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MX27 VPU Encoder WinCE Release Notes

ABSTRACT:

Release Notes for i.MX27 VPU Encoder

KEYWORDS:

Multimedia codecs, H264, MPEG4, DirectShow, MX27

Revision History

VERSION	DATE	AUTHOR	CHANGE DESCRIPTION
0.1	29-Nov-2007	Muralidhar	Initial Draft
1.0	12-Dec-2007	Lauren Post	Modifications based on new template
1.1	21-Jan-2008	Lauren Post	Updates based on CPO feedback
1.2	04-Feb-2008	Lauren Post	Updates for WinCE 6.0
1.3	14-Feb-2008	Lauren Post	Updates for WinCE 6.0
1.4	28-Feb-2008	Atif Saeed	Fix typos and grammatical errors, update input parameters, updates specific to WinCE6.0

Table of Contents

1 Introduction

1.1 Purpose

The purpose of this document is to provide information on the package contents, instructions on building the library and test applications and the test execution process for the MX27ADS on the WinCE operating system.

1.2 Scope

The scope is restricted to information on the package contents and instructions for building and testing. This document does not provide any details about the architecture or APIs in the Encoder.

1.3 Audience Description

The reader is expected to have basic understanding of video signal processing, H.264 encoding, MPEG4 encoding and MS DirectShow Framework.

1.4 References

1.4.1 Standards

1.4.2 Freescale Multimedia References

- VPU API Specification Document – c&m-tristanex-api_reference_manual_v1.3.0.doc
- VPU Data Sheet – mx27_vpu_datasheet.pdf
- VPU Encoder Release Notes– mx27_vpu_enc_release_notes.pdf

1.5 Definitions, Acronyms, and Abbreviations

TERM\ACRONYM	DEFINITION
API	Application Programming Interface
AVC	Advanced Video Coding
FSL	Freescale
ISO	International Standards Organization
ITU	International Telecommunication Union
MPEG	Moving Pictures Expert Group
VPU	Video Processing Unit
DSHOW	Direct Show

1.6 Document Location

docs\mx27_vpu_enc

2 Release History

RELEASE NUMBER	DELIVERABLES	FEATURES

1.0	• Documentation
	• Application Interface header file
	• Encoder filter with sources and test application
	• Registry
		• Beta version of the Filter supporting the following
		   i. H264 Baseline Encoder
		   ii. MPEG4 Simple Profile Encoder

1.1	• Same	• Documentation changes
1.2	• Same	• WinCE 6.0 support
1.3	• Same	• Fixes and cleanup
1.4	• Same	• Fixes and cleanup • Performance logging • Input parameter changes to test application • Documentation updates
1.5	• Same	• Source filter accepts camera as an input source

Table 1. Details of the release

2.1 Assumptions and Known Problems

- This filter supports H.264, MPEG4 and H.263 encoding only
- The filter has a dependency on the VPU driver and its APIs
- Filter works only on WinCE 6.0
- Test bench application requires the Freescale source filter which is provided in a separate package.

2.2 Support

If you have any questions or problems concerning this release, please contact a Freescale representative. Please include the release version, the board version, the BSP version and any other relevant information.

3 List of Deliverables

3.1 Documentation

Base directory: \fsl_mm_wince\Multimedia\

Subdirectory	Files
docs\mx27vpu_enc	mx27_vpu_enc_release_notes.pdf mx27_vpu_datasheet.pdf

3.2 Public Headers

Base directory: \fsl_mm_wince\Multimedia\

Subdirectory	File
API_include	FSLGuids.h

3.3 Binaries

Base directory: \fsl_mm_wince\Multimedia\

Subdirectory	File
bin500\libarm9\ARMV4I\retail	VPU Encoder filter – mx27_vpu_enc_dshow.dll
bin500\exearm9\ARMV4I\retail	Test Bench executable

3.4 DSHOW Source

Base directory: \fsl_mm_wince\Multimedia\components\video

Subdirectory	Files
mx27_vpu_enc_dshow_6.0	PB Project file
mx27_vpu_enc_dshow_6.0\dshow_filter	VPU dshow *dirs* file , encoder source and header files
mx27_vpu_enc_dshow_6.0\dshow_test\	VPU Dshow *dirs* file, test bench application header and source files

3.5 Registry

Base directory: \fsl_mm_wince\Multimedia\misc

Subdirectory	Files
misc	fslmm_mx27.reg for MX27 platforms

4 Software Setup & Tools

- Build machine should be running Microsoft WinXP
- Build machine should have following installed
    - Microsoft Windows CE 6.0
    - WinCE BSP F14
- i.MX27 ADS board should be running Freescale WinCE BSP F14. The BSP must be built with VPU drivers.

  Location of VPU driver in Catalog:

  - Third Party->BSPs->Freescale MX27 ADS: ARMV4I ->Device Drivers->Video
  Processing Unit

  Note: If the Third Party is not visible then,
    - Go to File -> Manage Catalog Items
    - Click on Import…
    - Choose mx27ads.cec

5 Build Procedure

The VPU Encoder project can be loaded into Visual Studio 2005 is available as a *dirs* projects with the directory structure mentioned above. The details of the projects are given below.

- mx27_vpu_enc_dshow_6.0 - This contains the DirectShow filter and the test bench application.

Steps to insert projects into Visual Studio workspace:

- Copy the directory 'Multimedia' to the MX27ADS workspace.
- Right click on projects in the MX27ADS BSP Solution Explorer, select the option 'Add Existing Subproject….'.
- Select the option 'Sources\Dirs Files (sources;dirs)' in dropdown menu for "Files Of Type".
- Open the "dirs" file in the folder ...\Multimedia\components\video\ mx27_vpu_enc_dshow_6.0\ (PB will automatically create the mx27_vpu_enc_dshow_6.0.pbpxml).

Steps to build the DirectShow filter:

1. Right click on dshow_filter icon in Visual Studio workspace under the mx27_vpu_enc folder
2. Select "Build"

This builds the DirectShow (mx27_vpu_enc_dshow.dll) filter and the test bench (mx27_vpu_enc_dshow_testbench.exe) respectively in ...\Multimedia\bin\lib\ARMV4I\Retail\   and \Multimedia\bin\exe\ARMV4I\Retail\ in the same order.

6 Test Application Execution

The package contains the test applications for
- Testing VPU Encoder DirectShow filter

6.1 Test Bench for Encoder DSHOW filter

The VPU Encoder DirectShow filter and the FSL Source Filter need to be registered before using the test bench.   The utility for registering the dll is **regsvr32.exe** (for details regarding its build procedure refer to appendix)

Command for registering:

> *regsvr32.exe mx27_vpu_enc_dshow.dll*

> *regsvr32.exe fsl_source_filter..dll*

Command for executing the test bench:

For encoding:

> *mx27_vpu_enc_dshow_testbench.exe* `<INPUT> <OUTPUT> <width> <height>`
> `<bitrate in kbps> <target frame rate> <ENCODETYPE>, <key frame rate>`

> `<INPUT> = <input folder name with y, cb & cr DIRECTORIES> or <raw`
> `(yuv) input file> or <CAMERA>`

> `<OUTPUT> = <output file name> or <output folder name>`

> `<CAMERA> = camera:<TIME>`

> `<TIME> = camera timeout in seconds`

> `<ENCODETYPE> = H264 or MPEG4 or H263`

NOTE:

The <INPUT> here can be a folder containing subfolders – y, cb, cr, a yuv input file or the camera. The source filter needs to be built with the respective #define to enable the folder or the single file option. The <bit rate> is in kbps and the <frame rate> is in milliseconds.

7 Updating Registry

Following are the steps to update the registry settings in the registry:

- Copy the fslmm_mx27.reg to a location on your hard disk

- Locate platform.reg in the list of parameter files in the BSP

- Add the path of fslmm_mx27.reg as below in the platform.reg file

  #include "<Path of file>\fslmm_mx27.reg"

- Select Build OS->Sysgen to build the BSP

The image built will have all the necessary registry settings for the Filter

8 Pre compilation Options

8.1 DSHOW Filter Options

The following C options need to be set

C Defines	Purpose	Remarks
PERFORMANCE	To measure the performance	When defined, this measures the total time taken for encoding the file. Two output files are generated which can be imported into an excel sheet for performance analysis.
VPU_ALLOCATOR_INTERFACE	Encoder Optimization	When defined, the filter avoids memcpy of the data on the input side.

8.2 Test Bench Options

The following C options need to be set

C Defines	Purpose	Remarks
FILE_SINK	To enable dumping the output to a file as oppose to rendering it on the display.	Rendering the output to the display has not been tested thoroughly.
OUTPUT_FILE	When enabled identifies <OUTPUT> to be the output file name.	When not defined the output filename is "encfile".

8.3 Source Filter Options

The following C options need to be set

C Defines	Purpose	Remarks
SINGLE_FILE	Enables single yuv file input source or camera input	Disabling this define means that the input source is a directory containing folders for y, cb and cr data. Camera input is enabled only when this #define is set.

9 APPENDIX

9.1 Build Procedure for regsvr32 utility

- Open the MX27ADS BSP Workspace in Visual Studio 2005
- Click on the *Solution Explorer* tab
- The REGSVR project can be found in the following location:
  - *WINCE600 -> PUBLIC -> dcom -> sdk -> samples*
- Right click on *REGSVR* and select *Build*
- The file regsvr32.exe will be available in one of the following folders :
  - **% PBWORKSPACEROOT%\ RelDir\MX27_ARMV4I_Release** for the release version
  - **% PBWORKSPACEROOT %\RelDir\MX27_ARMV4I_Debug** for the debug version.