alongside the rack assembly such that the electrical connectors extend through windows of the backplane. However, due to the size of the backplane and/or the number of electrical connectors, misalignment may occur between the electrical connectors and the backplane as the rack assembly approaches the backplane or vice versa. If excessive force is used to couple the backplane and the rack assembly when the electrical connectors are misaligned, the backplane and/or the electrical connectors may be damaged.

[0005] There is a need for a backplane communication system that reduces the risk of damaging the electrical connectors and/or the backplane during assembly of the backplane communication system.

BRIEF DESCRIPTION OF THE INVENTION

[0006] According to a first aspect of the present invention, there is provided a backplane communication system including: a backplane having mating windows and guide holes that extend through the backplane; a rack assembly having an engagement side and an array of electrical connectors having respective mating ends that are disposed along and face away from the engagement side, the rack assembly including a brick unit having a sub-array of the electrical connectors; and a plurality of guide pins each having a distal end, a proximal end, and a central axis extending therebetween, each of the guide pins having a cross-sectional diameter taken transverse to the corresponding central axis, the guide pins being coupled to the rack assembly at the proximal ends and projecting away from the engagement side; wherein the backplane interfaces with the engagement side such that the guide pins extend through corresponding guide holes and the electrical connectors are aligned with and extend through the mating windows, each of the guide pins having a leading segment that extends through the corresponding guide hole and a trailing segment that is disposed within the corresponding guide hole, wherein the cross-sectional diameter along the trailing segment is greater than the cross-sectional diameter along the leading segment.

[0006a] According to a second aspect of the present invention, there is provided a rack assembly of a backplane communication system, the rack assembly including: an assembly frame having an engagement side configured to interface with a backplane having mating windows; a plurality of brick units supported by the assembly frame, each of the brick units including electrical connectors having mating ends for engaging corresponding connectors of a daughter card assembly, the mating ends being disposed along and face away from the engagement side; and a plurality of guide pins that each have a distal end, a proximal end, and

a central axis extending therebetween, each of the guide pins having a cross-sectional diameter taken transverse to the corresponding central axis, the guide pins being coupled to the assembly frame at the proximal ends and extending away from the engagement side, wherein each of the guide pins has a leading segment that extends through a guide hole of the backplane and a trailing segment that is disposed within the guide hole when the backplane interfaces with the engagement side, the cross-sectional diameter along the trailing segment being greater than the cross-sectional diameter along the leading segment.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] Figure 1 is a front-perspective view of a backplane communication system formed in accordance with an embodiment.

[0008] Figure 2 is a perspective view of a portion of a backplane and a portion of a rack assembly that may be loaded onto the backplane when the backplane communication system of Figure 1 is assembled.

CLAIMS

1. A backplane communication system comprising:

a backplane having mating windows and guide holes that extend through the backplane;

a rack assembly having an engagement side and an array of electrical connectors having respective mating ends that are disposed along and face away from the engagement side, the rack assembly including a brick unit having a sub-array of the electrical connectors; and

a plurality of guide pins each having a distal end, a proximal end, and a central axis extending therebetween, each of the guide pins having a cross-sectional diameter taken transverse to the corresponding central axis, the guide pins being coupled to the rack assembly at the proximal ends and projecting away from the engagement side;

wherein the backplane interfaces with the engagement side such that the guide pins extend through corresponding guide holes and the electrical connectors are aligned with and extend through the mating windows, each of the guide pins having a leading segment that extends through the corresponding guide hole and a trailing segment that is disposed within the corresponding guide hole, wherein the cross-sectional diameter along the trailing segment is greater than the cross-sectional diameter along the leading segment.

2. The backplane communication system of claim 1, wherein the guide pins include first and second guide pins having a sub-array of the electrical connectors positioned therebetween.

3. The backplane communication system of claim 1, wherein each of the guide pins includes a stepped portion that is located between the leading and trailing segments, the cross-sectional diameter along the stepped portion increasing as the guide pin extends from the leading segment to the trailing segment.

4. The backplane communication system of claim 3, wherein the stepped portion is located a first axial distance away from the backplane and the electrical connectors clear the backplane such that distal edges of the electrical connectors are located a second axial distance away from the backplane, the second axial distance being less than the first axial distance.

5. The backplane communication system of claim 1, wherein a unit housing supports the sub-array of the electrical connectors, at least one of the guide pins having a fixed position with respect to the unit housing.

6. The backplane communication system of claim 5, wherein the rack assembly includes an assembly frame that floatably holds the brick unit, the brick unit configured to move relative to the assembly frame as the at least one guide pin engages a daughter card assembly in a misaligned manner.

7. The backplane communication system of claim 6, wherein the electrical connectors of the sub-array are floatably held by the unit housing, each of the electrical connectors of the sub-array configured to mate with a corresponding connector of the daughter card assembly, wherein each of the electrical connectors of the sub-array is configured to independently move relative to the unit housing as the corresponding connector engages the respective electrical connector in a misaligned manner.

8. The backplane communication system of claim 1, wherein the rack assembly includes first and second brick units that each have a sub-array of the electrical connectors, the electrical connectors of the first brick unit having an orthogonal relationship with respect to the electrical connectors of the second brick unit.

9. The backplane communication system of claim 1, wherein the backplane coincides with a plane defined by first and second lateral axes, the guide pins being substantially evenly distributed across at least one of the first lateral axis or the second lateral axis.

10. The backplane communication system of claim 1, further comprising communication cables that interconnect at least some of the electrical connectors.

11. The backplane communication system of claim 1, further comprising a stiffener that extends along the backplane, the stiffener having guide holes that align with the guide holes of the backplane, at least some of the guide pins extending through the guide holes of the stiffener.

12. A rack assembly of a backplane communication system, the rack assembly comprising:

an assembly frame having an engagement side configured to interface with a backplane having mating windows;

a plurality of brick units supported by the assembly frame, each of the brick units including electrical connectors having mating ends for engaging corresponding connectors of a daughter card assembly, the mating ends being disposed along and face away from the engagement side; and

a plurality of guide pins that each have a distal end, a proximal end, and a central axis extending therebetween, each of the guide pins having a cross-sectional diameter taken transverse to the corresponding central axis, the guide pins being coupled to the assembly frame at the proximal ends and extending away from the engagement side, wherein each of the guide pins has a leading segment that extends through a guide hole of the backplane and a trailing segment that is disposed within the guide hole when the backplane interfaces with the engagement side, the cross-sectional diameter along the trailing segment being greater than the cross-sectional diameter along the leading segment.

13. The rack assembly of claim 12, wherein the brick units include unit housings and the guide pins include first guide pins and second guide pins, each of the brick units having one of the first guide pins and one of the second guide pins coupled to the unit housing of the brick unit, the electrical connectors of the brick unit being located between the first and second guide pins.

14. The rack assembly of claim 12, wherein at least some of the guide pins includes a stepped portion between the leading and trailing segments, the cross-sectional diameter along the stepped portion increasing as the corresponding guide pin extends from the leading segment to the trailing segment.

15. The rack assembly of claim 12, wherein the brick units include first and second brick units, the electrical connectors of the first brick unit having an orthogonal relationship with respect to the electrical connectors of the second brick unit.

16. The rack assembly of claim 12, wherein the brick units include first and second brick units, the electrical connectors of the first brick unit being stacked side-by-side along a first lateral axis, the electrical connectors of the second brick unit being stacked side-by-side along a second lateral axis that is perpendicular to the first lateral axis.

17. The rack assembly of claim 12, wherein the brick units include first and second brick units and the rack assembly further comprises communication cables, wherein one or more of the electrical connectors of the first brick unit are interconnected to one or more of the electrical connectors of the second brick unit through the communication cables.

18. The rack assembly of claim 17, wherein the rack assembly includes a plurality of the first brick units and a plurality of the second brick units.

19. The rack assembly of claim 12, wherein the assembly frame floatably holds the brick units such that the brick units are capable of independently moving relative to the assembly frame.

20. The rack assembly of claim 12, wherein each of the brick units includes a unit housing that floatably holds the electrical connectors of the corresponding brick unit, wherein each of the electrical connectors of the brick unit is configured to independently move relative to the unit housing as the corresponding connector engages the respective electrical connector in a misaligned manner.