



5MP OV5640 OmniVision Camera support on SABRE SDP/B WEC 7 Platform

White Paper

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Abstract

Windows Embedded Compact 7 (WEC 7) BSP developed by iWave Systems for Freescale SABRE SDP/B platform now supports Omnivision's OV5640 5MP camera interface. OV5640 camera modules was successfully ported to the WEC 7 camera driver architecture and tested with the standard WEC 7 Camera application for Preview and Still Image Capture interfaces. Camera driver uses Camera Sensor Interface (CSI) of i.MX6Q's IPU for receiving the image data from the camera sensor and further processing it for the preview pin. OV5640 camera solution can be used in the wide variety of media applications such as Digital Still/Video Cameras, Mobile phones and entertainment solutions.

OV5640 Camera Module

OV5640 provides the full functionality of a complete camera, including an anti-shake technology, AF control and MIPI while easier to tune, making it an ideal choice in terms of cost, time-to-market and ease of platform integration.

OV5640 enables 720p HD video at 60 frames per second (fps) and 1080p HD video at 30 fps with complete user control over formatting and output data transfer.



Figure 1: OV5640 Camera Module

Software Architecture

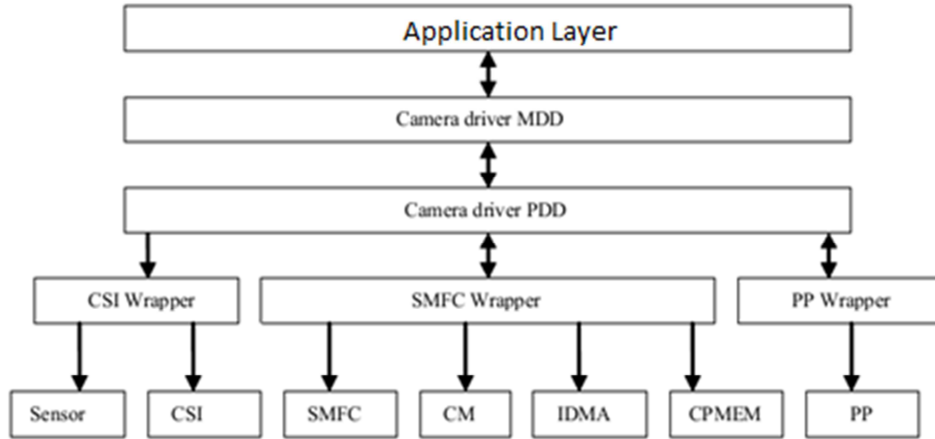


Figure 2: WEC 7 Camera Architecture

WEC7 OV5640 driver adheres to the above WinCE camera driver architecture which follows the MDD (Model Device Driver) and PDD (Platform Device Driver) layer for separation of the generic and platform dependant interfaces.

The OV5640 camera sensor passes the frame data to the CSI module of the IPUv3 of i.MX6Q, which then passes the data to the SMFC (Sensor Multi-FIFO Controller). The SMFC sets up the data for the IDMAC (Image DMA Controller). The camera driver sets a pointer to an external memory buffer which is filled by the DMA after the IDMAC is complete. The camera driver uses the frame data in the external memory as the Capture/Still Pin output. Simultaneously, this frame data is used as the PP (Post Processor) input for the Colour Space Conversion (CSC), size change, and rotation/flip/mirror operation. The camera driver uses the PP output as the Preview Pin output.

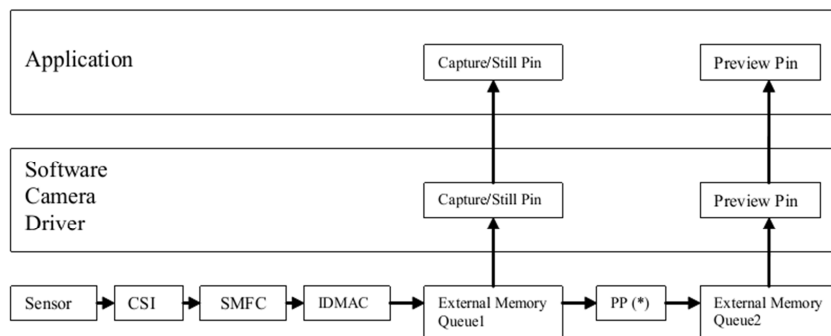


Figure 3: Camera Sensor Data Flow

Features

OV5640 driver ported to WEC 7 SABRE SDP/B platform supports following features:

1. Resolution support

5 Mega Pixel and any arbitrary size scaling down from 5 MP, following resolution support can be provided.

QSXGA (2592x1944) – 15fps

1080p – 30fps

720p – 60fps

VGA (640x480) – 90fps

QVGA (320x240) – 120fps

2. Output format support

RAW RGB, RGB565/555/444, CCIR656, YUV422/420, YCbCr422

Applications

OV5640 camera module can be used in the variety of applications, few of them are listed below.

1. Tablets and smartphones
2. Digital Still and Video Cameras
3. Media Streaming & Surveillance applications

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