

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

INVALIDITY CLAIM CHART Invalidity of U.S. Patent No. 9,651,320 in view of Nakamura

Japanese Patent No. 4,511,444 (“Nakamura”) was filed on October 26, 2005, and was published on July 28, 2010. Nakamura therefore qualifies as prior art to the '320 patent under, at least, (pre-AIA) 35 U.S.C. § 102(a) or (b). Nakamura anticipates and/or renders obvious (in combination with the knowledge of a person of ordinary skill in the art) the Asserted Claims of the '320 patent, at least as Dell understands Cloud Byte’s application of the Asserted Claims in an effort to show infringement.

To the extent Cloud Byte argues that any element below is not disclosed by Nakamura, a person of ordinary skill in the art would have found it obvious to combine the teachings of Nakamura with the background knowledge of a person of ordinary skill in the art and/or the additional references, and exemplary teachings, set forth in Dell’s Invalidity Contentions and accompanying charts and/or in Appendix E.

The chart below provides representative examples of where each element of each claim is found within Nakamura. Citations are meant to be exemplary, not exhaustive, and Dell reserves the right to identify and discuss additional portions of the reference in support of its contentions and/or to rebut arguments made by Cloud Byte. Citations to figures, drawings, tables, and the like include reference to any accompanying or related text. All internal cross references are meant to incorporate the cross-referenced material as if fully set forth therein. Where Dell states that Nakamura “discloses” a limitation, that disclosure may be express, implicit, and/or inherent.

It is Dell’s position that Cloud Byte’s Infringement Contentions have not established that any accused product or service infringes any valid claim. Thus, Dell’s statements below should not be treated as an admission, implication, or suggestion that Dell agrees with Cloud Byte regarding either the scope, construction, or interpretation of any of the Asserted Claims or the infringement theories advanced by Cloud Byte in its Infringement Contentions, including whether any Asserted Claim satisfies 35 U.S.C. §§ 101 or 112. Nothing in this chart is intended to suggest that Dell agrees with Cloud Byte’s application of any claim element, suggest a proposed construction at this stage of the case, or suggest that construction is needed, as the parties are not required to exchange terms for construction or propose claim constructions until a later date.

Cloud Byte has yet to identify any limitation of the Asserted Claims that it contends is not anticipated and/or rendered obvious by Nakamura. Dell therefore expressly reserves the right to respond to any such contention, including by identifying additional obviousness combinations, if Cloud Byte makes any such contention. This chart is subject to all reservations, objections, and disclaimers in Dell’s Invalidity Contentions and any amendment, supplement, or modification thereof, which are incorporated herein by reference in their entirety.

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

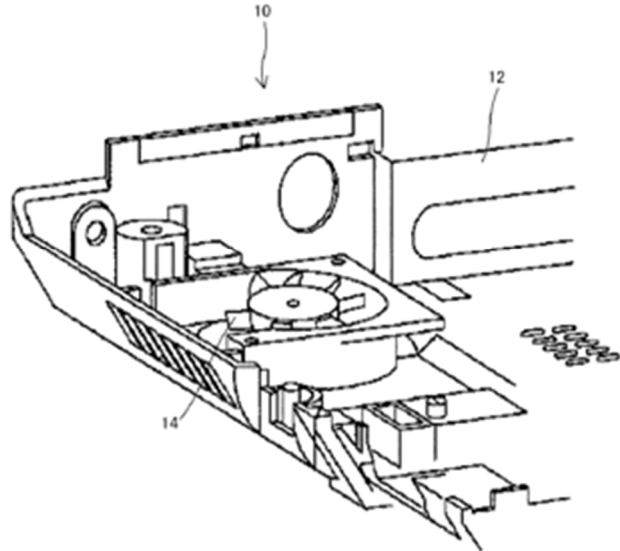
Asserted Claims	Nakamura
<p>[1.pre] 1. ICT (information and Communication Technology) equipment having an electronic component, the ICT equipment comprising:</p>	<p>Dell takes no position in these Invalidity Contentions on whether the entirety of the preamble of this claim limitation. To the extent it is a limitation, Nakamura discloses, expressly and/or inherently, ICT (information and Communication Technology) equipment having an electronic component, the ICT equipment.</p> <p><i>See, e.g.:</i></p> <p>Nakamura at Fig. 1 and accompanying text:</p> <p>[FIG. 1]</p>  <p>Nakamura at Fig. 2 and accompanying text:</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

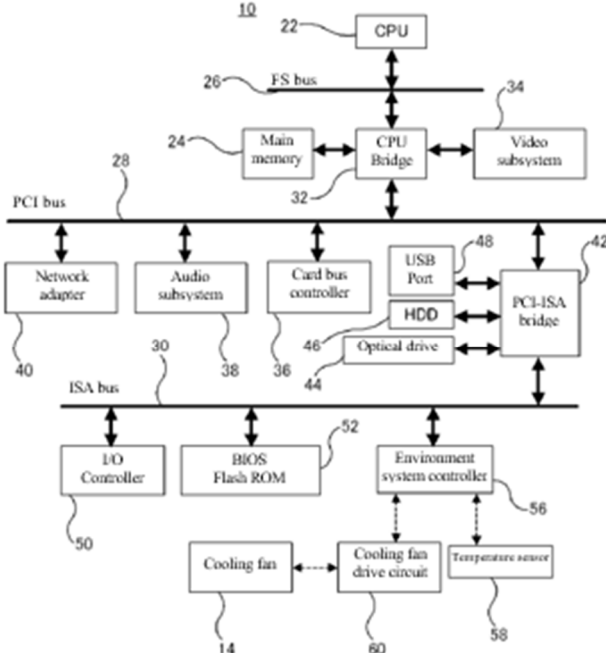
Asserted Claims	Nakamura
	<p data-bbox="682 261 779 289">[FIG. 2]</p>  <p data-bbox="653 1062 919 1089">Nakamura at [0001]: The present invention relates to a control scheme for a cooling fan for evacuating generated heat from the interior of an electronic device enclosure, particularly to a control scheme for reducing the noise generated by such a fan.</p> <p data-bbox="653 1247 1877 1422">Nakamura at [0002]: Electronic devices such as computer systems comprise electrical components inside an enclosure, including boards (substrates) on which various LSI chips such as CPUs are mounted, storage devices such as hard disks, power supply units, and input/output devices, where the respective electrical components generate heat during operation. The specifications for these</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>electrical components define certain temperature ranges to guarantee proper operation. CPUs in particular generate a large amount of heat and are susceptible to serious damage if used continuously outside their specified temperature range. Therefore, electronic devices are provided with cooling fans to evacuate heat generated in the interior of the enclosure to the exterior of the enclosure in order to maintain the interior temperature of the enclosure within a certain temperature range.</p> <p>Nakamura at [0005]: Techniques have been disclosed for controlling personal computer cooling fan rotation while maintaining sufficient cooling capacity without causing discomfort to humans. For example, patent document 1 discloses a technique for controlling cooling fan rotational speed to within a range that is not unpleasant to human ears, based on temperature variation patterns of the object of cooling. Patent document 2 discloses a technique for controlling cooling fan rotational speed to prevent sudden changes, making operating sound changes less noticeable to human ears. Patent document 3 discloses a technique for controlling cooling fan rotational speed using fuzzy logic.</p>
[1.a] a cooling fan;	<p>Nakamura discloses, expressly and/or inherently, a cooling fan.</p> <p><i>See, e.g.:</i></p> <p>Nakamura at Fig. 1 and accompanying text:</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

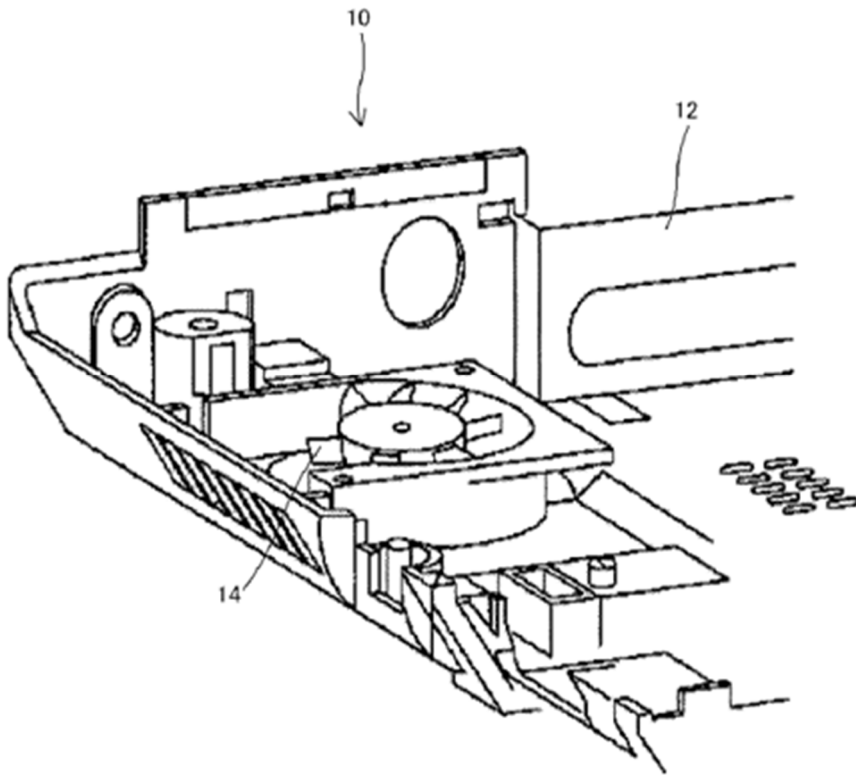
Asserted Claims	Nakamura
	<p data-bbox="724 256 861 300">[FIG. 1]</p>  <p data-bbox="651 1128 1207 1161">Nakamura at Fig. 2 and accompanying text:</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

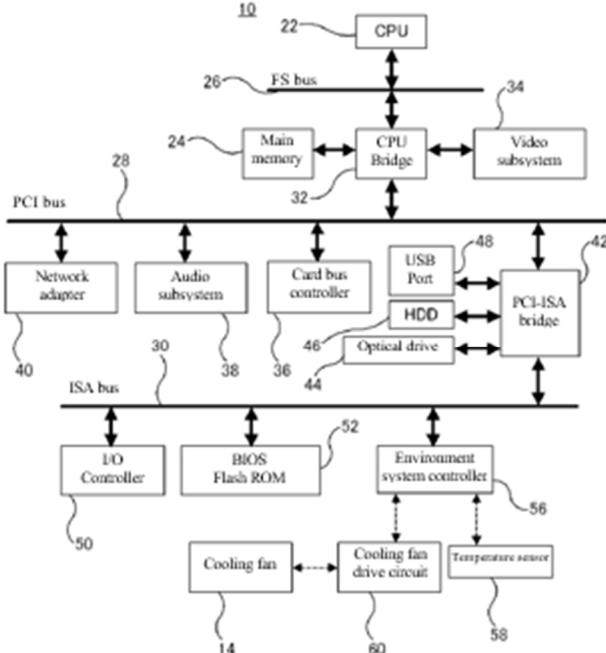
Asserted Claims	Nakamura
	<p data-bbox="682 261 779 289">[FIG. 2]</p>  <p data-bbox="653 1062 1226 1089">Nakamura at Fig. 11 and accompanying text:</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p data-bbox="722 261 898 310">[FIG. 11]</p> <p data-bbox="653 1117 919 1149">Nakamura at [0001]: The present invention relates to a control scheme for a cooling fan for evacuating generated heat from the interior of an electronic device enclosure, particularly to a control scheme for reducing the noise generated by such a fan.</p> <p data-bbox="653 1300 1877 1403">Nakamura at [0002]: Electronic devices such as computer systems comprise electrical components inside an enclosure, including boards (substrates) on which various LSI chips such as CPUs are mounted,</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

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	<p>storage devices such as hard disks, power supply units, and input/output devices, where the respective electrical components generate heat during operation. The specifications for these electrical components define certain temperature ranges to guarantee proper operation. CPUs in particular generate a large amount of heat and are susceptible to serious damage if used continuously outside their specified temperature range. Therefore, electronic devices are provided with cooling fans to evacuate heat generated in the interior of the enclosure to the exterior of the enclosure in order to maintain the interior temperature of the enclosure within a certain temperature range.</p> <p>Nakamura at [0003]: In computer systems, the amount of heat generated by internal electrical components varies depending on the operational state. For example, in the case of a CPU, heat generation increases during high-load processing when executing application software, while during low-load processing, heat generation decreases. Therefore, computer systems are provided with mechanisms to control cooling fan rotational speed according to the interior temperature of the enclosure. The speed control mechanism generally changes the cooling fan rotational speed when the temperature measured by temperature sensors installed in the interior of the enclosure reaches preset reference values.</p> <p>Nakamura at [0004]: As computer systems have become widely used in human living environments and office environments, noise reduction has become an important issue alongside performance improvement, size and weight reduction, and cost reduction. The majority of noise generated by computer systems comes from the operating sound of rotating cooling fans. In particular, notebook computers have seen increased heat generation due to higher CPU clock frequencies, and because of the limited interior space of the enclosure, cooling fans require higher cooling capacity, resulting in higher rotational speeds and consequently louder operating sound.</p> <p>Nakamura at [0005]: Techniques have been disclosed for controlling personal computer cooling fan rotation while maintaining sufficient cooling capacity without causing discomfort to humans. For example, patent document 1 discloses a technique for controlling cooling fan rotational speed to within a</p>

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Asserted Claims	Nakamura
	<p>range that is not unpleasant to human ears, based on temperature variation patterns of the object of cooling. Patent document 2 discloses a technique for controlling cooling fan rotational speed to prevent sudden changes, making operating sound changes less noticeable to human ears. Patent document 3 discloses a technique for controlling cooling fan rotational speed using fuzzy logic.</p> <p>Nakamura at [0006]: FIG. 11 shows cooling fan rotational speed control and change in interior temperature of the enclosure of a computer. Cooling fan rotational speed control is carried out by changing the cooling fan rotational speed when the temperature measured by a temperature sensor installed in the interior of the enclosure reaches a preset temperature value. For example, in the cooling system described in FIG. 11, the cooling fan rotational speed can be switched between three levels - high speed, medium speed, and low speed, with a total of three set temperature values 505, 507, and 509 being set at the boundary between high speed rotation and medium speed rotation, at the boundary between medium speed rotation and low speed rotation, and at the boundary between low speed rotation and stop. When a computer transitions to a low-load state after being operated in a high-load state, the interior temperature of the enclosure changes as shown by line 501, represented by a dotted line. As the interior temperature of the enclosure drops below the set temperature values 505 and 507 due to decreased heat generation, the state of the cooling fan, which had been rotating at high speed in a high-load state, transitions through medium speed rotation to low speed rotation. As the rotational speed of the cooling fan decreases, less heat is evacuated to the exterior of the enclosure, causing the temperature drop to become more gradual. The rotation of the cooling fan stops when the measured temperature reaches the set temperature value 509.</p> <p>Nakamura at [0007]: When the amount of heat generated in the interior of the enclosure becomes nearly equal to the amount of heat evacuated to the exterior and the interior of the enclosure approaches thermal equilibrium, the interior temperature of the enclosure can no longer decrease readily and so the rate of temperature decrease stagnates. The temperature value at which the rate of decrease stagnates varies depending on individual differences among computers related to heat generation and cooling, differences in usage environment, and the like. The set temperature value 509 for</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

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	<p>transitioning from low speed rotation to stop is set by experimentally determining a value that will prevent stagnation of the rate of temperature decrease, but due to individual differences, this does not allow stalling to be prevented for all computers in different usage environments. If the set temperature value 509 is made higher to prevent stagnation, the cooling fan will stop before the interior temperature of the enclosure sufficiently decreases, and in some computers, when the load then sharply increases, the cooling capacity tracking response may be too slow, causing the interior of the enclosure to reach a dangerous temperature. As a result, as shown by line 503, represented as a solid line, the temperature value may become stagnated at a value higher than the set temperature value 509.</p> <p>Nakamura at [0008]: In this cooling system, if the rate of decrease of the interior temperature of the enclosure becomes stagnated at a temperature value higher than the set temperature value 509, the cooling fan continues to rotate without stopping. This phenomenon is likely to occur when switching a computer from a high-load state to a temporary standby state, and since the cooling fan continues to rotate even after their work is finished, users find the operating sound that accompanies the rotation of the cooling fan unpleasant. Furthermore, power continues to be wastefully consumed by the rotation of the cooling fan, which is undesirable.</p> <p>Nakamura at [0009]: Therefore, it is an object of the present invention to provide a cooling system that prevents situations where the electronic device cooling fan continues to rotate when the interior temperature of the enclosure has been decreased. It is another object of the present invention to provide a cooling system that can detect the state where the rate of temperature decrease has stagnated before the interior temperature of the enclosure reaches the set temperature value for transitioning from low speed rotation to stop, and can stop the rotation of the cooling fan, reducing both user discomfort from noise and power consumption. It is yet another object of the present invention to provide a cooling method executed by such a cooling system and an electronic device provided with such a cooling system.</p> <p>Nakamura at [0010]:</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>When the rate of decrease of the interior temperature of the enclosure enters a stagnated state, the temperature change over time becomes minimal. In the present invention, when it is determined that the rate of temperature decrease has stagnated while the interior temperature of the enclosure is within a predetermined set temperature range, the cooling fan is stopped. The predetermined set temperature range is set within the range between a second set temperature value at which the cooling fan transitions from a second rotational speed to a first rotational speed, and a first set temperature value at which the cooling fan transitions from the first rotational speed to stop, while the interior temperature of the enclosure is decreasing. When the interior temperature of the enclosure is within the predetermined set temperature range, it means the temperature at which the cooling fan should be stopped has not been reached yet, but the interior of the enclosure is approaching thermal equilibrium, and so there is no risk of the interior of the enclosure reaching a dangerous temperature even if the cooling fan is stopped.</p> <p>Nakamura at [0012]: The set temperature value for transitioning the cooling fan from stop to the first rotational speed when the interior temperature of the enclosure is increasing, and the set temperature value for transitioning from the first rotational speed to stop when the temperature is decreasing are normally made different to prevent the phenomenon of cooling fan chattering, with the former being slightly higher than the latter. By setting the upper limit of the predetermined set temperature range equal to the set temperature value for transitioning from stop to first rotational speed, accurate determination of stagnation state and avoidance of reaching dangerous temperatures can be achieved in a balanced manner.</p> <p>Nakamura at [0014]: Additionally, to stop the cooling fan, the first set temperature value can be temporarily changed to a value higher than the measured temperature value. This method has the advantage of enabling stagnation-based stopping operation while minimizing changes to the control circuit that controls cooling fan rotational speed based on set temperature values.</p> <p>Nakamura at [0015]: When it is determined that the rate of decrease of the interior temperature of the enclosure has stagnated, instead of immediately stopping rotation of the cooling fan, the rotational speed of the</p>

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Asserted Claims	Nakamura
	<p>cooling fan can also be temporarily increased to lower the interior temperature of the enclosure to the first set temperature value before stopping. In this case, although noise temporarily increases due to the increased fan rotational speed, since the cooling fan will subsequently stop, users can recognize that the cooling fan has entered its pre-stop state, and this causes less discomfort than continuous low-speed fan rotation.</p> <p>Nakamura at [0017]: The present invention makes it possible to provide a cooling system that prevents situations where an electronic device cooling fan continues to rotate when the interior temperature of the enclosure has been lowered. Furthermore, the present invention makes it possible to provide a cooling system that can detect a state where the rate of temperature decrease has stagnated before the interior temperature of the enclosure reaches the set temperature value for transitioning from low speed rotation to stop, and can stop the rotation of the cooling fan, reducing both user discomfort from noise and power consumption. Moreover, the present invention makes it possible to provide a cooling method executed by such a cooling system and an electronic device provided with such a cooling system.</p> <p>Nakamura at [0018]: A best mode for carrying out the present invention will be described. FIG. 1 is an enlarged view showing a cooling fan 14 installed in an enclosure 12 of a notebook personal computer system 10 (hereinafter referred to as PC system 10). In this drawing, the enclosure 12 constitutes the lower part of the main body of the PC system 10 in this drawing, which shows a state where only the cooling fan 14 has been installed, without components such as boards, storage devices such as hard disks, power supply units, and input/output devices being installed.</p> <p>Nakamura at [0027]: The BIOS flash ROM 52 is a memory for holding various BIOS programs, and is non-volatile with electrically rewritable memory content. The environment system controller 56 includes an 8-16 bit microprocessor along with RAM, ROM, analog input, timer, digital input/output, etc., and can execute programs related to the operating environment of the PC system 10 without placing excessive load on the CPU 22. The environment system controller 56 also sends control signals for controlling the rotational speed of the cooling fan 14 to the cooling fan drive circuit.</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

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	<p>Nakamura at [0029]: The cooling fan drive circuit generates and supplies voltage at a frequency corresponding to the speed signal received from the environment system controller 56 to the cooling fan 14, changing the speed of or stopping the cooling fan 14. It should be noted that FIG. 2 merely shows a simplified representation of the main hardware configuration and connection relationships to avoid complication of the drawing. Many other electrical circuits and devices are necessary to configure the PC system 10, but since these are well known to those skilled in the art, detailed mention will not be made of parts other than those constituting the essence of the present invention.</p> <p>Nakamura at [0030]: The hardware configuration of the PC system 10 described above does not particularly differ from that of a general PC system. Furthermore, the shape and structure of the cooling fan 14 and the electrical configuration related to the control of the cooling fan 14 do not particularly differ from those generally used for heat evacuation from the interior of an enclosure 12 of a personal computer. The main components of the cooling system according to the present invention are implemented by means of a temperature control program stored in the ROM of the environment system controller 56 and executed by the processor of the environment system controller 56. Additionally, since the hardware resources necessary for implementing the present invention, such as the cooling fan 14, temperature sensor 58, and cooling fan drive circuit 60, are standardly equipped in most PC systems, no special hardware or software needs to be added for implementation of the present invention, and only the temperature control program used in conventional systems needs to be modified.</p> <p>Nakamura at [0031]: FIG. 3 shows the relationship between the interior temperature of the enclosure and the operation of the cooling fan 14. In the present embodiment, the cooling fan drive circuit 60 and the environment system controller 56 are configured so that the cooling fan 14 can switch between three levels of rotational speed: high speed, medium speed, and low speed. The temperature control program executed by the environment system controller includes set temperature values for switching the rotational speed of the cooling fan for each temperature sensor 58. When the</p>

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Asserted Claims	Nakamura
	<p>temperature measured by the temperature sensor 58 has an increasing trend, the set temperature values include set temperature value Ta3 for transitioning from stop to low speed rotation, set temperature value Ta2 for transitioning from low speed rotation to medium speed rotation, and set temperature value Ta1 for transitioning from medium speed rotation to high speed rotation. When the interior temperature of the enclosure has a decreasing trend, the set temperature values include set temperature value Tb1 for transitioning from high speed rotation to medium speed rotation, set temperature value Tb2 for transitioning from medium speed rotation to low speed rotation, and set temperature value Tb3 for transitioning from low speed rotation to stop. To prevent the so-called chattering phenomenon where switching of the rotational speed of the cooling fan 14 occurs frequently when the interior temperature of the enclosure is in the vicinity of a set temperature value, differences are normally provided between Ta1 and Tb1, Ta2 and Tb2, and Ta3 and Tb3, with the former being set several degrees Celsius higher than the latter in each case.</p> <p>Nakamura at [0032]: Now, a case will be considered with the PC system 10 according to the present embodiment where processing that places a large load on the CPU 22 terminates and the CPU transitions to an idle state. Since the CPU 22 transitions from a state of high heat generation to a state of low heat generation, the cooling fan 14 operates at high speed rotation, and the interior temperature of the enclosure 12 gradually decreases from a value higher than set temperature value Ta1. The cooling fan 14, which was initially in a high speed rotation state, switches to medium speed rotation when the temperature inside the enclosure 12 falls below Tb1. Then, when the temperature inside the enclosure 12 falls below Tb2, the cooling fan 14 switches to low speed rotation. When the rotational speed of the cooling fan 14 decreases to low speed rotation, since the amount of heat evacuated to the exterior of the enclosure 12 decreases, the rate of temperature decrease also becomes more gradual. If the interior temperature of the enclosure 12 continues to decrease in the same manner and falls below Tb3, the cooling fan 14 will stop. If the interior temperature of the enclosure 12 stagnates at a temperature value slightly above Tb3, the cooling fan 14 will continue to rotate without stopping.</p> <p>Nakamura at [0033]:</p>

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Asserted Claims	Nakamura
	<p>In the present invention, the state where the rate of decrease of the interior temperature of the enclosure 12 has stagnated is appropriately detected, and the cooling fan 14 is stopped. More specifically, a state where the rate of decrease of the interior temperature of the enclosure 12 has stagnated refers to a state where, when the cooling fan 14 is in a low speed rotation state, which is the lowest rotational speed among the rotational speeds set in stepwise fashion, the interior temperature of the enclosure 12 is slightly higher than Tb3, and the change over time is minimal. There are several methods conceivable for detecting this state, and three detection methods will be described here.</p> <p>Nakamura at [0034]: The first detection method for detecting a state where the rate of decrease of the interior temperature of the enclosure 12 has stagnated will be described. FIG. 4 illustrates the concept of the first detection method. FIG. 5 represents the first detection method as a flowchart. In this detection method, the interior temperature of the enclosure 12 is sampled at fixed sampling intervals Δt and stored in the memory inside the environment system controller 56 (steps 100, 102). The environment system controller 56 generates speed signals or stop signals according to temperature signals received from the temperature sensor 58, and sends them to the cooling fan drive circuit 60 to control the operation of the cooling fan 14. Let T be the temperature value at current time t.</p> <p>Nakamura at [0035]: In the flowchart, the processing branches according to the current rotational speed of the cooling fan 14 (step 104), and when the cooling fan 14 is stopped and $T \geq Ta3$, the environment system controller 56 causes the cooling fan 14 to rotate at low speed (steps 106, 108). When the cooling fan 14 is at low speed rotation and $T \geq Ta2$, since the temperature has an increasing trend, the environment system controller 56 increases the rotational speed of the cooling fan 14 to medium speed rotation (steps 110, 112). When the cooling fan 14 is at medium speed rotation and $T \geq Ta1$, since the temperature has a further increasing trend, the environment system controller 56 increases the rotational speed of the cooling fan 14 to high speed rotation (steps 114, 116). When the cooling fan 14 is at high speed rotation and $T \leq Tb1$, since the temperature has a decreasing trend, the environment system controller 56 decreases the rotational speed of the cooling fan 14 to medium speed rotation (steps 118, 120). When the cooling fan 14 is at medium speed rotation</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>and $T \leq T_{b2}$, since the temperature has a decreasing trend, the environment system controller 56 decreases the rotational speed of the cooling fan 14 to low speed rotation (steps 122, 124). When the cooling fan 14 is at low speed rotation and $T \leq T_{b3}$, since the temperature has a further decreasing trend, the environment system controller 56 stops the cooling fan 14 (steps 126, 128).</p> <p>Nakamura at [0037]: The temperature values T1 to T4 are stored in the RAM of the environment system controller 56 along with their sampling times. When the rate of temperature decrease stagnates, the difference between the current temperature value T and the temperature values at each sampling time gradually becomes smaller. For example, the temperature difference (T3-T) between current time t and time t3 becomes smaller than the temperature difference (T4-T) between current time t and time T4. In the present embodiment, the temperature control program can be configured to determine that the rate of temperature decrease has stagnated when the temperature difference (T-T1) between current time t and the previous sampling time t1 is at or below a predetermined value. Alternatively, to more reliably determine the stagnation state, the temperature control program can be configured to determine that the rate of decrease has stagnated when the differences between the current temperature value T and three past temperature values (T1-T, T2-T, T3-T) are all at or below a predetermined value. When the environment system controller detects a state where the rate of decrease of the interior temperature of the enclosure 12 has stagnated (step 130), it stops the cooling fan 14 (step 128). This routine is then repeated (step 132). In the present embodiment, the cooling fan 14 is stopped before the decreasing temperature of the interior of the enclosure 12 reaches set temperature value Tb3, but by determining a stagnation state within a predetermined set temperature range, the system is designed to prevent reaching dangerous temperatures even if high-load processing subsequently occurs in the PC system 10.</p> <p>Nakamura at [0038]: Next, a second detection method for detecting a state where the rate of decrease of the interior temperature of the enclosure 12 has stagnated will be described. FIG. 6 is a diagram describing the concept of the second detection method. In the second detection method, as in the first detection method, the set temperature range is set within the range between Ts1 and Ts2. Now, when the interior temperature of the enclosure 12 is within the set temperature range between</p>

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	<p>Ts1 and Ts2, assuming $\Delta T1 = T - T1$, $\Delta T2 = T1 - T2$, $\Delta T3 = T2 - T3$, as the rate of temperature decrease stagnates, the temperature differences become smaller in the order $\Delta T3$, $\Delta T2$, $\Delta T1$. In the present embodiment, for the second detection method, the temperature control program is configured to determine that the rate of decrease has stagnated when the change in temperature difference between sampling intervals becomes smaller than a predetermined value. The environment system controller detects a state where the decrease in interior temperature of the enclosure 12 has stagnated and sends a stop signal to cooling fan drive circuit 60 to stop the cooling fan 14.</p> <p>Nakamura at [0039]: Next, a third detection method for detecting a state where the rate of decrease of the interior temperature of the enclosure 12 has stagnated will be described. FIG. 7 is a diagram describing the concept of the third detection method. In the third detection method, as in the first and second detection methods, the set temperature range is set within the range between Ts1 and Ts2. Now, time measurement starts at $t=0$ at the time point the interior temperature of the enclosure 12 decreases and falls below Ts1. Time measurement is stopped if temperature T deviates from the set temperature range even once. In the present embodiment, as the third detection method, the temperature control program is configured to determine that the rate of decrease has stagnated when temperature T is within the set temperature range $Ts1 \leq T \leq Ts2$ at all time points where time t satisfies the relationship $0 \leq t \leq \text{predetermined time period}$. The environment system controller detects a state where the decrease in interior temperature of the enclosure 12 has stagnated and sends a stop signal to cooling fan drive circuit 60 to stop the cooling fan 14.</p> <p>Nakamura at [0040]: When a state where the decrease in the interior temperature of the enclosure 12 has stagnated is detected based on the detection methods described above, stop processing of the cooling fan 14 is performed. There are several conceivable methods for stop processing, and two methods will be described here. In the first stop processing method, rotation of the cooling fan 14 is stopped immediately upon detecting the stagnation state. Since $Ts1 = Ta3$ in the first through third detection methods, the interior temperature of the enclosure 12 at the time point when rotation of the cooling fan 14 is stopped becomes a temperature below set temperature value Ta3. Set</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

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	<p>temperature value Ta3 is the temperature value at which transition to low speed rotation occurs when the interior temperature of the enclosure 12 increases while the cooling fan 14 is in a stopped state. In other words, set temperature value Ta3 has the meaning of being the upper limit temperature for maintaining the stopped state of the cooling fan 14 when the interior temperature of the enclosure 12 has an increasing trend. Therefore, no heat-related problems occur in the PC system 10 even if the cooling fan 14 is stopped when the interior temperature of the enclosure 12 is below the set temperature value Ta3. Furthermore, if the PC system 10 is used again and the interior temperature of the enclosure 12 begins to increase again, rotation of the cooling fan 14 starts at set temperature value Ta3, allowing it to track the increase in interior temperature of the enclosure 12. FIG. 8 shows actual measurement examples of change in the interior temperature of the enclosure 12 in the first stop processing method. Comparing cases with and without application of the present invention, the time required until stopping of the rotation of the cooling fan 14 has been shortened by approximately 700 seconds.</p> <p>Nakamura at [0041]: FIG. 9 is a diagram showing changes in interior temperature values of the enclosure 12 in the second stop processing method. In the second stop processing method, the rotational speed of the cooling fan 14 is temporarily increased from time point 304 when stagnation was detected in the decrease of interior temperature of the enclosure 12. As a result, the change of the interior temperature of the enclosure 12 temporarily decreased rapidly as shown by line 300, represented as a solid line, as compared to line 302, represented as a dotted line, indicating what the temperature change would be if low speed rotation had been continued. Then, rotation of the cooling fan is stopped at time point 306, when the interior temperature of the enclosure 12 reaches Tb3. FIG. 10 is a flowchart depicting the operation of stop processing in the second stop processing method. When a state of stagnated decrease in the interior temperature of the enclosure 12 is detected, the rotational speed of the cooling fan 14 is temporarily increased to high speed rotation or medium speed rotation (step 400), increasing the amount of heat evacuated to the exterior of the enclosure 12. Then, the interior temperature of the enclosure 12 is brought to Tb3, the temperature at which rotation of the cooling fan 14 should originally stop (steps 402, 404), thereby stopping the rotation of the cooling fan 14 (step 406). This makes it possible to further reduce the possibility of problems occurring in the PC system 10 due to the interior temperature of the enclosure 12. With this stop processing method, although noise</p>

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	<p>temporarily increases when the rotational speed of the cooling fan 14 rises, users can recognize this as an operation for stopping the cooling fan 14 since the cooling fan 14 stops immediately thereafter, within several seconds. Therefore, this reduces discomfort compared to continued low-speed rotation of the cooling fan 14.</p> <p>Nakamura at [0042]: It should be noted that, as a method for stopping the rotation of the cooling fan 14, besides sending a rotation stop control signal directly to the cooling fan drive circuit 60, there is also a method of stopping by temporarily raising the set temperature value Tb3 to a value equal to or higher than the current temperature T. After rotation of the cooling fan 14 stops, the normal state is restored by returning the set temperature value Tb3 to its original value. This method has the advantage of enabling stopping operation while minimizing changes to the cooling fan drive circuit 60.</p> <p>Nakamura at [0043]: Different variations can be considered for the embodiments described thus far. For example, in the first detection method described above, temperatures were compared for up to 4 steps prior to the current time point, but this number of steps can be any number. In the second detection method, the amount of temperature change was compared between the current time point and up to 3 steps prior to the current time point, but this number of steps can be any number as long as it is 2 steps or more. Additionally, the rotational speed of cooling fan 14 can have any number of levels so long as there are 2 or more levels. Furthermore, given that multiple temperature sensors 58 are installed in the interior of the enclosure 12, the rotation of the cooling fan 14 can be stopped when a state where the rate of decrease has stagnated has been detected for all temperatures measured by multiple temperature sensors 58 selected from among the installed sensors. In this case, different set temperature values can be used for each temperature sensor 58. This makes it possible to reduce the influence of temperature variations at different locations in the interior of the enclosure 12 and to more accurately detect a state where the rate of temperature decrease has stagnated.</p> <p>Nakamura at [0045]:</p>

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Asserted Claims	Nakamura
	<p>The invention is not limited to computer devices and is broadly applicable to electronic devices in which heat evacuation is performed from the interior of the enclosure by means of a cooling fan.</p>
<p>[1.b] a first temperature sensor that detects a component temperature of the electronic component included in the ICT equipment;</p>	<p>Nakamura discloses, expressly and/or inherently, a first temperature sensor that detects a component temperature of the electronic component included in the ICT equipment.</p> <p><i>See, e.g.:</i></p> <p>Nakamura at Fig. 2 and accompanying text:</p> <p>[FIG. 2]</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>Nakamura at Fig. 5 and accompanying text: [FIG. 5]</p> <p>Nakamura at [0003]: In computer systems, the amount of heat generated by internal electrical components varies depending on the operational state. For example, in the case of a CPU, heat generation increases</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>during high-load processing when executing application software, while during low-load processing, heat generation decreases. Therefore, computer systems are provided with mechanisms to control cooling fan rotational speed according to the interior temperature of the enclosure. The speed control mechanism generally changes the cooling fan rotational speed when the temperature measured by temperature sensors installed in the interior of the enclosure reaches preset reference values.</p> <p>Nakamura at [0006]: FIG. 11 shows cooling fan rotational speed control and change in interior temperature of the enclosure of a computer. Cooling fan rotational speed control is carried out by changing the cooling fan rotational speed when the temperature measured by a temperature sensor installed in the interior of the enclosure reaches a preset temperature value. For example, in the cooling system described in FIG. 11, the cooling fan rotational speed can be switched between three levels - high speed, medium speed, and low speed, with a total of three set temperature values 505, 507, and 509 being set at the boundary between high speed rotation and medium speed rotation, at the boundary between medium speed rotation and low speed rotation, and at the boundary between low speed rotation and stop. When a computer transitions to a low-load state after being operated in a high-load state, the interior temperature of the enclosure changes as shown by line 501, represented by a dotted line. As the interior temperature of the enclosure drops below the set temperature values 505 and 507 due to decreased heat generation, the state of the cooling fan, which had been rotating at high speed in a high-load state, transitions through medium speed rotation to low speed rotation. As the rotational speed of the cooling fan decreases, less heat is evacuated to the exterior of the enclosure, causing the temperature drop to become more gradual. The rotation of the cooling fan stops when the measured temperature reaches the set temperature value 509.</p> <p>Nakamura at [0011]: The interior temperature of the enclosure is measured by means of a temperature sensor installed in the interior space of the enclosure, a temperature sensor embedded in the CPU, a temperature sensor attached to the board, etc. The predetermined set temperature range should be set to accurately determine the stagnation state while preventing dangerous temperature from being reached. The set temperature range can be set on the first set temperature value side, with an</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>upper limit value less than the second set temperature value and a lower limit value equal to or greater than the first temperature setting value.</p> <p>Nakamura at [0028]: Multiple temperature sensors 58 are present in the interior of the enclosure 12. These are mounted on the boards of, or in the vicinity of, the CPU 22, video subsystem 34, hard disk drive 44, power supply unit (not illustrated), etc. When components on which temperature sensors have been mounted are incorporated into the PC system 10, each temperature sensor 58 is connected to the environment system controller 56 via a bus. In the present specification, the temperatures measured by these various temperature sensors will be referred to as the interior temperature of the enclosure.</p> <p>Nakamura at [0029]: The cooling fan drive circuit generates and supplies voltage at a frequency corresponding to the speed signal received from the environment system controller 56 to the cooling fan 14, changing the speed of or stopping the cooling fan 14. It should be noted that FIG. 2 merely shows a simplified representation of the main hardware configuration and connection relationships to avoid complication of the drawing. Many other electrical circuits and devices are necessary to configure the PC system 10, but since these are well known to those skilled in the art, detailed mention will not be made of parts other than those constituting the essence of the present invention.</p> <p>Nakamura at [0030]: The hardware configuration of the PC system 10 described above does not particularly differ from that of a general PC system. Furthermore, the shape and structure of the cooling fan 14 and the electrical configuration related to the control of the cooling fan 14 do not particularly differ from those generally used for heat evacuation from the interior of an enclosure 12 of a personal computer. The main components of the cooling system according to the present invention are implemented by means of a temperature control program stored in the ROM of the environment system controller 56 and executed by the processor of the environment system controller 56. Additionally, since the hardware resources necessary for implementing the present invention, such as the cooling fan 14, temperature sensor 58, and cooling fan drive circuit 60, are</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>standardly equipped in most PC systems, no special hardware or software needs to be added for implementation of the present invention, and only the temperature control program used in conventional systems needs to be modified.</p> <p>Nakamura at [0031]: FIG. 3 shows the relationship between the interior temperature of the enclosure and the operation of the cooling fan 14. In the present embodiment, the cooling fan drive circuit 60 and the environment system controller 56 are configured so that the cooling fan 14 can switch between three levels of rotational speed: high speed, medium speed, and low speed. The temperature control program executed by the environment system controller includes set temperature values for switching the rotational speed of the cooling fan for each temperature sensor 58. When the temperature measured by the temperature sensor 58 has an increasing trend, the set temperature values include set temperature value Ta3 for transitioning from stop to low speed rotation, set temperature value Ta2 for transitioning from low speed rotation to medium speed rotation, and set temperature value Ta1 for transitioning from medium speed rotation to high speed rotation. When the interior temperature of the enclosure has a decreasing trend, the set temperature values include set temperature value Tb1 for transitioning from high speed rotation to medium speed rotation, set temperature value Tb2 for transitioning from medium speed rotation to low speed rotation, and set temperature value Tb3 for transitioning from low speed rotation to stop. To prevent the so-called chattering phenomenon where switching of the rotational speed of the cooling fan 14 occurs frequently when the interior temperature of the enclosure is in the vicinity of a set temperature value, differences are normally provided between Ta1 and Tb1, Ta2 and Tb2, and Ta3 and Tb3, with the former being set several degrees Celsius higher than the latter in each case.</p> <p>Nakamura at [0034]: The first detection method for detecting a state where the rate of decrease of the interior temperature of the enclosure 12 has stagnated will be described. FIG. 4 illustrates the concept of the first detection method. FIG. 5 represents the first detection method as a flowchart. In this detection method, the interior temperature of the enclosure 12 is sampled at fixed sampling intervals Δt and stored in the memory inside the environment system controller 56 (steps 100, 102). The environment system controller 56 generates speed signals or stop signals according to</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>temperature signals received from the temperature sensor 58, and sends them to the cooling fan drive circuit 60 to control the operation of the cooling fan 14. Let T be the temperature value at current time t.</p> <p>Nakamura at [0036]: In the first detection method, a set temperature range is set for detecting stagnation in the rate of decrease of the temperature inside the enclosure 12 near Tb3. The set temperature range is set with an upper limit value Ts1 equal to set temperature value Ta3, which is the set temperature value for transitioning from stop to low speed rotation, and with a lower limit value Ts2 set to set temperature value Tb3, which is for transitioning from low speed rotation to stop. Now, when the interior temperature of the enclosure 12 is within the set temperature range between Ts1 and Ts2, the environment system controller 56 processes signals from the temperature sensor 58 at a sampling interval Δt. Let the temperature value at current time t be T, and the temperature values at past sampling times t_1, t_2, t_3, and t_4 be T_1, T_2, T_3, and T_4 respectively.</p> <p>Nakamura at [0043]: Different variations can be considered for the embodiments described thus far. For example, in the first detection method described above, temperatures were compared for up to 4 steps prior to the current time point, but this number of steps can be any number. In the second detection method, the amount of temperature change was compared between the current time point and up to 3 steps prior to the current time point, but this number of steps can be any number as long as it is 2 steps or more. Additionally, the rotational speed of cooling fan 14 can have any number of levels so long as there are 2 or more levels. Furthermore, given that multiple temperature sensors 58 are installed in the interior of the enclosure 12, the rotation of the cooling fan 14 can be stopped when a state where the rate of decrease has stagnated has been detected for all temperatures measured by multiple temperature sensors 58 selected from among the installed sensors. In this case, different set temperature values can be used for each temperature sensor 58. This makes it possible to reduce the influence of temperature variations at different locations in the interior of the enclosure 12 and to more accurately detect a state where the rate of temperature decrease has stagnated.</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
<p>[1.c] a second temperature sensor that detects a temperature of an intake air; and</p>	<p>Nakamura discloses, expressly and/or inherently, a second temperature sensor that detects a temperature of an intake air.</p> <p><i>See, e.g.:</i></p> <p>Nakamura at Fig. 2 and accompanying text:</p> <p>[FIG. 2]</p> <p>Nakamura at Fig. 5 and accompanying text:</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>[FIG. 5]</p> <p>Nakamura at [0011]: The interior temperature of the enclosure is measured by means of a temperature sensor installed in the interior space of the enclosure, a temperature sensor embedded in the CPU, a temperature sensor attached to the board, etc. The predetermined set temperature range should be set to</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>accurately determine the stagnation state while preventing dangerous temperature from being reached. The set temperature range can be set on the first set temperature value side, with an upper limit value less than the second set temperature value and a lower limit value equal to or greater than the first temperature setting value.</p> <p>Nakamura at [0028]: Multiple temperature sensors 58 are present in the interior of the enclosure 12. These are mounted on the boards of, or in the vicinity of, the CPU 22, video subsystem 34, hard disk drive 44, power supply unit (not illustrated), etc. When components on which temperature sensors have been mounted are incorporated into the PC system 10, each temperature sensor 58 is connected to the environment system controller 56 via a bus. In the present specification, the temperatures measured by these various temperature sensors will be referred to as the interior temperature of the enclosure.</p>
[1.d] a microprocessor including:	<p>Nakamura discloses, expressly and/or inherently, a microprocessor including.</p> <p><i>See, e.g.:</i></p> <p>Nakamura at Fig. 2 and accompanying text:</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

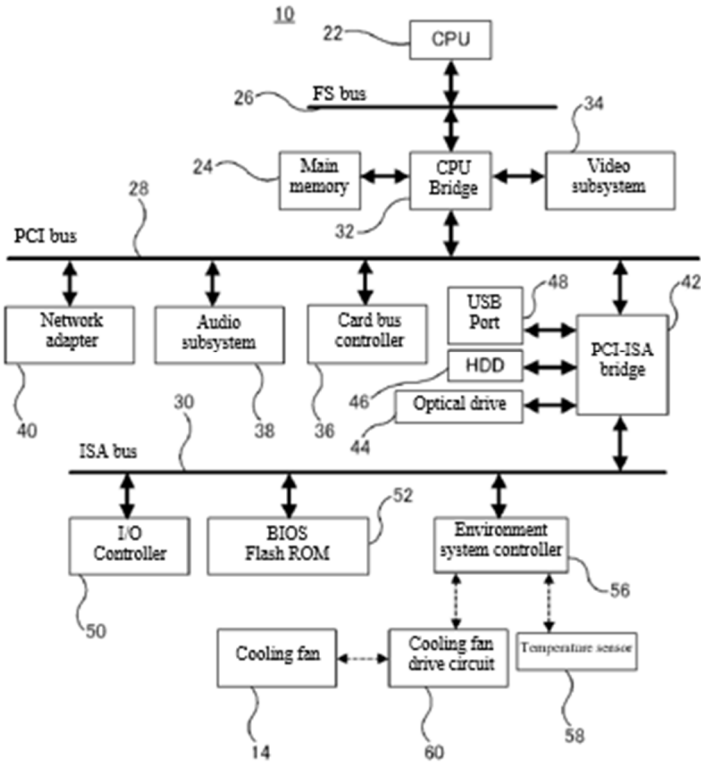
Asserted Claims	Nakamura
	<p data-bbox="701 284 810 318">[FIG. 2]</p>  <p data-bbox="648 1125 919 1159">Nakamura at [0002]:</p> <p data-bbox="648 1164 1875 1412">Electronic devices such as computer systems comprise electrical components inside an enclosure, including boards (substrates) on which various LSI chips such as CPUs are mounted, storage devices such as hard disks, power supply units, and input/output devices, where the respective electrical components generate heat during operation. The specifications for these electrical components define certain temperature ranges to guarantee proper operation. CPUs in particular generate a large amount of heat and are susceptible to serious damage if used continuously outside their specified temperature range. Therefore, electronic devices are</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>provided with cooling fans to evacuate heat generated in the interior of the enclosure to the exterior of the enclosure in order to maintain the interior temperature of the enclosure within a certain temperature range.</p> <p>Nakamura at [0003]: In computer systems, the amount of heat generated by internal electrical components varies depending on the operational state. For example, in the case of a CPU, heat generation increases during high-load processing when executing application software, while during low-load processing, heat generation decreases. Therefore, computer systems are provided with mechanisms to control cooling fan rotational speed according to the interior temperature of the enclosure. The speed control mechanism generally changes the cooling fan rotational speed when the temperature measured by temperature sensors installed in the interior of the enclosure reaches preset reference values.</p> <p>Nakamura at [0004]: As computer systems have become widely used in human living environments and office environments, noise reduction has become an important issue alongside performance improvement, size and weight reduction, and cost reduction. The majority of noise generated by computer systems comes from the operating sound of rotating cooling fans. In particular, notebook computers have seen increased heat generation due to higher CPU clock frequencies, and because of the limited interior space of the enclosure, cooling fans require higher cooling capacity, resulting in higher rotational speeds and consequently louder operating sound.</p> <p>Nakamura at [0011]: The interior temperature of the enclosure is measured by means of a temperature sensor installed in the interior space of the enclosure, a temperature sensor embedded in the CPU, a temperature sensor attached to the board, etc. The predetermined set temperature range should be set to accurately determine the stagnation state while preventing dangerous temperature from being reached. The set temperature range can be set on the first set temperature value side, with an upper limit value less than the second set temperature value and a lower limit value equal to or greater than the first temperature setting value.</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>Nakamura at [0019]: FIG. 2 is a schematic diagram showing the hardware configuration of the PC system 10. The CPU 22, which controls the entire PC system 10, executes various programs under OS control. The CPU 22 is configured to include an L2 (Level 2) cache, which is a high-speed operating memory for reducing total access time to the main memory 24 by temporarily storing very limited portions of code and data that are accessed frequently. The CPU 22 is interconnected with each hardware component, described later, via three hierarchical buses: an FS (FrontSide) bus 26 as a processor-direct bus directly connected to the external pins of the CPU, a PCI (Peripheral Component Interconnect) bus 28 as a bus for high-speed I/O devices, and an ISA (Industry Standard Architecture) bus 30 as a bus for low-speed I/O devices.</p> <p>Nakamura at [0020]: The FS bus 26 and PCI bus 28 are connected by means of a CPU bridge (host-PCI bridge) 32, generally called a memory/PCI control chip. The CPU bridge 32 in the present embodiment is configured to include memory controller functions for controlling access operations to main memory 24, data buffers for accommodating the difference in data transfer rates between the FS bus 26 and the PCI bus 28, etc.</p> <p>Nakamura at [0021]: The main memory 24 is a writable memory used as a loading area for programs executed by the CPU 22 and as a work area for writing processed data of executed programs. It should be noted that the executed programs mentioned here include various device drivers for hardware operation of peripheral devices, application programs directed at specific tasks, and firmware such as BIOS, stored in BIOS flash ROM 52.</p> <p>Nakamura at [0022]: The video subsystem 34 is a subsystem that realizes video-related functions, and includes a video controller that first writes drawing information, obtained by actually processing drawing commands from the CPU 22, to video memory (VRAM), and also reads drawing information from VRAM and output it as drawing data to a display (not illustrated).</p> <p>Nakamura at [0027]:</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>The BIOS flash ROM 52 is a memory for holding various BIOS programs, and is non-volatile with electrically rewritable memory content. The environment system controller 56 includes an 8-16 bit microprocessor along with RAM, ROM, analog input, timer, digital input/output, etc., and can execute programs related to the operating environment of the PC system 10 without placing excessive load on the CPU 22. The environment system controller 56 also sends control signals for controlling the rotational speed of the cooling fan 14 to the cooling fan drive circuit.</p> <p>Nakamura at [0028]: Multiple temperature sensors 58 are present in the interior of the enclosure 12. These are mounted on the boards of, or in the vicinity of, the CPU 22, video subsystem 34, hard disk drive 44, power supply unit (not illustrated), etc. When components on which temperature sensors have been mounted are incorporated into the PC system 10, each temperature sensor 58 is connected to the environment system controller 56 via a bus. In the present specification, the temperatures measured by these various temperature sensors will be referred to as the interior temperature of the enclosure.</p> <p>Nakamura at [0032]: Now, a case will be considered with the PC system 10 according to the present embodiment where processing that places a large load on the CPU 22 terminates and the CPU transitions to an idle state. Since the CPU 22 transitions from a state of high heat generation to a state of low heat generation, the cooling fan 14 operates at high speed rotation, and the interior temperature of the enclosure 12 gradually decreases from a value higher than set temperature value Ta1. The cooling fan 14, which was initially in a high speed rotation state, switches to medium speed rotation when the temperature inside the enclosure 12 falls below Tb1. Then, when the temperature inside the enclosure 12 falls below Tb2, the cooling fan 14 switches to low speed rotation. When the rotational speed of the cooling fan 14 decreases to low speed rotation, since the amount of heat evacuated to the exterior of the enclosure 12 decreases, the rate of temperature decrease also becomes more gradual. If the interior temperature of the enclosure 12 continues to decrease in the same manner and falls below Tb3, the cooling fan 14 will stop. If the interior temperature of the enclosure 12 stagnates at a temperature value slightly above Tb3, the cooling fan 14 will continue to rotate without stopping.</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
<p>[1.e] a declination index value calculation unit that calculates an index value indicating a degree of declination of the component temperature of the electronic component based on a detection result of the first temperature sensor; and</p>	<p>Nakamura discloses, expressly and/or inherently, a declination index value calculation unit that calculates an index value indicating a degree of declination of the component temperature of the electronic component based on a detection result of the first temperature sensor.</p> <p><i>See, e.g.:</i></p> <p>Nakamura at Fig. 3 and accompanying text:</p> <div data-bbox="722 553 1425 1154" data-label="Figure"> <p>[FIG. 3]</p> </div> <p>Nakamura at Fig. 4 and accompanying text:</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>[FIG. 4]</p> <p>The graph illustrates a temperature decay process. The vertical axis represents Temperature, and the horizontal axis represents Time. A solid curve shows the temperature decreasing from an initial point towards a lower temperature. Several horizontal dashed lines indicate specific temperature levels: T_s1 (top), T_4, T_{a3}, T_3, T_2, T_1, T_{b3}, and T_{s2} (bottom). Vertical dashed lines mark time points t_4, t_3, t_2, t_1, and t on the time axis. The intervals between these time points are each labeled Δt.</p> <p>Nakamura at Fig. 5 and accompanying text:</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>[FIG. 5]</p> <pre> graph TD Start([Start]) --> 100[Measure temperature value] 100 --> 102[Save temperature value to memory] 102 --> 104{Current cooling fan rotational speed} 104 -- Stop (106) --> 108{T ≥ Ta3?} 104 -- Low speed rotation (110) --> 112{T ≥ Ta2?} 104 -- Medium speed rotation (114) --> 116{T ≥ Ta1?} 104 -- High speed rotation (118) --> 120{T ≤ Tb1?} 108 -- YES --> 108a[Fan to low speed rotation] 108 -- NO --> 132{End?} 112 -- YES --> 112a[Fan to medium speed rotation] 112 -- NO --> 126{T ≤ Tb3?} 126 -- YES --> 130{Tb1 ≥ Tb2 ≥ Ta2 and temperature decrease stagnating?} 130 -- YES --> 128[Perform fan stop processing] 130 -- NO --> 132 116 -- YES --> 116a[Fan to high speed rotation] 116 -- NO --> 122{T ≤ Tb2?} 122 -- YES --> 124[Fan to low speed rotation] 122 -- NO --> 132 120 -- YES --> 120a[Fan to medium speed rotation] 120 -- NO --> 132 128 --> 132 124 --> 132 120a --> 132 128 --> 132 124 --> 132 120a --> 132 132 -- NO --> 104 132 -- YES --> End([End]) </pre> <p>Nakamura at [0032]:</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>Now, a case will be considered with the PC system 10 according to the present embodiment where processing that places a large load on the CPU 22 terminates and the CPU transitions to an idle state. Since the CPU 22 transitions from a state of high heat generation to a state of low heat generation, the cooling fan 14 operates at high speed rotation, and the interior temperature of the enclosure 12 gradually decreases from a value higher than set temperature value Ta1. The cooling fan 14, which was initially in a high speed rotation state, switches to medium speed rotation when the temperature inside the enclosure 12 falls below Tb1. Then, when the temperature inside the enclosure 12 falls below Tb2, the cooling fan 14 switches to low speed rotation. When the rotational speed of the cooling fan 14 decreases to low speed rotation, since the amount of heat evacuated to the exterior of the enclosure 12 decreases, the rate of temperature decrease also becomes more gradual. If the interior temperature of the enclosure 12 continues to decrease in the same manner and falls below Tb3, the cooling fan 14 will stop. If the interior temperature of the enclosure 12 stagnates at a temperature value slightly above Tb3, the cooling fan 14 will continue to rotate without stopping.</p> <p>Nakamura at [0033]: In the present invention, the state where the rate of decrease of the interior temperature of the enclosure 12 has stagnated is appropriately detected, and the cooling fan 14 is stopped. More specifically, a state where the rate of decrease of the interior temperature of the enclosure 12 has stagnated refers to a state where, when the cooling fan 14 is in a low speed rotation state, which is the lowest rotational speed among the rotational speeds set in stepwise fashion, the interior temperature of the enclosure 12 is slightly higher than Tb3, and the change over time is minimal. There are several methods conceivable for detecting this state, and three detection methods will be described here.</p> <p>Nakamura at [0034]: The first detection method for detecting a state where the rate of decrease of the interior temperature of the enclosure 12 has stagnated will be described. FIG. 4 illustrates the concept of the first detection method. FIG. 5 represents the first detection method as a flowchart. In this detection method, the interior temperature of the enclosure 12 is sampled at fixed sampling intervals Δt and stored in the memory inside the environment system controller 56 (steps 100, 102). The environment system controller 56 generates speed signals or stop signals according to</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>temperature signals received from the temperature sensor 58, and sends them to the cooling fan drive circuit 60 to control the operation of the cooling fan 14. Let T be the temperature value at current time t.</p> <p>Nakamura at [0035]: In the flowchart, the processing branches according to the current rotational speed of the cooling fan 14 (step 104), and when the cooling fan 14 is stopped and $T \geq Ta3$, the environment system controller 56 causes the cooling fan 14 to rotate at low speed (steps 106, 108). When the cooling fan 14 is at low speed rotation and $T \geq Ta2$, since the temperature has an increasing trend, the environment system controller 56 increases the rotational speed of the cooling fan 14 to medium speed rotation (steps 110, 112). When the cooling fan 14 is at medium speed rotation and $T \geq Ta1$, since the temperature has a further increasing trend, the environment system controller 56 increases the rotational speed of the cooling fan 14 to high speed rotation (steps 114, 116). When the cooling fan 14 is at high speed rotation and $T \leq Tb1$, since the temperature has a decreasing trend, the environment system controller 56 decreases the rotational speed of the cooling fan 14 to medium speed rotation (steps 118, 120). When the cooling fan 14 is at medium speed rotation and $T \leq Tb2$, since the temperature has a decreasing trend, the environment system controller 56 decreases the rotational speed of the cooling fan 14 to low speed rotation (steps 122, 124). When the cooling fan 14 is at low speed rotation and $T \leq Tb3$, since the temperature has a further decreasing trend, the environment system controller 56 stops the cooling fan 14 (steps 126, 128).</p> <p>Nakamura at [0036]: In the first detection method, a set temperature range is set for detecting stagnation in the rate of decrease of the temperature inside the enclosure 12 near $Tb3$. The set temperature range is set with an upper limit value $Ts1$ equal to set temperature value $Ta3$, which is the set temperature value for transitioning from stop to low speed rotation, and with a lower limit value $Ts2$ set to set temperature value $Tb3$, which is for transitioning from low speed rotation to stop. Now, when the interior temperature of the enclosure 12 is within the set temperature range between $Ts1$ and $Ts2$, the environment system controller 56 processes signals from the temperature sensor 58 at a sampling interval Δt. Let the temperature value at current time t be T, and the temperature values at past sampling times $t1$, $t2$, $t3$, and $t4$ be $T1$, $T2$, $T3$, and $T4$ respectively.</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>Nakamura at [0037]: The temperature values T1 to T4 are stored in the RAM of the environment system controller 56 along with their sampling times. When the rate of temperature decrease stagnates, the difference between the current temperature value T and the temperature values at each sampling time gradually becomes smaller. For example, the temperature difference (T3-T) between current time t and time t3 becomes smaller than the temperature difference (T4-T) between current time t and time T4. In the present embodiment, the temperature control program can be configured to determine that the rate of temperature decrease has stagnated when the temperature difference (T-T1) between current time t and the previous sampling time t1 is at or below a predetermined value. Alternatively, to more reliably determine the stagnation state, the temperature control program can be configured to determine that the rate of decrease has stagnated when the differences between the current temperature value T and three past temperature values (T1-T, T2-T, T3-T) are all at or below a predetermined value. When the environment system controller detects a state where the rate of decrease of the interior temperature of the enclosure 12 has stagnated (step 130), it stops the cooling fan 14 (step 128). This routine is then repeated (step 132). In the present embodiment, the cooling fan 14 is stopped before the decreasing temperature of the interior of the enclosure 12 reaches set temperature value Tb3, but by determining a stagnation state within a predetermined set temperature range, the system is designed to prevent reaching dangerous temperatures even if high-load processing subsequently occurs in the PC system 10.</p> <p>Nakamura at [0038]: Next, a second detection method for detecting a state where the rate of decrease of the interior temperature of the enclosure 12 has stagnated will be described. FIG. 6 is a diagram describing the concept of the second detection method. In the second detection method, as in the first detection method, the set temperature range is set within the range between Ts1 and Ts2. Now, when the interior temperature of the enclosure 12 is within the set temperature range between Ts1 and Ts2, assuming $\Delta T1 = T - T1$, $\Delta T2 = T1 - T2$, $\Delta T3 = T2 - T3$, as the rate of temperature decrease stagnates, the temperature differences become smaller in the order $\Delta T3$, $\Delta T2$, $\Delta T1$. In the present embodiment, for the second detection method, the temperature control program is configured to determine that the rate of decrease has stagnated when the change in temperature difference between sampling intervals becomes smaller than a predetermined value. The</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>environment system controller detects a state where the decrease in interior temperature of the enclosure 12 has stagnated and sends a stop signal to cooling fan drive circuit 60 to stop the cooling fan 14.</p> <p>Nakamura at [0039]: Next, a third detection method for detecting a state where the rate of decrease of the interior temperature of the enclosure 12 has stagnated will be described. FIG. 7 is a diagram describing the concept of the third detection method. In the third detection method, as in the first and second detection methods, the set temperature range is set within the range between Ts1 and Ts2. Now, time measurement starts at t=0 at the time point the interior temperature of the enclosure 12 decreases and falls below Ts1. Time measurement is stopped if temperature T deviates from the set temperature range even once. In the present embodiment, as the third detection method, the temperature control program is configured to determine that the rate of decrease has stagnated when temperature T is within the set temperature range $Ts1 \leq T \leq Ts2$ at all time points where time t satisfies the relationship $0 \leq t \leq \text{predetermined time period}$. The environment system controller detects a state where the decrease in interior temperature of the enclosure 12 has stagnated and sends a stop signal to cooling fan drive circuit 60 to stop the cooling fan 14.</p> <p>Nakamura at [0040]: When a state where the decrease in the interior temperature of the enclosure 12 has stagnated is detected based on the detection methods described above, stop processing of the cooling fan 14 is performed. There are several conceivable methods for stop processing, and two methods will be described here. In the first stop processing method, rotation of the cooling fan 14 is stopped immediately upon detecting the stagnation state. Since $Ts1 = Ta3$ in the first through third detection methods, the interior temperature of the enclosure 12 at the time point when rotation of the cooling fan 14 is stopped becomes a temperature below set temperature value Ta3. Set temperature value Ta3 is the temperature value at which transition to low speed rotation occurs when the interior temperature of the enclosure 12 increases while the cooling fan 14 is in a stopped state. In other words, set temperature value Ta3 has the meaning of being the upper limit temperature for maintaining the stopped state of the cooling fan 14 when the interior temperature of the enclosure 12 has an increasing trend. Therefore, no heat-related problems occur in the PC</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>system 10 even if the cooling fan 14 is stopped when the interior temperature of the enclosure 12 is below the set temperature value Ta3. Furthermore, if the PC system 10 is used again and the interior temperature of the enclosure 12 begins to increase again, rotation of the cooling fan 14 starts at set temperature value Ta3, allowing it to track the increase in interior temperature of the enclosure 12. FIG. 8 shows actual measurement examples of change in the interior temperature of the enclosure 12 in the first stop processing method. Comparing cases with and without application of the present invention, the time required until stopping of the rotation of the cooling fan 14 has been shortened by approximately 700 seconds.</p> <p>Nakamura at [0041]:</p> <p>FIG. 9 is a diagram showing changes in interior temperature values of the enclosure 12 in the second stop processing method. In the second stop processing method, the rotational speed of the cooling fan 14 is temporarily increased from time point 304 when stagnation was detected in the decrease of interior temperature of the enclosure 12. As a result, the change of the interior temperature of the enclosure 12 temporarily decreased rapidly as shown by line 300, represented as a solid line, as compared to line 302, represented as a dotted line, indicating what the temperature change would be if low speed rotation had been continued. Then, rotation of the cooling fan is stopped at time point 306, when the interior temperature of the enclosure 12 reaches Tb3. FIG. 10 is a flowchart depicting the operation of stop processing in the second stop processing method. When a state of stagnated decrease in the interior temperature of the enclosure 12 is detected, the rotational speed of the cooling fan 14 is temporarily increased to high speed rotation or medium speed rotation (step 400), increasing the amount of heat evacuated to the exterior of the enclosure 12. Then, the interior temperature of the enclosure 12 is brought to Tb3, the temperature at which rotation of the cooling fan 14 should originally stop (steps 402, 404), thereby stopping the rotation of the cooling fan 14 (step 406). This makes it possible to further reduce the possibility of problems occurring in the PC system 10 due to the interior temperature of the enclosure 12. With this stop processing method, although noise temporarily increases when the rotational speed of the cooling fan 14 rises, users can recognize this as an operation for stopping the cooling fan 14 since the cooling fan 14 stops immediately thereafter, within several seconds. Therefore, this reduces discomfort compared to continued low-speed rotation of the cooling fan 14.</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>Nakamura at [0043]:</p> <p>Different variations can be considered for the embodiments described thus far. For example, in the first detection method described above, temperatures were compared for up to 4 steps prior to the current time point, but this number of steps can be any number. In the second detection method, the amount of temperature change was compared between the current time point and up to 3 steps prior to the current time point, but this number of steps can be any number as long as it is 2 steps or more. Additionally, the rotational speed of cooling fan 14 can have any number of levels so long as there are 2 or more levels. Furthermore, given that multiple temperature sensors 58 are installed in the interior of the enclosure 12, the rotation of the cooling fan 14 can be stopped when a state where the rate of decrease has stagnated has been detected for all temperatures measured by multiple temperature sensors 58 selected from among the installed sensors. In this case, different set temperature values can be used for each temperature sensor 58. This makes it possible to reduce the influence of temperature variations at different locations in the interior of the enclosure 12 and to more accurately detect a state where the rate of temperature decrease has stagnated.</p>
<p>[1.f] a control unit that controls the number of rotations of the cooling fan based on the index value calculated by the declination index value calculation unit and the temperature of the intake air by the second temperature sensor.</p>	<p>Nakamura discloses, expressly and/or inherently, a control unit that controls the number of rotations of the cooling fan based on the index value calculated by the declination index value calculation unit and the temperature of the intake air by the second temperature sensor.</p> <p><i>See, e.g.:</i></p> <p>Nakamura at Fig. 3 and accompanying text:</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

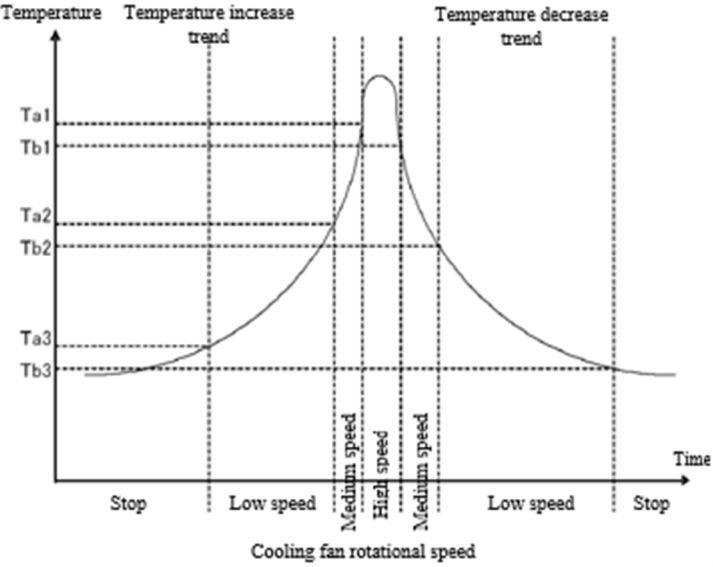
Asserted Claims	Nakamura
	<p data-bbox="709 256 821 293">[FIG. 3]</p>  <p>The graph shows temperature on the y-axis and time on the x-axis. The temperature curve starts at a baseline, rises during a 'Temperature increase trend' period, peaks, and then falls during a 'Temperature decrease trend' period. The fan speed is indicated by vertical dashed lines and labels below the x-axis: Stop, Low speed, Medium speed, High speed, Medium speed, Low speed, Stop. Horizontal dashed lines connect temperature points on the curve to the y-axis: Ta1, Tb1, Ta2, Tb2, Ta3, and Tb3. Ta1 and Tb1 are at the peak; Ta2 and Tb2 are on the rising slope; Ta3 and Tb3 are on the falling slope.</p> <p data-bbox="653 919 1213 951">Nakamura at Fig. 5 and accompanying text:</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>[FIG. 5]</p> <p>Nakamura at Fig. 11 and accompanying text:</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

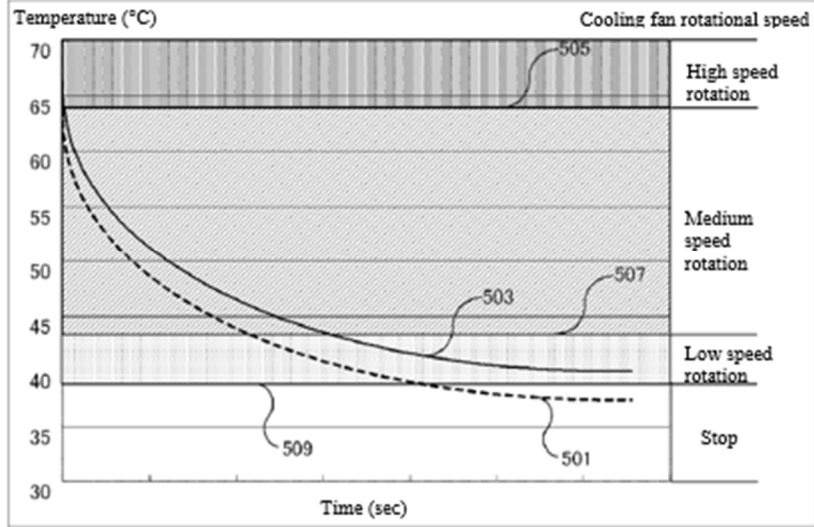
Asserted Claims	Nakamura
	<p data-bbox="699 261 831 297">[FIG. 11]</p>  <p data-bbox="646 914 919 950">Nakamura at [0003]:</p> <p data-bbox="646 954 1881 1242">In computer systems, the amount of heat generated by internal electrical components varies depending on the operational state. For example, in the case of a CPU, heat generation increases during high-load processing when executing application software, while during low-load processing, heat generation decreases. Therefore, computer systems are provided with mechanisms to control cooling fan rotational speed according to the interior temperature of the enclosure. The speed control mechanism generally changes the cooling fan rotational speed when the temperature measured by temperature sensors installed in the interior of the enclosure reaches preset reference values.</p> <p data-bbox="646 1282 919 1318">Nakamura at [0004]:</p> <p data-bbox="646 1323 1881 1422">As computer systems have become widely used in human living environments and office environments, noise reduction has become an important issue alongside performance improvement, size and weight reduction, and cost reduction. The majority of noise generated by</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>computer systems comes from the operating sound of rotating cooling fans. In particular, notebook computers have seen increased heat generation due to higher CPU clock frequencies, and because of the limited interior space of the enclosure, cooling fans require higher cooling capacity, resulting in higher rotational speeds and consequently louder operating sound.</p> <p>Nakamura at [0005]: Techniques have been disclosed for controlling personal computer cooling fan rotation while maintaining sufficient cooling capacity without causing discomfort to humans. For example, patent document 1 discloses a technique for controlling cooling fan rotational speed to within a range that is not unpleasant to human ears, based on temperature variation patterns of the object of cooling. Patent document 2 discloses a technique for controlling cooling fan rotational speed to prevent sudden changes, making operating sound changes less noticeable to human ears. Patent document 3 discloses a technique for controlling cooling fan rotational speed using fuzzy logic.</p> <p>Nakamura at [0006]: FIG. 11 shows cooling fan rotational speed control and change in interior temperature of the enclosure of a computer. Cooling fan rotational speed control is carried out by changing the cooling fan rotational speed when the temperature measured by a temperature sensor installed in the interior of the enclosure reaches a preset temperature value. For example, in the cooling system described in FIG. 11, the cooling fan rotational speed can be switched between three levels - high speed, medium speed, and low speed, with a total of three set temperature values 505, 507, and 509 being set at the boundary between high speed rotation and medium speed rotation, at the boundary between medium speed rotation and low speed rotation, and at the boundary between low speed rotation and stop. When a computer transitions to a low-load state after being operated in a high-load state, the interior temperature of the enclosure changes as shown by line 501, represented by a dotted line. As the interior temperature of the enclosure drops below the set temperature values 505 and 507 due to decreased heat generation, the state of the cooling fan, which had been rotating at high speed in a high-load state, transitions through medium speed rotation to low speed rotation. As the rotational speed of the cooling fan decreases, less heat is evacuated to the exterior of the enclosure, causing the temperature drop to</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>become more gradual. The rotation of the cooling fan stops when the measured temperature reaches the set temperature value 509.</p> <p>Nakamura at [0007]: When the amount of heat generated in the interior of the enclosure becomes nearly equal to the amount of heat evacuated to the exterior and the interior of the enclosure approaches thermal equilibrium, the interior temperature of the enclosure can no longer decrease readily and so the rate of temperature decrease stagnates. The temperature value at which the rate of decrease stagnates varies depending on individual differences among computers related to heat generation and cooling, differences in usage environment, and the like. The set temperature value 509 for transitioning from low speed rotation to stop is set by experimentally determining a value that will prevent stagnation of the rate of temperature decrease, but due to individual differences, this does not allow stalling to be prevented for all computers in different usage environments. If the set temperature value 509 is made higher to prevent stagnation, the cooling fan will stop before the interior temperature of the enclosure sufficiently decreases, and in some computers, when the load then sharply increases, the cooling capacity tracking response may be too slow, causing the interior of the enclosure to reach a dangerous temperature. As a result, as shown by line 503, represented as a solid line, the temperature value may become stagnated at a value higher than the set temperature value 509.</p> <p>Nakamura at [0008]: In this cooling system, if the rate of decrease of the interior temperature of the enclosure becomes stagnated at a temperature value higher than the set temperature value 509, the cooling fan continues to rotate without stopping. This phenomenon is likely to occur when switching a computer from a high-load state to a temporary standby state, and since the cooling fan continues to rotate even after their work is finished, users find the operating sound that accompanies the rotation of the cooling fan unpleasant. Furthermore, power continues to be wastefully consumed by the rotation of the cooling fan, which is undesirable.</p> <p>Nakamura at [0009]: Therefore, it is an object of the present invention to provide a cooling system that prevents situations where the electronic device cooling fan continues to rotate when the interior</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>temperature of the enclosure has been decreased. It is another object of the present invention to provide a cooling system that can detect the state where the rate of temperature decrease has stagnated before the interior temperature of the enclosure reaches the set temperature value for transitioning from low speed rotation to stop, and can stop the rotation of the cooling fan, reducing both user discomfort from noise and power consumption. It is yet another object of the present invention to provide a cooling method executed by such a cooling system and an electronic device provided with such a cooling system.</p> <p>Nakamura at [0010]: When the rate of decrease of the interior temperature of the enclosure enters a stagnated state, the temperature change over time becomes minimal. In the present invention, when it is determined that the rate of temperature decrease has stagnated while the interior temperature of the enclosure is within a predetermined set temperature range, the cooling fan is stopped. The predetermined set temperature range is set within the range between a second set temperature value at which the cooling fan transitions from a second rotational speed to a first rotational speed, and a first set temperature value at which the cooling fan transitions from the first rotational speed to stop, while the interior temperature of the enclosure is decreasing. When the interior temperature of the enclosure is within the predetermined set temperature range, it means the temperature at which the cooling fan should be stopped has not been reached yet, but the interior of the enclosure is approaching thermal equilibrium, and so there is no risk of the interior of the enclosure reaching a dangerous temperature even if the cooling fan is stopped.</p> <p>Nakamura at [0012]: The set temperature value for transitioning the cooling fan from stop to the first rotational speed when the interior temperature of the enclosure is increasing, and the set temperature value for transitioning from the first rotational speed to stop when the temperature is decreasing are normally made different to prevent the phenomenon of cooling fan chattering, with the former being slightly higher than the latter. By setting the upper limit of the predetermined set temperature range equal to the set temperature value for transitioning from stop to first rotational speed, accurate determination of stagnation state and avoidance of reaching dangerous temperatures can be achieved in a balanced manner.</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>Nakamura at [0014]: Additionally, to stop the cooling fan, the first set temperature value can be temporarily changed to a value higher than the measured temperature value. This method has the advantage of enabling stagnation-based stopping operation while minimizing changes to the control circuit that controls cooling fan rotational speed based on set temperature values.</p> <p>Nakamura at [0015]: When it is determined that the rate of decrease of the interior temperature of the enclosure has stagnated, instead of immediately stopping rotation of the cooling fan, the rotational speed of the cooling fan can also be temporarily increased to lower the interior temperature of the enclosure to the first set temperature value before stopping. In this case, although noise temporarily increases due to the increased fan rotational speed, since the cooling fan will subsequently stop, users can recognize that the cooling fan has entered its pre-stop state, and this causes less discomfort than continuous low-speed fan rotation.</p> <p>Nakamura at [0017]: The present invention makes it possible to provide a cooling system that prevents situations where an electronic device cooling fan continues to rotate when the interior temperature of the enclosure has been lowered. Furthermore, the present invention makes it possible to provide a cooling system that can detect a state where the rate of temperature decrease has stagnated before the interior temperature of the enclosure reaches the set temperature value for transitioning from low speed rotation to stop, and can stop the rotation of the cooling fan, reducing both user discomfort from noise and power consumption. Moreover, the present invention makes it possible to provide a cooling method executed by such a cooling system and an electronic device provided with such a cooling system.</p> <p>Nakamura at [0027]: The BIOS flash ROM 52 is a memory for holding various BIOS programs, and is non-volatile with electrically rewritable memory content. The environment system controller 56 includes an 8-16 bit microprocessor along with RAM, ROM, analog input, timer, digital input/output, etc., and can execute programs related to the operating environment of the PC system 10 without</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>placing excessive load on the CPU 22. The environment system controller 56 also sends control signals for controlling the rotational speed of the cooling fan 14 to the cooling fan drive circuit.</p> <p>Nakamura at [0031]: FIG. 3 shows the relationship between the interior temperature of the enclosure and the operation of the cooling fan 14. In the present embodiment, the cooling fan drive circuit 60 and the environment system controller 56 are configured so that the cooling fan 14 can switch between three levels of rotational speed: high speed, medium speed, and low speed. The temperature control program executed by the environment system controller includes set temperature values for switching the rotational speed of the cooling fan for each temperature sensor 58. When the temperature measured by the temperature sensor 58 has an increasing trend, the set temperature values include set temperature value Ta3 for transitioning from stop to low speed rotation, set temperature value Ta2 for transitioning from low speed rotation to medium speed rotation, and set temperature value Ta1 for transitioning from medium speed rotation to high speed rotation. When the interior temperature of the enclosure has a decreasing trend, the set temperature values include set temperature value Tb1 for transitioning from high speed rotation to medium speed rotation, set temperature value Tb2 for transitioning from medium speed rotation to low speed rotation, and set temperature value Tb3 for transitioning from low speed rotation to stop. To prevent the so-called chattering phenomenon where switching of the rotational speed of the cooling fan 14 occurs frequently when the interior temperature of the enclosure is in the vicinity of a set temperature value, differences are normally provided between Ta1 and Tb1, Ta2 and Tb2, and Ta3 and Tb3, with the former being set several degrees Celsius higher than the latter in each case.</p> <p>Nakamura at [0032]: Now, a case will be considered with the PC system 10 according to the present embodiment where processing that places a large load on the CPU 22 terminates and the CPU transitions to an idle state. Since the CPU 22 transitions from a state of high heat generation to a state of low heat generation, the cooling fan 14 operates at high speed rotation, and the interior temperature of the enclosure 12 gradually decreases from a value higher than set temperature value Ta1. The cooling fan 14, which was initially in a high speed rotation state, switches to medium speed rotation when the temperature inside the enclosure 12 falls below Tb1. Then, when the</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>temperature inside the enclosure 12 falls below Tb2, the cooling fan 14 switches to low speed rotation. When the rotational speed of the cooling fan 14 decreases to low speed rotation, since the amount of heat evacuated to the exterior of the enclosure 12 decreases, the rate of temperature decrease also becomes more gradual. If the interior temperature of the enclosure 12 continues to decrease in the same manner and falls below Tb3, the cooling fan 14 will stop. If the interior temperature of the enclosure 12 stagnates at a temperature value slightly above Tb3, the cooling fan 14 will continue to rotate without stopping.</p> <p>Nakamura at [0033]: In the present invention, the state where the rate of decrease of the interior temperature of the enclosure 12 has stagnated is appropriately detected, and the cooling fan 14 is stopped. More specifically, a state where the rate of decrease of the interior temperature of the enclosure 12 has stagnated refers to a state where, when the cooling fan 14 is in a low speed rotation state, which is the lowest rotational speed among the rotational speeds set in stepwise fashion, the interior temperature of the enclosure 12 is slightly higher than Tb3, and the change over time is minimal. There are several methods conceivable for detecting this state, and three detection methods will be described here.</p> <p>Nakamura at [0035]: In the flowchart, the processing branches according to the current rotational speed of the cooling fan 14 (step 104), and when the cooling fan 14 is stopped and $T \geq Ta3$, the environment system controller 56 causes the cooling fan 14 to rotate at low speed (steps 106, 108). When the cooling fan 14 is at low speed rotation and $T \geq Ta2$, since the temperature has an increasing trend, the environment system controller 56 increases the rotational speed of the cooling fan 14 to medium speed rotation (steps 110, 112). When the cooling fan 14 is at medium speed rotation and $T \geq Ta1$, since the temperature has a further increasing trend, the environment system controller 56 increases the rotational speed of the cooling fan 14 to high speed rotation (steps 114, 116). When the cooling fan 14 is at high speed rotation and $T \leq Tb1$, since the temperature has a decreasing trend, the environment system controller 56 decreases the rotational speed of the cooling fan 14 to medium speed rotation (steps 118, 120). When the cooling fan 14 is at medium speed rotation and $T \leq Tb2$, since the temperature has a decreasing trend, the environment system controller 56 decreases the rotational speed of the cooling fan 14 to low speed rotation (steps 122, 124). When</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>the cooling fan 14 is at low speed rotation and $T \leq T_{b3}$, since the temperature has a further decreasing trend, the environment system controller 56 stops the cooling fan 14 (steps 126, 128).</p> <p>Nakamura at [0036]: In the first detection method, a set temperature range is set for detecting stagnation in the rate of decrease of the temperature inside the enclosure 12 near T_{b3}. The set temperature range is set with an upper limit value T_{s1} equal to set temperature value T_{a3}, which is the set temperature value for transitioning from stop to low speed rotation, and with a lower limit value T_{s2} set to set temperature value T_{b3}, which is for transitioning from low speed rotation to stop. Now, when the interior temperature of the enclosure 12 is within the set temperature range between T_{s1} and T_{s2}, the environment system controller 56 processes signals from the temperature sensor 58 at a sampling interval Δt. Let the temperature value at current time t be T, and the temperature values at past sampling times t_1, t_2, t_3, and t_4 be T_1, T_2, T_3, and T_4 respectively.</p> <p>Nakamura at [0040]: When a state where the decrease in the interior temperature of the enclosure 12 has stagnated is detected based on the detection methods described above, stop processing of the cooling fan 14 is performed. There are several conceivable methods for stop processing, and two methods will be described here. In the first stop processing method, rotation of the cooling fan 14 is stopped immediately upon detecting the stagnation state. Since $T_{s1} = T_{a3}$ in the first through third detection methods, the interior temperature of the enclosure 12 at the time point when rotation of the cooling fan 14 is stopped becomes a temperature below set temperature value T_{a3}. Set temperature value T_{a3} is the temperature value at which transition to low speed rotation occurs when the interior temperature of the enclosure 12 increases while the cooling fan 14 is in a stopped state. In other words, set temperature value T_{a3} has the meaning of being the upper limit temperature for maintaining the stopped state of the cooling fan 14 when the interior temperature of the enclosure 12 has an increasing trend. Therefore, no heat-related problems occur in the PC system 10 even if the cooling fan 14 is stopped when the interior temperature of the enclosure 12 is below the set temperature value T_{a3}. Furthermore, if the PC system 10 is used again and the interior temperature of the enclosure 12 begins to increase again, rotation of the cooling fan 14 starts at set temperature value T_{a3}, allowing it to track the increase in interior temperature of the enclosure 12. FIG. 8 shows actual measurement examples of change in the interior temperature</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>of the enclosure 12 in the first stop processing method. Comparing cases with and without application of the present invention, the time required until stopping of the rotation of the cooling fan 14 has been shortened by approximately 700 seconds.</p> <p>Nakamura at [0041]: FIG. 9 is a diagram showing changes in interior temperature values of the enclosure 12 in the second stop processing method. In the second stop processing method, the rotational speed of the cooling fan 14 is temporarily increased from time point 304 when stagnation was detected in the decrease of interior temperature of the enclosure 12. As a result, the change of the interior temperature of the enclosure 12 temporarily decreased rapidly as shown by line 300, represented as a solid line, as compared to line 302, represented as a dotted line, indicating what the temperature change would be if low speed rotation had been continued. Then, rotation of the cooling fan is stopped at time point 306, when the interior temperature of the enclosure 12 reaches Tb3. FIG. 10 is a flowchart depicting the operation of stop processing in the second stop processing method. When a state of stagnated decrease in the interior temperature of the enclosure 12 is detected, the rotational speed of the cooling fan 14 is temporarily increased to high speed rotation or medium speed rotation (step 400), increasing the amount of heat evacuated to the exterior of the enclosure 12. Then, the interior temperature of the enclosure 12 is brought to Tb3, the temperature at which rotation of the cooling fan 14 should originally stop (steps 402, 404), thereby stopping the rotation of the cooling fan 14 (step 406). This makes it possible to further reduce the possibility of problems occurring in the PC system 10 due to the interior temperature of the enclosure 12. With this stop processing method, although noise temporarily increases when the rotational speed of the cooling fan 14 rises, users can recognize this as an operation for stopping the cooling fan 14 since the cooling fan 14 stops immediately thereafter, within several seconds. Therefore, this reduces discomfort compared to continued low-speed rotation of the cooling fan 14.</p> <p>Nakamura at [0042]: It should be noted that, as a method for stopping the rotation of the cooling fan 14, besides sending a rotation stop control signal directly to the cooling fan drive circuit 60, there is also a method of stopping by temporarily raising the set temperature value Tb3 to a value equal to or higher than the current temperature T. After rotation of the cooling fan 14 stops, the normal state</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>is restored by returning the set temperature value Tb3 to its original value. This method has the advantage of enabling stopping operation while minimizing changes to the cooling fan drive circuit 60.</p> <p>Nakamura at [0043]: Different variations can be considered for the embodiments described thus far. For example, in the first detection method described above, temperatures were compared for up to 4 steps prior to the current time point, but this number of steps can be any number. In the second detection method, the amount of temperature change was compared between the current time point and up to 3 steps prior to the current time point, but this number of steps can be any number as long as it is 2 steps or more. Additionally, the rotational speed of cooling fan 14 can have any number of levels so long as there are 2 or more levels. Furthermore, given that multiple temperature sensors 58 are installed in the interior of the enclosure 12, the rotation of the cooling fan 14 can be stopped when a state where the rate of decrease has stagnated has been detected for all temperatures measured by multiple temperature sensors 58 selected from among the installed sensors. In this case, different set temperature values can be used for each temperature sensor 58. This makes it possible to reduce the influence of temperature variations at different locations in the interior of the enclosure 12 and to more accurately detect a state where the rate of temperature decrease has stagnated.</p>
<p>2. The ICT equipment according to claim 1, wherein the index value is a declined temperature per unit time of the component temperature of the electronic component.</p>	<p>Nakamura discloses, expressly and/or inherently, the ICT equipment according to claim 1, wherein the index value is a declined temperature per unit time of the component temperature of the electronic component.</p> <p><i>See, e.g.:</i></p> <p>Nakamura at Fig. 3 and accompanying text:</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

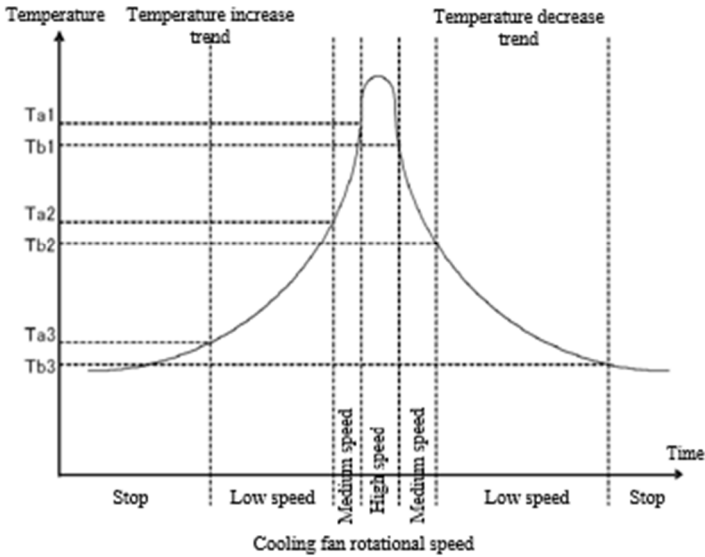
Asserted Claims	Nakamura
	<p data-bbox="730 284 842 321">[FIG. 3]</p>  <p data-bbox="653 938 1213 971">Nakamura at Fig. 4 and accompanying text:</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>[FIG. 4]</p> <p>The graph illustrates a temperature decay process. The vertical axis represents Temperature, and the horizontal axis represents Time. A solid curve shows the temperature decreasing from an initial value towards a lower value. Several horizontal dashed lines indicate specific temperature levels: T_s1 (top), T_s2 (bottom), T_4, T_{a3}, T_3, T_2, T_1, and T_{b3}. Vertical dashed lines mark time points t_4, t_3, t_2, t_1, and t on the time axis. The intervals between these time points are each labeled Δt.</p> <p>Nakamura at Fig. 5 and accompanying text:</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

[FIG. 5]

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graph TD
    Start([Start]) --> 100[Measure temperature value]
    100 --> 102[Save temperature value to memory]
    102 --> 104{Current cooling fan rotational speed}
    104 -- Stop --> 106{<math>T \geq Ta3?</math>}
    104 -- Low speed rotation --> 110{<math>T \geq Ta2?</math>}
    104 -- Medium speed rotation --> 114{<math>T \geq Ta1?</math>}
    104 -- High speed rotation --> 118{<math>T \leq Tb1?</math>}
    106 -- YES --> 108[Fan to low speed rotation]
    106 -- NO --> 108
    110 -- YES --> 112[Fan to medium speed rotation]
    110 -- NO --> 126{<math>T \leq Tb3?</math>}
    126 -- YES --> 128[Perform fan stop processing]
    126 -- NO --> 116[Fan to high speed rotation]
    114 -- YES --> 116
    114 -- NO --> 122{<math>T \leq Tb2?</math>}
    122 -- YES --> 124[Fan to low speed rotation]
    122 -- NO --> 120[Fan to medium speed rotation]
    118 -- YES --> 120
    118 -- NO --> 108
    108 --> 132{End?}
    112 --> 132
    128 --> 132
    116 --> 132
    124 --> 132
    120 --> 132
    132 -- YES --> End([End])
    132 -- NO --> 104

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Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

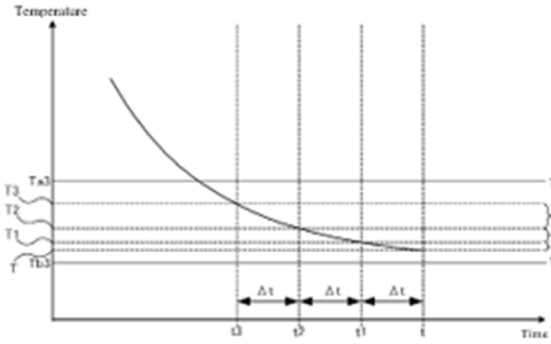
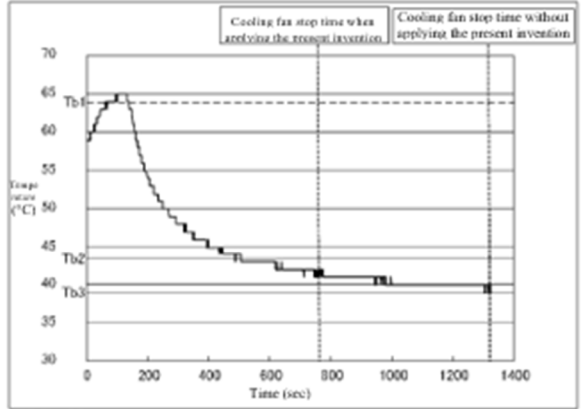
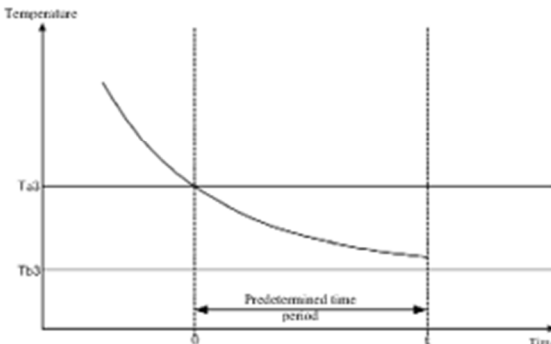
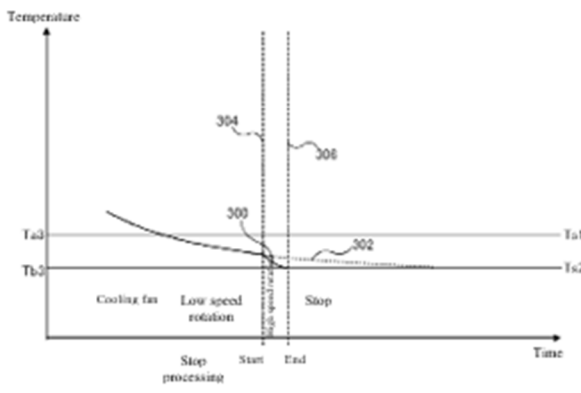
Asserted Claims	Nakamura
	<p>Nakamura at Figs. 6–9 and accompanying text:</p> <div data-bbox="682 289 766 321">[FIG. 6]</div>  <div data-bbox="1260 289 1344 321">[FIG. 8]</div>  <div data-bbox="682 698 766 730">[FIG. 7]</div>  <div data-bbox="1260 730 1344 763">[FIG. 9]</div>  <p>Nakamura at Fig. 11 and accompany text:</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

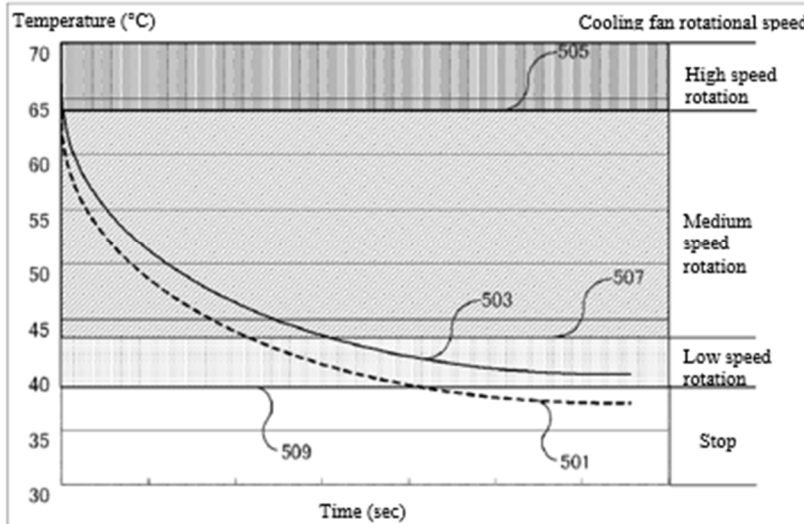
Asserted Claims	Nakamura
	<p data-bbox="682 267 808 300">[FIG. 11]</p>  <p data-bbox="651 901 924 933">Nakamura at [0032]:</p> <p data-bbox="651 941 1890 1364">Now, a case will be considered with the PC system 10 according to the present embodiment where processing that places a large load on the CPU 22 terminates and the CPU transitions to an idle state. Since the CPU 22 transitions from a state of high heat generation to a state of low heat generation, the cooling fan 14 operates at high speed rotation, and the interior temperature of the enclosure 12 gradually decreases from a value higher than set temperature value Ta1. The cooling fan 14, which was initially in a high speed rotation state, switches to medium speed rotation when the temperature inside the enclosure 12 falls below Tb1. Then, when the temperature inside the enclosure 12 falls below Tb2, the cooling fan 14 switches to low speed rotation. When the rotational speed of the cooling fan 14 decreases to low speed rotation, since the amount of heat evacuated to the exterior of the enclosure 12 decreases, the rate of temperature decrease also becomes more gradual. If the interior temperature of the enclosure 12 continues to decrease in the same manner and falls below Tb3, the cooling fan 14 will stop. If the</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>interior temperature of the enclosure 12 stagnates at a temperature value slightly above Tb3, the cooling fan 14 will continue to rotate without stopping.</p> <p>Nakamura at [0033]: In the present invention, the state where the rate of decrease of the interior temperature of the enclosure 12 has stagnated is appropriately detected, and the cooling fan 14 is stopped. More specifically, a state where the rate of decrease of the interior temperature of the enclosure 12 has stagnated refers to a state where, when the cooling fan 14 is in a low speed rotation state, which is the lowest rotational speed among the rotational speeds set in stepwise fashion, the interior temperature of the enclosure 12 is slightly higher than Tb3, and the change over time is minimal. There are several methods conceivable for detecting this state, and three detection methods will be described here.</p> <p>Nakamura at [0034]: The first detection method for detecting a state where the rate of decrease of the interior temperature of the enclosure 12 has stagnated will be described. FIG. 4 illustrates the concept of the first detection method. FIG. 5 represents the first detection method as a flowchart. In this detection method, the interior temperature of the enclosure 12 is sampled at fixed sampling intervals Δt and stored in the memory inside the environment system controller 56 (steps 100, 102). The environment system controller 56 generates speed signals or stop signals according to temperature signals received from the temperature sensor 58, and sends them to the cooling fan drive circuit 60 to control the operation of the cooling fan 14. Let T be the temperature value at current time t.</p> <p>Nakamura at [0035]: In the flowchart, the processing branches according to the current rotational speed of the cooling fan 14 (step 104), and when the cooling fan 14 is stopped and $T \geq Ta3$, the environment system controller 56 causes the cooling fan 14 to rotate at low speed (steps 106, 108). When the cooling fan 14 is at low speed rotation and $T \geq Ta2$, since the temperature has an increasing trend, the environment system controller 56 increases the rotational speed of the cooling fan 14 to medium speed rotation (steps 110, 112). When the cooling fan 14 is at medium speed rotation and $T \geq Ta1$, since the temperature has a further increasing trend, the environment system controller 56</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>increases the rotational speed of the cooling fan 14 to high speed rotation (steps 114, 116). When the cooling fan 14 is at high speed rotation and $T \leq Tb1$, since the temperature has a decreasing trend, the environment system controller 56 decreases the rotational speed of the cooling fan 14 to medium speed rotation (steps 118, 120). When the cooling fan 14 is at medium speed rotation and $T \leq Tb2$, since the temperature has a decreasing trend, the environment system controller 56 decreases the rotational speed of the cooling fan 14 to low speed rotation (steps 122, 124). When the cooling fan 14 is at low speed rotation and $T \leq Tb3$, since the temperature has a further decreasing trend, the environment system controller 56 stops the cooling fan 14 (steps 126, 128).</p> <p>Nakamura at [0036]: In the first detection method, a set temperature range is set for detecting stagnation in the rate of decrease of the temperature inside the enclosure 12 near Tb3. The set temperature range is set with an upper limit value Ts1 equal to set temperature value Ta3, which is the set temperature value for transitioning from stop to low speed rotation, and with a lower limit value Ts2 set to set temperature value Tb3, which is for transitioning from low speed rotation to stop. Now, when the interior temperature of the enclosure 12 is within the set temperature range between Ts1 and Ts2, the environment system controller 56 processes signals from the temperature sensor 58 at a sampling interval Δt. Let the temperature value at current time t be T, and the temperature values at past sampling times t1, t2, t3, and t4 be T1, T2, T3, and T4 respectively.</p> <p>Nakamura at [0037]: The temperature values T1 to T4 are stored in the RAM of the environment system controller 56 along with their sampling times. When the rate of temperature decrease stagnates, the difference between the current temperature value T and the temperature values at each sampling time gradually becomes smaller. For example, the temperature difference (T3-T) between current time t and time t3 becomes smaller than the temperature difference (T4-T) between current time t and time T4. In the present embodiment, the temperature control program can be configured to determine that the rate of temperature decrease has stagnated when the temperature difference (T-T1) between current time t and the previous sampling time t1 is at or below a predetermined value. Alternatively, to more reliably determine the stagnation state, the temperature control program can be configured to determine that the rate of decrease has stagnated when the differences between the current temperature value T and three past temperature values (T1-T,</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>T2-T, T3-T) are all at or below a predetermined value. When the environment system controller detects a state where the rate of decrease of the interior temperature of the enclosure 12 has stagnated (step 130), it stops the cooling fan 14 (step 128). This routine is then repeated (step 132). In the present embodiment, the cooling fan 14 is stopped before the decreasing temperature of the interior of the enclosure 12 reaches set temperature value Tb3, but by determining a stagnation state within a predetermined set temperature range, the system is designed to prevent reaching dangerous temperatures even if high-load processing subsequently occurs in the PC system 10.</p> <p>Nakamura at [0038]: Next, a second detection method for detecting a state where the rate of decrease of the interior temperature of the enclosure 12 has stagnated will be described. FIG. 6 is a diagram describing the concept of the second detection method. In the second detection method, as in the first detection method, the set temperature range is set within the range between Ts1 and Ts2. Now, when the interior temperature of the enclosure 12 is within the set temperature range between Ts1 and Ts2, assuming $\Delta T1 = T - T1$, $\Delta T2 = T1 - T2$, $\Delta T3 = T2 - T3$, as the rate of temperature decrease stagnates, the temperature differences become smaller in the order $\Delta T3$, $\Delta T2$, $\Delta T1$. In the present embodiment, for the second detection method, the temperature control program is configured to determine that the rate of decrease has stagnated when the change in temperature difference between sampling intervals becomes smaller than a predetermined value. The environment system controller detects a state where the decrease in interior temperature of the enclosure 12 has stagnated and sends a stop signal to cooling fan drive circuit 60 to stop the cooling fan 14.</p> <p>Nakamura at [0039]: Next, a third detection method for detecting a state where the rate of decrease of the interior temperature of the enclosure 12 has stagnated will be described. FIG. 7 is a diagram describing the concept of the third detection method. In the third detection method, as in the first and second detection methods, the set temperature range is set within the range between Ts1 and Ts2. Now, time measurement starts at $t=0$ at the time point the interior temperature of the enclosure 12 decreases and falls below Ts1. Time measurement is stopped if temperature T deviates from the set temperature range even once. In the present embodiment, as the third</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>detection method, the temperature control program is configured to determine that the rate of decrease has stagnated when temperature T is within the set temperature range $Ts1 \leq T \leq Ts2$ at all time points where time t satisfies the relationship $0 \leq t \leq$ predetermined time period. The environment system controller detects a state where the decrease in interior temperature of the enclosure 12 has stagnated and sends a stop signal to cooling fan drive circuit 60 to stop the cooling fan 14.</p> <p>Nakamura at [0040]: When a state where the decrease in the interior temperature of the enclosure 12 has stagnated is detected based on the detection methods described above, stop processing of the cooling fan 14 is performed. There are several conceivable methods for stop processing, and two methods will be described here. In the first stop processing method, rotation of the cooling fan 14 is stopped immediately upon detecting the stagnation state. Since $Ts1 = Ta3$ in the first through third detection methods, the interior temperature of the enclosure 12 at the time point when rotation of the cooling fan 14 is stopped becomes a temperature below set temperature value $Ta3$. Set temperature value $Ta3$ is the temperature value at which transition to low speed rotation occurs when the interior temperature of the enclosure 12 increases while the cooling fan 14 is in a stopped state. In other words, set temperature value $Ta3$ has the meaning of being the upper limit temperature for maintaining the stopped state of the cooling fan 14 when the interior temperature of the enclosure 12 has an increasing trend. Therefore, no heat-related problems occur in the PC system 10 even if the cooling fan 14 is stopped when the interior temperature of the enclosure 12 is below the set temperature value $Ta3$. Furthermore, if the PC system 10 is used again and the interior temperature of the enclosure 12 begins to increase again, rotation of the cooling fan 14 starts at set temperature value $Ta3$, allowing it to track the increase in interior temperature of the enclosure 12. FIG. 8 shows actual measurement examples of change in the interior temperature of the enclosure 12 in the first stop processing method. Comparing cases with and without application of the present invention, the time required until stopping of the rotation of the cooling fan 14 has been shortened by approximately 700 seconds.</p> <p>Nakamura at [0041]: FIG. 9 is a diagram showing changes in interior temperature values of the enclosure 12 in the second stop processing method. In the second stop processing method, the rotational speed of the</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>cooling fan 14 is temporarily increased from time point 304 when stagnation was detected in the decrease of interior temperature of the enclosure 12. As a result, the change of the interior temperature of the enclosure 12 temporarily decreased rapidly as shown by line 300, represented as a solid line, as compared to line 302, represented as a dotted line, indicating what the temperature change would be if low speed rotation had been continued. Then, rotation of the cooling fan is stopped at time point 306, when the interior temperature of the enclosure 12 reaches Tb3. FIG. 10 is a flowchart depicting the operation of stop processing in the second stop processing method. When a state of stagnated decrease in the interior temperature of the enclosure 12 is detected, the rotational speed of the cooling fan 14 is temporarily increased to high speed rotation or medium speed rotation (step 400), increasing the amount of heat evacuated to the exterior of the enclosure 12. Then, the interior temperature of the enclosure 12 is brought to Tb3, the temperature at which rotation of the cooling fan 14 should originally stop (steps 402, 404), thereby stopping the rotation of the cooling fan 14 (step 406). This makes it possible to further reduce the possibility of problems occurring in the PC system 10 due to the interior temperature of the enclosure 12. With this stop processing method, although noise temporarily increases when the rotational speed of the cooling fan 14 rises, users can recognize this as an operation for stopping the cooling fan 14 since the cooling fan 14 stops immediately thereafter, within several seconds. Therefore, this reduces discomfort compared to continued low-speed rotation of the cooling fan 14.</p> <p>Nakamura at [0043]: Different variations can be considered for the embodiments described thus far. For example, in the first detection method described above, temperatures were compared for up to 4 steps prior to the current time point, but this number of steps can be any number. In the second detection method, the amount of temperature change was compared between the current time point and up to 3 steps prior to the current time point, but this number of steps can be any number as long as it is 2 steps or more. Additionally, the rotational speed of cooling fan 14 can have any number of levels so long as there are 2 or more levels. Furthermore, given that multiple temperature sensors 58 are installed in the interior of the enclosure 12, the rotation of the cooling fan 14 can be stopped when a state where the rate of decrease has stagnated has been detected for all temperatures measured by multiple temperature sensors 58 selected from among the installed sensors. In this case, different set temperature values can be used for each temperature sensor 58.</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	This makes it possible to reduce the influence of temperature variations at different locations in the interior of the enclosure 12 and to more accurately detect a state where the rate of temperature decrease has stagnated.
3. The ICT equipment according to claim 1, wherein the index value is an average value of declination rates of the component temperature of the electronic component in a plurality of measurement periods.	<p>Nakamura discloses, expressly and/or inherently, the ICT equipment according to claim 1, wherein the index value is an average value of declination rates of the component temperature of the electronic component in a plurality of measurement periods.</p> <p><i>See, e.g.:</i></p> <p>Nakamura at [0013]: There are several methods for determining a state where the rate of decrease of the interior temperature of the enclosure has stagnated. For example, this can be determined on the basis of the difference between the current sampling temperature value and multiple past sampling temperature values. This can also be determined based on amount of change in difference, by calculating the difference between temperature values measured at each sampling cycle. Furthermore, stagnation can be determined to be present if the interior temperature of the enclosure remains within the predetermined set temperature range for a predetermined period of time or longer.</p>
4. The ICT equipment according to claim 1, wherein the index value is a difference between a highest value of the component temperature of the electronic component in a past certain period and a current component temperature.	<p>Nakamura discloses, expressly and/or inherently, the abnormality detection device according to claim 1, wherein the temperature sensor is configured to detect a temperature of exhaust air.</p> <p><i>See, e.g.:</i></p> <p>Nakamura at Fig. 3 and accompanying text:</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

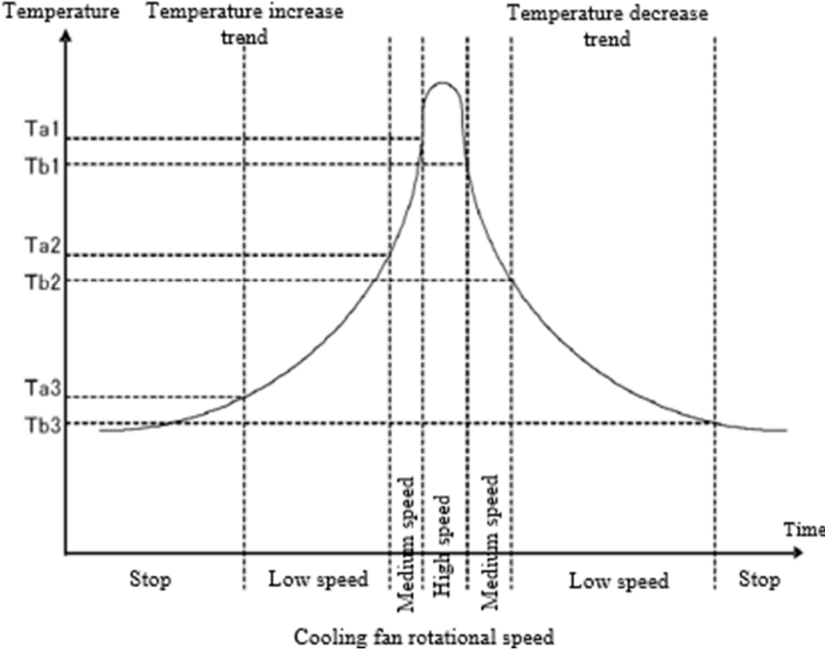
Asserted Claims	Nakamura
	<p data-bbox="688 272 814 311">[FIG. 3]</p>  <p data-bbox="688 337 1507 987">The graph shows Temperature on the vertical axis and Time on the horizontal axis. A curve represents the temperature profile. The curve starts at a baseline temperature (Ta3, Tb3), rises during a 'Temperature increase trend' (labeled 'Low speed'), reaches a peak during a 'High speed' period, and then falls during a 'Temperature decrease trend' (labeled 'Low speed'). The cooling fan rotational speed is indicated by vertical dashed lines: 'Stop', 'Low speed', 'Medium speed', 'High speed', 'Medium speed', 'Low speed', and 'Stop'. Horizontal dashed lines indicate temperature levels: Ta1, Tb1, Ta2, Tb2, Ta3, and Tb3. The temperature peaks at Ta1 and Tb1 during the 'High speed' period. The temperature decreases from Ta1 to Ta2 and from Tb1 to Tb2 during the 'Medium speed' periods. The temperature returns to the baseline (Ta3, Tb3) during the final 'Stop' period.</p> <p data-bbox="655 1026 919 1058">Nakamura at [0013]:</p> <p data-bbox="655 1062 1885 1351">There are several methods for determining a state where the rate of decrease of the interior temperature of the enclosure has stagnated. For example, this can be determined on the basis of the difference between the current sampling temperature value and multiple past sampling temperature values. This can also be determined based on amount of change in difference, by calculating the difference between temperature values measured at each sampling cycle. Furthermore, stagnation can be determined to be present if the interior temperature of the enclosure remains within the predetermined set temperature range for a predetermined period of time or longer.</p> <p data-bbox="655 1390 919 1422">Nakamura at [0031]:</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>FIG. 3 shows the relationship between the interior temperature of the enclosure and the operation of the cooling fan 14. In the present embodiment, the cooling fan drive circuit 60 and the environment system controller 56 are configured so that the cooling fan 14 can switch between three levels of rotational speed: high speed, medium speed, and low speed. The temperature control program executed by the environment system controller includes set temperature values for switching the rotational speed of the cooling fan for each temperature sensor 58. When the temperature measured by the temperature sensor 58 has an increasing trend, the set temperature values include set temperature value Ta3 for transitioning from stop to low speed rotation, set temperature value Ta2 for transitioning from low speed rotation to medium speed rotation, and set temperature value Ta1 for transitioning from medium speed rotation to high speed rotation. When the interior temperature of the enclosure has a decreasing trend, the set temperature values include set temperature value Tb1 for transitioning from high speed rotation to medium speed rotation, set temperature value Tb2 for transitioning from medium speed rotation to low speed rotation, and set temperature value Tb3 for transitioning from low speed rotation to stop. To prevent the so-called chattering phenomenon where switching of the rotational speed of the cooling fan 14 occurs frequently when the interior temperature of the enclosure is in the vicinity of a set temperature value, differences are normally provided between Ta1 and Tb1, Ta2 and Tb2, and Ta3 and Tb3, with the former being set several degrees Celsius higher than the latter in each case.</p> <p>Nakamura at [0037]: The temperature values T1 to T4 are stored in the RAM of the environment system controller 56 along with their sampling times. When the rate of temperature decrease stagnates, the difference between the current temperature value T and the temperature values at each sampling time gradually becomes smaller. For example, the temperature difference (T3-T) between current time t and time t3 becomes smaller than the temperature difference (T4-T) between current time t and time T4. In the present embodiment, the temperature control program can be configured to determine that the rate of temperature decrease has stagnated when the temperature difference (T-T1) between current time t and the previous sampling time t1 is at or below a predetermined value. Alternatively, to more reliably determine the stagnation state, the temperature control program can be configured to determine that the rate of decrease has stagnated when the differences between the current temperature value T and three past temperature values (T1-T,</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>T2-T, T3-T) are all at or below a predetermined value. When the environment system controller detects a state where the rate of decrease of the interior temperature of the enclosure 12 has stagnated (step 130), it stops the cooling fan 14 (step 128). This routine is then repeated (step 132). In the present embodiment, the cooling fan 14 is stopped before the decreasing temperature of the interior of the enclosure 12 reaches set temperature value Tb3, but by determining a stagnation state within a predetermined set temperature range, the system is designed to prevent reaching dangerous temperatures even if high-load processing subsequently occurs in the PC system 10.</p> <p>Nakamura at [0038]: Next, a second detection method for detecting a state where the rate of decrease of the interior temperature of the enclosure 12 has stagnated will be described. FIG. 6 is a diagram describing the concept of the second detection method. In the second detection method, as in the first detection method, the set temperature range is set within the range between Ts1 and Ts2. Now, when the interior temperature of the enclosure 12 is within the set temperature range between Ts1 and Ts2, assuming $\Delta T1 = T - T1$, $\Delta T2 = T1 - T2$, $\Delta T3 = T2 - T3$, as the rate of temperature decrease stagnates, the temperature differences become smaller in the order $\Delta T3$, $\Delta T2$, $\Delta T1$. In the present embodiment, for the second detection method, the temperature control program is configured to determine that the rate of decrease has stagnated when the change in temperature difference between sampling intervals becomes smaller than a predetermined value. The environment system controller detects a state where the decrease in interior temperature of the enclosure 12 has stagnated and sends a stop signal to cooling fan drive circuit 60 to stop the cooling fan 14.</p>
<p>5. The ICT equipment according to claim 1, wherein the control unit controls the number of rotations of the cooling fan to be lower as the degree of declination of the component temperature of the electronic component, indicated by the</p>	<p>Nakamura discloses, expressly and/or inherently, the ICT equipment according to claim 1, wherein the control unit controls the number of rotations of the cooling fan to be lower as the degree of declination of the component temperature of the electronic component, indicated by the index value calculated by the declination index value calculation unit, is larger.</p> <p><i>See, e.g.:</i></p> <p>Nakamura at Fig. 3 and accompanying text:</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

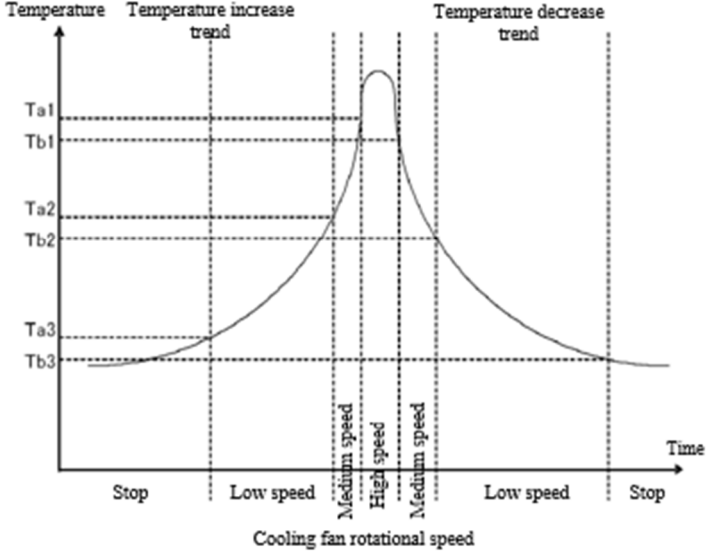
Asserted Claims	Nakamura
<p>index value calculated by the declination index value calculation unit, is larger.</p>	<p>[FIG. 3]</p>  <p>Nakamura at Fig. 4 and accompanying text:</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>[FIG. 4]</p> <p>The graph illustrates a temperature decay process. The vertical axis represents Temperature, and the horizontal axis represents Time. A solid curve shows the temperature decreasing from an initial point towards a lower temperature. Several horizontal dashed lines indicate specific temperature levels: T_s1 (top), T_4, T_{a3}, T_3, T_2, T_1, T_{b3}, and T_{s2} (bottom). Vertical dashed lines mark time points t_4, t_3, t_2, t_1, and t on the time axis. The intervals between these time points are each labeled Δt.</p> <p>Nakamura at Fig. 5 and accompanying text:</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>[FIG. 5]</p> <pre> graph TD Start([Start]) --> 100[Measure temperature value] 100 --> 102[Save temperature value to memory] 102 --> 104{Current cooling fan rotational speed} 104 -- Stop --> 108[Fan to low speed rotation] 104 -- Low speed rotation --> 110{T ≥ Ta3?} 110 -- YES --> 108 110 -- NO --> 112{T ≥ Ta2?} 112 -- YES --> 116[Fan to medium speed rotation] 112 -- NO --> 126{T ≤ Tb3?} 126 -- YES --> 128[Perform fan stop processing] 126 -- NO --> 122{T ≤ Tb2?} 122 -- YES --> 124[Fan to low speed rotation] 122 -- NO --> 114{T ≥ Ta1?} 114 -- YES --> 116 114 -- NO --> 118{T ≤ Tb1?} 118 -- YES --> 120[Fan to medium speed rotation] 118 -- NO --> 116 128 --> 130{T_{s1} ≥ T_{s2} and temperature decrease stagnating?} 130 -- YES --> 128 130 -- NO --> 132{End?} 132 -- YES --> End([End]) 132 -- NO --> 104 </pre> <p>Ts1</p> <p>Ts2</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>Nakamura at [0032]: Now, a case will be considered with the PC system 10 according to the present embodiment where processing that places a large load on the CPU 22 terminates and the CPU transitions to an idle state. Since the CPU 22 transitions from a state of high heat generation to a state of low heat generation, the cooling fan 14 operates at high speed rotation, and the interior temperature of the enclosure 12 gradually decreases from a value higher than set temperature value Ta1. The cooling fan 14, which was initially in a high speed rotation state, switches to medium speed rotation when the temperature inside the enclosure 12 falls below Tb1. Then, when the temperature inside the enclosure 12 falls below Tb2, the cooling fan 14 switches to low speed rotation. When the rotational speed of the cooling fan 14 decreases to low speed rotation, since the amount of heat evacuated to the exterior of the enclosure 12 decreases, the rate of temperature decrease also becomes more gradual. If the interior temperature of the enclosure 12 continues to decrease in the same manner and falls below Tb3, the cooling fan 14 will stop. If the interior temperature of the enclosure 12 stagnates at a temperature value slightly above Tb3, the cooling fan 14 will continue to rotate without stopping.</p> <p>Nakamura at [0033]: In the present invention, the state where the rate of decrease of the interior temperature of the enclosure 12 has stagnated is appropriately detected, and the cooling fan 14 is stopped. More specifically, a state where the rate of decrease of the interior temperature of the enclosure 12 has stagnated refers to a state where, when the cooling fan 14 is in a low speed rotation state, which is the lowest rotational speed among the rotational speeds set in stepwise fashion, the interior temperature of the enclosure 12 is slightly higher than Tb3, and the change over time is minimal. There are several methods conceivable for detecting this state, and three detection methods will be described here.</p> <p>Nakamura at [0034]: The first detection method for detecting a state where the rate of decrease of the interior temperature of the enclosure 12 has stagnated will be described. FIG. 4 illustrates the concept of the first detection method. FIG. 5 represents the first detection method as a flowchart. In this detection method, the interior temperature of the enclosure 12 is sampled at fixed sampling intervals Δt and stored in the memory inside the environment system controller 56 (steps 100,</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>102). The environment system controller 56 generates speed signals or stop signals according to temperature signals received from the temperature sensor 58, and sends them to the cooling fan drive circuit 60 to control the operation of the cooling fan 14. Let T be the temperature value at current time t.</p> <p>Nakamura at [0035]: In the flowchart, the processing branches according to the current rotational speed of the cooling fan 14 (step 104), and when the cooling fan 14 is stopped and $T \geq Ta3$, the environment system controller 56 causes the cooling fan 14 to rotate at low speed (steps 106, 108). When the cooling fan 14 is at low speed rotation and $T \geq Ta2$, since the temperature has an increasing trend, the environment system controller 56 increases the rotational speed of the cooling fan 14 to medium speed rotation (steps 110, 112). When the cooling fan 14 is at medium speed rotation and $T \geq Ta1$, since the temperature has a further increasing trend, the environment system controller 56 increases the rotational speed of the cooling fan 14 to high speed rotation (steps 114, 116). When the cooling fan 14 is at high speed rotation and $T \leq Tb1$, since the temperature has a decreasing trend, the environment system controller 56 decreases the rotational speed of the cooling fan 14 to medium speed rotation (steps 118, 120). When the cooling fan 14 is at medium speed rotation and $T \leq Tb2$, since the temperature has a decreasing trend, the environment system controller 56 decreases the rotational speed of the cooling fan 14 to low speed rotation (steps 122, 124). When the cooling fan 14 is at low speed rotation and $T \leq Tb3$, since the temperature has a further decreasing trend, the environment system controller 56 stops the cooling fan 14 (steps 126, 128).</p> <p>Nakamura at [0036]: In the first detection method, a set temperature range is set for detecting stagnation in the rate of decrease of the temperature inside the enclosure 12 near Tb3. The set temperature range is set with an upper limit value Ts1 equal to set temperature value Ta3, which is the set temperature value for transitioning from stop to low speed rotation, and with a lower limit value Ts2 set to set temperature value Tb3, which is for transitioning from low speed rotation to stop. Now, when the interior temperature of the enclosure 12 is within the set temperature range between Ts1 and Ts2, the environment system controller 56 processes signals from the temperature sensor 58 at a sampling interval Δt. Let the temperature value at current time t be T, and the temperature values at past sampling times t1, t2, t3, and t4 be T1, T2, T3, and T4 respectively.</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>Nakamura at [0037]: The temperature values T1 to T4 are stored in the RAM of the environment system controller 56 along with their sampling times. When the rate of temperature decrease stagnates, the difference between the current temperature value T and the temperature values at each sampling time gradually becomes smaller. For example, the temperature difference (T3-T) between current time t and time t3 becomes smaller than the temperature difference (T4-T) between current time t and time T4. In the present embodiment, the temperature control program can be configured to determine that the rate of temperature decrease has stagnated when the temperature difference (T-T1) between current time t and the previous sampling time t1 is at or below a predetermined value. Alternatively, to more reliably determine the stagnation state, the temperature control program can be configured to determine that the rate of decrease has stagnated when the differences between the current temperature value T and three past temperature values (T1-T, T2-T, T3-T) are all at or below a predetermined value. When the environment system controller detects a state where the rate of decrease of the interior temperature of the enclosure 12 has stagnated (step 130), it stops the cooling fan 14 (step 128). This routine is then repeated (step 132). In the present embodiment, the cooling fan 14 is stopped before the decreasing temperature of the interior of the enclosure 12 reaches set temperature value Tb3, but by determining a stagnation state within a predetermined set temperature range, the system is designed to prevent reaching dangerous temperatures even if high-load processing subsequently occurs in the PC system 10.</p> <p>Nakamura at [0038]: Next, a second detection method for detecting a state where the rate of decrease of the interior temperature of the enclosure 12 has stagnated will be described. FIG. 6 is a diagram describing the concept of the second detection method. In the second detection method, as in the first detection method, the set temperature range is set within the range between Ts1 and Ts2. Now, when the interior temperature of the enclosure 12 is within the set temperature range between Ts1 and Ts2, assuming $\Delta T1 = T - T1$, $\Delta T2 = T1 - T2$, $\Delta T3 = T2 - T3$, as the rate of temperature decrease stagnates, the temperature differences become smaller in the order $\Delta T3$, $\Delta T2$, $\Delta T1$. In the present embodiment, for the second detection method, the temperature control program is configured to determine that the rate of decrease has stagnated when the change in temperature</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p data-bbox="653 253 1856 396">difference between sampling intervals becomes smaller than a predetermined value. The environment system controller detects a state where the decrease in interior temperature of the enclosure 12 has stagnated and sends a stop signal to cooling fan drive circuit 60 to stop the cooling fan 14.</p> <p data-bbox="653 436 919 467">Nakamura at [0039]:</p> <p data-bbox="653 475 1881 943">Next, a third detection method for detecting a state where the rate of decrease of the interior temperature of the enclosure 12 has stagnated will be described. FIG. 7 is a diagram describing the concept of the third detection method. In the third detection method, as in the first and second detection methods, the set temperature range is set within the range between Ts1 and Ts2. Now, time measurement starts at t=0 at the time point the interior temperature of the enclosure 12 decreases and falls below Ts1. Time measurement is stopped if temperature T deviates from the set temperature range even once. In the present embodiment, as the third detection method, the temperature control program is configured to determine that the rate of decrease has stagnated when temperature T is within the set temperature range $Ts1 \leq T \leq Ts2$ at all time points where time t satisfies the relationship $0 \leq t \leq \text{predetermined time period}$. The environment system controller detects a state where the decrease in interior temperature of the enclosure 12 has stagnated and sends a stop signal to cooling fan drive circuit 60 to stop the cooling fan 14.</p> <p data-bbox="653 984 919 1015">Nakamura at [0040]:</p> <p data-bbox="653 1023 1892 1416">When a state where the decrease in the interior temperature of the enclosure 12 has stagnated is detected based on the detection methods described above, stop processing of the cooling fan 14 is performed. There are several conceivable methods for stop processing, and two methods will be described here. In the first stop processing method, rotation of the cooling fan 14 is stopped immediately upon detecting the stagnation state. Since $Ts1 = Ta3$ in the first through third detection methods, the interior temperature of the enclosure 12 at the time point when rotation of the cooling fan 14 is stopped becomes a temperature below set temperature value Ta3. Set temperature value Ta3 is the temperature value at which transition to low speed rotation occurs when the interior temperature of the enclosure 12 increases while the cooling fan 14 is in a stopped state. In other words, set temperature value Ta3 has the meaning of being the upper limit temperature for maintaining the stopped state of the cooling fan 14 when the interior temperature</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>of the enclosure 12 has an increasing trend. Therefore, no heat-related problems occur in the PC system 10 even if the cooling fan 14 is stopped when the interior temperature of the enclosure 12 is below the set temperature value Ta3. Furthermore, if the PC system 10 is used again and the interior temperature of the enclosure 12 begins to increase again, rotation of the cooling fan 14 starts at set temperature value Ta3, allowing it to track the increase in interior temperature of the enclosure 12. FIG. 8 shows actual measurement examples of change in the interior temperature of the enclosure 12 in the first stop processing method. Comparing cases with and without application of the present invention, the time required until stopping of the rotation of the cooling fan 14 has been shortened by approximately 700 seconds.</p> <p>Nakamura at [0041]:</p> <p>FIG. 9 is a diagram showing changes in interior temperature values of the enclosure 12 in the second stop processing method. In the second stop processing method, the rotational speed of the cooling fan 14 is temporarily increased from time point 304 when stagnation was detected in the decrease of interior temperature of the enclosure 12. As a result, the change of the interior temperature of the enclosure 12 temporarily decreased rapidly as shown by line 300, represented as a solid line, as compared to line 302, represented as a dotted line, indicating what the temperature change would be if low speed rotation had been continued. Then, rotation of the cooling fan is stopped at time point 306, when the interior temperature of the enclosure 12 reaches Tb3. FIG. 10 is a flowchart depicting the operation of stop processing in the second stop processing method. When a state of stagnated decrease in the interior temperature of the enclosure 12 is detected, the rotational speed of the cooling fan 14 is temporarily increased to high speed rotation or medium speed rotation (step 400), increasing the amount of heat evacuated to the exterior of the enclosure 12. Then, the interior temperature of the enclosure 12 is brought to Tb3, the temperature at which rotation of the cooling fan 14 should originally stop (steps 402, 404), thereby stopping the rotation of the cooling fan 14 (step 406). This makes it possible to further reduce the possibility of problems occurring in the PC system 10 due to the interior temperature of the enclosure 12. With this stop processing method, although noise temporarily increases when the rotational speed of the cooling fan 14 rises, users can recognize this as an operation for stopping the cooling fan 14 since the cooling fan 14 stops immediately thereafter, within several seconds. Therefore, this reduces discomfort compared to continued low-speed rotation of the cooling fan 14.</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>Nakamura at [0043]:</p> <p>Different variations can be considered for the embodiments described thus far. For example, in the first detection method described above, temperatures were compared for up to 4 steps prior to the current time point, but this number of steps can be any number. In the second detection method, the amount of temperature change was compared between the current time point and up to 3 steps prior to the current time point, but this number of steps can be any number as long as it is 2 steps or more. Additionally, the rotational speed of cooling fan 14 can have any number of levels so long as there are 2 or more levels. Furthermore, given that multiple temperature sensors 58 are installed in the interior of the enclosure 12, the rotation of the cooling fan 14 can be stopped when a state where the rate of decrease has stagnated has been detected for all temperatures measured by multiple temperature sensors 58 selected from among the installed sensors. In this case, different set temperature values can be used for each temperature sensor 58. This makes it possible to reduce the influence of temperature variations at different locations in the interior of the enclosure 12 and to more accurately detect a state where the rate of temperature decrease has stagnated.</p>
<p>6. The ICT equipment according to claim 1, wherein if the index value is not less than a predetermined threshold, the control unit stops the cooling fan.</p>	<p>Nakamura discloses, expressly and/or inherently, the ICT equipment according to claim 1, wherein if the index value is not less than a predetermined threshold, the control unit stops the cooling fan.</p> <p><i>See, e.g.:</i></p> <p>Nakamura at Fig. 3 and accompanying text:</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

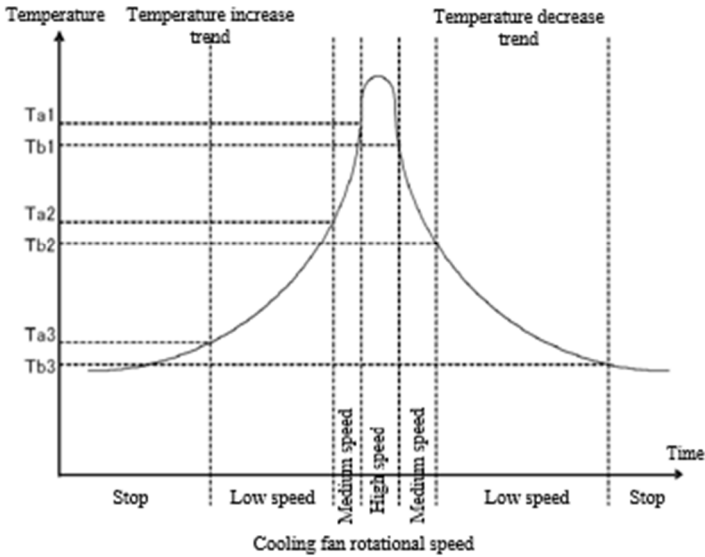
Asserted Claims	Nakamura
	<p data-bbox="730 284 842 321">[FIG. 3]</p>  <p data-bbox="653 938 1213 974">Nakamura at Fig. 4 and accompanying text:</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>[FIG. 4]</p> <p>The graph illustrates a temperature decay process. The vertical axis represents Temperature, with marked levels T_4, T_{a3}, T_3, T_2, T_1, T_{b3}, T_{s1}, and T_{s2}. The horizontal axis represents Time, with marked points t_4, t_3, t_2, t_1, and t. The time intervals between these points are each Δt. A curve shows the temperature decreasing from T_4 at t_4 towards T_{s2} at t.</p> <p>Nakamura at Fig. 5 and accompanying text:</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>[FIG. 5]</p> <pre> graph TD Start([Start]) --> 100[Measure temperature value] 100 --> 102[Save temperature value to memory] 102 --> 104{Current cooling fan rotational speed} 104 -- Stop --> 108[Fan to low speed rotation] 104 -- Low speed rotation --> 110{T ≥ Ta3?} 110 -- YES --> 108 110 -- NO --> 112{T ≥ Ta2?} 112 -- YES --> 116[Fan to medium speed rotation] 112 -- NO --> 126{T ≤ Tb3?} 126 -- YES --> 128[Perform fan stop processing] 126 -- NO --> 130{Ts1 ≥ Ts2 and temperature decrease stagnating?} 130 -- YES --> 128 130 -- NO --> 116 104 -- Medium speed rotation --> 114{T ≥ Ta1?} 114 -- YES --> 116 114 -- NO --> 122{T ≤ Tb2?} 122 -- YES --> 124[Fan to low speed rotation] 122 -- NO --> 120[Fan to medium speed rotation] 104 -- High speed rotation --> 118{T ≤ Tb1?} 118 -- YES --> 120 118 -- NO --> 116 108 --> 132{End?} 116 --> 132 120 --> 132 124 --> 132 128 --> 132 132 -- YES --> End([End]) 132 -- NO --> 104 </pre> <p>Labels: Ts1, Ts2</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

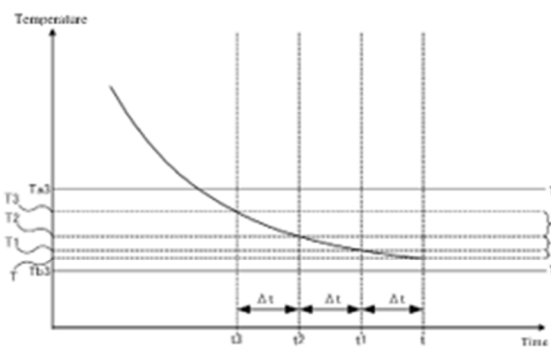
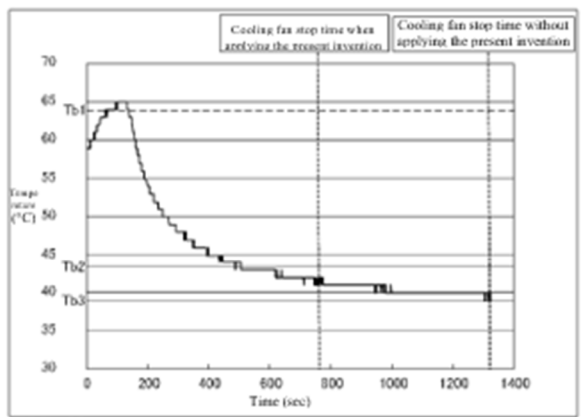
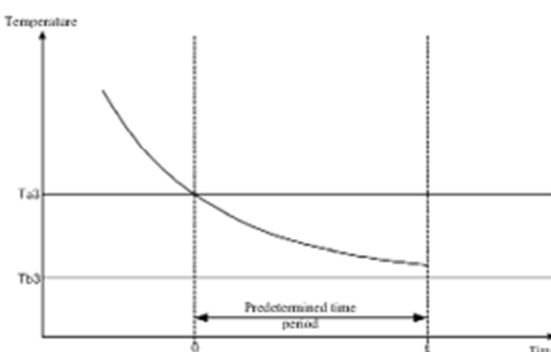
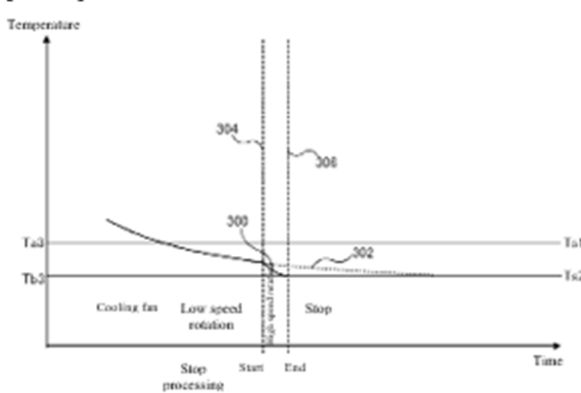
Asserted Claims	Nakamura
	<p>Nakamura at Figs. 6–9 and accompanying text:</p> <div data-bbox="682 292 766 324">[FIG. 6]</div>  <div data-bbox="1260 292 1344 324">[FIG. 8]</div>  <div data-bbox="682 698 766 730">[FIG. 7]</div>  <div data-bbox="1260 730 1344 763">[FIG. 9]</div>  <p>Nakamura at Fig. 11 and accompany text:</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

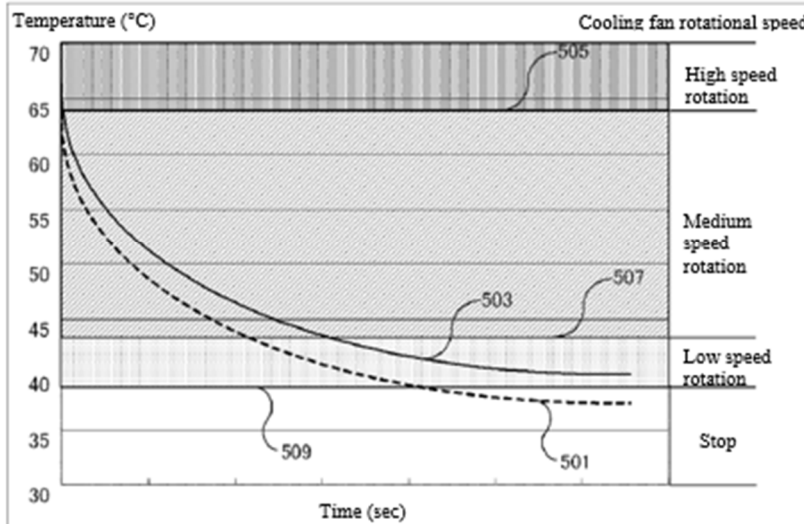
Asserted Claims	Nakamura
	<p data-bbox="682 267 808 300">[FIG. 11]</p>  <p data-bbox="651 933 924 966">Nakamura at [0006]:</p> <p data-bbox="651 974 1879 1404">FIG. 11 shows cooling fan rotational speed control and change in interior temperature of the enclosure of a computer. Cooling fan rotational speed control is carried out by changing the cooling fan rotational speed when the temperature measured by a temperature sensor installed in the interior of the enclosure reaches a preset temperature value. For example, in the cooling system described in FIG. 11, the cooling fan rotational speed can be switched between three levels - high speed, medium speed, and low speed, with a total of three set temperature values 505, 507, and 509 being set at the boundary between high speed rotation and medium speed rotation, at the boundary between medium speed rotation and low speed rotation, and at the boundary between low speed rotation and stop. When a computer transitions to a low-load state after being operated in a high-load state, the interior temperature of the enclosure changes as shown by line 501, represented by a dotted line. As the interior temperature of the enclosure drops below the set temperature values 505 and 507 due to decreased heat generation, the state</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>of the cooling fan, which had been rotating at high speed in a high-load state, transitions through medium speed rotation to low speed rotation. As the rotational speed of the cooling fan decreases, less heat is evacuated to the exterior of the enclosure, causing the temperature drop to become more gradual. The rotation of the cooling fan stops when the measured temperature reaches the set temperature value 509.</p> <p>Nakamura at [0007]: When the amount of heat generated in the interior of the enclosure becomes nearly equal to the amount of heat evacuated to the exterior and the interior of the enclosure approaches thermal equilibrium, the interior temperature of the enclosure can no longer decrease readily and so the rate of temperature decrease stagnates. The temperature value at which the rate of decrease stagnates varies depending on individual differences among computers related to heat generation and cooling, differences in usage environment, and the like. The set temperature value 509 for transitioning from low speed rotation to stop is set by experimentally determining a value that will prevent stagnation of the rate of temperature decrease, but due to individual differences, this does not allow stalling to be prevented for all computers in different usage environments. If the set temperature value 509 is made higher to prevent stagnation, the cooling fan will stop before the interior temperature of the enclosure sufficiently decreases, and in some computers, when the load then sharply increases, the cooling capacity tracking response may be too slow, causing the interior of the enclosure to reach a dangerous temperature. As a result, as shown by line 503, represented as a solid line, the temperature value may become stagnated at a value higher than the set temperature value 509.</p> <p>Nakamura at [0009]: Therefore, it is an object of the present invention to provide a cooling system that prevents situations where the electronic device cooling fan continues to rotate when the interior temperature of the enclosure has been decreased. It is another object of the present invention to provide a cooling system that can detect the state where the rate of temperature decrease has stagnated before the interior temperature of the enclosure reaches the set temperature value for transitioning from low speed rotation to stop, and can stop the rotation of the cooling fan, reducing both user discomfort from noise and power consumption. It is yet another object of the</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>present invention to provide a cooling method executed by such a cooling system and an electronic device provided with such a cooling system.</p> <p>Nakamura at [0010]: When the rate of decrease of the interior temperature of the enclosure enters a stagnated state, the temperature change over time becomes minimal. In the present invention, when it is determined that the rate of temperature decrease has stagnated while the interior temperature of the enclosure is within a predetermined set temperature range, the cooling fan is stopped. The predetermined set temperature range is set within the range between a second set temperature value at which the cooling fan transitions from a second rotational speed to a first rotational speed, and a first set temperature value at which the cooling fan transitions from the first rotational speed to stop, while the interior temperature of the enclosure is decreasing. When the interior temperature of the enclosure is within the predetermined set temperature range, it means the temperature at which the cooling fan should be stopped has not been reached yet, but the interior of the enclosure is approaching thermal equilibrium, and so there is no risk of the interior of the enclosure reaching a dangerous temperature even if the cooling fan is stopped.</p> <p>Nakamura at [0012]: The set temperature value for transitioning the cooling fan from stop to the first rotational speed when the interior temperature of the enclosure is increasing, and the set temperature value for transitioning from the first rotational speed to stop when the temperature is decreasing are normally made different to prevent the phenomenon of cooling fan chattering, with the former being slightly higher than the latter. By setting the upper limit of the predetermined set temperature range equal to the set temperature value for transitioning from stop to first rotational speed, accurate determination of stagnation state and avoidance of reaching dangerous temperatures can be achieved in a balanced manner.</p> <p>Nakamura at [0014]: Additionally, to stop the cooling fan, the first set temperature value can be temporarily changed to a value higher than the measured temperature value. This method has the advantage of enabling stagnation-based stopping operation while minimizing changes to the control circuit that controls cooling fan rotational speed based on set temperature values.</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>Nakamura at [0015]: When it is determined that the rate of decrease of the interior temperature of the enclosure has stagnated, instead of immediately stopping rotation of the cooling fan, the rotational speed of the cooling fan can also be temporarily increased to lower the interior temperature of the enclosure to the first set temperature value before stopping. In this case, although noise temporarily increases due to the increased fan rotational speed, since the cooling fan will subsequently stop, users can recognize that the cooling fan has entered its pre-stop state, and this causes less discomfort than continuous low-speed fan rotation.</p> <p>Nakamura at [0017]: The present invention makes it possible to provide a cooling system that prevents situations where an electronic device cooling fan continues to rotate when the interior temperature of the enclosure has been lowered. Furthermore, the present invention makes it possible to provide a cooling system that can detect a state where the rate of temperature decrease has stagnated before the interior temperature of the enclosure reaches the set temperature value for transitioning from low speed rotation to stop, and can stop the rotation of the cooling fan, reducing both user discomfort from noise and power consumption. Moreover, the present invention makes it possible to provide a cooling method executed by such a cooling system and an electronic device provided with such a cooling system.</p> <p>Nakamura at [0029]: The cooling fan drive circuit generates and supplies voltage at a frequency corresponding to the speed signal received from the environment system controller 56 to the cooling fan 14, changing the speed of or stopping the cooling fan 14. It should be noted that FIG. 2 merely shows a simplified representation of the main hardware configuration and connection relationships to avoid complication of the drawing. Many other electrical circuits and devices are necessary to configure the PC system 10, but since these are well known to those skilled in the art, detailed mention will not be made of parts other than those constituting the essence of the present invention.</p> <p>Nakamura at [0031]:</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>FIG. 3 shows the relationship between the interior temperature of the enclosure and the operation of the cooling fan 14. In the present embodiment, the cooling fan drive circuit 60 and the environment system controller 56 are configured so that the cooling fan 14 can switch between three levels of rotational speed: high speed, medium speed, and low speed. The temperature control program executed by the environment system controller includes set temperature values for switching the rotational speed of the cooling fan for each temperature sensor 58. When the temperature measured by the temperature sensor 58 has an increasing trend, the set temperature values include set temperature value Ta3 for transitioning from stop to low speed rotation, set temperature value Ta2 for transitioning from low speed rotation to medium speed rotation, and set temperature value Ta1 for transitioning from medium speed rotation to high speed rotation. When the interior temperature of the enclosure has a decreasing trend, the set temperature values include set temperature value Tb1 for transitioning from high speed rotation to medium speed rotation, set temperature value Tb2 for transitioning from medium speed rotation to low speed rotation, and set temperature value Tb3 for transitioning from low speed rotation to stop. To prevent the so-called chattering phenomenon where switching of the rotational speed of the cooling fan 14 occurs frequently when the interior temperature of the enclosure is in the vicinity of a set temperature value, differences are normally provided between Ta1 and Tb1, Ta2 and Tb2, and Ta3 and Tb3, with the former being set several degrees Celsius higher than the latter in each case.</p> <p>Nakamura at [0032]:</p> <p>Now, a case will be considered with the PC system 10 according to the present embodiment where processing that places a large load on the CPU 22 terminates and the CPU transitions to an idle state. Since the CPU 22 transitions from a state of high heat generation to a state of low heat generation, the cooling fan 14 operates at high speed rotation, and the interior temperature of the enclosure 12 gradually decreases from a value higher than set temperature value Ta1. The cooling fan 14, which was initially in a high speed rotation state, switches to medium speed rotation when the temperature inside the enclosure 12 falls below Tb1. Then, when the temperature inside the enclosure 12 falls below Tb2, the cooling fan 14 switches to low speed rotation. When the rotational speed of the cooling fan 14 decreases to low speed rotation, since the amount of heat evacuated to the exterior of the enclosure 12 decreases, the rate of temperature decrease also becomes more gradual. If the interior temperature of the enclosure 12</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>continues to decrease in the same manner and falls below Tb3, the cooling fan 14 will stop. If the interior temperature of the enclosure 12 stagnates at a temperature value slightly above Tb3, the cooling fan 14 will continue to rotate without stopping.</p> <p>Nakamura at [0033]: In the present invention, the state where the rate of decrease of the interior temperature of the enclosure 12 has stagnated is appropriately detected, and the cooling fan 14 is stopped. More specifically, a state where the rate of decrease of the interior temperature of the enclosure 12 has stagnated refers to a state where, when the cooling fan 14 is in a low speed rotation state, which is the lowest rotational speed among the rotational speeds set in stepwise fashion, the interior temperature of the enclosure 12 is slightly higher than Tb3, and the change over time is minimal. There are several methods conceivable for detecting this state, and three detection methods will be described here.</p> <p>Nakamura at [0034]: The first detection method for detecting a state where the rate of decrease of the interior temperature of the enclosure 12 has stagnated will be described. FIG. 4 illustrates the concept of the first detection method. FIG. 5 represents the first detection method as a flowchart. In this detection method, the interior temperature of the enclosure 12 is sampled at fixed sampling intervals Δt and stored in the memory inside the environment system controller 56 (steps 100, 102). The environment system controller 56 generates speed signals or stop signals according to temperature signals received from the temperature sensor 58, and sends them to the cooling fan drive circuit 60 to control the operation of the cooling fan 14. Let T be the temperature value at current time t.</p> <p>Nakamura at [0035]: In the flowchart, the processing branches according to the current rotational speed of the cooling fan 14 (step 104), and when the cooling fan 14 is stopped and $T \geq Ta3$, the environment system controller 56 causes the cooling fan 14 to rotate at low speed (steps 106, 108). When the cooling fan 14 is at low speed rotation and $T \geq Ta2$, since the temperature has an increasing trend, the environment system controller 56 increases the rotational speed of the cooling fan 14 to medium speed rotation (steps 110, 112). When the cooling fan 14 is at medium speed rotation and $T \geq$</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>Ta1, since the temperature has a further increasing trend, the environment system controller 56 increases the rotational speed of the cooling fan 14 to high speed rotation (steps 114, 116). When the cooling fan 14 is at high speed rotation and $T \leq Tb1$, since the temperature has a decreasing trend, the environment system controller 56 decreases the rotational speed of the cooling fan 14 to medium speed rotation (steps 118, 120). When the cooling fan 14 is at medium speed rotation and $T \leq Tb2$, since the temperature has a decreasing trend, the environment system controller 56 decreases the rotational speed of the cooling fan 14 to low speed rotation (steps 122, 124). When the cooling fan 14 is at low speed rotation and $T \leq Tb3$, since the temperature has a further decreasing trend, the environment system controller 56 stops the cooling fan 14 (steps 126, 128).</p> <p>Nakamura at [0036]: In the first detection method, a set temperature range is set for detecting stagnation in the rate of decrease of the temperature inside the enclosure 12 near Tb3. The set temperature range is set with an upper limit value Ts1 equal to set temperature value Ta3, which is the set temperature value for transitioning from stop to low speed rotation, and with a lower limit value Ts2 set to set temperature value Tb3, which is for transitioning from low speed rotation to stop. Now, when the interior temperature of the enclosure 12 is within the set temperature range between Ts1 and Ts2, the environment system controller 56 processes signals from the temperature sensor 58 at a sampling interval Δt. Let the temperature value at current time t be T, and the temperature values at past sampling times t1, t2, t3, and t4 be T1, T2, T3, and T4 respectively.</p> <p>Nakamura at [0037]: The temperature values T1 to T4 are stored in the RAM of the environment system controller 56 along with their sampling times. When the rate of temperature decrease stagnates, the difference between the current temperature value T and the temperature values at each sampling time gradually becomes smaller. For example, the temperature difference (T3-T) between current time t and time t3 becomes smaller than the temperature difference (T4-T) between current time t and time T4. In the present embodiment, the temperature control program can be configured to determine that the rate of temperature decrease has stagnated when the temperature difference (T-T1) between current time t and the previous sampling time t1 is at or below a predetermined value. Alternatively, to more reliably determine the stagnation state, the temperature control program can be configured to determine that the rate of decrease has stagnated when the</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>differences between the current temperature value T and three past temperature values ($T_1 - T$, $T_2 - T$, $T_3 - T$) are all at or below a predetermined value. When the environment system controller detects a state where the rate of decrease of the interior temperature of the enclosure 12 has stagnated (step 130), it stops the cooling fan 14 (step 128). This routine is then repeated (step 132). In the present embodiment, the cooling fan 14 is stopped before the decreasing temperature of the interior of the enclosure 12 reaches set temperature value T_{b3}, but by determining a stagnation state within a predetermined set temperature range, the system is designed to prevent reaching dangerous temperatures even if high-load processing subsequently occurs in the PC system 10.</p> <p>Nakamura at [0038]: Next, a second detection method for detecting a state where the rate of decrease of the interior temperature of the enclosure 12 has stagnated will be described. FIG. 6 is a diagram describing the concept of the second detection method. In the second detection method, as in the first detection method, the set temperature range is set within the range between T_{s1} and T_{s2}. Now, when the interior temperature of the enclosure 12 is within the set temperature range between T_{s1} and T_{s2}, assuming $\Delta T_1 = T - T_1$, $\Delta T_2 = T_1 - T_2$, $\Delta T_3 = T_2 - T_3$, as the rate of temperature decrease stagnates, the temperature differences become smaller in the order ΔT_3, ΔT_2, ΔT_1. In the present embodiment, for the second detection method, the temperature control program is configured to determine that the rate of decrease has stagnated when the change in temperature difference between sampling intervals becomes smaller than a predetermined value. The environment system controller detects a state where the decrease in interior temperature of the enclosure 12 has stagnated and sends a stop signal to cooling fan drive circuit 60 to stop the cooling fan 14.</p> <p>Nakamura at [0039]: Next, a third detection method for detecting a state where the rate of decrease of the interior temperature of the enclosure 12 has stagnated will be described. FIG. 7 is a diagram describing the concept of the third detection method. In the third detection method, as in the first and second detection methods, the set temperature range is set within the range between T_{s1} and T_{s2}. Now, time measurement starts at $t=0$ at the time point the interior temperature of the enclosure 12 decreases and falls below T_{s1}. Time measurement is stopped if temperature T</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>deviates from the set temperature range even once. In the present embodiment, as the third detection method, the temperature control program is configured to determine that the rate of decrease has stagnated when temperature T is within the set temperature range $Ts1 \leq T \leq Ts2$ at all time points where time t satisfies the relationship $0 \leq t \leq$ predetermined time period. The environment system controller detects a state where the decrease in interior temperature of the enclosure 12 has stagnated and sends a stop signal to cooling fan drive circuit 60 to stop the cooling fan 14.</p> <p>Nakamura at [0040]: When a state where the decrease in the interior temperature of the enclosure 12 has stagnated is detected based on the detection methods described above, stop processing of the cooling fan 14 is performed. There are several conceivable methods for stop processing, and two methods will be described here. In the first stop processing method, rotation of the cooling fan 14 is stopped immediately upon detecting the stagnation state. Since $Ts1 = Ta3$ in the first through third detection methods, the interior temperature of the enclosure 12 at the time point when rotation of the cooling fan 14 is stopped becomes a temperature below set temperature value $Ta3$. Set temperature value $Ta3$ is the temperature value at which transition to low speed rotation occurs when the interior temperature of the enclosure 12 increases while the cooling fan 14 is in a stopped state. In other words, set temperature value $Ta3$ has the meaning of being the upper limit temperature for maintaining the stopped state of the cooling fan 14 when the interior temperature of the enclosure 12 has an increasing trend. Therefore, no heat-related problems occur in the PC system 10 even if the cooling fan 14 is stopped when the interior temperature of the enclosure 12 is below the set temperature value $Ta3$. Furthermore, if the PC system 10 is used again and the interior temperature of the enclosure 12 begins to increase again, rotation of the cooling fan 14 starts at set temperature value $Ta3$, allowing it to track the increase in interior temperature of the enclosure 12. FIG. 8 shows actual measurement examples of change in the interior temperature of the enclosure 12 in the first stop processing method. Comparing cases with and without application of the present invention, the time required until stopping of the rotation of the cooling fan 14 has been shortened by approximately 700 seconds.</p> <p>Nakamura at [0041]:</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>FIG. 9 is a diagram showing changes in interior temperature values of the enclosure 12 in the second stop processing method. In the second stop processing method, the rotational speed of the cooling fan 14 is temporarily increased from time point 304 when stagnation was detected in the decrease of interior temperature of the enclosure 12. As a result, the change of the interior temperature of the enclosure 12 temporarily decreased rapidly as shown by line 300, represented as a solid line, as compared to line 302, represented as a dotted line, indicating what the temperature change would be if low speed rotation had been continued. Then, rotation of the cooling fan is stopped at time point 306, when the interior temperature of the enclosure 12 reaches Tb3. FIG. 10 is a flowchart depicting the operation of stop processing in the second stop processing method. When a state of stagnated decrease in the interior temperature of the enclosure 12 is detected, the rotational speed of the cooling fan 14 is temporarily increased to high speed rotation or medium speed rotation (step 400), increasing the amount of heat evacuated to the exterior of the enclosure 12. Then, the interior temperature of the enclosure 12 is brought to Tb3, the temperature at which rotation of the cooling fan 14 should originally stop (steps 402, 404), thereby stopping the rotation of the cooling fan 14 (step 406). This makes it possible to further reduce the possibility of problems occurring in the PC system 10 due to the interior temperature of the enclosure 12. With this stop processing method, although noise temporarily increases when the rotational speed of the cooling fan 14 rises, users can recognize this as an operation for stopping the cooling fan 14 since the cooling fan 14 stops immediately thereafter, within several seconds. Therefore, this reduces discomfort compared to continued low-speed rotation of the cooling fan 14.</p> <p>Nakamura at [0042]: It should be noted that, as a method for stopping the rotation of the cooling fan 14, besides sending a rotation stop control signal directly to the cooling fan drive circuit 60, there is also a method of stopping by temporarily raising the set temperature value Tb3 to a value equal to or higher than the current temperature T. After rotation of the cooling fan 14 stops, the normal state is restored by returning the set temperature value Tb3 to its original value. This method has the advantage of enabling stopping operation while minimizing changes to the cooling fan drive circuit 60.</p> <p>Nakamura at [0043]:</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>Different variations can be considered for the embodiments described thus far. For example, in the first detection method described above, temperatures were compared for up to 4 steps prior to the current time point, but this number of steps can be any number. In the second detection method, the amount of temperature change was compared between the current time point and up to 3 steps prior to the current time point, but this number of steps can be any number as long as it is 2 steps or more. Additionally, the rotational speed of cooling fan 14 can have any number of levels so long as there are 2 or more levels. Furthermore, given that multiple temperature sensors 58 are installed in the interior of the enclosure 12, the rotation of the cooling fan 14 can be stopped when a state where the rate of decrease has stagnated has been detected for all temperatures measured by multiple temperature sensors 58 selected from among the installed sensors. In this case, different set temperature values can be used for each temperature sensor 58. This makes it possible to reduce the influence of temperature variations at different locations in the interior of the enclosure 12 and to more accurately detect a state where the rate of temperature decrease has stagnated.</p>
<p>[7.pre] 7. A control device for ICT (Information and Communication technology) equipment having a cooling fan, electronic component, a first temperature sensor for detecting a temperature of the electronic component, and a second temperature sensor that detects a temperature of an intake air, the control device comprising:</p>	<p>Dell takes no position in these Invalidity Contentions on whether the entirety of the preamble of this claim limitation. Nakamura discloses, expressly and/or inherently, a control device for ICT (Information and Communication technology) equipment having a cooling fan, electronic component, a first temperature sensor for detecting a temperature of the electronic component, and a second temperature sensor that detects a temperature of an intake air, the control device comprising:</p> <p><i>See claims 1.pre–1.c.</i></p>
<p>[7.a] a microprocessor including:</p>	<p>Nakamura discloses, expressly and/or inherently, a microprocessor.</p> <p><i>See claim 1.d.</i></p>
<p>[7.b] a declination index value calculation unit that calculates an index value indicating a</p>	<p>Nakamura discloses, expressly and/or inherently, a declination index value calculation unit that calculates an index value indicating a degree of declination of a component temperature of the</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
degree of declination of a component temperature of the electronic component included in ICT equipment, based on a detection result of the first temperature sensor that detects the component temperature of the electronic component; and	<p>electronic component included in ICT equipment, based on a detection result of the first temperature sensor that detects the component temperature of the electronic component.</p> <p><i>See claim 1.e.</i></p>
[7.c] a control unit that controls the number of rotations of a cooling fan based on the index value calculated by the declination index value calculation unit and the temperature of the intake air by the second temperature sensor.	<p>Nakamura discloses, expressly and/or inherently, a control unit that controls the number of rotations of a cooling fan based on the index value calculated by the declination index value calculation unit and the temperature of the intake air by the second temperature sensor.</p> <p><i>See claim 1.f.</i></p>
[8.pre] 8. A temperature controlling method comprising:	<p>Dell takes no position in these Invalidity Contentions on whether the entirety of the preamble of this claim limitation. Nakamura discloses, expressly and/or inherently, a temperature controlling method.</p> <p><i>See, e.g.:</i></p> <p>Nakamura at Fig. 5 and accompanying text:</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>[FIG. 5]</p> <pre> graph TD Start([Start]) --> 100[Measure temperature value] 100 --> 102[Save temperature value to memory] 102 --> 104{Current cooling fan rotational speed} 104 --> LowSpeed[Low speed rotation] 104 --> MediumSpeed[Medium speed rotation] 104 --> HighSpeed[High speed rotation] LowSpeed --> 106{T >= Ta1?} 106 -- YES --> 108[Fan to low speed rotation] 106 -- NO --> 110{T >= Ta2?} 110 -- YES --> 112[Fan to medium speed rotation] 110 -- NO --> 126{T >= Tb3?} 126 -- YES --> 130{T >= Td and temperature is decrease continued?} 126 -- NO --> 128[Perform fan stop recognition] 130 -- YES --> 128 130 -- NO --> 104 MediumSpeed --> 114{T >= Ta1?} 114 -- YES --> 116[Fan to high speed rotation] 114 -- NO --> 122{T >= Tb2?} 122 -- YES --> 124[Fan to low speed rotation] 122 -- NO --> 120{T >= Tb1?} 120 -- YES --> 120[Fan to medium speed rotation] 120 -- NO --> 118{T >= Tb1?} 118 -- YES --> 120 118 -- NO --> 104 128 --> 132{End?} 132 -- YES --> End([End]) 132 -- NO --> 104 </pre> <p>Nakamura at [0009]:</p>

Exhibit E8 – Nakamura Invalidity Claim Chart for the '320 Patent

Asserted Claims	Nakamura
	<p>Therefore, it is an object of the present invention to provide a cooling system that prevents situations where the electronic device cooling fan continues to rotate when the interior temperature of the enclosure has been decreased. It is another object of the present invention to provide a cooling system that can detect the state where the rate of temperature decrease has stagnated before the interior temperature of the enclosure reaches the set temperature value for transitioning from low speed rotation to stop, and can stop the rotation of the cooling fan, reducing both user discomfort from noise and power consumption. It is yet another object of the present invention to provide a cooling method executed by such a cooling system and an electronic device provided with such a cooling system.</p> <p>Nakamura at [0013]: There are several methods for determining a state where the rate of decrease of the interior temperature of the enclosure has stagnated. For example, this can be determined on the basis of the difference between the current sampling temperature value and multiple past sampling temperature values. This can also be determined based on amount of change in difference, by calculating the difference between temperature values measured at each sampling cycle. Furthermore, stagnation can be determined to be present if the interior temperature of the enclosure remains within the predetermined set temperature range for a predetermined period of time or longer.</p> <p>Nakamura at [0014]: Additionally, to stop the cooling fan, the first set temperature value can be temporarily changed to a value higher than the measured temperature value. This method has the advantage of enabling stagnation-based stopping operation while minimizing changes to the control circuit that controls cooling fan rotational speed based on set temperature values.</p> <p>Nakamura at [0016]: Furthermore, the present invention can be understood not only as an electronic device enclosure interior cooling system, but also as an electronic device equipped with such a system, or as a method for cooling the interior of an electronic device enclosure. [Effects of the invention]</p>

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	<p>Nakamura at [0017]: The present invention makes it possible to provide a cooling system that prevents situations where an electronic device cooling fan continues to rotate when the interior temperature of the enclosure has been lowered. Furthermore, the present invention makes it possible to provide a cooling system that can detect a state where the rate of temperature decrease has stagnated before the interior temperature of the enclosure reaches the set temperature value for transitioning from low speed rotation to stop, and can stop the rotation of the cooling fan, reducing both user discomfort from noise and power consumption. Moreover, the present invention makes it possible to provide a cooling method executed by such a cooling system and an electronic device provided with such a cooling system.</p> <p>Nakamura at [0033]: In the present invention, the state where the rate of decrease of the interior temperature of the enclosure 12 has stagnated is appropriately detected, and the cooling fan 14 is stopped. More specifically, a state where the rate of decrease of the interior temperature of the enclosure 12 has stagnated refers to a state where, when the cooling fan 14 is in a low speed rotation state, which is the lowest rotational speed among the rotational speeds set in stepwise fashion, the interior temperature of the enclosure 12 is slightly higher than Tb3, and the change over time is minimal. There are several methods conceivable for detecting this state, and three detection methods will be described here.</p> <p>Nakamura at [0034]: The first detection method for detecting a state where the rate of decrease of the interior temperature of the enclosure 12 has stagnated will be described. FIG. 4 illustrates the concept of the first detection method. FIG. 5 represents the first detection method as a flowchart. In this detection method, the interior temperature of the enclosure 12 is sampled at fixed sampling intervals Δt and stored in the memory inside the environment system controller 56 (steps 100, 102). The environment system controller 56 generates speed signals or stop signals according to temperature signals received from the temperature sensor 58, and sends them to the cooling fan drive circuit 60 to control the operation of the cooling fan 14. Let T be the temperature value at current time t.</p>

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	<p>Nakamura at [0036]: In the first detection method, a set temperature range is set for detecting stagnation in the rate of decrease of the temperature inside the enclosure 12 near Tb3. The set temperature range is set with an upper limit value Ts1 equal to set temperature value Ta3, which is the set temperature value for transitioning from stop to low speed rotation, and with a lower limit value Ts2 set to set temperature value Tb3, which is for transitioning from low speed rotation to stop. Now, when the interior temperature of the enclosure 12 is within the set temperature range between Ts1 and Ts2, the environment system controller 56 processes signals from the temperature sensor 58 at a sampling interval Δt. Let the temperature value at current time t be T, and the temperature values at past sampling times t1, t2, t3, and t4 be T1, T2, T3, and T4 respectively.</p> <p>Nakamura at [0038]: Next, a second detection method for detecting a state where the rate of decrease of the interior temperature of the enclosure 12 has stagnated will be described. FIG. 6 is a diagram describing the concept of the second detection method. In the second detection method, as in the first detection method, the set temperature range is set within the range between Ts1 and Ts2. Now, when the interior temperature of the enclosure 12 is within the set temperature range between Ts1 and Ts2, assuming $\Delta T1 = T - T1$, $\Delta T2 = T1 - T2$, $\Delta T3 = T2 - T3$, as the rate of temperature decrease stagnates, the temperature differences become smaller in the order $\Delta T3$, $\Delta T2$, $\Delta T1$. In the present embodiment, for the second detection method, the temperature control program is configured to determine that the rate of decrease has stagnated when the change in temperature difference between sampling intervals becomes smaller than a predetermined value. The environment system controller detects a state where the decrease in interior temperature of the enclosure 12 has stagnated and sends a stop signal to cooling fan drive circuit 60 to stop the cooling fan 14.</p> <p>Nakamura at [0039]: Next, a third detection method for detecting a state where the rate of decrease of the interior temperature of the enclosure 12 has stagnated will be described. FIG. 7 is a diagram describing the concept of the third detection method. In the third detection method, as in the first and second detection methods, the set temperature range is set within the range between Ts1 and Ts2. Now, time measurement starts at $t=0$ at the time point the interior temperature of the</p>

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	<p>enclosure 12 decreases and falls below Ts1. Time measurement is stopped if temperature T deviates from the set temperature range even once. In the present embodiment, as the third detection method, the temperature control program is configured to determine that the rate of decrease has stagnated when temperature T is within the set temperature range $Ts1 \leq T \leq Ts2$ at all time points where time t satisfies the relationship $0 \leq t \leq$ predetermined time period. The environment system controller detects a state where the decrease in interior temperature of the enclosure 12 has stagnated and sends a stop signal to cooling fan drive circuit 60 to stop the cooling fan 14.</p> <p>Nakamura at [0040]: When a state where the decrease in the interior temperature of the enclosure 12 has stagnated is detected based on the detection methods described above, stop processing of the cooling fan 14 is performed. There are several conceivable methods for stop processing, and two methods will be described here. In the first stop processing method, rotation of the cooling fan 14 is stopped immediately upon detecting the stagnation state. Since $Ts1 = Ta3$ in the first through third detection methods, the interior temperature of the enclosure 12 at the time point when rotation of the cooling fan 14 is stopped becomes a temperature below set temperature value Ta3. Set temperature value Ta3 is the temperature value at which transition to low speed rotation occurs when the interior temperature of the enclosure 12 increases while the cooling fan 14 is in a stopped state. In other words, set temperature value Ta3 has the meaning of being the upper limit temperature for maintaining the stopped state of the cooling fan 14 when the interior temperature of the enclosure 12 has an increasing trend. Therefore, no heat-related problems occur in the PC system 10 even if the cooling fan 14 is stopped when the interior temperature of the enclosure 12 is below the set temperature value Ta3. Furthermore, if the PC system 10 is used again and the interior temperature of the enclosure 12 begins to increase again, rotation of the cooling fan 14 starts at set temperature value Ta3, allowing it to track the increase in interior temperature of the enclosure 12. FIG. 8 shows actual measurement examples of change in the interior temperature of the enclosure 12 in the first stop processing method. Comparing cases with and without application of the present invention, the time required until stopping of the rotation of the cooling fan 14 has been shortened by approximately 700 seconds.</p> <p>Nakamura at [0041]:</p>

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	<p>FIG. 9 is a diagram showing changes in interior temperature values of the enclosure 12 in the second stop processing method. In the second stop processing method, the rotational speed of the cooling fan 14 is temporarily increased from time point 304 when stagnation was detected in the decrease of interior temperature of the enclosure 12. As a result, the change of the interior temperature of the enclosure 12 temporarily decreased rapidly as shown by line 300, represented as a solid line, as compared to line 302, represented as a dotted line, indicating what the temperature change would be if low speed rotation had been continued. Then, rotation of the cooling fan is stopped at time point 306, when the interior temperature of the enclosure 12 reaches Tb3. FIG. 10 is a flowchart depicting the operation of stop processing in the second stop processing method. When a state of stagnated decrease in the interior temperature of the enclosure 12 is detected, the rotational speed of the cooling fan 14 is temporarily increased to high speed rotation or medium speed rotation (step 400), increasing the amount of heat evacuated to the exterior of the enclosure 12. Then, the interior temperature of the enclosure 12 is brought to Tb3, the temperature at which rotation of the cooling fan 14 should originally stop (steps 402, 404), thereby stopping the rotation of the cooling fan 14 (step 406). This makes it possible to further reduce the possibility of problems occurring in the PC system 10 due to the interior temperature of the enclosure 12. With this stop processing method, although noise temporarily increases when the rotational speed of the cooling fan 14 rises, users can recognize this as an operation for stopping the cooling fan 14 since the cooling fan 14 stops immediately thereafter, within several seconds. Therefore, this reduces discomfort compared to continued low-speed rotation of the cooling fan 14.</p> <p>Nakamura at [0042]: It should be noted that, as a method for stopping the rotation of the cooling fan 14, besides sending a rotation stop control signal directly to the cooling fan drive circuit 60, there is also a method of stopping by temporarily raising the set temperature value Tb3 to a value equal to or higher than the current temperature T. After rotation of the cooling fan 14 stops, the normal state is restored by returning the set temperature value Tb3 to its original value. This method has the advantage of enabling stopping operation while minimizing changes to the cooling fan drive circuit 60.</p> <p>Nakamura at [0043]:</p>

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	<p>Different variations can be considered for the embodiments described thus far. For example, in the first detection method described above, temperatures were compared for up to 4 steps prior to the current time point, but this number of steps can be any number. In the second detection method, the amount of temperature change was compared between the current time point and up to 3 steps prior to the current time point, but this number of steps can be any number as long as it is 2 steps or more. Additionally, the rotational speed of cooling fan 14 can have any number of levels so long as there are 2 or more levels. Furthermore, given that multiple temperature sensors 58 are installed in the interior of the enclosure 12, the rotation of the cooling fan 14 can be stopped when a state where the rate of decrease has stagnated has been detected for all temperatures measured by multiple temperature sensors 58 selected from among the installed sensors. In this case, different set temperature values can be used for each temperature sensor 58. This makes it possible to reduce the influence of temperature variations at different locations in the interior of the enclosure 12 and to more accurately detect a state where the rate of temperature decrease has stagnated.</p>
<p>[8.a] by a declination index value calculation unit, calculating an index value indicating a degree of declination of a component temperature of an electronic component included in ICT (Information and Communication Technology) equipment, based on a detection result of a first temperature sensor that detects the component temperature of the electronic component and a second temperature sensor that detects a temperature of an intake air; and</p>	<p>Nakamura discloses, expressly and/or inherently, by a declination index value calculation unit, calculating an index value indicating a degree of declination of a component temperature of an electronic component included in ICT (Information and Communication Technology) equipment, based on a detection result of a first temperature sensor that detects the component temperature of the electronic component and a second temperature sensor that detects a temperature of an intake air.</p> <p><i>See claims 1.pre, 1.b, 1.c, 1.e, 7.pre, 7.b.</i></p>

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[8.b] by a control unit, controlling the number of rotations of a cooling fan based on the index value calculated by the declination index value calculation unit and the temperature of the intake air by the second temperature sensor.	<p>Nakamura discloses, expressly and/or inherently, by a control unit, controlling the number of rotations of a cooling fan based on the index value calculated by the declination index value calculation unit and the temperature of the intake air by the second temperature sensor.</p> <p><i>See claims 1.f, 7.c.</i></p>