

PAT9125EL: Pixel Grab Function

Application Note AN05

Related Part Ordering Information

Part Number	Type
PAT9125EL	Optical Tracking Sensor



For any additional inquiries, please contact us at <http://www.pixart.com/contact.asp>.

1.0 Introduction

The Pixel Grab function (pixel grabber) in PAT9125EL captures one pixel data per frame. In 18x18 pixel arrays of the sensor, it takes 324 read operations to grab all the pixels to form a complete image. A write operation of any value into register address 0x0F will reset the pixel grabber to the first pixel location. The sensor should not be moved before the completion of 324 read operations to ensure a good image.

Note: Throughout this document PAT9125EL is referred to as the sensor.

2.0 Registers related to the pixel grabber

Register Name	Pixel_Grab_Status (Read ONLY)								
Bank	0			Address	0x08				
Access	R			Reset Value	0x00				
Bit Field	7	6	5	4	3	2	1	0	
	Frame_Valid	Pixel_Valid	Reserved						
Description	Pixel_Grab_Status enables users to check if the pixel data is ready for grabbing.								
Field	Reset	Description							
Frame_Valid	0	The flag to indicate the first pixel in a frame is ready or not 0 : First pixel is NOT ready yet 1 : First pixel is ready for grabbing							
Pixel_Valid	0	The flag to indicate any pixel in a frame is ready or not 0 : Pixel data is not ready yet 1 : Pixel data is ready for grabbing							

Register Name		PixelOut (Read ONLY)						
Bank	0	Address			0x0F			
Access	R	Reset Value			NA			
Bit Field	7	6	5	4	3	2	1	0
	PixelOut[7:0]							
Description	The pixel grabber output. The host MCU can get one of the pixel value from this register whenever Pixel_Valid flag is 1. A write operation of any value into this address will reset the pixel grabber to the first pixel location.							

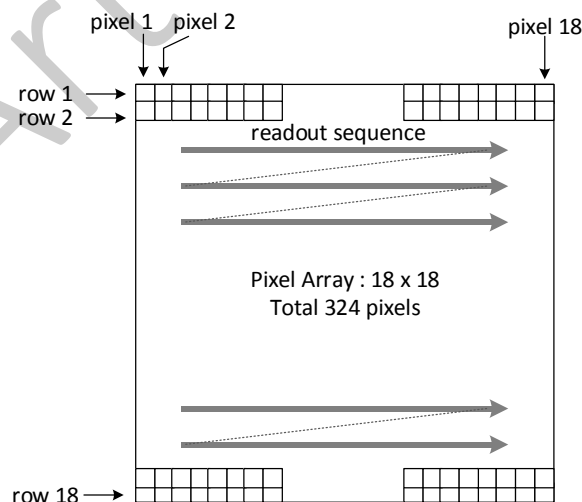
3.0 Control flow of pixel grabber

3.1 Register initialization for Pixel Grabbing

1. Write recommended initial register settings
2. Write register address 0x09 = 0x5A
3. Write register address 0x20 = 0x64
4. Write register address 0x05 = 0xA1
5. Delay at least 2ms
6. Write register address 0x7F = 0x01
7. Write register address 0x58 = 0x98
8. Write register address 0x7F = 0x00
9. Write register address 0x19 = 0x06

3.2 The control sequence

1. Write 0x00 to register address 0x0F to reset the pixel grabber. Do take note that writing any value into address 0x0F at any time will always reset the pixel grabber to the origin of a frame.
2. Check Frame_Valid flag and Pixel_Valid flag in address 0x08[7:6]. If Frame_Valid=1 and Pixel_Valid=1, it means the first pixel in a frame is ready for grabbing. If Frame_Valid=0 and Pixel_Valid=1, it means the pixels other than the first pixel is ready for grabbing.
3. Read PixelOut in address 0x0F then go back to step 2. It will take 324 cycles of step 2 and step 3 to grab all the 324 pixels to form a complete image.



3.3 Recover to the sensor normal operation after completing the Pixel Grab function

1. Write register address 0x06 = 0x97
2. Write recommended initial register settings

Document Revision History

Revision Number	Date	Description
0.1	12 May. 2016	New creation
0.2	14 Mar. 2017	Modified the sequence in section 0
0.3	24 Oct. 2017	Added a picture to illustrate the pixel sequence of pixel grabbing