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ENHANCED RJ45 CONNECTOR DESIGN WITH A MAGNETIC ELEMENT

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ABSTRACT

Widely employed within the world of telecommunications, registered jacks (RJs) are a standardized network interface mechanism. RJ45 connectors, consisting of a RJ45 plug (often referred to as a 'crystal head' due to common transparent plastic construction) and a RJ45 jack (sometimes referred to as a cage), are frequently used to interconnect networked computing devices. RJ45 connectors suffer from a number of deficiencies. As just one example, a RJ45 crystal head may (as a result of, possibly among other things, age, repeated use, improper installation, latch damage or weakness, etc.) become loose when it is inserted into a cage, which may result in compromised (e.g., disrupted, intermittent, etc.) connections. To address these challenges, techniques are presented herein that provide for the inclusion of a magnetic element in RJ45 connectors to enhance or augment the latch mechanism of a RJ45 crystal head to improve connection reliability.

DETAILED DESCRIPTION

Widely employed within the world of telecommunications, RJs are a standardized network interface mechanism. Common RJ types include, for example, RJ11 (frequently used to interconnect telephone devices) and RJ45 (frequently used to interconnect networked computing devices). RJ45 connectors consist of a RJ45 plug (often referred to as a 'crystal head' due to the transparent plastic construction) and a RJ45 jack (sometimes referred to as a cage).

RJ45 connectors suffer from a number of deficiencies. As just one example, a RJ45 crystal head may (as a result of, possibly among other things, age, repeated use, improper installation, damage to the latch, etc.) become loose when it is inserted into a cage resulting in compromised (e.g., disrupted, intermittent, etc.) connections. Such compromised

connections in a lab environment are not only annoying but are also significant time and energy consuming for network equipment users and engineers. In a data center environment, other factors (such as, for example, inappropriate network administrator operations, blowing fans, equipment vibration, etc.) may exacerbate such compromised connections resulting in, among other things, data link outages. Thus, the plastic latch that is located on the top of the RJ45 crystal head has proven to be not entirely reliable, especially after prolonged use.

To address these challenges, techniques are presented herein that support the addition of a magnetic element to RJ45 connectors to enhance or augment the latch mechanism of a RJ45 crystal head so as to resist the different forces that may work to dislodge a head from a cage while not changing the current standardized industrial mechanical shape, thus improving connection reliability and saving debug, diagnostic, etc. time and effort for RJ45 crystal head users.

Aspects of the techniques presented herein:

1. Provide as much magnetic force as possible for the RJ45 crystal head to resist the different forces (such as, for example, a dragging force from the cable, blowing fans, equipment vibration, etc.) that may work to dislodge the head from a RJ45 cage.

2. Change as little as possible of the current RJ45 crystal head shape, which is standardized and in wide industrial use, to make adoption of the techniques presented herein more acceptable for the industry.

Aspects of the techniques presented herein may be described with reference to Figure 1, below.

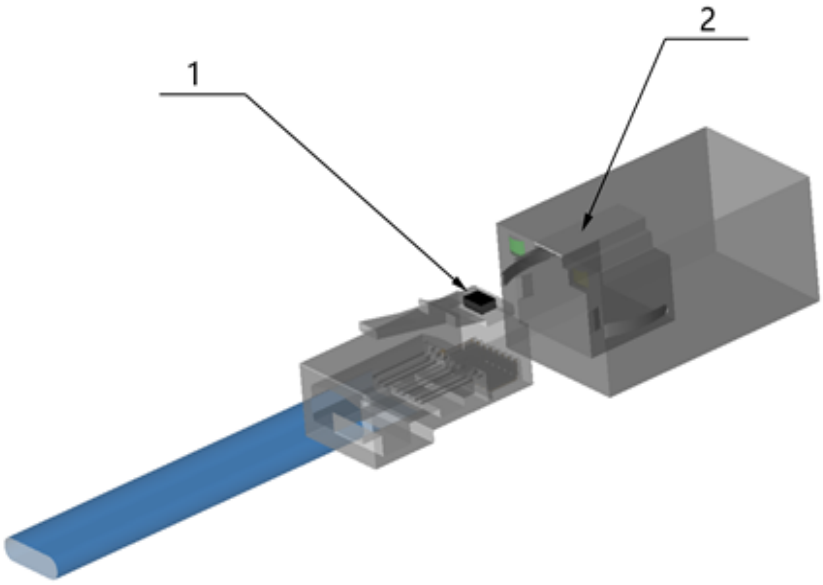

Figure 1: Illustrative Magnetic Element Placement

Figure 1, above, illustrates aspects of one particular magnetic element placement arrangement that may be possible through the techniques presented herein. In particular, as depicted in the figure:

- Element 1 identifies a magnet that is located in the center of the base part of the latch on top of the RJ45 crystal head. For example, the magnet may measure 3mm x 2mm x 1mm (L x W x H). The magnet may be attached through any number of means including, for example, insertion into a cavity in the base with a glue or other adhesive for retention.
- Element 2 identifies a metal (e.g., iron, etc.) strip inside the top of the RJ45 cage. Since, from Element 1, the magnet is placed on the top of the RJ45 crystal head, the magnet would touch, or otherwise come into contact with, the metal strip after the RJ45 crystal head is inserted into the cage, avoiding any weakening of the magnetic force.

Figure 2, below, provides a more detailed depiction of Element 1 from Figure 1.

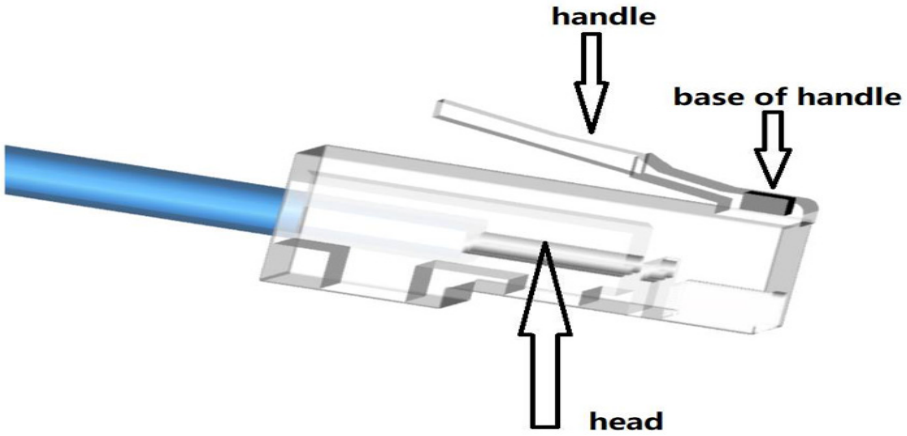

Figure 2: Head Structure

As illustrated in Figure 2, above, a RJ45 crystal head contains a flexible plastic handle that is attached (e.g., soldered) to the top of head. The attached/soldered area is referred to as the base of the handle, which is fixed at the front of the head. A magnet may be placed in the top portion of the base of the handle.

Continuing with the particular placement arrangement that was described and illustrated above, Figures 3, 4, and 5, below, provide further views of the magnet placement inside a RJ45 crystal head.

Figure 3: Side View

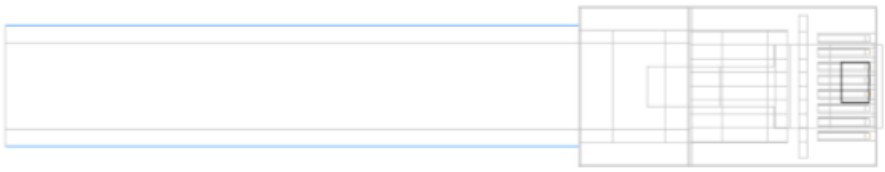

Figure 4: Top View

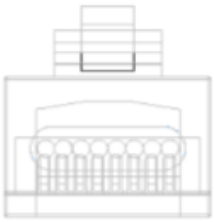

Figure 5: Front View

Figures 3, 4, and 5, above, provide different perspectives of a RJ45 crystal head as augmented through the techniques as described herein using the particular placement arrangement that was described and illustrated above. In particular:

- Figure 3 presents a side view illustrating placement of the magnet at the top part of the base of the handle.
- Figure 4 presents a top view illustrating placement of the magnet in the center of the top part of the base of the handle.
- Figure 5 presents a front view illustrating placement of the magnet in the center of the top part of the base of the handle.

The particular placement arrangement that was described and illustrated above reflects, among other things, the standardized structure of RJ45 connectors. For example, the structure of a RJ45 cage suggests that the top area inside the cage is a good place to install a thin metal strip or film. As well, the structure of a RJ45 crystal head determines placement of a magnet so as to avoid compromising the structural strength of the head. Taking into account these two factors yields placement of the magnet in the center of the top part of the base of the handle. For example, placing the magnet on the left side or the right side of the RJ45 crystal head might risk breaking the electrical components of the system.

However, it is important to note that the placement arrangement that was described and illustrated above is exemplary only, and numerous other placement arrangements may be possible using the techniques presented herein. As just one example, a magnet may be

placed at the face-end of a RJ45 crystal head and a metal strip may be placed at the back wall of a RJ45 cage.

In summary, techniques have been presented that support the inclusion of a magnetic element in RJ45 connectors provides a simple and graceful design to enhance or augment (but not substitute) the latch mechanism of a RJ45 crystal head to improve connection reliability.