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Modular support for telecommunication component

Abstract

An attachable support module for attachment to an electronic equipment casing. The support module allows the electronic equipment casing to be raised from a ground surface to allow cables to be attached to the underside of the casing. The support module includes a case having an exterior plate and a parallel interior plate. A support member is rotatably mounted between the exterior plate and the interior plate of the case. The support member has a collapsed position within the case and an extended position extending from the case. A pivot arm engages the support member in the collapsed position.

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Background/Summary

TECHNICAL FIELD

(1) The present disclosure relates generally to a mounting structure for telecom components. More particularly, aspects of this disclosure relate to a compact supporting module that may be attached to a telecommunication casing for elevating the casing.

BACKGROUND

(2) The fifth generation of mobile communication technology (5th generation wireless systems, referred to as 5G) is the latest generation of mobile communication technology. The 5G technology is an extension of legacy 4G (LTE) mobile communication systems. The recent roll out of the 5G communication infrastructure has required the deployment of 5G capable components. The previous 4G system required a baseband unit (BBU), a remote radio unit (RRU), and an antenna to allow for communications between mobile devices. 5G systems for communication between mobile devices have higher speeds, lower latency, and larger bandwidths, allowing for more connections and for more data to be processed. Such capabilities are possible through fan-less components such as radio units (RU), centralized units (CU), distributed units (DU), and active antenna units (AAU). In 5G systems the functions of the BBU in 4G systems are performed by the distributed units and centralized units, and the functions of the antenna and the RRU in 4G systems are performed by the active antenna units.

(3) 5G DUs and AAUs are components that are typically located in outdoor environments. Outdoor electronic chassis design for DUs and AAUs requires being waterproof, dustproof, and anti-corrosive. Therefore, the chassis for 5G outdoor components is designed as a closed system and the chassis is usually designed as a heat sink to cool the electronic devices in such components. Such thermal solutions are thus a fan-less design. A 5G case typically is roughly rectangular in shape

with heat sink vanes on the top and the sides of the casing. The casing houses various electronic components for 5G communication operations. The casing has an input/output (IO) panel that includes ports for connection of various cables for power and signals to the electronic components. The panel is typically on the bottom side of the case to allow maximum exposure of the heat sink vanes.

(4) Due to the location of the cable connections, 5G units require supports that may be used to raise the casing and thus allow access to the ports on the panel on the casing. Typically, these supports are installed near the bottom of the unit. There are two types of known bottom side supports for elevating 5G units. A first type is an integrated type where the supporter is designed in the system case as shown in a prior art telecommunication component **10** in FIG. **1**A. In this example, the component **10** is offered by Sumitomo Electric. A second type is an independent type that fixes the supporter to the system case of a prior art telecommunication component **50** as shown in FIG. **1**B. In this example, the component **50** is offered by Nokia. However, both types of existing supports have shortcomings.

(5) An integrated type of supporter that is built into the 5G component **10** is shown in FIG. **1**A. The 5G component has a casing **12** has with two side panels **14** and **16**. Each of the side panels **14** and **16** has supports **18** that allow the casing **12** to be raised off of the ground. This allows access for connection of cables to a bottom input/output panel **20**. The supports **18** will be scratched or damaged after frequent use. Thus, this will impact the appearance quality of the 5G unit and will require replacement of the support **18**. However, an integrated type of support **18** is difficult and expensive to replace as the entire casing must be replaced if a single supporter **18** is damaged.

(6) FIG. **1**B shows the 5G component **50** that includes a casing **52**. Two independent types of supports **60** and **62** are attached to the casing **52**. One of the independent supports **60** has a longitudinal support and a plate that may be screwed into the casing **52**. The other independent support **62** is a leg that may be attached to the casing **52** on an opposite side. The independent type of support suffers from the inability to be collapsed since once the supports **60** and **62** are attached, they cannot be easily retracted. Thus, if the component **50** is moved, the independent supports must be either detached or the fixed position of the supports extending from the casing **52** makes transport of the component **50** awkward. Further, the necessity for attaching the independent type of support to the system casing may require that the attached support overlaps the operating area near the front IO panel.

(7) Thus, there is a need for a modular support that may be attached to a telecommunications component. There is a further need for a modular support that may be collapsed easily for transport. There is also a need for a modular support that allows replacement without the expense of replacing the main components of the telecommunication component.

SUMMARY

(8) One disclosed example is an attachable support module for attachment to an electronic equipment casing. The support module includes a case having an exterior plate and a parallel interior plate. A support member is rotatably mounted between the exterior plate and the interior plate of the case. The support member has a collapsed position within the case and an extended position extending from the case. A pivot arm engages the support member in the collapsed position.

(9) A further implementation of the example attachable support module includes a torsion spring having a first spring arm coupled to the support member and a second spring arm coupled to the pivot arm. The torsion spring provides spring force to force the support member into the extended position. Another implementation is where the support member includes a main hook that engages a secondary hook of the pivot arm. The engagement of the main hook with the secondary hook retains the support member in the collapsed position. Another implementation is where the pivot arm includes a release button. Pushing the release button causes the pivot arm to move and disengage the secondary hook from the main hook. Another implementation is where the support

member includes a base member to engage a ground surface when the support member is in the extended position. Another implementation is where the support member includes a pivot bar positioned parallel to the base member. The pivot bar includes a hole with a pin inserted therein, and the support member rotates around the pin attached to the exterior and interior plates of the case. Another implementation is where the interior plate includes a fastener for fastening the case to a side panel of the electronic equipment casing. Another implementation is where the casing holds components for operation of a 5G mobile communication system, and where the casing includes an underside panel having an input/output connector that may be accessed when the support member is in an extended position.

(10) Another disclosed example is an electronic component including a casing having two side panels and a bottom panel including at least one connector. The component includes a first modular support attached to one of the side panels and a second modular support attached to the other side panel. The first and second modular supports each include a case having an exterior plate and a parallel interior plate. The modular supports each include a support member rotatably mounted between the exterior plate and the interior plate of the case. The support member has a collapsed position within the case and an extended position extending from the case. The casing is elevated when the support member is in an extended position allowing access to the bottom side input/output panel. Each of the modular supports include a pivot arm engaging the support member in the collapsed position.

(11) A further implementation of the example electronic component is where casing includes a heat sink chassis with cooling fins extending from an exterior surface of the heat sink chassis. The heat sink chassis is positioned between the two side panels. Another implementation is where the casing holds components for operation of a 5G mobile communication system. Another implementation is where the first and second modular supports each include a torsion spring having a first spring arm coupled to the support member and a second spring arm coupled to the pivot arm. The torsion spring provides spring force to force the support member into the extended position. Another implementation is where the support member includes a main hook that engages a secondary hook of the pivot arm. The engagement of the main hook with the secondary hook retains the support member in the collapsed position. Another implementation is where the pivot arm includes a release button. Pushing the release button causes the pivot arm to move and disengage the secondary hook from the main hook. Another implementation is where the support member includes a base member to engage a ground surface when the support member is in the extended position. Another implementation is where the support member includes a pivot bar positioned parallel to the base member. The pivot bar includes a hole. The support member rotates around a pin inserted therein. The pin is attached to the exterior and interior plates of the case. Another implementation is where the interior plate includes a fastener for fastening the case to one of the side panels.

(12) The above summary is not intended to represent each embodiment or every aspect of the present disclosure. Rather, the foregoing summary merely provides an example of some of the novel aspects and features set forth herein. The above features and advantages, and other features and advantages of the present disclosure, will be readily apparent from the following detailed description of representative embodiments and modes for carrying out the present invention, when taken in connection with the accompanying drawings and the appended claims.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

(1) The disclosure will be better understood from the following description of exemplary embodiments together with reference to the accompanying drawings, in which:

(2) FIG. **1**A is a perspective view of a telecommunications component casing with an integrated prior art support;
(3) FIG. **1**B is a perspective view of a telecommunications component casing with an independent prior art support;
(4) FIG. **2**A shows a front perspective view of a telecommunications component with example support modules, according to certain aspects of the present disclosure;
(5) FIG. **2**B shows a front perspective view of the telecommunications component with the example support modules in FIG. **2**A having supports extended to allow cables to be attached to the underside of the telecommunications component, according to certain aspects of the present disclosure;
(6) FIG. **2**C shows a side view of the telecommunications component with the example support modules having supports extended to allow cables to be attached, according to certain aspects of the present disclosure;
(7) FIG. **3**A is a perspective view of one of the example support modules shown in FIGS. **2**A-**2**B, according to certain aspects of the present disclosure;
(8) FIG. **3**B is a side view of one of the example support modules in FIGS. **2**A-**2**B, according to certain aspects of the present disclosure;
(9) FIG. **3**C is an exploded view of the components of the example support module, according to certain aspects of the present disclosure;
(10) FIG. **4**A shows a perspective view of the support module with the support being deployed, according to certain aspects of the present disclosure;
(11) FIG. **4**B shows a side view of the support module with the support being deployed in FIG. **2**A, according to certain aspects of the present disclosure;
(12) FIG. **5**A shows a perspective view of the example support module with the support in the extended position, according to certain aspects of the present disclosure;
(13) FIG. **5**B shows a side view of the example support module with the support in the extended position, according to certain aspects of the present disclosure;
(14) FIG. **6**A shows a perspective view of the example support module with the support being unlocked for collapsing into the support module, according to certain aspects of the present disclosure;
(15) FIG. **6**B shows a side view of the example support module with the support being unlocked for collapsing into the support module, according to certain aspects of the present disclosure;
(16) FIG. **7**A shows a perspective view of the example support module, where the support is in the process of being locked into the collapsed position, according to certain aspects of the present disclosure; and
(17) FIG. **7**B shows a side view of the example support module, where the support is in the process of being locked into the collapsed position, according to certain aspects of the present disclosure.
(18) The present disclosure is susceptible to various modifications and alternative forms, and some representative embodiments have been shown by way of example in the drawings and will be described in detail herein. It should be understood, however, that the invention is not intended to be limited to the particular forms disclosed. Rather, the disclosure is to cover all modifications, equivalents, and alternatives falling within the spirit and scope of the invention as defined by the appended claims.

DETAILED DESCRIPTION OF THE ILLUSTRATED EMBODIMENTS

(19) The present inventions can be embodied in many different forms. Representative embodiments are shown in the drawings, and will herein be described in detail. The present disclosure is an example or illustration of the principles of the present disclosure, and is not intended to limit the broad aspects of the disclosure to the embodiments illustrated. To that extent, elements and limitations that are disclosed, for example, in the Abstract, Summary, and Detailed Description sections, but not explicitly set forth in the claims, should not be incorporated into the claims, singly

or collectively, by implication, inference, or otherwise. For purposes of the present detailed description, unless specifically disclaimed, the singular includes the plural and vice versa; and the word “including” means “including without limitation.” Moreover, words of approximation, such as “about,” “almost,” “substantially,” “approximately,” and the like, can be used herein to mean “at, near, or nearly at,” or “within 3-5% of,” or “within acceptable manufacturing tolerances,” or any logical combination thereof, for example.

(20) The present disclosure relates to an example support module for a telecommunication component casing. The example support module has an independent support member that may be collapsed for storage and extended to raise the casing. The support module includes an activation button that allows a user to either extend the support member or collapse the support member. The example support modules may be attached to a variety of telecommunication products, such as 4G/5G telecommunication devices, wall mount servers, and other wall mount devices. The example support modules have easy to open and collapse support members that facilitate use in an outdoor environment. The support members may be deployed quickly in the outdoor environment. When the support members are extended, workers have more space to install cables to the underside of the telecommunication casing. Since the support modules are detachable, they are easy to replace and maintain.

(21) FIG. **2**A shows a perspective view of a telecommunication device **100**. The device **100** has a casing **110** with two attached support modules **112** and **114**. In this example, supports of the support modules **112** and **114** may be collapsed for storage of the telecommunication device **100**. As shown in a perspective view in FIG. **2**B and a side view in FIG. **2**C, when the telecommunication device **100** is deployed, support members of the support modules **112** and **114** may be extended to support the telecommunication device **100**. The extended support members raise the telecommunication device **100** off a ground surface and allows cables to be attached to the underside of the casing **110**. In this example, the support modules **112** and **114** may support weight of up to 20 kilograms. Of course, the same design principles may be used for similar support modules to support heavier equipment.

(22) The casing **110** has two side support panels **120** and **122** and a front end **124**. The two side support panels **120** and **122** and the front end **124** are covered by a shield housing **126** (not shown in FIGS. **2**B-**2**C for clarity) that is joined to a rear panel **128**. An underside input/output panel **130** encloses the bottom edges of the rear panel **128** and the shield housing **126**. The casing **110** has an open top end **132**. The side panels **120** and **122** have upper areas that have certain connectors **134** that may be accessed through apertures formed through the shield housing **126**. A heat sink chassis **136** is located between the side support panels **120** and **122**. Heat sink fins **138** extend from the front end **124** and the open top end **132**. A handle **140** is mounted on the top end **132** to allow easier carrying of the casing **110**. The underside input/output panel **130** has a series of connectors **142** for different cables that provide power and data signals to the device **100**.

(23) The telecommunication equipment device **100** is a fan-less electronic device. In this example, the telecommunication device **100** is a 5G distributed unit (DU). The casing **110** holds a printed circuit board and other electronic components for performing 5G communication functions. The example support modules may be used for any similar devices, such as other 5G telecommunication components (such as a radio unit (RU), or an active antenna unit (AAU)). In this example, the DU component is part of a 5G mobile communication system that relies on electronic components that require heat dissipation for proper operation.

(24) The electronic components will typically include a processor, such as a CPU, double data rate (DDR) memory, physical layer key generation circuits, network interfaces, power supply, and other components. The connectors may include small form-factor pluggable (SFP) optical and RJ45 type connectors. The components inside the casing **110** generate heat, which are absorbed by the heat sink chassis **136**.

(25) The heat sink chassis **136** allows transmission of heat generated by the internal electronics of

the telecommunication device **100** to the ambient exterior environment. The external fins **138** assist in dissipating the ambient heat to the external environment. In this example, the chassis **136** and fins **138** are constructed of heat absorbent material such as aluminum or aluminum alloy. A part of the interior surface of the heat sink chassis **136** may serve as a contact surface in thermal communication with components on the circuit board such as a CPU. Heat is funneled from the interior surface to an opposite exterior surface of the heat sink chassis. The vertical fins **138** extend from the exterior surface of the heat sink chassis **136**. The vertical fins **138** increase the surface area available to dissipate heat from the heat sink chassis **136** to the ambient environment.

(26) FIG. **3**A is a perspective view of the components of the example supporter module such as the support module **112** in FIGS. **2**A-**2**C. FIG. **3**B is a side view of the components of the example support module **112**. FIG. **3**C is an exploded 3-D perspective view of the four components of the example support module such as the support module **112** in FIGS. **2**A-**2**B. The support module **112** includes a module case **310**, a support member **312**, a switch arm **314**, and a torsion spring **316**. The module case **310** holds the support member **312**, switch arm **314**, and torsion spring **316**. The module case **310** includes fastening systems such as holes for screws or rivets that allow easy attachment and detachment from one of the side panels **120** and **122** of the casing **110**. In this example, the module case **310**, support member **312** and switch arm **314** are fabricated from die casting aluminum. Of course other appropriate fabrication techniques and materials may be used.

(27) The module case **310** includes an exterior plate **320** that includes a series of screw holes **322** that allows the attachment of the module case **310** to the side panel **120**. The screw holes **322** include a center hole and four holes near each of the corners of the exterior plate **320**. A parallel interior plate **324** is attached to the exterior plate **320** by a side border **326**. Screws are inserted into each of the holes **322** to secure the exterior plate **320** to the interior plate **324**. The support member **312** has a rectangular frame shape that includes a bottom support member **330**. The bottom support member **330** is attached to two post supports **332** and **334**. A pivot bar **336** is attached to the opposite ends of the supports **332** and **334** to define the frame shape. A hole **338** is formed through the pivot bar **336**. A main hook **340** extends from the end of the support **332**. The pivot bar **336** rotates on a pin **342** that is inserted through the hole **338** and is supported between the plates **320** and **324** of the module case **310**. In this example, the bottom support member **330** and post supports **332** and **334** may be extended by 2.5-4.0 cm from the bottom of the case **310**.

(28) The switch arm **314** has an arm member **350**. One end of the arm member **350** is attached to a secondary hook **352** that engages with the main hook **340** of the support member **312**. The opposite end of the arm member **350** is connected to an angled stub **354**. A hole **356** is formed on the end of the arm member **350** connected to the angled stub **354**. The arm member **350** is mounted to rotate around a pin **358** that is inserted in the hole **356**. The pin **358** is supported between the plates **320** and **324** of the module case **310**. A switch button **360** extends from one end of the arm member **350**. The switch button **360** may be moved in a vertical direction in a slot **362** on the exterior plate **320**.

(29) The torsion spring **316** has a main coil **370** that is attached to a first spring arm **372** and a second spring arm **374**. The first spring arm **372** is attached to the pivot bar **336** of the support member **312**. The second spring arm **374** is placed in contact with the end of the secondary hook **352** of the switch arm **314**. When the support member **312** of the support module **112** is in the collapsed position, the support member **312** is held in place by the engagement of the main hook **340** to the secondary hook **352** as shown in FIGS. **3**A-**3**B. An interior block **380** extends from the interior surface of the exterior plate **320**. The pivot bar **336** of the support member **312** contacts the interior block **380** to assist in keeping the support member **312** in the collapsed position. The main coil **370** is mounted on a screw that is inserted in the center screw hole **322** in the plate **320** attached to the interior plate **324**.

(30) When the support member **312** is in the collapsed position, the torsion spring **316** will be compressed. The spring force from the torsion spring **316** is restrained by the engagement of the

main hook **340** with the secondary hook **352**. Thus, when the switch button **360** is pushed in a downward direction, the main hook **340** is released from the secondary hook **352**. The spring force from the torsion spring **316** forces the support member **312** to rotate to the extended position. The torsion spring **316** installed to the support member **312** thus pushes the support member **312** to achieve automatic operation to the extended position for supporting the casing.

(31) By pushing the switch button **360** downward, the switch arm **314** pivots around the pin **358**. When the switch arm **314** pivots, the secondary hook **352** moves downward and disengages from the main hook **340** as shown in FIGS. **4**A-**4**B. The spring force from the compressed torsion spring **316** forces the support member **312** to rotate counter-clockwise around the pin **342**. This swings the bottom support member **330** from a vertical orientation to a horizontal orientation to the bottom edge of the case **310**.

(32) Once the bottom support member **330** is rotated in a horizontal orientation as shown in FIGS. **5**A-**5**B, the bottom support member **330** is extended from the bottom of the case **310** through the post supports **332** and **334**. The support member **312** is thus in the extended position and raises the telecommunication device **100** in FIG. **2**B from a ground surface to allow access to the underside input/output panel **130**. In the extended position, the support **334** of the support member contacts a bottom block **382** that extends from the interior surface of the exterior panel **320**. The support member **312** is thus held in the extended position by the spring force from the torsion spring **316** and the block **382**.

(33) When a user desires to collapse the support member **312** into the case **310**, the user pushes on the post support **334** as shown in FIGS. **6**A-**6**B. The force causes the support member **312** to be rotated in a clockwise direction. The user will have to apply sufficient force to overcome the spring force of the torsion spring **316** during the rotation. As shown in FIGS. **7**A-**7**B, once the bottom support member **330** is rotated into a vertical orientation, the main hook **340** will be rotated into position to engage the secondary hook **352**. Once the main hook **340** engages the secondary hook **352**, the support member **312** is held in place thus compressing the torsion spring **316**. The support member **312** in the collapsed position is fully stored with in the case **310**.

(34) As used in this application, the terms “component,” “module,” “system,” or the like, generally refer to a computer-related entity, either hardware (e.g., a circuit), a combination of hardware and software, software, or an entity related to an operational machine with one or more specific functionalities. For example, a component may be, but is not limited to being, a process running on a processor (e.g., digital signal processor), a processor, an object, an executable, a thread of execution, a program, and/or a computer. By way of illustration, both an application running on a controller, as well as the controller, can be a component. One or more components may reside within a process and/or thread of execution, and a component may be localized on one computer and/or distributed between two or more computers. Further, a “device” can come in the form of specially designed hardware; generalized hardware made specialized by the execution of software thereon that enables the hardware to perform specific function; software stored on a computer-readable medium; or a combination thereof.

(35) The terminology used herein is for the purpose of describing particular embodiments only, and is not intended to be limiting of the invention. As used herein, the singular forms “a,” “an,” and “the” are intended to include the plural forms as well, unless the context clearly indicates otherwise. Furthermore, to the extent that the terms “including,” “includes,” “having,” “has,” “with,” or variants thereof, are used in either the detailed description and/or the claims, such terms are intended to be inclusive in a manner similar to the term “comprising.”

(36) Unless otherwise defined, all terms (including technical and scientific terms) used herein have the same meaning as commonly understood by one of ordinary skill in the art. Furthermore, terms, such as those defined in commonly used dictionaries, should be interpreted as having a meaning that is consistent with their meaning in the context of the relevant art, and will not be interpreted in an idealized or overly formal sense unless expressly so defined herein.

(37) While various embodiments of the present invention have been described above, it should be understood that they have been presented by way of example only, and not limitation. Although the invention has been illustrated and described with respect to one or more implementations, equivalent alterations and modifications will occur or be known to others skilled in the art upon the reading and understanding of this specification and the annexed drawings. In addition, while a particular feature of the invention may have been disclosed with respect to only one of several implementations, such feature may be combined with one or more other features of the other implementations as may be desired and advantageous for any given or particular application. Thus, the breadth and scope of the present invention should not be limited by any of the above described embodiments. Rather, the scope of the invention should be defined in accordance with the following claims and their equivalents.

Claims

1. A support module for attachment to an electronic equipment casing, the support module comprising: a case having an exterior plate and a separate interior plate, the interior plate being parallel to the exterior plate, the interior and exterior plates having parallel bottom edges; a support member parallel to the exterior plate and interior plate, the support member rotatably mounted between the exterior plate and the interior plate of the case, the support member having a collapsed position between the interior and exterior plates within the case and an extended position extending from the bottom edges of interior and exterior plates of the case; and a pivot arm engaging the support member in the collapsed position.
2. The support module of claim 1, further comprising a torsion spring having a first spring arm coupled to the support member and a second spring arm coupled to the pivot arm, the torsion spring providing a spring force to force the support member into the extended position.
3. The support module of claim 2, wherein the support member includes a main hook that engages a secondary hook of the pivot arm, wherein the engagement of the main hook with the secondary hook retains the support member in the collapsed position.
4. The support module of claim 3, wherein the pivot arm includes a release button, wherein pushing the release button causes the pivot arm to move and disengage the secondary hook from the main hook.
5. The support module of claim 1, wherein the support member includes a base member to engage a ground surface when the support member is in the extended position.
6. The support module of claim 5, wherein the support member includes a pivot bar positioned parallel to the base member, wherein the pivot bar includes a hole, and wherein the support member rotates around a pin inserted in the hole, the pin being attached to the exterior and interior plates of the case.
7. The support module of claim 1, wherein the interior plate includes a fastener for fastening the case to a side panel of the electronic equipment casing.
8. The support module of claim 1, wherein the electronic equipment casing holds components for operation of a 5G mobile communication system, wherein the electronic equipment casing includes a bottom panel having an input/output connector that may be accessed when the support member is in the extended position.
9. An electronic component, comprising: a casing including two side panels and a bottom panel including at least one connector; and a first modular support attached to one of the side panels; a second modular support attached to the other side panel, wherein the first and second modular supports each include: a case having an exterior plate and an interior plate, the interior plate being parallel to the exterior plate; a support member rotatably mounted between the exterior plate and the interior plate of the case, the support member having a collapsed position within the case and an extended position extending from the case, wherein the casing is elevated when the support

member is in the extended position to allow access to the bottom panel; and a pivot arm engaging the support member in the collapsed position.
10. The electronic component of claim 9, wherein the casing includes a heat sink chassis with cooling fins extending from an exterior surface of the heat sink chassis, the heat sink chassis being positioned between the two side panels.
11. The electronic component of claim 9, wherein the casing holds components for operation of a 5G mobile communication system.
12. The electronic component of claim 9, wherein the first and second modular supports each include a torsion spring, the torsion spring having a first spring arm coupled to the support member and a second spring arm coupled to the pivot arm, the torsion spring providing a spring force to force the support member into the extended position.
13. The electronic component of claim 12, wherein the support member includes a main hook that engages a secondary hook of the pivot arm, wherein the engagement of the main hook with the secondary hook retains the support member in the collapsed position.
14. The electronic component of claim 13, wherein the pivot arm includes a release button, wherein pushing the release button causes the pivot arm to move and disengage the secondary hook from the main hook.
15. The electronic component of claim 9, wherein the support member includes a base member to engage a ground surface when the support member is in the extended position.
16. The electronic component of claim 15, wherein the support member includes a pivot bar positioned parallel to the base member, wherein the pivot bar includes a hole, and wherein the support member rotates around a pin inserted in the hole, the pin attached to the exterior and interior plates of the case.
17. The electronic component of claim 9, wherein the interior plate includes a fastener for fastening the case to one of the side panels.
18. A support module for attachment to an electronic equipment casing, the support module comprising: a case having an exterior plate and an interior plate, the interior plate being parallel to the exterior plate; a support member rotatably mounted between the exterior plate and the interior plate of the case, the support member having a collapsed position within the case and an extended position extending from the case; a pivot arm engaging the support member in the collapsed position; and a torsion spring having a first spring arm coupled to the support member and a second spring arm coupled to the pivot arm, the torsion spring providing a spring force to force the support member into the extended position.
19. The support module of claim 18, wherein the support member includes a base member to engage a ground surface when the support member is in the extended position.
20. The support module of claim 18, wherein the interior plate includes a fastener for fastening the case to a side panel of the electronic equipment casing.