XICATO

XIM Onboard Diagnostics

Component suppliers and their customers, luminaire designers and manufacturers, work hard to ensure their LED products perform reliably and meet data sheet specifications. Lighting specifiers also go to great lengths to make sure that they have specified the right luminaire for the intended application. However, despite all the due diligence, testing, validation and mock ups, sometimes field conditions are not as expected and can have a detrimental impact on the performance of the luminaire. Heat is usually the offending factor. Excessive heat beyond the luminaire's specified range, can degrade the performance of the luminaire's components and lead to premature color shift, lumen degradation, and catastrophic failure.

To address this risk Xicato's XIM includes integrated negative temperature coefficient thermistors, commonly referred to as "NTCs" or thermal sensors, and associated microcontroller electronics. These sensors can detect, for example, elevated heat triggered by unintended insulation. Through active, *intelligent*, thermal management, power to the LEDs is reduced and performance restored (see Figure 1).

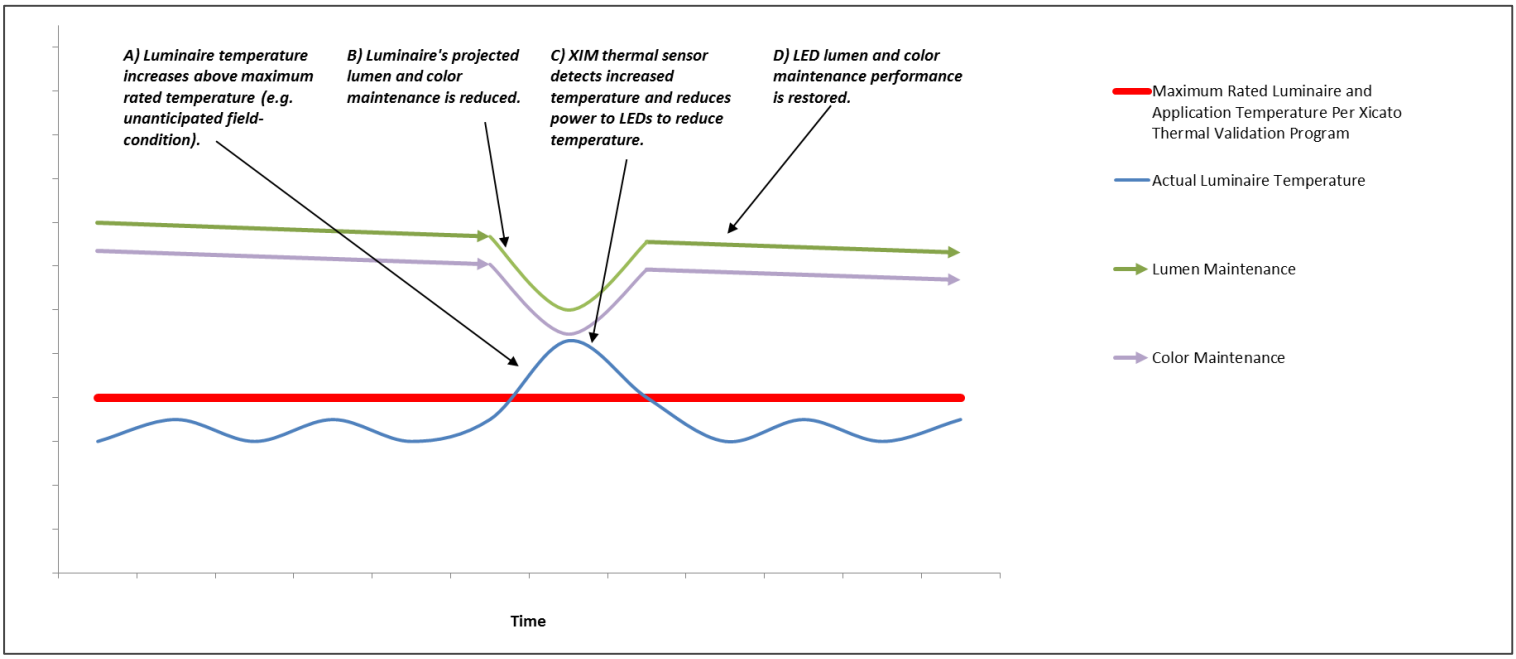

Figure 1

Another use of an integrated NTC and microcontroller is to record the temperature history of the module in form of a Temperature History Histogram (THH). An example of such a histogram is shown in Figure 2. The data for the histogram is collected by the microcontroller, which collects the temperature data from the thermistor on the LED board on a regular basis. The runtime is recorded in temperature buckets of 5°C each. In this example, the intelligent module has been running for over 30,000 hours, of which half of the time it has been at a temperature between 75°C and 80°C. This temperature history information is one of the most important parameters with regard to reliability and can be used to predict the remaining life of the module.

For more details on XIM internal sensors and diagnostics, refer to the XIM Operating Guide.

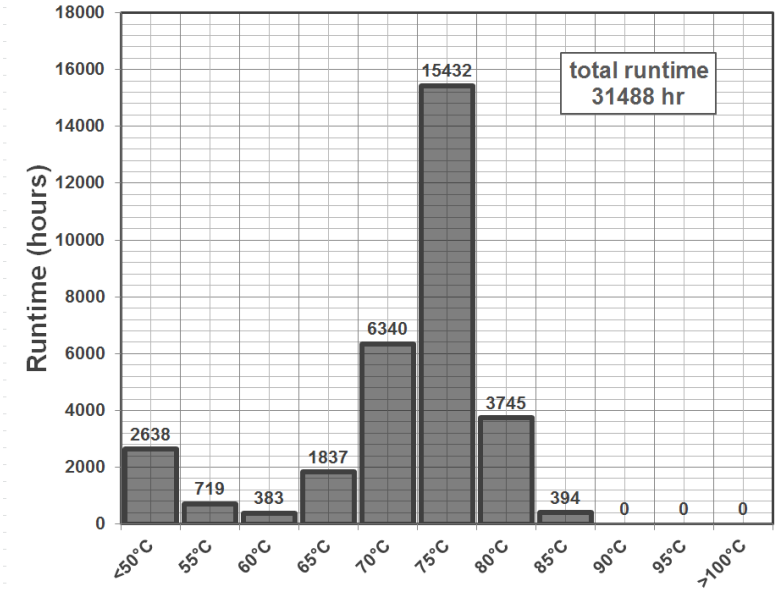

Figure 2: Example of a Temperature History Histogram, showing the total runtime of XIM at various operating temperatures.