Use Case Guide

Feb 2012

DM816x Decode Display - Use Case Guide

ABSTRACT

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

- Multichannel Decode & Display (NVR) Use-case

These use-cases are targeted for DM816x SoC from TI

1 Overview

Use-case summary

A summary of the use-cases is given below

Product	Description
Multichannel Decode & Display Use-case (DM8168)	Decode upto 32Ch D1 @30fps and dual HD mosaic Display with a max of 16 windows per mosaic display

Target Applications

This use-case is targeted for the below applications

- Hybrid DVR
- NVR

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

System	
DM8168 Part Number	DM8168 PG2.0
DDR	1GB
Linux Memory	128MB
Decode	
H264 Decode	○ A Max of 32ch D1 H264-HP Decode @ 30fps ○ OR a Max of 12ch 720p @ 30fps ○ OR a Max of 6ch 1080p @ 30fps ○ OR any combination of the above
H264 Profile supported	○ High Profile (HP) ○ Base Profile (BP) ○ Main Profile (MP)
MPEG4 Decode	A Max of 32ch D1 MPEG4 Decode @ 30fps
MPEG4 Profile supported	○ Simple Profile (SP) ○ Advanced Simple Profile (ASP)
MJPEG Decode	A Max of 32ch D1 MJPEG Decode
Max resolution supported	HD (1920x1080)
Min resolution supported	QCIF (ideally all resolution upto 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
Initially during the Dec link create time application should create the DEC link with MAX number of channel need to be supported any point of time. Actually this will be automatically getting from the previous links (IPCBitsIn Link on videoM3). Please note that the MAX number of channels can not be change dynamically	
Decode Parameters	
Disable Channel	Support Disabling specific Channel
Enable channel	Support Enabling a specific Channel
Support 32ch H264 HD @ lower FPS	"numBufPerCh" in DecLink_ChCreateParams need to be configured with lower values such as 2 or 3 here

Switch channel resolution runtime	Dec link and Demo app supports runtime resolution change. For example, A channel created with D1 can be closed and open for HD resolution
Dynamically switch codec Alg type	Dec link and Demo app supports runtime codec type change. For example, A channel created with H264 can be closed and open for MPEG codec Type

Please use an ini file to start the demo app, or set by App, with following channel configuration

- ✓ First 6ch -> HD
- ✓ Next 6ch -> 720p
- ✓ Remaining 20 -> D1
- ✓ This will help to allocate all different size buffers (HD, 720p, D1 & CIF) on Linux side
- ✓ Set DecLink_ChCreateParams. algCreateStatus = 0 for the unwanted channels

A new parameter "algCreateStatus" has been added in the DecLink_ChCreateParams(), where it can take values either 0 or 1. This will allow the App to **DO NOT** create the codec instance and output buffers in certain channels

- ✓ If algCreateStatus = 0: Only the partial channel gets created, neither codec instance nor the output buffers will be getting created. App will be able to make this channel fully functional dynamically by calling DEC_LINK_CMD_CREATE_CHANNEL API
- ✓ If algCreateStatus =1: Fully functional channel will be created with Both codec instance and the output buffers created, ready to operate

T-Play Support	I-frame based fast-forward, fast-rewind. Decoder will generate Target Frame Rate for Trick-Play from the available input frame-rate. Please note that the input frame rate >= Target frame rate

Dynamically create/delete channels supported only in NON-TILED mode as Ducati Tiler memory allocation doesn't support run time memory allocation & free

Display

Number of Display	2 HD display (On-chip & off-Chip HDMI)
Display 0	HD Display 0: On-Chip HDMI max 1080p60
Display 1	HD Display 1: via DVO2 (Off-Chip HDMI) max 1080p60
Display 2	SD display is not supported in this use-case, but can be added
Display Resolutions	**HDMI / VGA Monitor:** 1080p60 – 1920x1080 @ 60Hz 720p60 – 1280x720 @ 60Hz SXGA – 1280x1024 @ 60Hz XGA – 1024x768 @ 60Hz **SD Display:** NTSC – 720x240 @ 60Hz – interlaced

	PAL – 720x288 @ 50Hz – interlaced Resolution can be changed dynamically.
Playback frame-rate and supported display mosaic layouts	1x1 Layout 2x2 Layout 3x3 Layout 4x4 Layout 2x2 +4ch Layout 1+5 Layout 1+7 Layout + A few more... All layouts @30fps
Graphics	- Not supported in this use-case currently, but can be added. o Via FBDev o 16/32-bit Graphic on one or both display
Switch Layout	Support dynamic Switching between layouts
Switch Channels	Support dynamically changing the channels in the layout
Layout Grid lines	Should be done using GRPX plane
Other requirements	
Boot logo	Yes, via Uboot 720P60 display of 1280x720 resolution bitmap on On-Chip HDMI. **HDMI TV should support 720P60 mode.**
Boot time	- Power ON to boot logo – 5-10secs - Power ON to Display live preview – 30-45 secs
Networking	NOT USED
SATA	NOT USED
USB	NOT USED
PCIe	Taken care by Customer

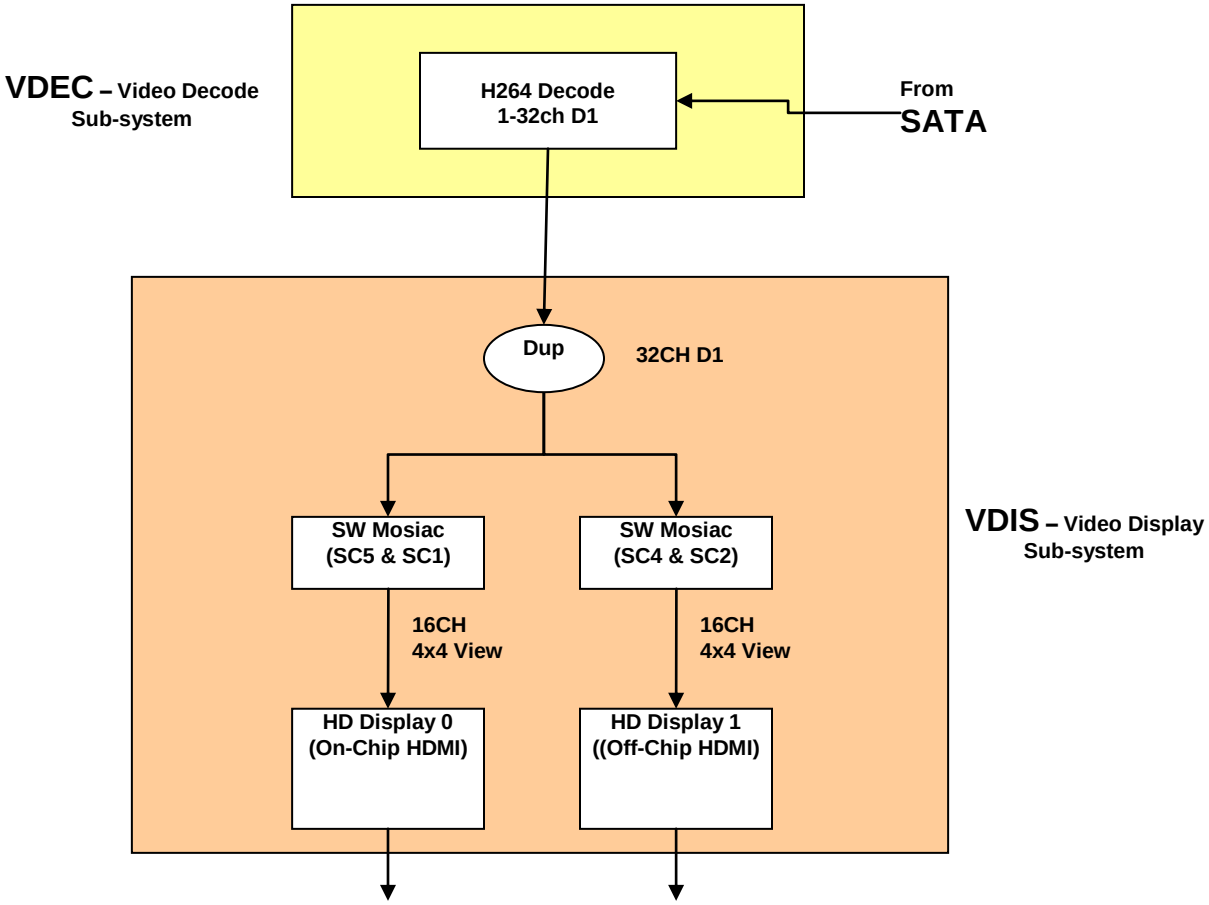
3 Limitations

These data flows have the following limitations / constraints

- These data flows are implemented for DM816x SoC.
- 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 DM8168: 32ch D1 Decode & Display – Additional Details

Data Flow



Measured Performance

Frame-rate

All 32ch D1 @ 30fps

CPU Load (Measured)

Processor	CPU load in %
M3 VPSS	30 %
M3 Video	60 %
DSP	0 %