WHAT IS CLAIMED IS:

1. A method for fabricating a micro-LED display chip, comprising:

providing a substrate supporting an array of pixel drivers; and

fabricating two or more strata stacked on top of the substrate and pixel drivers, with a planar interface between adjacent strata, by:

for a bottom stratum: bonding, using metal layers, an unpatterned epitaxial structure on top of the substrate and pixel drivers; and for any other stratum: bonding, using metal layers, an unpatterned epitaxial structure on top of a previous stratum;

patterning the epitaxial structure to form micro LEDs and patterning the bonding metal layers to form metal pads, some of the metal pads functioning as lower contact metal pads electrically connected to bottoms of the micro LEDs; and

for all strata except a top stratum, filling and planarizing the stratum to create a planar top interface, the planar top interface including electrical connections to tops of the micro LEDs.

2. The method of claim 1 wherein patterning the epitaxial structure to form micro LEDs comprises fully separating the epitaxial structures for different micro LEDs.

3. The method of claim 1 wherein patterning the epitaxial structure comprises dry etching the epitaxial structure to form the micro LEDs.

4. The method of claim 1 wherein patterning the bonding metal layers to form metal pads comprises forming one metal pad for every micro LED in every strata.

5. The method of claim 1 wherein bonding the unpatterned epitaxial structure on top of the substrate or previous stratum comprises:

bonding unpatterned epitaxial layers supported on an epitaxy substrate to the top of the substrate or previous stratum; and

removing the epitaxy substrate.

6. The method of claim 5 wherein removing the epitaxy substrate comprises removing the epitaxy substrate using one of a lift-off process or wet chemical etching.

7. The method of claim 1 wherein filling the stratum comprises filling the stratum with transparent material.

8. The method of claim 7 wherein the transparent material is silicon dioxide or silicon nitride.

9. The method of claim 1 wherein filling the stratum comprises filling the stratum with transparent material in regions that are laterally located above micro LEDs of lower strata, so that light produced by the micro LEDs of the lower strata are able to propagate through such regions.

10. The method of claim 1 wherein planarizing the stratum comprises using chemical mechanical polishing to planarize the stratum.

11. The method of claim 1 further comprising:

depositing upper contact metal pads on the tops of the micro LEDs before filling and planarizing the stratum.

12. The method of claim 11 further comprising:

after filling, fabricating vias from the planar top interface through the filling to the upper contact metal pads.

13. The method of claim 1 further comprising:

after filling, fabricating vias from the planar top interface through the filling to metal pads that do not function as lower contact metal pads.

14. The method of claim 1 further comprising:

filling and planarizing the top stratum to create a planar top interface, the planar top interface including electrical connections to tops of the micro LEDs; and

fabricating a common electrode on top of the planar top interface of the top stratum, the tops of the micro LEDs electrically connected to the common electrode.

15. The method of claim 14 wherein the common electrode is further electrically connected to one or more of the metal pads of the bottom stratum.

16. The method of claim 1 wherein the micro LEDs of different strata are grouped into multi-color pixels, and fabricating the strata further comprises:

fabricating a structure in the strata that optically separates adjacent multi-color pixels.

17. The method of claim 1 wherein the two or more strata are exactly three strata, and the micro LEDs are red micro LEDs for one of the strata, green micro LEDs for another one of the strata, and blue micro LEDs for a third one of the strata.

18. The method of claim 1 wherein fabricating the strata further comprises:

fabricating vias to provide electrical connection through the stratum.

19. The method of claim 18 wherein fabricating vias comprises:

etching via holes; and

filling the via holes with a conductor.

20. A method for fabricating a micro-LED display chip, comprising:

providing a substrate supporting an array of pixel drivers; and

fabricating three strata stacked on top of the substrate and pixel drivers, with a planar interface between adjacent strata, one of the strata containing red micro LEDs, another one of the strata containing green micro LEDs, and a third one of the strata containing blue micro LEDs, wherein fabricating each stratum comprises:

for a bottom stratum: bonding, using metal layers, an unpatterned epitaxial structure on top of the substrate and pixel drivers; and for any other stratum: bonding, using metal layers, an unpatterned epitaxial structure on top of a previous stratum;

patterning the epitaxial structure to form the micro LEDs for the stratum, and patterning the bonding metal layers to form metal pads, some of the metal pads functioning as lower contact metal pads electrically connected to bottoms of the micro LEDs;

depositing upper contact metal pads electrically connected to tops of the micro LEDs;

for all strata except a top stratum, filling and planarizing the stratum to create a planar top interface, the planar top interface including electrical connections to tops of the micro LEDs; and

fabricating vias from the planar top interface to the upper contact metal pads and to the metal pads that do not function as lower contact metal pads.