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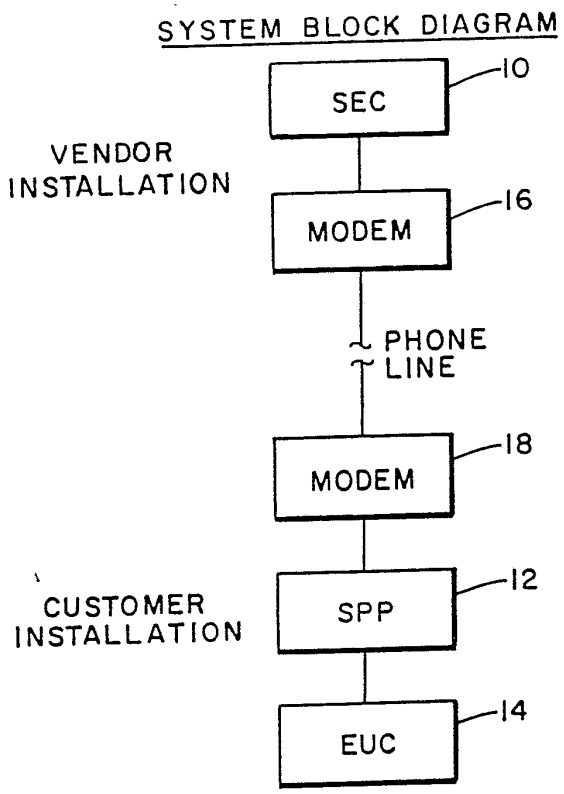
(54) Title: SOFTWARE DISTRIBUTION SYSTEM

(57) Abstract

A system for distributing copies of computer software provides inherent protection against unauthorized copy of the software. The software distribution system includes three computers: a host (10), a software protection computer (12) and an end-user computer (14). The host computer (10) is under the control of the vendor, and the software protection computer (12) and the end-user computer (14) are located at the customer installation. The software is encrypted in the host computer (10) and then transferred to and stored in the end-user computer (14) after it is registered in the software protection computer (12). The transferred software is encrypted using a unique encryption key. Each copy of a software package generated by the host computer (10) is a unique encrypted version of that software package. When this unique encrypted version of the software package is run on the end user's computer (14) and encounters an encrypted portion of itself, it will suspend normal execution and transfer the encrypted portion to the software protection computer (12). This computer (12) will then decrypt the encrypted portions of the code and return the decrypted portion of the code to the end-user computer (14) where that code is itself executed or allows execution of the program of which it is a part to continue.



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SOFTWARE DISTRIBUTION SYSTEM

BACKGROUND OF THE INVENTION

This invention relates to electronic software distribution and more particularly to a software distribution system in which the distributed software is protected against copying.

Over the past few years, the growth of the software industry has been enormous, and as more and more people purchase personal computers, the industry is expected to continue to grow rapidly. For the most part, purchased software changes hands from a mail order or retail vendor to a customer in some physical form such as a tape, disk or even a printed listing of code. Such physical distribution has resulted in a number of problems with respect to both the mode of distribution and customer servicing as well as with the rights of the creators and publishers of the software which is sold. Principal among the problems is that a large percentage of the software which is sold ends up being illegally copied. Frequently, a purchaser of software will "lend" his copy of the software to a friend who makes a copy for himself. The most obvious result of this unauthorized copying is that the profits of the creator and publisher of the software (who probably have a copyright in the software) are greatly reduced. To make up for these lost profits, the price of the software is maintained at a high level. This sustained high price unfortunately produces an even greater incentive to illegally copy.

Copyright protection, which does provide the creator and publisher of software with legal recourse against the person making the unauthorized copies has, in fact, afforded little or no relief from the problem of copied software. As the copies are often made by individuals for their own use, large-scale policing

of such copying is virtually impossible. On rare occasions, a copier having a large copy resale operation can be caught, but by the time he is caught, many unprotected copies usually already have been distributed. Furthermore, the advent of software rental shops has further limited the copyright owner's ability to protect his rights in the software he owns.

Another problem frequently encountered with software sold over the counter is the need to later distribute revised copies to add new features or to fix errors or "bugs" present in the software. These bugs appear despite rather substantial testing that is performed before a software package is put on the market. These bugs are particularly prevalent in software which has recently entered the market. In order to correct any errors which do appear in the software, a software publisher must recall the disk or tape which contains the faulty software. The problem with correcting errors in this manner is that the software is out of the hands of the purchaser for a number of days, if not weeks, while the exchange and correction take place. Finally, the cumbersome nature of this system discourages the user's updating of his software which often leaves a bad impression of the software publisher's products in the field.

In order to combat the illegal copying of software, the software industry has taken a number of precautions. The various approaches fall under three categories: media protection against copying, use of read-only media and processor serialization.

Media protection against copying refers to making some unique version of the medium containing the software. One type of media protection involves the use of variable-pattern diskettes. Variable-pattern diskettes, however, do not offer a practical solution to the software copying problem since these diskettes depend on a soft format diskette drive and they are

vulnerable to memory copy if the entire program is loaded at once. Furthermore, such variable-pattern diskettes can only be used in a small percentage of the drives currently on the market. Therefore, the software distributed on such diskettes can only be offered to a rather small percentage of the market. Finally, physical alteration of the media, usually by forcing hard errors on the media checked for by the software itself, has been used. This method fails in that hardware checks in the software can be located and neutralized in the software itself.

Another type of media protection against copying involves the use of an operating system override. Such a protection scheme depends on a rather unique operating system which prevents copying of diskettes. The use of an operating system override, however, has not proven to be the answer to the problem either since the altered operating system must be tailored to the particular controller chip of the computer on which it is operating, and the operating system override cannot support use with standard operating systems currently on the market. In addition, any operating system override is vulnerable to an algorithmic solution or "cracking". One variation on the operating system override scheme has the software employ features of the hardware, circumventing the operating system, to check areas on the storage media which the operating system cannot reach. This method can also be defeated by being neutralized in the software itself.

A third type of media protection against copying involves the use of segmented programs in conjunction with variable-pattern diskettes and/or an operating system override. The use of such segmented programs of necessity requires some type of a segment loader to read in the various segments when required. This results in very slow response from a computer utilizing such segmented programs. Furthermore, any loader

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