assembly in accordance with the present invention provides manufacturing cost reductions, improvements in reliability, and enhancements in the tactile experience for users.

The present invention provides a Braille display assembly including a plurality of individual Braille cells and a backplane adapted to receive the plurality of Braille cells, the backplane is selected to maintain each of the plurality of individual Braille cells in a predetermined position independent of the positioning of the other cells. The combination of the plurality of individual Braille cells and the backplane support allows for precise positioning of the cells and circuit communication between the cells. As such, the desired positioning is achieved and the individual cells are removable for repair and replacement without disturbing the alignment of the other cells.

In a particular embodiment, the backplane of the Braille display further includes a plurality of sockets mounted on a bottom side of the backplane in depending relation to the bottom side of the backplane and in spaced relation to one another wherein each socket is adapted to receive an individual Braille cell.

In an additional embodiment, the backplane further includes control circuitry to interface with the plurality of individual Braille cells. In an exemplary embodiment, the control circuitry is effective in receiving input from the cursor button or navigation button and communicating this input to the Braille cells as necessary.

In a particular embodiment, the backplane forms a top wall of a frame, and the Braille display further includes a bottom wall of the frame, an angle wall having a first part disposed in abutting relation to a leading edge of the backplane, the first part of the angle wall being coplanar with the backplane, a plurality of sets of tactile pin holes formed in the first part of the angle wall, each tactile pin being adapted to slideably receive a tactile pin, wherein the angle wall has a second part depending from a leading edge of the first part, the second part having a lower end disposed in abutting relation to a leading edge of the bottom wall of the frame. The bottom wall of the frame may be fabricated of an insulative material thereby eliminating the need to provide additional insulative means when connecting the display to a metal chassis.

To provide additional security in the frame, an upstanding flat wall is disposed in abutting relation to a second longitudinal edge of the frame bottom wall. A projection protruding from a trailing end of each of the plurality of Braille cells is provided and a plurality of slots are formed along the extent of the upstanding flat wall such that each slot of the plurality of slots adapted to receive the projection of an associated Braille cell. Additionally, a corresponding plurality of grooves are formed integral to the backplane, wherein each groove formed in the backplane is adapted to receive a leading end of a Braille cell along a top edge thereof, and each slot formed in the upstanding flat wall and each groove formed in the backplane cooperating with one another to stabilize each Braille cell of the plurality of Braille cells in the Braille display assembly.

Additional securing means are provided, wherein the frame bottom wall further includes a plurality of grooves formed in the frame bottom wall, each groove adapted to receive a leading end of a Braille cell along a bottom edge thereof, wherein each of the plurality of grooves and each slot formed in the upstanding flat wall and each groove formed in the backplane cooperate with one another to stabilize each Braille cell of the plurality of Braille cells in the Braille display assembly.

To prevent contaminants from reaching the circuitry of the system, the frame bottom wall further includes a plurality of deformable strip gaskets positioned perpendicular to the direction of the plurality of grooves. These deformable strip gaskets are effective in preventing the flow of liquid contaminants along the entire frame bottom wall. The strip gaskets may be fabricated of an absorbable material.

The plurality of Braille cells used in the Braille display include a plurality of piezoelectric reeds extending toward the angle wall in a stair step configuration. The Braille display also includes a plurality of tactile pins, each of the plurality of tactile pins associated with each of the plurality of piezoelectric reeds such that the bending of the piezoelectric reed moves the associated tactile pin in the vertical direction through the associated tactile pin hole. The tactile pins may be formed independently of one another or they may be formed in connected relation to one another forming a set of tactile pins so that one set of tactile pins is adapted to be associated with one Braille cell. The present invention is adaptable to be used with a variety of Braille cell assembly configurations having piezoelectric reeds for actuating tactile pins in the vertical direction.

To control the position of the cursor and to navigate within the Braille line display, the Braille display further includes a plurality of cursor routing buttons, each of the plurality of cursor routing buttons associated with each of the plurality of Braille cells, and a plurality of navigation buttons, each of the plurality of navigation buttons associated with each of the plurality of Braille cells. The plurality of cursor routing buttons and navigation buttons in circuit communication with the backplane.

In accordance with another embodiment, a monolithic cap is provided and adapted for use in a tactile display assembly. The monolithic cap includes a housing adapted to enclose multiple tactile cell assemblies. The housing includes a plurality of individual tactile cell apertures, where each of the plurality of tactile cell apertures is adapted to receive a single tactile cell pin. With the present invention the tactile pin is captive in the mechanical design, being secured between the top frame and the monolithic cell cap using a negative stop and a positive stop on the tactile pin. As such, there is no dependency on the bimorph actuators to hold the tactile pins in place.

In accordance with a preferred embodiment, the Braille display includes a cell cap providing a common tactile surface for the plurality of Braille cells, cell cap being releasably engaged to the backplane. The cell cap of the present invention includes a plurality of tactile pin holes formed in the cell cap, each tactile pin hole being adapted to slideably receive a tactile pin, and a plurality of button access holes, each button access hole being adapted to receive one of a plurality of control buttons, such as the cursor routing button or the navigation button. The control buttons may be releasably engaged to the underside of the cell cap. As such, the novel cell cap provides self-alignment of the tactile pins of the individual Braille cells and eliminates the ridge separation between cells as is inherent in the prior art displays.

A plurality of Braille display assemblies as described may be combined to provide a multiple line display. Accordingly, the Braille display assembly further includes a socket secured to an edge of the backplane and a connector secured to an opposite edge of the backplane. As such, a first Braille display assembly and the socket of a first Braille display assembly is adapted to receive a connector of a second Braille display assembly, such that a plurality of individual Braille display assemblies are secured in circuit communication to provide a multiple line display.

To prevent contaminants from entering the interior of the Braille display, the present invention includes an end cap