CLAIMS:

1. A stencil printer for printing viscous materials on electronic substrates, the stencil printer comprising:

a frame;

an electronic substrate support coupled to the frame, the electronic substrate support being configured to support an electronic substrate and move the electronic substrate between a lowered position and a raised position;

a stencil shuttle assembly coupled to the frame, the stencil shuttle assembly being configured to support a stencil and to move the stencil in an x-axis direction between a first position in which the stencil is positioned toward a front of the stencil printer and a second position in which the stencil is positioned toward a back of the stencil printer, the stencil shuttle assembly further being configured to move the stencil in a y-axis direction to align the stencil;

a print head coupled to the frame, the print head being configured to engage the stencil to dispense a material onto the substrate during a print stroke; and

a wiper to remove material from the stencil as the stencil is translated away from the substrate by the stencil shuttle assembly,

wherein the stencil shuttle assembly, when the stencil is translated away from the substrate, is configured to move the stencil in the y-axis direction in an oscillating manner,

wherein the stencil shuttle assembly includes

a staging frame configured to receive and secure the stencil thereto,

a stencil shuttle coupled to the frame and to the staging frame to move the staging frame and the stencil,

a first actuator configured to move the staging frame with respect to the stencil shuttle in a first direction,

a second actuator configured to move the staging frame with respect to the stencil shuttle in a second direction, the second direction being generally perpendicular to the first direction, and

a third actuator configured to move the staging frame with respect to the stencil shuttle in the first direction, the first, second and third actuators being configured to align the stencil and configured to move the stencil in the y-axis direction when translating the stencil, and

wherein the first, second and third actuators are energized individually or in a synchronized manner to generate a dual action wiping motion, which increases relative motion between wiper paper of the stencil wiper and a bottom surface of the stencil.

2. The stencil printer of claim 1, wherein the stencil shuttle assembly further includes at least one clamp to clamp the staging frame to the stencil shuttle.

3. The stencil printer of claim 1, further comprising a vision system coupled frame to inspect a surface of the substrate.

4. The stencil printer of claim 3, further comprising a controller coupled to the vision system, the first, second and third actuators, and the at least one clamp to move and secure the staging frame with respect to the stencil shuttle in an x-direction, a y-direction and a rotational direction to align the substrate.

5. The stencil printer of claim 4, wherein the stencil shuttle assembly further includes a first pivot pin provided on the staging frame and configured to receive the first actuator, a second pivot pin provided on the staging frame and configured to receive the second actuator, and a third pivot pin provided on the staging frame and configured to receive the third actuator, the first, second and third pivot pins being configured to position the stencil shuttle with respect to the staging frame via the first, second and third actuators.

6. The stencil printer of claim 1, wherein rotational direction of movement is achieved by adjusting the first and third actuators.

7. The stencil printer of claim 1, wherein the stencil shuttle assembly further includes two shuttle supports coupled to the frame and configured to secure the stencil shuttle to the frame.

8. The stencil printer of claim 7, wherein the stencil shuttle assembly further includes at least one clamp to clamp the stencil shuttle to the two shuttle supports.

9. The stencil printer of claim 1, further comprising a drive assembly coupled to the frame and the print head, the drive assembly being configured to move the print head to perform the print stroke and configured to selectively move the stencil shuttle frame between the first and second positions.

10. A method of dispensing viscous material onto an electronic substrate and of cleaning a stencil, the method comprising:

transporting the electronic substrate to a print position;

moving a vision system over the electronic substrate to obtain electronic substrate and stencil fiducial locations;

performing an x-axis, y-axis and rotational adjustment of the stencil position with actuators to precisely align fiducial locations of the stencil with fiducial locations of the electronic substrate;

performing a print stroke with a print head over the stencil to force solder paste through apertures in the stencil onto the electronic substrate;

selectively engaging shuttle transport clamps to rigidly couple the print head to a stencil shuttle assembly that supports the stencil;

moving the print head and the stencil in an x-axis direction toward a stencil wiper assembly to initiate a stencil wipe operation in which the stencil wiper assembly cleans an underside of the stencil; and

moving the stencil in the y-axis direction in an oscillating manner,

wherein moving the stencil in the y-axis direction includes energizing first, second and third actuators of a stencil shuttle assembly individually or in a synchronized manner to generate a dual action wiping motion.

11. The method of claim 10, further comprising moving the print head in an opposite direction to the print position during the stencil wipe operation.

12. The method of claim 11, further comprising raising the stencil wiper assembly to a wipe height.

13. The method of claim 10, further comprising lifting the electronic substrate to a vision height prior to moving a vision system over the electronic substrate.

14. The method of claim 10, wherein the vision system moves to a park location after obtaining the electronic substrate and stencil fiducial locations.

15. The method of claim 10, further comprising lifting the electronic substrate to a print height prior to performing a print stroke.

16. The method of claim 15, wherein performing a print stroke includes lowering a squeegee blade of the print head prior to the print stroke toward the stencil so that the squeegee blade engages the stencil and raising the squeegee blade after the print stroke away from the stencil.