The Definitive TurboDrive FAQ:

GET ALL OF YOUR QUESTIONS ANSWERED HERE.

Teledyne DALSA has introduced an exciting new technology designed to increase the throughput of GigE Vision networks. This patent pending development is available in the company's new **GigE Vision line scan camera series**, the **Linea GigE** and will be available on more new products in the future. This FAQ explains what TurboDrive is, how it works and what benefits it brings to an inspection system.

What is TurboDrive?

TurboDrive is a mode of operation used when transporting data across a gigabit Ethernet network. Specifically designed for GigE Vision networks, TurboDrive increases the effective throughput of the GigE network. TurboDrive can be turned on (or off) through a software API command in Sapera LT 8.0, or through a command button on Teledyne DALSA's CamExpert program.

Why use TurboDrive?

Gigabit Ethernet networks are designed to transport data at approximately 1 gigabit/sec, or about 125Mbytes/sec. In 2006, the AIA ratified GigE Vision 1.0, a protocol to be used with machine vision cameras that leveraged the advantages of networking technology. At the time of ratification, images from the predominant sensors could easily be transmitted across these networks. Fast forward to 2015 with the rise of fast, large CMOS image sensors, and the gigabit Ethernet network has become a bottleneck. TurboDrive increases the throughput of the GigE network connection to enable use of these CMOS sensors in new systems, without having to revert to more expensive technologies to move images from the camera to the host computer.

What are typical scenarios where TurboDrive is beneficial?

TurboDrive allows users to push past the gigabit Ethernet speed ceiling, allowing a GigEVision cameras to send pixel information at a rate in excess of 125 MB/s, speeding up line and frame rates beyond the nominal link capacity. It can also be used to aggregate information from multiple cameras onto a single physical link. For instance, data coming from 2 cameras could be sent to the same network card.

How does TurboDrive work?

TurboDrive is a patent pending technology so we cannot disclose exact details. What we can say is that, depending on the image, TurboDrive strives to pack the pixel data into the gigabit Ethernet packets more efficiently. Teledyne DALSA has prepared a technical primer on TurboDrive which lists the four principles behind the technology. You can find the Primer here: http://www.teledynedalsa.com/turbodrive

Does TurboDrive affect the image?

No, TurboDrive does not affect the image. The image in system memory is exactly the same as the image read from the camera sensor. There is no loss of image quality and no compromises. Many people ask whether TurboDrive relies on image compression technics similar to JPEG, and it does not.

What performance improvement can I expect?

The degree of improvement is highly dependent on the image itself. Teledyne DALSA has created a software simulator called the TurboDrive Performance Tool, which uses your typical image data to predict the degree of improvement TurboDrive can deliver (more on that in the TurboDrive Technical Primer).

Throughput increases range from 20-150%, with 50-100% common.

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How reliable is TurboDrive?

There is nothing unreliable about TurboDrive technology. The technique is as reliable as communications link between the camera and the computer. Because of the nature of the data packing, TurboDrive does require a reliable transmission channel such those offered by GigE Vision, USB3 Vision and CLHS (Camera Link High Speed). Transmission errors in these protocols are handled at the transmission link layer: therefore the TurboDrive decoding engine on the host always sees an error free digital signal. This is described in more detail in the TurboDrive Technical Primer.

Do I need Teledyne Dalsa Sapera LT to run TurboDrive?

Yes, TurboDrive is proprietary to Teledyne DALSA and you require Sapera LT 8.0 (minimum) to run Turbo Drive. Like Sapera LT 8.0, TurboDrive is free of charge!

How does TurboDrive work with other features like burst mode, or cycling mode?

These three techniques are three separate features. Burst mode is the ability to buffer many images in internal camera memory during peak acquisition times, and to transmit them over the GigE network during slow periods. TurboDrive would accelerate the transmission of images and increase the overall system throughput.

Cycle mode is the ability to acquire several images in close sequence, changing acquisition parameters (like exposure times, region of interests) between each image acquisition. Once completed the cycle restarts until the overall process is stopped. Cycle mode can be combined with Burst mode to acquire images at faster than link speed, storing images in local memory while changing parameters in between each acquired image. TurboDrive can also be used to accelerate the transmission of images and increase overall system throughput.

Does TurboDrive only work with GigE Vision?

TurboDrive can work with any reliable transmission link, specifically those with error correction. In addition to GigE Vision, USB3 Vision and Camera Link HS are candidates for TurboDrive. TurboDrive is not suitable for Camera Link, since any transmission errors that may occur with Camera Link are not corrected at the transmission protocol layer.

Is it available only with Teledyne DALSA cameras?

Yes, TurboDrive is available with specific GigE Vision cameras from Teledyne DALSA.

Does TurboDrive affect the imaging application?

The TurboDrive decoding engine does run on the host computer and will consume some CPU cycles to execute.

TurboDrive has been designed to operate transparently with Teledyne DALSA products. It is activated as a feature presented by the Teledyne DALSA GigE Vision driver. It is available starting with Sapera LT 8.0. In CamExpert, go to the GigE Vision Host Control Features and set the Turbo Transfer Mode to TRUE. No changes are necessary to the application source code: the Teledyne DALSA GigE Vision driver takes care of decoding the image stream received from the camera. Upon activation of TurboDrive, the camera and software will automatically synchronize and permit faster image acquisition. Even though data on the link is encoded, the resulting image buffer provided to the user application contains the original data output by the sensor.

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