Design and Implementation of The Computer’S Main Structure with Waterproof and Moisture-Proof Function

Jianhu Gong1,*

1School of Data and Computer Science, Guangdong Peizheng College, Guangzhou 510830, P.R. China

*Corresponding author e-mail: gjhlunwenyxy@peizheng.edu.cn

Abstract. In order to prevent the harm caused by high air humidity to the computer, a series of structures, such as exhaust parts, lower shell, support legs, water baffle, filter parts, air inlet parts and waterproof shell, are set in this paper to solve the waterproof and moisture-proof problem of the main structure in the computer hardware system.

Keywords: filter parts; exhaust parts; air inlet part; waterproof and moisture proof

1. Introduction
With the increasing popularity of computer applications, when people use computers for office work, if water drips into the chassis from the upper end of the chassis carelessly, the components will be short-circuited or even burned when the water entering the chassis covers them. In addition, when the indoor and outdoor air humidity is too large or too small, it will affect the main structure of the computer hardware system. When the relative humidity exceeds 80%, the excessive humidity in the air will erode the chip and cause damage to the electrical components; However, when the relative humidity is lower than 20%, electrostatic interference will be generated, which will also cause computer misoperation. In order to prevent components from being damaged due to water molecule erosion, this paper proposes a technical solution of the computer’s main structure with waterproof and moisture-proof function [1].

2. Method

2.1. Design of waterproof and moisture-proof chassis
In order to realize the above functions, the waterproof and moisture-proof chassis structure proposed in this paper includes exhaust parts, lower shell, water baffle, filter parts, air inlet parts and waterproof shell. In the main chassis structure, the left and right sides of the lower shell are fixedly connected with flexible parts, and the filter parts are inserted and connected with the lower shell, then the filter parts are attached and connected with the flexible parts; At the same time, the right
inner wall of the lower shell is fixedly connected with an exhaust piece, and the left inner wall of the lower shell is fixedly connected with an air inlet piece, then the left and right outer walls of the lower shell are fixedly connected with a water baffle and a waterproof shell. The upper part of the lower shell is fixedly connected with the upper cover, and the bottom of the lower shell is fixedly connected with supporting feet which are distributed at four corners of the bottom of the lower shell in a rectangular array. The filter comprises a first filter cloth, a pressing cover, a connecting sleeve, an abutting sleeve and a second filter cloth. The upper part of the abutting sleeve is sleeved with a second filter cloth, and the abutting sleeve is inserted and connected with the connecting sleeve. The upper part of the connecting sleeve is sleeved with a first filter cloth, and the connecting sleeve is inserted and connected with the pressing cover. The exhaust part comprises exhaust fan blades, a first motor, an exhaust casing, a first bolt, a first plug and a first connecting wire, wherein the inner wall of the exhaust casing is fixedly connected with the first motor, and the output shaft of the first motor fixedly connected with the exhaust fan blades. The exhaust shell is fixedly connected with the lower shell through a first bolt, the side surface of the exhaust shell fixedly connected with one end of a first connecting line, and the other end of the first connecting line fixedly connected with a first plug. The air inlet part comprises an air inlet fan blade, a second motor, a second connecting wire, a second plug, an air inlet shell and a second bolt, wherein the inner wall of the air inlet shell fixedly connected with the second motor, and the output shaft of the second motor fixedly connected with the air inlet fan blade. The air inlet shell is fixedly connected with the lower shell through a second bolt, the side surface of the air inlet shell fixedly connected with one end of a second connecting line, and the other end of the second connecting line fixedly connected with a second plug [2–4].

2.2. Technical program of specific implementation

The specific implementation mode is shown in Figure 1-4. In the main structure of the computer, it includes an exhaust part 2, a lower shell 3, a water baffle 5, a filter part 6, an air inlet part 7 and a waterproof shell 8. The lower shell 3 is the shell of the device, which is used to assemble the main parts of other parts, with flexible pieces 9 fixedly connected to its left and right sides. The filter element 6 is inserted and connected with the lower shell, with the filter element 6 attached and connected with the flexible element 9, wherein the flexible element 9 is an intermediate between the lower shell 3 and the filter element 6, which can make the insertion of the filter element 6 and the lower shell 3 more secure. In addition, the flexible member 9 can effectively fill the gap between the filter 6 and the lower shell 3, so as to improve the sealing performance between the filter 6 and the lower shell 3. The filter 6 can block and filter the water molecules in the air to prevent the main structure of the computer from getting wet. An exhaust member 2 is fixedly connected to the right inner wall of the lower shell 3, which is used to exhaust the airflow in the lower shell 3. The left inner wall of the lower shell 3 is fixedly connected with an air inlet 7, which can suck the outside airflow into the lower shell 3. The left and right outer walls of the lower shell 3 are fixedly connected with the water baffle 5 and the waterproof shell 8, which can effectively prevent the water sprayed from the outside from contacting the filter element 6, so as to effectively guarantee the service life of the filter element 6. The upper part of the lower shell 3 is fixedly connected with the upper cover 1, which can seal the upper part of the lower shell 3. The bottom of the lower shell 3 is fixedly connected with a foot 4, which can support the lower shell 3, so that the bottom of the lower shell 3 keeps a proper height with the ground, thus preventing the bottom of the lower shell 3 from being eroded by the ground moisture and ensuring a good ventilation effect at the bottom of the lower shell 3. The legs 4 are distributed at the four corners of the bottom of the lower shell 3 in a rectangular array, so that they have better stability when supporting the lower shell 3. The filter 6 includes a first filter cloth 10, a pressing cover 11, a connecting sleeve 12, an abutting sleeve 13 and a second filter cloth 14. The abutting sleeve 13 is a member for engaging the second filter cloth 14 with the connecting sleeve 12, and the second filter cloth 14 is sleeved on its upper part. The second filter cloth 14 can filter and block water molecules in the air, and the abutting sleeve 13 is inserted and connected with the connecting sleeve 12, which is a part of the filter element 6 used for connecting
with the lower shell 3 and also a main part of the filter element 6. The upper part of the connecting sleeve 12 is sleeved with the first filter cloth 10, which has the same function as the second filter cloth 14, and can further enhance the filtering and blocking of water molecules in the air. And the connecting sleeve 12 is inserted and connected with the pressing cover 11, which is used for fixing the first filter cloth 10 on the connecting sleeve 12. The exhaust part 2 includes an exhaust fan blade 15, a first motor 16, an exhaust housing 17, a first bolt 18, a first plug 19 and a first connecting wire 20. The inner wall of the exhaust housing 17 is fixedly connected with the first motor 16, which is a main part of the exhaust part 2 and is used for fixing the first motor 16. The output shaft of the first motor 16 is fixedly connected with the exhaust fan blade 15, which can drive the exhaust fan blade 15 to rotate. The exhaust fan blade 15 can generate airflow vortex driven by the first motor 16 to blow out the airflow in the lower shell 3. The exhaust housing 17 is fixedly connected with the lower casing 3 by a first bolt 18 that is a component for fixing the exhaust casing 17 to the lower casing 3. The side surface of the exhaust casing 17 is fixedly connected with one end of a first connecting wire 20, one end of which is electrically connected with the first motor 16, and the other end of which is electrically connected with the first plug 19. The air inlet 7 includes an air inlet fan blade 21, a second motor 22, a second connecting wire 23, a second plug 24, an air inlet housing 25 and a second bolt 26. The air inlet housing 25 is the main part of the air inlet part 7, which is used to fix the second motor 22, and its inner wall is fixedly connected with the second motor 22 that can drive the intake fan blades 21 to rotate. The output shaft of the second motor 22 is fixedly connected with an air inlet fan blade 21, which can generate an airflow vortex driven by the second motor 22 and suck the external airflow into the lower shell 3. The air inlet housing 25 is fixedly connected with the lower housing 3 by a second bolt 26, which is a component for fixing the air inlet housing 25 to the lower housing 3. The side surface of the air inlet housing 25 is fixedly connected with one end of the second connecting wire 23, one end of which is electrically connected with the second motor 22 and the other end is electrically connected with the second plug 24 [5–7].

3. Experiment

Before use, the exhaust part 2 and the air inlet part 7 are inserted and connected with the computer main structure through the first plug 19 and the second plug 24, so that the computer main structure can output electric energy to the exhaust fan part and the air inlet part 7 through them. The first plug 19 and the second plug 24 transmit electric energy to the first motor 16 and the second motor 22 through the first connecting line 20 and the second connecting line 23, so that they can drive the exhaust fan blades 15 and the inlet fan blades 21 to rotate. The exhaust fan blades 15 blow out the air inside the lower shell 3 when rotating, while the air inlet fan blades 21 generate air vortex when rotating to suck the outside air into the lower shell 3, so that the air inside the lower shell 3 can be circulated with the outside through the exhaust part 2 and the air inlet part 7. The first filter cloth 10 and the second filter cloth 14 in the filter part 6 can block and filter the water molecules in the air when the air exhaust part 2 and the air inlet part 7 circulate, thereby effectively filtering the water molecules in the outside air, so as to prevent the outside moist air flow from entering the lower shell 3. The filter part 6 is coated by the water baffle 5 and the waterproof shell 8, so as to prevent the first filter cloth 10 and the second filter cloth 14 in the filter part 6 from being wetted by water accidentally splashed from the outside, thereby ensuring the normal use of the filter part 6. At the same time, the foot 4 provided at the bottom of the lower shell 3 can support the lower shell 3 to keep a proper height with the ground, thus preventing the bottom of the lower shell 3 from being eroded by the moisture of the ground [8–10].
Fig 1. Schematic diagram of waterproof and moisture-proof chassis

Fig 2. Schematic diagram of filter part structure
4. Results

Compared with the existing technology, the waterproof and moisture-proof chassis proposed in this paper makes the lower shell circulate with the outside air through the air exhaust and air inlet devices, thus effectively reducing the temperature in the lower shell, ensuring the normal operation of the chip in the computer main body mechanism and reducing the probability that the chip in the computer main body structure is burned by excessive temperature. The water molecules in the humid air are blocked and filtered by the first filter cloth and the second filter cloth in the arranged...
filter part, so that the water molecules in the humid air are effectively prevented from entering the lower shell, and components in the computer main structure are prevented from being eroded and damaged by the water molecules in the humid air, thereby reducing the failure probability of the computer main structure and prolonging the service life of the computer. The filter can be coated by the water baffle and waterproof, thus effectively avoiding the impact of water droplets splashed from the outside on the filter cloth, ensuring the service life of the first filter cloth and the second filter cloth, prolonging the maintenance interval of the device, reducing the overhaul times and saving a lot of later maintenance costs. The lower shell is propped up by the set supporting feet, so that the lower shell keeps a proper distance from the ground, and then the bottom of the lower shell can not be eroded by the moisture of the ground. It can be known from the above description that the device solves the problems raised in the background technology through a series of structures [11].

5. Conclusion
In this paper, a series of structures, such as exhaust part, lower shells, supporting legs, water baffles, filter part, air inlet part and waterproof shells, are set up, thus solving the problems that the chips in the main structure of the computer hardware system are often short-circuited and burned due to dripping water droplets covering the components, or the chips are eroded by excessive humidity in the air, thus causing the computer to malfunction and seriously shortening the service life of the computer.

References
[1] Rong-Jong Wei, Jia-Ming Chang, Intelligent control of induction servo motor drive via wavelet neural network, Electric Power Systems Research, Volume 61, Issue 1, 28 February 2002: Pages 67~76.
[2] Martin France, Dominique Dubet, Sebastian Karmic and Lionel Petit, Electronic and software control for rotary pyrometer, Sensors and Actuators A: Physical, Volume 121, Issue 2, 30 June 2005: 462~471.
[3] Chin-Wen Chuang and Liang-Cheng Shin, CPLD based DIVSC of hydraulic position control systems, Computers & Electrical Engineering, Volume 30, Issue 7, October 2004: 527~541.
[4] Fuzhou Han, Shinya Wachi and Masanori Kunieda, Improvement of machining characteristics of micro-EDM using transistor type repulse generator and servo feed control, Precision Engineering, Volume 28 Issue 4, October 2004: 378~385.
[5] S.R Turncock and A.M. Wright, Directly coupled fluid structural model of a ship rudder behind a propeller, Marine Structures, Volume 13, Issue 1, January 2000: 53~72.
[6] Application of Multivariable Control Theory to Aircraft Control Laws. Final Report: Multivariable Control Design Guidelines. NASA Technical Report, AD-A31:52~59.
[7] Congyan. Analysis of computer hardware maintenance problems. Wireless Internet technology, 2012 (02): 30~31.
[8] Liu Xin. On computer software and hardware maintenance skills. Oriental enterprise culture, 2011 (14): 102.
[9] Huang Yefei. Computer maintenance and management. Han Yanlong. Digital technology and application. 2015 (05).
[10] Sun Xiaoru. Research on routine maintenance of computer system. China new communications, 2013 (21).
[11] Yang Shifu. On the maintenance of microcomputer system. New technology and new products in China, 2013 (15).