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# **i.MX51 SDK Windows Embedded CE 6.0 Multimedia Framework User's Guide**

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<b>About This Book .....</b>	<b>v</b>
Audience .....	v
Organization.....	v
Conventions .....	vi
References.....	vi
Revision History .....	vi
 <b>Chapter 1 SDK Installation .....</b>	 <b>1</b>
1.1 Installation the BSP.....	1
1.2 Install the SDK.....	2
1.2.1 Check the Installation.....	5
1.2.1.1 Check the SDK folder in BSP Code Tree.....	5
1.2.1.2 Check BSP modification performed by the Installer .....	6
1.2.1.3 Check workspace modification performed by the Installer .....	6
1.2.2 Remove an Existing Installed SDK .....	6
 <b>Chapter 2 Build OS Images .....</b>	 <b>8</b>
2.1 Working with Multimedia Components .....	8
2.1.1 Components in the catalog.....	8
2.1.1.1 Importing the Windows Embedded CE 6.0 Catalog.....	8
2.1.2 Add/Remove components from Catalog.....	9
2.2 Build OS Images .....	9
2.2.1 Build image in platform builder.....	9
2.2.2 Build image in command line .....	10
2.3 Build multimedia components in sample workspace.....	10
2.3.1 Build all of the components simultaneously .....	10
2.3.2 Build individual components .....	10
 <b>Chapter 3 Using the Test Procedure .....</b>	 <b>11</b>
3.1 Audio Decoder Test .....	11
3.2 Video Decoder Test .....	11
3.3 Image Decoder Test .....	11
3.4 MP3 Encoder Test.....	12

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3.5	WMA8 Encoder Test .....	12
3.6	PEQ Audio Post-processing Test.....	14
3.7	VPU Encoder Test .....	16
3.8	Digital Audio Recorder Test .....	17
3.9	Digital A/V Recorder for AVI Test .....	17
3.10	Hardware Video De-interlace Enable/Disable .....	19
3.11	G.711 Encoder/Decoder Test.....	20
3.12	G.723.1 Encoder/Decoder Test.....	20
3.13	G.726 Encoder/Decoder Test.....	21
3.14	G.729AB Encoder/Decoder Test .....	23
3.15	NB_AMR Encoder/Decoder Test .....	23
3.16	WB_AMR Encoder/Decoder Test .....	25

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## About This Book

This guide explains how to install, build and execute Windows® Embedded CE™ 6.0 OS images for the Babbage board, using the Freescale i.MX51 EVK 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      "[SDK Installation](#)" explains how to install/uninstall the SDK.
- Chapter 2      "[Build OS Images](#)" explains how to build Windows CE OS images using the BSP.
- Chapter 3      "[Test Procedure](#)" explains how to test multimedia component you installed.

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## 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.

All source code examples are in C.

## References

The following documents were referenced to build this document.

1. i.MX51 EVK Windows Embedded CE 6.0 User's Guide

## Revision History

The following table summarizes revisions to this manual since the previous release (Rev. 1.7).

**Table 1 Revision History**

Doc. Version	Date / Author	Description / Location of Changes
1.1-D01	12-15-2008 / Guoyin Chen	Update doc with FSL standard document template
1.2	02-16-2009 / Jun Zhu (R01007)	Mini modifications on current document
1.4	07-15-2009 / Jun Zhu (R01007)	Mini modifications for SDK1.6 release
1.7	12-16-2009 / Jun Zhu (R01007)	Mini modifications for SDK1.7 release
2.0	01-06-2011 / Jun Zhu (R01007)	Mini modifications for SS1012 release

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# Chapter 1

## SDK Installation

The Freescale Multimedia Framework Software Develop Kit (SDK) is a collection of binary, code, and support files that you can use to create Windows CE OS images for the i.MX51 Babbage board. The SDK is distributed as a single archive EXE (.exe) file.

### 1.1 Installation the BSP

To install the BSP, use these steps:

1. Confirm that the BSP version for EVK.
2. Follow the steps in the Chapter 1 of *i.MX51 EVK Windows Embedded CE 6.0 User's Guide*.

## 1.2 Install 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.

As some codecs such as AAC Plus and Microsoft WMA are separate packages, they should be installed after the SDK is installed.

1. Run the installation execution package.

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

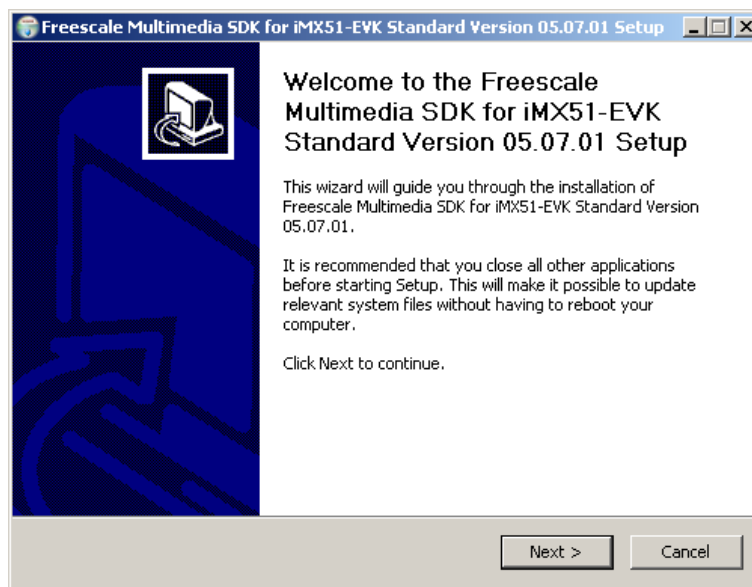
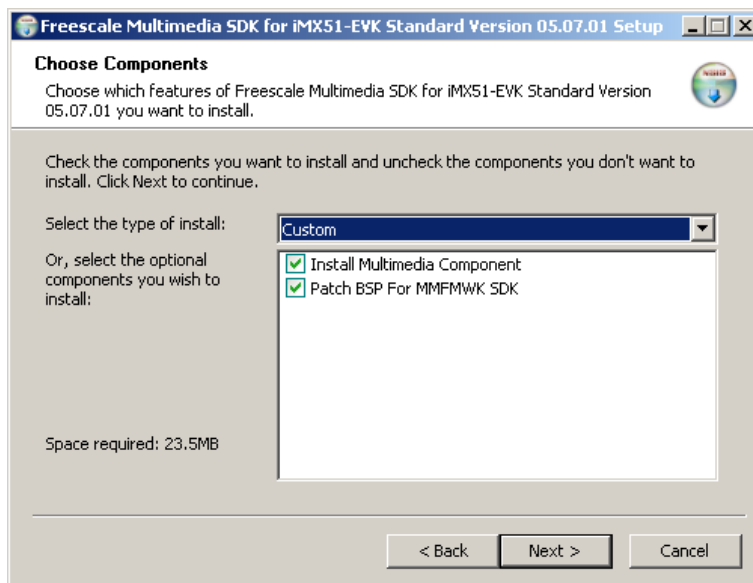


Figure 1-1 Setup Screen

2. Click **Next**.

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

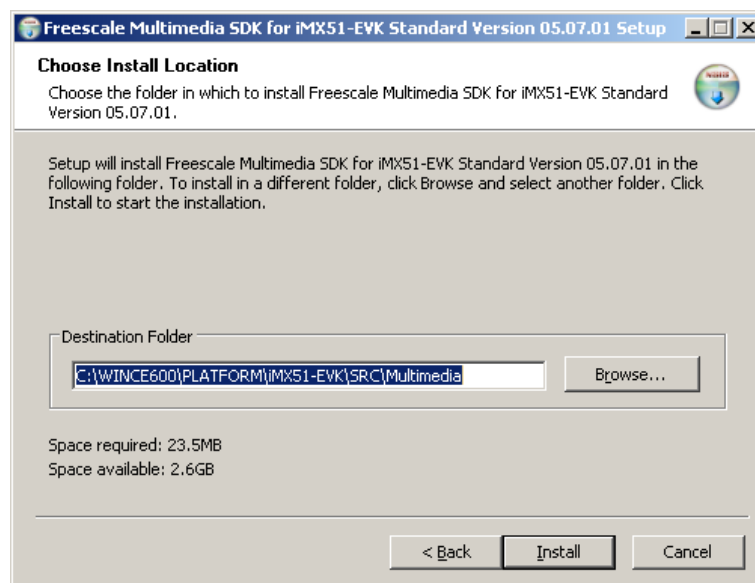




**Figure 1-2 Component Choosing Screen**

3. Click **Next**.

The installation location screen is displayed (Figure 1-3).



**Figure 1-3 Install Location Choosing Screen**

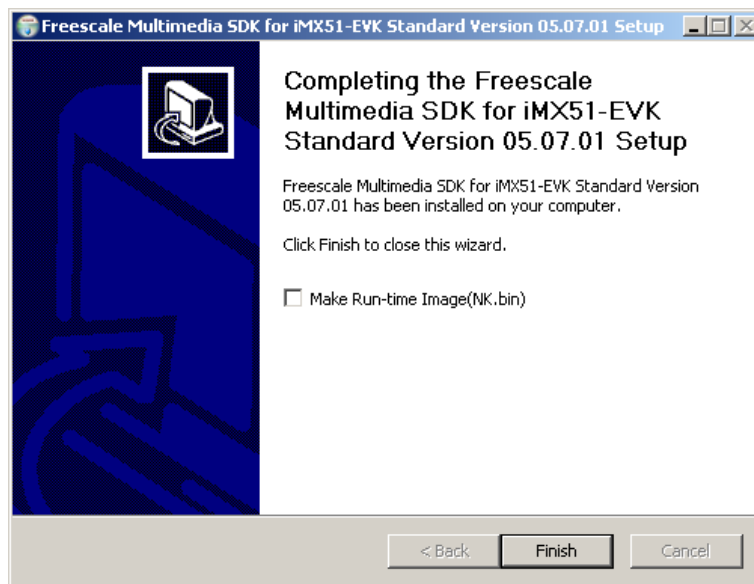
4. Under the Destination Folder, set the path of destination folder for SDK installation. By default, multimedia framework SDK will be installed at the following path:

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

Where:

- `$(_WINCEROOT)` is the path of your Windows CE root folder – “WINCE600”

- **<platform\_name>** is the name of the Babbage platform BSP directory –“iMX51-EVK-PDK1\_7” for i.MX51 Babbage WinCE 6.0 BSP
5. Continue with the installation wizard until the installation is complete.
  6. 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 Setup Complete Screen**

7. After SDK is installed, AAC Plus and Microsoft codec packages can be installed one by one.

## 1.2.1 Check the Installation

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

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

### 1.2.1.1 Check the SDK folder in BSP Code Tree

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

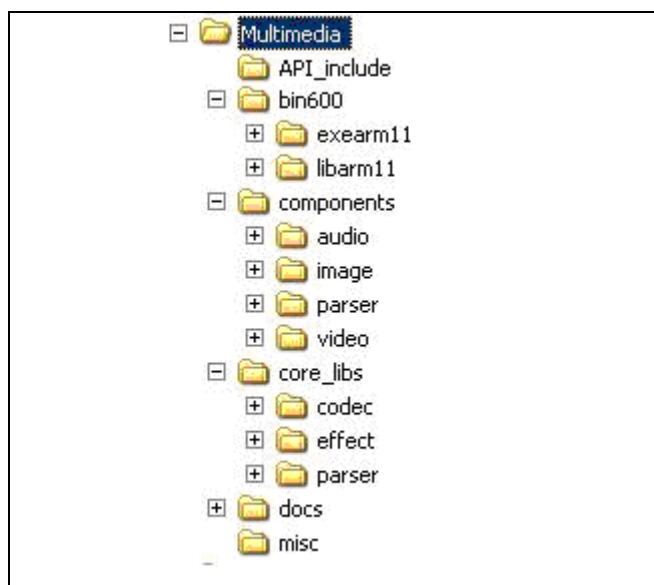


Figure 1-5 SDK Code Tree Screen

Table 2 SDK Code Tree Folder Content

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 DirectShow DMO and Filters' source code of multimedia components.
core_libs	This folder contains header files and lib 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
Bin600	This folder contains DLL and EXE binaries, which are built by the components' source code

### 1.2.1.2 Check BSP modification performed by the Installer

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

To check the BSP modifications, use these steps:

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

```
#include "$(_TARGETPLATROOT)\src\Multimedia\misc\fs1mm_mx51.reg"
```

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

```
#include "$(_TARGETPLATROOT)\src\Multimedia\misc\fs1mm_mx51.bib"
```

### 1.2.1.3 Check workspace modification performed by the Installer

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

To check the workspace, use these steps:

1. In Platform Builder IDE, select menu **Project -> iMX51-EVK-Mobility-PDK1\_7 Properties -> Configuration Properties -> Environment**, check the variables were added, as indicated
  - Added – variable **TGTARM** has been set to **arm12**
  - Added – variable **BSP\_WATERMARK** has been set to **1**
2. In **Catalog Items** 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 Formats -> MPEG-1 Parser/Splitter**
  - Added - the component **Core OS -> CEBASE -> Graphics and Multimedia Technologies -> Media -> Media Formats -> 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 Remove 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

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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 the SDK, 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 renaming SDK files and directories -  
`$(_WINCEROOT)\Platform\<platform_name>\src\Multimedia`

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## Chapter 2

### Build OS Images

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

#### 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 Components in the catalog

After the SDK has been installed, you can find the multimedia components in the window Catalog.

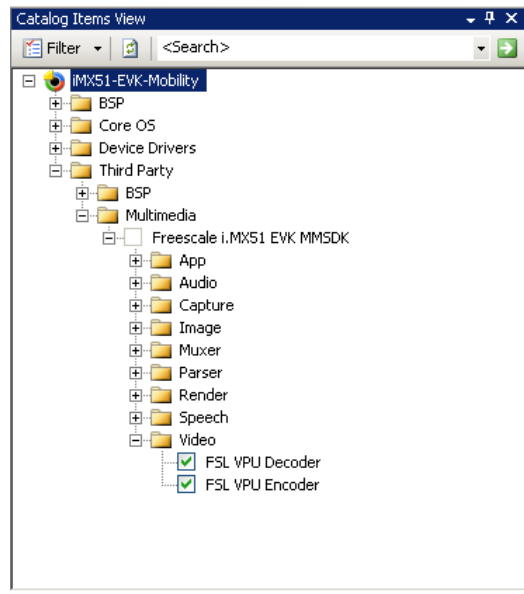
###### 2.1.1.1 Importing the Windows Embedded CE 6.0 Catalog

For Windows Embedded CE 6.0, the multimedia SDK catalog is automatically imported when the sample workspace is opened.

To view the catalog, use these steps:

1. Click **View -> Other Windows -> Catalog items view**

The Catalog Items View dialog is displayed (Figure 2-1).



**Figure 2-1 SDK Catalog View**

2. To view the multimedia components, open **Third Party -> Multimedia -> Freescape i.MX51 EVK MMSDK**

If can not find these components in catalog items view, it need exit and restart the Platform Builder to make multimedia catalog imported completely.

## 2.1.2 Add/Remove components from Catalog

To add/remove components from the catalog, use these steps:

1. Click **View > Other Windows > Catalog Items View**.
2. To view the multimedia components, open **Third Party > Multimedia > Freescape i.MX51 EVK MMSDK**.
3. To add/remove a multimedia component, just select/unselect the associated check box.

## 2.2 Build OS Images

This section explains how to build Windows CE OS image included multimedia components in the sample workspace.

### 2.2.1 Build image in platform builder

For instructions for building OS images using Platform Builder, see the *i.MX51EVK Windows Embedded CE 6.0 User's Guide*.

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## 2.2.2 Build image in command line

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

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

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

## 2.3 Build multimedia components in sample workspace

This section explains how to build/rebuild installed multimedia components after the SDK upgrading or the modification on multimedia components' source code

### 2.3.1 Build all of the components simultaneously

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

1. In the project window, open the **Multimedia** project in the folder **Platform -> iMX51-EVK-PDK1\_7 -> SRC**
2. Right click on the **Multimedia** project and select **Rebuild**.

This builds all of DLL and EXE binaries in **bin600** directories under the **Multimedia** folder in BSP code tree.

### 2.3.2 Build individual components

To build the individual component, 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 select **Rebuild**,

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



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## Chapter 3

### Using the Test Procedure

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

#### 3.1 Audio Decoder Test

To perform these tests, use Windows CE Media Player to playback the audio files.

#### 3.2 Video Decoder Test

To perform these tests, use Windows CE Media Player to playback the video files.

#### 3.3 Image Decoder Test

To test image decoders, use test application 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
- \*.png for PNG decoder
- \*.jpg for JPEG decoder

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

**Table 3 Command for Image Display**

Image Type	Command
<b>BMP</b>	fsl_bmp_img_lib_test.exe <image_file_name>
<b>GIF</b>	fsl_gif_img_lib_test.exe <image_file_name>
<b>PNG</b>	fsl_png_img_lib_test.exe <image_file_name>

JPEG	fsl_jpeg_img_lib_test.exe <image_file_name>
------	---

## 3.4 MP3 Encoder Test

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

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

**fsl\_mp3\_enc\_dmo\_test.exe <input file> <output file> <Encoder Configuration>**

The parameter **<Encoder Configuration>** is optional, and describes as follows:

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

**Table 4 MP3 Encoder Configuration**

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

## 3.5 WMA8 Encoder Test

Test Application for WMA8 audio encoder is built into the WinCE OS image, when the encoder component is added from Catalog during the image build procedure.

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

**fsl\_wma8\_enc\_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> <DISCRIPTION>] [<-T> <TITLE>]**

The meaning for each parameter is as follow:

**Table 5 WMA8 Encoder Configuration**

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

The following table (Table 6) describes the valid configuration combination for WMA8 Encoder.

**Table 6 WMA8 Encoder's Valid Configuration Combination**

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

Refer to the following command line for information.

**fsl\_wma8\_enc\_test.exe pcm.wav output.wma -b 128000 -d “Freescale test music”**

## 3.6 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

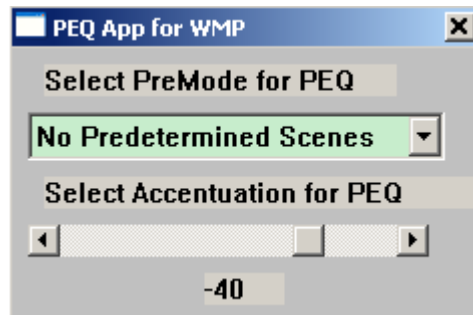
Before using WMP to playback the audio files, make sure that test application for PEQ is running. Otherwise, PEQ audio post-processing will not function.

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 application window will pop up (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. Pre-defined profiles are defined as Table 6.

**Table 7** PEQ Profiles

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.

## 3.7 VPU Encoder Test

The package contains the Test Bench for VPU Encoder filter, which supports encode the raw IYUV (YUV420p) format data file into H.264/MPEG4/H.263/MJPEG bit stream and store them into AVI container. So tester can check the encode result easily by playback the output AVI file.

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

***fsl\_vpu\_enc\_dshow\_testbench.exe <input file> <output file> <Encoder Configuration>***

The parameters **<Encoder Configuration>** describes as Table 8.

**Table 8 VPU Encoder Configuration**

Arguments	Description
<b>&lt;width&gt;</b>	Frame width about the input YUV file
<b>&lt;height&gt;</b>	Frame height about the input YUV file
<b>&lt;bitrate in kbps&gt;</b>	Output bitrate, bit/second in Unit Up to 8 Mbps
<b>&lt;target frame rate&gt;</b>	Output frame rate, frame/second in Unit Up to 30 fps
<b>&lt;ENCODETYPE&gt;</b>	Output bitstream format. It should be one of the value below: <ul style="list-style-type: none"><li>• H264</li><li>• MPEG4</li><li>• H263</li><li>• MJPG</li></ul>
<b>&lt;key frame interval&gt;</b>	Key frame duration for output bitstream

### NOTE

In order to keep the reasonable quality, MJPEG compression ratio should be smaller than 20. The compression ratio can be calculated by formula below:

$$compress\_ratio = (width * height * frame\ rate * 12) / bit\ rate$$

Refer to the following command line for information.

**fsl\_vpu\_enc\_dshow\_testbench.exe 480\_320.yuv output.avi 480 320 800 30 H264 30**

## 3.8 Digital Audio Recorder Test

Audio recording test bench uses MSFT's Audio Capture Filter to capture the PCM raw data from Audio Line-In Port and encodes them into MP3 by FSL's MP3 Encoder DMO.

### NOTE

Digital Audio Recorder test application may not run successful, if the component "FSL MP3 Encoder" is not selected in the catalog before the WinCE OS Image building.

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

**fsl\_dar\_app.exe <Time in sec> <Output file> <Sample Rate> <BitRate>**

The following table describes the arguments:

**Table 9 Digital Audio Recorder Arguments**

Arguments	Description
<Time in sec>	Duration for audio capture, second in Unit.
<Output file >	The name of output mp3 file
<Sample Rate >	Sample rate for Audio Line-In, sample/second in Unit The available values can be 32000, 44100, 48000
<BitRate>	Bit rate for the encoded mp3 bit stream, bit/second in Unit. The available values can be 32000, 40000, 48000, 56000, 64000, 80000, 96000, 112000, 128000, 160000, 192000, 224000, 256000, 320000

Refer to the following command line for information.

**fsl\_dar\_app.exe 10 output.mp3 44100 32000**

## 3.9 Digital A/V Recorder for AVI Test

A/V Recorder for AVI Test bench uses MSFT's Audio Capture Filter and FSL Video Capture Filter to capture raw audio data from Line In and raw video data from Camera, then encode the audio and the video to one AVI file with mp3 audio format and h264, mp4v or h263 video format.

### NOTE

A/V Recorder for AVI Test application may not run successful, if the component “FSL MP3 Encoder”, “FSL Video Capture”, FSL VPU Encoder”, “FSL AVI Muxer” and “FSL File Writer” are not selected in the catalog before the WinCE OS Image building.

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

**fsl\_avi\_mux\_test.exe -av <Time in Sec> <Output File> <Sample Rate> <Audio BitRate> <Width> <Height> <Frame Rate> <Key Frame Rate> <Video BitRate> <Video Encoder Type>**

The following table describes the arguments:

**Table 10 Digital A/V Recorder Arguments**

Arguments	Description
<Time in Sec>	Duration for audio/video capture, second in Unit.
<Output File >	The name of output avi file
<Sample Rate >	Sample rate for Audio Line-In, sample/second in Unit The available values can be 32000, 44100, 48000
<Audio BitRate>	Bit rate for the encoded mp3 bit stream, bit/second in Unit. The available values can be 32000, 40000, 48000, 56000, 64000, 80000, 96000, 112000, 128000, 160000, 192000, 224000, 256000, 320000
<Width> <Height>	Width and height for camera capturing window. The available values can be: <ul style="list-style-type: none"> <li>• Width = 160, Height = 120(QQVGA)</li> <li>• Width = 176, Height = 144(QCIF)</li> <li>• Width = 320, Height = 240(QVGA)</li> <li>• Width = 352, Height = 288(CIF)</li> <li>• Width = 640, Height = 480(VGA)</li> <li>• Width = 720, Height = 480(NTSC D1)</li> <li>• Width = 720, Height = 576(PAL D1)</li> </ul>
<Frame Rate>	Frame rate for video camera capturing. The only available value should be 15
<Key Frame Rate>	Key frame rate for video encoder setting. The available value should be in the range [2, 256]
<Video BitRate>	Bit rate for the encoded video bit stream, kilo bits per second in Unit. The available value should be in the range [64, 4096]



<Video Encoder Type>	Output video bitstream format. It should be one of the value below: <ul style="list-style-type: none"> <li>• 0 -- H264</li> <li>• 1 -- MPEG4</li> <li>• 2 -- H263</li> <li>• 3 -- MJPG</li> </ul>
----------------------	--

Refer to the following command line for information:

```
fsl_avi_mux_test.exe -av 10 av_mp3_44100hz_32kbps_h264_qcif_512kbps.avi 44100 32000
176 144 15 20 512 0
```

## 3.10 Hardware Video De-interlace Enable/Disable

The hardware Video De-interlace can be enabled or disabled using the registry key before playback the video stream.

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

where:

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

In default, the hardware video de-interlace module is in disable mode. A configuration application is provided to enable/disable the VDI module.

To use configuration application for VDI, follow these steps:

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

***fsl\_vdi\_config.exe***

Then the application window will pop up (Figure 3-2)



**Figure 3-2 VDI Enable/Disable**

2. And then select **Video De-interlace State** to enable or disable the DVI module.

## 3.11 G.711 Encoder/Decoder Test

G.711 encoder test application is built into the Windows CE OS image when the G.711 codec component is added from Catalog during the image build procedure.

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

**fsl\_g711\_enc\_test.exe <Options> <InFile> <OutFile>**

The following table describes the arguments:

**Table 11 G.711 Encoder Configuration**

Arguments	Description
Options	<ul style="list-style-type: none"><li>• A      A-law</li><li>• M      Mu-law</li><li>• A2M    convert A-law to Mu-law</li><li>• M2A    convert Mu-law to A-law</li></ul>
InFile	Name of the input file
OutFile	Name of the output file

G.711 decoder test application is built into the Windows CE OS image when the G.711 codec component is added from Catalog during the image build procedure.

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

**fsl\_g711\_dec\_test.exe <Options> <InFile> <OutFile>**

The following table describes the arguments:

**Table 12 G.711 Decoder Configuration**

Arguments	Description
Options	<ul style="list-style-type: none"><li>• A      A-law</li><li>• M      Mu-law</li></ul>
InFile	Name of the input file
OutFile	Name of the output file

## 3.12 G.723.1 Encoder/Decoder Test

G.723.1 encoder test application is built into the Windows CE OS image when the G.723.1 codec component is added from Catalog during the image build procedure.

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

**fsl\_g723\_enc\_test.exe [-Options] <InFile> <OutFile>**

The following table describes the arguments:

**Table 13 G.723.1 Encoder Configuration**

Arguments	Description
<b>Options</b>	<ul style="list-style-type: none"><li>• -DTX for DTX test vector</li><li>• - Noh Enable/Disable Hp Filter</li><li>• -rate # bit-rate (in kbit/s): 63 for 6.3 kbit/s and 53 for 5.3 kbit/s</li><li>• -?/-help print help message</li></ul>
<b>InFile</b>	Name of the input file
<b>OutFile</b>	Name of the output file

G.723.1 decoder test application is built into the Windows CE OS image when the G.723.1 codec component is added from Catalog during the image build procedure.

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

**fsl\_g723\_dec\_test.exe [-Options] <InFile> <OutFile>**

The following table describes the arguments:

**Table 14 G.723.1 Decoder Configuration**

Arguments	Description
<b>Options</b>	<ul style="list-style-type: none"><li>• - Nop Enable/Disable Hp Filter</li><li>• -?/-help print help message</li><li>• -f &lt;file&gt; Use file as CRC file</li></ul>
<b>InFile</b>	Name of the input file
<b>OutFile</b>	Name of the output file

### 3.13 G.726 Encoder/Decoder Test

G.726 encoder test application is built into the Windows CE OS image when the G.726 codec component is added from Catalog during the image build procedure.

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

**fsl\_g726\_enc\_test.exe [-Options] <InFile> <OutFile>**

The following table describes the arguments:

**Table 15 G.726 Encoder Configuration**

Arguments	Description
<b>Options</b>	<div>-law &lt;a u l&gt;      The letters A or a for G.711 A-law, letter u for G.711 m-law, or letter l for linear. Default is A-law.</div> <div>-rate #            the bit-rate (in kbit/s): 40, 32, 24 or 16. Default is 32 kbit/s.</div> <div>-homing &lt;InitFile&gt;    The file contains initialization (homing) sequence to drive the Encoder to a known initial state. Default is no init file and the Codec is in reset state.</div> <div>-?/-help            print help message</div>
<b>InFile</b>	Name of the input file
<b>OutFile</b>	Name of the output file

G.726 decoder test application is built into the Windows CE OS image when the G.726 codec component is added from Catalog during the image build procedure.

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

**fsl\_g726\_dec\_test.exe [-Options] <InFile> <OutFile>**

The following table describes the arguments:

**Table 16 G.726 Decoder Configuration**

Arguments	Description
<b>Options</b>	<div>-law &lt;a u l&gt;      The letters A or a for G.711 A-law, letter u for G.711 m-law, or letter l for linear. Default is A-law.</div> <div>-rate #            the bit-rate (in kbit/s): 40, 32, 24 or 16. Default is 32 kbit/s.</div> <div>-homing &lt;InitFile&gt;    The file contains initialization (homing) sequence to drive the Encoder to a known initial state. Default is no init file and the Codec is in reset state.</div> <div>-?/-help            print help message</div>
<b>InFile</b>	Name of the input file
<b>OutFile</b>	Name of the output file

### 3.14 G.729AB Encoder/Decoder Test

G.729AB encoder test application is built into the Windows CE OS image when the G.729AB codec component is added from Catalog during the image build procedure.

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

**fsl\_g729ab\_enc\_test.exe <InFile> <OutFile> <VAD\_flag>**

The following table describes the arguments:

**Table 17 g.729ab Encoder Configuration**

Arguments	Description
InFile	Name of the input file
OutFile	Name of the output file
VAD_flag	0: disable VAD, 1: enable VAD.

G.729AB decoder test application is built into the Windows CE OS image when the G.729AB codec component is added from Catalog during the image build procedure.

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

**fsl\_g729ab\_dec\_test.exe <InFile> <OutFile>**

The following table describes the arguments:

**Table 18 G.729ab Decoder Configuration**

Arguments	Description
InFile	Name of the input file
OutFile	Name of the output file

### 3.15 NB\_AMR Encoder/Decoder Test

NB\_AMR encoder test application is built into the Windows CE OS image when the NB\_AMR codec component is added from Catalog during the image build procedure.

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

**fsl\_nb\_amr\_enc\_test.exe [-dtx|dtx2] [-bitstreamformat] [-numframetoencode] <amr\_mode> <speech\_file> <bitstream\_file>**

The following table describes the arguments:

**Table 19 NB\_AMR Encoder Configuration**

Arguments	Description
<b>-dtx</b>	enables DTX or DTX2 mode
<b>-bitstreamformat</b>	File format, etsi, if1, if2 or mms, default is etsi
<b>-numframetoencode</b>	Number of frame to encode should be between 1 and 255
<b>amr_mode</b>	Specify the bit rate, it should be MR122, MR102, MR795, MR74, MR67, MR59, MR 515, MR475 or -modefile = mode_file(this will read AMR modes from text file)
<b>speech_file</b>	Name of the input file
<b>bitstream_file</b>	Name of the output file

Refer to the following command line for information.

```
fsl_nb_amr_enc_test.exe -dtx1 -if2 -numframe=1 MR122 \release\input\dtx1\DTX1.INP  
\release\output\if2\DTX1_MR122.COD
```

```
fsl_nb_amr_enc_test.exe -dtx1 -if2 -numframe=1 -modefile=\release\input\dtx1\allmodes.txt  
\release\input\dtx1\SPEECH.INP \release\output\if2\SPEECH_VAD1.COD
```

NB\_AMR decoder test application is built into the Windows CE OS image when the NB\_AMR codec component is added from Catalog during the image build procedure.

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

```
fsl_nb_amr_dec_test.exe [-bitstreamformat] [-numframetodecode] <encoded_file>  
<output_file>
```

The following table describes the arguments:

**Table 20 NB\_AMR Decoder Configuration**

Arguments	Description
<b>-bitstreamformat</b>	Specify input file format, etsi, if1, if2 or mms, default is etsi
<b>-numframetodecode</b>	Number of frame to decode per time, default value is 1
<b>encoded_file</b>	Name of the input file
<b>output_file</b>	Name of the output file

Refer to the following command line for information.

```
fsl_nb_amr_dec_test.exe -if2 -numframe=1  
\release\input\if2_ref_vectors\no_dtx\t_mode\T21.COD \release\output\if2\T21.OUT
```

## 3.16 WB\_AMR Encoder/Decoder Test

WB\_AMR encoder test application is built into the Windows CE OS image when the WB\_AMR codec component is added from Catalog during the image build procedure.

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

**fsl\_wb\_amr\_enc\_test.exe [-dtx] [-bitstreamformat] < mode> <speech\_file> <bitstream\_file>**

The following table describes the arguments:

**Table 21 WB\_AMR Encoder Configuration**

Arguments	Description
<b>-dtx</b>	-dtx if DTX is ON, default is OFF
<b>-bitstreamformat</b>	include: -itu   -mime   -if1   -if2, default is -itu
<b>mode</b>	Specify the bit rate, it should be 0,1,2,3,4,5,6,7,8. "mode : (0) (1) (2) (3) (4) (5) (6) (7) (8) " "bitrate: 6.60 8.85 12.65 14.25 15.85 18.25 19.85 23.05 23.85kbit/s "
<b>speech_file</b>	Name of the input file
<b>bitstream_file</b>	Name of the output file

Refer to the following command line for information.

**fsl\_wb\_amr\_enc\_test 0 release/wb\_amr/input/T\_inp/T00.inp  
release/wb\_amr/output/T00\_660.cod**

**fsl\_wb\_amr\_enc\_test -dtx 0 release/wb\_amr/input/DTX\_test\_vectors/T\_inp/Dtx3.inp  
release/wb\_amr/output/Dtx3\_660.cod**

WB\_AMR decoder test application is built into the Windows CE OS image when the WB\_AMR codec component is added from Catalog during the image build procedure.

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

**fsl\_wb\_amr\_dec\_test.exe [-bitstreamformat] <encoded\_file> <output\_file>**

The following table describes the arguments:

**Table 22 WB\_AMR Decoder Configuration**

Arguments	Description
<b>-bitstreamformat</b>	specify output file format include: -itu   -mime   -if1   -if2, default is -itu
<b>encoded_file</b>	Name of the input file

---

<b>output_file</b>	Name of the output file
--------------------	-------------------------

Refer to the following command line for information.

```
fsl_wb_amr_dec_test.exe release/wb_amr/input/T_660/T00_660.cod  
release/wb_amr/output/T00_660.out
```