

**eagle1008 心电监护仪故障维修一例 (An example of
troubleshooting for eagle1008 ECG monitor)**

DOA, make the hero tears collar. Book chizhe paper will work,
art chizhe technology will yield. The waves between the river
and the sky surge into the wind and the earth. Not just romantic
eloquence wins, taste the longest without words. An army may
be deprived of, man can not be deprived. An example of EAGLE1008
ECG monitor troubleshooting Post By:2006-2-24 10:05:00

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Abstract: the most prominent problem that bothers medical
equipment maintenance personnel at present is that there are
only manual manuals and almost no technical drawings for
imported large medical equipment. This paper mainly introduces
the EAGLE1008 ECG monitor fault produced by the maintenance,
and combining years working experience, how to adopt flexible
maintenance method according to the fault phenomena and
equipment on the circuit board that to solve the problem, talk
about a few experience.

ECG monitor; troubleshooting; troubleshooting; experience

EAGLE1008 is the MarquetteHelligeGmbhEAGLE1008 portable ECG
monitor produced by American GE company. The instrument

integrates ECG, respiration, SPO2 and NIBP measurements, and is mainly used for the monitoring of critically ill patients. Here is a breakdown of maintenance.

Fault phenomenon: after the boot screen is very dark, dimly visible waveform, press the button on the screen are able to respond properly. It is difficult to observe and adjust the panel contrast knob with little change.

Fault analysis: the machine has no wiring diagram and is displayed by lcd. In order to facilitate quick maintenance, and then to the GE company China engineering consulting, get the answer is that the LCD screen aging, need to send back to the engineering department to replace. This machine is used for a year and a half of the aging possibility is very small, I had maintenance of LCD power supply are similar, so think it is possible that the peripheral circuit of the LCD screen is caused by fault, then to determine their own maintenance.

Troubleshooting:

(1) open the main cover, remove the NIBP blood pump control panel, visible LCD peripheral circuit is connected by 3 socket with the motherboard, carefully check the lead 3 socket were not broken and abnormal.

(2) measure the power supply to the motherboard +15V with a multimeter. Since the waveform display and the panel buttons can work, the CPU control circuit of the motherboard and the amplifying drive circuit of the LCD screen are considered normal, without considering the AMP amplification and driving

the circuit before the 14 pin sockets.

(3) the next view other 2 LCD screen and motherboard connected socket, one of the conducting strip socket, the socket opened at both ends of the clip, remove the socket after the electricity conducting strip, equipment, can not boot and panel key failure. Enter the key position beside the LCD screen by viewing the conduction, due to remove the LCD screen is very difficult, think this is a socket panel button and transmission power switch wire socket. After that, the power is resumed and the power is switched on normally. The trouble is the same as before. It is considered that the fault is independent of this circuit.

(4) to check out another motherboard with a liquid crystal display with two AE socket, electricity, respectively, with a multimeter, AC and DC maximum gear, gear measuring AE minimum plug is 0V, unplug the AE plug screen no change.

So I think this may be caused by the input voltage of the LCD high voltage generating circuit. Because there is no circuit diagram, we decided to look for the circuit before the socket.

(5) found 2 lead wires of AE socket, one after another 10K resistance grounding, root into the motherboard of a fixed welding small printed circuit board OUT1 terminal, carefully check the OUT1 at both ends of the element, found that cross connected with a high voltage capacitor at both ends of OUT1, its voltage is 2kV from this, can determine whether this is high output, low input power instead of generating high pressure.

(6) in order to prove the correctness of the judgment, to further look at the small printed circuit board logo, there are "HIGHVOLTAGE" and "DANGER" word, so more to determine the printed board for LCD screen high voltage generation circuit.

(7) the small printed circuit board is welded with the main board through 4 pins, one end of which is the 2 pins of the VIN and the ground, and the other is the 2 pins of the OUT1 and the ground. The +5V voltage is measured between the VIN and the ground using a multimeter, while the OUT1 is between 0V and ground. By observation, the small printed circuit board is composed of 2 D965 transistors, inductors, L, capacitors, C and transformer oscillation circuit, and through the high voltage capacitor output between the OUT1 and the ground. There is no high voltage output, and there is a +5V operating voltage, indicating the fault in the oscillation circuit.

(8) since the small printed circuit is an independent circuit which is welded with the main board through the 4 pins, it is decided to repair the small printed circuit board with +5V power supply. Power down and measure the static voltage of the triode, and prepare the circuit diagram of the small printed circuit board high voltage generating circuit. When measuring one transistor base voltage is 0V, the base is connected with a resistor R1, a voltage measuring resistance at the other end of the +5V, doubts the resistance welding resistance is bad, measured with color ring according to its judgment resistance is 240 ohms, instead of using the same resistance, electricity and hissing up vibration noise, output AC voltage 1100V. After the welding is resumed, the ECG monitor is restored to normal.

Conclusion and experience: this fault is due to high voltage generation, the circuit can not provide high voltage to the LCD screen, so that the LCD screen is very dark and can not be monitored properly. Through the analysis of the above fault, by the method of exclusion of the maintenance, have the following experience: with the continuous development of medical science and technology, analog electronics, digital circuit, computer, sensor technology, automation and intelligent control technology has been used in high-tech medical equipment field, and almost all countries not only random circuit diagram. The operation manual, coupled with a lot of land, municipal hospitals in the purchase of large imported medical equipment, do not pay attention to technical training of medical engineering technicians, medical engineering technicians repair caused great difficulties. In this case, medical engineering technicians should do so:

(1) to constantly strengthen their own cultural knowledge, professional and technical learning, to understand the latest developments in technology and medical equipment.

(2) when the new imported large medical equipment fails, it is better to consult with the after sales Engineering Department of the telephone and equipment to avoid detours and to gain time for maintenance.

(3) in the maintenance of equipment, according to the theory of knowledge and the individual tips board on their own and use elements and element value, voltage value, current value of insurance reasoning judgment, fault analysis and then verified,

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Gradually narrowing the scope of failure, when the fault is determined in a very small range, the working point of the voltage waveform and into action, the static measurement, unable to identify the cause of the malfunction, can the local circuit doubt according to wire circuit board drawing circuit are analyzed, and finally achieve the purpose of troubleshooting.

In the maintenance of many large imported medical equipment, the use of the above method has achieved good results.

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Shun your spirit and strike his laziness. The mountain is not high, there is an immortal name; the water is not deep, there are Long Zeling. The fallen flower, in gloomy mood, Speechless