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APPLICATION NOTE 4934

How to Calculate the CCEN Duration for the MAX9257/MAX9258 Programmable SerDes Chipset

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Abstract: This application note describes how to calculate the CCEN duration for the MAX9257/MAX9258 programmable serializer/deserializer (SerDes) devices, based on STO timeout, clock frequency, and UART bit timing.

The MAX9257/MAX9258 programmable serializer/deserializer (SerDes) devices transfer both video data and control signals over the same twisted-pair cable. However, control data can only be transmitted during the vertical blank time, which is indicated by the control-channel-enabled output (CCEN) signal. The electronic control unit (ECU) firmware designer needs to know how quickly to respond to the CCEN signal before it times out and how to calculate this duration. This application note describes how to calculate the duration of the CCEN for the MAX9257/MAX9258 SerDes chipset. The calculation is based on STO timeout, clock frequency, and UART bit timing. The CCEN duration is programmable and can be closed if not in use.

The data sheet for this SerDes chipset explains that the MAX9257 serializer detects an active VSYNC edge and sends three synchronization words. Once the MAX9258 deserializer sees the active VSYNC transition and detects the synchronization words, it enters the control-channel phase and CCEN goes high. There is a brief delay of T1 between the VSYNC transition and CCEN transitioning high. The electronic control unit (ECU) is allowed to communicate when CCEN is high.

If the ECU does not communicate while CCEN is high (**Figure 1**), the link remains silent and STO starts counting toward its preset timeout-counter value. If STO times out (T2), CCEN transitions low and the control channel closes.

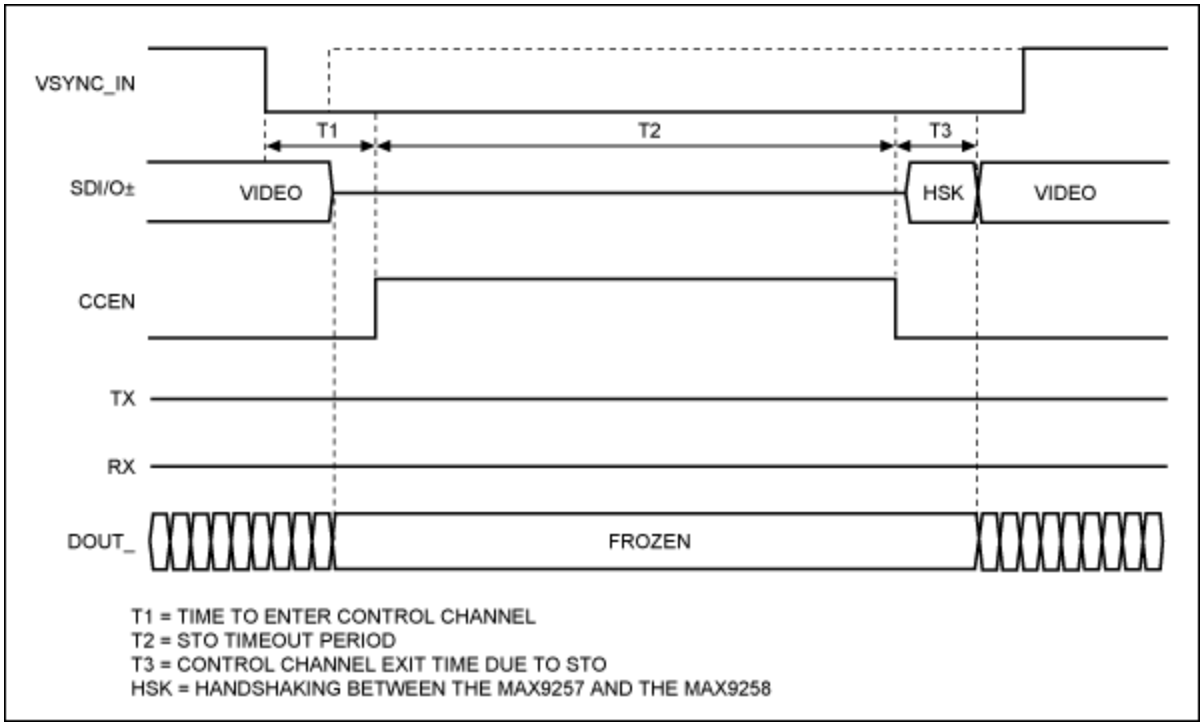

Figure 1. The control channel closes due to STO timeout.

The actual CCEN time without ECU communication is a 3-UART bit time plus t_{STO}. The STO timer is configured by the register REG2 for both the MAX9257 and MAX9258.

For example, if the pixel clock frequency is set to 16MHz, STODIV is set to 0000 (STODIV = 16) and STOCNT is set to 0000 (STOCNT = 1). The UART bit rate is 400kbps.

Three UART bit time is 3 × (1/400k) = 7.5µs.

The formula for calculating the STO timeout-period is:

$$t_{STO} = (1/f_{CLK}) \times STODIV \times (STOCNT + 1)$$

So t_{STO} = 1µs and the CCEN active time is 7.5µs + 1µs = 8.5µs.

The 3-UART bit time can also be used to calculate the CCEN active-time duration when the ETO timer is activated.

Related Parts		
MAX9257	Programmable Serializer/Deserializer with UART/I²C Control Channel	Free Samples
MAX9258	Programmable Serializer/Deserializer with UART/I²C Control Channel	Free Samples

More Information
