Claims

1. A liquid handling cassette comprising:

a first plate;

a second plate; and

a midplate positioned between the first plate and the second plate, the midplate comprising:

a first side with an obstructing structure projecting from the first side, the obstructing structure is a valve station or pump station on the first side of the midplate, the valve station or pump station comprises a diaphragm actuated by a fluid, the fluid supplied to the valve or pump station with an actuation channel that extends to an actuation port on the edge of the cassette, a first set of channel walls projecting from the first side, the first set of channel walls defining at least a first and a second liquid channel and a liquid port in liquid communication with the first channel;

a second side with a second set of channel walls projecting from the second side, the second set of channel walls defining at least a third liquid channel; and

openings through the midplate that fluidly connect the third liquid channel to the first and second liquid channels;

wherein the third liquid channel provides a flow path to bypass the obstructing structure on the first side; and

wherein the first plate contacts the channel walls on the first side of the midplate and the second plate contacts the channel walls on the second side of the midplate;

a plurality of edges each of which is perpendicular and coinciding with an outer edge of the midplate, wherein the liquid port is positioned at a first edge of the plurality of edges and located between the midplate and the first plate.

2. The liquid handling cassette of claim 1, further comprising an actuation chamber of a pump station or valve station, the actuation chamber defined by the diaphragm and the first plate, wherein the first, second and third liquid channels provide a liquid path between the valve or pump station and the liquid port.

3. A liquid handling cassette comprising:

a midplate positioned between a first plate and a second plate, the midplate comprising:

a first side with a first plurality of channel walls projecting from the first side, at least two channel walls of the first plurality of channel walls defining a first liquid channel; and

a second side with a second plurality of channel walls projecting from the second side and a tubular projection from the second side forming an extension conduit, at least two channel walls of the second plurality of channel walls defining a second liquid channel; and

a hole in the midplate fluidly connecting the first liquid channel to the extension conduit;

wherein the first plate contacts the channel walls on the first side of the midplate, the second plate contacts the channel walls on the second side of the midplate and the tubular projection extends through the second plate;

a plurality of edges each of which is perpendicular to and coinciding with an outer edge of the midplate; and

an actuation port positioned at a first edge of the plurality of edges, located between the midplate and the first plate and fluidly connected to the extension conduit.

4. The liquid handling cassette of claim 3, wherein the extension conduit provides a mechanical connection to a pod pump and a fluid connection to the actuation chamber of the pod pump.

5. A liquid handling cassette comprising:

a midplate positioned between a first plate and a second plate, the midplate comprising:

a first side with a first plurality of channel walls projecting from the first side, and a tubular projection from the first side forming a conduit, at least two channel walls of the first plurality of channel walls defining a first liquid channel; and

a second side with a second plurality of channel walls projecting from the second side, at least two channel walls of the second plurality of channel walls defining a second liquid channel; and

a hole in the midplate fluidly connecting the second liquid channel to the conduit;

wherein the first plate contacts the channel walls on the first side of the midplate, the second plate contacts the channel walls on the second side of the midplate and the tubular projection extends through the first plate;

a plurality of edges each of which is perpendicular to and coinciding with an outer edge of the midplate; and

an actuation port positioned at a first edge of the plurality of edges, located between the midplate and the first plate and fluidly connected to the first liquid channel.

6. The liquid handling cassette of claim 5, wherein the conduit provides a mechanical connection to a pod pump and a liquid connection to the pumping chamber of the pod pump.