



Flexible Camera Interface Solution

Faster to Product, Faster to Market with the Latest NXP MCU Solutions

What is the problem we are solving

- ▶ **Camera interface solution are available on very few parts in the market place**
 - Flexible camera solution is portable to a large variety of LPC MCUs
 - You can add a camera interface to a low end or high-end microcontrollers
- ▶ **Flexible camera interface is highly configurable**
 - The SCT/PWM is programmable therefore it can support different communication protocols

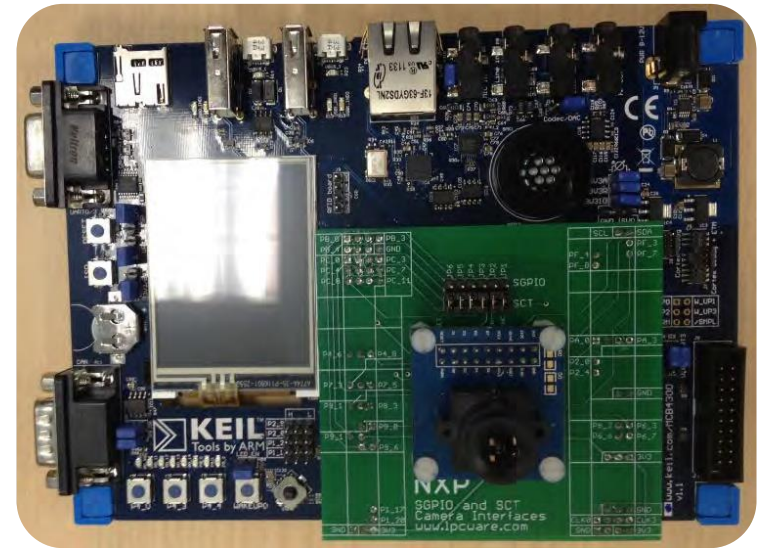
Outline

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- ▶ Keil board
- ▶ Camera Module
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- ▶ For more information and to order the board



Solution Highlights

- Interface to and capture digital images from a Serial Camera Control Bus (SCCB) still camera module
- Add images based features to your applications using a fraction of the CPU
 - Image processing, face detection, motion control, etc.
- It can interface any SCCB based camera



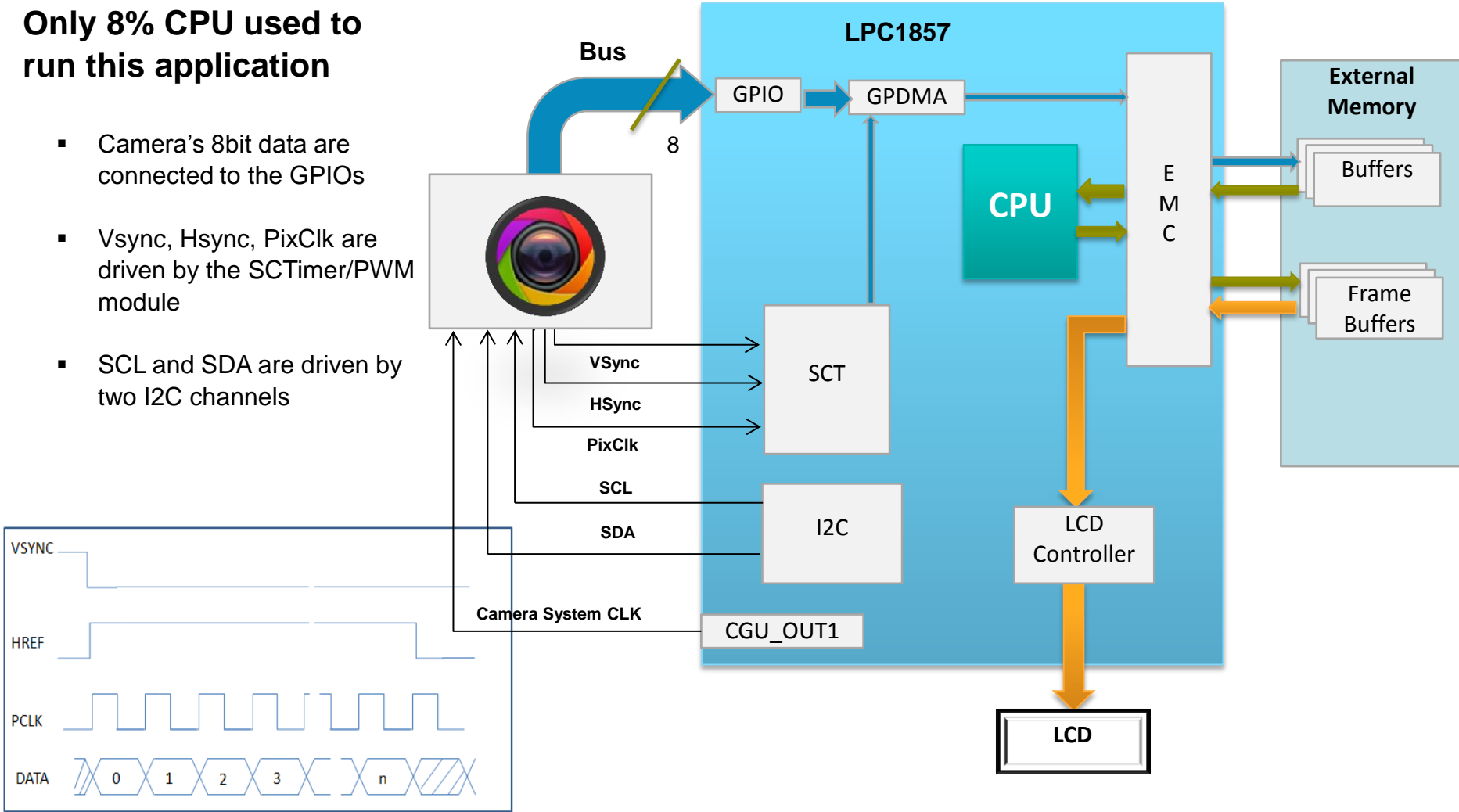
Applications

- ▶ **Toys**
- ▶ **Face Detection**
- ▶ **Door bell camera**
- ▶ **Wearable Cameras**
- ▶ **Automated inspection**
 - **Quality assurance (detection of defects, flaws, missing parts)**
- ▶ **Part sorting and identification**
- ▶ **Bar-code reading & verification**
- ▶ **Fire or smoke detection camera based**

Camera interface Description

► Only 8% CPU used to run this application

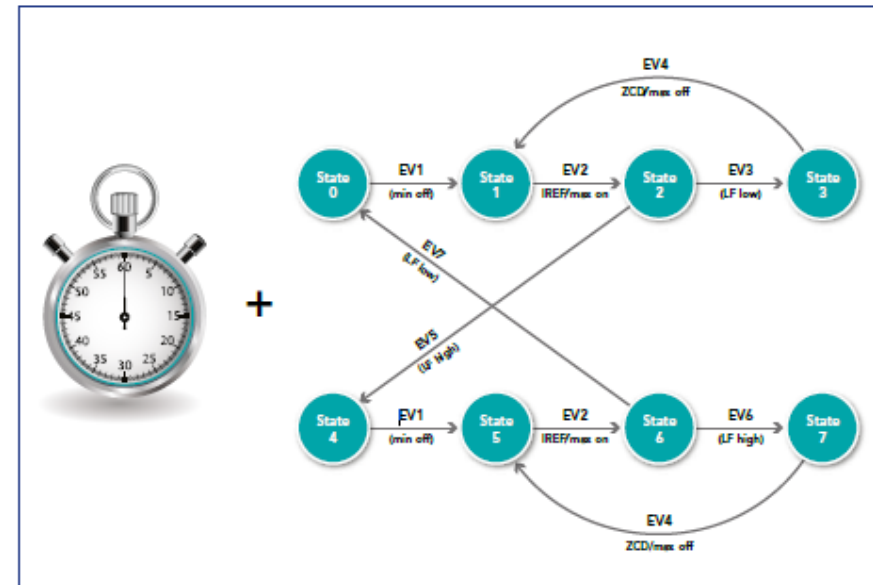
- Camera's 8bit data are connected to the GPIOs
- Vsync, Hsync, PixClk are driven by the SCTimer/PWM module
- SCL and SDA are driven by two I2C channels



State Configurable Timer (SCT/PWM)

- ▶ Combines powerful 32-bit timer counter with configurable state machine logic
- ▶ SCT based Camera Interface Advantages
 - Flexible Data Format
 - possible early image processing
 - adjust video data capture speed and size
 - Adaptable to Proprietary Camera Interface
 - adjustable synchronization scheme
 - adjustable clocking scheme

The SCT combines a timer with a state machine



Keil Board

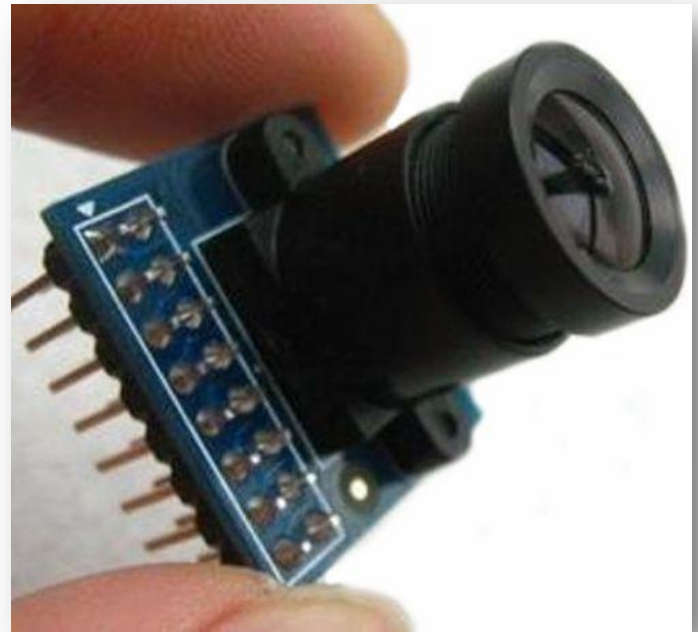
- ▶ NXP LPC1850 family of ARM Cortex™-M3 processor
- ▶ 180MHz ARM Cortex-M3 processor-based MCU in LBG256
- ▶ On-Chip SRAM: 136KB (LPC1857), 200KB (LPC1850)
- ▶ On-Chip Flash: 1MB dual bank (LPC1857), no on-chip Flash (LPC1850)
- ▶ On-Board Memory: 16MB NOR Flash, 4MB Quad-SPI Flash, 16 MB SDRAM, & 16KB EEPROM (I2C)
- ▶ Color QVGA TFT LCD with touchscreen
- ▶ High-speed USB 2.0 Host/Device/OTG interface (USB host + Micro USB Device/OTG connectors)
- ▶ Full-speed USB 2.0 Host/Device interface (USB host + micro USB Device connectors)
- ▶ CAN interfaces, Serial/UART Port, 10/100 Ethernet Port, MicroSD Card Interface
- ▶ Digital Temperature Sensor (I2C)
- ▶ Analog Voltage Control for ACD Input
- ▶ Audio CODEC with Line-In/Out and Microphone/headphone connector + Speaker
- ▶ Debug Interface Connectors



<http://www.keil.com/mcb1800/>

OmniVision OV7670 camera module

- ▶ High sensitivity low-light operation
- ▶ Low operating voltage for embedded portable apps
- ▶ Standard SCCB interface compatible with I2C interface
- ▶ Output support for Raw RGB, RGB (GRB 4:2:2, RGB565/555/444), YUV (4:2:2) and YCbCr (4:2:2)
- ▶ image sizes: VGA, CIF, and any size scaling
- ▶ Automatic image control functions



<http://www.ovt.com/>

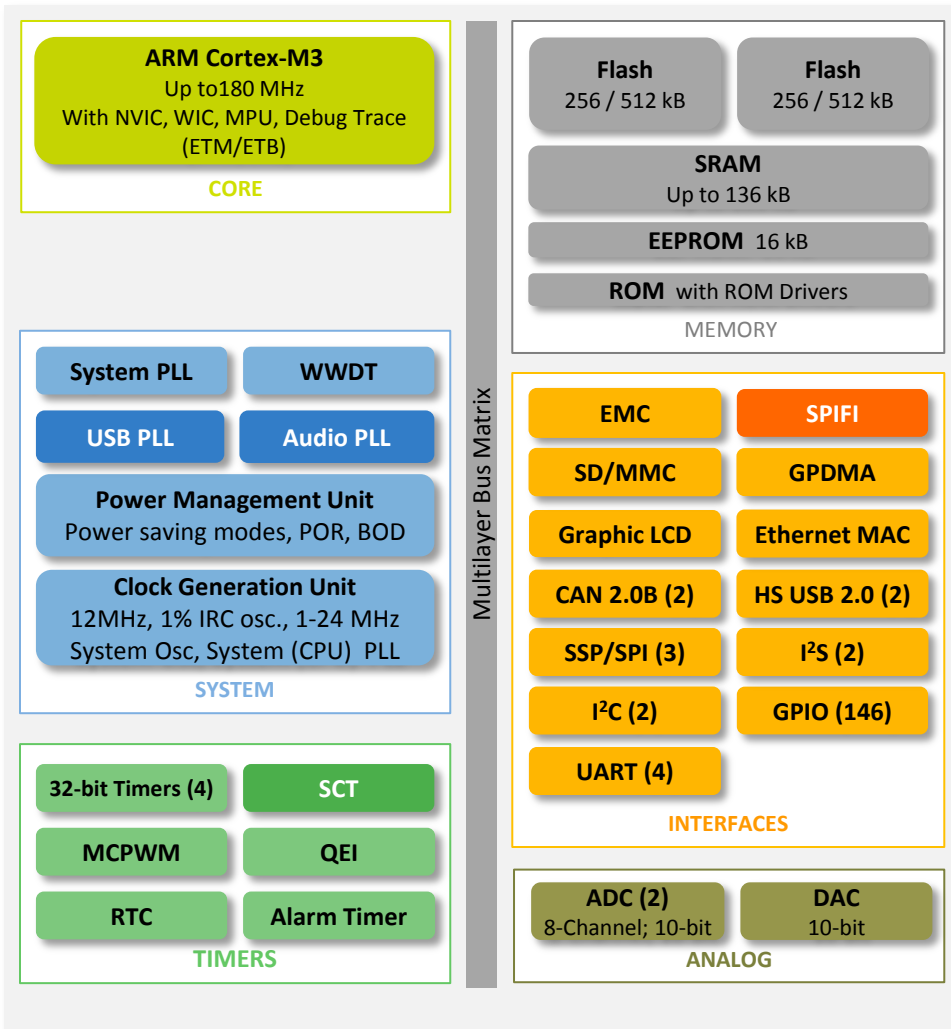
Any other SCCB type of cameras can be used

Interface to other Camera Modules

- ▶ **Adaptable to any 8 bit parallel camera modules with QVGA format**
- ▶ **Steps to integrate a new camera module:**
 - a. align the camera pins to the camera daughter boards
 - b. adjust the camera pixel clock based on the new camera module
 - c. initialize the new camera registers



LPC1800



- ▶ 180 MHz
- ▶ 1MB dual-bank Flash
- ▶ High Speed USB: on-chip HS PHY, dual HS USB host capable
- ▶ High-Performance Cortex-M3
- ▶ BGA256/180/100, LQFP208/144

Part Number	Flash (kB)	SRAM (kB)	Ethernet MAC	HS USB	LCD	SD/MMC
LPC1812	512**	104				
LPC1813	512	104				
LPC1815	768	136				
LPC1817	1024	136				
LPC1822	512**	104		1		
LPC1823	512	104		1		
LPC1825	768	136		1		
LPC1827	1024	136		1		
LPC1833	512	136	1	2		Y
LPC1837	1024	136	1	2		Y
LPC1853	512	136	1	2	Y	Y
LPC1857	1024	136	1	2	Y	Y

**Single bank of Flash

For more information and to order the board

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Direct downloads

All documents (0)

Quick ordering

OM13059UL

Region

Distributor **In Stock**

No distributors in the selected region have this product in stock, please contact our [sales office](#)

CP:

Demo board description

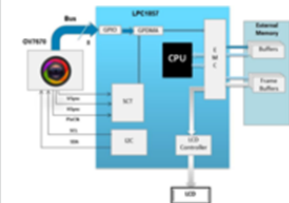
This flexible camera solution is an out-of-the-box development kit, built around the LPC1857 Cortex-M3 based MCU, providing everything your system needs to view the world around you.

Included with the solution is a camera module that uses an 8-bit parallel output in RGB565 format with support for QVGA mode. The application is optimized for size and performance, and uses only eight percent of available CPU bandwidth. That means the LPC1857 can be programmed to perform a wide variety of additional functions, creating a complete system with a small, compact footprint.


Features

- Full design based on Keil MCB1800 evaluation board
- 180 MHz ARM® Cortex™-M3 LPC1857 microcontroller
- 1 MB Flash, 136 KB SRAM, 16 KB EEPROM
- Quad SPIFI interface
- Two 8-ch/10-b ADCs, one 10-bit DAC
- 8-bit OmniVision OV7670 QVGA camera module
- On-Chip SRAM: 136 KB (LPC1857), 200 KB (LPC1850)
- On-Chip Flash: 1 MB dual bank (LPC1857), no on-chip Flash (LPC1850)
- On-Board Memory: 16 MB NOR Flash, 4 MB Quad-SPI Flash, 16 MB SDRAM & 16 KB EEPROM (I²C)

Show functional diagram



OM13059: Flexible Camera Solution



<http://www.nxp.com/demoboard/OM13059.html>