SONY

Benefits of Dynamic Frame Integration (DFI) Technology

There are advantages to both of the different CCD scanning modes: progressive and interlaced. From a video security point of view, the advantages of progressive scan CCDs are that a higher vertical resolution can be attained and less image blur occurs when capturing moving objects. However, interlaced scan CCDs inherently provide higher sensitivity.

As you may already know, when using an interlaced scan CCD for network video monitoring, a technique called I/P (Interlace/Progressive) conversion is required to produce a single frame of video. Basically, with this technique, image data is buffered in memory until a single frame of data is ready to be output.

When performing IP conversion, Sony incorporates a technology called Dynamic Frame Integration (DFI) in some of its interlaced scan CCD network cameras so that both moving objects and still objects are clearly reproduced while taking advantage of the relatively high sensitivity inherent in interlaced scanning CCDs.

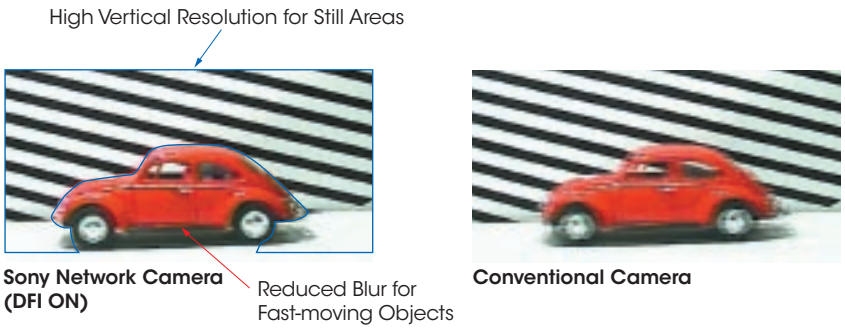

Image Comparison Between Sony Network Camera (DFI ON) and Conventional Camera

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To understand the DFI mechanism, it is necessary first to understand the two different I/P conversion methods, called Frame Mode and Field Mode, that have been incorporated into Sony's range of network cameras. (Fig. 1)

Frame Mode

Frame Mode simply combines two adjacent picture fields into one picture frame. This method provides a high vertical resolution and works well for still areas within an image; however, if a fast-moving object appears in the image, those areas with movement become blurry. (Fig. 1-A)

Field Mode

Field Mode produces progressive pictures by utilizing data from the even field only (i.e., lines 0, 2, 4, 6...). This method reproduces the absent lines of the interlaced field by interpolating data from the lines above and below. Field Mode can reduce the blurred images caused by fast-moving objects; however, vertical resolution is half that of Frame Mode, and this method of processing images can produce jagged edges in still areas of the image, particularly in angled lines with high contrast. (Fig. 1-B)

Dynamic Frame Integration (DFI)

Combining the advantages of the two I/P conversion techniques, DFI adaptively selects from Frame Mode and Field Mode within an image to reproduce a progressive picture. The algorithm is such that it detects motion within an image on a two-pixel basis. For areas where motion is detected, DFI applies Field Mode to minimize blurring and, at the same time, applies Frame Mode to still areas to maintain high resolution without jagged edges. (Fig. 1-C) [1]

In summary, DFI takes advantage of the high sensitivity inherent in Sony's range of network cameras to produce clear and smooth images even under low-light conditions.

[1] Depending on the scene, the DFI algorithm may not process the image effectively; however, the image will always be clearer than when using Frame Mode

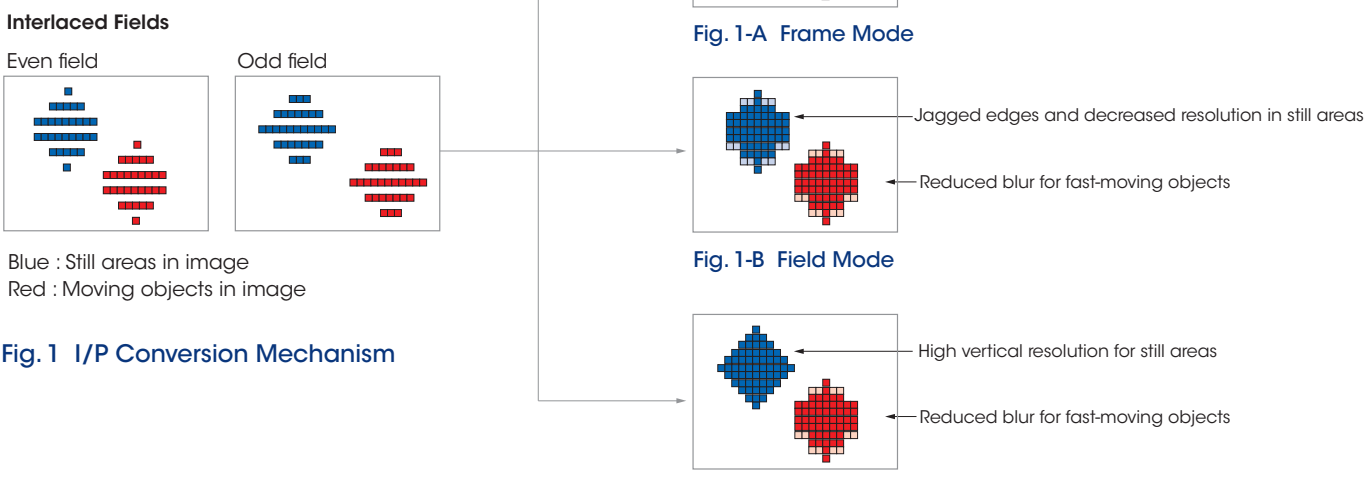

Fig. 1 I/P Conversion Mechanism

Fig. 1-A Frame Mode

Fig. 1-B Field Mode

Fig. 1-C Auto Mode (DFI ON)

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