Description

This invention relates to digital computers, and more particularly relates to a configuration philosophy for laptop computers.

As the size of semiconductor devices and various other computer components has decreased dramatically in the past decade, computer manufacturers have been able to provide progressively smaller computer systems having the same or improved computational abilities as their larger predecessors. Computers of the laptop size for personal or business usage, for example, may typically have a width of 35cm and a depth of 22cm, thus occupying approximately 770 sq. cm of a desktop, while an equally functional desktop computer might have a width of 50cm and a depth of 40cm, requiring 2000 sq. cm of desktop area.

In addition to their compact size, laptop computers typically have the advantage of being relatively light as compared to their desktop-sized counterparts, weighing perhaps 7kg, and are usually provided with a battery power supply so that users may fully exploit their portability.

In order for laptop computers to retain functional compatibility with their desktop-sized counterparts and with currently available software, laptop machines should include many of the functional components found in desktop machines, including sufficient on-board memory, floppy disk and hard disk drives, display screens, expansion slots, and standard input/output ports. Additional features, such as built-in modems, may also be incorporated into laptop machines to complement their portable nature.

It is accordingly a feature of the present invention that an arrangement of components is provided which results in a compact, lightweight unit with an efficient and convenient user interface. Another feature of the invention is that the compact and lightweight configuration does not degrade the functionality of the system relative to a typical desktop computer, and that the resultant system incorporates laptop-specific capabilities not always found in desktop computers.

According to the present invention, the components of a laptop computer are arranged in a highly space-efficient yet convenient manner, so that the computer is compact, lightweight and easy-to-use. The computer of the present invention includes most of the functional components typically found in desktop computers, such as both fixed and floppy disk drives, a full-size high-resolution display, serial communications and external VGA monitor ports, and a standard sized alphanumeric keyboard. Furthermore, a computer in accordance with the present invention allows for operation with AC power from an external AC power supply, or with a readily installed rechargeable battery pack, and can be equipped with an internal modem, memory expansion boards, and a floating- point numeric co-processor for increased system performance.

All of the above features can be incorporated into a housing which may be less than one-third the size of a comparable desktop computer. In addition, however, a computer in accordance with the present invention can be accompanied by an optional desktop expansion base which enables the computer to support a number of optional accessories, including industry standard expansion hardware. The desktop expansion base also provides an additional port for an external video graphics monitor, and an additional combination AC power supply/battery charger.

The novel features believed characteristics of the invention are set forth in the appended claims. The invention itself, however, as well as other features and advantages thereof, will be best understood by reference to a detailed description of a specific embodiment which follows, when read in conjunction with the accompanying drawing, wherein:

Figure 1 is an illustration of a computer constructed in accordance with the present invention.

EP-A-0 246 154 shows a desktop computer system having a main unit and an expansion unit being connected without cabling. However, the expansion unit does not have a recess to receive the main unit and the main unit does not have a display which can be received in the first unit and a keyboard which is removably receivable in the first unit.

A portable or "laptop" style computer system is described in detail in the document entitled "COMPAQ SLT/286 PERSONAL COMPUTER FEATURES/SPECIFICATIONS" (first edition, October 1988) published on 17.10.1988 by Compaq Computer Corporation.

Referring to Figure 1, a laptop size computer system of the present invention is illustrated. The system comprises three major components: a main system unit 10, an alphanumeric keyboard 12, an external AC power supply 14, and a desktop expansion base 16.

Main system unit 10 and alphanumeric keyboard 12 together constitute a self-contained, fully functional personal-type computer system. Main system unit 10 includes a 25.4cm (diagonal) monochrome LCD display screen 18 which folds down when not in use to function as a cover for main system unit 10 during transport or storage. Furthermore, main system unit 10 houses a three and one-half unit 1.44-megabyte or 720-kilobyte floppy disk drive 20 as well as a 20-megabyte or 40-megabyte fixed disk drive 22. Both floppy disk drive 20 and fixed disk drive 22 are situated generally in the front of main system unit 10, so that floppy disks are easily inserted and removed during use, and so that disk drive activity indicators 24, 26 are readily visible to the user. If an optional 2400-baud internal modem is installed in the computer of Figure 1, a modem connection can be conveniently made using internal modem slot 27 on the side of main system unit 10. Although main system unit 10 is equipped with a 9-pin serial communication port, slot 27 can be user-

configured to serve as an additional 9-pin serial port.

A rechargeable battery pack 28, such as a Nickel-Cadmium (NiCad) battery pack or the like is also incorporated into main system unit 10. Battery pack 28 allows for up to three hours of system use without AC power, and can be fully re-charged in less than three hours. The top of main system unit 10 has a rectangular opening therein for receiving battery pack 28, which is easily inserted or removed by a user. Battery pack 28 is secured in rectangular opening 30 by means of clasps 31. In "portable" applications where AC power is available, external AC power supply 14 can be connected to main unit 10; internal battery pack 28 is automatically charged whenever external power supply 14 is connected.

Keyboard 12 is attached to main system unit 10 by means of a coiled cable 32 so that during operation keyboard 12 can be located generally near main system unit 10, in any position that is convenient for a user. Furthermore, keyboard 12 has adjustable supports 34 so that it can be set at a convenient working angle with respect to a user. When the computer of Figure 1 is not in use, keyboard supports 34 may be folded flush with the keyboard housing, and keyboard 12 placed above battery pack 28 on top of the main system unit 12. A small channel 33, running generally from the left side of the main unit to the right, below the display screen 18,is shaped to receive the coiled cable 32 and the rear edge of keyboard 12 when keyboard 12 is disposed on top of the main unit 10. This allows the display screen 18 to be folded down on top of the main unit 10; then display screen 18 and keyboard 12 can be further secured in place by means of latches 36 which can extend from the display screen 18 through slots 37 in the keyboard and into similar slots 39 in the housing of main system unit 10; in this closed state, the computer of Figure 1 has approximate dimension (height, depth, width, respectively) of 10.5cm x 21.5cm x 34.5cm, weighs approximately 6.5-kilograms, and can be easily stored or transported. A retractable carrying handle 38 is normally inset to be flush with the front of the main system unit 10. When the main system unit 10 is folded closed as described above, a recess 40 in the front of the unit 10 allows retractable handle 38 to be pulled out, and the entire unit 10 including display screen 18 and keyboard 12 can be carried like a briefcase.

With continued reference to Figure 1, a computer in one embodiment of the present invention can be "docked" in an optional desktop expansion base 16, which is precisely formed to receive the main system unit 10. A multi-pin electrical coupling (not shown in Figure 1) is disposed near the rear of the base 16 in such a position as to mate with a complementary coupling on the rear of the main system unit 10. In this way, the main system unit is automatically electrically coupled whenever the unit 10 is docked in the desktop expansion base 16.

The expansion base 16 has two 8-bit or 16-bit industry standard expansion slots therein (not shown in Figure 1) which serve to increase system flexibility and to provide the capability to customize the system for particular applications and hardware configurations. For example, these slots can be used for local-area network (LAN) or other communication cards, so that the computer can become part of a larger system. In addition to these expansion slots, the expansion base 16 contains three standard interface ports (not shown in Figure 1) which duplicate some ports already existing on the main system unit 10, including both parallel and parallel communications interface ports, an additional external VGA graphics monitor port and an external enhanced keyboard port. Since devices such as printers, high-resolution graphics monitors and enhanced keyboards can be permanently attached to the expansion base 16, the user can make a transition from an office or home environment to a portable environment without awkward cable connecting and disconnecting. Finally, the expansion base 16 includes an internal AC power supply which can trickle-charge or fast-charge the battery pack 28 in the main system unit 10 when the unit 10 is attached to the base 16.

From the above detailed description of a preferred embodiment, it should be evident that a laptop size computer system has been disclosed which is configured to provide maximum computing functionally in a housing of minimal size. Constructing a laptop computer in accordance with the present invention should result in a system which is compact, lightweight and easy to use.

Although a specific embodiment of the invention has been disclosed in detail, it is to be understood that various changes, alterations and substitutions can be made. In particular, with reference to the specific dimensions recited in the detailed description, it should be obvious to one skilled in the art that the class of machines which are considered "laptop" in size includes computers of varying shapes and size.

Claims

1. A portable computer system comprising:
   a portable computer having
   a first housing (10) containing a first set of computer components;
   a display screen (18) hinged to the top of the first housing to allow the display screen to be moved either to upright positions or to a folded position;
   a keyboard (12) removably receivable in and coupled via a cable (32) to the first housing;
   and,
   an expansion unit having

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configured to serve as an additional 9-pin serial port.

A rechargeable battery pack 28, such as a Nickel-Cadmium (NiCad) battery pack or the like is also incorporated into main system unit 10. Battery pack 28 allows for up to three hours of system use without AC power, and can be fully re-charged in less than three hours. The top of main system unit 10 has a rectangular opening therein for receiving battery pack 28, which is easily inserted or removed by a user. Battery pack 28 is secured in rectangular opening 30 by means of clasps 31. In "portable" applications where AC power is available, external AC power supply 14 can be connected to main unit 10; internal battery pack 28 is automatically charged whenever external power supply 14 is connected.

Keyboard 12 is attached to main system unit 10 by means of a coiled cable 32 so that during operation keyboard 12 can be located generally near main system unit 10, in any position that is convenient for a user. Furthermore, keyboard 12 has adjustable supports 34 so that it can be set at a convenient working angle with respect to a user. When the computer of Figure 1 is not in use, keyboard supports 34 may be folded flush with the keyboard housing, and keyboard 12 placed above battery pack 28 on top of the main system unit 12. A small channel 33, running generally from the left side of the main unit to the right, below the display screen 18,is shaped to receive the coiled cable 32 and the rear edge of keyboard 12 when keyboard 12 is disposed on top of the main unit 10. This allows the display screen 18 to be folded down on top of the main unit 10; then display screen 18 and keyboard 12 can be further secured in place by means of latches 36 which can extend from the display screen 18 through slots 37 in the keyboard and into similar slots 39 in the housing of main system unit 10; in this closed state, the computer of Figure 1 has approximate dimension (height, depth, width, respectively) of 10.5cm x 21.5cm x 34.5cm, weighs approximately 6.5-kilograms, and can be easily stored or transported. A retractable carrying handle 38 is normally inset to be flush with the front of the main system unit 10. When the main system unit 10 is folded closed as described above, a recess 40 in the front of the unit 10 allows retractable handle 38 to be pulled out, and the entire unit 10 including display screen 18 and keyboard 12 can be carried like a briefcase.

With continued reference to Figure 1, a computer in one embodiment of the present invention can be "docked" in an optional desktop expansion base 16, which is precisely formed to receive the main system unit 10. A multi-pin electrical coupling (not shown in Figure 1) is disposed near the rear of the base 16 in such a position as to mate with a complementary coupling on the rear of the main system unit 10. In this way, the main system unit is automatically electrically coupled whenever the unit 10 is docked in the desktop expansion base 16.

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Although a specific embodiment of the invention has been disclosed in detail, it is to be understood that various changes, alterations and substitutions can be made. In particular, with reference to the specific dimensions recited in the detailed description, it should be obvious to one skilled in the art that the class of machines which are considered "laptop" in size includes computers of varying shapes and size.

Claims

1. A portable computer system comprising:
   a portable computer having
   a first housing (10) containing a first set of computer components;
   a display screen (18) hinged to the top of the first housing to allow the display screen to be moved either to upright positions or to a folded position;
   a keyboard (12) removably receivable in and coupled via a cable (32) to the first housing;
   and,
   an expansion unit having

a second housing (16) containing a second set of computer components and having a recess for receiving the first housing;

the first housing (10) and the second housing (16) having complementary coupling means for electrically coupling the first and second sets of computer components when the first housing is inserted into the recess in the second housing, to enable the portable computer to utilise the second set of computer components.

2. A computer system according to claim 1, further including

a floppy disk drive (20), positioned in the first housing to allow for the insertion of floppy disks therein through an access slot in a front planar face of the first housing;

a hard disk drive (22) mounted in the front of the first housing; and first and second indicator means mounted on the front planar face of the first housing for indicating read or write access to the floppy disk drive and the hard disk drive;

an AC power supply (14) for supplying power to the first set of computer components, and a battery power supply (28) for supplying power to the first set of computer components, the battery power supply having a substantially rectangular prism shape;
and wherein

the first housing has a rectangular prism shape with substantially planar front, back, top, bottom and side faces, and a rectangular opening in its top planar face for receiving the battery power supply, the rectangular opening being formed to allow the battery power supply to be flush with the top planar face, and the battery power supply having clasping means (31) for holding the power supply in the rectangular opening;

and the means hinging the display screen to the top of the housing defining a channel (33) running along the top planar surface of the first housing generally between the side faces thereof, the channel being sized to receive the cable (32) when the keyboard is placed on the top planar face of the first housing, directly above the battery power supply and immediately adjacent to the hinging means and the channel.

Patentansprüche

1. Tragbares Computersystem, das umfaßt:
einen tragbaren Computer, der aufweist:
ein erstes Gehäuse (10), das eine erste Gruppe von Computerbauteilen enthält;
einen Bildschim (18), der an der Oberseite des ersten Gehäuses klappbar angebracht ist, so daß der Bildschirm entweder in aufrechte Stellungen oder eine eingeklappte Stellung bewegt werden kann;
eine Tastatur (12), die lösbar in dem ersten Gehäuse aufgenommen und über ein Kabel (32) mit selbigem verbunden werden kann;
und,
eine Erweiterungseinheit, die aufweist:
ein zweites Gehäuse (16), das eine zweite Gruppe von Computerbauteilen enthält und eine Aussparung zur Aufnahme des ersten Gehäuses aufweist;
wobei das erste Gehäuse (10) und das zweite Gehäuse (16) komplementäre Verbindungseinrichtungen zur elektrischen Verbindung der ersten und der zweiten Gruppe von Computerbauteilen, wenn das erste Gehäuse in die Aussparung in dem zweiten Gehäuse eingeführt wird, aufweisen, um zu ermöglichen, daß der tragbare Computer die zweite Gruppe von Computerbauteilen nutzt.

2. Computersystem nach Anspruch 1, das des weiteren enthält:
ein Diskettenlaufwerk (20), das sich in dem ersten Gehäuse befindet und die Einführung von Disketten in selbiges durch einen Zugangsschlitz in einer vorderen planen Fläche des ersten Gehäuses ermöglicht;
ein Festplattenlaufwerk (22), das im Vorderteil des ersten Gehäuses angebracht ist; sowie eine an der vorderen planen Fläche des ersten Gehäuse angebrachte erste und zweite Anzeigeeinrichtung, die Lese- oder Schreibzugriff auf das Diskettenlaufwerk und das Festplattenlaufwerk anzeigt;
eine Wechselspannungsquelle (14), die der ersten Gruppe von Computerbauteilen Spannung zuführt, sowie eine Batteriespannungsquelle (28), die der ersten Gruppe von Computerbauteilen Spannung zuführt, wobei die Batteriespannungsquelle im wesentlichen rechteckige Prismenform hat;
und wobei
das erste Gehäuse eine rechteckige Prismenform mit im wesentlichen planen Vorder-, Rück-, Ober-, Unter- und Seitenflächen hat, sowie eine rechteckige Öffnung in seiner oberen plane Fläche zur Aufnahme der Batteriespannungsquelle, wobei die rechteckige Öffnung so geformt ist, daß sie es ermöglicht, daß die Batteriespannungsquelle mit der oberen planen Fläche bündig ist, und die Batteriespannungsquelle Klemmeinrichtungen (31) aufweist, die die Spannungsquelle in der rechteckigen Öffnung halten;
und die Einrichtung, die den Bildschirm klappbar an der Oberseite des Gehäuses hält, eine Nut (33) begrenzt, die über die obere plane Fläche

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des ersten Gehäuse im allgemeinen zwischen den Seitenflächen desselben verläuft, wobei die Nut so bemessen ist, daß sie das Kabel (32) aufnimmt, wenn die Tastatur auf die obere plane Fläche des ersten Gehäuses direkt oberhalb der Batteriespannungsquelle und unmittelbar an die Klappabbringungseinrichtung und die Nut angrenzend aufgelegt wird.

Revendications

1. Un système d'ordinateur portable comprenant :
un ordinateur portable ayant
un premier boîtier (10) contenant un premier ensemble de composants d'ordinateur;
un écran de visualisation (18) articulé à la partie supérieure du premier boîtier pour permettre de déplacer l'écran de visualisation vers des positions dressées ou vers une position rabattue;
un clavier (12) pouvant être logé de façon amovible dans le premier boîtier et connecté à celui-ci par l'intermédiaire d'un câble (32);
et,
une unité d'extension ayant
un second boîtier (16) contenant un second ensemble de composants d'ordinateur et ayant une cavité destinée à recevoir le premier boîtier;
le premier boîtier (10) et le second boîtier (16) comportant des moyens de connexion complémentaires pour connecter électriquement les premier et second ensembles de composants d'ordinateur lorsque le premier boîtier est introduit dans la cavité dans le second boîtier, pour permettre à l'ordinateur portable d'utiliser le second ensemble de composants d'ordinateur.

2. Un système d'ordinateur selon la revendication 1, comprenant en outre
une unité de disquette (20), placée dans le premier boîtier pour permettre l'introduction de disquettes dans cette unité par l'intermédiaire d'une fente d'accès dans une face plane avant du premir boîtier;
une unité de disque dur (22) montée à l'avant du premier boîtier; et des premier et second moyens indicateurs montés sur la face plane avant du premier boîtier, pour indiquer des opérations d'accès de lecture ou d'écriture de l'unité de disquette et de l'unité de disque dur;
une alimentation alternative (14) pour fournir de l'énergie au premier ensemble de composants d'ordinateur, et une alimentation par batterie (28) pour fournir de l'énergie au premier ensemble de composants d'ordinateur, l'alimentation par batterie ayant pratiquement une forme de prisme rectangulaire;

et dans lequel
le premier boîtier a une forme de prisme rectangulaire avec des faces avant, arrière, supérieure, inférieure et latérales pratiquement planes, et une ouverture rectangulaire dans sa face plane supérieure, pour recevoir l'alimentation par batterie, l'ouverture rectangulaire étant formée de façon que l'alimentation par batterie puisse affleurer la face plane supérieure, et l'alimentation par batterie comportant des languettes de retenue (31) pour. maintenir l'alimentation dans l'ouverture rectangulaire;
et les moyens pour l'articulation de l'écran de visualisation sur la partie supérieure du boîtier définissant un canal (33) qui s'étend le long de la surface plane supérieure du premier boîtier, de façon générale entre les faces latérales de celui-ci, ce canal étant dimensionné pour recevoir le câble (32) lorsque le clavier est placé sur la face plane supérieure du premier boîtier, directement au-dessus de l'alimentation par batterie, et dans une position immédiatement adjacente aux moyens d'articulation et au canal.