Codec Memory Management (CMM) User’s Manual (Linux)

S3C6400/6410
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REV 1.11
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# Revision History

<table>
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<tr>
<th>Revision No</th>
<th>Description of Change</th>
<th>Refer to</th>
<th>Author(s)</th>
<th>Date</th>
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<tr>
<td>1.00</td>
<td>Initial Version</td>
<td>-</td>
<td>Jiun Yu</td>
<td>2008-07-05</td>
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<tr>
<td>1.10</td>
<td>Node name is changed</td>
<td></td>
<td>Jiun Yu</td>
<td>2008-07-19</td>
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<tr>
<td>1.11</td>
<td>New ioctl’s command is added</td>
<td></td>
<td>Jiun Yu</td>
<td>2008-08-26</td>
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1 Introduction

1.1 Purpose
The purpose of the document is to describe the CMM API for easy portability into different platforms by developers.

1.2 Scope
The scope of this document is to describe
- Software architecture of CMM
- Usage of CMM API
- How to use CMM driver

1.3 Intended Audience

<table>
<thead>
<tr>
<th>Intended Audience</th>
<th>Tick whenever Applicable</th>
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<tbody>
<tr>
<td>Project Manager</td>
<td>Yes</td>
</tr>
<tr>
<td>Project Leader</td>
<td>Yes</td>
</tr>
<tr>
<td>Project Team Member</td>
<td>Yes</td>
</tr>
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<td>Test Engineer</td>
<td>Yes</td>
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1.4 Definitions, Acronyms, and Abbreviations

<table>
<thead>
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<th>Abbreviations</th>
<th>Description</th>
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<tbody>
<tr>
<td>CMM</td>
<td>Codec Memory Management</td>
</tr>
<tr>
<td>API</td>
<td>Application Program Interface</td>
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1.5 References

<table>
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<th>Number</th>
<th>Reference</th>
<th>Description</th>
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<tr>
<td>1</td>
<td>SMDK6400_WinCE6.0_FMD_PortingGuide.doc</td>
<td>OS porting guide</td>
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<tr>
<td>2</td>
<td>SMDK6400_WinCE6.0_VideoDriver_UserManual.doc</td>
<td>Video Driver specification</td>
</tr>
<tr>
<td>3</td>
<td>S3C6400_6410_Linux2.6.21_CMM_UserManual_REV1.00_20080705.doc</td>
<td>CMM v1.00 user's manual</td>
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</table>
2 Software Architecture

2.1 Overview

When multimedia player uses software decoder, performance problems are often issued. CMM (Codec Memory Management) driver helps to improve rendering performance.

In common multimedia players, decoded YUV data is transferred to video memory using memcpy(). It decreases much performance when the resolution of movie is large.

CMM Driver provides the interface to transfer decoded YUV data to video memory directly. At first, it allocates virtual address to the player. The virtual address is surely cacheable area. So, s/w decoder can utilize cache. After decoding, the player requests CMM to flush cached area. And then, the player requests physical address of YUV buffer to CMM. With the physical address, the player calls video driver API for rendering. YUV data is transferred to h/w post processor by DMA.

It does not only reduce memcpy() time, but also make player to decode and render at the same time. Because rendering is done by only h/w, decoding performance is not decreased. You should make decoding and rendering as multi-threaded.

There are two methods to render YUV data. The one is using local path between h/w post processor and LCD. It doesn’t possess data BUS. But local path only supports RGB888. The other is using DMA between post processor and LCD.

![Architecture of CMM API](image-url)
# 3 Package Guidelines

## 3.1 Directory Structure

<table>
<thead>
<tr>
<th>Directory</th>
<th>Files</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>/cmm_app/</td>
<td>*.c, *.h</td>
<td>CMM test file</td>
</tr>
<tr>
<td>/cmmDrv/</td>
<td>*.c, *.h</td>
<td>CMM Device Driver file</td>
</tr>
<tr>
<td>/doc</td>
<td>*.doc, *.pdf</td>
<td>CMM documents</td>
</tr>
</tbody>
</table>
4 How to Test CMM

4.1 Kernel Build
Before kernel compilation, you must setup memory layout below figure in “include/asm-arm/arch-s3c2410/reserved_mem.h” file

```c
/*
 * Default reserved memory size
 * MFC    : 6 MB
 * Post   : 8 MB
 * JPEG   : 8 MB
 * CM     : 8 MB
 * Camera : 15 MB
 * These sizes can be modified
 */

//define CONFIG_RESERVED_MEM_JPEG
//define CONFIG_RESERVED_MEM_JPEG_POST
//define CONFIG_RESERVED_MEM_MFC
//define CONFIG_RESERVED_MEM_MFC_POST
//define CONFIG_RESERVED_MEM_JPEG_MFC_POST
//define CONFIG_RESERVED_MEM_JPEG_MFC_CAMERA
//define CONFIG_RESERVED_MEM_MFC_CAMERA
//define CONFIG_RESERVED_MEM_MFC_POST_CAMERA
//define CONFIG_RESERVED_MEM_MCM_MFC_POST_CAMERA
#define CONFIG_RESERVED_MEM_MCM_MFC_POST_CAMERA
//define CONFIG_RESERVED_MEM_MCM_MFC_CAMERA
```

4.2 CMM driver module compilation
Node name : /dev/misc/s3c-cmm
Major number : 10
Minor number : 250
1. how to make device node

```
[root@localhost CMM]# mknod /dev/misc/s3c-cmm c 10 250
```

2. module compilation

```
[root@localhost cmm_drv]# make
```

4.3 Test application compilation

```
[root@localhost cmm_app] make
```

4.4 Insert module and execute binary in Target side
Below commands are executed in target side

```
[root@Samsung cmm_drv] insmod s3c_cmm.ko
[root@Samsung cmm_drv] cd ../cmm_app/
[root@Samsung cmm_app] ./cmm_test
```