

AudioCodes Boards Fail to Initialize

Issue Date: 2/15/06

Issue

Systems with multiple AudioCodes boards (4-6) may fail to initialize

Products Affected

This issue has been observed with AudioCodes PCI cards (except SmartWORKS NGX) under Microsoft Windows 2000 or 2003 Server. All Microsoft operating systems are potentially affected.

Symptoms

Applications show fewer channels than expected, and/or cannot open certain boards

Board DSP LEDs fail to illuminate

Windows event log logs the following error:

"Global Memory mapping failed on brd nn" where nn is the board number

Applications compiled using a SmartWORKS SDK earlier than 2.7.0 may experience a blue screen upon board failure

Description

AudioCodes boards are considered external devices by the Operating Systems they work under. External devices (PCI cards, disc drives, video adapters, etc.) are mapped into system memory using a unit of measure called a PTE, or Page Table Entry.

Most AudioCodes boards require a base memory region plus an extra 2MB of memory in order to get mapped in. All AudioCodes boards require a *contiguous non-fragmented* memory region in order to be successfully mapped in. For example, the SmartWORKS AT 1609 requires a base memory space of 16MB plus 2MB more. It is possible that a system may have 20MB worth of PTEs available, but the largest contiguous region may be less than 16MB, in which case this AudioCodes AT1609 board would fail to initialize. Always bear in mind that the total number of PTEs available can vary widely from system to system and any changes to a system also modifies the number of PTEs available.

The following table lists each SmartWORKS board and it's *estimated* minimal memory requirement.

Table 1: Memory Requirements of Current AudioCodes SmartWORKS Cards

Board	6409	3209	2409	1609	809	409	Other
SmartWORKS DT	16+2MB	16+2MB	---	---	---	---	---
SmartWORKS DT TE	16+2MB	16+2MB	---	---	---	---	---
SmartWORKS DP	16+2MB	16+2MB	---	---	---	---	---
SmartWORKS AT	---	---	---	16+2MB	16+2MB	16+2MB	---
SmartWORKS PT	---	---	---	16+2MB	16+2MB	16+2MB	---
SmartWORKS LD	---	---	4 + 2MB	4+2MB	2+2MB	2 + 2MB	---
SmartWORKS LD 101	---	---	---	---	---	---	4+2MB
SmartWORKS LD 409H	---	---	---	---	---	---	2 + 2MB
SmartWORKS LD 809X	---	---	---	---	---	---	4 + 2MB
SmartWORKS NGX	---	---	---	---	---	---	2MB + 1KB + 1KB + 256B
SmartWORKS PCM	16+2MB	16+2MB	---	---	---	---	---
SmartWORKS IPX	---	---	---	---	---	---	16MB +160KB

Application

The following is a way to estimate the number of boards your system will support by determining the number of PTEs available. The number of PTEs varies from system to system and varies with the number of devices mapped. Hence, this method of determining the number of AudioCodes boards that can be loaded in a system is an estimate only.

1. First, evaluate how many PTEs are available after booting the system.

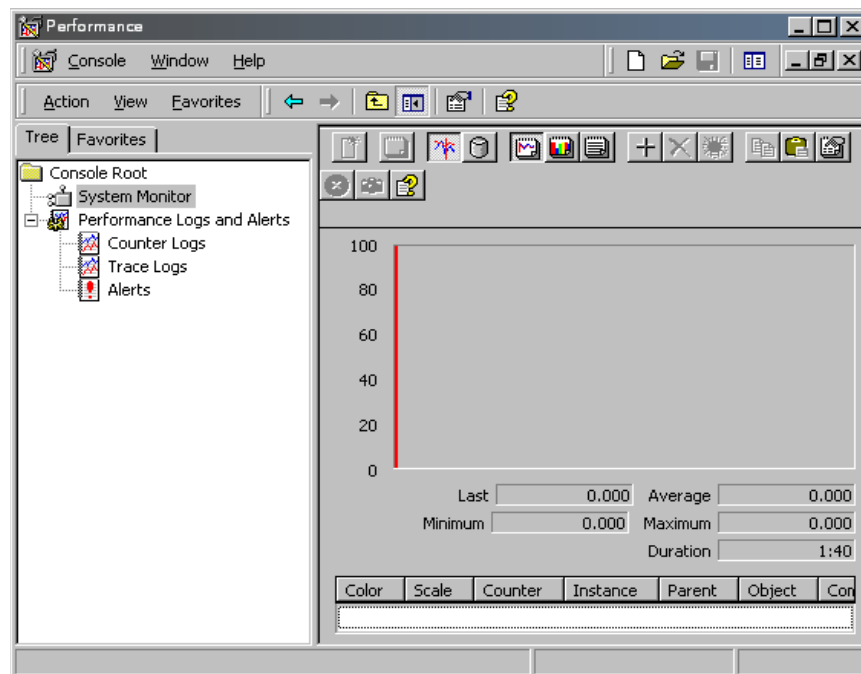
Run the Windows System Performance Monitor:

Start > Run > "perfmon",

or

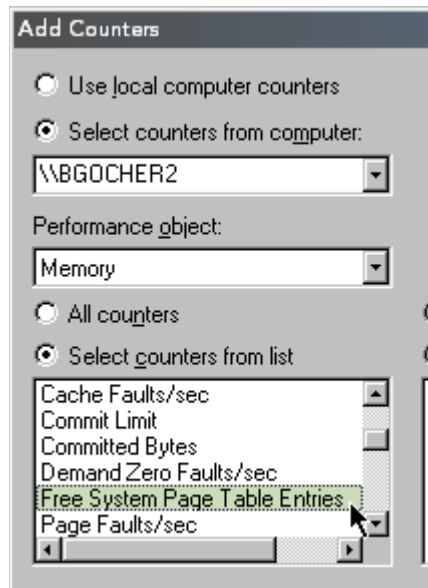
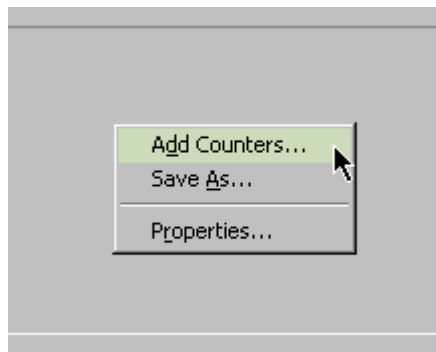
Start > Programs > Administrative Tools > Performance

TABLE 2: PERFORMANCE MONITOR



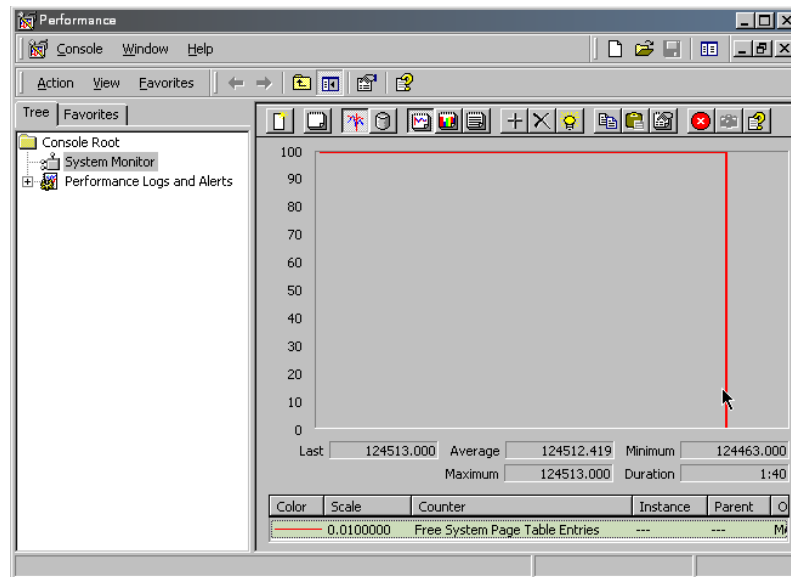
2. Next, add the "Free System Page Table Entries" counter from the "memory" object. Right click inside the performance field and select "Add Counter" from the menu. In the window that appears, choose "Memory" from the Performance object menu, and "Free System Page Table Entries" from the counter list. When finished, Click "Add".

TABLE 3: ADD COUNTER



- The Performance Monitor will display several numbers. Use the "Last" number. For our example, the Last number is 124513. Each PTE is worth 4096 bytes of memory. $124513 * 4096 = 51,000,1152$ Bytes available.

TABLE 4: "LAST" NUMBER



- Some AudioCodes cards require 18,878,464 Bytes for mapping. Hence, $51,000,1152 / 18,878,464 = 27.01$. 27 boards could theoretically exist in this system. Always bear in mind that the total number of PTEs available can vary widely from system to system. Some systems will be capable of far fewer boards.

Conclusion

Each Microsoft operating system relies on a proprietary method for mapping system address memory. Users must be aware that any changes to the system (the installation of other hardware components or software applications) all impact the amount of memory available to AudioCodes boards during system startup. Updates to the operating system can also change the process of memory mapping and change the number of PTEs available on your total system. AudioCodes has also observed that the operating system designed for servers, which require more user log on, utilize more PTEs than systems designed for desktops.

Users are encouraged to research the memory mapping requirements of each Microsoft operating system and understand how to control system variables that can be used to increase the performance of each system.

The following are recommendations offered by Microsoft corporation:

- Understand that each Microsoft operating system maps memory uniquely and differences are to be expected per version. Applying a Microsoft software patch may also change the memory allocation process of a given server.
- Identify all drivers which are using any switches or parameters that reduce or eliminate the use of system PTEs. Examples of drivers that may use such switches are the hard disk driver,

the network adapter driver, and also AGP video cards that may require extensive physical memory.

3. Modify registry entries under the memory management key for **Page table** entries or for **Paged pool maximum** entries. These entries are very useful for tuning the standard installation. For more information refer to the following Microsoft article: *How to configure the Paged Address Pool and System Page Table entry memory areas* (article #247904 <http://www.microsoft.com/technet>).
4. Refer to the Microsoft article, *Ruling Out Memory-Bound Problems* in the Microsoft Exchange Tech Site (<http://www.microsoft.com/technet/prodtechnol/exchange/guides/>). Information and tips for optimizing memory allocation are discussed.
5. Optimize system pool memory allocation by modifying the **SystemPages** registry setting. Refer to Microsoft documentation before modifying system specific recommendations.