

## XIM Frequently Asked Questions

### General Questions

**Q** Why did Xicato develop this new product?

**A** We developed this new product so that we could deliver on the promise of current and future digital technologies. Accommodating these technologies required a new, taller module platform and an advanced approach to our Corrected Cold Phosphor Technology®.

**Q** What are the new features of Xicato's XIM?

**A** There are three new features developed by Xicato and integrated in XIM. First and foremost is quality dimming. Xicato's integrated dimming (1-10V or DALI) is specifically tuned to our LED technology and provides the smoothest, deepest dimming that's possible with LEDs today. Second is internal diagnostics including thermal protection which ensures that light quality is maintained over time. And finally, XIM is "electrically future-proof", helping ensure that a luminaire specified today can be supplied at time of shipment, often several years in the future, despite inevitable underlying changes in LED chip performance.

**Q** How is XIM electrically future-proof?

**A** LED efficacies constantly improve. Typically every 2 years or less LED source manufacturers launch higher efficacy versions of their sources and discontinue their prior revisions. While this benefits end-users through reduced power consumption, it forces OEMs to redesign their luminaires frequently and stock various LED drivers to accommodate all the different flux packages and revisions. With the XIM, one power supply can be specified for the life of the luminaire design, and the efficacy changes are addressed within the module itself through the integrated driver.

**Q** What versions of XIM are available?

**A** XIM is available in 1300lm and 2000lm flux packages, in Standard Series (83 CRI), and Vibrant Series V80. XIM is offered in both 1-10V and DALI versions.

**Q** What luminaire applications are possible with XIM?

**A** XIM can be used in various applications including track and downlights. It can be integrated on a one-to-one basis with a single power supply, or multiple modules can be powered with a single higher wattage power supply, for example in a "multi-head" luminaire or track luminaire. Room-based applications where many modules are connected to a central power supply are possible.

**Q** Why was 48V used instead of 24V?

**A** For applications where one high wattage power supply is used to power multiple modules, for example in a room-based application, 48V enables longer wire runs at higher system efficiency.

**Q** When is XIM available?

**A** Now. Lead times are typically 4 weeks. Samples are available by contacting your Xicato Account Manager. Product Data Sheets are posted on our website along with other technical documents.

**Q** What is the minimum order quantity for XIM?

**A** The minimum order quantity, or MOQ, is 100 units.

**Q** How does an XIM-based lighting system compare in price to a conventional LED lighting system?

**A** An XIM-based lighting system (module with power supply), is comparable in price to a conventional high quality LED dimming system that uses a remote LED driver. Contact your Xicato Account Manager for pricing based on your annual requirements.

**Q** What are XIM's specification features?

**A** Deep dimming, smooth "dim to off/on", smooth "monotonic" dimming curves, and no flicker, even at dimmed levels. In addition, XIM incorporates thermal and electrical diagnostics to ensure that once in the field, light quality is assured over the life of the module.

**Q** What drivers, optics, and heat sinks can I use?

**A** There are many drivers, optics, heat sinks available that are compatible with the XIM. Complete information is available from the Xicato Application Support Team.

**Q** Can I use the XIM instead of XSM?

**A** Yes. The two modules are very close in size and moving from one to the other can be accomplished with minimal design work.

**Q** Is XIM a *drop-in* replacement for XSM?

**A** No. However, our Application team can provide guidance to make the process as simple as possible.

**Q** Is it Chip on Board (COB)?

**A** Yes. Xicato uses a COB approach to its new Corrected Cold Phosphor technology to reduce cost and increase efficiency while most importantly maintaining light quality.

**Q** Is it okay to touch the front of the module and clean it?

**A** Yes. Like the XSM, the XIM and XTM incorporate a glass plate to protect the LEDs. It is okay to touch, and it is okay if isopropyl alcohol (IPA), a liquid commonly used to clean reflectors, comes in contact with the phosphor.

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- Q** Does XIM have the same 5 year color and lumen maintenance warranty as XSM?
- A** Yes.
- Q** What reliability testing has been done with XIM?
- A** XIM has undergone extensive reliability testing, including HALT, HAST, WHTOL, HTOL prior to final design. Long term reliability testing is ongoing and 10,000hr LM-80 testing will be available in 2015.
- Q** What is XIM's IP rating?
- A** IP20.
- Q** How does the dimming performance compare with a conventional lighting system?
- A** The LED driver is a critical component to ensuring a luminaire's light quality. Quality and performance of drivers vary wildly. XIM was designed to provide the best quality of light, at an affordable system price.
- Q** Will you be coming out with Artist Series for XIM?
- A** Yes. See below for questions related to roadmap.

## Product Roadmap

**Q** What are the next versions planned?

**A** Artist and Vibrant Series “V9” 1300lm versions will be launched in 2015.

**Q** What about higher flux versions?

**A** Xicato’s initial focus is on the smaller luminaire, 50mm diameter market. Typically these luminaires use flux packages of under 2000lm. Higher flux versions are being evaluated.

**Q** What future ‘Intelligence’ is planned?

**A** XIM currently features performance and safety diagnostics, and quality integrated dimming. Xicato is working with industry lighting specifiers, end users, and luminaire OEMs to define the next phase of module-integrated intelligence and connectivity as part of the longer term roadmap.

**Q** Will a 5% or 10% dimming version be available?

**A** No. Our dimming is to 1% for 1-10V and 0.1% for DALI versions. 5%+ dimming is typically insufficient for architectural lighting applications.

**Q** Is the XIM available in a non-dimming version?

**A** No. However, the standard XIM can be operated in a non-dim state.

## Electronics, Dimming and Flicker

- Q** Aren't there some restrictions or limits on using 48V?
- A** Yes, there are some limitations based on country of installation. Canada limits Class 2 systems at 42.4V. Please consult our (application note) or our application team for details.
- Q** How does XIM connect to the power supply and dimming device?
- A** XIM connects to a power supply and dimming controls via a 6 pin connector and harness from Tyco. Xicato stocks this harness (catalog number XSA-331) to assist customers with design-in. Special versions can be requested direct from Tyco.
- Q** How is the module used when a single power supply powers multiple modules?
- A** XIM can be wired in parallel when being used on a common bus or PSU approach, vs series which is more typical with constant current (CC) products and which often leads to operation outside class 2 or SELV. This is a more robust approach in that a single lamp failure won't cause the whole string to turn off.
- Q** What dimming systems and devices is XIM compatible with?
- A** XIM DALI is compatible with any DALI system. XIM 1-10V is designed to be compatible with dimmers that comply with ANSI 0-10V/1-10V dimmer standard IEC60929 Annex E. This includes many popular 1-10V/0-10V dimming systems from leading manufacturers. For optimum dimming performance, we recommend 1-10V dimmers that use a logarithmic curve.
- Q** Does XIM 1-10V work better with a "source" type dimmer or "sink"?
- A** XIM works best with a sink dimmer, however it is compatible with a source dimmer. For detailed questions on compatibility, please contact Xicato.
- Q** What do you mean by "flicker-free across the dimming range"?
- A** Flicker can be problematic not only at full brightness (non-dimmed), but also when dimmed. Controlling for flicker at lower light levels can be especially challenging. XIM is designed to be flicker-free at these lower levels.
- Q** Why don't you publish flicker index or percent flicker for XIM?
- A** Both Flicker Index and Percent Flicker have been proven to be poor and/or inaccurate indicators of LED flicker.
- Q** Can XIM be used in luminaires designed for emergency lighting?
- A** Yes. Refer to the Emergency Battery Backup System Application Note on the Xicato website for more details.
- Q** How can I find out more about XIM diagnostics?
- A** Please refer to the XIM Operating Guide for details about diagnostics.

- Q** How does XIM install into a luminaire?
- A** For information on how an OEM installs XIM into a luminaire, refer to the XIM Assembly Guide.
- Q** Your literature indicates that XIM is offered in a “1-10V” version. What if the customer has a “0-10V” application? Are there problems using XIM?
- A** No. While there are no official definitions for 1-10V, or 0-10V, most manufacturers (including Xicato) usually refer to compliance to IEC60929 Annex E2, “Control by DC Voltage”. Typically North America refers to “0-10V” and Europe “1-10V”. If there are compatibility questions with a given dimming system, please contact Xicato.
- Q** What is the minimum and maximum wire harness length that can be used?
- A** There is no minimum wire harness length requirement.
- Q** Does XIM use PWM or CCR to dim?
- A** Xicato uses a hybrid-type approach to provide deep, smooth, flicker free dimming.
- Q** What are the advantages of PWM or CCR?
- A** Advantages of CCR are flicker free light output, smooth transitions between light levels (no fundamental digital steps between levels). Disadvantages are lower dimming limit of ~10%-15% (based on LED specified operating range). Going below 10-15% dimming level can lead to lighting artifacts such as spotting and color shift as LEDs randomly drop out (stop lighting up). PWM dimming advantages are that it is easier to achieve deep dimming (below 10%). However, PWM is prone to flicker and stroboscopic effects, and may create video artifacts such as banding and strobing. Stepping between levels may be visible since adjustment is by discrete steps.
- Q** What does it mean when manufacturers indicate a lighting system “dims to off”?
- A** Some manufacturers use terms like “dims to off” or “dims to zero” to describe the combination of very deep dimming (typically 1% or less), and the module’s ability to dim from that point to off, and also the speed and quality of the transition between the low dim level and off.
- Q** On the Product Data Sheets, in the long term reliability specifications, what is meant by “C”, “L”, “B”?
- A** “C” refers to color change of the module over a period of time. “C3” indicates a color change of less than .003 measured in  $u'$ ,  $v'$ . “L” refers to lumen maintenance of the module (e.g. L70= 70% of initial output). “F” refers to catastrophic failures. “B” is the percentage of modules that perform below the “C” and “L” values. The C3 and L70 figures are B50, meaning that 50% of the modules will be above this value at that point in time. B50 is a typical reliability level in the lighting industry (for example, most conventional lamps’ failure data is a B50 value).