

100 Questions on PSU

V 1.0

Abstract: in this manual, knowledge-related questions met during product sales are sorted to five parts, namely fundamentals, technical standards, system components, trouble shooting and product applications. 100 questions are provided totally, which strive to be popular and comprehensive. This manual is an interactive open system and we will select typical questions to enrich it consistently. This manual is for internal employees or for training of agents only, and please keep it secret.

Fundamentals

1. What are the basic operating principles of PC power supplies?

Answer: The input AC is converted to DC required by PC through the high-frequency switching technique.

2. What is the work flow of PC power supplies?

Answer: When the AC power is supplied, the undesired high-frequency noise and ripple will be removed first through choke and capacitor, and then HVDC will be obtained through rectification and wave filtering. Then the DC will be converted to high frequency AC through the switching circuit, which will be sent to the high-frequency switch transformer for voltage reduction. Then the high-frequency AC portion will be filtered, and relatively pure low voltage DC will be output for PC ultimately.

3. What is the primary function of EMI circuit?

Answer: The primary function of EMI circuit is to remove undesired noise and ripple from the electric network, and prevent the high frequency generated by the power switch circuit from influencing the electric network.

4. What are the characteristics of passive PFC?

Answer: The passive PFC usually adopts the method of inductance compensation to promote the power factor through reducing the phase shift between the fundamental current and voltage of AC input, but the power factor of the passive PFC can but reach 0.9, and the thermal value is relatively bigger.

The boot-strap and close down is realized through PW-OK circuit. For standby, PW-OK will output power supply self-checking signals of zero level to the mother board, and the computer will stop working and assume the standby state. After PW-OK is initiated, it will jump from 0 power level to +5V hundred of milliseconds after the output voltage stabilization of the switching power supply, and it then outputs high-level signals to the motherboard, which are corresponding to the PG signals of AT power supply. The motherboard will start the system after detecting such signals. During the operation of the computer, if the AC fails or the computer is

shut down suddenly, PW-OK signals will disappear at least one millisecond before the +5V output voltage of ATX switching power supply, notifying the mother board to trigger the self-closing of the system before power failure, lest the system be damaged due to sudden power down..The conducted interference is used to measure the electronic jamming signals sent from electronic products to the whole electric network during the course of operation. All electronic products will emit undesired signals to the electric network during operation, which may influence the power utilization quality of the electric network and the normal running of other electric appliances. Therefore, most countries have set a rigid indicator of conducted interference and products with bigger conducted interference are not allowed to be produced or sold.

5. What is rectification and filtering circuit?

Answer: the rectification and filtering circuit is composed of rectifiers and capacitors and inductors, which is used to convert AC to DC.

6. What are the principles of the switching circuit?

Answer: the switching transistor and PWM (pulse width modulation) control chip will form an oscillatory circuit to generate high-frequency pulse, which will convert the HVDC generated by high voltage rectification and filtering circuit to high-frequency AC. The high-frequency AC will be transferred to the second side by the main transformer, and will be convert to DC there.

7. What is the function of auxiliary power supply circuit?

Answer: The DC will become high frequency AC through the switching transistor , and outputs two groups of alternating voltages through the transformer. One way will output +5VSB through rectification and three-terminal voltage stabilizer, which will be exerted on the main board to be the standby voltage; the other way will output an auxiliary +20V power through rectification and wave filtering, which will be supplied to PWM and so on. With the auxiliary power supply circuit, the computers can realize boot-strap or closedown with software.

8. What is PFC?

Answer: PFC (Power Factor Correction) is mainly used to characterize the utilization efficiency of electric power by electronic products. A higher power factor indicates a higher utilization efficiency of the electric power. PFC can be divided into two types: one is passive PFC and the other is active PFC.

9. What are the characteristics of active PFC?

Answer: The input voltage of the active PFC ranges could be from 90v to 270v; the high power factor is higher than 0.999, and it is featured in low-loss; the ripples of the output DC are quite small.

10. What are major items for power supply test?

Answer: the major items include cross load, surging, input voltage, ripple noise, output short circuit, overload, conversion efficiency, harmonic distortion, response time, timing sequence, noise, conduction and radiation, leakage current, high and low temperature test, etc. The above indicators are an integrated standard for judging whether a power supply is of a high quality or not, and it is not enough to judge a power supply from single indicators, such as output, noise, etc.

11. What is surge current?

Answer: The surge current refers to the peak current flowing into the power supplies at the moment of power on, which is much higher than the steady-state current as the input wave filtering capacitance is charged quickly. The power supply should restrict the surge level sustained by AC switch, rectification bridge, safety fuse and EMI wave filter. Switch on and off the loop repeatedly, and AC input voltage should not damage the power supply or lead to blowout of the fuse.

12. What is the conversion efficiency?

Answer: during the operation of the power supply, some electrical energy is converted to heat and is lost, so the power supply must reduce the heat loss to the most. The conversion efficiency is the value obtained through dividing the output power by the power input.

13. What is the difference between power factor and conversion efficiency?

Answer: Both refer to the utilization factor of power supplies, but they are greatly different from each other. To put it simply, the losses generated by power factor is shouldered by the power department, while the losses of conversion efficiency is assumed by users. It is observed that the power factor and EMI are both for the protection of the state electric network.

14. What is the rated power?

Answer: the rated power refers to the maximum load of the power supply during stable and continuous operation, which represents the real load capacity of a power supply. For instance, the rated power of a power supply is 300W, which means that the total load can't exceed 300W during continuous working all year around. In fact, the power is provided with certain margin, for instance, the power supply whose rated power is 300W can work normally at 310W, but this case should be avoided.

15. What is the OPP?

Answer: Besides the rated power, there is an indicator called overpower protection, OPP for short. The OPP means that the power supply will be off automatically when the power load rises to a certain point, lest the power supply or other parts of the computers be damaged due to over current. OPP value is usually 1.3 times of the rated power, and it is unsafe to set it too high. There is an interval between the rated power and OPP, for instance, the rated power of a new power supply is 300W, the OPP is 370W, then the interval between 300-370W is a blind spot.

16. What are the operating principles of temperature-control power supplies?

Answer: the temperature control circuit is mainly realized through the thermistor. The supply voltage of the fan is about 7V when the power supply starts to work, and the fan speed will be promoted by and by along with the internal temperature increment, value reduction of the thermistor and the increase of fan voltage. In this way, the internal temperature of PC can keep a lower level. The silence can be achieved with light load, and the heat elimination can be guaranteed even with heavy load. Therefore, the temperature-control power supplies are more scientific and safer than the manual-regulated power supplies.

Technical Standards

1. What is the development history of switching power supplies for computers?

Answer: the development can be divided into 3 stages, namely AT, ATX and ATX12V. AT was presented by IBM when it put forward PC/AT, which provides +5V, - 5V, +12V and - 12V as well as hard switch. ATX is of an epoch-making significance, which realizes the soft boot-strap and closedown, as well as wake-up from remote network, and +3.3V, +5VSB output is added. ATX12V is the product along with the development of hardware, CPU for instance, which promotes +12V output capability.

2. How many versions of ATX12V Standard are provided?

Answer: ATX12V Standard has 5 versions, namely, 1.0, 1.1, 1.2, 1.3 and 2.0. -5V is cancelled from Version

3. What is the mainstream version of power supply now? How about its characteristics?

Answer: the present mainstream version is 1.3, which promotes the +12V output capability to meet the development of CPU and graphic cards. In addition, the minimum conversion efficiency is promoted to 70% from 68%, which reduces the heat of the power supplies greatly.

4. What are the new features of ATX12V 2.0?

Answer: ATX12 V2.0 further enhances the +12V output capability, and adopts twin-channel +12v, wherein +12v1 powers the peripheral equipment and +12v2 powers CPU specially. In addition, 24PIN primary power interface is adopted to meet the demand of PCI Express 16X and DDR2. The typical load transfer efficiency is preferred to be 70%.

5. Is BTX a power supply standard?

Answer: BTX is a general term of the system architecture, including the case structure, main board layout, air passage, etc. Power supplies adapted to BTX structure also conform to ATX12V Standard, such as CFX12V and LFX12V. The former is suitable for Micro BTX and the latter for Pico BTX.

6. Why is BTX put forward since ATX is so popular now?

Answer: the reason for BTX release is just for heat elimination. The air passage of ATX is just like an "S" written reversely, namely from the hard disk to chip set, CPU and the fan of power supply, and this way of heat elimination is not effective. BTX adopts an enclosed air passage in a straight line, and the CPU, chip set, video card and memory are all in this air passage, thus the heat elimination becomes more effective. In the future, the BTX will become more advantageous along with the promoted power consumption of CPU.

7. What is SFX?

Answer: SFX is a power supply standard for MicroATX, and is the same as ATX12V basically. Now the up-to-date version is 3.0. SFX is provided in more sizes for selection by users, such as 100*50*125, 100*(63.5+17.1)*125(LW2168), 125*(63.5+17.1)*100, 100*63.5*125(HK280-41EP\LW2156) , 150*86*101.4 (PS3 HK280-25AP)

8. What are the differences and common ground between SSI and EPS?

Answer: SSI refers to the basic architecture of the server system, and it provides the server system with power supply standard. In accordance with the operating environment and application scale, the SSI power supply specifications can be divided into following specifications: TPS (Thin Power Supply) , EPS (Entry Power Supply), MPS (Midrange Power Supply) and DPS (Distributed Power Supply). EPS is only one of the SSI specifications. Actually, with the release of ATX12V Version 2.0, there is almost no difference between ATX and EPS, except that EPS demands higher reliability.

9. What does 1U power supply mean?

Answer: U is a measurement unit in the industrial system. Due to the large space occupation of tower servers, the cabinet servers are put forward. The cabinets have standard size, the width is 19" and the height adopts U as the unit (1U is equal to 1.75"). That is to say 1U power supplies are power supplies for 1U servers. Of course, they are also extensively applied to industrial computers besides the servers. The 1U power supplies are 106mm or 100mm wide and 40mm high. In similar manner, 2U refers to servers that are 3.5" high.

10. What is redundant power supply?

Answer: The redundant power supply is a kind of power supply for servers, which is composed of two or more power supplies of the same type that are controlled by chip for load balancing. When one power supply goes wrong, another one will take over its work instantly and after a new power supply is added, both will work coordinately. The redundant power supply is used to realize the high usability of server system. It is applied extensively to servers and disk array system, for instance, HK400- 21PER is a redundant power supply.

11. What is the corresponding standard of Huntkey LW- 9126?

Answer: besides the aforesaid ATX12V and SFX12V, there is still another power supply standard not frequently used, namely TFX12V. T represents Thin. This power supply is suitable for super small cases, and is of a lower power. Correspondingly, BTX specifications also have a thin power supply, that is LFX12V.

12. What is the 240VA limit?

Answer: the output of any channel of the power supply can't be over 240VA for safety, that is for every output current multiple voltage should not be exceeded 240VA. A higher load capacity can be realized through two-way or multi-way output. The product can't be UL certified if failing to meet the above requirement, and this is a cause for the adoption of two-way +12v by power supplies Version 2.0.

System Components

1. What is the power consumption of CPU?

Answer: both INTEL and AMD have publicized the power consumption of their CPU, which is actually the maximum power dissipation within the range of normal temperature. For instance, TDP of P4 560 is 115W/72.8 °, namely the maximum temperature sustained by the CPU surface is 72.8 ° when TDP is 115W. Refer to Appendix 2 for details.

2. How do we know the power consumption of graphic cards?

Answer: The data on power consumption of graphic cards is not so detailed as compared with that of CPU. Generally, we verify whether the power consumption is more than 46W according to whether auxiliary power supply is provided, and the power consumption will be greatly increased during 3D acceleration. Graphic cards without auxiliary power supply are mainly powered by +3.3v, and those with auxiliary power supply are mainly powered by +12v. Refer to Appendix 3 for details.

3. What is the power supply for the up-to-date CPU?

Answer: a more powerful +12v output capability is required as the power consumption of CPU is high. If graphic card without external power supply is used together, power supply whose rated power is above 250W is recommended, and if video card with external power supply is used, power supply whose rated power is above 300W is recommended.

4. The power supply connector of 915/925 chipset is 24 pin, while my power supply is 20 pin, what can I do?

Answer: Intel Version 2.0 power supplies are recommended for 915/925 motherboard, and the old power supplies are also workable through the 20-24 conversion wire. (Or two pins can be left unused, but this way is not recommended)

5. Why is auxiliary power supply required for AGP graphic cards over 46W?

Answer: because the maximum power provided by AGP interface is 46W, including +5V/2.0A, +3.3V/6.0A,

+12V/1.0A, +3.3Vaux/0.375A and 1.5V/2.0A.

6. Is the power consumption of NV 6800 video cards 120W?

Answer: it is 120W according to authoritative data. It is found through practical test that the power consumption of GeForce6800 Ultra is as follows: 2D: +5V/1.86A, 9.3W, +12V/1.97A, 23.64W, 23.64W in total; 3D: 3Dmark2003, +5V/3A, +12V/4.5A, 70W in total. The power consumption of ATI X800 that is put forward at the same time is about 67W.

7. Which channel is used to power the video cards with external power supply?

Answer: mainly +12v and +5v, and +12v is preferred. The up-to-date NV45 video cards are only provided with +12V.

8. Recently, there are many reports on LGA775, so what does LGA775 mean?

Answer: LGA775 is a CPU platform, namely the socket of CPU on the motherboard. The platform has gone through a series of changes, for instance, Intel CPU has Slot 1, Socket 370, Socket 478, LGA775, etc. and AMD CPU now has Socket 462, Socket 754, Socket 939, Socket 940, etc.

9. What is the double-CPU system of AMD?

Answer: Opteron is a X86 - 64 instruction set CPU put forward by AMD in April, 2003, namely the so-called 64-bit system, which adopts dedicated Socket 940 platform. "Opteron is originated from Latin optimus, and is divided into one way, two ways and eight ways. The main difference between Opteron processor and Athlon 64 processor is the quantity of Hyper Transport connections built in the chip. Athlon 64 processor contains one HyperTransport connection, providing 6.4 GB/s data transmission rate, while Opteron processor could offer three connections. The buffer of such two processors is also different from each other.

Trouble Shooting

1. Does a higher source power result in a bigger noise?

Answer: generally, the wind-cooled power supplies will get hot along with the power promotion, thus a bigger air flow is required to reduce the internal temperature. In particular, power supplies whose rated power is 300W and above will lead to a bigger noise due to heat emission, but the noise will not be more than the normal value of noise, 40 dB. The noise generated by the 12CM and 14CM quiet power suppliers of Huntkey is under 28 dB.

2. Why does the noise of power supplies become bigger in winter?

Answer: Generally, power supplies adopt self-lubricating bearing fans, and there will be a bigger noise in low temperature due to the lowered efficiency of lubricating oil. After the operation for a period, the noise will be lowered due to the heat generated by friction. The operating temperature range of power supplies is 0- +40°C and don't work beyond the range.

3. Why does the noise increase after the power supplies have operated for a period?

Answer: it is quite normal, as most power supplies contain self-lubricating bearing fans, whose lubrication performance will be affected by the volatilization of lubricating oil and dust.

4. How to judge the noise of power supplies?

Answer: the correct way is to judge the noise of power supplies at a place 50 CM to the air outlet, which is also the standard check method of INTEL. Some clients move their ears near to the fans when checking the power supply noise of 12" and 14" fans, while this influences the air passage and will lead to inaccurate noise.

5. Does power supplies with ball-bearing fans have a smaller noise than those with sleeve fans?

Answer: Better ball-bearing fans have a longer serviced life and high cost than sleeve fans, but it has not been proved that ball-bearing fans have a lower noise than sleeve fans.

6. Why are the keyboard and mouse still on after the computer is closed down?

Answer: it is due to the BIOS setting of the motherboard and is quite normal. The standby circuit of the power supply is in the working mode so long as the power line is not cut, even the computer is closed down. In addition, there are also some working circuits on the motherboard.

7. Why are the power supplies hot slightly after the computer shut off?

Answer: The standby circuit of the power supply is in the working mode so long as the power line is not cut, even the computer is closed down. The power of standby circuit may reach 10W, which leads to slight heat. Users are suggested to switch off the outlet when the computers are out of service.

8. Is it normal that the PC casing is hot after the power supplies have worked for a long period?

Answer: first of all, it is quite normal, and the main thermal source is PFC inductance. The PFC inductance eliminates the heat by dint of the framework and machine case, which will not lead to the temperature rise of the overall system. In order to protect the system, a simple way can be adopted, namely checking whether the CPU temperature is normal or not. If the CPU temperature is usually below 60 °, it shows that the temperature of the power supply has no influence on the system.

9. Why is electric current sound heard sometime?

Answer: it is normal, as PFC circuit can generate electromagnetic vortex sound of industrial frequency.

10. Is the system halt upon normal closedown of the power supply due to the power supply?

Answer: it may be due to the software problem, such as damage of the exit Windows sound file, quick closedown, APM, failed exit of some programs or Windows loopholes.

11. What is the normal working temperature of CPU?

Answer: the CPU working temperature is related with its model. According to authoritative data, the AMD temperature refers to the core temperature, which is 85 - 95 °, while the INTEL temperature refers to the surface temperature, about 68-75 °. Actually, the temperature tested on the motherboard is lower than this

value, and it is normal so long as the CPU temperature is not more than 60 °. Of course, it is quite important to adopt a better CPU cooler.

12. Why does the performance of CPU fall after overfrequency? Is it due to under supply?

Answer: usually not. There is a TCC inside P4 CPU, namely the heat control circuit, which can adjust the CPU performance according to the CPU temperature automatically.

13. Is the freaky display caused by the video card due to power supply?

Answer: no, it may be due to the quality of the video card, in addition, it, or even blank screen, may occur when the video card or CPU is overfrequency, which can be settled through adjusting the resolution, number of colors and refresh rate or reset after lowering the frequency. Furthermore, this may happen if the video card has poor heat elimination or different types of memory are mixed in use.

14. The fan moves a little upon boot-strap, but stops at once, and it becomes normal after reset, why?

Answer: it is due to the big leading load of the motherboard. As we know, there are many capacitors on the motherboard, which are equal to storage batteries. Upon boot-strap, the capacitors will be charged first, and if the power required for charging is over the power of the power supply due to big leading load, the power will assume automatic protection, thus reset is needed.

15. My computer, equipped with low-level hardware, can't be started now, but it is ok after a new power supply is adopted, while my power supply is workable in other computers, why?

Answer: it is usually due to the compatibility with the motherboard, and there is something wrong with the cooperation between the PWR_OK delay signal and the response time of the motherboard. The delay signal of the power supply and motherboard is 100ms- 500ms, and boot-strap problems may happen if the cooperation is not good or beyond this scope. In this case, the best way is to change a new power supply.

16. My computer beeps continuously after boot-strap, is it power failure?

Answer: it is usually due to the problems of the video card and memory. Different beep sounds have

different meanings and different BIOS manufactures provide different definitions, refer to Appendix 1 for details.

17. After my computer is plugged in, it starts before the POWER key is pressed, why?

Answer: this may happen in quite a few cases. First of all, check the motherboard BIOS setting, Power Management. The "Restore ac power loss" should be disabled. If the setting is ok, it is due to the motherboard or power supply, namely the interference generated at the moment of AC cut-in leads to misjudgement of the major loop and finding whether the problem is due to the motherboard or the power supply with the exclusive method.

18. What is the normal working temperature range of the power supplies?

Answer: 0°C to +40°C (In full load, the maximum temperature change rate is 5°C/10m and not more than 10°C/h). In the non-operating state, it is - 40°C- +70°C (the maximum temperature change rate is 20°C/h).

19. Why is my computer case electrified?

Answer: it is due to the imperfect earthing of the casing, so the computer must use three-phase supply wire and outlet. Few buildings provide earthing wire for safety, so the earthing end of computer supplies is useless even it is connected to the commercial power. So, it is to be noted that the earthing body must be connected with the ground electrically. It is not realistic to leading the conductor to the earth for people living in storied buildings, thus we may connect the iron wire used as conductor to the tapping pipe. Now some buildings are provided with special ground wire, which is better.

20. Why is the plug board said to be the first barrier of computers?

Answer: the plug board is of great significance for the power supply, and some problems regarded to be resulted from power failure are due to the plug board actually, for instance, unpitched sound of the sound box, ripples on display, and the frequent restart of the computer due to poor contact or oxygenation of the leaf-spring of the plug board. Actually, the plug board is the first barrier of computers besides power supply, and a good plug board is capable of lightning protection, overvoltage protection and overcurrent protection.

21. What should be paid attentions to during use of plug board?

Answer: The computer should use a plug board by itself lest other electric appliance make a difference on the computer. The commercial power must be cut off when the computer is out of use, which can save the power and prevent damage of the power supply and the standby circuit of the motherboard due to sudden rise of the voltage during nighttime. The plug board should be replaced at once when it is found to be too hot, tight, loose or when there are eclectic sparks.

22. The system always halts during 3D game playing, while it is normal in 2D mode. Is it due to the power supply?

Answer: It is usually due to the high temperature of CPU resulted from poor heat elimination, for instance, that the system halts time after time after having operated for 10-20 minutes is a typical problem caused by the poor heat elimination of CPU. Therefore, heating radiator and heat-conductive silicon gel of famous brand should be adopted to strengthen the heat elimination, or more fans can be added.

23. What factors should be paid attentions to when a modification is requested?

Answer: individualized products are the trend of DIY market, which must be guided and followed under the precondition of keeping our uniqueness. We must pay attention to the reasonableness of modification and whether the modification conforms to the safety regulations and brings values to consumers. The individualization will add to the cost, which must be considered when a modification is demanded.

Product Applications

1. What are the characteristics of power supplies with 12 or 14 CM fans?

Answer: the noise of power supplies with 12Cm fans is greatly reduced due to the lower fan speed. The heat elimination is better directly from CPU. For 14cm power supply , the speed of the fan could be decreased in further step and the CFM could be increased instead.

2. Why are the output wires of the power supply in different sizes?

Answer: the wire size is regulated according to the American Wire Gauge, and those for power supplies mainly include No. 16, No. 18, No. 20 and No. 22, and a smaller number indicates a bigger wire diameter. In accordance with the technical requirement, No. 18 is generally adopted, but +3.3V of the 11PIN requires No. 22, the floppy drive requires No. 20.

3. How to enable output of the power supply without being plugged to the motherboard?

Answer: apply short circuit of the green wire with any black wire, and plug in for operation. This is a simple way to check whether the power supply is normal or not.

4. What is the normal variation range of the output voltage?

Answer: Positive voltage $\pm 5\%$ and negative voltage $\pm 10\%$, namely +5V/4.75-5.25, +12V/11.4-12.6, +3.3V/3.14-3.47, +5VSB/4.75-5.25, -12V/10.8-13.2.

5. How to work out the power consumption of computers?

Answer: An authoritative formula is: power consumption of computer = power consumption of all components exclude CPU * 0.8+CPU power consumption. The computer components are divided into five parts: CPU, memory, graphic card, peripheral equipment, main board and others, wherein the main board and others are relatively stable, including the main board, sound card, network card, USB devices, keyboard, mouse, system fan, etc, whose power consumption is 60-70. Refer to the attached table for the power consumption of CPU and video card. The power consumption of each piece of 128M memory is about 8W, and that of peripheral

devices is about 15-25W according to the rating plate. Refer to Appendix 4 for details.

6. How many heat elimination modes are provided for power supplies?

Answer: the heat elimination of power supplies is mainly realized through fans. There are 8CM and 12CM fans according to the diameter, and new 14CM fans have just put forward. The heat elimination modes include heat elimination from top, heat elimination from tail and heat elimination with double fans.

7. How many types of fans are provided according to the bearing?

Answer: sleeve and ball bearing and double-ball bearing. In addition, some manufacturers have patented products, such as the magnetic suspending fans of SUNON.

8. Can PC power supplies be applied to industrial computers?

Answer: generally speaking, the application of industrial computers is stricter than PC, especially in some special industries. For instance, the disqualified ripples, noises and leakage current may affect the result of monitoring and output during medical service. Certain graphic field has a higher demand for the output of certain channel, for instance, +3.3V. While now the industrial computers are developing towards PC, so the application of PC power supplies to industrial computers can be realized after strict testing.

9. CFM is commonly seen, so what is its meaning?

Answer: CFM (Cubic Feet per Minute) is the most direct performance indicator of fans, which is bigger if the fan is bigger and rotation speed is faster. Yet, a higher speed may result in a bigger noise. In addition, there are also such indicators as static wind pressure, noise and fan speed. The unit of static wind pressure is Pascal, and a bigger wind pressure means a better heat elimination result.

10. What are the unique features of the mainstream power supplies of Huntkey?

Answer: now the features of each existing product are summarized to one sentence:

LW6300-LW6400: Standard power supply with a high performance/price ratio, which is popular due to strong stability.



LW6300H-LW6400H: Mainstream quiet power supply.

LW6300HP-LW6400HP: Mainstream quiet power supply popular in European countries where PFC is enforced.

HK300 13BP-HK400-13BP: Wide voltage design 90V-265V, active PFC, high efficiency, and high-end power supply popular in European countries where PFC is enforced.

HK56011PEP-HK650 11PEP: High-power server power supply, compliance with EPS12V Standard, active PFC and wide voltage design.

HK300-11UAP/HK350-11UAP/HK450-11UAP: 1U power supply conforming to SSI EPS1U V2.1.

HK400-13CP: External power supply for 40" LCD TV.

Version 2.0 power supply: comply with Intel 2.0, and mainstream power supply for the future market.

Appendix 1 BIOS Beep Codes Descriptions

Award BIOS:

1 short: Normal start-up

2 short: Routine test failure. Solution: reset BIOS

1 long, 1 short: RAM or main board failure

1 long, 2 short: Display or video card failure

1 long, 3 short: Keyboard controller failure

1 long, 9 short: FLASH RAM or EPROM error, BIOS damaged

Beep without stop (long beep): loose or damaged memory

Beep without stop: poor connection of the power supply and between display and video card

Repeated short beeps: power supply failure

No sound and no display: power supply failure

AWI BIOS:

Beep Code Descriptions

1 short DRAM refresh failure

2 short Parity circuit failure

3 short Base 64K RAM failure

4 short System timer failure

5 short Process failure

6 short Keyboard controller Gate A20 error

7 short Virtual mode exception error

8 short Display memory Read/Write test failure

9 short ROM BIOS checksum failure

1 long, 3 short Conventional/Extended memory failure

1 long, 8 short Display/Retrace test failed

Phoenix BIOS:

- 1 short: Normal start-up
- 1-1-1: Initialization failure
- 1-1-2: Faulty Motherboard
- 1-1-3: CMOS read/write failure
- 1-1-4: ROM BIOS checksum error
- 1-2-1: Programmable interval timer failure
- 1-2-2: DMA initialization failure
- 1-2-3: DMA page register read/write failure
- 1-3-1: RAM refresh verification failure
- 1-3-2: Conventional memory error
- 1-4-1: Address line failure first 64k RAM
- 1-4-2: Parity failure first 64k RAM
- 1-4-3: EISA timing sequencer error
- 1-4-4: EASA NMI port error
- 2- _ _ : Faulty Memory
- 3-1-1: Slave DMA register error
- 3-1-2: Master DMA register error
- 3-1-3: Master interrupt processing register error
- 3-1-4: Slave interrupt processing register error
- 3-2-4: Keyboard controller Test failure
- 3-3-4: Video card memory error
- 3-4-2: Display failure
- 3-4-3: Search for video ROM in progress
- 4-2-1: Timer tick interrupt in progress or failure
- 4-2-2: Shutdown test in progress or failure
- 4-2-3: Gate A20 failure

4-2-4: Unexpected interrupt in protected mode

4-3-1: RAM test in progress or failure>ffffh

4-3-3: Interval timer channel 2 test or failure

4-3-4: Time of Day clock test failure

4-4-1: Serial port test or failure

4-4-2: Parallel port test or failure

4-4-3: Math coprocessor test or failure

Compatible BIOS:

1 short: normal system

2 short: POST failure

1 long: power failure. Video card error if no display

1 long; 1 short: main board failure

1 long; 2 short: video card failure

1 short, 1 short, 1 short: power failure

3 long, 1 short: keyboard error

Appendix 2 CPU Power Consumption

Table I INTEL

Core	Name	Frequency Hz	Power (W)
willamette	Celeron 4	1.7G-1.8G	66.1
northwood	Celeron 4	2.0G-2.2G	52.8-57.1
prescott	Celeron D	2.8G	73
willamette	P4	1.3G-2.0G	48.9-71.8
northwood	P4	1.8G-2.6G	49.6-63.6
northwood	P4 (FSB 100MHz)	2.2G-2.8G	56.0-68.4



northwood	P4	3.0G	81.8
prescott	P4	2.8G-3.2G	89-103
prescott	P4	3.4G-3.6G	115

Note: the power consumption of CPU before P4 is less than 30W.

Table II AMD

Core	Name	Frequency Hz	Power (W)
	Duron	1400-1800	57
Barton	Athlon XP	2500+-3200+	68.3-76.8
Socket 754	Athlon 64/FX	2800-3400	89W
	Athlon MP	1000-12000	46.1-54.7
	Athlon MP	1500+-2100+	60-66
	Athlon MP	2000+-2600+	58.2-60
Barton	Athlon MP	2800+	60
Socket 940	Opteron		84.7

Data Source: Toms Hardware.

Appendix 3 Power Consumption of Mainstream Video Cards

Unit: Watt.

Maker	Model of Video Chip	2D Power Consumption	3D Power Consumption
NV	5950 Ultra		(73)
	GeForceFX 5900 Ultra	18	69
	GeForceFX 5900	13	59(65)
	GeForceFX 5800	32	70-73
	5700 Ultra		(50)
	5700		(40)
	5600 Ultra	14	33(45)

	5600XT		(35)
	5600	13	24(38)
	5200 Ultra	8	31(33)
	5200/128M	4	22(26)
	5200/64M	8	13
	GeForce4 Ti4600	28	50
	GeForce4 Ti4200	20	39
	GeForce3 Ti200	10	19
	MX440		(30)
ATI	9800XT		(75)
	Radeon 9800 Pro	38	73
	9800SE		(52)
	Radeon 9700 Pro	22	48
	9600XT		(42)
	9600PRO	7	23(38)
	9600	4	15(33)
	9600SE		(30)
	Radeon 9500 Pro	02	39
	9200		(28)
	9200SE		(25)

Data Source: TOM Hardware. The data in brackets is from other sources and for your information only.