region. Similarly the mouth may be controlled in size and/or shape independently by a dedicated pair of electrodes placed under the mouth region.

[0083] In another example, a cartoon face is printed upon an electroactive polymer material **15**, in which the individual electrodes of varying size and shape are positioned under the graphical image **10** such that electrodes are present under each eye, each ear, the nose, the mouth, and under the hair. In such embodiments, the electronic controller **35** can selectively energize these electrodes **20**A-**20**J to render motion to the features of the cartoon face, allowing for electronic control of facial features and expressions.

[0084] Referring to **FIG. 7**, a process flow chart for preparing a dynamic electroactive graphical imagery display device is depicted. The process is initiated **700** by providing an electroactive polymer device **705** and an electromotive force generator **710**

[0085] The electromotive force generator is operatively coupled to the electroactive polymer device **715**. A graphical image is affixed to at least one exposed surface of the electroactive polymer device **720**. If the there are multiple active regions **730** on the electroactive polymer device, the process **720** is repeated until all desired active regions have a graphical image affixed thereto **730**. Alternately or in conjunction therewith, the process ends **735** upon completion of the affixing portion of the process **720**. The affixing process may **725** be accomplished using one or more processes such as painting, dye sublimation, silk screening, and adhesive bonding.

[0086] The foregoing described embodiments of the invention are provided as illustrations and descriptions. They are not intended to limit the invention to the precise form described or an order presented. In particular, it is contemplated that certain functional implementations of the invention described herein may be constructed from various types of electroactive polymers. Electronic control over the graphical imagery display device may be implemented equivalently in hardware, software, firmware, and/or other available functional components or building blocks and materials. Other variations and embodiments are possible in light of above teachings, and it is not intended that this Detailed Description limit the scope of invention, but rather by the Claims following herein.

What is claimed:

1. A dynamic graphical imagery display device comprising:

an electroactive polymer device including;

a plurality of electrodes; and,

at least one exposed surface;

an electromotive force generator operatively coupled to said plurality of electrodes;

a graphical image affixed to said at least one exposed surface; and,

wherein said graphical image is affixed to said at least one exposed surface such that a sufficient voltage applied by said electromotive force generator to said plurality of electrodes causes said graphical image to dynamically change geometric shape in conformity with a deformation of said at least one exposed surface.

2. The display device according to claim 1 wherein said change in geometric shape comprises an elongation in at least one dimension.

3. The display device according to claim 1 wherein said electromotive force generator includes a voltage waveform circuit configured to generate a waveform, said waveform including one of a sine wave, a square wave, a saw tooth wave, a triangle wave and any combination thereof.

4. The display device according to claim 1 wherein said graphical image is affixed using one of; a lamination process, a painting process, a dye sublimation process, a silk screening process, an adhesive process and any combination thereof.

5. The display device according to claim 4 wherein said graphical image is disposed on a separate elastomeric membrane and wherein said elastomeric membrane is affixed to said at least one exposed surface.

6. The display device according to claim 1 wherein at least a portion of said at least one exposed surface is pre-stressed in at least one dimension to allow a greater geometric change in said graphical image.

7. The display device according to claim 1 wherein said electroactive polymer device is configured in a form factor, said form factor being one of; a pushbutton, a curio, an ornament, a logo and any combination thereof.

8. The display device according to claim 1 wherein said change is an oscillatory change in geometric shape in conformance with a frequency of said waveform.

9. The display device according to claim 1 wherein said graphical image comprises a depiction of a personified face where at least a portion of said personified face deforms under electronic control.

10. The display device according to claim 1 wherein said graphical image comprises a depiction of a cartoon character where at least a portion of said cartoon character deforms under electronic control.

11. A dynamic graphical imagery display device comprising:

an electroactive polymer device including;

a plurality of electrodes;

at least one exposed surface; and,

a generally planar form factor;

an electromotive force generator operatively coupled to said plurality of electrodes;

a graphical image affixed to said at least one exposed surface; and,

wherein said graphical image is affixed to said at least one exposed surface such that a sufficient voltage applied by said electromotive force generator to said plurality of electrodes causes said graphical image to dynamically change geometric shape in conformity with a deformation of said at least one exposed surface.

12. The display device according to claim 11 wherein said sufficient voltage is greater than 100 volts.

13. The display device according to claim 11 wherein a modulation circuit is operatively coupled to said electromotive force generator and configured to superimpose a wave form on said sufficient voltage.

14. The display device according to claim 11 wherein said electroactive polymer device includes a plurality of independently controllable regions.