

Application Note – Xicato XTM LED Module Assembly Instructions Version 20150916

General Handling

When handling the XTM module, it is important to avoid touching both the phosphor coating on top of the LED array as well as the integrated thermal pad underneath. These surfaces are sensitive to scratches, contamination, and debris which may decrease module performance. If any dust or debris accumulates on the phosphor coating, clean the surface by blowing on it with clean air or gently wipe the surface clean with isopropyl alcohol. In addition, take special care not to press down upon the phosphor surface of the array as pressure to this area may cause the array to dislodge itself from its protective plastic housing. If the XCA core becomes dislodged, refer to the following instructions to return the XCA back into the XTM housing.

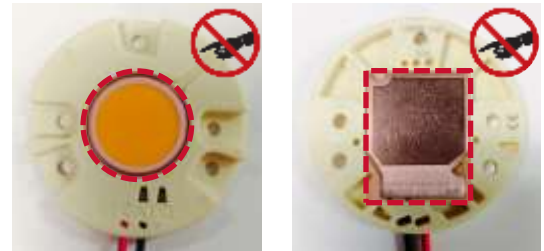


Figure 1: XTM areas sensitive to scratches, contamination & debris.



Figure 2: Electrical contacts on the bottom of the housing



Figure 3: V+ & V- Pad Alignment

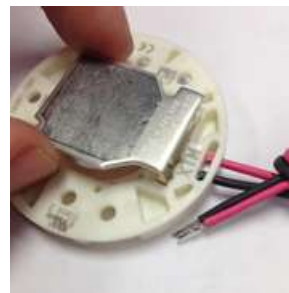


Figure 4: XCA Core aligned and parallel to housing

1. If the XCA falls out of the XTM housing, great care should be taken to avoid touching or damaging the two electrical contacts on the bottom of the housing (Figure 2).

2. To reinsert a XCA, place the housing on a solid flat surface with the electrical contact facing upwards.

Orient the unit so that the pads V+ and V- are aligned with the electrical contacts of the housing. Gently position the XCA into the pocket so that it is always parallel with the housing (Figures 3 & 4).



Figure 5: Misaligned XCA Core



Figure 6: Applying pressure to XCA

3. Do not insert the XCA at an angle, this could possibly deform or damage the electrical contacts on the housing (Figure 5).

4. Make sure even pressure is applied to the entire surface of the thermal interface material and press downwards. Be careful not to tear or scratch the surface of the thermal interface material during this process (Figure 6).

Module Installation

To install the Xicato XTM module, attach a heatsink to the bottom of the XTM using M3 x 0.5mm x 8mm screws. Ensure the module has sufficient contact with the surface of the heatsink by visually verifying there are no air gaps between the thermal pad and the top of the heatsink. Xicato recommends that the heatsink have a surface flatness $\leq 0.1\text{mm}$ and no center hole. Center holes are only permitted if the diameter is $\leq 12\text{mm}$ and the electrical power of the module does not exceed 30 watts for 19mm LES modules or 20 watts for 9mm LES modules.

Using a calibrated torque driver, torque the fasteners to between 3.2in·lbs (0.36N·m) and 3.8in·lbs (0.43N·m) using the three-hole pattern or between 4.8in·lbs (0.54N·m) and 5.8in·lbs (0.65N·m) for the two-hole pattern. Take caution not to exceed these values as this may damage the XTM. Xicato recommends using a spring lock washer with either a flat washer or adapter ring at all mounting locations to reduce the likelihood that the fasteners will loosen under shock, vibration, or thermal cycling. It is important for optic attachment that the combined height of the screw head, spring washer, and flat washer or adapter ring does not exceed the 3.8mm pocket depth.

The 20 AWG electrical wires exiting the XTM module are 400mm (15.7in) in length with ends stripped back 12.7mm (0.5in). Use wire connectors to join the black wire to the negative lead (-) and the red wire to the positive lead (+) of a constant current driver. The fixed non-detachable wires have been designed to meet cable pull test per EN 60598-1-2008.

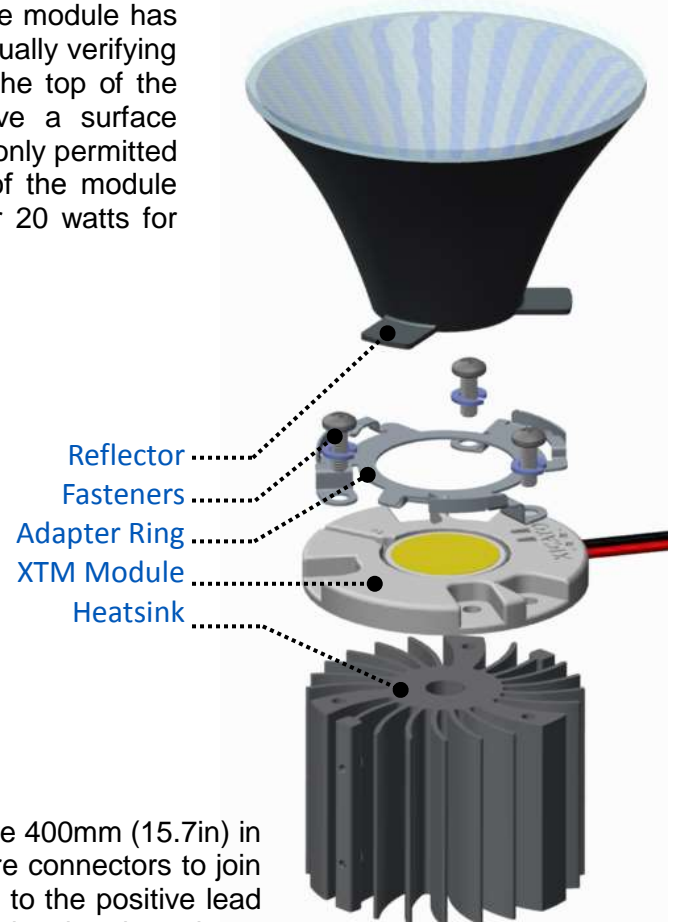


Figure 7: XTM Assembly (Exploded View)

Mounting Examples

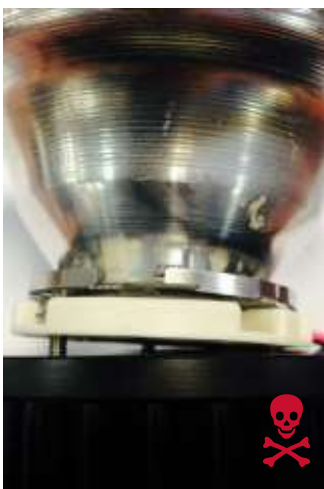


Figure 8: XTM is incorrectly mounted with visible gaps between the bottom surface of the module and the top of the heatsink. Any gap between the thermal pad and the heatsink significantly decreases thermal performance.



Figure 9: XTM is correctly mounted. The bottom surface of the thermal pad is completely flush with the top surface of the heatsink. Additionally, the screw head, lock washer, and adapter ring flange fit inside the pocket (3.8mm depth) which allows the reflector to sit flush to the optics plane.

Note: Gaps between mounting screws are normal. This indicates the screws are providing an adequate clamping force.

Reflector Attachment

Xicato offers several twist-lock reflector adapter ring styles to choose from to aid in attaching secondary optics. Rings mount to the top surface of the XTM module and incorporate the same M3 fasteners used to mount the module to the heatsink.

When installing adapter rings, the attachment flanges of the ring should sit inside the XTM housing pockets between the module surface and the locking spring washer. Once adapter rings are tightly fastened to the module to their appropriate torque values, Xicato twist-lock compatible reflectors can then be installed into the assembly by placing the bottom surface of the reflector flush against the top surface of the module and slowly rotating the reflector clockwise until the reflector is fully engaged and secured underneath the restraining tabs of the adapter rings. Reflector alignment surfaces on the perimeter of the ring will automatically center the axis of the reflector with the light emitting surface of the module. Be careful not to over torque the reflector when rotating it into its locked position; this may damage the reflector or adapter ring.



Figure 10: Example of a 3-Hole Twist-Lock Adapter Ring

Please note that Xicato is the only authorized distributor and supplier of twist-lock adaptor rings. For more information on adapter ring options, contact your XICATO account manager or technical representative.

Spacers

When upgrading an existing fixture that was designed around an XSM module, or designing a fixture that may use XIM-CV in the future, it may be desirable to use an XTM module that matches the height of an XIM-CV or XSM module. In these situations, aluminum spacers are available that can be incorporated into the XTM assembly.



Figure 11: XSA-271 (left) can be installed with an XTM module to match the height of an XSM module. XSA-274 (right) includes a bottom feed alternative.

When installing, make sure the spacer is placed between the module and the heatsink. If the optional integrated thermal pad is included with the spacer, make sure that thermal pad side of the spacer is in full contact with the heatsink. Incorrectly installing the spacer upside-down such that the thermal pads of the module and spacer contact each other will severely diminish thermal performance of the module. When using a bottom feed incorporated spacer (XSA-274-T), the retaining clamp can be used for wire strain relief and center feed but it is not designed for wires to double back. Ensure the surfaces of module, spacer, and heatsink have sufficient contact with each other by visually verifying there are no air gaps between the thermal pads. Fasten the module and the spacer into the heatsink using M3 x 0.5mm x 25mm screws. Again, Xicato recommends using a spring lock washer with either a flat washer or adapter ring at all mounting locations to reduce the likelihood that the fasteners will loosen under shock, vibration, or thermal cycling. Be careful not to over torque the fasteners when spacers are used in the assembly as this may damage the XTM.

The table below can help determine the correct spacer needed to achieve the desired platform height. All spacers below can be ordered through the authorized supplier, MechaTronix, with or without an integrated thermal pad. MechaTronix can be contacted through their website at <http://www.led-heatsink.com>.

Xicato Part #	Description	Integrated Thermal Interface	Spacer Height
XSA-270	XTM/XIM Spacer	Not Included	14.2 mm
XSA-270-T	XTM/XIM Spacer	Included	
XSA-271	XTM/XSM Spacer	Not Included	11.2mm
XSA-271-T	XTM/XSM Spacer	Included	
XSA-274-T	XTM/XSM Spacer with Bottom Feed	Included	



Figure 12: Fully assembled XTM assembly incorporating XSA-270 spacer and XSA-244 twist-lock adapter ring.

T_C Measurement

On the top surface of the XTM module, between the thermal ring and the plastic housing case, is the module's T_C measurement location. This site must be utilized for attaching a thermocouple to the thermal ring of the LED array in order to verify that the XTM module is running below its maximum design temperature limit of 90°C. Xicato recommends attaching the thermocouple using the following method accepted by UL1598-2008, Section 19.7.4, Rev January 11, 2010.

1. Verify that the T_C location is clean, dry, and free from debris. Any debris between the module thermal ring and the thermocouple bead may add thermal resistance to the test and could deliver erroneous results.
2. Apply cyanoacrylate adhesive sparingly to the surface of the thermocouple bead. Press surface of bead to thermal ring immediately. Hold in place until bond sets per manufacturer's instructions. Do not reposition.
3. In a separate mixing container, add recommended ratio of two-part thermally conductive adhesive and blend per adhesive manufacturer's instructions. Avoid high mixing speeds which could entrap excessive amounts of air or cause overheating of the mixture resulting in reduced working life.
4. Apply the adhesive around the surfaces of the bonded thermocouple bead such that the bead is fully contained within the adhesive. Let the adhesive fully cure per the manufacturer's instructions. Stress relieve the thermocouple wire to further protect the joint.

Note: Only a minimal amount of adhesive should bridge the gap between the thermal ring and the XTM housing. The CTE mismatch between the two materials can weaken the adhesive bond between the thermal ring and thermocouple bead particularly during repeated thermal testing. Xicato recommends inspecting the T_C joint between thermal tests to ensure it is still attached properly.

Important: The thermocouple bead must make direct, reliable contact with the surface of the thermal ring; otherwise, unknown thermal impedance between the thermal ring and the thermocouple appears. This could result in lower temperature readings. It is the responsibility of the test engineer or test party to ensure the thermocouple bead is properly attached to the T_C point.

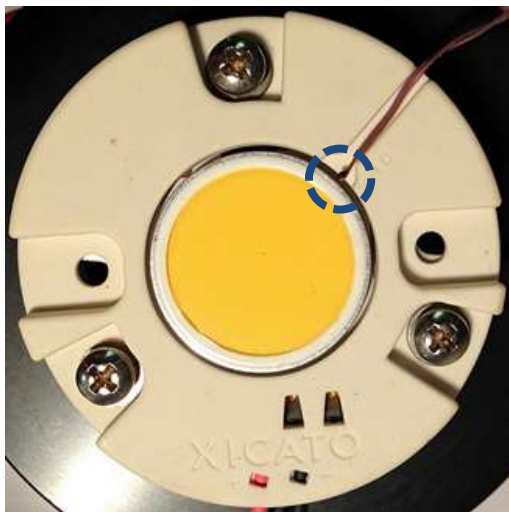


Figure 13: Typical T-type thermocouple attachment at the T_C measurement location. Adhesive omitted for clarity.

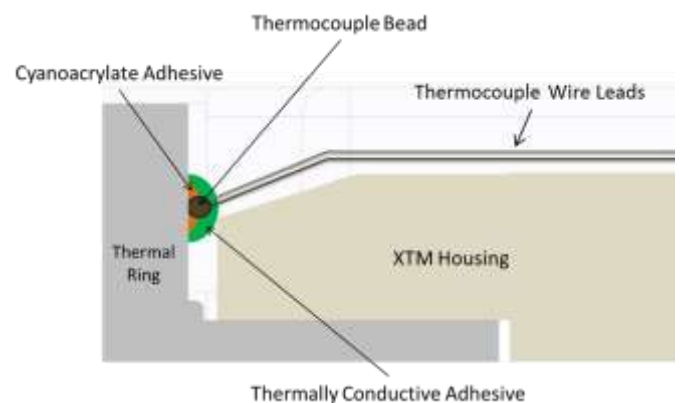


Figure 14: Cross-section of Xicato recommended thermocouple attachment.

CAUTION: Quick-drying adhesives or cyanoacrylate adhesive, popularly known as superglue, should not be used in any luminaire design or for long term testing. These adhesives are known to be destructive to LED components over time.