

GMSL SerDes Enables ADAS

Introduction

The automotive industry is increasingly leveraging technology advancements to help drivers minimize accidents. Installation of rear-view cameras and the use of surround-view systems are the first steps in this direction. Mass deployment of these systems will require easy-to-use, flexible, compact SerDes (serializer/deserializers) to transmit large amounts of high-resolution digital video data. New SerDes technology provides the connectivity needed to build the current generation of Advanced Driver Assistance Systems (ADAS) as shown in Figure 1.

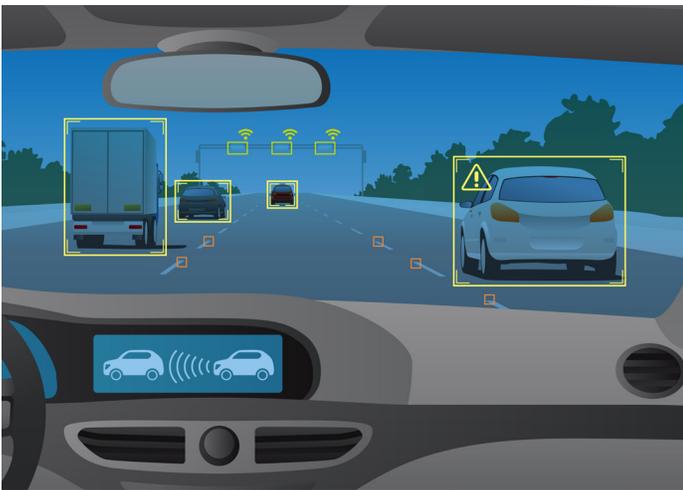


Figure 1. Advanced Driver Assistance Systems

Challenge

Most SerDes chipsets available today are older generation devices that don't have adequate ADAS connectivity built-in, have relatively large footprints, and don't have the flexibility needed to handle the higher speed and resolution requirements of the latest ADAS technology.

Solution

GMSL (Gigabit Multimedia Serial Link) SerDes technology provides a compression-free alternative to Ethernet, delivering faster data rates, lower cabling costs, and better electromagnetic

compatibility (EMC) when used to drive coaxial or shield twisted pair (STP) cables. Through the use of pre-emphasis and de-emphasis techniques, Maxim Integrated's GMSL chipsets can drive up to 15m of coax or STP cabling, providing the margin required for robust and versatile designs. Spread-spectrum capability is built into each serializer and deserializer IC to improve the electromagnetic interference (EMI) performance of the link, without the need for an external spread-spectrum clock.

In Maxim's current generation of GMSL SerDes devices, each serializer can operate with any deserializer in the family. This allows the use of a different interface at each end of the link (allowing 1.5Gbps and 3Gbps SerDes devices to be used together). In addition to driving high-resolution central and rear-seat displays, the new GMSL SerDes can also be used in megapixel camera systems. A simplified block diagram of a system using the MAX96705 serializer and MAX96706 deserializer is shown in Figure 2.

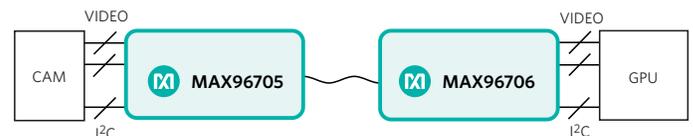


Figure 2. GMSL SerDes system in an Automotive Application

Serializer

The MAX96705 is a GMSL compact serializer especially suited for automotive camera applications. While maintaining function and pin compatibility with previous generation GMSL serializers, MAX96705 includes features and benefits not previously available. In high-bandwidth mode, the parallel-clock maximum is 116MHz for 12-bit linear data which supports up to 1-megapixel 60fps applications. Parallel data input in 116MHz double mode operation enables even higher resolution images. In high immunity mode, MAX96705 provides error detection (up to 8-bit CRC for the control channel and 32-bit CRC for the forward video channel) and retransmission in

the event of CRC failure of non-time-critical control channel information. This provides a significant benefit for Automotive Safety Integrity Level (ASIL) applications, such as side mirror replacement.

Another innovative feature of the MAX96705 is the use of a digital crosspoint switch which allows camera data inputs to be serialized in any order while still providing the desired deserialized output bit order. Advantages include simplified board design and reduced EMI. The small form factor (available in a 5mm × 5mm TQFN or QFND) makes it ideally suited for use in camera modules while maintaining backward compatibility with previous generation GMSL serializers.

Deserializer

The MAX96706 GMSL deserializer is designed specifically for use with the MAX96705 serializer. While providing the same features and benefits as the MAX96705, the MAX96706 also includes continuous fault monitoring through the use of eye mapping technology. The horizontal eye diagram opening of the data stream is measured once the link has been established, and thereafter at one second intervals. This continuous monitoring of the degradation of the video signal over time allows faults to be diagnosed and promptly addressed.

MAX967xx GMSL SerDes Family

The [MAX96711](#) serializer performs the same functions as the MAX96705 and is available in the same package but also provides line fault detection. The [MAX96707](#) serializer has similar functionality to the MAX96705 but is available in an even smaller 4mm × 4mm TQFN package. The [MAX96709](#) serializer operates at lower speeds. The [MAX96708](#) is a variation on the MAX96706 deserializer, retaining all of its functionality except for continuous eye monitoring.

Conclusion

The move towards advanced driver safety systems in the automotive industry necessitates the use of higher resolution and faster SerDes devices to accommodate video stream inputs from an ever-increasing number of cameras. Maxim has responded to this challenge with a range of GMSL SerDes devices which provide ADAS designers with unprecedented levels of performance in packages with ever smaller form factors.

Learn more:

[MAX96705 16-Bit GMSL Serializer with High-Immunity/Bandwidth Mode and Coax/STP Cable Drive](#)

[MAX96706 14-Bit GMSL Deserializer with Coax or STP Cable Input](#)

[MAX96707 14-Bit GMSL Serializer with High-Immunity/Bandwidth Mode and Coax/STP Cable Drive](#)

[MAX96708 14-Bit GMSL Deserializer with Coax or STP Cable Input](#)

[MAX96709 14-Bit GMSL Serializer with High-Immunity Mode and Coax/STP Cable Drive](#)

[MAX96711 14-Bit GMSL Serializer with High-Immunity/Bandwidth Mode and Coax/STP Cable Drive](#)

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