Technical Note

MT9D112

Obtaining the Module ID from the GPIO Function on an Image Sensor

Introduction

This technical note addresses Micron's MT9D112 CMOS image sensor and provides the camera module integrator identification from the general purpose input/output (GPIO). The camera module vendor identification confirms electrically which camera module integrator manufactured the camera module. The customer uses this information to load correct register settings tuned to that specific camera module integrator.

Background

To aid in identifying the camera module integrator for loading register settings optimized for specific camera module integrators, Micron has incorporated a method to enable the GPIO to obtain the identification.

The identification is obtained from four GPIOs which are wire bonded to either a LOW or HIGH logic level. The sensor displays the values of these GPIO within a register when configured as an input. The camera module integrator is responsible for implementing the correct identification code and the integrity of the wire bonds.

The identification is accessible using a two-wire serial interface. Specific registers need to be set to enable a READ through the two-wire serial interface. Reading the results of a different register provides the binary response to the bias applied to the respective GPIO.

Obtaining Module ID from GPIO function

To initiate the use of the GPIO as inputs, R0x1078 should be configured to enable the input mode for the image sensor. Setting a bit HIGH in R0x1078 enables a corresponding GPIO pin to be configured as an input.

For module ID, Micron requires configuring R0x1078[11:8] as inputs. These bit values [11:8] map to GPIO3, GPIO2, GPIO1, and GPIO0 pins on the image sensor, respectively. Bits [7:0] of R0x1078 enable and map the GPIO_AF as inputs or outputs, respectively.

Once R0x1078 is set to enable the GPIO as an input and the respective GPIO is biasd to a HIGH or LOW logic level for the image sensor, reading bits [11:8] of R0x1070 provides the bias level of the GPIO. This value from bits [11:8] of R0x1070 corresponds to bias applied to the respective GPIO pin.

This is the procedure for reading GPIO [3:0] as inputs. Assume logic bias levels on GPIO pins are as follows:

GPIO3 = H
GPIO2 = L
GPIO1 = L
GPIO0 = H

- Initiate image sensor

- Write R0x1078=0Fxx (x = don't care for this case)
- Read R0x1070[11:8] (expect value to be 09 from bits 11:8)
- The value when translated to binary shows that GPIO [3:0] are bias as HLLH

Conclusion

The MT9D112 has the capability to enable encoding (limited to 16 bits) of GPIO pins to be used as identification. This encoding enables customers to identify the specific encoding and apply the tuned register settings specific for a camera module integrator.

The encoding requires the GPIO pins to be physical biased to logic HIGH or LOW. A READ of the encoding through the image sensor register requires the GPIO to be configured as an input. The value of the GPIO is obtained by reading a specific register and the value of the register is mapped to specific GPIO pins. The values assigned to the GPIO pin provides a 16-bit identification option for customers.

For more information on this or for more information on these features, refer to the MT9D112 1/4-Inch system-on-a-chip (SOC) CMOS digital image sensor data sheet on Micron's Web site at www.micron.com/imaging.

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Revision History

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- Initial release