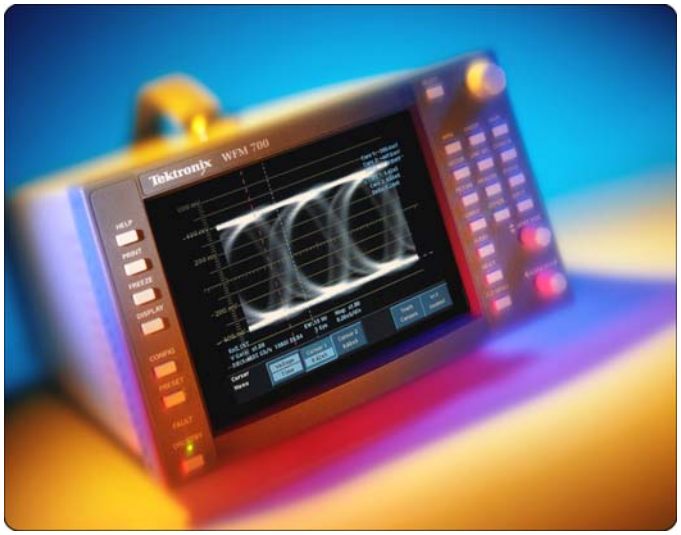
Cypress Semiconductor Listens to its Customers: Tektronix Instruments Essential for Video Testing



Solution Summary	
Challenge	Develop the industry's first quad independent-channel physical layer devices, which enable both Standard Definition (SD) and High Definition (HD) video applications
Solution	Tektronix WFM700M multi-format waveform monitors and Tektronix TG2000 precision signal generation platform
Benefits	Flexibility to test multiple video formats simultaneously, advanced jitter measurements, real video signal generation, and customer confidence in device compliance with various industry standards

Developing an industry first cannot be accomplished without the industry's best. This is the lesson Cypress Semiconductor, a world leader in point-to-point physical layer devices, quickly learned as it embarked upon the creation of the video industry's first quad-channel chip that enables both Standard Definition (SD) and High Definition (HD) video applications simultaneously.

Targeted specifically at professional video applications requiring Society of Motion Pictures and Television Engineers (SMPTE) standard compliance and video transport applications requiring Digital Video Broadcast-Asynchronous Serial Interface (DVB-ASI) standard compliance, the development of the independent-channel HOTLink II transceiver presented a host of challenges.

"Developing a silicon device that incorporates both standard and high definition video formats concurrently and with multiple independent transceiver channels had never been accomplished," said Erin Kettwig, Product Manager, Cypress Semiconductor. "But we were determined to enable the transmission and reception of four totally independent channels of multiple video protocols in a single chip. It was a highly complex undertaking." e

The project required the creation of silicon devices that meet both SMPTE-259M (270Mbps) and SMPTE-292M (1.485Gbps) digital television broadcast speeds, as well as the DVB-ASI (270Mbps) video transport standard.

"We had a good idea of how to develop the multi-format devices, but we weren't sure how we would test them for overall performance and compliance with various standards," Kettwig noted. "So we asked our customers about their test tools, and the feedback was resounding: Tektronix instruments are absolutely essential for video test."

Cypress Semiconductor chose the Tektronix WFM700M multi-format waveform monitor and Tektronix TG2000 precision signal generation platform to test and validate its new HOTLink II transceiver.

The Tektronix WFM700 series multi-standard waveform monitors offer measurement capabilities needed in the production, post-production, distribution, and transmission of HD and SD digital video and audio content. For mixed HD/SD environments such as Cypress' new devices, the multi-format WFM700M can perform such operational monitoring tasks as checking signal validity and content quality, setting levels, and verifying signal paths. In addition, it provides the digital analysis capabilities important in the design, installation, and maintenance of digital video systems, including eye, jitter, and data measurements for both HD and SD formats.

According to Cypress Semiconductor Applications Engineer Palani Subbiah, the WFM700M's advanced jitter measurement capabilities are vital for verifying SMPTE compliance. "Measuring jitter in accordance with SMPTE recommendations would be very complex and difficult without the WFM700M," he mentioned. "Not only has the instrument made these complex

measurements feasible, but also straightforward and easy."

The WFM700M's jitter mode demodulates signal jitter, displaying a trace of video-correlated jitter vs. time, and measuring peak-to-peak time jitter in the active display. It contains four high-pass filters with various cutoff frequencies to isolate low, medium and high frequency jitter. The WFM700M is also able to measure the temporal jitter of a selected line, providing greater precision than waveform monitors that only measure field jitter.

"The WFM700M and TG2000 have produced a level of comfort and validation among our customers; Tektronix instruments provide a virtual stamp of approval above and beyond standards compliance."

- Erin Kettwig, product manager, Cypress Semiconductor

The Tektronix TG2000, a multi-format, precision signal generation platform, also provides a key ingredient for ensuring SMPTE compliance, indicated Subbiah. Designed for the most demanding test applications, the TG2000 provides reference quality test signals, stressing functions in both the analog and digital domains, and the flexibility to address user-defined testing requirements.

"SMPTE standards require compliance testing to three types of pathological test patterns, and the TG2000 enables us to generate real video data signals to produce and test these patterns with exceptional accuracy," mentioned Subbiah. "In addition, we can use the TG2000 to introduce stress conditions into the data stream in order to test our devices' tolerance to jitter and other real-world anomalies."

Together, the WFM700M and TG2000 provide a comprehensive toolset for generating, acquiring, and analyzing video signals to ensure the HOTLink II transceiver's compliance with SMPTE 259M (SD) and SMPTE 292M (HD) standards.

"The HOTLink II transceiver is both highly flexible in its functionality and highly targeted in its compliance to industry standards – and we needed test tools that are equally flexible, powerful, and targeted specifically for the video industry," said Subbiah. "Tektronix is the clear industry leader in video test, and the decision to utilize the WFM700M and TG2000 became quite obvious."

As a result, Cypress's highly integrated HOTLink II independent-channel transceivers are some of the most flexible on the market, offering a wide operating range (0.2-1.5Gbps), bypassable 8B/10B encoding, and redundant outputs. Each HOTLink II independent-channel device integrates four independent transmit channels with clock-multiplying phase lock loops (PLL), four independent receive channels with clock and data recovery units (CDRs), and transmit phase align buffers for single-chip solution.

Customers Pleased with Cypress' Use of Tektronix Tools

Kettwig stressed the benefit of the Tektronix tools extends far beyond Cypress' development labs.

"The vast majority of our customers use Tektronix instruments to test their products. By using the same test tools, we can assure our customers that our devices will perform well in their systems and produce the results they expect during their test processes," she said.

Cypress has also been able to improve customer support using the Tektronix instruments.

"When our customers have problems, we are able to quickly set up debug situations in our labs versus talking them through the process and troubleshooting on the phone," Subbiah noted. "The ability to mimic their circumstances on the fly and help them overcome setbacks in real time is a huge benefit. And the overall relationship we have with our video customers has improved as a result."

The use of Tektronix' video instruments from silicon creation to end-user product design is a testament to the company's leadership in the video test market.

"Cypress intends to be the premier provider of advanced silicon devices for the professional and broadcast video industry. And in order to do so, we need to utilize the very best tools," said Kettwig. "Tektronix is the reigning leader in video test, and after using the WFM700M and TG2000 – and realizing the functionality, simplicity, and customer validation they provide – it's easy to see why."