

# TELI FireDragon-Series Industrial CCD Camera

Eight IEEE1394.b-compliant FireDragon-series models are now on the market.



TOSHIBA TELI Corporation, the imaging information equipment expert manufacturer based in Hino, Tokyo (President: Hiroshi Takaoka), has released new high-speed high-resolution industrial CCD<sup>1</sup> cameras: the 8 IEEE1394.b<sup>2</sup>-compliant FireDragon-series models. Production to order will start from October 16. The FireDragon series is to be shipped from December 1.

## Features

### 1. Systems ideal for users' applications can be created.

An ideal model for image output can be selected from models complying with the specifications of IEEE1394.b, the high-speed serial-interface standard,.

### 2. Selection from 8 combinations

With the FireDragon series, four resolution levels and two color tones (monochrome and color) are available in just one package. Select the desired device from 8 combinations.

### 3. Same software for all models

The SDK<sup>3</sup> and Viewer software for IEEE1394.b cameras can be downloaded from the TOSHIBA TELI website. The software can be used for all IEEE1394.b-compliant cameras.

## Background of development

Monochrome analog cameras for semiconductor-related and packaging-related productions have been the mainstream in the industrial camera market. However, with the enhanced processing capabilities of image-processing devices such as PCs, there has been a growing need for higher quality and functions. Such needs include a larger amount of pixels and frames to provide more information. Furthermore, with the rapid digitization of cameras thanks to the proliferation of high-speed and high-reliability digital interfaces, compatibility with PCs has also been increasing. To support the diverse requirements of users in today's market, TOSHIBA TELI has developed the Dragon-series CCD cameras, which offer a wide selection of interface options, pixels, and color tones (color/monochrome).

## Features

### 1. Systems can be created according to users' applications.

A camera that satisfies the user's specifications can be selected from IEEE1394.b compliant products. The FireDragon series adopting IEEE1394.b-2002 ensures high-speed data transfer. The VGA-specification cameras fetch data at a frame rate as high as 90 fps<sup>4</sup> (YUV4:2:2 or 4:1:1 output only for color specifications).

### 2. Selection from 8 types of cameras

Downsizing is essential to incorporate cameras in electronic devices and systems. The FireDragon series provides 4 levels of resolution, VGA, XGA, SXGA, and UXGA<sup>5</sup>, as well as 2 types of color tone, color and monochrome, and thus selection can be made from 8 types in total with just one frame (44x29x26.5 mm, excluding protrusions).

### 3. Same software for all models

The SDK and Viewer software for IEEE1394.b cameras can be downloaded from the TOSHIBA TELI website. The software can be used for all IEEE1394.b cameras.

[Glossary]

\*1: CCD (Charge-Coupled Device) is an image-sensing device.

\*2: IEEE1394.b is a standard applicable to high-speed data transfer for connection with PCs and peripheral devices.

\*3: SDK stands for Software Development Kits.

\*4: High frame rate means that the number of times of image rewriting per second (frame rate) is large.

\*5: VGA (Video Graphic Array) resolution: 640x480 pixels, X (Extended) GA: 1024x768, SX (Super Extended) GA: 1280x1024, and UX (Ultra Extended) GA: 1600x1200 pixels.

# Description of Features

## FireDragon-series IEEE1394.b output camera

### 1. High frame rate

The CSFV90BC3 (monochrome)/CSFV90CC3 (color) achieves a frame rate as high as 90 fps (frames per second) at VGA, while the CSFX36BC3/CSFX36CC3 achieves 36 fps at XGA, the CSFS20BC2/CSFS20CC2 20 fps at SXGA, and the CSFU15BC18/CSFU15CC18 15 fps at UXGA.

### 2. All-pixel reading

The all-pixel reading system allows the camera to read all the pixels with just one frame processing. The FireDragon series is equipped with a full-frame shutter that allows all the pixels to be read even during shutter operations.

### 3. Full-frame shutter

All the pixels can be read even at random trigger shutter operations, which provides vertical resolution without degradation.

### 4. Tetragonal lattice layout

The tetragonal lattice layout of CCD pixels facilitates computation for image processing.

### 5. Built-in color process

The built-in color process provides not only Raw output mode, where switching between 8 and 10 bits is allowed, but also RGB (equivalent to 24 bits), YUV4:2:2 (16 bits), and YUV4:1:1 (12 bits) output modes.

### 6. IEEE1394.b interface (Bilingual)

Image output and camera control are performed according to the IEEE1394b-2002 (IEEE1394.b), high-speed serial interface standard. Data transfer is performed at 800 Mbps, and non-compressed 10-bit images can be output. The bilingual mode allows connection to IEEE1394a-2000 (IEEE1394.a) devices, in which case the data transfer rate decreases to 400 Mbps. Non-compressed 10-bit images can thus be output at half the frame rate of IEEE1394.b.

### 7. Conformity to IIDC 1394-based Digital Camera Specification Ver.1.31

Conformity to IIDC 1394-based Digital Camera Specification Ver.1.31, the international industrial camera standard, facilitates camera control.

### 8. Random trigger shutter function

The FireDragon series is equipped with a random trigger shutter, which starts exposure, synchronizing with external trigger signals. Fast-moving objects can thus be captured in place, which ensures accurate image processing.

### 9. Scalable function

The image output range can be specified arbitrarily. By limiting the output range in the vertical direction, images can be read even faster, whereas limiting the output range in the horizontal direction reduces the dedicated bandwidth of the IEEE1394 transfer line.

### 10. Ultra-compact and lightweight main unit

The space-saving ultra-compact and lightweight camera has excellent resistance against vibration and impact.

### 11. Conformity to RoHS directive

The FireDragon series is manufactured in compliance with the European RoHS directive, which prohibits the use of hazardous substances.

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