CLAIMS

What is claimed is:

1. A method of manufacturing an augmented LED array assembly comprising:

providing an LED array assembly, the ~~method comprising:~~

~~providing a hybridized device, the hybridized device~~LED array assembly comprising a micro-LED array mounted onto a driver integrated circuit, the driver integrated circuit comprising a plurality of driver integrated circuit contact pads on a top surface of the driver integrated circuit;

providing a flexible printed circuit board (PCB) comprising a bottom surface, a plurality of first contact pads on the bottom surface, a plurality of second contact pads on the bottom surface, and a plurality of contact bridges, each of the plurality of contact bridges extending between one of the plurality of first contact pads and one of the ~~second~~ plurality of second contact pads; and

mounting the flexible PCB to the ~~hybridized device~~LED array assembly by forming solder bonds between the plurality of first contact pads of the flexible PCB and the driver integrated circuit contact pads.

2. The method according to claim 1, wherein the solder bonds are formed in a reflow soldering process.

3. The method according to ~~claim 1, wherein the solder bonds are formed in a diffusion soldering process.~~

~~4. The method according to~~ claim 1, further comprising applying underfill about the solder bonds at the driver integrated circuit contact pads.

4. The method according to claim 1, wherein the solder bonds are formed in a diffusion soldering process.

5. A method of manufacturing an LED lighting circuit comprising:

providing an augmented LED array assembly that comprises:

an LED array assembly comprising a micro-LED array mounted on a driver integrated circuit (IC), the driver ~~integrated circuit~~IC comprising driver IC contact pads on a top surface of the driver IC, and

a flexible printed circuit board (PCB) comprising a bottom surface, a plurality of first contact pads on the bottom surface, a plurality of second contact pads on the bottom surface, and a plurality of contact bridges, each of the plurality of contact bridges extending from one of the plurality of first contact pads to one of the plurality of second contact pads,

each of the plurality of driver IC contact pads being bonded to a corresponding one of the plurality of first contact pads of the flexible PCB;

providing a circuit board assembly comprising a circuit board mounted onto a heat spreader and comprising circuit board assembly contact pads;

mounting the augmented LED array assembly to the heat spreader; and

bonding the plurality of second contact pads of the flexible PCB to the circuit board assembly contact pads.

6. The method according to claim 5, wherein ~~the~~ mounting the augmented LED array assembly to the heat spreader is preceded by applying a thermally-conductive adhesive layer to a mounting surface of the heat spreader.

7. The method according to claim 6, wherein ~~the~~ mounting the augmented LED array assembly to the heat spreader is followed by curing the thermally-conductive adhesive layer.

8. The method according to claim 5, wherein ~~the~~ bonding the ~~plurality of~~ second contact pads of the ~~flexible PCT~~contact bridge carrier to the contact pads of the circuit board assembly ~~contact pads comprises~~is performed by hot bar soldering.

9. An augmented LED array assembly comprising:

~~a hybridized device~~an LED array assembly comprising a micro-LED array mounted on a driver integrated circuit (IC), the driver integrated circuit comprising driver IC contact pads on a top surface of the driver IC; and

a flexible printed circuit board (PCB) comprising a bottom surface, a plurality of first contact pads on the bottom surface, a plurality of second contact pads on the bottom surface, and a plurality of contact bridges, each of the plurality of contact bridges extending from one of the plurality of first contact pads to one of the plurality of second contact pads~~,~~; and

each of the plurality of driver IC contact pads being bonded to a corresponding one of the plurality of first contact pads of the flexible PCB.

10. The augmented LED array assembly according to claim 9, wherein the flexible PCB comprises a multi-layer flexible substrate.

11. The augmented LED array assembly according to claim 9, wherein:

the micro-LED array has an emission face, and

an upper face of the flexible ~~PCV~~PCB is not higher than the emission face of the micro-LED array.

12. The augmented LED array assembly according to claim 9, further comprising a plurality of passive circuit components on the flexible PCB.

13. The augmented LED array assembly according to claim 9, wherein the flexible PCB further comprises conductive tracks for additional switching circuitry.

14. The augmented LED array assembly according to claim 13, further comprising a plurality of switching circuit components ~~on~~ the flexible PCB.

15. An LED lighting circuit comprising:

a circuit board assembly comprising a circuit board on a heat spreader and circuit board assembly contact pads;

an augmented LED array assembly that comprises:

~~a hybridized device~~an LED array assembly comprising a micro-LED array mounted on a driver integrated circuit (IC), the driver integrated circuit comprising driver IC contact pads on a top surface of the driver IC, and

a flexible printed circuit board (PCB) comprising a bottom surface, a plurality of first contact pads on the bottom surface, a plurality of second contact pads on the bottom surface, and a plurality of contact bridges, each of the plurality of contact bridges extending from one of the plurality of first contact pads to one of the plurality of second contact pads,

each of the plurality of driver IC contact pads being bonded to a corresponding one of the plurality of first contact pads of the flexible PCB and each of the circuit board assembly contact pads being bonded to a corresponding one of the plurality of second contact pads of the flexible PCB; and

a thermal bond between the driver ~~IC~~integrated circuit of the augmented LED array assembly and the heat spreader of the circuit board assembly.

16. The LED lighting circuit according to claim 15, wherein:

the circuit board ~~comprises~~includes an aperture, and

the heat spreader comprises a raised seat extending upward into the aperture and configured to receive the LED array assembly.