*Use Case Guide*

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# DM814x Decoder Display - Use Case Guide

## ABSTRACT

This document explains the capabilities and limitations of the below use-cases of DVR-RDK

- Decoder Display Use-case

These use-cases are targeted for DM814x SoC from TI (would be ported to DM8107 in future)

# 1 Overview

## Use-case summary

A summary of the use-cases is given below

| Product | Description |
|---|---|
| Decoder Display demo (DM8148) | Decoder only<br>Dec: 12Ch D1 30fps |

## Target Applications

This use-case is targeted for the below applications

- Hybrid DVR
- NVR

This use-case is NOT targeted for

## Resolutions

| NTSC / PAL Resolutions | NTSC – 30fps | PAL – 25fps |
|---|---|---|
| D1 | 704x480 | 704x576 |
| VGA | 640x480 | 640x480 |
| 2CIF | 704x240 | 704x288 |
| CIF | 352x240 | 352x288 |
| QVGA | 320x240 | 320x240 |
| QCIF | 176x120 | 176x144 |

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| HD / VESA Resolutions | |
|---|---|
| 1080p | 1920x1080 30/60Hz |
| 720p | 1280x720 60Hz |
| SXGA | 1280x1024 60Hz |
| XGA | 1024x768 60Hz |

# 2 Features

| | | Decoder Display demo |
|---|---|---|
| **System** | | |
| DM8148 Part Number | | CE1 (DM8148-Mid)<br>Si Rev 2.1 |
| System Clocks | ARM | 720Mhz |
| | M3 | 240Mhz |
| | DSP | 750Mhz |
| | DDR | 480Mhz |
| | IVA-HD | 410Mhz |
| | HDVPSS | 200Mhz |
| Default U Boot config | | YES |
| DDR | | 512MB |
| Linux Memory | | 128MB |
| **Decode** | | |
| Format supported | | H264, mpeg4, mjpeg |
| Displaydelay | | Decoder shall start displaying of frames not later than displayDelay number of frames are decoded(-1 to 16) |
| numbuf | | Number of decode buffers required for particular channel. |
| H264 Decode | | ○ A Max of 12ch D1 H264-HP Decode @ 30fps |
| H264 Profile supported | | ○ High Profile (HP)<br>○ Base Profile (BP)<br>○ Main Profile (MP) |
| MPEG4 Decode | | A Max of 12ch D1 MPEG4-SP Decode @ 30fps |
| MJPEG Decode | | A Max of 12ch D1 MJPEG Decode |
| Max resolution supported | | HD (1920x1080) |
| Min resolution supported | | QCIF (ideally all resolution up to HD shall be supported. But resolution < QCIF is not verified) |
| Combo | | Any Combination of the above shall be supported |
| Generic Decoder support | | Generic Decoder support is verified only with H264 |

| | **Decoder Display demo** |
|---|---|
| **Display** | |
| Display 0 | HD Display 0: On-Chip HDMI max 1080p60 |
| Tied VENCs | HD Display 0 and HD Display 1 will be "TIED"<br>o They will show same video + GRPX<br>o @ Same frame-rate<br>o @ Same resolution<br>o @ Same timing<br>o i.e. Input source to the HD Displays will be the same |
| Display Resolutions | **HDMI / VGA Monitor:**<br>1080p60 – 1920x1080 @ 60Hz<br>720p60 – 1280x720 @ 60Hz<br>SXGA – 1280x1024 @ 60Hz<br>XGA – 1024x768 @ 60Hz |
| Display Layouts | ○ 1x1 – All CH being showed, deinterlaced at 60fps<br>○ 2x2 – All CHs being shown, deinterlaced at 60fps<br>○ 3x3 – CH being shown scaled at 30fps by taking ONLY the even fields<br>○ 4x4 – CH being shown scaled at 30fps by taking ONLY the even fields (8CIF AND 16CIF ONLY)<br>○ 4x5 – CH being shown scaled at 30fps by taking ONLY the even fields (16CIF ONLY)<br>○ 1+7 – 1 BIG CH being showed deinterlaced at 60fps. OTHER SMALL CHs scaled at 30fps by taking ONLY the even fields<br>○ 1+5 – 1 BIG CH being showed deinterlaced at 60fps. OTHER SMALL CHs scaled at 30fps by taking ONLY the even fields |

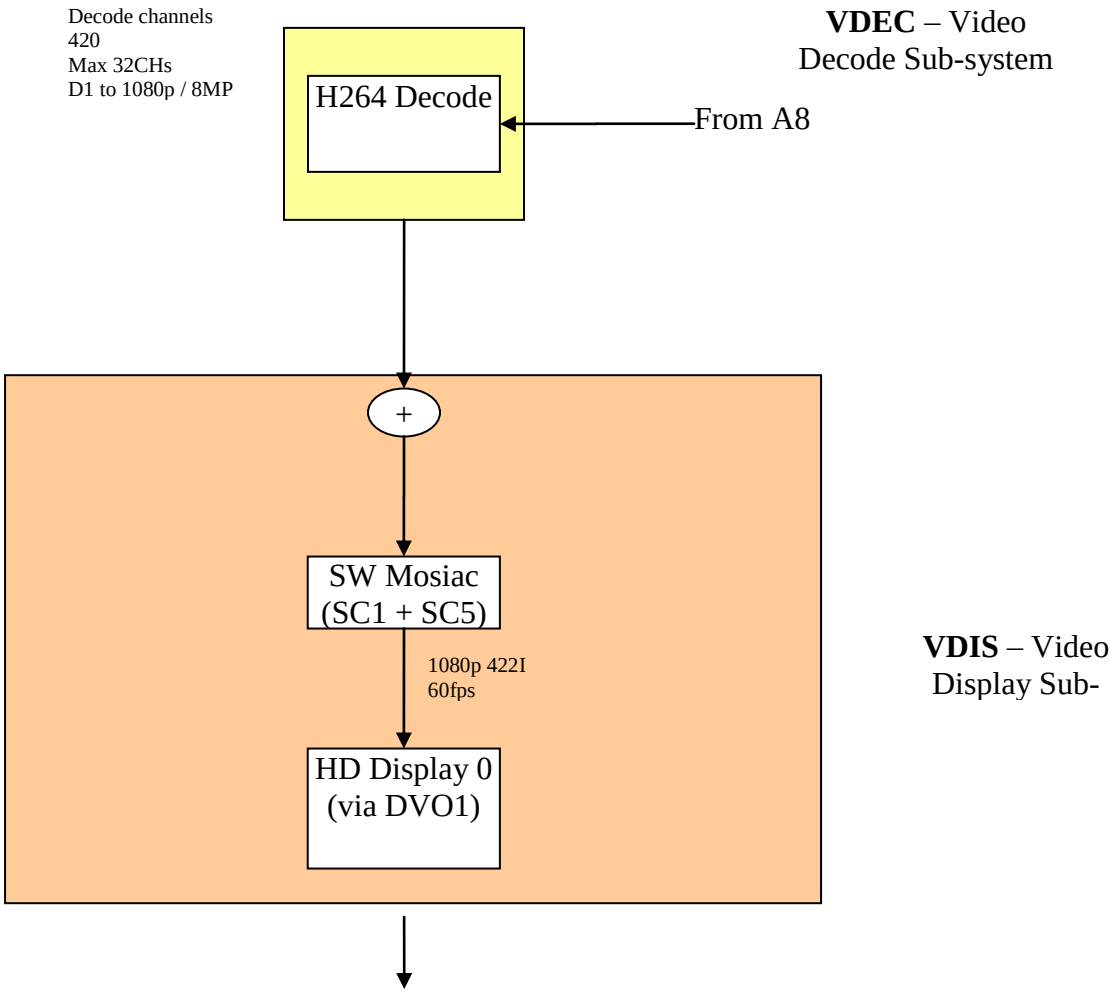
# 3 Limitations

These data flows have the following limitations / constraints

- These data flows are implemented for DM814x SoC.
- The software mosaic support 2 scaler instance in one SWMS. That means you can archieve 32D1@30fps performance with only one SWMS. But please don't use VIP scaler and DEI scaler in the same SWMS, this will cause issue. You can use VIP scaler and SC5, or SC5 with DEI scaler.
- SD display is not supported currently
- Graphic support is not added currently
- Multiple references frames is supported but only 1 reference frame(B-frame) has been tested extensively, hence limited Generic Decoder testing has been conducted for H264
- The numbuf should always be greater than the displaydelay and **preferably the difference between them should be five or more**
- Keep the numbuf = 16 and displaydelay = 10 in the ini file, for generic streams which have multiple reference buffers
- Limitted error stream testing has been done
- Decoder assume the first frame shall be an IDR frame (SPS/PPS + I frame)
- MPEG4-ASP is not supported

# 4 DM814x Decoder Display – Additional Details

### Data Flow



## Measured Performance

### Frame-rate

Refer to sub-section, Decode in section 2 Features for details

### CPU Load (Measured)

| Processor | CPU load in % |
|---|---|
| M3 VPSS | 11 % |
| M3 Video | 16 % |
| DSP | 1 % |