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Tools for Radio

dcsTools Audio Engine Troubleshooting Guide

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1 Audio Engine Troubleshooting

This reference is intended to assist in diagnosing and correcting unusual problems with the dcsTools Audio Engine. It covers areas that are not contained in the standard documentation.

Some techniques involve manually modifying the registry. It is strongly urged that the sections of the registry that pertain to the dcsTools Audio Engine be backed up before they are modified. See the Registry Information topic for details on where information is stored.

The audio engine is installed as a Windows service and is set up to automatically start when the PC's operating system is loaded. This makes the audio engine available before any user login is performed on the host PC, and opens the possibility for controlling the audio engine from another PC.

Current Audio Engine Version Numbers

File	***Version***
AudioEngine.exe	Version 1.99.76.101 (Build 20220112 - 13:34)
GenCodec.dll	No version info. Date: 01/12/2022 1:31 PM
NCTAudioCompress.dll	Version 1.7.8.0 Date: 2/11/2003 2:32 PM
asihpi32.dll	Version 4.30.13.0 Date: 9/17/2021 5:32 AM
aeRemote.dll	Version 1.0.0.1 Date: 01/12/2022 1:35 PM (Used by client applications, provided for completeness)

This version requires the Microsoft Visual C++ 2015-2019 Redistributable Package (x86), which is automatically installed by the dcsTools Audio Engine installer if not present on the host system.

1.1 Audio Engine Specific Problems

This section documents specific problems that may occur and the solution and/or work-around. Before applying any of the techniques described, you should check to be sure that you are running the latest version of the dcsTools Audio Engine.

1.1.1 Audio Engine Service Unresponsive

Symptom: The audio engine service is started and appears to be running, but client applications are unable to communicate with the audio engine.

Reviewing the application client event log indicates that the audio engine service is running. The client communications software, aeRemote.dll, loads OK according to the client application's event log, but when a connection attempt is made, the attempt times out after trying 10 or more times.

Solution 1 - TCP/IP Port Check

The client application communicates with the audio engine using TCP/IP on port **12042**. Another application may have control of this port or a firewall may be preventing communications on the port. You may have to consult with your LAN administrator to determine if either of these possibilities are the case.

Solution 2 - apt-X Encoder Check

Check to see if the apt-X encoder is installed with the audio engine. If apt-X is installed, check to see if the apt-X temporary time period has expired. It can be checked one of two ways:

1. Use the ***apt-X Registration Utility*** included in audio engine installations - the file name is aptX_RegDlg.exe.
2. Stop the audio engine service and launch the audio engine from a command window. See the topic on running the audio engine in console mode for instructions.

If an expired apt-X trial license is the issue, the apt-X registration dialog will appear using either of the two methods. Correct the problem by registering the software or removing it.

Solution 3 - Host PC Name Check

Check the client application's host PC name. If the computer name is longer than 15 characters, it is unlikely a connection can be made. To test, shorten the computer name to 15 characters or less. This problem occurs because of Microsoft's maximum computer name length of 15 characters for NetBios naming compatibility. It is why users are warned when they try to create a computer name longer than this limitation.

1.1.2 Audio Engine Slow Playback Response Time

It is possible that a combination of factors comes together to cause what might be called a "hesitation" in playback of audio when rehearsing sequences. If there is a noticeable delay between the time you click on the [**Play**] button and when you hear audio - on the order of 1/2-second or more, there are some things that can be done to improve response time.

The problem most generally manifests itself when the playback audio folder is on a remote machine, as would be the case with centrally-stored audio.

Here are some steps to try to improve response time - try them in order, shutting down the audio engine before making the changes, then restarting the audio engine and testing the change. It is recommended you make one change at a time to get a good sense of the effect of each change rather than making several changes and not knowing which of them may have fixed the problem.

1. **Change the audio stream buffer size**. The default audio stream buffer size is 32768 (32,768 bytes). Open the registry, locate the key ***PlayBufferSize*** (see the Registry Information section for details on its location) and change the value to 8196 (8,196 bytes). Relaunch the audio engine and test the playback start response. If the response is acceptable, shut the audio engine down and increase the value to 16384 (16,384 bytes). Re-test playback response. If it's still acceptable, try increasing the value to 24580 (24,580 bytes) and repeat the test. If playback response time is acceptable, leave the setting. If not, revert the setting back to the last value you tested that produced acceptable results.

   Lowering the ***PlayBufferSize*** value increases hard disk read frequency. The idea is to use the largest value possible while getting acceptable play start response time. This is particularly true of situations where the playback audio is stored on a central server - you want to keep disk access to a minimum to keep from "hammering" the central storage device any more than necessary.

2. **Change the pipe clock setting**. If you've changed the buffer size down to 8196 and are still not getting acceptable results, you can try changing the pipe clock setting. Note changing this value may cause some audio cards to fail altogether, including some Digigram models.

   Ensure the audio engine is shut down, then open the registry and locate the key ***PipeClock***. See the Registry Information section for details on its location. Change the value from it's default of 44100 to 32000, restart the audio engine and test playback response. You can also try setting the value to 48000.

   By way of explanation, if the source playback audio was sample at 32kHz and the ***PipeClock*** setting is 44100 (44.1kHz), the audio engine is rate-converting, which adds some time to the process. The idea is to match this value to the value of the majority of the source audio.

   Changing the ***PipeClock*** value produces best results when you know all or most of the source playback audio was sampled at the same rate. For audio files produced on a DCS system, this would be 32000 (32kHz).

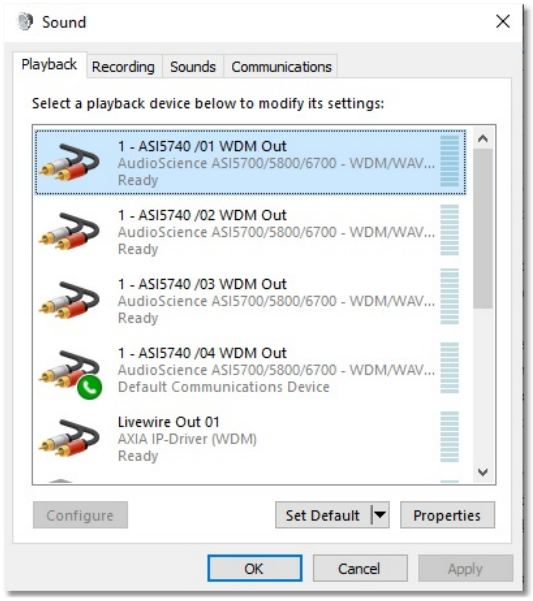
1.2 Specific Audio Card Issues

This section provides information on audio card issues that can occur, along with remedies or workarounds.

1.2.1 Audio Science (ASI) WDM Configuration

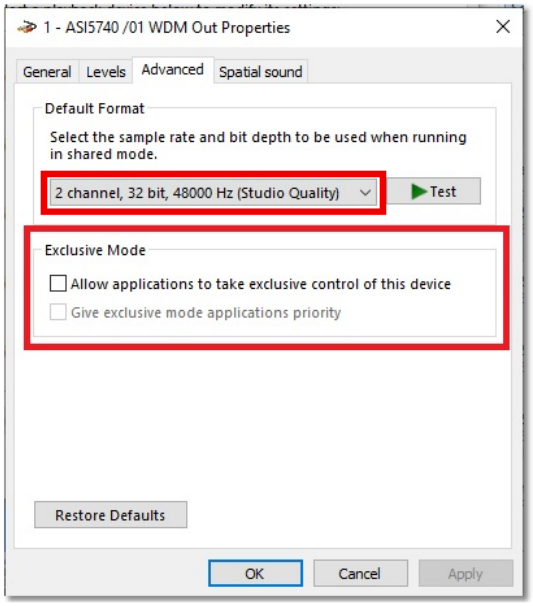
If you are having trouble playing or recording audio (particularly simultaneous play/record) with an ASI card using their WDM (WAVE) drivers, it most likely can be remedied by making changes to the input and output Windows Sounds properties. Note these changes are to the device Windows properties, not ASI's driver or card configuration properties.

1. Open the Sound Control Panel, either from **Control Panel (Sounds)** or by accessing it via the task bar - [**Right-Click**] on the sound (speaker) icon, then selecting the "**Sounds**" menu item from the pop-up menu. The Sound dialog will be displayed:



2. For each Playback output and Record Input (on the Playback & Recording tabs, respectively), select the item and click on the [**Properties**] button.

3. Select the **Advanced** tab, as shown:



4. In the **Default Format** section, select the "**2 channel, 16 bit, 44100 Hz (CD Quality)**" option.
5. In the **Exclusive Mode** section, uncheck the "**Allow applications to take exclusive control of this device**" item. This will automatically disable the "**Give exclusive mode application priority**" item.
6. Save the changes (click on the [**Apply**] button).

Be sure to do this for each of the ASI WDM Out & ASI WDM In items in the dialog.

1.3 Audio Engine Manual Installation

If for some reason the dcsTools Audio Engine did not get installed properly, you can follow these instructions to manually install the dcsTools Audio Engine.

The audio engine can be used only on Windows 7 and above operating systems. It will not run on older OS versions.

1. Files needed for manual installation:

   AudioEngine.exe

   GenCodec.dll

   NCTAudioCompress.dll

   asihpi32.dll

   aptX100.dll (***ONLY IF*** apt-X is to be installed and licensed)

   pcgw32.dll (***ONLY IF*** apt-X is to be installed and licensed)

   It is important that the files come from the same release version of the audio engine. Review the Current Audio Engine Version Numbers for additional details.

Audio Engine Prerequisites

Beginning with version 1.99.76.101, the audio engine and client dll require the ***Microsoft Visual C++ 2015-2019 Redistributable Package (x86)*** be present on the host PC. To check whether or not it is installed, open Add/Remove Programs (or equivalent) in Control Panel. Look for the item "**Microsoft Visual C++ 2015-2019 Redistributable - x86**" followed by a version number. If not present you will need to download and install the software from Microsoft.

2. Copy all needed files to a common folder. All files must be in the same folder. The normal location for these files is "***x*:\dcsTools\AudioEngine**", where "***x***" is the boot drive. Exceptions are the aptX100.dll & pcgw32.dll files, which can be located in the Windows path, although not recommended.

3. The NCT dll must be registered with the operating system. To register the dll, open a command window (DOS window) and navigate to the folder in which the NCT dll is located. At the command prompt, type the following: **regsvr32 NCTAudioCompress.dll** followed by the [**Enter**] key to register the dll.

4. The audio engine must be installed as a service. You can do this from a command window (DOS window), similar to the NCT dll registration. Open a command window and

navigate to the folder in which the audio engine executable is located. At the command prompt, enter the following:

audioengine /install

Press the [**Enter**] key to install the service.

To manually uninstall the audio engine from a command prompt, type the following:

audioengine /uninstall

Press the [**Enter**] key to uninstall the audio engine as a service.

Running the Audio Engine in Console Mode

For troubleshooting purposes, the audio engine can also be run in console mode. Ensure that the audio engine, if installed as a service, is not running before attempting to run it as a console application.

To start the audio engine as a console application, open a command window (DOS window), navigate to the folder containing the audio engine files, and enter the following at a command prompt:

audioengine /console

Press the [**Enter**] key to launch the audio engine. The audio engine will launch and the command window will display status information. The command prompt disappears.

When running in console mode, the audio engine inherits the rights and privileges of the logged-on user, which may be different from the rights and privileges assigned to the audio engine when running as a service.

To stop the audio engine when running as a console application, press [**Ctrl-C**] in the command window. The audio engine will shut down and the command-prompt will reappear.

1.4 Audio Engine Registry Information

The audio engine uses the Windows registry to store its settings, including registration information. The base key for these settings is:

HKEY_LOCAL_MACHINE\SOFTWARE\dcsTools\AudioEngine

There are several sub-keys containing information about audio channels, available devices, and audio stream configuration.

The base registry key is for 32-bit (x86) operating systems. If using a 64-bit OS (x64), you will find the entries in the **HKEY_LOCAL_MACHINE\SOFTWARE\WOW6432Node\dcsTools\AudioEngine** base key location.

All of the standard settings are automatically set and maintained by the engine with the exception of the registration information, which must be entered in order for the engine to run as a fully-licensed application. As a default, the audio engine will run 5 days from first launch in trial mode. After that, registration is required.

Some of the registry keys can be "tweaked" to correct or further diagnose problems. The following is a list of of registry settings used by the audio engine, along with a brief explanation as applicable.

Audio Engine Registry Settings

Key Name	***Default Value***	***Description***
HKEY_LOCAL_MACHINE\SOFTWARE\dcsTools		
CodeTraceLevel	Key does not exist.	DWord. This key is used to force the audio engine to create dump files for tracing codec problems. It is used primarily for determining why apt-X or MPEG errors are occurring, with messages like "codec not available". When the key is created and assigned a value of **2**, dump files with the naming syntax ***GenCodecXXX.dmp*** are created, with a new ***XXX*** value each time the audio engine is launched.

Key Name	***Default Value***	***Description***
Registration Key	Key does not exist.	REG_SZ. Contains the user-entered registration key, which enables full functionality of the audio engine. The audio engine as a default supports PCM, apt-X and MPEG encoding, although the apt-X encoding dll must be present and available.
HKEY_LOCAL_MACHINE\SOFTWARE\dcsTools\AudioEngine		
Registration Key (Deprecated)	Key does not exist.	REG_SZ. Contains the user-entered registration key, which enables full functionality of the audio engine. The audio engine as a default supports PCM, apt-X and MPEG encoding, although the apt-X encoding dll must be present and available.
TraceLevel	Key does not exist.	DWord. This key must be added manually. It is used for troubleshooting and when present, increases the amount of information stored in the ***AudioEngine.dmp*** log file. To increase the logging detail, create this key as a **REG_DWORD** type and enter a value of **2**.
HKEY_LOCAL_MACHINE\SOFTWARE\dcsTools\AudioEngine\Channels		
PipeClock	44100	DWord. The clock rate for audio handling. For Windows driver devices, this value can be changed, but for devices like the Digigram audio card, it must be left alone. Valid values are: 32000, 44100, and 48000
HKEY_LOCAL_MACHINE\SOFTWARE\dcsTools\AudioEngine\Device_x		
(There could be more than one of these entries if a Digigram or AudioScience card is installed in the PC in addition to standard wave devices.		

Key Name	***Default Value***	***Description***
DeallocateIdlePipes	Engine-maintained.	DWord = 1
DefaultRecordInput	Engine-maintained.	DWord = 0
EnableWatchdog	Engine-maintained.	DWord = 0
PlayPipeMask	Engine-maintained.	DWord = 4294967295
PreallocatePlayPipes	Engine-maintained.	DWord = 0
PreallocateRecordPipes	Engine-maintained.	DWord = 0
RecordPipeMask	Engine-maintained.	DWord = 4294967295
StreamCount	Engine-maintained.	DWord = 3
WatchdogTimeout	Engine-maintained.	DWord = 500
HKEY_LOCAL_MACHINE\SOFTWARE\dcsTools\AudioEngine\Devices		
Device_1	0	DWord. 0 = WDM (WAVE) Driver. Device_1 contains wave device information. (Value 6 = Audio Science ASIO Driver)
Device_2	4294967295	DWord. 2nd device record.
Device_3	4294967295	DWord. 3rd device record.
Device_4	4294967295	DWord. 4th device record.
Device_5	4294967295	DWord. 5th device record.
Device_6	4294967295	DWord. 6th device record.

Key Name	***Default Value***	***Description***
Device_7	4294967295	DWord. 7th device record.
Device_8	4294967295	DWord. 8th device record.
HKEY_LOCAL_MACHINE\SOFTWARE\dcsTools\AudioEngine\Streams		
xxxBufferCount	8	DWord. The "***xxx***" portion is "Play" and "Record". The number of buffers allocated for audio data handling. The larger the number of buffers, the more memory consumed. If the BufferSize value is reduced, it may be beneficial to increase this value to something like **12**.
xxxBufferSize	32768	DWord. The "***xxx***" portion is "Play" and "Record". The size of each individual audio data buffer. Valid values can range from a low of 2048 to a high of 32768 (the default). Recommended values in case of a need to change would be on 4K boundaries - ie, 8192, 12288, 16384, 20480, 24576, 28672. General recommendation is to stick with 8K boundaries - 8192, 16384, 32768. This value, by observation, can have an impact on audio play response time. If the play source is a network drive and the buffer is the default, some delay in start of audio may be noticed as the buffer is being filled and decompressed. To improve response, reduce the buffer size. See the topic on slow play response. ***Note:*** If using the Audio Science ASIO driver, these values should be set to 2048 (the minimum allowed size).

Key Name	***Default Value***	***Description***
MpegCodec	2	DWord.
RateConvertQuality	1	DWord.
UseMpegCodec	0	DWord.

1.5 Audio Engine Revision History

This topic documents older revisions of the dcsTools Audio Engine. This information may be helpful in determining if you are using the correct version of the audio engine.

Version 1.99.45.16 (Build 20120215 - 14:15)

All files used by this version of the dcsTools Audio Engine, including file version numbers and date stamps, are listed in the table below.

File	***Version***
AudioEngine.exe	Version 1.99.45.16 (Build 20120215 - 14:15)
GenCodec.dll	No version info. Date: 1/20/2012 12:03 PM
NCTAudioCompress.dll	Version 1.7.8.0 Date: 2/11/2003 2:32 PM
aeRemote.dll	Version 1.0.0.1 Date: 2/15/2012 2:16 PM (Used by client applications, provided for completeness)

This version required the Microsoft Visual C++ 2008 SP1 Redistributable Package (x86).

Version 1.90 (Build 20070630 - 17:48)

All files used by this version of the dcsTools Audio Engine, including file version numbers and date stamps, are listed in the table below.

File	***Version***
AudioEngine.exe	Version 1.90 (Build 20070630 - 17:48)
GenCodec.dll	No version info. Date: 6/28/2007 2:11 PM
NCTAudioCompress.dll	Version 1.7.8.0 Date: 2/11/2003 2:32 PM
aeRemote.dll	Version 1.0.0.1 Date: 6/26/2007 10:26 PM (Used by client applications, provided for completeness)