



TROUBLESHOOTING CLIO 11(10) INSTALLATION AND FW-01 INTERFACING WITH PERSONAL COMPUTERS

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INTRODUCTION

The highly integrated and dense of functionality personal computers found on the market nowadays create many challenges to the designers facing very short design-to-market schedules often obliged to continue system debug and optimization after the release to market. This lack of readiness often found on new computers, especially notebooks, may cause problems when dealing with high-end peripherals interfacing.

Another cause of problems is due to the obsolescence of Windows XP in parallel to the not-well-performing Vista operating system; many opted not to install Vista and preferred downgrades to XP but many XP subsystems (and in particular the 1394 firewire one), poorly designed since the beginning, suffered from ulterior bugs from Microsoft resulting in installations working with lower Service Packs that stopped operation once a newer SP was installed; one more problem is that XP development and support now stopped and the low level drivers are often not able to keep up with newer hardware chipsets.

The dawn of Windows 7 has brought to the market a re-designed operating system that is not suffering of the limitations found on Vista and permits to abandon the old Windows XP.

The latest Windows 8 and 8.1, at the time of writing, did not add any new issue and performs substantially the same as Windows 7; the operation of CLIO and FW-01 is smooth but, due Windows 8 redesigned user interface, which mainly addresses portable devices, and the parallel downgrade possibility offered by Microsoft on almost all PCs, we strongly suggest to install and use Windows 7.

This technical note describes useful hints to troubleshoot the CLIO System installation starting from the software but mainly focusing on the use of the FW-01 Firewire Audio Interface when operating with Windows based computers.

Emphasis will be put on the CLIO 11(10) software under the Windows 7 operating system; similar considerations apply to CLIO 8.5 and other supported operating systems (see <http://www.audiomatica.com/wp/wp-content/uploads/windowsxref10.pdf> for details).

CLIO INSTALLATION AND FIRST STEPS

1. Always verify that you are using the latest FW-01 drivers from Audiomatica: http://www.audiomatica.com/wp/?page_id=34.
2. Request the latest available free CLIO software upgrade: http://www.audiomatica.com/wp/?page_id=667.

Chapter 3 of CLIO 11(10) Software User's Manual describes the hardware and software installations under Windows.

Should the software not run read the next paragraph "SOFTWARE DOES NOT START".

If both installations went fine it is possible to follow *3.6 RUNNING CLIO FOR THE FIRST TIME* and have your CLIO running properly.

Of particular importance is *3.6 INITIAL TEST MEASUREMENT*; if this test is not passed do not proceed any further and **do not execute system calibration**.

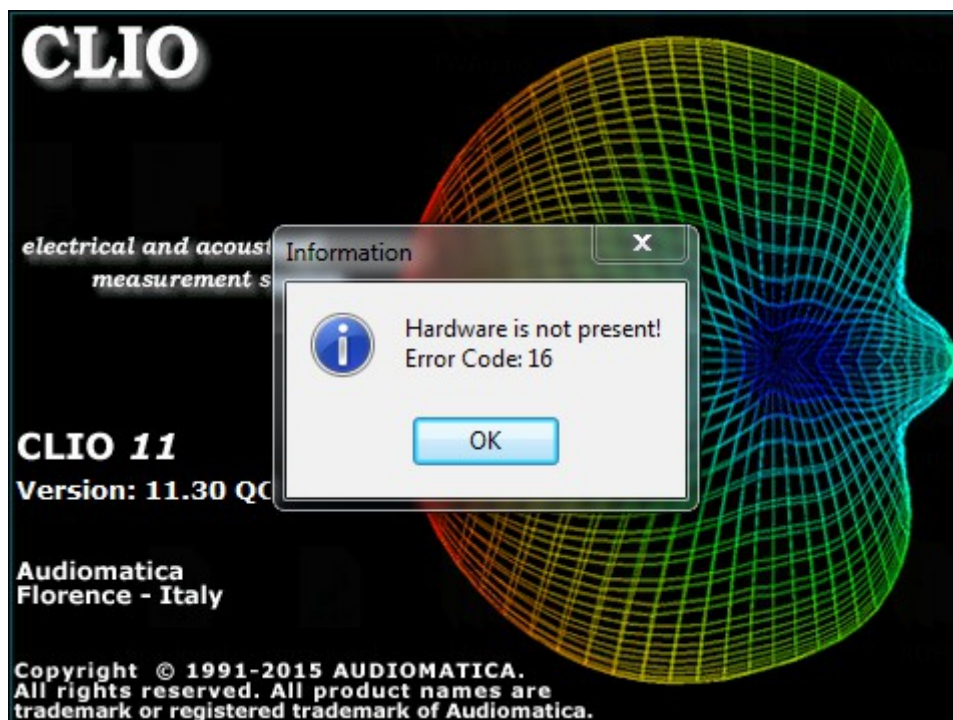
Next is *3.7 SYSTEM CALIBRATION* and *3.7.1 CALIBRATION VALIDATION*; the tests given in 3.7.1 will accompany you during the life of your CLIO instrument telling you if the system is running properly.

If the FW-01 hardware is not running properly read below "HARDWARE IS MALFUNCTIONING" after the next paragraph.

SOFTWARE DOES NOT START

Each CLIO software is protected to operate only with its mating hardware; if correct serial number is not found or if the FW-01 unit is not connected to the PC, the software operates in DEMO mode giving the user only post-processing facilities, measurements are inhibited.

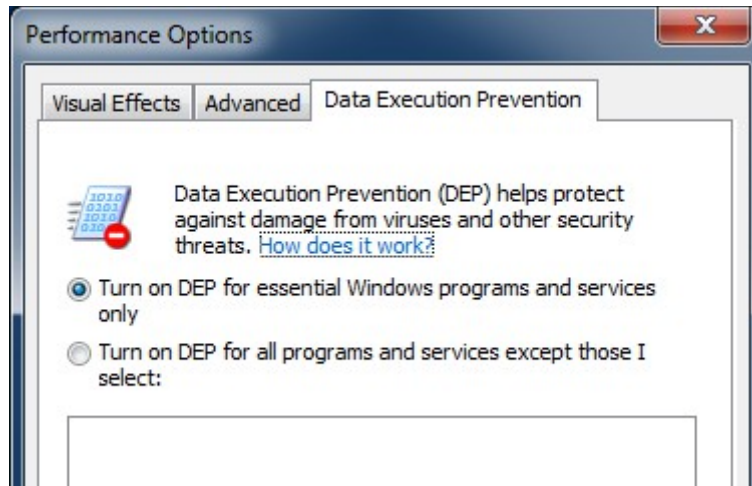
In these cases the following error message occurs:



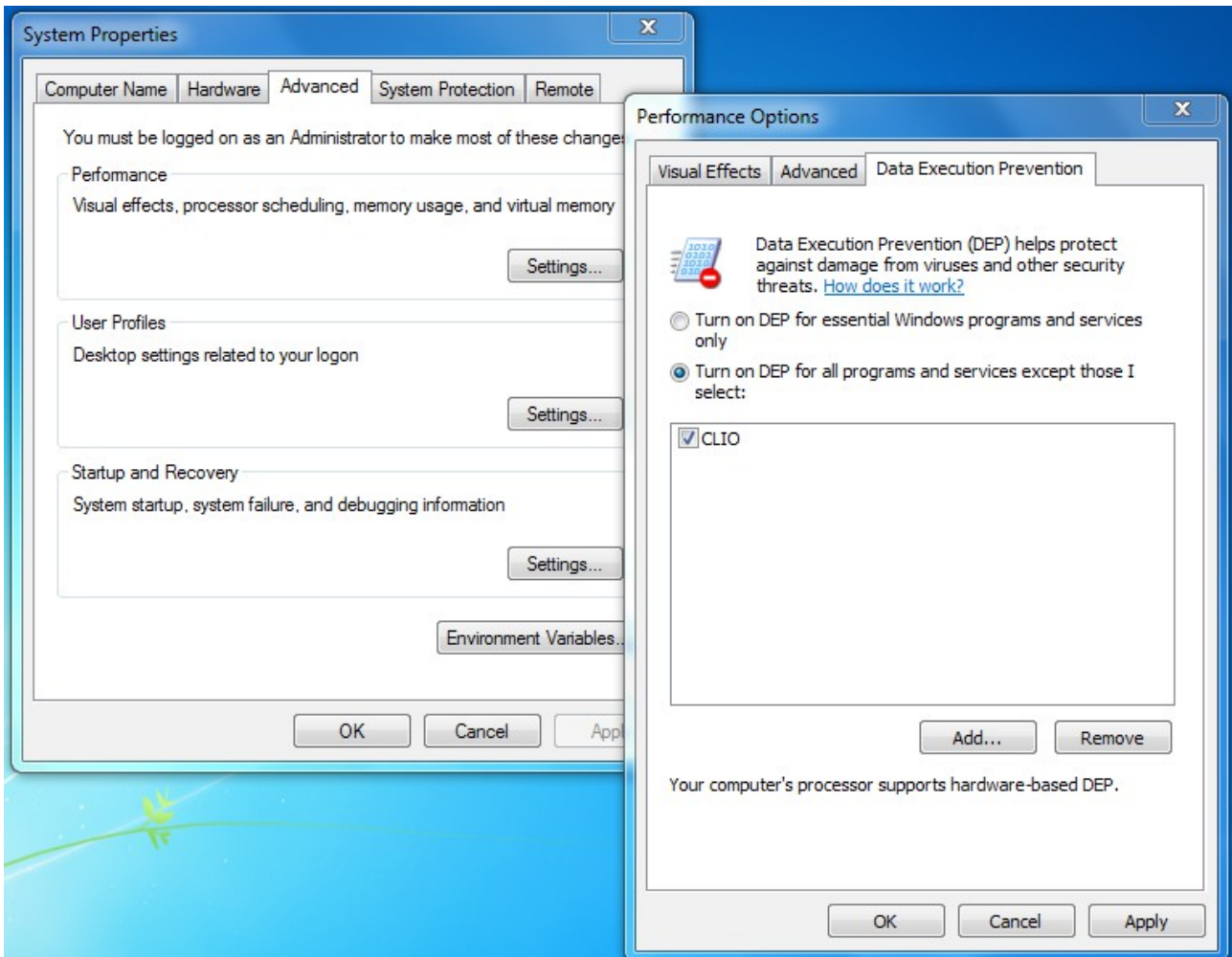
To protect the CLIO software, sophisticated anti-piracy techniques have been implemented; DEP (Data Execution Prevention) settings may prevent CLIO to run.

Leave basic default DEP settings (found under System Properties>Advanced>Performance Options>DEP) i.e. turn on DEP only for essential Windows programs and services.

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If you want to change the default Windows settings and turn on DEP for all programs then allow exception for the CLIO.exe program.



HARDWARE IS MALFUNCTIONING

The CLIO system running the CLIO 11(10) software and the FW-01 unit is not designed to handle power-down states of the computer:

- 1) If the system is running and goes into power-down or sleep state, at the next wake-up you must restart the CLIO system.
- 2) If extended real-time measurements have to be carried on, avoid turning off both the hard-disk and the monitor; experience showed that even turning off the monitor may cause large latencies and loss of synchronization.
- 3) When using a notebook and taking measurements maintain the computer connected to an AC power outlet; this is to avoid automatic hardware power savings that step down the performances of the computer itself.

The most common problems of a CLIO system with the FW-01 interface are:

- 1) The presence of glitches in the audio data stream. This may be inspected with a sustained test as in 3.6; glitches clearly show in the oscilloscope time display.
- 2) Lack of synchronization, phase instability. This can be inspected, after system calibration, by the loop tests described in 3.7.1.
- 3) The CLIO system freezes; Error Code 16 is displayed.

Possible causes of these kind of malfunctions are:

- 1) Kernel-mode Windows device drivers implemented improperly and cause of excessive latencies of Deferred Procedure Calls (DPCs).
- 2) Hardware conflicts between peripherals. Improper use of shared resources.
- 3) Low level firewire 1394 bus driver not capable of addressing specific 1394 hardware.

To cure/combat these phenomenons you may do the following:

- 0) As a general rule-of-thumb execute a BIOS update, if available from your PC's manufacturer.
- 1) To analyze DPC latencies connect to Thesycon website and download the DPC Latency Checker (http://www.thesycon.de/eng/latency_check.shtml); read the interesting instructions (<http://www.thesycon.de/dpclat/dpclat.pdf>) and investigate if any latency is present in your system and how to get rid of it. The DPC Latency Checker will prove a useful tool also for your future installations and for everyday work; keep it on your desktop and, in case of sustained or subtle problems, run it together CLIO in background.
- 2) After the BIOS update verify, from your PC's manufacturer, and possibly update the low-level hardware drivers of any peripheral of your computer. Most important are the drivers of the graphics video subsystem, wireless and Ethernet adapters, audio cards, battery management if present.
- 3) If you have doubts about the 1394 controller of your computer collect informa-

tion about your computer hardware as described in Audiomatica's website (http://www.audiomatica.com/wp/?page_id=368) and contact our technical support (support@audiomatica.com).

- 4) If Using Windows XP or Vista, evaluate a possible upgrade to Windows 7; especially if using Vista the upgrade to 7 is straightforward and keeps all your current settings and installed software.

HINTS TO SELECT YOUR PC HARDWARE AND OS

If you are selecting a personal computer these are hints coming from Audiomatica's experience and from assisting our clients:

- 1) Use Windows 7 whenever possible, second choice is Windows 8.1. Avoid using Windows Vista. XP runs fine but, as we all know, is out of Microsoft support.
- 2) CLIO 11(10) is a professional instrument: please use professional versions of Windows! This is almost a joke, it means do not use Home or Home Premium versions of Windows where the operating system settings and features are limited and optimized for a non-professional user.
- 3) Selecting the hardware platform choose preferably Intel based designs, Intel graphics chipsets; avoid, if possible, Nvidia graphics and Nvidia based designs.
- 4) If adding a PCI expansion card use, when possible, a 1394a card (400MHz) instead of a 1394b (800MHz). If using XP this helps with the bugs presents and introduced by Microsoft with Service Packs after SP1.
- 5) Don't use expansion Express cards; use PCMCIA if possible.

CLIO is a measurement instrument; as all test systems it should be able to give maximum repeatability to measurements and confidence to the user, especially when it is seldom used; to achieve this, avoid using computers that will serve you for thousands different scopes, it is highly advisable to maintain a computer devoted to your investment with CLIO; for the same reasons our suggestion is to **avoid extreme solutions while choosing the computer**: avoid maximum speed, maximum disk capacity, maximum screen resolution and so on.

The CLIO 11(10) software has been designed and should be run with the normal Font size (100%) Windows setting; CLIO 11(10) can accommodate 125% Font size, avoid using it at higher DPI settings. This requirements suggests, for correct readability, to limit maximum screen resolution to SXGA (1400×1050) or the equivalent WSXGA (1680×1050) ; we do not suggest using full HD screens and screen resolution.

ERROR MESSAGES

The only error message you may receive is Error Code 16, as outlined above.

If you receive this message with the FW-01 connected to the computer first verify the firewire cable and the power adapter, if present; then read the chapter "HARDWARE IS MALFUNCTIONING" above.

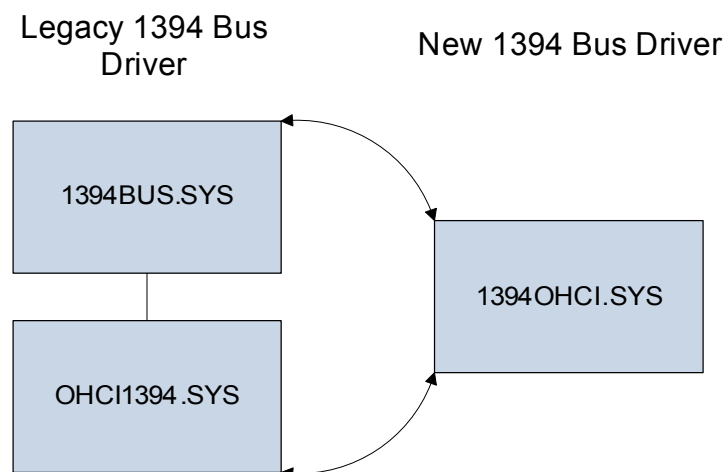
HARDWARE TECHNICAL BACKGROUND

The CLIO FW-01 Firewire Audio Interface is a high performance real-time data streaming peripheral that poses precise challenges to a PC and its operating system.

To operate a CLIO FW-01 Firewire Audio Interface it is needed a IEEE-1394a (Firewire @ 400MHz) synchronous link coupled to a Windows bus driver correctly supporting the IEC 61883 specification.

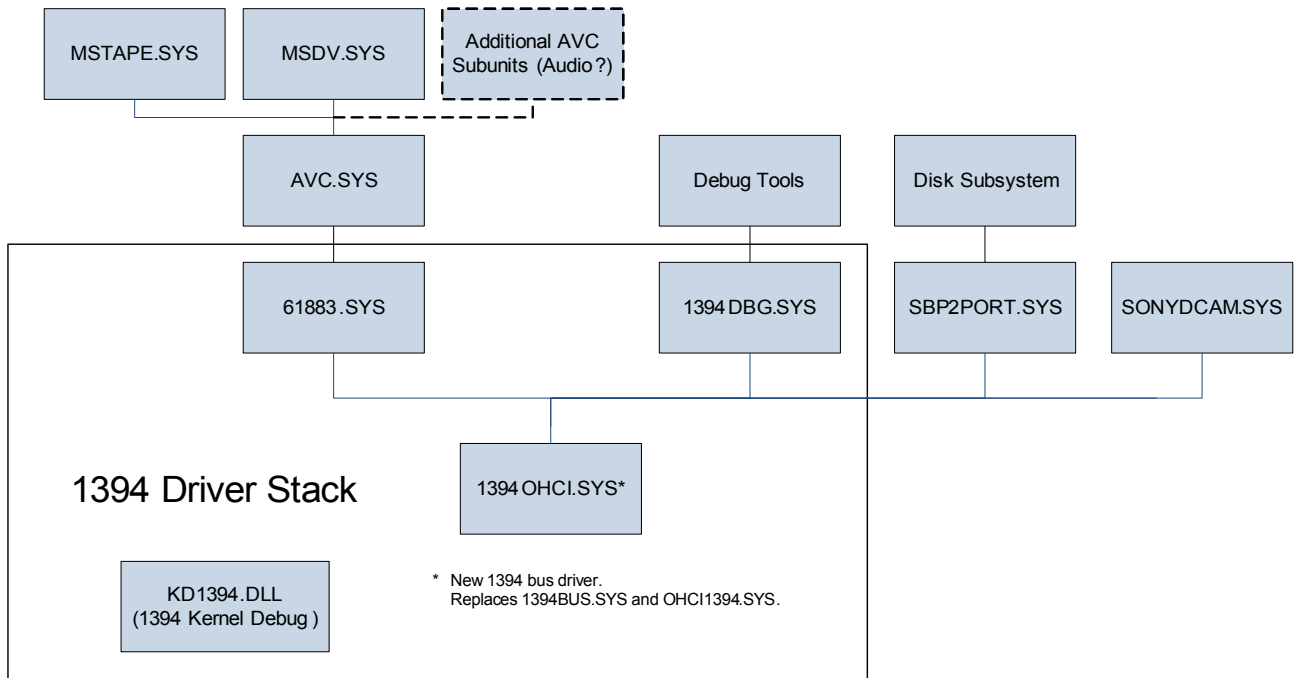
The 1394 bus driver is a unified software component, furnished by Microsoft, that comes with the Windows operating system and should correctly drive and operate the entirety of 1394 controllers found on the market; unfortunately this is not always true.

With respect to the 1394 bus driver Windows XP and Vista implemented it using the legacy Windows Driver Model (WDM) in a port/miniport configuration. The port driver is 1394BUS.SYS, and the primary miniport driver is OHCI1394.SYS. Windows 7 (and later OSes) instead uses a totally rewritten new 1394 bus driver as a single (monolithic) device driver, 1394OHCI.SYS, which has been implemented by using the kernel-mode driver framework (KMDF).



The figure below shows the 1394 stack with the Windows 7 1394 bus driver and the Microsoft-supported 1394 client drivers.

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This diagram is shown mainly for the purpose to underline the various different formats supported by the 1394 Firewire link; each of these protocols poses unique challenges to its correct operation so for the full verification of a Firewire interface all possible applications must be considered.

For example, to troubleshoot your environment a working 1394 Hard Disk peripheral may not ensure that an audio subsystem correctly operates.