CLAIMS

1. An active lens insert for an ophthalmic lens comprising:

arcuate shape ring segments assembled into substrate layers with one or both of electrical and logical functionality; wherein the size, shape and stacking structure of each of the annular shaped substrate layers is based on the thickness around an optical zone of the ophthalmic lens;

electrical interconnections between substrate layers; and

wherein the active lens insert is encapsulated with one or more materials for bonding within the body material of a molded ophthalmic lens.

2. The active lens insert of Claim 1, wherein the substrate functional layers are adhered to insulating layers forming a stacked feature.

3. The active lens insert of Claim 1 or 2, wherein the arcuate shaped ring segments are cut from a wafer.

4. The active lens insert of Claim 1, 2 or 3, wherein one or more of the arcuate shaped ring segment(s) has one or both tapered ends.

5. The active lens insert of any preceding claim, wherein the arcuate ring segments comprise arc matched sections.

6. The active lens insert of any preceding claim, wherein two or more arcuate ring segments can form a full ring.

7. The active lens insert of any preceding claim, wherein the design of the arcuate ring segments is based on factors comprising wafer optimization.

8. The active lens insert of Claim 7, wherein the design of the arcuate ring segments is further based on surface area maximization of the ring within the active lens insert.

9. The active lens insert of Claim 1, wherein the arcuate ring segments are non-arc matched segments.

10. The active lens insert of Claim 1, wherein the arcuate ring segments comprise both arc matched segments and non-arc matched segments.

11. The active lens insert of any preceding claim, wherein the substrate layers include both said assembled ring substrate layers from the arcuate shape ring segments and intact full ring segments.

12. The active lens insert of Claim 11, wherein the intact full ring substrate layer comprises a metallic layer which functions as an antenna.

13. The active lens insert of any preceding claim, wherein the size, shape and stacking structure of each of the annular shaped substrate layers is further based on the base curve of an ophthalmic lens.

14. The active lens insert of any preceding claim, wherein the size, shape and stacking structure of each of the annular shaped substrate layers is further influenced by the diameter of an ophthalmic lens.

15. The active lens insert of any preceding claim, wherein the size, shape and stacking structure of each of the annular shaped substrate layers is further influenced by encapsulation parameters of the active lens insert.

16. The active lens insert of any preceding claim, wherein the substrate layers comprise silicon based wafer layers.

17. The active lens insert of one of Claims 1 to 15, wherein the substrate layers comprise ceramic based wafer layers.

18. The active lens insert of one of Claims 1 to 15, wherein the substrate layers comprise Kapton based wafer layers.

19. A method of forming an active lens insert for an ophthalmic lens, the method comprising:

forming arcuate shape ring segments;

assembling said arcuate shape ring segments into ring substrate layers with one or both of electrical and logical functionality; wherein the size, shape and stacking structure of each of the annular shaped substrate layers is based on the thickness around an optical zone of the ophthalmic lens;

forming electrical interconnections between substrate layers; and

encapsulating the active lens insert with one or more materials for bonding within the body material of a molded ophthalmic lens.

The invention claimed is:

1. An active lens insert for an ophthalmic lens comprising:

arcuate shape ring segments assembled into substrate layers with one or both of electrical and logical functionality, wherein the substrate layers are stacked, wherein a size and a stacking structure for the substrate layers is based on a thickness around an optical zone of the ophthalmic lens; and

electrical interconnections between substrate layers,

wherein the active lens insert is encapsulated with one or more materials that may be bonded within a body of a molded ophthalmic lens, and

wherein one or more of the arcuate shape ring segments have one or both tapered ends.

2. The active lens insert of claim **1**, wherein the substrate layers are adhered to insulating layers.

3. The active lens insert of claim **1**, wherein the arcuate shape ring segments are cut from a wafer.

4. The active lens insert of claim **1**, wherein the arcuate shape ring segments comprise arc matched sections.

5. The active lens insert of claim **1**, wherein two or more of the arcuate shape ring segments can form a full ring.

6. The active lens insert of claim **3**, wherein a design of each of the arcuate shape ring segments is based on factors comprising wafer optimization.

7. The active lens insert of claim **6**, wherein the design of each of the arcuate shape ring segments is further based on surface area maximization of the arcuate shape ring segments within the active lens insert.

8. The active lens insert of claim **1**, wherein the arcuate shape ring segments are non-arc matched segments.

9. The active lens insert of claim **1**, wherein the arcuate shape ring segments comprise both arc matched segments and non-arc matched segments.

10. The active lens insert of claim **1**, wherein the substrate layers include both said assembled ring substrate layers from the arcuate shape ring segments and intact full rings.

11. The active lens insert of claim **10**, wherein an intact full ring comprises a metallic layer which functions as an antenna.

12. The active lens insert of claim **1**, wherein the size and stacking structure of the substrate layers is further based on a base curve of the ophthalmic lens.

13. The active lens insert of claim **1**, wherein the size and stacking structure of the substrate layers is further influenced by a diameter of the ophthalmic lens.

14. The active lens insert of claim **1**, wherein the size and stacking structure of the substrate layers is further influenced by encapsulation parameters of the active lens insert.

15. The active lens insert of claim **1**, wherein the substrate layers comprise silicon based wafer layers.

16. The active lens insert of claim **1**, wherein the substrate layers comprise ceramic based wafer layers.

17. The active lens insert of claim **1**, wherein the substrate layers comprise Kapton® based wafer layers.

18. The active lens insert of claim **1**, wherein the substrate layers comprise polymide film based wafer layers.

19. The active lens insert of claim **1**, wherein the thickness around the optical zone of the ophthalmic lens is a predetermined thickness.

20. An active lens insert for an ophthalmic lens comprising:

arcuate shape ring segments assembled into substrate layers with one or both of electrical and logical functionality, wherein the substrate layers are stacked, wherein a size and a stacking structure for the substrate layers is based on a thickness around an optical zone of the ophthalmic lens; and

electrical interconnections between substrate layers,

wherein the active lens insert is encapsulated with one or more materials that may be bonded within a body of a molded ophthalmic lens,

wherein the arcuate shape ring segments are cut from a wafer,

wherein a design of each of the arcuate shape ring segments is based on factors comprising wafer optimization, and

wherein the design of each of the arcuate shape ring segments is further based on surface area maximization of the arcuate shape ring segments within the active lens insert.

21. An active lens insert for an ophthalmic lens comprising:

arcuate shape ring segments assembled into substrate layers with one or both of electrical and logical functionality, wherein the substrate layers are stacked, wherein a size and a stacking structure for the substrate layers is based on a thickness around an optical zone of the ophthalmic lens; and

electrical interconnections between substrate layers,

wherein the active lens insert is encapsulated with one or more materials that may be bonded within a body of a molded ophthalmic lens, and

wherein the arcuate shape ring segments are non-arc matched segments.

22. An active lens insert for an ophthalmic lens comprising:

arcuate shape ring segments assembled into substrate layers with one or both of electrical and logical functionality, wherein the substrate layers are stacked, wherein a size and a stacking structure for the substrate layers is based on a thickness around an optical zone of the ophthalmic lens; and

electrical interconnections between substrate layers,

wherein the active lens insert is encapsulated with one or more materials that may be bonded within a body of a molded ophthalmic lens, and

wherein the arcuate shape ring segments comprise both arc matched segments and non-arc matched segments.

23. An active lens insert for an ophthalmic lens comprising:

arcuate shape ring segments assembled into substrate layers with one or both of electrical and logical functionality, wherein the substrate layers are stacked, wherein a size and a stacking structure for the substrate layers is based on a thickness around an optical zone of the ophthalmic lens; and

electrical interconnections between substrate layers,

wherein the active lens insert is encapsulated with one or more materials that may be bonded within a body of a molded ophthalmic lens, and

wherein the substrate layers comprise Kapton® based wafer layers.