Claims

1. A system comprising:

a component carrier configured to receive a plurality of semiconductor components in series; and

a pick and place mechanism operable to collectively pick up the plurality of semiconductor components carried by the component carrier, the pick and place mechanism further operable to collectively transfer the plurality of semiconductor components from the component carrier onto a packaging medium.

2. The system as in claim 1, further comprising a rotatory semiconductor component handling mechanism configured to receive, in series, the plurality of semiconductor components at an uptake position and transfer, in series, the plurality of semiconductor components from the uptake position to an offload position.

3. The system as in claim 2, the rotatory semiconductor component handling mechanism comprising a plurality of heads, each of the plurality of heads configured to carry one of the plurality of semiconductor components.

4. The system as in claim 3, wherein each of the plurality of heads is rotatably displaceable along a predefined travel path to transfer the one of the plurality of semiconductor components carried thereby from the uptake position to the offload position.

5. The system as in claim 4, wherein each of the plurality of heads comprises a holding mechanism configured to provide a vacuum suction for holding the one of the plurality of semiconductor components thereto.

6. The system as in claim 4, wherein the component carrier comprises a plurality of receivers, each receiver of the plurality of receivers configured to receive one of

the plurality of semiconductor components, and wherein each of the plurality of heads is vertically displaceable to one of facilitate and effectuate transfer of the one of the plurality of semiconductor components carried thereby to one of the plurality of receivers of the component carrier.

7. The system as in claim 4, further comprising a plurality of processing modules positioned proximal to the predefined travel path, the plurality of processing modules configured to process the plurality of semiconductor components carried by the plurality of heads during the rotational displacement thereof along the predefined travel path.

8. The system as in claim 7, the plurality of processing modules comprising:

at least one inspection module and at least one testing module for inspecting and testing, respectively, the plurality of semiconductor components carried by the plurality of heads during the rotational displacement thereof along the predefined travel path.

9. The system as in claim 7, further comprising:

a loading module configured to carry the plurality of semiconductor components; and

a conveyor system configured to transfer the plurality of semiconductor components from the loading module to the uptake position,

wherein the plurality of semiconductor components carried by the loading module is received in series by the plurality of heads of the rotatory semiconductor component handling mechanism at the uptake position.

10. The system as in claim 8, further comprising:

a programmable controller for controlling at least one of the rotational displacement of the rotatory semiconductor component handling mechanism and the operation of the pick and place mechanism.

11. The system as in claim 1, wherein the pick and place mechanism comprises a plurality of pick up tips configured to be simultaneously displaceable towards the component carrier to effectuate the collective pick up of the plurality of semiconductor components from the component carrier.

12. The system as in claim 11, wherein the plurality of receivers of the component carrier is arranged in a uniform pitch configuration.

13. The system as in claim 11, wherein the plurality of pick up tips is arranged in a linear configuration with a pitch that is at least substantially equivalent to the pitch of the plurality of receivers of the component carrier.

14. The system as in claim 11, wherein the plurality of pick up tips is simultaneously displaceable to effectuate the collective transfer of the plurality of semiconductor components from the component carrier to the packaging medium.

15. The system as in claim 14, wherein the packaging medium is a tray-type packaging medium.

16. The system as in claim 15, wherein the tray-type packaging medium comprises a plurality of receiving pockets formed thereon, the plurality of receiving pockets of the tray-type packaging medium having a pitch corresponding to the pitch of the plurality of receivers of the component carrier.

17. The system as in claim 12, wherein the component carrier is spatially displaced by a distance equivalent to the pitch between the plurality of receivers between receipt of one semiconductor component and a consecutive semiconductor component of the plurality of semiconductor components from the rotatory semiconductor component handling mechanism.

18. A system comprising:

a first component packaging medium;

a second component packaging medium;

a plurality of component carriers comprising a first component carrier and a second component carrier, the first and second component carriers configured for cyclical displacement between a first position and a second position, each of the first and second component carriers configured to carry a plurality of components;

a pick and place mechanism configured for gang component transfer between each of the first and second component carriers and one of the first component packaging medium and the second component packaging medium; and

a rotary component handling mechanism configured to transfer, in series, components by way of rotational displacement between each of the first and second component carriers and one of the first component packaging medium and the second component packaging medium.

19. The system as in claim 18, wherein each component carrier within the plurality of component carriers is configured for cyclical displacement between the first position and the second position.

20. The system as in claim 18, wherein the pick and place mechanism comprises a plurality of pick up tips that are displaceable to thereby one of facilitate and effectuate gang component transfer between each of the first and second component carriers and one of the first component packaging medium and the second component packaging medium.

21. The system as in claim 20, wherein each of the first and second component carriers comprises a plurality of receivers configured to receive the plurality of semiconductor components, the plurality of receivers arranged in a uniform pitch configuration.

22. The system as in claim 21, wherein the plurality of pick up tips is arranged with a pitch that is at least substantially equivalent to the pitch of the plurality of receivers of each of the first and second component carriers.

23. The system as in claim 18, wherein the rotary semiconductor component handling mechanism comprises a plurality of heads configured to transfer, in series, the plurality of components between each of the first and second component carriers and one of the first component packaging medium and the second component packaging medium.

24. A system comprising:

a rotatable turret structure comprising a plurality of turret heads, each of the plurality of turret heads configured to carry one of a plurality of semiconductor components and configured for rotary displacement along a predefined travel path to displace the one of the plurality of semiconductor component carried thereby along the predefined travel path; and

a first component carrier displaceable between a first position and a second position, the first component carrier configured to receive, in series, a first portion of the plurality of semiconductor components from a corresponding first plurality of turret heads when disposed at the first position; and

a pick and place mechanism configured to pick up the first portion of the plurality of semiconductor components from the first component carrier when the first component carrier is disposed at the second position and collectively transfer the first portion of the plurality of semiconductor components from the first component carrier to a packaging medium.

25. The system as in claim 24, further comprising a second component carrier displaceable between the first position and second position, the second component carrier configured to receive, in series, a second portion of the plurality of semiconductor components from a corresponding second plurality of turret heads when disposed at the first position,

wherein the pick and place mechanism configured to pick up the second portion of the plurality of semiconductor components from the second component carrier when the second component carrier is disposed at the second position and collectively transfer the second portion of the plurality of semiconductor components from the second component carrier to the packaging medium.

26. The system as in claim 25, wherein the first component carrier and the second component carrier are configured for coordinated cyclical displacement between the first position and the second position.

27. The system as in claim 26, wherein operation of the first and second component carriers for receiving and transferring the first and second portions of the plurality of semiconductor components occurs in an independent and cyclical manner.

28. The system as in claim 25, wherein each of the plurality of turret heads is vertically displaceable for one of facilitating and effectuating transfer of the semiconductor component carried thereby to one of the first and second component carriers.

29. The system as in claim 25, wherein the pick and place mechanism is operable for collectively transferring the first portion of the plurality of semiconductor components and the second portion of the plurality of semiconductor components to the packaging medium in a coordinated cyclical manner.

30. The system as in claim 25, wherein each of first and second component carriers comprises a plurality of receivers with a uniform pitch configuration, each of the plurality of receivers configured to receive one of the plurality of semiconductor components.

31. The system as in claim 30, the pick and place mechanism comprising a plurality of pick up tips, the plurality of pick up tips having a pitch that is equivalent to the pitch of the plurality of receivers.

32. The system as in claim 30, wherein the plurality of pick up tips can be vertically displaced for collectively receiving each of the first portion of the plurality of semiconductor components and the second portion of the plurality of semiconductor components from the first component carrier and the second component carrier respectively.

33. The system as in claim 24, wherein the packaging medium is a tray-type packaging medium comprising a plurality of receiving pockets configured to receive the plurality of semiconductor components from the pick and place mechanism.

34. The system as in claim 24, further comprising a plurality of processing modules configured and positioned to process the plurality of semiconductor components carried by the plurality of turret heads during the rotational displacement of the plurality of turret heads along the predefined travel path.

35. A system comprising:

a first component carrier configured to carry a plurality of semiconductor components;

a pick and place mechanism configured to effectuate gang component transfer between a packaging medium and the first component carrier; and

a rotatable turret structure comprising a plurality of turret heads that are rotatably displaceable along a predefined travel path, the plurality of turret heads configured to receive, in series, the plurality of semiconductor components from the first component carrier and displace the plurality of semiconductor components along the predefined travel path.

36. The system as in claim 35, further comprising a second component carrier configured to carry a plurality of semiconductor components, the pick and place mechanism configured to effectuate gang component transfer between the packaging medium and the second component carrier,

wherein the plurality of turret heads is configured to receive, in series, the plurality of semiconductor components from the second component carrier and displace the plurality of semiconductor components along the predefined travel path.

37. The system as in claim 36, wherein the first component carrier and the second component carrier are displaceable between a first position and a second position in a coordinated cyclical manner.

38. The system as in claim 36, the pick and place mechanism comprising a plurality of pick up tips that are arranged in a uniform pitch configuration.

39. The system as in claim 38, each of the first component carrier and the second component carrier comprising a plurality of receivers configured to receive the plurality of semiconductor components, wherein the plurality of receivers of each of the first component carrier and the second component carrier has a pitch that is equivalent to the pitch of the pick up tips.

41. A method for transferring a plurality of semiconductor components, the method comprising:

transferring, in series, a plurality of semiconductor components from a rotatory semiconductor component handling mechanism to a component carrier;

collectively retrieving the plurality of semiconductor components from the component carrier; and

collectively transferring the retrieved plurality of semiconductor components from the component carrier onto a packaging medium.

42. The method as in claim 41, wherein the collectively retrieving the plurality of semiconductor components from the component carrier comprises displacing a pick and place mechanism to pick up, collectively, the plurality of semiconductor components from the component carrier.

43. The method as in claim 42, wherein the rotatory semiconductor component handling mechanism comprises a plurality of heads configured to carry the plurality of semiconductor components, and wherein transferring, in series, the plurality of semiconductor components from the rotatory semiconductor component handling mechanism to the component carrier comprises rotatably displacing each of the plurality of heads along a predefined travel path to thereby rotatably displace the semiconductor component carried thereby along said predefined travel path.

44. The method as in claim 43, wherein each of the plurality of heads is vertically displaceable for one of facilitating and effectuating transfer of the semiconductor component carried thereby to the component carrier.

45. The method as in claim 44, further comprising:

processing the plurality of semiconductor components during the rotational displacement thereof along the predefined travel path.

46. The method as in claim 45, wherein processing the plurality of semiconductor components comprises:

at least one of inspecting and testing the plurality of semiconductor components during the rotational displacement thereof along the predefined travel path.

47. The method as in claim 42, wherein the pick and place mechanism comprises a plurality of pick up tips configured to pick up the plurality of semiconductor components from the component carrier.

48. The method as in claim 47, further comprising displacing the plurality of pick up tips towards the component carrier to thereby one of facilitate and effectuate collective pick up of the plurality of semiconductor components from the component carrier.

49. The method as in claim 48, further comprising simultaneously displacing the plurality of pick up tips for collectively transferring the plurality of semiconductor components from the component carrier to the packaging medium.

50. The method as in claim 47, wherein the plurality of pick up tips of the pick and place mechanism are arranged in a uniform pitch configuration.

51. The method as in claim 47, the component carrier comprising a plurality of receivers configured to receive the plurality of semiconductor components, wherein the plurality of receivers of the component carrier and the plurality of pick up tips of the pick and place mechanism have corresponding pitch configurations.

52 The method as in claim 47, wherein the packaging medium is a tray-type packaging medium comprising a plurality of receiving pockets formed thereon, and wherein the plurality of receiving pockets has a pitch corresponding to the pitch of each of the plurality of receivers of the component carrier and the plurality of pick up tips of the pick and place mechanism.

53. The method as in claim 51, further comprising displacing the component carrier a distance equivalent to a pitch between the plurality of receivers thereof between transfer of each consecutive semiconductor component of the plurality of semiconductor components from the rotatory semiconductor component handling mechanism to the component carrier.

54. The method as in claim 51, further comprising:

displacing the component carrier from an input position, wherein the plurality of semiconductor components is received in series from the rotatory semiconductor component handling mechanism by the plurality of receivers of the component carrier when the component carrier is at the input position, to an output position, wherein the plurality of semiconductor components carried by the component carrier is collectively picked up by the plurality of pick up tips of the pick and place mechanism when the component carrier is at the output position.

55. The method as in claim 54, further comprising:

coupling a programmable controller to at least one of the rotatory semiconductor component handling mechanism, the component carrier, and the pick and place mechanism for controlling at least one of the rotational displacement of the rotary semiconductor component handling mechanism, the displacement of the component carrier, and the operation of the pick and place mechanism.

56. A method for transferring a plurality of components, the method comprising:

transferring components from an input packaging medium to an input position of a rotary component handling mechanism;

transferring components along a rotary travel path between the input position and an offload position of the rotary component handling mechanism; and

transferring components from the offload position to an output packaging medium,

wherein one of transferring components to the input position of the rotary component handling mechanism and transferring components from the offload position to the output packaging medium comprises:

serially transferring components between the rotary component handling mechanism and a first component carrier; and

collectively transferring components between the first component carrier and one of the input packaging medium and the output packaging medium.

57. The method as in claim 56, further comprising processing components at particular positions along the rotary travel path during transferring of the plurality of components between the input position and the offload position.

58. The method as in claim 56, wherein one of transferring components to the input position of the rotary component handling mechanism and transferring components from the offload position to the output packaging medium comprises:

serially transferring components between the rotary component handling mechanism and a second component carrier; and

collectively transferring components between the second component carrier and one of the input packaging medium and the output packaging medium.

59. The method as in claim 58, wherein serially transferring components and collectively transferring components comprises displacing the first component carrier in a coordinated cyclical manner relative to the second component carrier.

60. The method as in claim 58, wherein collectively transferring components between the component carriers and one of the input packaging medium and the output packaging medium comprises simultaneously carrying multiple components using a pick and place mechanism.

61. The method as in claim 60, wherein the pick and place mechanism comprises a plurality of pick up tips that are displaceable to thereby one of facilitate and effectuate gang component transfer between the component carriers and one of the input packaging medium and the output packaging medium.

62. The method as in claim 61, wherein the plurality of pick up tips has a uniform pitch configuration.

63. The method as in claim 62, wherein each of the first and second component carriers comprises a plurality of receiving pockets configured to receive components therein, wherein the plurality of receiving pockets of each of the first and second component carriers has a substantially equivalent pitch configuration as compared to the plurality of pick up tips.