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Conrad

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[54] **IDENTIFICATION AND POLARIZATION OF MSI/LSI ASSEMBLY AND RECEPTACLE**

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[73] Assignee: **Litton Systems, Inc.,** Beverly Hills, Calif.

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[52] **U.S. Cl.** ..... **339/17 C,** 339/113, 339/184

[51] **Int. Cl.** **H05k 1/02**

[58] **Field of Search** 339/17, 18, 42, 36, 339/113, 184, 186; 174/112; 35/69, 70, 71; 46/23–25, 27–29; 273/137, 160

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[57] **ABSTRACT**

Means for coupling an electrical assembly having a plurality of connecting pins about the periphery thereof, to a receptacle of similar dimensions having a plurality of pin receiving means about the periphery thereof; one of said assembly and receptacle having embossed on the under-surface an alpha-numeric symbol representative of the mating part, while the other one of said assembly and receptacle has engraved therein a reverse image of the alpha-numeric representation whereby said surfaces can mate in only one direction.

7 Claims, 7 Drawing Figures

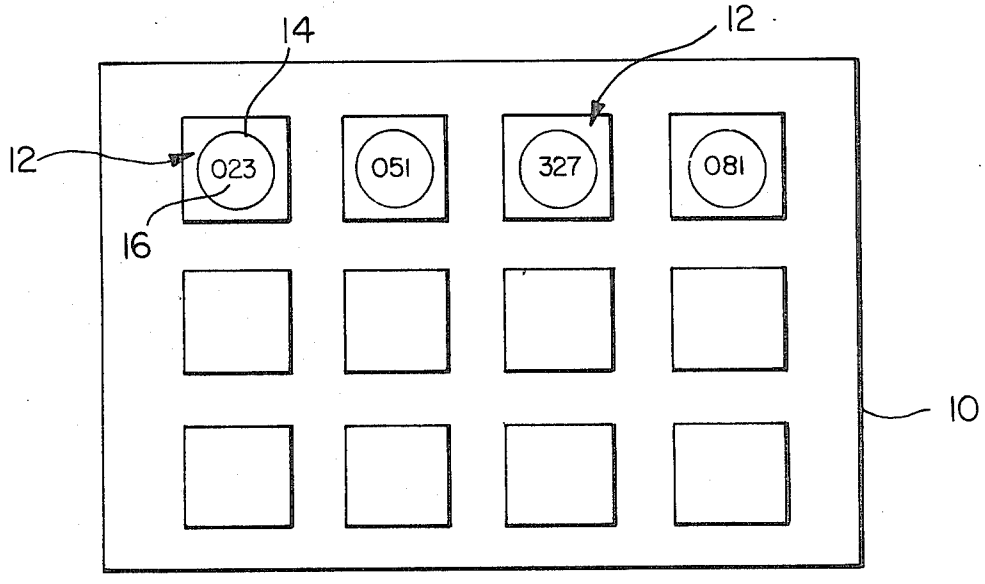


Fig. 1

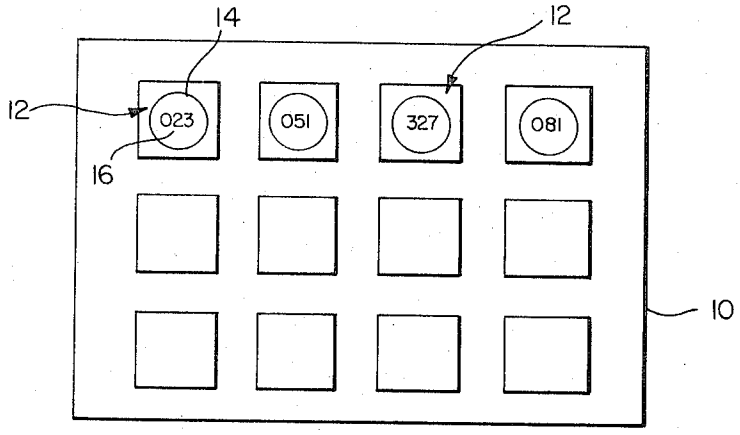


Fig. 2

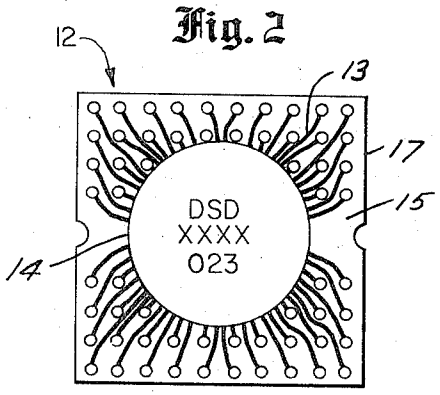


Fig. 3

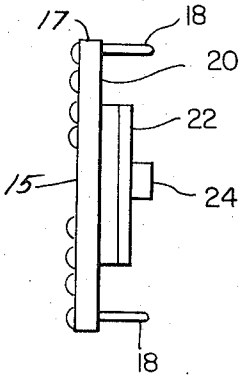
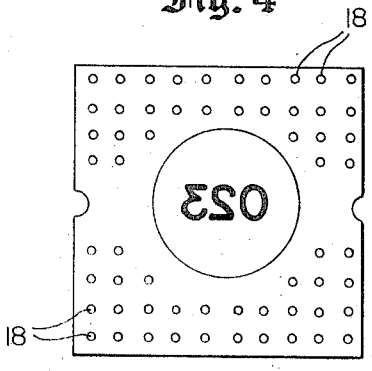


Fig. 4



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Fig. 5

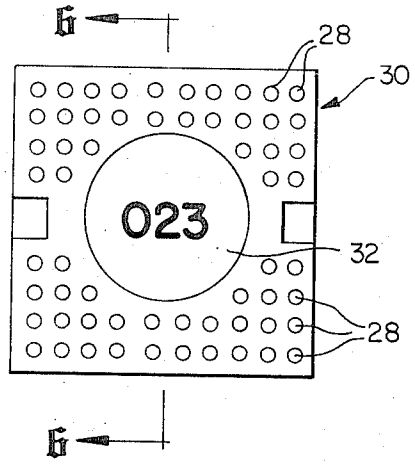


Fig. 6

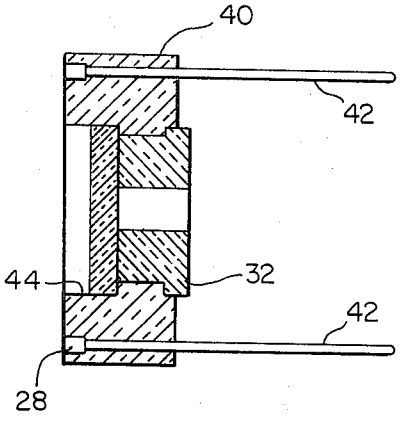
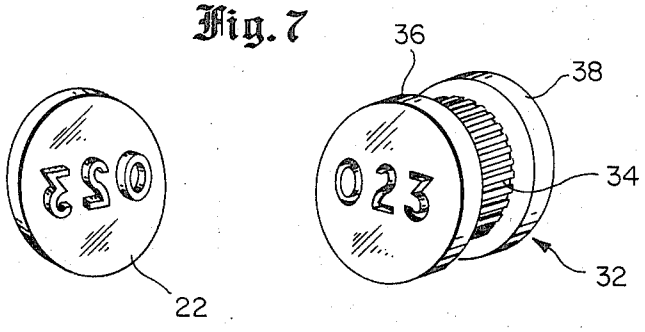


Fig. 7



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IDENTIFICATION AND POLARIZATION OF MSI/LSI ASSEMBLY AND RECEPTACLE

BACKGROUND OF THE INVENTION

Many schemes have been employed to solve the problem of keying physically identical but electronically different assemblies to prevent the insertion of a wrong part. Previous methods have consisted of color coding, guide pins of various configurations or sizes, varying location of guide pins or attaching hardware or rotating unsymmetrical keys to alternate positions. All of the above methods require careful observation on the part of the operator to determine compatibility, and generally a certain amount of instruction or system familiarity is required.

In todays electronics assembly methods, medium scale integration (MSI) and large scale integration (LSI) have reduced the size of circuits to infinitely smaller proportions. A given circuit is generally mounted on a substrate of a rectangular or square configuration. In a matrix having a large number of physically identical cards, each having a different electronic circuit thereon, the problem of keying becomes more acute when all card assemblies fit all receptacles, and it is therefore necessary that a means be devised to accurately position the correct electronic package in the correct receptacle.

It is, accordingly, an object of this invention to provide a new and improved method and apparatus for keying physically identical but electronically different assemblies.

It is another object of this invention to provide a new and improved keying means which is capable of proper orientation by observation.

It is a further object of this invention to provide a new and improved keying means using alpha-numeric characters.

It is still another object of this invention to provide a new and improved keying means using alpha-numeric characters indicative of the part number of the electronic assembly.

SUMMARY OF THE INVENTION

The foregoing and other objects of the invention are accomplished by providing on the electronic assembly under surface a reverse image of an alpha-numeric designation embossed in a central location. This alpha-numeric designation generally may be, for example, the last two or three digits of the manufacturer's part number for that particular assembly. The mating receptacle is provided with an engraved obverse image of the alpha-numeric designation to thereby permit the electronic assembly to matingly engage only that particular receptacle.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention can be better understood with reference to the specification when taken in conjunction with the drawings in which:

FIG. 1 shows a top view of a circuit card of the MSI/LSI variety having assembled thereon a plurality of identical electronic assemblies;

FIG. 2 shows a top view of an LSI electronic package bearing the part number;

FIG. 3 shows a side view of the package of FIG. 2;

FIG. 4 shows a bottom view of the package of FIG. 2 showing the embossed reverse image of the alpha-numeric designation;

FIG. 5 shows a top view of an LSI receptacle for the package of FIG. 2;

FIG. 6 shows a cross-sectional view of the receptacle of FIG. 5 along line VI—VI; and

FIG. 7 shows an exploded isometric view of a sealing cap and insert according to the invention.

A BRIEF DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings and more particularly to FIG. 1, there is shown a circuit card 10 having mounted thereon a plurality of electronic LSI packages 12 of generally square configurations. Each electronic package has a metallic disk 14 mounted thereon to hermetically seal the circuitry thereon. As shown in FIGS. 2 and 3, printed circuit leads 13 emanate from the circuitry beneath the disk 14 to pin locations 18 on the upper surface 15 of the substrate 17 on which the circuit is mounted. Each of these disks 14 have appropriately embossed thereon a manufacturer's part number 16 with the numbers designated in FIG. 1 representing the last three digits of the manufacturer's part number.

FIGS. 2, 3 and 4 show details of the electronic package 12 in the various views. As shown in FIG. 4, the electronic package 12 has a plurality of pins 18 positioned about the periphery of the underside thereon and on a square package such as that illustrated, the pins are symmetrical with respect to two axes. Therefore, with such a package, it is possible to have four different positions of the package 12 which would mate with the appropriate receptacle. In accordance with the invention, the under surface 20 of the package 12 has mounted thereon a disc-shaped sealing cap 22 which has embossed thereon a reverse image of an alpha-numeric designation 24 representative of the last three numbers of the part number 16. The sealing cap 22 can be affixed by any suitable means such as epoxy. In FIGS. 5 and 6, there is shown a receptacle 26 with a plurality of pin-receiving means or sockets 28 positioned about the upper surface 30 thereof to receive the pins 18 of the electronic package 12. Centrally positioned with respect to the outside perimeter of the receptacle 26 is an insert 32 having engraved thereon an obverse image of the alpha-numeric designation embossed on the electronic package 12 to be mated therewith. As shown in FIG. 6 the insert 32 is recessed with respect to the upper surface 30 of the receptacle 26. This provides positive mating engagement with the downwardly depending sealing cap 22 in the under surface 20 of the electronic package 12. As better illustrated in FIG. 7, the insert 32 has a narrow knurled central body portion 34 with flanges 36 and 38 on either side thereof. The insert 32 and the sockets 28 may, for example, be molded in the receptacle body 40. Each receptacle pin 28 has integral and coaxially aligned therewith a square wire wrap pin 42 for interconnection with other receptacles and other electronic circuitry. In the alternative, the receptacle body 40 may be molded with the sockets 28 in position with the body 40 having a central circular recess 44, having sufficient depth to receive a disc insert similar to flange portion 36 of insert 32 as well as receiving the circumference of the sealing cap 22 in close mating engagement.

It is obvious from the explanation herein provided that an operator mounting the electronic package **12** to the receptacle **26** can visually observe the last three (3) digits of the part number **16** on the disk **14** of the electronic package and by observation of the receptacle **26**, select the appropriate disignation therein and mate the package with the corresponding part number in the receptacle **26** in proper axial alignment. It is also obvious, for example, that the insert may be embossed while the sealing cap can be engraved. Similarly, other alpha-numeric designations may be used and the invention need not be limited to the utilization of numbers only. While there has been shown and described one (1) embodiment in accordance with my invention, it is to be understood that other adaptations and modifications may be made within the spirit and scope of the invention and the invention is not to be limited by the specific structure shown herein.

What I claim is:

1. A combination comprising:

a. an electronic package having a plurality of downwardly depending pins on the under surface thereof, said pins being disposed about the periphery to provide at least two angular orientations for mating, said package having on the under surface thereof a generally centrally located first portion having no pins;

b. a corresponding receptacle having pin receiving means disposed about the upper surface thereof in a configuration for receiving said pins, the upper surface thereof having a generally centrally located second portion; and

c. one of said first and second portions having engraved thereon an alpha-numeric designation, the other of said first and second portions having embossed thereon a reverse image of said alpha-numeric designation for identifying said corresponding receptacle package and for mating engagement in proper axial alignment of said electronic package with said receptacle.

2. The combination according to claim **1** wherein said second portion has engraved thereon an obverse image of the alpha-numeric designation and said first portion has a reverse embossed image of said alpha-numeric designation.

3. The combination according to claim **1** wherein said second portion has an embossed obverse image of the alpha-numeric designation and said first portion has a reverse engraved image of said alpha-numeric designation.

4. The combination according to claim **1** wherein said second portion has an obverse image of the alpha-numeric designation and the electronic package has imprinted on the upper surface thereof the same alpha-numeric designation whereby the electronic package for mating receptacle is readily identifiable by observation.

5. In a circuit card assembly containing a plurality of physically identical but electronically different assemblies, the combination comprising:

a. a plurality of physically identical receptacles affixed to said circuit card, each of said receptacles having pin receiving means positioned about the upper surface thereof, said pin receiving means being disposed about the periphery of said surface to provide at least two angular orientations for mating, each of said receptacles having a central portion on the upper surface thereof containing an obverse image of an alpha-numeric designation; and

b. a plurality of physically identical but electronically different packages, each of said packages having depending pins on the under surface thereof adapted for mating engagement with said pin receiving means, each of said packages having on the undersurface thereof, a reverse image of an alpha-numeric designation, at least one of said obverse and reverse images being embossed and the other of said images being engraved with the same alpha-numeric designation for mating alignment in only one angular orientation, each said electronic packages having on the upper surface thereof an obverse image of the alpha-numeric designation corresponding to the receptacle adapted for receiving said package.

6. A combination comprising:

a. an electronic package having a plurality of downwardly depending pins on the under surface thereof, said pins being disposed about the periphery to provide at least two angular orientations for mating, said package having on the under surface thereof a generally centrally located first portion having no pins; and

b. a receptacle having pin receiving means disposed about the upper surface thereof in a configuration for receiving said pins, the upper surface thereof having a generally centrally located second portion, one of said first and second portions having engraved thereon an alpha-numeric designation, the other of said first and second portions having embossed thereon a reverse image of said alpha-numeric designation for mating engagement in proper axial alignment of said electronic package with said receptacle, said first portion having a separate sealing cap affixed to the undersurface of said electronic package and said second portion having a separate member inserted into and affixed within a recess in said receptacle with said separate member being recessed from the upper surface of said receptacle a distance at least equal to the thickness of said sealing cap.

7. The combination of claim **6** wherein said second portion has an insert having a knurled body portion with a disc flange on either side thereof, one of said disc flanges containing the alpha-numeric designation, said insert being molded in said receptacle.

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