CLAIMS

1. A method of testing an integrated circuit of a device, comprising:

adjusting the force of at least one spring that connects a piston to a cylinder to level the piston relative to the cylinder;

holding the device against a surface of a holder;

actuating the actuator by moving the piston within the cylinder, thereby moving a contactor support structure relative to an apparatus frame and urging terminals on the contactor support structure against contacts on the device; and

providing signals through the terminals and contacts to the integrated circuit.

2. The method of claim 1, wherein a first portion of the spring adjustment mechanism that is used to adjust that force of the at least one spring is an elongate member that extends through an opening in the cylinder so that a first end thereof is secured to the piston and a second end thereof is located outside the cylinder.

3. The method of claim 2, wherein the second portion is a nut that has thread that engages with thread on the second end of the elongate member.

4. The method of claim 1, wherein a plurality of springs and a plurality of adjustment mechanisms jointly level the piston.

5. The method of claim 1, further comprising:

modifying a cross-sectional surface area of the volume normal to a direction of movement of the piston relative to the cylinder.

6. The method of claim 5, further comprising: selectably attaching a volume-defining component to either the main piston component or the main cylinder component to modify the cross-sectional area of the volume.

7. The method of claim 6, wherein each of a plurality of volume-defining components is selectably attachable to either the main piston component or the main cylinder component to progressively modify the cross-sectional area of the volume.

8. The method of claim 6, wherein the volume-defining component is a ring.

9. The method of claim 1, wherein the contactor support structure includes a distribution board substrate and a contactor substrate mounted to the distribution board substrate.

10. The method of claim 1, further comprising:

removably mounting a cartridge frame of a cartridge to the apparatus frame, the contactor support structure forming part of the cartridge; and connecting a surface of a connector interface to a surface of a contactor interface.

11. The method of claim 1, wherein the contactor support structure forms part of a cartridge that includes a common subassembly and a first unique contactor subassembly, further comprising: replacing the first unique contactor subassembly with a second unique contactor subassembly.

12. The method of claim 10, wherein a plurality of conductors is held by a connector body to form a connector, the connector interface being surfaces of the conductors.

13. An apparatus for testing an integrated circuit of a device, comprising:

an apparatus frame;

a holder for the device, secured to the apparatus frame;

a contactor support structure held by the apparatus frame;

a plurality of terminals held by the contactor support structure, the holder and contactor support structure being movable relative to one another so that each one of the terminals makes releasable contact with a respective contact of the device;

an actuator connected between the apparatus frame and the contactor support structure, having a piston and a cylinder so that the cylinder and the piston jointly define a volume, the piston and the cylinder being movable relative to one another to move the contactor support structure relative to the apparatus frame and toward the surface of the holder so that the terminals are urged against contacts of the device;

a spring;

a spring adjustment mechanism having a first portion secured to the piston and a second portion connected to the spring, the spring adjustment mechanism being adjustable to adjust a force of the spring and level the piston relative to the cylinder;

a fluid line connected to the volume to modify a pressure of the volume and move the piston relative to the cylinder;

a power source;

a power electrical path connecting the power source to a power terminal of the terminals held by the support structure;

a signal source; and

a plurality of signal electrical paths, each connecting the signal source to a respective

signal terminal of the terminals held by the support structure.

14. The apparatus of claim 13, wherein the first portion of the spring adjustment mechanism is an elongate member that extends through an opening in the cylinder so that a first end thereof is secured to the piston and a second end thereof is located outside the cylinder.

15. The apparatus of claim 14, wherein the second portion of the spring adjustment mechanism is a nut that has thread that engages with thread on the second end of the elongate member.

16. The apparatus of claim 13, comprising a plurality of springs and a plurality of adjustment mechanisms that jointly level the piston.

17. The apparatus of claim 13, wherein a cross-sectional surface area of the volume normal to a direction of movement of the piston relative to the cylinder is modifiable.

18. The apparatus of claim 17, wherein the piston includes a main piston component and the cylinder includes a main cylinder component, further comprising:

a volume-defining component that is selectably attachable to either the main piston component or the main cylinder component to modify the cross-sectional area of the volume.

19. The apparatus of claim 18, comprising a plurality of volume-defining components, each being selectably attachable to either the main piston component or the main cylinder component to progressively modify the cross-sectional area of the volume.

20. The apparatus of claim 18, wherein the volume-defining component is a ring.

21. The apparatus of claim 13, wherein the contactor support structure includes a distribution board substrate and a contactor substrate mounted to the distribution board substrate.

22. The apparatus of claim 13, further comprising:

a cartridge, including a cartridge frame that is removably mountable to the apparatus frame, the contactor board forming part of the cartridge;

a contactor interface on the contactor support structure; and

a connector interface having a surface for connecting to a surface of the contactor interface.

23. The apparatus of claim 13, wherein the contactor support structure forms part of a cartridge that includes a common subassembly and a first unique contactor subassembly that is replaceable with a second unique contactor subassembly.

24. The apparatus of claim 22, further comprising a connector including:

a connector body; and

a plurality of connector conductors held by the connector body, the connector interface being surfaces of the connector conductors.

25. A cartridge, comprising:

a cartridge frame;

formations on the cartridge frame for mounting the cartridge frame in a fixed position to an apparatus frame;

a contactor support structure;

a contactor interface on the contactor support structure;

an actuator connected between the cartridge frame and the contactor support structure, having a piston and a cylinder so that the cylinder and the piston jointly define a volume, the piston and the cylinder being movable relative to one another to move the contactor support structure relative to the apparatus frame and toward the surface of the holder so that the terminals are urged against contacts of the device, wherein a cross-sectional surface area of the volume normal to a direction of movement of the piston relative to the cylinder is modifiable;

a spring;

a spring adjustment mechanism, having a first portion secured to the piston and a second portion connected to the spring, the spring adjustment mechanism being adjustable to adjust a force of the spring and level the piston relative to the cylinder;

a plurality of terminals, held by the contactor support structure, for contacting contacts on a device; and

a plurality of conductors, held by the contactor support structure, connecting the interface to the terminals.

26. The cartridge of claim 25, wherein the first portion of the spring adjustment mechanism is an elongate member that extends through an opening in the cylinder so that a first end thereof is secured to the piston and a second end thereof is located outside the cylinder.

27. The cartridge of claim 26, wherein the second portion of the spring adjustment mechanism

is a nut that has thread that engages with thread on the second end of the elongate member.

28. The cartridge of claim 25, comprising a plurality of springs and a plurality of adjustment mechanisms that jointly level the piston.

29. The cartridge of claim 25, wherein a cross-sectional surface area of the volume normal to a direction of movement of the piston relative to the cylinder is modifiable.

30. The cartridge of claim 29, wherein the piston includes a main piston component and the cylinder includes a main cylinder component, further comprising:

a volume-defining component that is selectably attachable to either the main piston component or the main cylinder component to modify the cross-sectional area of the volume.

31. The cartridge of claim 30, comprising a plurality of volume-defining components, each being selectably attachable to either the main piston component or the main cylinder component to progressively modify the cross-sectional area of the volume.

32. The cartridge of claim 30, wherein the volume-defining component is a ring.

33. The cartridge of claim 25, wherein the contactor support structure includes a distribution board substrate and a contactor substrate mounted to the distribution board substrate.

34. The cartridge of claim 25, wherein the cartridge includes a common subassembly and a

first unique contactor subassembly that is replaceable with a second unique contactor subassembly.

35. The cartridge of claim 25, further comprising a connector including:

a connector body; and

a plurality of connector conductors held by the connector body, the connector interface being surfaces of the connector conductors.