CLAIMS

1. A method of forming an ophthalmic lens, the method comprising:

placing a media insert comprising a microcontroller and an energy source proximate to a first mold part;

depositing a reactive monomer mix into the first mold part;

positioning the insert comprising a microcontroller and an energy source in contact with the reactive monomer mix;

positioning the first mold part proximate to a second mold part thereby forming a lens cavity with the variable optic insert and at least some of reactive monomer mix in the lens cavity; and

exposing the reactive monomer mix to actinic radiation, wherein the microcontroller comprises a data storage portion.

2. The method of claim 1 wherein the microcontroller comprises a microcontroller requiring about 0.1 micro amps or less of electrical energy for random access memory retention.

3. The method of claim 1 wherein the microcontroller comprises a microcontroller requiring about 0.8 micro amps or less of electrical energy for real-time clock mode operation.

4. A method of forming an ophthalmic lens, the method comprising:

placing a media insert comprising a microcontroller and an energy source proximate to a first mold part;

depositing a reactive monomer mix into the first mold part;

positioning the insert comprising a microcontroller and an energy source in contact with the reactive monomer mix;

positioning the first mold part proximate to a second mold part thereby forming a lens cavity with the variable optic insert and at least some of reactive monomer mix in the lens cavity; and

exposing the reactive monomer mix to actinic radiation, wherein the microcontroller comprises a microcontrollerrequiring about 250 micro amps or less of electrical energy for per million instructions per second active operation.

5. The method of claim 1 additionally comprising the step of conformal coating one or both of: the microcontroller and the media.

6. The method of claim 5 additionally comprising the step of encapsulating coating one or both of: the microcontroller and the media

7. The method of claim 6 wherein the electrochemical cell comprises a lithium ion battery.

8. The method of claim 6 wherein the electrochemical cell comprises a rechargeable material.

9. The method of claim 6 wherein the electrochemical cell comprises a cathode comprising nano-scaled crystals.

10. A method of forming an ophthalmic lens, the method comprising:

placing a media insert comprising a microcontroller and an energy source proximate to a first mold part;

depositing a reactive monomer mix into the first mold part;

positioning the insert comprising a microcontroller and an energy source in contact with the reactive monomer mix;

positioning the first mold part proximate to a second mold part thereby forming a lens cavity with the variable optic insert and at least some of reactive monomer mix in the lens cavity; and

exposing the reactive monomer mix to actinic radiation, wherein the media insert comprises a polyamide flexible circuit.

11. The method of claim 1 wherein the microcontroller additionally comprises an analog to digital converter.

12. The method of claim 11wherein the microcontroller additionally comprises a timer.

13. The method of claim 12 additionally comprising the step of storing executable code within the memory which is executable by the processor to change a state of a component comprising the ophthalmic lens.

14. An apparatus for manufacturing an ophthalmic lens, the apparatus comprising:

automation for placing a media insert comprising a microcontroller inone or both of: proximate to, or in contact with, a first mold part;

a dispenser for depositing a reactive monomer mix into the first moldpart; and

a source of actinic radiation for the reactive monomer mix.

15. The apparatus for manufacturing an ophthalmic lens of claim 14 additionally comprising:

automation operative for placing a second mold part proximate to the first mold thereby creating a lens forming cavity with the variable optic insert and at least some of the reactive monomer mix within the lens forming cavity.

16. The apparatus for manufacturing an ophthalmic lens of claim 15 additionally comprising:

a pallet for holding multiple first mold parts; and

automation for moving the pallet proximate to the source of actinic radiation.

17. The apparatus for manufacturing an ophthalmic lens of claim 11 additionally comprising:

a processor for controlling the automation;

a digital storage device comprising software, executable upon demand, said software operative with the processor to cause the apparatus to:

place the media insert comprising a microcontroller proximate to, or in contact with, the first mold part.

CLAIMS

1. A method of forming an ophthalmic lens, the method comprising:
   forming a media insert by attaching a microcontroller, an energy source, and a liquid meniscus variable optic to a substrate;
   coating and encapsulating the media insert with a conformal coating;
   placing the coated media insert proximate to a first mold part;
   depositing a reactive monomer mix into the first mold part around the coated media insert;
   positioning the coated media insert in contact with the reactive monomer mix;
   positioning the first mold part proximate to a second mold part thereby forming a lens cavity containing the coated media insert and at least some of reactive monomer mix in the lens cavity; and
   exposing the reactive monomer mix to actinic radiation or heat.

2. The method of Claim 1, wherein the microcontroller comprises a microcontroller requiring about 0.1 micro amps or less of electrical energy for random access memory retention.

3. The method of Claim 1, wherein the microcontroller requiring about 0.8 micro amps or less of electrical energy for real-time clock mode operation.

4. The method of Claim 1, wherein the microcontroller requires about 250 micro amps or less of electrical energy per million instructions of active operation.

5. The method of Claim 1, wherein the conformal coating is a biocompatible material.

6. The method of Claim 16, wherein the electrochemical cell comprises a lithium ion battery.

7. The method of Claim 16, wherein the electrochemical cell comprises a rechargeable material.

8. The method of Claim 1, wherein the microcontroller additionally comprises an analog to digital converter.

9. The method of Claim 8, wherein the microcontroller additionally comprises a timer.

10. The method of Claim 9, additionally comprising the step of storing executable code within the memory which is executable by the processor to change a state of a component comprising the ophthalmic lens.

11. An apparatus for manufacturing an ophthalmic lens, the apparatus comprising:
automation for placing a media insert comprising a microcontroller, an energy source and a liquid meniscus variable optic in one or both of proximate to, or in contact with, a first mold part;
a dispenser for depositing a reactive monomer mix into the first mold party and; a
a source of actinic radiation to cure the reactive monomer mix.

12. The apparatus of Claim 11, additionally comprising: automation operative for placing a second mold part proximate to the first mold part thereby creating a lens forming cavity with the media insert and at least some of the reactive monomer mix within the lens forming cavity.

13. The apparatus Claim 12, additionally comprising:
a pallet for holding multiple first mold parts; and
automation for moving the pallet proximate to the source of actinic radiation.

14. The apparatus of Claim 11, additionally comprising:
a processor for controlling the automation;
a digital storage device comprising software, executable upon demand, said software operative with the processor to cause the apparatus to: place the media insert proximate to, or in contact with, the first mold part.

15. The method of Claim 5, wherein the biocompatible material is a silicone hydrogel matrix.

16. The method of Claim 1, wherein the energy source comprises a thin film electrochemical cell capable of providing sufficient energy to change an optical characteristic of the liquid meniscus lens.

17. The method of forming an ophthalmic lens of Claim 1, wherein the step of forming the media insert further comprises attaching an energy harvester to the substrate.

18. The method of forming an ophthalmic lens of Claim 17, wherein the energy harvester comprises a photoreceptor.

19. The method of forming an ophthalmic lens of Claim 1, wherein the step of forming the media insert further comprises forming a conductive circuit path on the substrate between the microcontroller and the energy source.

20. The method of forming an ophthalmic lens of Claim 1, wherein the step of forming the media insert further comprises attaching a focus adjustment activator selected from the group consisting of a magnetically activated switch, a photo-optically activated switch, and an electrical sensor configured to sense a signal within an eye to the substrate in communication with the microcontroller.

21. The method of forming an ophthalmic lens of Claim 1, wherein the substrate is flexible.