cells. Cell cap **90** significantly reduces the tolerance issues associated with individual caps without compromising access to the individual Braille cells if repair or replacement is required.

**[0090]** Cell cap **90** of the Braille multi-cell module is smooth, lacking the grooves and unevenness between each cell (character) found in all existing Braille displays on the market. This advantageous side-effect of a cost-reduction effort is one of the most significant features of the invention. To users, the tactility of the grooves and cell-to-cell unevenness of prior art Braille displays is equivalent to the aggravation caused sighted people by the noise and flickering of a computer monitor. The paper-like smoothness of the novel Braille display is a first in the electronically refreshable Braille display industry.

**[0091]** Moreover, the monolithic cell cap provides better dimensional control of the Braille electromechanical module when it is assembled in the final product. Prior art cell caps produce a gap between the Braille module and the opening in the Braille display case. Each gap is a result of the accumulation of dimensional tolerances on a per cell basis as distinguished from the novel single dimensional tolerance for a plurality of cells. The invention of the monolithic cell cap supplants the above-mentioned prior art approach that employs an extra frame to correctly space each cell at a centerline. This prior art approach is unsatisfactory because it further accentuates the unevenness of the display and provides additional area for contaminates.

**[0092]** Monolithic cell cap **90** can be constructed with antibacterial plastics or other suitable materials to inhibit the spread and growth of germs.

**[0093]** In all embodiments, the Braille pin of the assembly is captive in the mechanical design. It is secured between a top wall of the chassis/backplane **60** and cell providing a negative and a positive stop to the Braille pin's displacement, respectively. There is no dependency on the bimorph actuators hold the Braille pins in place. There is no dependency on the bimorph actuators to hold the Braille pins in place. This improves manufacturability and serviceability. This low cost part of the design (frame top wall, cell cap, and pins) eliminates the requirement to clean bio-contaminates on a regular basis, as it can now be considered a disposable item. The Braille cell PCB that contains the expensive high voltage control circuitry, expensive bimorph actuators, and critical alignment is reused in a new, clean mechanical chassis/backplane during cleaning or refurbishment of the display.

**[0094]** Frame (chassis/backplane) bottom wall **46** is more fully depicted in FIG. **10**. Six (6) threaded inserts, collectively denoted **100**, are employed to attach the double decade assembly to the final OEM product. Frame bottom wall is preferably constructed of a material that does not require additional isolation from the metal chassis to which it is mounted. Slots **102** cooperate with slots **72** formed in frame top wall **44** to hold PCBs **36**.

**[0095]** FIG. **11** illustrates a set of buttons and a frame **110** for holding the buttons. Each button has a head **112** that is enlarged with respect to its stem **114**. Frame **110** has a comb-like construction where the contiguous teeth of the comb are spaced apart from one another by a space that slideably receives a stem **114**. The teeth of the comb thus support heads **112**. Buttons **110** perform functions relating to cursor location and panning features.

**[0096]** FIG. **12** depicts the novel double decade Braille cell assembly without the novel cell cap. Note that there are two (2) button and frame assemblies **110** of the type depicted in FIG. **11** and that said assemblies **110** are disposed in confronting relation to one another.

**[0097]** FIG. **13** depicts the double decade Braille cell assembly with the novel cell cap **92** in its functional position. All pins are in their retracted position in this Fig.

**[0098]** The modularization provided by the novel design is a key to success in providing a low cost product that is economical to manufacture and easy to service. Each of the Braille cells can be individually installed or removed from service as a result of the backplane/chassis solution. The backplane/chassis provides the benefits of electrical interconnect, correct mechanical alignment, high voltage isolation, and a stable platform for additional circuitry such as tactile switches commonly used for routing the cursor to a specified cell location.

**[0099]** Any number of cells may be used in the modularization, and each module is interconnectable to another module. For commercial purposes, the minimum-sized module has been selected at twenty (20) cells, thereby enabling the selling of products including twenty (20) cells, forty (40) cells, sixty (60) cells, eighty (80) cells, and so on. Other module sizes are within the scope of this invention. For example, production of a four (4) cell module would enable production of a forty four (44) cell Braille display (20+20+4), a seventy-two cell Braille display (20+20+20+4+4+4), an eighty four (84) cell Braille display (20+20+20+20+4), and so on.

**[0100]** The provision of the monolithic cell cap also produces an array of button caps over the tact switches. This array of button caps reduces labor costs. Prior art Braille dell manufacturers require each switch cap be individually installed.

**[0101]** It will be seen that the advantages set forth above, and those made apparent from the foregoing description, are efficiently attained and since certain changes may be made in the above construction without departing from the scope of the invention, it is intended that all matters contained in the foregoing description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

**[0102]** It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention that, as a matter of language, might be said to fall therebetween. Now that the invention has been described,

**1-5**. (canceled)

**6**. A Braille cell assembly including a plurality of individual Braille cells, the assembly comprising:

a plurality of printed circuit boards, with each printed circuit board controlling the operation of an individual Braille cell;

a plurality of clips interconnected to each of the printed circuit boards, each clip including opposing arms and an intermediate space therebetween;

a plurality of parallel polled bimorph reeds, each reed being positioned within the intermediate space of an individual clip, a plurality of reeds forming an individual Braille cell;

a Braille cell cap positioned over the plurality of Braille cells to enhance tactile feel of the Braille cell assembly by eliminating uneven surfaces.