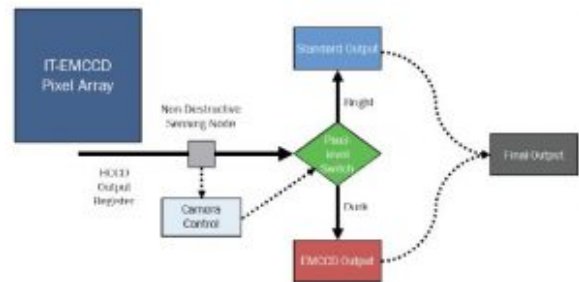


# Interline Transfer

## EMCCD

,EMCCD pixel array is a type of CCD sensor that uses an interline transfer architecture. This architecture allows for the separation of the light-sensitive area from the readout area, which is a key feature of EMCCD sensors. The interline transfer process involves moving the charge from the light-sensitive area to a series of transfer gates, which then move the charge to the readout area. This process is repeated for each row of the array, allowing for the capture of a full frame of data. The EMCCD architecture is designed to minimize the risk of blooming, which is a common issue in standard CCD sensors. Blooming occurs when the charge in one pixel overflows into adjacent pixels, causing a loss of image quality. The EMCCD architecture uses a series of transfer gates to prevent this from happening, ensuring that the charge remains in the intended pixel. This makes EMCCD sensors ideal for applications where high dynamic range and low noise are required, such as in scientific imaging and astronomy. The EMCCD architecture also allows for the use of a variety of readout schemes, including frame transfer and global shutter. This flexibility makes EMCCD sensors a popular choice for a wide range of applications. The EMCCD architecture is a key component of many high-performance imaging systems, and its use continues to grow as the demand for high-quality imaging solutions increases.



Intra-scene Switchable Gain Output .1

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EMCCD 的 Full Frame Transfer (FFT) 模式，其特點是每個像素的電荷在曝光後，會先被積分在像素的電容中，然後在曝光結束後，再將電荷全部轉移到讀出寄存器。這種模式可以避免在讀出過程中產生串擾，但由於每個像素的電荷都要經過一次完整的轉移過程，因此讀出速度較慢。

EMCCD 的 Interline Transfer (ILT) 模式，其特點是每個像素的電荷在曝光後，會先被積分在像素的電容中，然後在曝光結束後，再將電荷轉移到讀出寄存器。這種模式可以避免在讀出過程中產生串擾，但由於每個像素的電荷都要經過一次完整的轉移過程，因此讀出速度較慢。

EMCCD 的 Global Shutter 模式，其特點是每個像素的電荷在曝光後，會先被積分在像素的電容中，然後在曝光結束後，再將電荷轉移到讀出寄存器。這種模式可以避免在讀出過程中產生串擾，但由於每個像素的電荷都要經過一次完整的轉移過程，因此讀出速度較慢。

EMCCD 的 Rolling Shutter 模式，其特點是每個像素的電荷在曝光後，會先被積分在像素的電容中，然後在曝光結束後，再將電荷轉移到讀出寄存器。這種模式可以避免在讀出過程中產生串擾，但由於每個像素的電荷都要經過一次完整的轉移過程，因此讀出速度較慢。

EMCCD 的 Rolling Shutter 模式，其特點是每個像素的電荷在曝光後，會先被積分在像素的電容中，然後在曝光結束後，再將電荷轉移到讀出寄存器。這種模式可以避免在讀出過程中產生串擾，但由於每個像素的電荷都要經過一次完整的轉移過程，因此讀出速度較慢。

0000 00 0000 0000 (2 00000 0000000 000000) 000000 00000 00000  
 00000 0000 00 "00000" 00000000 00 000 000 000 ,0000000 00 000000  
 (000000) 0000000 EMCCD 00000 00 000000000000000 00 .0000000 00 000000  
 00000 0000 ,0000000 00 00000 000000 00000 00 000000 00 0000000 0000  
 00000 0000000 ,000000 00 0000000 000000 0000000 000000 000000 000000  
 EMCCD 000000000000 .0000000 000000 00 000000 0000000 00 000000 000000  
 0000000 00 000000 000000 000000 0000000 (000000) 0000000 000 000000 00  
 00000 00000 ,0000000 00 000000 000000 00000 00 000000 000000 000000  
 00000000 0000 00 000 0000 00 00000 0000000 00 "00000" 00000 00 00000000  
 .000000



A scene with both 0000  
 bright and very dark  
 components, imaged by .2  
 a standard IT-CCD (left), a  
 standard EMCCD (center), and  
 an Interline  
 Transfer EMCCD device  
 )(right

000000 00000000 000000 ,000000 000 000000 00 EMCCD 000000000000  
 .0000000 00 0000000 0000000 00000 000000 ,000000000 00000000 0000000  
 00000000 On Semiconductor 00 KAE-02150 0000000 0000000  
 000000 00 000000 000000 000 0000000 000 000000 00 EMCCD 000000000000  
 000 000 (1920X1080) 00000000 1080 00 00000000000 000000 0000000  
 00 000000000 0000000 000000 0000 00000 ,0000000 0000000 30 -0 000000  
 000000 00000 (situational awareness) 0000000 000000000 000000 ,000000  
 0000000 000000 00 000000 00 000000 000000000 000000 000000 000000  
 0000000 000000 ,00000 000000 000000000000 00000 00 000 0000000 .0000000  
 00 0000000 (2856X2856) 000000 000 8 00 0000000000 0000 , KAE-08151  
 ,0" 22 00 0000000 0000 0000000 (aspect ratio) 00000 00000 0000  
 00 00 00000 00000000 0000000000000 00 00000000 0000000 000000 0000000  
 000000000000 000000000 00000000000 0000000000 00 00000000 .000 000000 00000

