

CUSTOMIZED INSTRUCTION GENERATOR

Cross reference is made to U.S. Pat. No. 4,591,983 for "Hierarchical Knowledge System."

BACKGROUND OF THE INVENTION

The invention relates to instructions for installing and changing systems, and in particular to the generation of instructions for installing and changing or upgrading systems.

Computer systems are made up of multiple components which a customer may be required to assemble. Sometimes, a customer may desire to expand a computer system, and may be required to add components. The assembly or addition of components usually requires the placing of components in the correct physical position relative to other components and the cabling of the components together. It can be a complex task depending on the number of components making up the computer system.

Prior computer systems have been shipped to customers with instruction manuals for installation and upgrade. The instruction manuals may provide instructions for most of the components of a basic system, and may make reference to further instruction manuals relating to still more components. An example may be seen by looking at personal computers, where one component is the personal computer box containing a system board and a card for interfacing to a monitor. Another component is the monitor, and the customer is required to connect a cable between the monitor and the computer box. If the customer orders a disk drive device, a separate instruction manual may be needed, or a section in the manual for the computer box must be found in order to determine how to install the disk drive. The disk drive may consist of two components, such as a controller card and the drive itself. There may also be a need to set switches in both the system board and the controller card, with the switch setting being dependent on the rest of the components of the system and size of the drive. This procedure can be quite confusing when multiple options must be installed, or replacement components are required. A customer must search for the appropriate manual to determine how to install the option.

New computer systems in the mid range are much more complex to install than the simple example given above. The system may be made up of one or more racks into which a large variety of cards and devices are installed. The number of options available to customers in ordering such systems is so great that no two systems ordered may look alike, and be installable in the same manner. The use of a generic installation guide is not feasible. If an installation guide set forth instructions in order for one such system, installation of another, different system would cause skipping back and forth between sections of the guide during installation. Further, the guide would be extremely large if it provided sufficient detail for one to successfully install all possible varieties of system.

SUMMARY OF THE INVENTION

Customized instructions for a computer system installation or change are generated by an instruction generator program. A system description file describes a desired set of hardware components for the computer system. Each of the components is broken down by the

generator into one or more installation tasks, and the tasks are sequenced in a desired order for installation of the components. The sequence of tasks is then assembled into an installation guide which is customized to each system.

The sequencing of the installation tasks is done by an expert system, which incorporates knowledge of installation experts into a series of rules. The experts have defined a detailed sequence of goals with associated tasks. The expert system sorts on the goals according to the list of desired components. It provides a list of all tasks required, sequenced in proper order.

The installation guide is put together using detailed graphic modules and text modules associated with the tasks, making installation of or change to a system very easy. Line drawings which are modified dependent on the components to be installed are also provided in the installation guide. Since the instructions are specifically tailored to the system which is to be installed or changed, all of the instructions are applicable. The instructions may be followed straight through to completion of the installation or change, thus drastically reducing the time and skill level required to install a system.

Since each task is described using its own graphic and text modules, an engineering change is not nearly as significant an event to the people involved in generating installation instruction manuals. In the past, an engineering change after the manuals were printed would result in either a reprinting of the manuals, or at the least an insert to the manuals. With the present invention, a few modules of text, and or graphics are revised. Since the instructions are generated uniquely for each installation or upgrade, the changes will automatically be incorporated in instructions generated after the changes. Once the system is installed or upgraded, the instructions are thrown away as each further change to the system will be described uniquely in a new set of instructions which is likely much smaller than the original set of instructions. There is no huge stockpile of manuals which need to be changed due to engineering changes.

The detail of instructions is also easily controlled. In one preferred embodiment, a very detailed level of instructions is generated. The graphics modules are very detailed, and are integrated with detailed text modules which refer to the graphics. In testing of instructions generated at this detail, it was found that a person with no prior installation skills could install a system in under an hour, where with prior art instructions some prior skills were usually required to even complete the installation. In further preferred embodiments, the instructions are drastically shortened for those which already have installation skills. One need merely have two sets of text and graphics modules to accomplish a variation in the skill level of the instructions generated.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a block flow diagram of the facilities used to generate a detailed installation guide in accordance with the invention.

FIG. 2 a more detailed block flow diagram of the flow in FIG. 1.

FIGS. 3a through 3c are descriptions of topology file records which describe different types of components.

FIGS. 4a through 4e are descriptions of element description file records, which provide further information describing components.