

Funai Electric Deployment of the VM5000 Video Analyzer Accelerates DVD Recorder Development



Solution Summary

Challenge	DVD recorders must be able to output both progressive and HD format analog component signals, but there has been no analyzer available in the development process that can quickly capture the great amounts and diversity of data involved.
Solution	In addition to the existing VM700T for SD signals, Funai is now using the VM5000 for HD signals. This is the new standard in automatic measurements for HD analog component signals, including 480p SD progressive.
Benefits	Dramatically accelerates processes for evaluation of HD component signals and prototype performance test.

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Funai Electric, headquartered in Daito, Osaka, is known for its printers, TV, video, and DVD equipment, and its products are increasingly seen in markets around the world, especially in the USA through its OEM operations. Even though the Funai nameplate may not be widely seen, Funai products are. Funai shifted its focus from analog products to digital some years ago, and now it is changing again, from DVD players to DVD recorders.

HD signal assessment essential to DVD recorder development

Funai Electric manufactures its DVD equipment in China, but performs R&D and builds the prototypes in Japan. Funai has earned the trust of world markets for its superior product development that focuses on functionality. In the past, the company has relied on the Tektronix VM700 video analyzer to measure and assess analog component signals. The VM700 is considered the reference instrument for measuring NTSC and other SD analog signals worldwide. It has been at the heart of a proprietary testing system built in-house at Funai, and is used on the company's assembly lines as well. However, in order to handle the new formats used by DVD recorders, such as 480p, and to develop products with new features while maintaining superior quality, Funai needed new capabilities.

Initially tried combination of many instruments

Takaharu Kanehira, technical engineer responsible for developing DVD products, in the DVD engineering department, commented: "in the early phases of development, we were using a combination of instruments, like a high-definition signal generator and an oscilloscope for 480p signal assessment. But the sheer number of different factors to be measured—level, timing, noise, frequency response, nonlinearity, channel delay, etc—made this extremely time-consuming." Taking the human factor into account when taking readings, "introduces the possibility of imprecise measurements," he continued. Developing consumer products is a race against time, and the time spent just on assessing the outputs at analog terminals was prohibitive, not to mention the need for more reliable measurements.

Drastically accelerate development process

Seeing the need for a worthy successor to the VM700 that supported HD signals, Kanehira chose the Tektronix VM5000. "There were not any instruments in the same class as the VM5000." According to Kanehira, "since deploying the VM5000, HD



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component signal assessments that had taken more than an hour before now only require a few minutes.” Kanehira also mentions, “prototype performance tests conducted many times during the development phase had taken a whole day. But it now with the VM5000 these tests take only 2 hours or so.” Using the VM5000 accelerated the development process. The analyzer is easy to use: “I did not need to pore over the manual.” In fact, it is so simple that Kanehira emphasizes: “engineers with less experience are able to operate it easily, which has led to less time required for training.” This simplicity of use was one of the factors that led to the decision to use the VM5000.

Using dedicated matrix-test signals

At Funai, the company uses a dedicated HDTV matrix test signal DVD, which is supplied with the VM5000, as a signal source. This DVD includes all the signals required for HD component output testing with the VM5000: just insert it into the player to be tested, with no need to hook up other signal sources or change testing parameters. The VM5000 captures more than 100 different parameters from HD component output (the latest models in the VM5000 series capture 140), and after automatic measurement, the results are



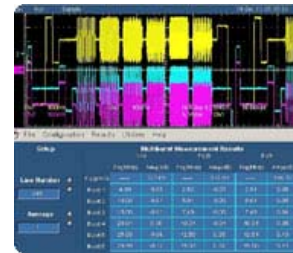
Testing DVD-R/RW recorder “FDRS-01 TORUGA” by VM5000

automatically formatted into a data sheet. Funai Electric also aggregates CSV formatted results on a PC for analysis. The company has plans to deploy more Tektronix machines of the same series. When used on the production line to speed up the production process, their automatic evaluation features measure whether signal and timing levels are within specified values. The newest models in the VM5000 series are well suited to such needs. They are equipped with a pass/fail function that can make automatic comparisons with reference values, making them suitable for immediate use on a production line.

Plans to add to production lines

In the product development section, the work doesn’t consist of solely testing analog component signals. Kanehira continues: “actually, our use of the VM5000 is

concentrated into a limited period of time.” During that time, engineers use it for quickly and automatically measuring many different parameters and that is unquestionably one of the devices’ strong suits. Not only can the VM5000 be used as a dedicated component signal test instrument, it can also be used as a stand-alone TDS5000-series digital phosphor oscilloscope. Due to the fact that Funai also uses for the VM5000 as an oscilloscope, the company was able to reduce costs significantly since the device can be used as needed without the need for two separate devices. In the future, Kanehira predicts “because the main unit is Windows based, we could use it as a controller for other instruments.” Yet further proof of the device’s versatile benefits.



Example of measurement using matrix-test signal

