A kit for mounting a monitor including a mounting plate adapted to mount to a monitor, a joint adapted to be coupled to the mounting plate in a quick-release manner, and a bracket having first and second ends. The first end is adapted to couple to the joint and the second end is adapted to be attached to a fixed structure, such as a pole or a wall. The articulated arm has a fixed end and a movable end adapted to be coupled to the joint, whereby the joint can be coupled to either of the bracket and the articulated arm.
FLAT SCREEN MONITOR SUPPORT SYSTEM

[0001] This application claims priority from U.S. provisional Pat. application Ser. No. 60/464,568, filed Apr. 22, 2003, and U.S. provisional Pat. application Ser. No. 60/472,48, filed May 21, 2003, which are herein incorporated by reference in their entireties.

BACKGROUND OF THE INVENTION

[0002] The present invention relates to a mounting device and mounting kit for mounting one or more monitors, such as flat screen monitors and flat panel displays, to a support.


[0004] Since the advent of personal computers, there has been a persistent quest for the reduction in size and weight of the computer, as well as an increase in the portability of the computer. Initially, personal computers were supplied with cathode ray tube monitors (CRTs), which did good service; however, they required a great deal of workspace and quite often special support devices.

[0005] In recent years, advances in monitor technology have seen the CRT monitors improved substantially, especially now with the versions of so-called flat screen monitors that are widely available. The term “flat screen monitor” as used herein will include flat panel displays and other types of displays that have a relatively narrow thickness when compared to conventional CRT monitors. It is believed that in the not-too-distant future, flat screen monitors will totally displace the CRT monitors altogether. Flat screen monitors provide the same sized viewing areas as traditional CRT screens but in width and height they are much less bulky and typically only a few inches thick. This has resulted in numerous opportunities for reorganizing the computer workstation environment, including finding ways to support the flat screen monitor conveniently.

[0006] What has developed as a result of the flat screen monitor opportunities are many different designs and approaches for support arms that are able to hold the flat screen monitor in a desirable orientation for use. The support arms may be solid piece mounts that attach to the flat screen monitor, or they may be articulated, allowing x-y-z movement.

[0007] Some of the prior art mounting methods for flat screen monitor arms have been developed by OEMs (original equipment manufacturers). For instance, OEM manufacturers of flat screen monitor arms have provided stands for their products that fasten directly into the mounting holes on the back side of the device itself. In other circumstances, suppliers of more sophisticated monitor supports have supplied mounting hardware that merely allows the interface between the support arm and the mounting holes for the flat screen monitor to be a backing plate that is directly screwed into the flat screen monitor.

[0008] There are serious drawbacks to the mounting approaches that have been taken in the past. Assembly of the flat screen monitor to the prior art mountings is difficult and, at times, requires the utmost in eye-hand coordination to align the various components, which sometimes are being held manually in order to complete the installation.

[0009] Further, the rearrangement of the location of monitors, or the detachment of a monitor from a mount for service, or other reasons, has also been time consuming. Still further, some flat screen monitors do not come with standard screw holes for fastening a mount to the monitor. In those cases, specialized mounts have to be custom adapted for the particular monitor. Thus, there has been a need in the marketplace for a mounting system for a wide variety of flat screen monitors that can easily be installed onto a support arm or other structure, and which has other features, such as a reversible locking system.

SUMMARY OF THE INVENTION

[0010] Accordingly, the present invention provides a kit and system for mounting flat screen monitors in a simple and time efficient manner. The present invention allows flat screen displays to be easily attached to various different types of structures, such as walls, poles, standards, or work surfaces. Further, the present invention allows the flat screen monitors to be easily detached from these structures.

[0011] According to one aspect of the present invention, a kit for mounting a monitor is provided. The kit includes a mounting plate, a joint, a wall mount, and an articulated arm. The plate is adapted to be fixedly attached to the back side of a monitor. The joint is adapted to be coupled to the mounting plate in a quick-release manner. The wall mount bracket is adapted to be attached to a wall on one end and to the joint on another end. The articulated arm includes a fixed end and a movable end. The movable end is adapted to be coupled to the joint whereby the joint can be coupled to either the wall mount bracket or the arm.

[0012] According to another aspect of the present invention, a mounting assembly for a monitor is provided. The mounting assembly includes a mounting plate, a wall mount bracket, and a joint. The plate is adapted to be fixedly attached to the back side of a monitor. The wall mount bracket is adapted to be attached to a wall. The joint has first and second ends, the first end of which is attachable to the wall mount bracket. The second end includes a quick release mechanism that is adapted to releasably couple to the mounting plate whereby the plate can be attached to the quick release mechanism without the need for tightening any fasteners.

[0013] According to another embodiment of the present invention, a mounting assembly is provided for mounting at least two monitors. The mounting assembly includes a first mounting plate, a second mounting plate, an elongated plate, a first joint, a second joint, and a third joint. The first and second mounting plates are adapted to be fixedly attached to the back sides of first and second monitors, respectively. The elongated plate has first and second mounting areas. The first joint is adapted to allow the first mounting plate to be snap-fittingly secured thereto. The second joint is adapted to allow the second mounting plate to be snap-fittingly secured thereto. The first and second joints are attachable to the first and second mounting areas, respectively. The third joint is adapted to allow the elongated plate to be snap-fittingly attached thereto.

[0014] According to still another embodiment of the present invention, a mounting assembly for a flat screen
monitor having a plurality of edges is provided. The mounting assembly includes a first arm adapted to extend around a first one of the edges of the monitor. A second arm is also included and adapted to extend around a second one of the edges of the monitor. The first and second edges are generally opposite each other. A bracket and joint are also included. The bracket is adapted to be attached to a fixed structure. The joint has first and second ends. The first end is adapted to be secured to the bracket, and the second end is adapted to be secured to one of the first and second arms. The joint is pivotable with respect to the bracket.

According to yet another embodiment of the present invention, a mounting assembly for mounting a monitor to a pole is provided. The mounting assembly includes a mounting plate, a collar, a lever arm, and a joint. The mounting plate is adapted to be fixedly attached to the backside of the monitor. The collar is dimensioned to fit around a pole. The lever arm is pivotally attached to the collar and adapted to move between a locked position in which the collar is frictionally retained on the pole and an unlocked position in which the collar is free to move along the length of the pole. The joint has first and second ends. The first end is attached to the collar and the second end is adapted to releasably couple to the mounting plate.

According to still other aspects of the present invention, the various joints may be ball and socket joints which allow the mounting assembly to pivot in all directions. The joints themselves may be pivotally coupled to either the articulated arm or the wall mount bracket. The mounting plates may include at least one pivotable locking member that is pivotable between a locking and an unlocking position and which prevents the mounting plate from being removed when in the locking position. The locking member may be maintained in the locking position by a flexible latch portion that can be elastically deformed between a first and second shape. The joints may include a tapered plate having a generally trapezoidal shape that tapers from a bottom end toward a top end and that is adapted to contact the mounting plate when the joint is coupled thereto. The tapered plate may define a plane that is generally parallel to an adjacent plane defined by the mounting plate when the mounting plate is coupled to the joint. The elongated plate may be adapted so that it can be attached to the mounting plate in a plurality of different orientations. The mounting plate may include a tapered, trapezoidal sleeve adapted to receive the tapered plate. The bracket may include one or more hooks adapted to allow it to be mounted onto a standard, such as a standard found in conventional office wall panels.

The mounting assembly of the present invention provides a quick and easy way of attaching and detaching monitors, such as flat screen monitors from various types of mounts. The mounts may include articulated arms or wall brackets. The attachment of a monitor to one of these mounts does not require the use of any separate fasteners. Further, the removal of one of these monitors from the mounts can be easily accomplished by simply flexing a pair of elastically deformable latch members and lifting the display out of the mount. These and other advantages of the present invention will be apparent to one skilled in the art upon review of the following written description and the accompanying drawings.
FIG. 23 is a front, elevational view of the lever arm;

FIG. 24 is a perspective view of the mounting assembly according to another aspect of the present invention;

FIG. 25 is a perspective view of the mounting assembly of FIG. 24;

FIG. 26 is a perspective view of the mounting assembly of FIG. 24 taken from a different angle;

FIG. 27 is a plan view of the mounting assembly of FIG. 24; and

FIG. 28 is a side, elevational view of the mounting assembly of FIG. 24.

DETAILED DESCRIPTION OF THE INVENTION

The present invention will now be described with reference to the accompanying drawings wherein the reference numerals appearing in the following written description correspond to like numbered elements in the attached drawings. The present invention provides a number of different mounting assemblies for supporting flat screen or flat panel displays. An example of a flat panel display 20 that can be mounted on one of the mounting assemblies of the present invention is depicted in FIG. 1. Flat panel display 20 includes a screen 22 appearing on its front side and a plurality of control buttons 24 positioned underneath the screen. Flat panel display 20 has a thickness that is substantially less than conventional cathode ray tube displays. As one example, the thickness of flat panel display 20 may be approximately 1 inch. It will be understood, of course, that the size, construction, and details of flat panel display 20 can vary from that illustrated in FIG. 1. In fact, the present invention contemplates no limit on the size, shape, or overall construction of the flat panel displays that may be mounted on the mounting assemblies described herein.

A mounting plate 26 is also depicted in FIG. 1. Mounting plate 26 attaches to the back side of flat panel display 20. Thus, mounting plate 26 attaches to the side of display 20 opposite screen 22. Mounting plate 26 includes four outer apertures 28 and four inner apertures 30. The four outer apertures 28 are arranged generally at the four corners of an imaginary square. Similarly, the four inner apertures 30 are also generally arranged at the corners of an imaginary square. The imaginary square defined by inner apertures 30 is smaller than that defined by outer apertures 28. Apertures 28 and 30 are used to mount mounting plate 26 to the back side of display 20. Screws, or other suitable fasteners, are inserted into apertures 28 or 30 and into the back of display 20. Conventional flat panel displays typically include four screw holes positioned on their back side that allow a mount to be attached thereto. The screw holes are typically arranged to define a square having one of two different sizes. One of these sizes may have sides of approximately ten centimeters, although other sizes are contemplated by the invention. By including both outer apertures 28 and inner apertures 30 in mounting plate 26, mounting plate 26 can be attached to displays 20 having either of the two main configurations of screw holes on their back side. Mounting plate 26 can therefore be used with virtually all conventional flat panel displays.

After mounting plate 26 is screwed onto the back of the display 20, the mounting plate 26 is typically never removed therefrom. The mounting plate 26 can be selectively coupled to a joint mounted to a wall, a standard, an articulating arm, or a pole in a manner that will be described in more detail herein. The attachment of mounting plate 26 to these various structures can be accomplished in an easy, snap-fitting manner that facilitates both attachment and detachment of the display from the mount.

A mounting assembly 32 according to one aspect of the present invention is depicted in FIG. 2. Mounting assembly 32 is specifically adapted to allow a flat panel display to be mounted on a wall, or other flat surface. Mounting assembly 32 includes a variety of components that are depicted in more detail in FIGS. 3 and 4. With specific reference to FIG. 4, mounting assembly 32 includes mounting plate 26, a joint 34, and a wall or flat mount bracket 36. Joint 34 further includes a support plate 38, a ball 40, and a socket 42. Mounting plate 26 further includes a pair of locking arms 44 which are illustrated in FIG. 4 as being detached from mounting plate 26. Locking arms 44 are, however, actually pivotally attached to mounting plate 26. Specifically, each locking arm 44 includes a pin 46 that fits through a pivot aperture 48 defined in mounting plate 26. This attachment is illustrated in FIGS. 7 and 9-10.

Wall or flat mount bracket 36 is adapted to be attached to a flat surface such as a wall. Bracket 36 includes an upper mounting aperture 50 and a lower mounting aperture 52. Mounting apertures 50 and 52 each receive a screw that passes through bracket 36 and into a wall or other flat surface. When mounted to a wall, the screws or other fasteners inserted through apertures 50 and 52 are oriented generally horizontally. Bracket 36 further includes a pin aperture 54. Pin aperture 54 is adapted to receive a pin 56. When pin 56 is received in pin aperture 54, pin 56 is oriented generally perpendicular to the screws that pass through apertures 50 and 52. Stated alternatively, when bracket 36 is attached to a wall, pin 56 will be in a vertical orientation. Pin 56 may include a knurled outer surface that allows it to be frictionally secured in pin aperture 54.

Socket 42 includes an upper half 58 and a lower half 60. Each half 58 and 60 includes a spherical portion 62 which receives ball 40. Upper and lower halves 58 and 60 are secured together by way of a pair of bolts 64 and nuts 66. Before these halves are secured together, ball 40 is positioned in spherical portions 62. Thereafter, nuts and bolts 66 and 64 are tightened so that upper and lower halves 58 and 60 are secured to each other. The tightening of the nuts and bolts 66 and 64 takes place after ball 40 has been moved to a desired orientation. The tightening via the nuts and bolts maintains the ball in this desired orientation. If a new orientation is desired, bolts 64 are loosened sufficiently to allow ball 40 to rotate to the desired orientation in spherical portion 62. Thereafter, bolts 64 are again tightened to clamp down and hold ball 40 in the desired orientation.

Socket 42 further includes a pin aperture 68 in both upper and lower halves 58 and 60. Pin apertures 68 in each of these halves are vertically aligned with each other. Pin apertures 68 receive pin 56 of wall mount bracket 36. Pin 56 thereby secures socket 42 to wall mount bracket 36. As mentioned, pin 56 may be maintained in pin aperture 54 on bracket 36 by way of a frictional fit. Thus, once pin 56 is
inserted into aperture 54, it is difficult, if not impossible to remove therefrom. Pin 56 could alternatively be constructed to include threads, or other means, that would allow it to be screwed into pin aperture 54. Such threads, or other means, would allow pin 56 to be easily inserted and removed from pin aperture 54. By allowing pin 56 to be easily removed, joint 34 could be easily detached from wall mount bracket 36.

[0053] The size of pin aperture 68 and socket 40 are preferably slightly smaller than the diameter of pin 56. Further, socket 42 is preferably manufactured out of a flexible material, such as plastic, that flexes when pin 56 is inserted therein. This flexing creates sufficient friction between pin 56 and the surfaces of pin aperture 68 to maintain socket 42 in a given orientation with respect to pin 56. Stated alternatively, pin 56 defines a vertical pivot axis 70 about which socket 42 can rotate. The frictional engagement of pin 56 in pin aperture 68 maintains socket 42 in whatever orientation it has been pivoted to with respect to pin 56. This pivoting allows the orientation of the monitor attached to mounting assembly 32 to be adjusted about a vertical axis. As an alternative to sizing pin 52 larger than aperture 68, the external surface of pin 56 that contacts aperture 68 could be knurled or roughened in order to provide sufficient frictional engagement.

[0054] The position of flat panel display 20 can also be adjusted by way of the ball and socket joint defined by ball 40 and socket 42. Ball 40 can be adjusted about a vertical axis and two mutually orthogonal horizontal axes while in socket 42. Once ball 40 has been moved to the desired orientation, nuts and bolts 66 and 64 are tightened to maintain the display 20 in the desired orientation. Ball 40 includes a fastener aperture 72 that receives a fastener, such as a screw 74 (FIGS. 3-4). Screw 74 passes through a fastener aperture 76 in support plate 38 before it is inserted into fastener aperture 72 and secured therein. Thus, screw 74 secures support plate 38 to ball 40. A keyway 73 is defined on ball 40 and receives a key projection 75, that projects outwardly from the back side of mounting plate 38, when the two are secured together by screw 74. This interaction of the keyway 73 and key projection 75 helps prevent any unintentional rotation or slippage between mounting plate 38 and ball 40.

[0055] As illustrated in FIGS. 3 and 4, support plate 38 is generally trapezoidal shaped. Support plate 38 includes two upper side surfaces 78 which are positioned above a pair of notches 80 defined in the side surfaces of support plate 38. Notches 80 selectively receive protrusions 82 defined on locking arms 44. When protrusions 82 are positioned on notches 80, mounting plate 26 is secured to support plate 38. This locking of mounting plate 26 to support plate 38 will now be described in more detail, particularly with reference to FIGS. 7-10.

[0056] As illustrated generally in FIG. 7, the back side of mounting plate 26 includes a pair of bent flanges 84 on each side of mounting plate 26. Bent flanges 84 generally define a sleeve 86 on the back side of mounting plate 26. Sleeve 86 is generally shaped so that it tapers from a wide bottom end 88 toward a narrow top end 90 of mounting plate 26. This tapering generally matches the tapering of the side walls of support plate 38. Thus, when mounting plate 26 is moved downwardly in a direction 92 (FIG. 7), support plate 38 will fit into sleeve 86. Because of the tapered nature of sleeve 86 and support plate 38, mounting plate 26 will be prevented from moving downwardly in direction 92 past support plate 38. Stated alternatively, the distance between bent flanges 84 adjacent top end 90 of mounting plate 26 is narrower than the width of support plate 38. Thus, when mounting plate 26 is moved downwardly in direction 92, it will come to rest on support plate 38 when contact is made between the side walls of support plate 38 and the inside of sleeves 86. This resting position is illustrated in FIG. 9.

[0057] In the resting position depicted in FIG. 9, mounting plate 26 is maintained on support plate 38 by way of gravity. In other words, mounting plate 26 is prevented from being removed from support plate 38 other than by manual lifting of mounting plate 26 off of support plate 38. Mounting plate 26 is prevented from being moved toward or away from support plate 38 by the depth of sleeve 86. Specifically, the depth of sleeve 86 is dimensioned to generally be the same as the thickness of support plate 38. Thus, when support plate 38 is received in sleeve 86, mounting plate 26 has little or no wiggle room. Mounting plate 26 can therefore not be moved toward or away from support plate 38 when in the position illustrated in FIG. 9.

[0058] In order to lock mounting plate 26 to support plate 38, locking arms 44 are pivoted about pivot axes 94 (FIG. 9). Pivot axes 94 as defined generally through pivot apertures 48 on mounting plate 26. When locking arms 44 are pivoted toward support plate 38, protrusions 82 fit through slots 86 defined in bent flanges 84 (FIG. 7). As locking arms 44 continue to pivot towards support plate 38, protrusions 82 pass completely through slots 86 and into notches 80 of support plate 38. When protrusions 82 are positioned in notches 80, mounting plate 26 is prevented from being lifted off of support plate 38. In order to maintain locking arms 44 in this position, each locking arm includes a shoulder 98 positioned on an upper, flexible latch portion 100 of locking arm 44 (FIGS. 7-8). Flexible latch portion 100 includes an angled surface 102 that abuts against an edge 104 at the top end of bent flange 84 (FIG. 8) as locking arm 44 is moved to the locking position. When angled surface 102 contacts edge 104, the angled nature of surface 102 causes edge 104 to exert an upward force on flexible latch portion 100. This causes flexible latch portion 100 to bend or flex sufficiently to allow the bottom of flexible latch portion 100 to over come edge 104. As the bottom of flexible latch portion 100 continues to move toward bent flange 84, shoulder 98 eventually reaches a locking edge 106 defined on bent flange 84. When shoulder 98 reaches locking edge 106, flexible latch portion 100 snaps back to its unflexed position. The engagement of shoulder 98 with locking edge 106 prevents locking arms 44 from pivoting about pivot axis 94. This locking position is illustrated in FIG. 10. In this position, protrusions 82 are inserted into notches 80 and mounting plate 26 cannot be removed from support plate 38. The flexing of shoulders 98 into locking edges 106 thus provides a snap-fitting manner of securing mounting plate 26 to support plate 38. Locking arms 44 are preferably made out of a plastic resin or other suitable material that generates the desired amount of flexibility for the snap-fit.

[0059] In order to remove mounting plate 26 from support plate 38, a user simply pushes upwardly on flexible latch portions 100. This upward force is applied with a sufficient magnitude to cause shoulders 98 to flex out of engagement
with locking edges 106. After this disengagement, locking arms 44 can be pivoted about pivot axes 94 such that protrusions 82 retreat out of notches 80. Thereafter, mounting plate 26 is lifted upwardly off of support plate 38. The attachment and detachment of mounting plate 26 to support plate 38 can therefore be accomplished in a simple, snap-fitting manner in which no separate fasteners need to be tightened or used to secure the two parts together. It will of course be understood that the securement of support plate 38 to mounting plate 26 could be carried out in a reverse fashion from that illustrated and described herein. For example, mounting plate 26 could simply comprise a generally trapezoidal plate which fits into a sleeve defined on support plate 38. Further, locking arms 44 could be moved to support plate 38. Further modifications are also possible.

[0060] A mounting assembly 132 according to a second embodiment of the present invention is depicted in FIGS. 5 and 6. Mounting assembly 132, like mounting assembly 32, includes a mounting plate 26, a support plate 38, a ball 40, a socket 42, and a wall mount bracket 36. These components are all constructed and operated in the same manner that has been described previously. Accordingly, they will not be described again. Mounting assembly 132 further includes an extension 108. Extension 108 fits between wall mount bracket 36 and socket 42. Extension 108 serves to extend the mounting assembly 132 a greater distance away from the wall or flat surface to which it is mounted. Extension 108 includes a vertical aperture 110 that receives a cylindrical sleeve 112. Cylindrical sleeve 112 includes an internal diameter that is sized to provide sufficient frictional engagement with pin 56 to maintain extension 108’s orientation about pin 56. The frictional contact between cylindrical sleeve 112 and pin 56 is not, however, so great as to prevent extension 108 from being able to pivot about pivot axis 70.

[0061] Extension 108 further includes an upper arm 114 and a lower arm 116. Upper arm 114 and lower arm 116 are separated from each other at their end opposite vertical aperture 110. Lower arm 116 includes an aperture 118 that extends vertically completely through lower arm 116. Aperture 118 is adapted to receive a pin 120 that is used to pivotably secure extension 108 to socket 42. Specifically, pin 120 fits through pin aperture 68 in upper and lower halves 58 and 60 of socket 42. Pin 120 may be knurled or sized slightly greater than the dimension of pin aperture 68 to thereby generate sufficient friction to maintain socket 42 in whatever orientation it has been pivoted to. The top end of pin 120 is received in a partial aperture defined in upper arm 114 (not shown). This partial aperture does not extend all the way through upper arm 114, as does aperture 118 through lower arm 116. Pin 120 may be maintained in aperture 118 by way of an interference fit. With extension 108 incorporated into mounting assembly 132, pivoting of the mounting assembly can take place about pivot axis 70, the pivot axis defined by pin 120, and the multi-directional pivoting provided by ball 40 and socket 42. Mounting assembly 132 thus provides a great deal of freedom for positioning a flat panel display 20 when it is secured to support plate 38 of assembly 132.

[0062] A mounting assembly 232 according to yet another embodiment of the present invention is depicted in FIGS. 11 and 12. Mounting assembly 232 includes a number of components that are common to mounting assemblies 32 and 132. These common components are identified by the same reference numerals, and operate in the same manner as previously described. Accordingly, no further description of these components will be provided herein. Where more than one of these common components appears in mounting assembly 232, a letter designation has been added to the end of the reference number to distinguish them from their duplicates.

[0063] In addition to the components in common with mounting assemblies 32 and 132, mounting assembly 232 further includes an elongated plate 122. Elongated plate 122 is used to mount up to two different mounting assemblies 32, such as assemblies 32a and 32b in FIGS. 11 and 12. Alternatively, elongated plate 122 could be used to mount up to two mounting assemblies 132. Still further, elongated plate 122 could be used to mount one mounting assembly 32 and one mounting assembly 132. Elongated plate 122 includes a first mounting area 124, a second mounting area 126, and a central mounting area 128. First and second mounting areas 124 and 126 define locations to which mounting assemblies 32 and 132 can be attached. Each mounting area 124 and 126 includes four fastener holes 130a-d. Fastener holes 130a-d each receive a screw 132, or other suitable fastener, which fits through upper and lower mounting apertures 50 and 52 on mounting assembly 32 or 132. Each screw 132 also is received in a nut 134 that can be used to tighten the attachment of mounting assembly 32 or 132 to elongated plate 122. In addition to the general horizontal orientation of elongated plate 122 depicted in FIG. 11, elongated plate 122 can also be used in a vertical orientation, such as that is illustrated in FIG. 12. When elongated plate 122 is positioned in this vertical orientation, fastener holes 130c and d receive screws 132 in order to secure mounting assembly 32 or 132 to the elongated plate 122.

[0064] In both FIGS. 11 and 12, an additional mounting plate 26c (illustrated in dashed lines) is preferably attached to central mounting area 128 by way of additional screws 132 and nuts 134. The screws 132 fit through four central fastener holes 136. From central fastener holes 136, screws 132 further fit through outer apertures 28 in mounting plate 26c. Because central fastener holes 136 and outer apertures 28 are each positioned at the vertex of a square, elongated plate 122 can be attached to mounting plate 26 in either the horizontal orientation (FIG. 11) or the vertical orientation (FIG. 12). In either case, the same central fastener holes 136 are used to secure elongated plate 122 to mounting plate 26c. Mounting plate 26c can be part of a third mounting assembly 32 (not shown), which would support elongated plate 122 as if it were a flat panel display. The position and orientation of elongated plate 122 could therefore be adjusted by way of the third mounting assembly. Alternatively, mounting plate 26 could be attached to a mounting assembly 132 or a mounting assembly supported on an articulated arm, such as depicted in FIG. 13. Regardless of what mounting plate 26c is attached to, elongated plate 122 allows two flat panel displays 20 to be mounted side by side in either vertical or horizontal alignment. Because each flat panel display 20 has its own mounting assembly 32 or 132 attached to elongated plate 122, the individual flat panel displays can have their orientations with respect to elongated plate 122 independently adjusted. Further, if mounting plate 26c is attached to another mounting assembly 32 or 132, the overall position and orientation of elongated plate 122 can be adjusted.
A mounting assembly 332 attached to an articulated arm 140 is depicted in FIG. 13. An exploded view of mounting assembly 332 and articulated arm 140 is illustrated in FIG. 14. Mounting assembly 332 is the same as mounting assembly 132 with the exception that mounting assembly 332 does not include a wall mount bracket 36. Instead, extension 108 of mounting assembly 332 attaches to a knuckle 142. Knuckle 142 is part of articulated arm 140. Knuckle 142 includes a vertical aperture 144 which receives a pin 146. Pin 146 fits through the cylindrical sleeve 112 of extension 108 in the same manner that pin 56 does. Thus, extension 108 is pivotal about a vertical axis defined by the longitudinal extent of pin 146.

Articulated arm 140 is intended to be attached to a desktop, or worsurface, or another stationary structure. As illustrated, the articulated arm does not include any means for fastening it to a desktop. In order to fasten it to a worksurface or desktop, an additional structure can be utilized. This additional structure can take on any conventional or otherwise suitable form. Moreover, the overall construction of articulated arm 140 can vary from that depicted in FIGS. 13 and 14. In fact, the invention contemplates mounting extension 108 to any type of articulated arm that includes a pin, or other structure, that allows extension 108 to be attached thereto. Articulating arm 140 could even have its stationary end mounted to a wall or a ceiling if desired.

As illustrated, articulated arm 140 includes a main arm 148 surrounded by first and second arms 150a and b. An upper pivot aperture 152 of main arm 148 receives a pair of pivot pins 154 that are inserted through an upper aperture 156 on knuckle 142. This attachment of knuckle 142 to main arm 148 via pivot pin 154 allows knuckle 142 to pivot with respect to main arm 148 about the axis defined by pivot pins 154. Knuckle 142 further includes a lower pivot aperture 158. Lower pivot aperture 158 receives a pair of pivot pins 154 that also pass through upper pivot apertures 160 defined on first and second arms 150a and b. Thus, knuckle 142 can pivot with respect to first and second arms 150a and b about the pivot axis defined by these pivot pins. Main arm 148 and first and second arms 150a and b are attached at their lower end to a post 162. Post 162 includes an upper pivot aperture 164 and a lower pivot aperture 166. Upper pivot aperture 164 receives a pair of pivot pins 154 that pass through a lower pivot aperture 168 of main arm 148. Lower pivot apertures 166 receive a pair of pivot pins 154 that pass through lower pivot apertures 170 of first and second arms 150a and b. A piston (not shown) may be included within post 162 to help maintain articulated arm 140 in any desired orientation. A bolt 172 and a plurality of washers 174 may also be included for securing post 162 to any additional structure necessary to mount it on a desktop. A cable support 176 may also be attached to main arm 148 to conceal and support cables running to the flat panel display 20.

In addition to the various mounting assemblies that have been discussed herein, the present invention contemplates a kit assembly that comprises selected components from the various embodiments discussed herein. Specifically, a kit according to one aspect of the present invention could include an articulated arm, such as arm 140, in combination with mounting assembly 32. A purchaser or user of such a kit would therefore have the option of supporting a flat panel display on either a wall or an articulated arm. If this person desired to mount their flat panel display on a wall, mounting assembly 32 would be used in the manner previously described. If the person desired to mount their flat panel display on an articulated arm, socket 42 of mounting assembly 32 would be secured to knuckle 132 of articulated arm 140 via pin 146. Bracket 36 would not be used. The kit therefore provides the user with the option of having their display mounted on either a wall or an articulated arm. Further, if pin 146 is adapted to be removable from vertical aperture 144, then the user can easily switch between the two mounting styles as desired. It will of course be understood that the kit could alternatively include mounting assemblies 132 or 232 in combination with articulated arm 140. If the kit included a mounting assembly 232 and an articulated arm 140, an additional ball and socket joint, in an optional extension 108, and a wall mount bracket 36 could be included to allow mounting plate 26c to be supported on either knuckle 142 or the wall mount bracket 36.

A mounting bracket 36 according to another aspect of the present invention is depicted in FIG. 15. Mounting bracket 36 is adapted to support a flat panel display assembly on a conventional mounting standard 178. Bracket 36 includes a pair of hooks 180 that extend out of its back surface and hook into a pair of slots 182 defined in mounting standard 178. The particular slots 182 selected to receive hooks 180 are based upon the desired height at which the flat panel display assembly is to be mounted. It will be understood that the particular form of the mounting standard 178 can vary substantially from that depicted in FIG. 15. In fact, the invention contemplates any form of mounting standards in which one or more hooks on the back of bracket 36 can be inserted at desired heights. Such standards include those customarily found on wall panels used in office environments for defining cubicles or other work areas. Similarly, the design and shape of hooks 180 can be varied substantially from that depicted in FIG. 15. Bracket 36 may be used to support joint 34 directly, or may be used to support joint 34 via an extension 108. Bracket 36 may also be used to support either a single flat panel display, or an elongated plate 122 used to support multiple flat panel displays.

A mounting assembly 432 according to another embodiment of the present invention is depicted in FIGS. 16-23. Mounting assembly 432 is specifically adapted to support a flat screen monitor on a pole, such as pole 184 depicted in FIG. 16. Pole 184 may extend vertically, horizontally, or at an angle. Mounting assembly 432 allows the flat panel monitor to be selectively secured at any position along the length of pole 184. Mounting assembly 432 includes a variety of components that are common to the mounting assemblies previously described. These components are labeled with the same reference numerals. New components are labeled with new reference numerals.

Mounting assembly 432 specifically includes a mounting plate 26 having a plurality of apertures 28 and 30 which can be used to either secure it directly to the back of a flat panel monitor, or to secure it to an elongated plate, such as elongated plate 122. Alternatively, apertures 28 and 39 can be used to secure mounting plate 26 to a pair of arms, as will be discussed in more detail below. Mounting assembly 432 further includes a pair of locking arms 44 that are used to selectively secure it to a joint 34 in the manner previously described. Joint 34 is connected to an extension 108 having upper and lower arms 114 and 116, respectively.
Extension 108 is pivotally attached to a collar 186. Collar 186 wraps around pole 184 and is adapted to be frictionally secured thereto at a desired location on pole 184. Extension 108 is adapted to pivot with respect to collar 186 about a pivot axis 188 that is generally parallel to the longitudinal extent of pole 184.

Collar 186 further includes a lever arm 190 which is pivotally secured thereto. Lever arm 190 is pivotable with respect to collar 186 about a pivot axis 192. Pivot axis 192 is defined by an aperture 194 defined in lever arm 190 (FIG. 21). Aperture 194 receives a pin, or other fastener, which secures it to collar 186. Lever arm 190 is pivotable about this pin, or other fastener. Lever arm 190 specifically pivots between a locked position and an unlocked position. FIG. 16 depicts lever arm 190 in the unlocked position. FIG. 17 depicts lever arm 190 in the locked position. In the locked position, collar 186 and lever arm 190 squeeze against pole 184 with sufficient friction to prevent movement of collar 186 along the length of pole 184. This is true regardless of whether or not pole 184 is oriented horizontally or vertically. If a flat screen monitor is not mounted at the proper location along pole 184, a user can easily change this by simply moving lever arm 190 to the unlocked position and then sliding collar 186 to the new, desired position. Thereafter, lever arm is moved back to the locked position, and collar 186 is held in that location on pole 184. Collar 186 and lever arm 190 thus provide a quick and convenient manner for mounting the mounting assembly 432 to pole 184.

The manner in which lever arm 190 and collar 186 selectively grip pole 184 can best be understood with reference to FIGS. 19-23. Lever arm 190 includes a cam surface 196 that is selectively brought into frictional engagement with pole 184 when lever arm 190 is moved to the locked position. When lever arm 190 is moved to the unlocked position, cam surface 196 is either out of contact with pole 184, or only loosely in contact therewith. In either case, the loose or absent frictional engagement between cam surface 196 and pole 184 allows collar 186 to be slid along pole 184 to any desired location. FIG. 19 illustrates lever arm 190 when it has been pivoted to the unlocked position. As illustrated, an aperture 198 defined in collar 186, which receives pole 184, is not interrupted by lever arm 190. However, as illustrated in FIG. 20, which depicts lever arm 190 in the locked position, cam surface 196 has interrupted aperture 198. Specifically, cam surface 196 has reduced the diameter of aperture 198 when measured in a direction that intersects cam surface 196. The reduced diameter of aperture 198 when lever arm 190 is in the locked position causes collar 186 and lever arm 190 to securely maintain a frictional grip on pole 184.

As illustrated in FIG. 20, cam surface 196 is generally curved. Specifically, this curve is defined as an arc of a circle. The arc preferably has a radius which is substantially the same as the radius of the pole 184. This creates a better frictional fit between lever arm 190 and pole 184, thereby more securely affixing collar 186 to a given region on pole 184. Once lever arm 190 is moved to the locked position, the friction between it and pole 184, as well as the shape of lever arm 190, maintains it in the locked position until it is manually moved to the unlocked position. In the illustrated embodiment, collar 186 may be made out of a metal, such as aluminum. Lever arm 190 may be made out of a plastic, such as a nylon resin. Other types of materials are, of course, also possible.

When lever arm 190 is moved to the locked position, it is maintained in this locked position by way of a change in the length of the radius from pivot axis 192 to cam surface 196. This is illustrated more clearly in FIG. 22. When lever arm 190 is rotated so that point A is in contact with pole 184, the distance between point A and pivot axis 192 is equal to the length of radius R1. When point B on cam surface 196 is in contact with pole 184, radius R2 represents the distance between pivot axis 192 and point B. When point C on cam surface 196 is in contact with pole 184, radius R3 represents the distance between pivot axis 192 and point C. The three radii R1, R2, R3 are not equal. Rather, radius R2 has the greatest dimension. Thus, as lever arm 190 is rotated to the fully locked position, it rotates past point B such that a point on cam surface 196 near point C is in contact with pole 184. In this position, lever arm 190 is prevented from slipping out of the locked position because of the greater radius of R2. Stated alternatively, in order for lever arm 190 to be rotated to the unlocked position, extra force must be applied to lever arm 190 in order to move past radius R1 in the unlocking direction. This is because the greater radius R2 causes a greater force to be exerted against pole 184. Thus, the shape of cam surface 196 with respect to pivot axis 192 allows lever arm 190 to be automatically maintained in the locked position. A user must therefore exert additional force against lever arm 190 in the unlocking direction in order to move lever arm 190 to the unlocked position.

Collar 186 further includes a plurality of arms 200. Arms 200 are positioned on a side of collar 186 and define a wire management channel 202 (FIGS. 18-20). Wire management channel 202 provides a structure in which cords or wires that are running to the monitor supported on mounting assembly 432 may be run. In addition, cords running along the length of pole 184 to other structures may also be contained within wire management channel 202. The three arms 200 allow wires to be easily threaded into wire management channel 202, but generally retain them in there unless manually unthreaded. Wire management channel 202 therefore provides a structure for minimizing the clutter of wires running along pole 184.

FIGS. 24-28 depict another embodiment of a mounting assembly 532. Mounting assembly 532 is particularly suited for supporting flat screen monitors that don’t have a standard screw hole configuration on their back surface. Specifically, as was mentioned previously, flat screen monitors often tend to have four screw holes positioned on their back surface. The screw holes define the four corners of a square. Quite often, but not always, the distance between these four screw holes is one of two different standard dimensions. Thus, outer apertures 28 and inner apertures 30 are positioned to accommodate either of these two standard distances. However, in some cases, flat screen monitors do not have such a standard set of screw holes. In those instances, mounting assembly 532 may be used to mount the flat screen monitor. Mounting assembly 532 allows flat screen monitors to be mounted regardless of what type of screw holes, or other mounting means, are positioned on the backside of the monitor.

Mounting assembly 532 includes an upper arm 204 and a lower arm 206. In general, upper and lower arms 204
and 206 are slidably attached to each other. This allows the distance D depicted in FIGS. 24 and 28 to be adjusted. The distance D generally corresponds to the height of the flat screen monitor which is to be mounted. Distance D is therefore adjusted to match this height. Thereafter, upper and lower arms 204 and 206 are secured together in this position. This causes the flat screen monitor to be firmly gripped. Mounting assembly 532 can then be mounted onto any of the previously described structures, as will be described in more detail below.

[0079] Upper arm 204 includes two generally flat flanges 208 positioned near its upper end (FIG. 28). Each flat flange 208 includes an adjacent bent flange 210. Flat flanges 208 are positioned to generally contact the topside of the flat screen monitor. Bent flanges 210 are positioned to extend downward along a portion of the front of the flat screen monitor. Bent flanges 210 ensure that the flat screen monitor does not fall out of mounting assembly 532. Similarly, lower arm 206 also includes a pair of flat flanges 212, each of which also is positioned adjacent a bent flange 214. Flat flanges 212 generally contact the bottom side of the flat screen monitor. Bent flanges 214 generally engage a bottom edge of the front of the flat screen monitor. The distance between the front edges of bent flanges 210 and 214 is generally preferably less than the height of the flat screen monitor. This prevents the flat screen monitor from falling forwardly out of mounting assembly 532.

[0080] A pair of slide tracks 216a and b are defined in upper arm 204. Slide tracks 216 are oriented parallel to each other and extend in a vertical direction. Each slide track 216a and b is dimensioned sufficiently wide to receive two screws 218. The screws 218 are received in four screw holes 220 defined in lower arm 206 (FIGS. 24-25). Screw holes 220 are threaded screw holes adapted to threadedly receive the screws 218. Each of the screws 218 also pass through the outer apertures 26 on a mounting plate 26. Mounting plate 26 is thus secured by screws 218 to upper and lower arms 204 and 206. When screws 218 are firmly tightened, upper and lower arms 204 and 206 are not free to slide with respect to each other. Thus, distance D is kept at a constant height. Further, mounting plate 26 is fixedly secured to upper and lower arms 204 and 206. When it is desired to alter the distance D, screws 218 are loosened. This loosening allows upper and lower arms 204 and 206 to slide with respect to each other, and thus change distance D. Once distance D has been set to a desired magnitude, screws 218 are then again tightened to secure arms 204 and 206 in this position.

[0081] Mounting plate 26 in mounting assembly 532 is the same as mounting plate 26 in the other embodiments of the mounting assemblies described herein. Thus, it includes a pair of locking arms 44 which may be used to secure it to a support plate 38 in the manner previously described. Mounting plate 26 can thus be easily attached and detached from a support plate 38. The support plate 38 is preferably part of a joint 34, such as the joints 34 that have been described herein. The joint 34 may be mounted to any of the structures previously described. Thus, the joint may be mounted to a wall using wall bracket 36, a standard using standard bracket 36, an arm using knuckle 142, or a pole using collar 186. These mountings may or may not include an extension 108, or other intermediate structures. As yet another alternative, mounting plate 26 of mounting assembly 532 may be mounted to elongated plate 122, which may in turn be mounted to any of the structures just described. Mounting assembly 532 thus provides a structure for mounting non-standard flat panel displays to wall, standards, arms, and poles.

[0082] While the present invention has been described in terms of the various embodiments discussed in the above specification, it will be understood by one skilled in the art that the present invention is not limited to these particular embodiments, but includes any and all such modifications that are within the spirit and scope of the present invention as defined in the appended claims.

What is claimed is:

1. A kit for mounting a monitor comprising:
   a mounting plate adapted to mount to the monitor;
   a joint adapted to be coupled to said mounting plate in a quick-release manner;
   a bracket having first and second ends, said first end adapted to couple to said joint, said second end adapted to be attached to a fixed structure; and
   an articulated arm having a fixed end and a movable end, said movable end adapted to be coupled to said joint, whereby said joint can be coupled to either of said bracket and said articulated arm.

2. The kit of claim 1, wherein said mounting plate is adapted to mount to the back side of the monitor.

3. The kit of claim 1, wherein said joint is a ball and socket joint.

4. The kit of claim 1, wherein said joint is adapted to be pivotably secured to the articulated arm or to the bracket.

5. The kit of claim 1, wherein the mounting plate includes at least one pivotable locking member, said pivotable locking member being pivotable between a locking position and an unlocking position, said locking member preventing said mounting plate from being removed from said joint when said locking member is in the locking position.

6. The kit of claim 5, wherein said locking member is maintained in said locking position by a flexible latch portion that can be elastically deformed between a first and second shape.

7. The kit of claim 1, wherein said joint includes a tapered plate, said tapered plate having a generally trapezoidal shape that tapers from a bottom end toward a top end and that is adapted to contact said mounting plate when said joint is coupled to said mounting plate.

8. The kit of claim 1, wherein said tapered plate defines a plane that is generally parallel to and adjacent a plane defined by said mounting plate when said mounting plate is coupled to said joint.

9. The kit of claim 1, wherein the fixed end of said articulated arm is adapted to be mounted on a worksurface.

10. The kit of claim 1, wherein said mounting plate and said joint are adapted to be secured together in a snap-fitting manner.

11. The kit of claim 1, wherein said bracket is adapted to mount to a wall.

12. The kit of claim 1, wherein said bracket is adapted to be attached to a pole.

13. The kit of claim 12, wherein said bracket includes a collar for mounting to a pole.

14. The kit of claim 12, wherein said bracket includes a collar and a lever arm, said collar dimensioned to fit around
a pole, said lever arm adapted to move between a locked position in which the lever arm and collar frictionally retain the bracket on said pole and an unlocked position in which the lever arm and collar are free to move along the length of the pole.

15. The kit of claim 14, wherein said bracket further includes a channel adapted to receive and hold at least one cord for the flat screen monitor.

16. The kit of claim 1, wherein said bracket includes at least one hook and said bracket is adapted to be mounted onto a standard.

17. A mounting assembly for a monitor comprising:
   a mounting plate adapted to be fixedly attached to the back side of the monitor;
   a pole, said lever arm adapted to move between a locked position in which the lever arm and collar frictionally retain the bracket on said pole and an unlocked position in which the lever arm and collar are free to move along the length of the pole.
   a collar dimensioned to fit around a pole;
   a lever arm pivotally attached to said collar and adapted to move between a locked position in which the collar is frictionally retained on the pole and an unlocked position in which the collar is free to move along the length of the pole; and
   a joint having a first and a second end, said first end being attached to said collar, said second end adapted to releasably couple to said mounting plate.

23. A mounting assembly for a monitor to a pole comprising:
   a mounting plate adapted to mount to the monitor;
   a pole, said lever arm adapted to move between a locked position in which the lever arm and collar frictionally retain the bracket on said pole and an unlocked position in which the lever arm and collar are free to move along the length of the pole.
   a collar dimensioned to fit around a pole;
   a lever arm pivotally attached to said collar and adapted to move between a locked position in which the collar is frictionally retained on the pole and an unlocked position in which the collar is free to move along the length of the pole; and
   a joint having a first and a second end, said first end being attached to said collar, said second end adapted to releasably couple to said mounting plate.

24. The assembly of claim 23, wherein said joint includes a quick-release mechanism adapted to releasably couple to said mounting plate without the need for tightening any fasteners.

25. The assembly of claim 24, wherein said quick-release mechanism includes at least one pivotable locking member, said pivotable locking member being pivotable between a locking position and an unlocking position, said locking member preventing said mounting plate from being removed when said locking member is in the locking position.

26. The assembly of claim 25, wherein said locking member is maintained in said locking position by a flexible latch portion that can be elastically deformed between a first and second shape.

27. The assembly of claim 23, wherein said joint is adapted to pivot with respect to said collar.

28. The assembly of claim 23, wherein said joint includes a ball and socket joint.

29. The assembly of claim 23, wherein said joint includes a tapered, trapezoidal plate and said mounting plate includes a tapered trapezoidal sleeve adapted to receive said tapered, trapezoidal plate.

30. The assembly of claim 23, wherein said collar further includes a channel adapted to receive and hold at least one cord for the monitor.

31. The assembly of claim 23, wherein said collar includes a cylindrical aperture adapted to receive a pole, said cylindrical aperture having a first diameter when said lever is in the locked position and a second diameter when said lever is in the unlocked position, said first diameter being smaller than said second diameter.

32. The assembly of claim 31, wherein said lever includes a cam surface that engages the pole when the lever is in the locked position, said cam surface having a curvature that matches a curvature of an outer surface of the pole.