An Application of the Electric-type Keyboard, Mouse and Monitor Switcher

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Abstract: - In previous research, we used the corresponding theory of micro-chip as the base to develop an Electric-type Keyboard, Mouse and Monitor Switcher (EtKMMS). The proposed EtKMMS device has circumvented the problem of the traditional mechanic switcher and we have obtained some successful results in the simulation tests. In this paper, we implement the proposed EtKMMS in the industrial proceeding control to solve the parallel proceeding problem and demonstrate the proposed device with following special features (i) Less Communication Error; (ii) Less Signals Distortions; (iii) Efficiency of the Switching.

Keywords: - Communication Error, Efficiency Switching, Micro-chip, Signals Distortions.

1 Introduction

Personal Computers (PCs) [1] are one of the most important tools in the world. The applications of PCs have been wildly used in many fields, such as, the business, industrial, agricultural, education,…,etc. Since the computer technologies grown-up, PCs play an important role in the proceeding control of the automatic production system. There are some interface input/output (I/O) facilities in PC, such as keyboard, mouse and monitor and these interface I/O facilities are the basic devices of PC, the users can use the keyboard to input the commands to PC, use the mouse to switch the operations mode of two opened window in PC and use the monitor to examine the simulation results of the program in PC. In general, there is one set of interface facilities (keyboard, mouse and monitor) in one PC to process and examine the states of every step in one proceeding control, but if there are many proceeding control included in one pack job, therefore there are too many keyboards, mouse and monitors needed in the generation line. For example, if there are four sub processing procedures included in an automatic generation system and every processing procedure should have one set of PC to handle the job, hence there should have Four sets of PCs needed to process the job. Therefore, there will have four sets of interface facilities (keyboards、mouse and monitors) needed in the generation line In the other worlds, there are Twelve interface facilities needed for the engineers to handle the job. These interface facilities sometime occupy the room of the generation line. One very interesting question strike to the author, can the numbers of these four sets of interface facilities (keyboards、mouse and monitors) be shorten? Or, is that possible for engineers to use only one set of the interface facilities (keyboard, mouse and monitor) to operate and control four sets of PCs? Nowadays, the micro-chip technologies have become more mature, the distributed control is a trend in industrials. The distributed processes and managements technology are already been used for the Large scale Computer. However, PCs are still of the type with the single processor and one set of interface facilities (keyboard、mouse and monitor). Several papers that are concerned with the Interface Layer in PC, such as, the multi-functions of the Monitors [2]-[9]; the performance of Processors in PC [10]-[18], and the corresponding Interface card used to upgrade the performances of PC [19]-[31]. However, there are few documents related to how to use the technology of micro-chip to design an electric switch controller which using one set of interface facilities (keyboard, mouse and monitor) to control many PCs (not only one PC, could be three or four). The traditional Switchers [32] are of the type of mechanic, the component of the Switchers is mechanic material, there are two major defects in the Mechanic Switcher (i) Communication Error: the reason of the Communication Error is the mechanic material of the Mechanic Switcher cannot tolerant the high frequency transmission; (ii) Signals Distortions: the reason of the Signals Distortions is the exhaustion and wrecking of the mechanic material used in Mechanic Switcher during the frequent operation. (iii) Slow speed of the Switching: the reason is the

mechanic material used in the Switcher. In previous research [33], we use the corresponding theory of micro-chip as the base to develop an Electric-type Keyboard, Mouse and Monitor Switcher (EtKMMS). This device has circumvented the problem of the traditional mechanic switcher and we have obtained some successful results in the simulation tests. In this paper, we implement the proposed EtKMMS in the industrial proceeding control to demonstrate the following special features (i) Less Communication Error; (ii) Less Signals Distortions; (iii) Efficiency of the Switching. The paper is organized in the following manner; Section 2 reviews the proposed EtKMMS. In Section 3, we implement the proposed EtKMMS in the industrial proceeding control and demonstrate the attractive features of the proposed device. Finally, we make a brief conclusion in Section 4.

2 Reviewing of the EtKMMS

For the purpose to overcome the problems of the traditional Mechanic Switchers, we use the corresponding technologies of micro-chip to design an Electric-type Keyboard, Mouse and Monitor Switcher. The system structure block diagram of the proposed EtKMMS is shown in Figure 1. The PS/2.CONNECTING PORT [34] in every Personal Computer is used as the Input/Output Ports of the connection. There are four major Units in the EtKMMS stated in the following: (i) The Micro-chip Processing Unit; (ii) The Control Unit; (iii) The Analog signals Multi-channel Switching circuit Unit; (iv) The Image signals Switching circuit Unit. And we will have detailed descriptions in the following.

2.1 The Micro-chip Processing Unit

The micro processor used in this paper to design the EtKMMS is the Mc89C51 [35]; the numbers of the micro-chip Mc89C51 in the Micro-chip Processing Unit are depended on the numbers of PCs be controlled (operated) by one set of the interface I/O facilities (keyboard, mouse and monitor); in this paper, we call this interface I/O facilities set as the "Standard I/O Device (keyboard, mouse and monitor)". For example, in Fig. 1 there are four PCs will be controlled by one set of the interface I/O facilities (keyboard, mouse and monitor), therefore, there should have four micro-chip Mc89C51 to handle the signals processing. The major job of the micro-chip Mc89C51 is to monitor and detect the connections between the EtKMMS and the PCs during the operation, as well as the interface I/O facilities (keyboard, mouse and monitor). It should be noticed that every micro-chip Mc89C51 are been in charge of the Control Unit.

2.2 The Control Unit

There is one micro-chip Mc89C51 in the Control Unit. The Control Unit of the EtKMMS handles the whole situations of the Switching mode; the input devices (keyboard and mouse) and the output device (monitor) are included in the Control Unit. If the Control Unit receives the "Command" from the EtKMMS of which the switching operation mode to another PC, the Control Unit will send the "Switching Command" to the Micro-chip Processing Unit to execute the transferring operation; in the other words, the specified (selected by the users) PC will be operated (controlled) by the "Standard I/O Device (keyboard, mouse and monitor)". The hardware interface of the Control Unit of the EtKMMS is the "Image Switching Circuit" which is controlled by another Micro-chip Mc89C51.

2.3 The Analog signals Multi-channel Switching circuit Unit

The function of the Analog signals Multi-channel Switching circuit Unit [36] is stated in the following: After received the "Switching Command" from the Control Unit of the EtKMMS, the "Analog signals Multi-channel Switching circuit Unit" uses the PS2 connecting Port to switch the "Commands" of the original PC operated by the "Standard I/O Device (keyboard, mouse and monitor)" at the present time into the specified (selected by the users) PC.

2.4 The Image signals Switching circuit Unit

The function of Image signals Switching circuit [37] is stated in the following: After received the "Switching Command" from the Control Unit of the EtKMMS, the "Image signals Switching circuit Unit" uses the PS2 connecting Port to transfer the image signals of the original PC operated by the "Standard I/O Device (keyboard, mouse and monitor)" at the present time into the specified (selected by the users) PC.

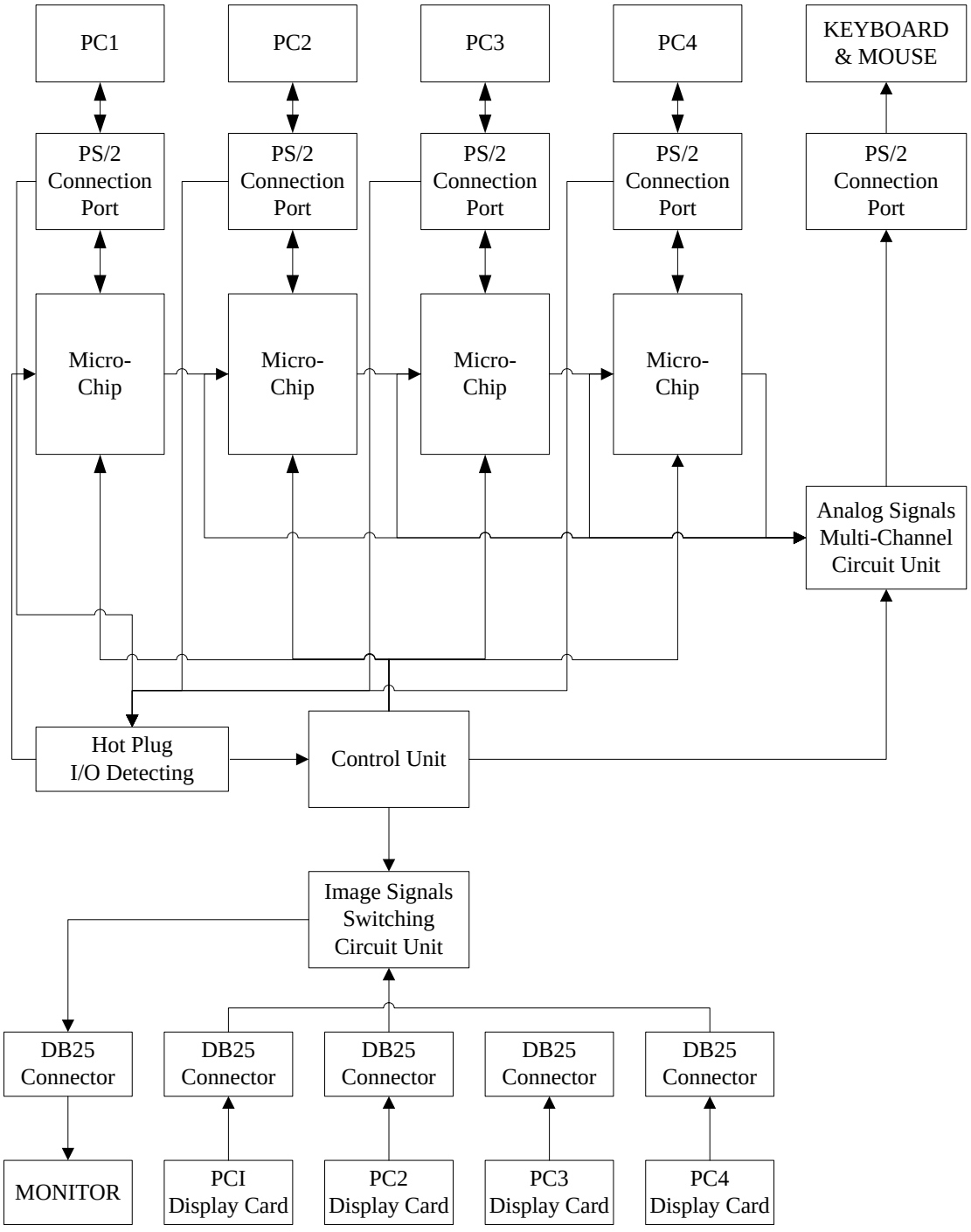

Fig. 1 System structure block diagram of the EtKMMS

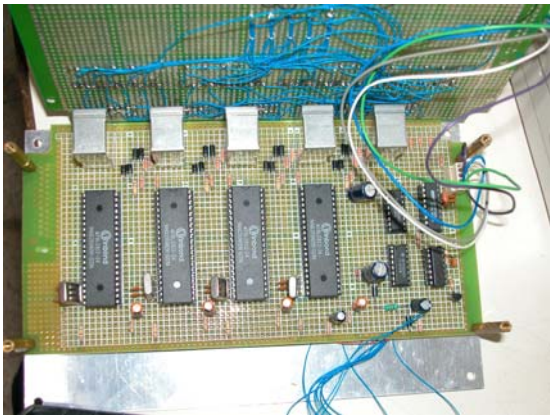

Fig. 2 Hardware Circuit of the EtKMMS

Fig. 3 Prototype of the EtKMMS

3 The Implementation of the proposed EtKMMS in the Industrial proceeding Control

First of all, we will describe the testing of the EtKMMS in the industrial proceeding control. Subsequently, we use the proposed EtKMMS to monitor the proceeding step in solving the state estimation problem [38] in every PC.

The testing operation procedure of the proposed EtKMMS is stated in the following:

Stage 0: One set of "Standard I/O Device (keyboard, mouse and monitor)", Four sets of PCs with the PS/2 PORT and every PC with Two PS/2 extension Lines (one is for the Keyboard and the other is for the Mouse), the proposed EtKMMS.

Stage 1: Making the necessary connections of the "Standard I/O Device (keyboard, mouse and monitor)", Four sets of PCs and the proposed EtKMMS.

Stage 2: Power on the Four sets PCs and check every PC of the Four sets of PCs are on the normal situation (the PCs are on the WINDOWS 98, 2000 or XP Screen), the object of this Stage is to check whether the connection between the "Standard I/O Device (keyboard, mouse and monitor)", Four sets of PCs and the proposed EtKMMS are NORMAL connection.

Stage 3: Using the Keyboard of the Standard I/O Device to change the STATUS of the Four sets of PCs (such the PC1 is of the CAPS LOCK situation and the PC2 is of the NUM LOCK situation, PC3 is playing the video, and PC4 is of the GAME mode). The object of this Stage is to check whether the "Standard I/O Device (keyboard, mouse and monitor)" can MEMORY the different "STATUS" of the different PCs.

Stage 4: Plug out the connections between the "Standard I/O Device (keyboard, mouse and monitor)" and the proposed EtKMMS and Plug in again. The object of this Stage is to check whether the proposed EtKMMS with the function of the "HOT Plug in and out" of the proposed EtKMMS with the "Standard I/O Device (keyboard, mouse and monitor)"

Stage 5: Plug out the connections between One Specified PC called PC*d* and use the EtKMMS to switch the operation mode to the PC*d* and check whether the PC*d* is ENABLE. The object of this Stage is to check whether the proposed EtKMMS with the function of the detection between the EtKMMS and the PCs.

Stage 6: Replace the tradition Mouse of the "Standard I/O Device (keyboard, mouse and monitor)" with the newly 3D type Mouse and use the proposed EtKMMS to switch to some specified PC and operate the 3D type Mouse in Z Axis direction. Furthermore, change the 3D type Mouse back to the tradition Mouse. The object of this Stage is to check whether the proposed EtKMMS with the function of supporting the 3D type Mouse and check whether the proposed

EtKMMS with the function of memorizing the different kinds of Mouse.

The Implementation testing system and the PCs Network

The IEEE 118-bus system is used for the application system and we assume the IEEE 118-bus system consists of four subsystems, and we also set up a dedicated PC network with four PCs. The corresponding data of the state estimation problem in the IEEE 118-bus system of each subsystem are stored in the corresponding PC in Network.

We will make several tests in monitoring the different status of the four PC in solving state estimation problem in the IEEE 118-bus system using the proposed EtKMMS to switch the control mode and demonstrate the proposed EtKMMS with the ability to monitor the industrial distributed proceeding control procedure.

4 Conclusions

In this paper, we implement the proposed EtKMMS in the industrial proceeding control to solve the parallel proceeding problem and demonstrate the proposed EtKMMS with the following special features (i) Less Communication Error; (ii) Less Signals Distortions; (iii) Efficiency of the Switching.

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