



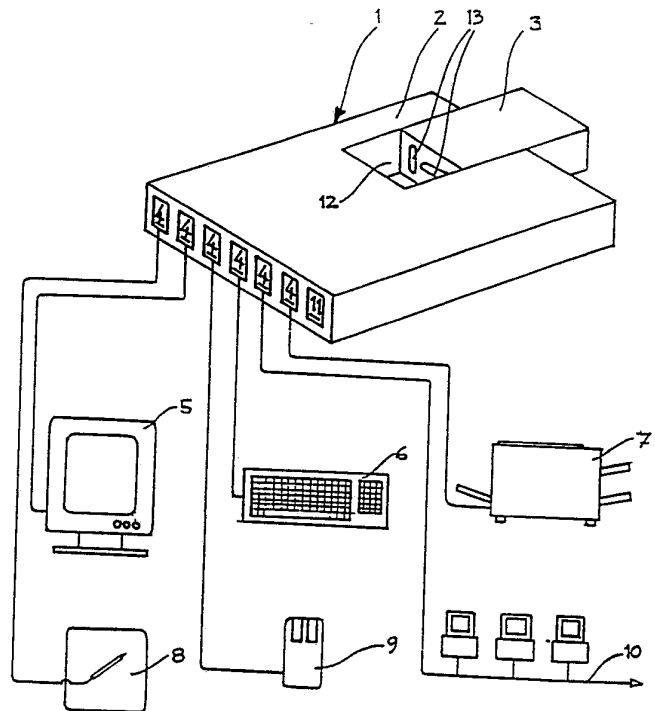
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(54) Title: A COMPUTER COMPRISING AT LEAST TWO EASILY INTERCONNECTABLE PARTS

(57) Abstract

The invention refers to a computer incorporating components necessary for data processing, such as e.g. main board with CPU, primary and secondary memory and electronics for driving peripheral equipment such as monitor, keyboard, printer, etcetera, and which computer is composed by at least two easily interconnectable parts. The invention is realized in that the computer consists on one hand of a docking station intended mainly for stationary installation and on the other hand a detachable and easily moveable module, and that the docking station at least incorporates or is connected to a power supply, electronic components for driving the peripheral equipment such as monitor, keyboard, printer and that the module incorporates at least the CPU, a primary and secondary memory, and that the module is arranged to be moveable between and to be dockable in, or connectable to different docking stations, and that the module and the docking station, when joined together form an integral unit.



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## A COMPUTER COMPRISING AT LEAST TWO EASILY INTERCONNECTABLE PARTS

### Introduction

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The invention refers to a computer incorporating components necessary for data processing, such as e.g. main board with CPU, primary and secondary memory and electronic components for driving peripheral equipment such as monitor unit, keyboard, printer, etcetera, and which computer consists of at least two easily  
10 interconnectable parts.

### Background of the invention

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The computers available on the market today are normally rather expensive and bulky. The complete units are furthermore rather heavy. Most computers are of stationary type i.e. they are not intended to be easily portable between different work sites, and they therefore are neither easy to move, to install or to start up. Installation of a computer requires a certain knowledge and also carefulness in  
20 order to avoid damages to the sensitive parts of the system. Beside the physical placement and positioning of the computer box and the monitor installation normally involves that a number of connections must be made e.g. connection of the computer to a possible network, interconnection of keyboard and computer, connection of monitor, printer, mouse, connection of mains voltage, etcetera.

25

It is often desirable to be able to carry along all programmes and all "private" data from one work site to another in a simple manner. This requirement can come up e.g. when visiting a client's office, during travel, in a car, a boat, etcetera. The user thereby has access to, and can easily work, with the same software and data at  
30 several different work sites. It is then necessary to have a working tool which is easy to carry along and easy to start up in order to allow the user swiftly to start his work, without the need for making a timewasting installation of the computer at the new location. It is thus of critical importance that the starting up time can be reduced.

35

### Prior art

5 For the purpose of facilitating the transfer of data from one computer to another it has earlier been developed movable secondary memories (hard discs). These systems require that a complete computer equipment is available at each work site, except for the hard disc itself, which is brought along. This means that the computer with its central processor unit (CPU), memory (RAM), mathematic processor unit (MPU) and other internal equipment such as drive electronics for the peripheral equipment, etcetera, must be available at every work station. 10 Unfortunately these components are the most expensive parts of a computer system. Cost development can be expected to go towards cheaper components, but ever bigger capacity is on the other hand required from the computers for being able to handle the ever more complex softwares. The system with moveable hard disc(s) 15 therefore will become comparatively expensive as at least two complete computers and one moveable hard disc have to be used.

In more recent time small portable computers, so called notebook computers have been developed. These computers however suffer from a number of crucial 20 drawbacks. The battery powered computers are often rather heavy and bulky and must normally be carried along as an extra briefcase. The operating time will furthermore be rather short as the mechanical components such as floppy disc drives, hard discs, etcetera, consume much energy.

25 The graphic display unit will not give the same resolution and not the color quality, a fixedly installed monitor unit normally can offer. Display units based on liquid crystal technique are often slow and have smaller display surface. The portable display units furthermore require that surrounding light falling thereon is reduced and that the display surface is viewed straight from the front as the viewing angle is 30 limited. The keyboards are also small and inconvenient to work with. Portable computers when not powered by built-in batteries, furthermore have to be connected to mains voltage via a cable, which then must be carried along. Then the use is limited by the distance to a voltage tap.

35 Said drawbacks contribute to the fact that portable computers are manufactured and marketed in smaller series resulting in substantially higher prices as compared to corresponding computers intended for "fixed installation". This is consequently a

clear competitive drawback.

5 With known technique it is thus today possible to transfer and use programmes and data between two or more computer stations. The transfer may take place e.g. via data disettes, or, as mentioned via moveable hard discs. The firstmentioned is an inexpensive solution but requires a comprehensive work and it is in practice almost unused when it concerns data between different work stations. The technique furthermore requires expensive standard computers (with central processor units and RAM-storages) at the different work sites.

10

The portable computes are neither a sound alternative, i.a. due to their high price, their limited display unit quality and due to the fact that series of connections must be made before any real work can start (connection to mains voltage, network, further peripheral equipment, such as printer, mouse, etcetera).

15

#### **Purpose and most essential features of the invention**

20 The purpose of the invention is to provide a computer which eliminates the abovementioned drawbacks and combines the capacity of a powerful computer with a convenient flexible and cost efficient utilization and the use of which can be compared to having access both to a stationary and to a portable computer. The invention shall make possible simple installation at home, at the work site, at the customer's office, in the car, in the boat, in the weekend cottage, in the caravan, etcetera, and it also shall reduce the need of file transfer between different  
25 computer stations.

30 Another purpose of the invention is to make the most expensive and valuable parts of the computer unusable to others than the owner, or to personnel authorized by the owner, and the parts shall be easy to lock for reducing the risk for theft.

35 A further purpose of the invention is to make possible up-grading of older computer systems in a simple manner in order to achieve larger computer capacity at a lower cost and with additional user advantages gained with the invention. This is obtained by the features defined in the claims.

### Drawing list

The invention herinafter will be further described with reference to the accompanying drawings, wherein

5

Fig 1, schematically shows a work station, with the parts included therein, in accordance with the invention,

Fig 2, shows more in detail, the parts included in the computer according to the invention and,

10  

Fig 3, shows a module according to the invention, with the components forming part thereof and shown partly broken up.

### Prefered embodiment

15  

In figure 1 is shown a work station built in accordance with the invention. The work station mainly comprises a computer 1 and peripheral equipment 5-9. The computer 1 consists in turn of a docking station 2 and a module 3 inserted therein. A series of peripheral units such as a monitor 5, a keyboard 6, a laser printer 7, a digitizer 8 and a mouse 9 are connected to the computer 1 via connectors 4. The computer is further equipped with a connection intended for an external network 20 10. For driving the computer 1 is required mains current, wich is supplied via a connector for mains voltage 11.

25  

The docking station 2 is mainly intended for stationary installation at a work site whereas the module 3 is detachable and intended to be easily moveable. For this purpose the docking station 2 is provided with a recess 12, the inner measures of which mainly corresponds to the outer measures of the module 3 and in which recess 12 the module 3 can be pushed in and be connected to the docking station 2 electrically and/or as to signals e.g. via electrical connectors 13, 22 or contact-free 30 via optical members (not shown). The optical system may for instance comprise signal transfer units (not shown), having transmitting and recieving functions, and being positioned in the module 3 as well as in the docking station 2, and by means of which signal transmission is effected in a contact-free mode, e.g. via optical member such as laser optics, LED technique or the like. The signal transmisssion 35 is effected at a speed about 100 MBaud.

The connecors 13, 22 are preferably of conventional type with a male part and a

female part. For transmission of the data via the data bus, the connector 13, 22 incorporates a number of contact pins, e.g. 90. The connector 13, 22 incorporates either an integral or separate part for transmission of drive current. For this purpose is normally required 4 contact pins. The connector 13 in the module 3 is preferably recessed into the casing in order to reduce the risk for mechanical damages to the contact pins, whereas the male part of the connector 22 is provided in the docking station 2, where it is well protected for mechanical damages.

Preferably the module 3 is designed with the same installation dimensions as a normally 3.5" floppy discette drive but it may of course also be designed with larger or smaller installation dimensions. Packing of the necessary electronics within the smaller dimensions is made possible by new generation of moveable auxiliary storages (e.g. hard discs) that has been developed. As an example it can be mentioned that a hard disc known as PraireTek (registrered trademark) with a 2.5" disc has the external dimensions 100 x 70 x 15 mm and accomodates 20 Mb. A somewhat bigger but for this purpose quite useful hard disc accomodates 40 Mb and the development goes towards hard discs having higher capacity. It is of course possible also to use stationary electronic storages as secondary memory.

In Fig. 2 the parts incorporated in the computer 1 are further shown. In the module 3 there is e.g. provided a secondary memory 14, preferably a hard disc drive (HDD), also other expensive electronics, such as main board 15 with a central processor unit (CPU) 16, a control program unit for the computer (BIOS) 17, primary storages (RAM) 18, etcetera. It also shall be possible optionally to install a matematical coprocessor (MPU) 19 in existing base. The module 3 also contains an electronics unit, so called IDE interface 20, for driving/controlling the hard disc drive 14. An internal bus 21 interconnects the different internal units of the module 3 as to signals. The CPU 16 may be either a 80286 processor or a 80386SX processor having an operation frequency of e.g. 16 MHz. The size of the primary storage 18 is 1 Mb but it is easily expandable up to 8 Mb or more by addition of circuits in the different storage banks (RAM 1, RAM 2 etcetera).

The connector 13 engages the connector 22 when the module 3 is pushed into the docking station 2. The "internal bus" (multi conductor) 21 of the module 3 thereby is connected to the "external bus" 29 of the docking station 2, which is provided on the bus board of the docking station (not shown). The bus board thereby consequently replaces certain functions normally maintained by the conventional

main board. The computer bus thus extends through the module 3 and also through the docking station 2. When the module 3 and the docking station 2 are separated from each other the bus thereby is divided into two physical parts and data processing may not be accomplished.

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To the external bus 29 is connected a graphic adapter 24, a keyboard contact 25, a parallel port 26, a serial port 27 and a network adapter 30. There are empty board positions 31 for expansion boards.

10 The connectors 13, 22 may consist of further parts, wherein beside the bus connection there is possibility directly to connect an additional hard disc drive, an additional floppy discette drive, etcetera.

15 The graphic adapter 24 controls, in a manner known per se the graphic of the monitor unit 5. The keyboard 6 is controlled by means of a function intended therefore and integral with the CPU 16. Via a parallel port unit 26 and/or via the serial port unit 27 it is possible to connect e.g. a laser printer 7, a mouse 9, a digitizer 8 etcetera, to the computer.

20 The network adapter 30 makes possible the communication with other computers (not shown). The docking station 2 includes, besides the docking space 12 itself, other electronic units necessary for the function of the computer 1. A power supply unit 23 is thus provided for supply of power to the docking station 2 and for controlling its peripheral equipment but also for the current requirement of the  
25 module 3. The current is transformed in the power supply unit 23 to voltage levels suited for the computer and its electronics, e.g. +/- 5V and +/- 12 V.

30 One or more floppy discette drives (FDD) may also be located in the docking station 2 as well as an additional hard disc drive 28 controlled from the module 3 via separate conduits (not shown).

The invention may also be applied for older computers, which easily can be rebuilt to suit the new technique. In one of the standard spaces, which has normally been reserved for an auxiliary discette drive or an auxiliary hard disc drive, it is then  
35 possible to mount a cassette especially designed for the purpose, which thereby operates as a docking station. The conventional main board then is exchanged for a "bus board" without CPU. This means that older computers do not have to be



discarded e.g. when the capacity of the computer system has to be expanded.

5 In figure 3 is shown, partly in broken up mode, an example of the appearance of a module 3 according to the invention in practice. Connectors 13 are provided in one gable of the module 3 for interconnection of the internal and the external bus, a possible external discette drive unit and/or an additional hard disc drive.

10 The computer according to the invention is provided with a code system, which inhibits the possibility for unauthorized persons to use the computer. The code system is implemented in the software in known manner; but it may also be accomplished as an electronic unit positioned in the module 3. This will reduce the attractiveness for thefts and the data security will increase.

15 By the structural design is achieved that several computer installations, as mentioned above, can be obtained at comparatively low cost in that expensive components must not be doubled, that software and data may be transported in a convenient and safe manner and that the need for set ups has been practically eliminated at transport between different work stations i.e. the set up time/start time is short.

20 The invention is of course not limited to the embodiment described but may be varied within the scope of the appended claims. It thus is quite possible to build in a docking unit in the dashboard of a car, a boat or the like. It is also possible to mount a docking unit below the tabletop at the work site or just on or in the wall adjacent the work site in question. When there is to little space at the location  
25 where it is desirable to place the docking station 2, it is possible to position space requiring electronic components separately in a cover of its own, which via cables is connected to the docking station 2.

30

## Claims

- 5 1. A computer comprising components necessary for data processing, such as e.g. main board with CPU, primary and secondary memory and electronics for driving peripheral equipment such as monitor, keyboard, printer etcetera, and which computer is composed by at least two easily interconnectable parts,  
c h a r a c t e r i z e d t h e r e i n ,  
10 that one of the parts is an easily movable module (3), and that this module (3) incorporates at least the CPU, primary and secondary memory of the computer and, that the module (3) is arranged to be connected to or docked in a docking station (2) intended for stationary installation and, that the module (3) and the docking station (2) thereby form an integral unit and an operating computer.
- 15 2. A computer as claimed in claim 1,  
c h a r a c t e r i z e d t h e r e i n ,  
that the docking station (2) incorporates, or is connected to, at least a power supply (23) and electronic unit (20-24) for driving the peripheral equipment such as e.g.  
20 monitor (5), keyboard (6) and printer (7).
3. A computer as claimed in claim 1 or 2 ,  
c h a r a c t e r i z e d t h e r e i n ,  
that the module (3) is arranged to be moveable between, dockable in, or  
25 connectable to different docking stations (2).
4. A computer as claimed in anyone of the above claims,  
c h a r a c t e r i z e d t h e r e i n ,  
that signal transmission units with transmitting and receiving functions are provided  
30 in the module (3) as well in the docking station (2) and by means of which the signal transmission between the module (3) and the docking station (2) is effected contactfree e.g. via optical members such as laser optics, LED technique or the like.

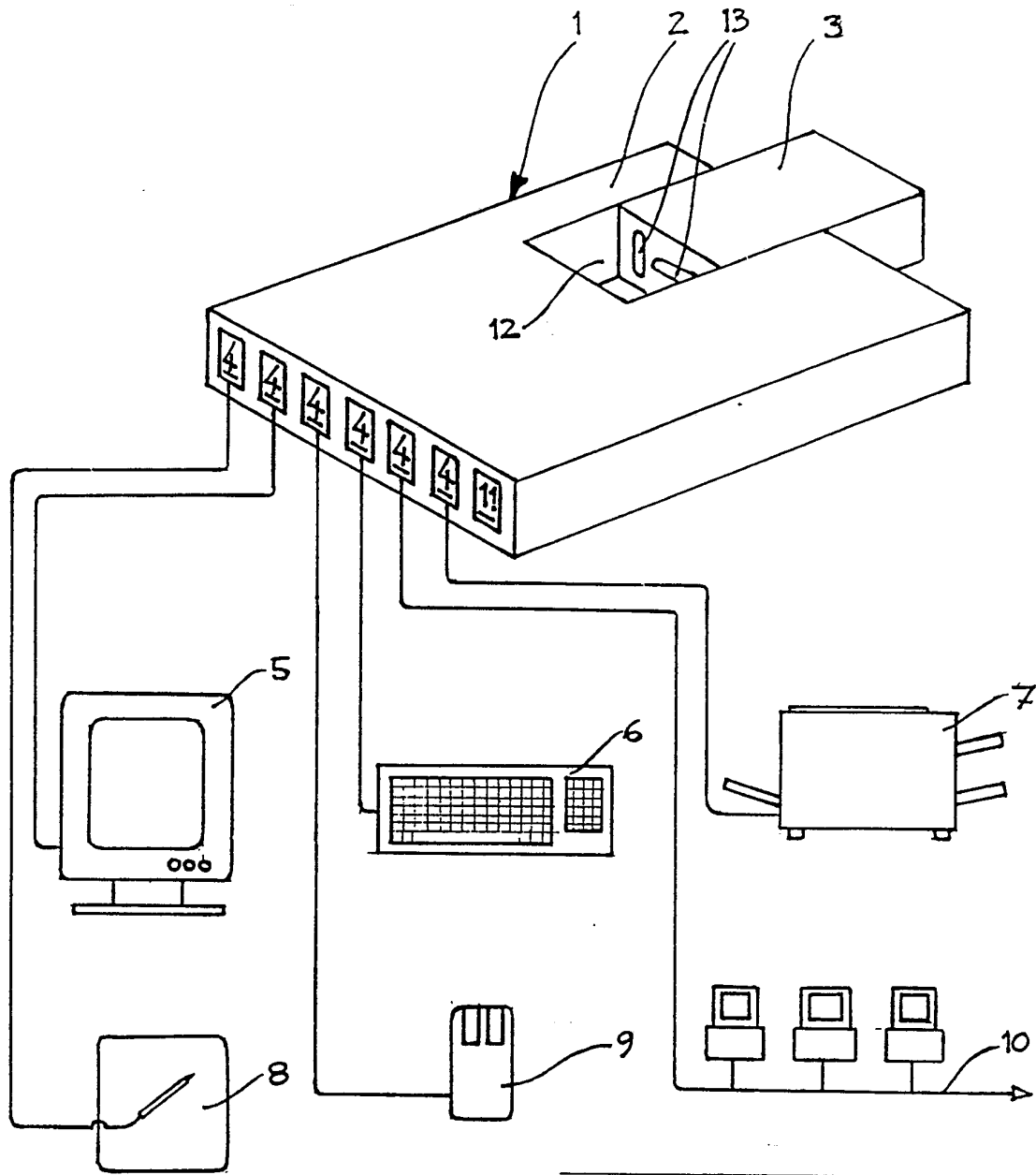


FIGURE 1

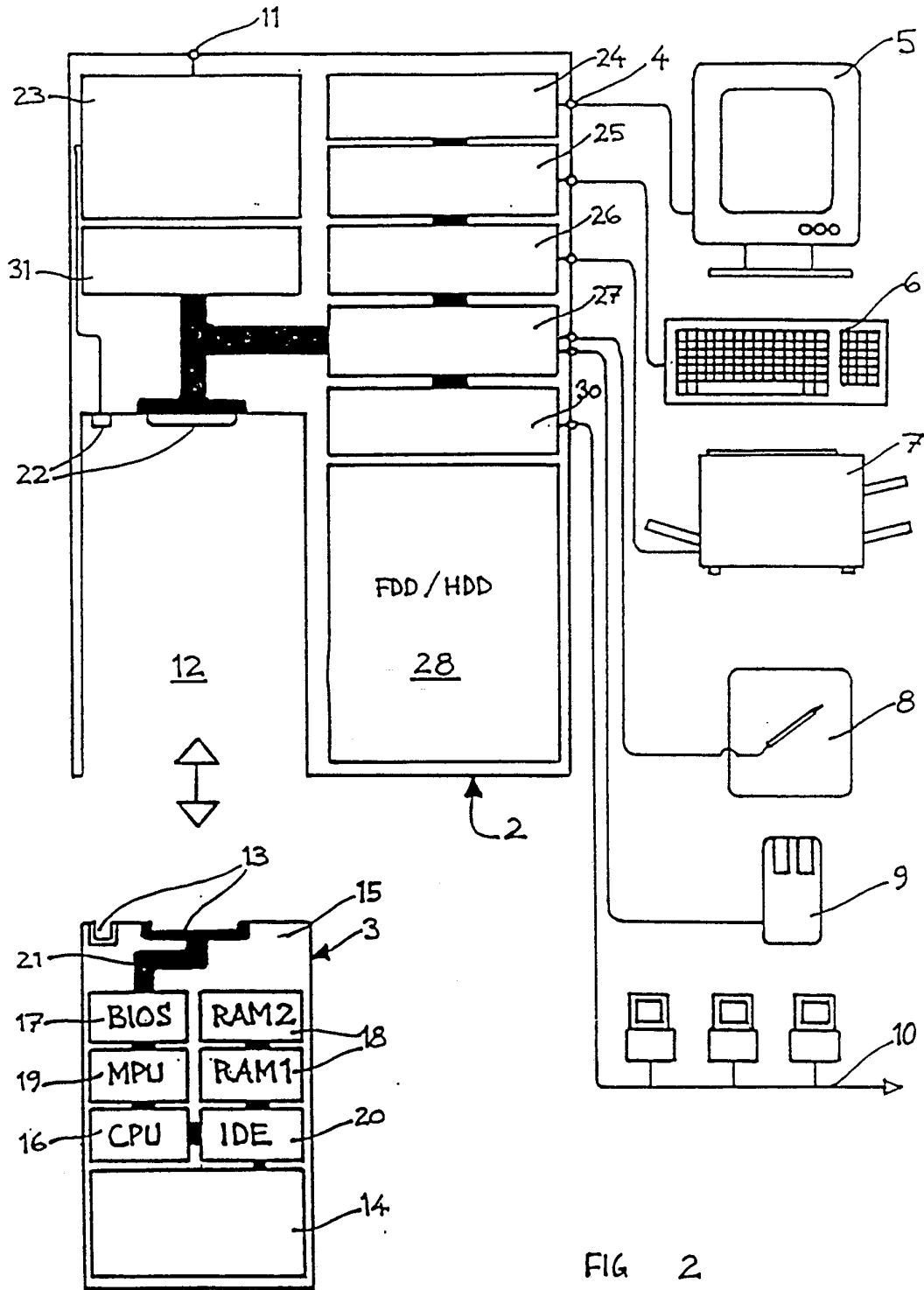


FIG 2

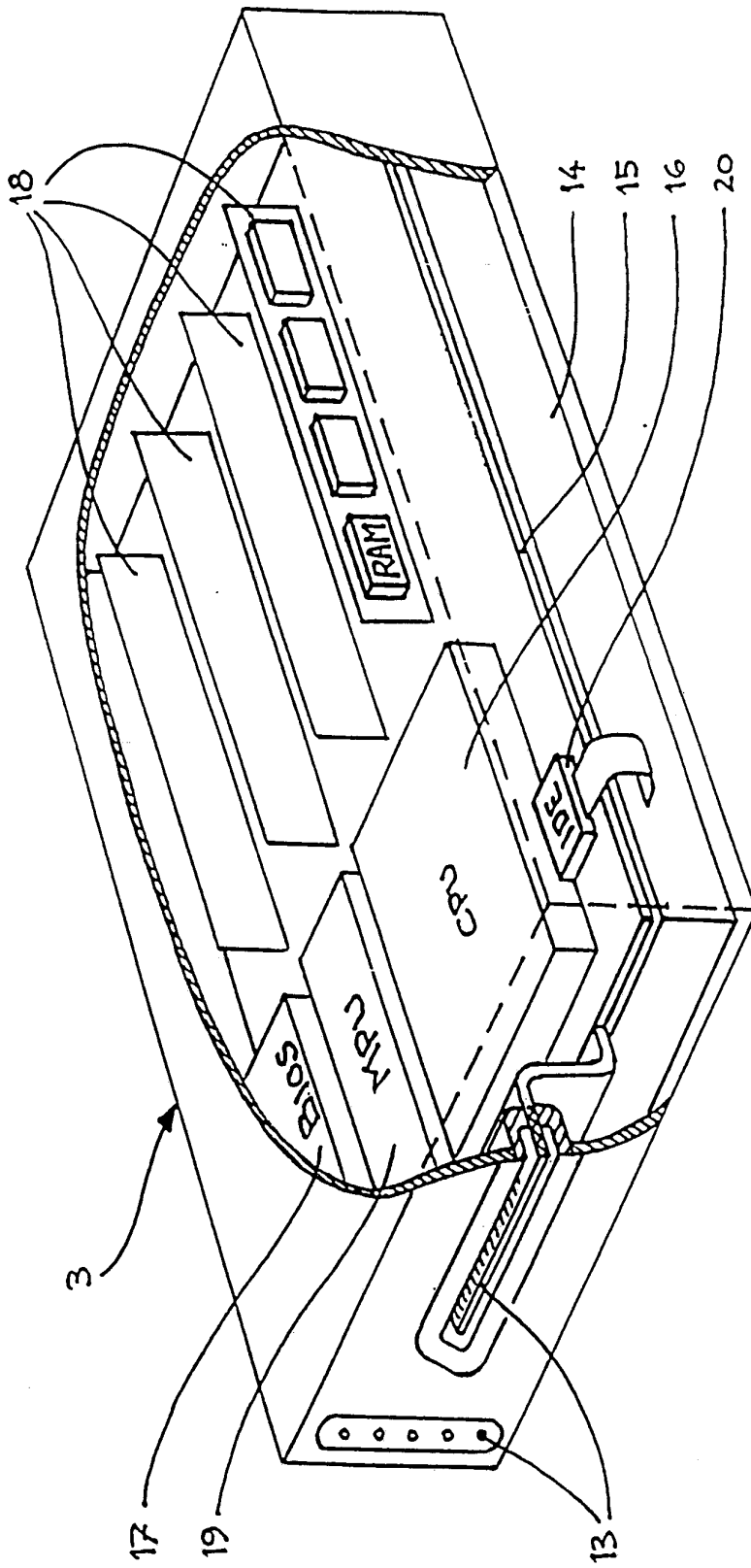
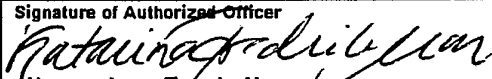


FIG 3

# INTERNATIONAL SEARCH REPORT

International Application No PCT/SE 92/00253

<b>I. CLASSIFICATION OF SUBJECT MATTER</b> (if several classification symbols apply, indicate all) <sup>6</sup>				
According to International Patent Classification (IPC) or to both National Classification and IPC				
IPC5: G 06 F 1/16				
<b>II. FIELDS SEARCHED</b>				
Minimum Documentation Searched <sup>7</sup>				
Classification System	Classification Symbols			
IPC5	G 06 F			
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in Fields Searched <sup>8</sup>				
SE,DK,FI,NO classes as above				
<b>III. DOCUMENTS CONSIDERED TO BE RELEVANT<sup>9</sup></b>				
Category *	Citation of Document, <sup>11</sup> with indication, where appropriate, of the relevant passages <sup>12</sup>	Relevant to Claim No. <sup>13</sup>		
X	US, A, 4769764 (ISAAC LEVANON) 6 September 1988, see column 5, line 62 - column 6, line 12; column 8, line 1 - line 42; figures 2,7A,7B	1-3		
Y	--	4		
Y	US, A, 4942534 (YOKOYAMA ET AL) 17 July 1990, see column 2, line 66 - column 3, line 18; figure 3	4		
A	--	1-3		
Y	EP, A2, 142013 (MARTE, GERHARD) 22 May 1985, see page 1, line 1 - line 10; figure 1	4		
A	--	1-3		
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<p>* Special categories of cited documents: <sup>10</sup></p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;"> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </td> <td style="width: 50%; border: none;"> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"&amp;" document member of the same patent family</p> </td> </tr> </table>			<p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"&amp;" document member of the same patent family</p>
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<b>IV. CERTIFICATION</b>				
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report			
17th July 1992	1992 -07- 20			
International Searching Authority	Signature of Authorized Officer			
SWEDISH PATENT OFFICE	 Katarina Fredriksson			

ANNEX TO THE INTERNATIONAL SEARCH REPORT  
ON INTERNATIONAL PATENT APPLICATION NO.PCT/SE 92/00253

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report.  
The members are as contained in the Swedish Patent Office EDP file on 29/05/92  
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US-A- 4769764	88-09-06	NONE	
US-A- 4942534	90-07-17	JP-A- 1150879	89-06-13
EP-A2- 142013	85-05-22	NONE	