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1. INTRODUCTION

1.1. Overview

Hercules 16/12 FW is a high-quality FireWire audio and MIDI interface for PCs running Windows and for Macintosh computers.

It offers 16 inputs and 12 outputs for a total of 28 simultaneous audio channels at an audio resolution of up to 24 bits and 96kHz.

16 independent inputs:

- 10 gold-plated balanced or unbalanced jack plugs, +4dBu and –10dBV compatible
- 2 Neutrik combo connectors (XLR/TRS)
- 1 optical stereo S/PDIF I/O
- 1 coaxial stereo S/PDIF I/O

12 independent outputs:

- 8 gold-plated balanced or unbalanced jack plugs, +4dBu and –10dBV compatible
- 1 optical stereo S/PDIF I/O
- 1 coaxial stereo S/PDIF I/O

Hercules 16/12 FW is a rack with multiple inputs and outputs that can be connected to any computer's FireWire port using the supplied FireWire cable.

1.2. System requirements

PC

- Microsoft Windows 2000 (SP4), XP (SP1A)
- Intel Pentium III/AMD Athlon 800MHz or compatible
- 128MB RAM (256MB recommended)
- CD-ROM or DVD-ROM drive
- 10GB free hard disk space (UDMA compatibility recommended)

Macintosh

- Macintosh OS X 10.3
- G4/Power Macintosh 1GHz equipped with a FireWire port
- 256MB RAM (512MB recommended)
- CD-ROM or DVD-ROM drive
- 10GB free hard disk space

1.3. Box contents

- Hercules 16/12 FW rack
- FireWire cable
- FireWire/mini DV adapter
- 2 brackets for attachment to a 19" 1U rack unit
- 4 rubber supports for stability and 6 screws to attach the brackets to the rack
- Power supply
- CD-ROM including drivers, electronic documentation and software suite
- User Manual

2. INSTALLING THE HERCULES 16/12 FW RACK



Install the Hercules 16/12 FW drivers **BEFORE** connecting the rack to your computer's FireWire port for the first time. If you have already connected the rack without first having installed the drivers, switch off the rack and disconnect it, restart your computer and then follow the software installation procedure. Note: the screens and installation procedure may vary noticeably in relation to the procedure described in this manual.

Since drivers and software are in a constant state of evolution, those provided on your installation CD-ROM may have been updated. Please visit our website now (www.hercules.com) to check whether this is the case and download the latest driver and software versions if necessary.

2.1. Installing the drivers in Windows



- Insert the installation CD-ROM into your CD-ROM drive.

The installation menu appears automatically, displaying all of the options available.

If the installation menu does not launch automatically:

- Double-click **My Computer**.
- Double-click the Hercules 16/12 FW CD-ROM icon.
- Double-click **Setup.exe**, if necessary.

- Click the **Drivers** button and follow the on-screen instructions.
- Connect one end of the FireWire cable to your computer's FireWire port.

If your computer has a mini DV FireWire port:

- Connect the FireWire cable to the included FireWire/mini DV adapter.
- Connect the other end of the FireWire cable to the **FireWire 1394** port on the back face of the Hercules 16/12 FW rack.
- Connect the 15V DC power supply's cable to the power plug on the back face of the Hercules 16/12 FW rack and plug the power supply into an electrical outlet.
- Switch on the rack by pressing the **Power** switch on the front face.

Windows will detect each of the 6 devices that make up your Hercules 16/12 FW rack in succession (Hercules 16/12 FW, Hercules 16/12 FW WDM Analog Audio Device, Hercules 16/12 FW WDM Optical S/PDIF Audio Device, Hercules 16/12 FW WDM Coax S/PDIF Audio Device, Hercules 16/12 FW GSIF, Hercules 16/12 FW MIDI). Repeat the procedure described below for each device.



The **Found New Hardware Wizard** dialog box appears and informs you that the system has detected a new device.

- Click **Next** as many times as is necessary to launch the installation.

A message regarding driver certification may appear on-screen.

- Click **Yes** (Windows 2000) or **Continue Anyway** (Windows XP).

- Click **Finish** to complete the installation.

2.2. Installing the applications



- Insert the installation CD-ROM into your CD-ROM drive.

The installation menu appears automatically, displaying all of the options available.

If the installation menu does not launch automatically:

- Double-click **My Computer**.

- Double-click the Hercules 16/12 FW CD-ROM icon.

- Double-click **Setup.exe**, if necessary.

- Select each of the elements you wish to install, and then follow the on-screen instructions.

If you have interrupted the installation procedure, you can launch it again as follows:

- Double-click **My Computer**.

- Double-click the Hercules 16/12 FW CD-ROM icon.

- Double-click **Setup.exe**, if necessary.

3. OPTIMIZING YOUR SYSTEM

Digital audio processing takes up a good deal of your computer's resources. Your computer must therefore be perfectly optimized in order to record audio signals without any losses in quality. This section will help you to configure your Windows environment for optimal performance.

3.1. Preparing to store your audio data

Before modifying any software options, it is a good idea to first have a look at your hardware configuration. In order to achieve optimal performance, your computer must obviously at least meet the minimum system requirements, but there are also other elements to consider, including your hard disk drive in particular. Much will be demanded of it during both recording and audio playback, so it is therefore important that you have a fast hard disk drive with minimal access time. Ultra DMA (or UDMA)-compatible hard disk drives allow for an optimal data transfer rate.

Moreover, the ideal configuration would consist of having two hard disk drives: a "System" hard disk, which would hold the operating system and applications, and an "Audio" hard disk, dedicated exclusively to audio recording. Please note that we are referring here to two separate physical hard disk units. Simply allocating a partition on your hard drive to audio will not do anything to improve performance.

Finally, you should defragment your hard disk drive(s) regularly in order to ensure that you are getting the best performance. You should also make sure that your system is up-to-date (the latest drivers, updates, etc.).

3.2. Freeing up system resources

When your computer is switched on, a variety of applications may be running as background tasks and thus taking up system resources, even though their functions are not crucial to audio recording. You can modify the launch settings for these applications and disable them from launching automatically when Windows starts up. The applications currently running in the background are represented by an icon in the taskbar. These may include your multimedia player, antivirus software, screensaver or even Windows Messenger, an element of Windows XP that launches automatically, taking up significant resources. Here, too, the application's options will allow you to disable automatic launching.

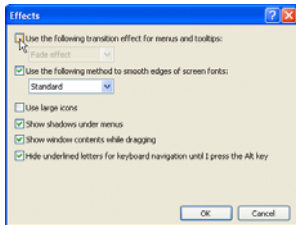
3.3. Recovering resources from the desktop

For audio processing purposes, some Windows desktop options are unnecessary. Removing or modifying them will allow you to free up resources.



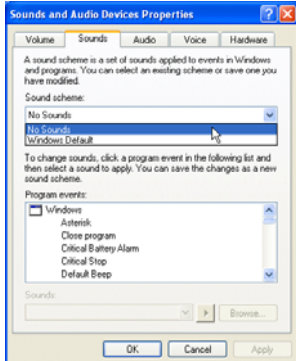
First off, as far as graphics are concerned you can limit your display to 16 bit quality, which is more than sufficient for displaying audio software interfaces.

- Click **Start/Settings/Control Panel**.
- Double-click the **Display** icon.
- Select the **Settings** tab.
- Select **Medium (16 bit)** in the **Color quality** drop-down list.
- Click **Apply**.



You can also disable transition effects when opening windows and menus.

- Select the **Effects** tab (**Appearance** in Windows XP).
- In Windows XP, click **Effects....**
- Disable the **Use the following transition effect for menus and tooltips** option.
- Click **OK**.

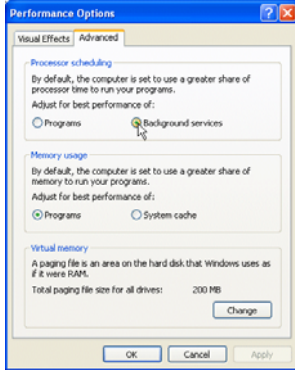


You can also optimize the audio component of the Windows desktop by disabling system sounds. These can cause problems in terms of the sample rate used by your audio software.

- In the Control Panel, double-click the **Sounds and Multimedia** icon.
- Select the **Sounds** tab.
- Select **No Sounds** in the **Sound scheme** drop-down list.
- Click **OK**.

3.4. Optimization

ASIO drivers, which provide minimal latency, can be optimized. These drivers are categorized as background services, and as such do not benefit from all of the system resources available. However, you can redefine Windows' priorities.



- Click **Start/Settings/Control Panel**.
- Double-click the **System** icon.
- Select the **Advanced** tab.

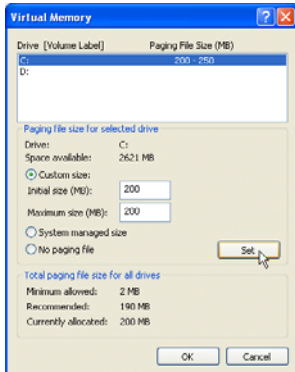
In Windows 2000:

- Click **Performance Options**...

In Windows XP:

- Click **Settings** in the **Performance** zone.
- Select the **Advanced** tab.
- Enable the **Background services** option.

This window also allows you to adjust virtual memory. This is a file on your hard disk drive that Windows uses to store data when RAM is inaccessible. It therefore has the same function as your computer's RAM (although it takes longer to access data). Windows automatically defines the virtual memory size, and it may be necessary to adjust this value in order to obtain optimal performance during audio processing operations.

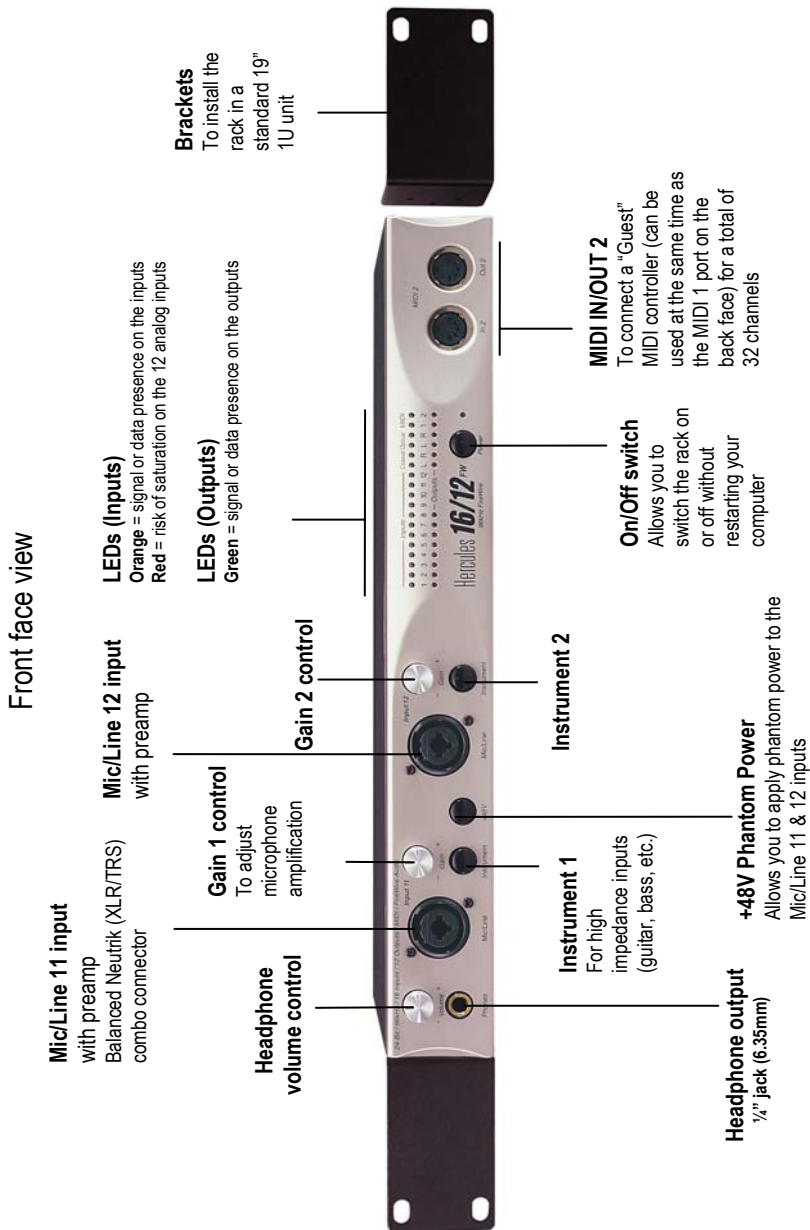


- Click **Change** in the **Virtual memory** zone.

*Virtual memory is defined by the values found in the **Initial size** and **Maximum size** fields. We recommend that you apply the same value to both fields. The size that you specify will depend on how much RAM your computer is equipped with: enter a file size corresponding to approximately 1.5 times the amount of RAM (example: enter the value 200 for 128MB of RAM), without exceeding 512MB.*

- Enter the values in the two fields referred to above.
- Click **Set**.
- Click **OK**.

4. A LOOK AT THE HERCULES 16/12 FW RACK



Rear face view

FireWire 1394

To connect the rack to your computer's FireWire port with the included standard FireWire cable (length: 4.5m)

MIDI IN/OUT 1

For a permanent "Master" MIDI keyboard

Coaxial I/O and optical I/O

2 independent stereo S/PDIF I/Os for data transfer to and from devices equipped with S/PDIF I/Os (DAT/MiniDisc players, etc.)

Analog outputs 1-8
 1/4" TRS (balanced) or TS (unbalanced) outputs
 Level can be set at -10dBV or +4dBu via software



Power plug (15V)

To connect the included 15V DC power supply
 Since your Hercules 16/12 FW is not powered by the FireWire port, you must connect the power supply to an electrical outlet.

Word Clock I/O

To generate or adjust to a clock signal in order to synchronize your Hercules 16/12 FW with other professional digital audio devices

Analog inputs 1-10

1/4" TRS (balanced) or TS (unbalanced) inputs
 Level can be set at -10dBV or +4dBu via software.
 Use these inputs for line level instruments such as keyboards, drum machines, etc.

ESPAÑOL

ITALIANO

NEDERLANDS

DEUTSCH

Français

ENGLISH

5. FUNCTIONALITY OVERVIEW

5.1. The analog inputs/outputs

5.1.1. General points

Hercules 16/12 FW features 12 analog inputs and 8 analog outputs, including two preamplified inputs equipped with Neutrik combo connectors (please see section [5.1.4. The Neutrik inputs](#)).

The gold-plated 6.35mm TRS (balanced) jack plugs for the 12 analog inputs and 8 analog outputs are compatible with 6.35mm TRS (balanced) jack cables, allowing you to connect professional equipment, or TS (unbalanced) jack cables, allowing you to connect consumer-grade equipment.

You can watch the activity on your Hercules 16/12 FW's different analog inputs and outputs thanks to the LEDs located on the front face.

For each input, the corresponding LED lights up in green when a signal is being received, in orange when the signal approaches -6dB and in red when the signal being received approaches or reaches saturation.

For each output, the corresponding LED lights up in green when a signal is being sent.

5.1.2. Switching from +4dBu to -10dBV

Consumer-grade and professional devices do not use the same measuring scale for their line levels. The nominal signal for consumer-grade devices is -10dBV , whereas it is $+4\text{dBu}$ for professional devices. Depending on the devices you are connecting, you must therefore correctly configure your Hercules 16/12 FW's inputs and outputs in order to avoid any breathing effects or saturation due to different levels.

Please refer to your devices' documentation to find out their line levels. In general, standard hi-fi devices operate with a -10dBV line level. Configuring your Hercules 16/12 FW's inputs and outputs is then carried out via software, using the Hercules 16/12 FW Control Panel interface (please see sections [6.6. Configuring the analog inputs](#) and [6.7. Configuring the analog outputs](#)).

5.1.3. Balanced/unbalanced signals

You can configure your Hercules 16/12 FW's analog inputs and outputs according to the type of device connected. The signals sent by different analog devices can be of two types: balanced or unbalanced.

A balanced connection (TRS cable) carries the signal over two conducting wires onto which a shielding braid is added, while an unbalanced connection (TS cable) is built on one conducting wire and a shielding braid. Balanced connections are of higher quality and are particularly well-suited to recording from microphones or for long-distance cabling (in excess of ten meters).

The connection mode must be configured for each input and output in order to correctly process the sound signal. This configuration is carried out via software, using the Hercules 16/12 FW Control Panel interface (please see sections [6.6. Configuring the analog inputs](#) and [6.7. Configuring the analog outputs](#)).

5.1.4. The Neutrik inputs

General points

The Mic/Line inputs can record a balanced or unbalanced signal via the Neutrik combo connectors, which allow them to accept two different connector types:

- XLR connectors, mainly used with microphones or instruments (guitar, bass, etc.),
- 6.35mm jack connectors, mainly used with line level devices (synthesizers, drum machines, etc.) but also with instruments and some microphones.

Gain control

The Mic/Line inputs support two recording levels: microphone level and line level.

Microphone level, as its name indicates, allows you to record a signal originating from a microphone. Line level allows you to record a signal originating from devices such as a synthesizer or drum machine or even external preamps (which receive a microphone signal and amplify it at line level).

The input is configured to line level when the **Gain** knob is set to the minimum value. To switch to microphone level, turn the knob clockwise and adjust the gain to the level you require.

To locate the ideal setting, the easiest way is to do some recording tests at different gain levels while keeping an eye on the input 11 LED. If the LED turns red, the signal is saturated and you will therefore have to reduce the level.

You should also trust your ears, since even if the sound is not saturated, you must make sure that breathing effects (the combination of all acoustic and electric sounds which make up the background noise) are not overly amplified by the selected gain, in which case you may have to reduce the gain. It's a question of achieving a compromise between the loudest and the weakest sounds, in order to optimize the signal dynamics.

Switching to high impedance

When the Mic/Line inputs are configured to microphone level, they are able to receive a high impedance signal. Nevertheless, a guitar's output impedance, for example, is still too high and the signal therefore cannot be recorded directly on these inputs.

The **Instrument** button allows you to resolve this problem by switching the impedance from 10 to 100k Ω , which corresponds to Hi-Z mode. You can therefore connect a guitar directly to one of the inputs and record the signal correctly, without having to use a DI ("Direct Injection") box, for example.

Phantom power

The Mic/Line inputs can record a signal originating directly from a microphone, thanks to their internal preamps. There are three main types of microphone: electrostatic (or condenser) microphones, electrodynamic microphones and ribbon microphones.

Electrostatic microphones require 48V of external power in order to function, referred to as phantom power. The Mic/Line inputs feature phantom power, which can be switched on or off via the **+48V** button. When it is enabled, the LEDs turn red.

Phantom power is not required for electrodynamic microphones, although they can support it without any problem. Thus, you can very well connect an electrostatic (condenser) microphone to input 11 and an electrodynamic microphone to input 12, and enable phantom power for the electrostatic microphone without disturbing the electrodynamic microphone's operation.

There remains one category: ribbon microphones. Closely related to electrodynamic microphones in their design, they are renowned for their fidelity in reproducing speech, singing and music. Electrostatic microphones, which provide superior levels, tend to be used in their place.



Ribbon microphones are not compatible with phantom power. Before connecting a ribbon microphone, make sure to switch off the phantom power. Failure to follow these instructions may result in damage to your microphone.

5.2. The digital inputs/outputs

Hercules 16/12 FW features two pairs of digital inputs/outputs, optical and coaxial.

These stereo connectors allow you to transfer data to and from digital devices such as a DAT recorder or digital effects processor.

You can watch the activity on your Hercules 16/12 FW's different digital inputs and outputs thanks to the LEDs located on the front face.

For each input, the corresponding LED lights up in red when data is being received.

For each output, the corresponding LED lights up in green when data is being sent.

5.3. The MIDI inputs/outputs

Hercules 16/12 FW features two pairs of MIDI inputs/outputs, allowing you to connect a "master" device and a "guest" device. In this way, you can use two MIDI sequencers simultaneously for a total of 32 MIDI channels. Moreover, this double-connectivity allows you to avoid going through the "MIDI THRU" connector on a MIDI device in order to communicate with a second device, thereby reducing any possible latency problems.

You can watch the activity on your Hercules 16/12 FW's different MIDI inputs and outputs thanks to the LEDs located on the front face.

For each input, the corresponding LED lights up in red when data is being received.

For each output, the corresponding LED lights up in green when data is being sent.

5.4. Monitoring

5.4.1. Hardware

Hercules 16/12 FW allows you to listen to the audio signals received on two of the 16 inputs (12 analog inputs and 2 digital stereo inputs) on outputs 1/2. Thanks to this hardware monitoring, you can listen without any noticeable latency, since the audio signals received on the inputs are sent directly to outputs 1/2 located at the back of the rack without going through your computer, as is the case with software monitoring carried out by audio software.

Simply connect a pair of active speakers to outputs 1/2 to enjoy direct hardware monitoring. Selection of the inputs being monitored is then carried out via software, using the Hercules 16/12 FW Control Panel interface. For more information, please refer to section [6.5. Configuring hardware monitoring](#).

5.4.2. With headphones

Hardware monitoring can also be carried out with headphones via the headphone output on the Hercules 16/12 FW's front face. The signal on the headphone output is the same as that on outputs 1-2, used for hardware monitoring.

Simply connect a pair of headphones to the headphone output (the **Volume** knob allows you to adjust the signal level on the output). Selection of the inputs being monitored is then carried out via software, using the Hercules 16/12 FW Control Panel interface. For more information, please refer to section [6.5. Configuring hardware monitoring](#).

5.5. Synchronization

Each digital device in your home studio is calibrated to a different sample rate, which can cause a loss of synchronization. The sound will then appear to be distorted. The solution consists of imposing a single sample rate on all the digital devices via a synchronization signal. This signal is transmitted in various ways: via the digital connectors (optical or coaxial) or via the Word Clock connectors (these BNC connectors are dedicated to transporting the synchronization signal, the audio signal ahead of it passing through the digital connectors).

Synchronization is based on the concept of Master/Slave devices within the recording chain, the Master device imposing its frequency on the Slave devices. If your Hercules 16/12 FW is receiving digital data you must configure it to Slave mode; if it is sending digital data it must be in the Master position.

There is also a third possibility: your Hercules 16/12 FW can both receive and send digital data at the same time, in which case it must be configured as a Slave. The synchronization signal will then be transmitted to your Hercules 16/12 FW, which will transmit it in turn to other devices in the recording chain.

Synchronization configuration is then carried out via software, using the Hercules 16/12 FW Control Panel interface. For more information, please refer to section [6.4. Selecting the synchronization mode](#).

Note: the MIDI input/output ports also allow you to synchronize MIDI devices using the MIDI Sync, MTC (MIDI Time Code) or MMC (MIDI Machine Control) standards. For more information, please refer to your MIDI devices' documentation.

5.6. Multi-client

Your Hercules 16/12 FW is multi-client compatible, which means that you can use more than one audio application simultaneously to manage the different inputs and outputs. For example, you can use outputs 1 to 8 in a given application while assigning outputs 9 to 12 to another application.

There are a few simple rules that must be respected in order to use the multi-client functionality correctly:

- Your Hercules 16/12 FW functions in multi-client mode, but with single-client drivers: you can use your Hercules 16/12 FW in an application using the ASIO drivers jointly with another application using the GSIF drivers, but you cannot use two applications both of which are using the ASIO drivers.

Note: this limitation only concerns the initial version of the Hercules 16/12 FW, as later versions will feature multi-clients drivers. If your Hercules 16/12 FW is affected by this limitation, you can consult the Hercules website (www.hercules.com) to verify whether updated drivers are available.

- An input or output can only be used by one application at a time. For example, you cannot assign your Hercules 16/12 FW's output 1 to both Live and Cubase simultaneously.

- All audio applications must be set at the same sample rate. For example, if you are using Cubase at 44.1kHz and play a sound in Live, which is set at 48kHz, then Live will modify your Hercules 16/12 FW's hardware configuration to switch it to 48kHz, and the tonality of sounds in Cubase will be modified as well.
- Make sure that your computer is powerful enough to support running more than one audio application at the same time. The critical elements are the memory and the CPU. We recommend that you have at least 256MB of RAM and a 1GHz CPU.

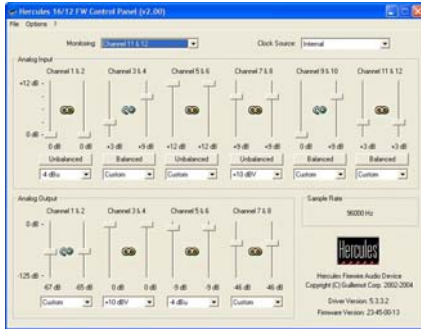
5.7. Firmware updating

Your Hercules 16/12 FW was designed with evolution in mind and thus includes a firmware updating function. Firmware represents the instructions stored in your Hercules 16/12 FW's ROM, telling it how to react under different circumstances (inputs/outputs, knobs, buttons). A firmware update can add new functionalities or improve certain existing functions.

You must download the update files from the Hercules website and then use the Firmware updater software, available in the Hercules 16/12 FW programs group, to update your firmware. This software allows you to update two different elements: the FPGA (Field-Programmable Gate Arrays) or the MCU (MicroController Unit). The MCU is responsible for managing the information passing through the FireWire port, while the FPGA mainly takes care of managing the Hercules 16/12 FW's inputs/outputs. All of the instructions required for updating your firmware will be supplied with the update file. Please visit www.hercules.com regularly to verify whether firmware updates are available.

6. THE HERCULES 16/12 FW CONTROL PANEL INTERFACE

6.1. General points



The Hercules 16/12 FW Control Panel interface allows you to configure the analog inputs and outputs, select the inputs to monitor and select the synchronization source, all via presets that you can save to return to your personalized settings.

6.2. Managing presets

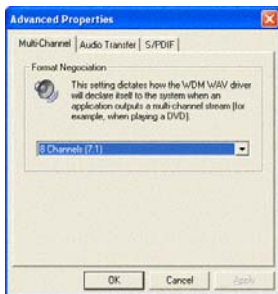
Presets are files containing your personalized settings for the different options in the Hercules 16/12 FW Control Panel interface. You can manage your presets via the **File** menu.

Load device parameters....: load a preset you have already saved.

Save device parameters as....: save a preset you are currently editing.

6.3. Advanced options

Click **Options/Advanced...** to bring up the advanced options menu.



The **Multi-Channel** tab is intended for multimedia use, the playback of DVDs with a multi-channel soundtrack in particular. It allows you to set the number of active outputs. The order for assigning speakers to the different outputs is as follows:

Front left speaker: output 1

Rear right speaker: output 6

Front right speaker: output 2

Rear left center speaker: output 7

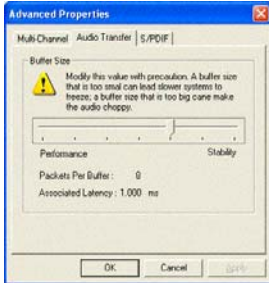
Center speaker: output 3

Rear right center speaker: output

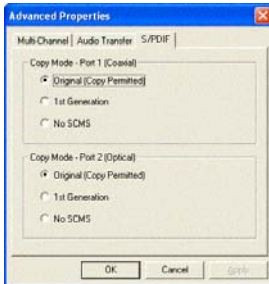
Subwoofer: output 4

8

Rear left speaker: output 5



The **Audio Transfer** tab deals with software monitoring. It allows you to configure the monitoring quality by regulating the number of packets per buffer. The fewer the packets, the more the latency is reduced, although some configurations may become unstable as a result. Conversely, a buffer made up of a greater number of packets increases the latency time but helps to ensure system stability.



The **S/PDIF** tab allows you to configure the copy protection attributes for your recordings on DAT or MiniDisc. The options available are as follows:

Original (Copy Permitted): authorizes an unlimited number of copies from the original; however, it will not be possible to make copies of a copy.

1st Generation: authorizes a single copy from a copy.

No SCMS: no protection.

6.4. Selecting the synchronization mode

Select the synchronization mode in the **Clock source** drop-down list:

Internal: Hercules 16/12 FW uses its internal clock and is thus in the Master position. Its frequency may be transmitted to other digital devices via the digital optical or coaxial outputs or the Word Clock output.

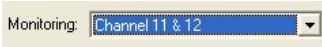
Word Clock: Hercules 16/12 FW synchronizes itself to the frequency received on the Word Clock input connector and is thus in the Slave position.

SPDIF/RCA: Hercules 16/12 FW synchronizes itself to the frequency received on the digital coaxial input connector and is thus in the Slave position.

SPDIF/OPT: Hercules 16/12 FW synchronizes itself to the frequency received on the digital optical input connector and is thus in the Slave position.

Note: when your Hercules 16/12 FW is in the Slave position, the frequency received is sent back out on the Word Clock and digital optical and coaxial outputs, guaranteeing homogeneous frequencies among all of the digital devices in the recording chain.

6.5. Configuring hardware monitoring



- To select the 2 inputs you wish to monitor, tick the corresponding box in the **Monitoring** zone.

The signal received on the selected inputs is instantly transmitted to outputs 1/2.

Note: if you use hardware monitoring, you should consider disabling the monitoring function integrated into your audio software, or else your recording will be monitored 2 times, first via direct hardware monitoring, and then a second time via software monitoring, with the risk of a gap between the signals.

6.6. Configuring the analog inputs

You can configure the line level for each analog input according to the device connected to it, consumer-grade or professional. Please refer to your devices' documentation to find out their line levels and adjust the inputs accordingly:



- If it is a consumer-grade device, enable the **-10dBV** option.

- If it is a professional device, enable the **+4dBu** option.

Repeat this procedure for each input in order to guarantee line level homogeneity and thus perfect sound quality. The second setting to configure has to do with the signal type, balanced or unbalanced.



- For each input, enable either the **Unbalanced** or **Balanced** options according to the signal coming in on the inputs.

Note: inputs paired together (1-2, 3-4, etc.) cannot be configured separately. If one is set as balanced, then the other must be balanced as well.

6.7. Configuring the analog outputs

You can also configure the line level for each analog output according to the device connected to it, consumer-grade or professional. Please refer to your devices' documentation to find out their line levels and adjust the outputs accordingly:



- If it is a consumer-grade device, enable the **-10dBV** option.

- If it is a professional device, enable the **+4dBu** option.

Repeat this procedure for each output in order to guarantee line level homogeneity and thus perfect sound quality. With respect to the type of signal sent (balanced or unbalanced), the Hercules 16/12 FW rack determines this according to the type of cable connected to the outputs: if it is a 6.35mm mono jack cable, the rack sends out an unbalanced signal; if it is a 6.35mm stereo jack cable, the rack sends out a balanced signal.

7. USING THE RACK WITH AUDIO SOFTWARE

7.1. General points

The Hercules 16/12 FW Control Panel interface has allowed you to configure your Hercules 16/12 FW's inputs and outputs, but in order to record a performance, you must use an audio application, which you will also have to configure. In particular, you will have to select the Hercules 16/12 FW drivers, select the sample rate, and configure the monitoring mode. This is generally done via an internal configuration panel in the software.

The information provided here is generic, since each audio application is different. For more information on configuring your audio software, please refer to its documentation.

7.2. Selecting the drivers to be used

In order to record the signals received on your Hercules 16/12 FW's inputs and then transmit them to the outputs, your audio software must use the Hercules 16/12 FW drivers, which allow it to identify the different inputs/outputs.

Your Hercules 16/12 FW comes with multiple drivers, ensuring perfect compatibility with all existing music applications. Each driver category has its advantages according to the software being used.

The standard drivers are the WDM (Windows Driver Model) drivers, which can be used with all music applications.

Your Hercules 16/12 FW also comes with ASIO drivers, which guarantee greatly reduced latency. Latency is the time that elapses between the moment you activate a control to play a sound and the moment the sound is actually played. Consequently, the more the latency is reduced, the better the audio playback. If your music software supports ASIO drivers, do not hesitate to use them.

Other specific drivers are also provided, the GSIF (GigaSampler Interface) drivers. These allow you to use your Hercules 16/12 FW with the GigaSampler and GigaStudio applications, while guaranteeing minimal latency.

As far as the MIDI interface is concerned, standard drivers are offered to help you get the most out of the inputs/outputs.

7.3. Configuring the audio resolution

Audio applications allow you to configure the sample rate and the audio resolution for recording and playback. Your Hercules 16/12 FW can process signals up to 24 bits and 96kHz.

7.4. Configuring the monitoring mode

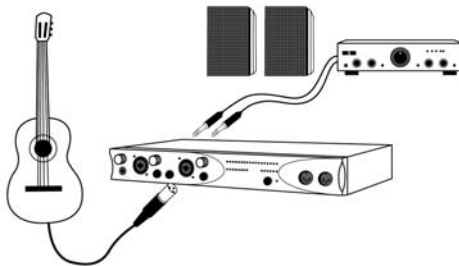
Your Hercules 16/12 FW allows you to carry out hardware monitoring of 2 inputs. On top of this there is software monitoring, which has the same function although it is less efficient in terms of latency since audio streams pass through the software. If you do not have to monitor more than 2 inputs simultaneously, disable software monitoring and give precedence to hardware monitoring.

8. TUTORIALS

This section gives you detailed, concrete examples of how to use your Hercules 16/12 FW with one of the bundled applications, Cubase LE.

8.1. Recording an instrument

This tutorial allows you to record your first audio track from an analog device, a guitar in this case. The guitar will be connected to input 11 to take advantage of its high impedance mode. The application selected in this tutorial, Cubase LE, is provided with your Hercules 16/12 FW.



- Connect the guitar to the **MicLine** input using an XLR cable (not included).

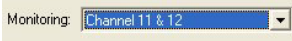
Hercules 16/12 FW includes a monitoring function, which transfers the signals recorded directly to the analog outputs, thus allowing you to listen to your performance.

- Connect an audio monitoring setup (amp + speakers, hi-fi system, etc.) to your Hercules 16/12 FW's analog outputs 1 and 2.

All of the elements are now connected. You must now configure the system.

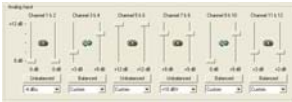
- Switch on your computer.
- Press your Hercules 16/12 FW's **Power** button.
- Press the **Instrument** button to enable the high impedance input on analog input 11.
- Launch the Hercules 16/12 FW Control Panel software.

You will now configure the attributes for your Hercules 16/12 FW's inputs and outputs.



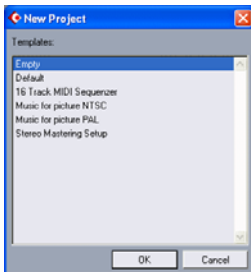
- In the **Monitoring** zone, tick the **11-12** box.

The sound coming from your guitar will be automatically transmitted to outputs 1-2 for hardware monitoring, thus eliminating any latency.



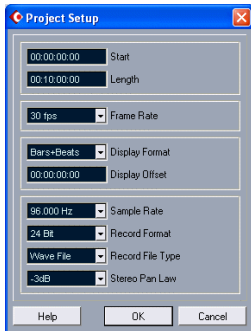
- In the **Input Levels** zone, set the type of signal received for input 11: balanced or unbalanced, as well as the level (-10dBV or +4dBu).

- In the **Output Levels** zone, set the level for analog outputs 1 and 2 (-10dBV or +4dBu).



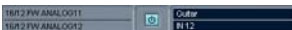
- Launch the Cubase LE software.
- Click **File/New Project**.
- Select the **Empty** setting to start with a blank project.
- Click **OK**.
- Select a working directory.
- Click **OK**.

You must now configure the software and set the recording quality.



- Click **Project/Project Setup....**
- Select **96.000 Hz** in the **Sample Rate** drop-down list.
- Select **24 Bit** in the **Record Format** drop-down list.
- Select **Wave File** in the **Record File Type** drop-down list.
- Click **OK**.

You have just configured Cubase LE to take advantage of your Hercules 16/12 FW's full potential. You must now select the inputs and outputs to use.



- Click **Devices/VST Inputs**.
- Verify that input 11 is enabled by clicking . You can also rename it (example: guitar) by clicking the black zone.



- Click **Devices/VST Outputs**.
- Select **16/12 FW ANALOG1** in the BUS 1 drop-down list.

The **ANALOG1** output corresponds to the 1&2 output pair, to which your audio monitoring setup is connected.


- Click **Project/Add Track/Audio**.




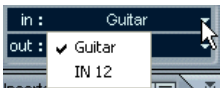
A track, named **Audio 01**, appears in the Cubase interface. You must now configure it via the options panel on the left-hand side.



- For more clarity, you can first rename the track in the same way that you renamed the input by clicking **Audio 01**. You can use the same name (Guitar), and this habit will help to avoid any errors when you are recording on numerous tracks.

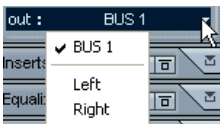
- The  button allows you to choose the monitoring mode (hardware or software) for this input. Since we have already configured hardware monitoring in the Hercules 16/12 FW Control Panel software, do not enable this button.

- On the other hand, make sure to enable the  button, since it is this button which determines whether the signal received on the track will be recorded. Note that this does not launch the recording; it simply defines that the track is ready to record.





- Select **IN 11** (or **Guitar** if you have renamed the track) in the in drop-down list.

You have just configured recording on input 11, to which your guitar is connected.



- Select **BUS 1** in the out drop-down list.

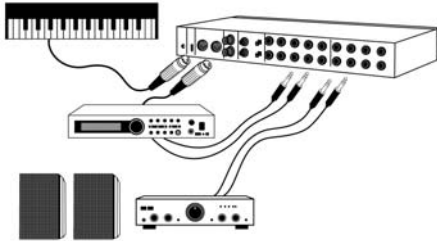
The sound of your guitar will be played on analog outputs 1 and 2, to which your audio monitoring setup is connected.

- Before recording, play a few chords and adjust the gain on input 11 if necessary using the **Gain** knob.
- Click  at the top of the interface to launch recording and then start playing.
- Click  once your performance is complete.

Your performance has now been recorded.

8.2. Recording a MIDI sequence

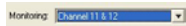
Thanks to your Hercules 16/12 FW's MIDI interface, you can use a master keyboard with a sequencer and transmit the information to an expander which will play back your performance. In this way you can rework your MIDI recording in the sequencer, to attain a perfect result.



- Connect the master keyboard's MIDI Out connector to your Hercules 16/12 FW's **Midi In 1** connector.
- Connect the expander's MIDI In connector to your Hercules 16/12 FW's **Midi Out 1** connector.
- Connect the expander's analog outputs to your Hercules 16/12 FW's analog inputs 1-2.
- Connect your audio monitoring setup (amp + speakers, hi-fi system, etc.) to your Hercules 16/12 FW's analog outputs 1 and 2.

All of the elements are now connected. You must now configure the system.

- Switch on your computer.
- Press your Hercules 16/12 FW's **Power** button.
- Switch on your MIDI devices.
- Launch the Hercules 16/12 FW Control Panel software.



- In the **Monitoring** zone, tick the **1-2** box.

The sound coming from your expander will be automatically transmitted to outputs 1-2 for hardware monitoring, thus eliminating any latency.

- Launch the Cubase LE software and repeat the configuration step described in section [8.1. Recording an instrument](#). The differences are as follows:
- Click **Project/Add Track/MIDI** to create a MIDI track and not an audio track.
- Select **Hercules 16/12 FW MIDI 1** in the **in** drop-down list.
- Select **Hercules 16/12 FW MIDI 1** in the **out** drop-down list.

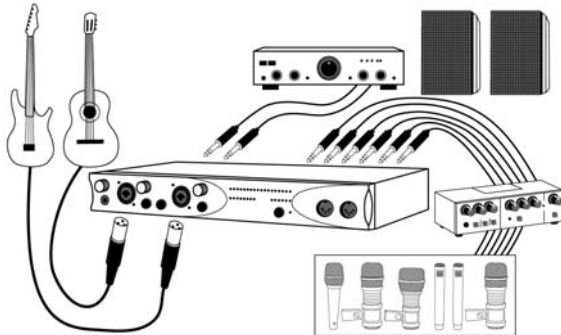
In this way, you configure the MIDI input/output ports as being those of your Hercules 16/12 FW's MIDI 1 interface.

- You can now play your master keyboard and listen to your performance thanks to hardware monitoring.

8.3. Recording a guitar-bass-drums type of group

The elements to be recorded are the following: guitar, bass, drums, singer. Since five microphones will be used to record the drums, the total number of inputs used will be 8.

The guitar will be connected directly to input 11 to take advantage of its high impedance mode, like the bass, connected to input 12. The other microphones (drums and singer) must first be connected to an external preamp (not included) in order to transmit a sufficiently powerful signal to your Hercules 16/12 FW.



- Connect the guitar and the bass to the **Mic/Line** inputs using XLR cables (not included).
- Connect the microphones for the drums and the singer to your preamp's inputs.
- Connect your preamp's corresponding outputs to your Hercules 16/12 FW's inputs.
- Connect your audio monitoring setup (amp + speakers, hi-fi system, etc.) to your Hercules 16/12 FW's analog outputs 1 and 2.

All of the elements are now connected. You must now configure the system.

- Switch on your computer.
- Press your Hercules 16/12 FW's **Power** button.
- Press the **Instrument** button to enable the high impedance inputs on analog inputs 11 and 12.
- Switch on your preamp.
- Launch the Hercules 16/12 FW Control Panel software.

You will now configure the attributes for your Hercules 16/12 FW's inputs and outputs.

- In the **Monitoring** zone, untick any boxes that have been ticked to disable hardware monitoring.

Since hardware monitoring only allows you to monitor 2 inputs at the same time, you will not be able to listen to the whole group. You will therefore use software monitoring.

- In the **Input Levels** zone, set the type of signal received for each input: balanced or unbalanced, as well as the level (-10dBV or +4dBu).
- In the **Output Levels** zone, set the level for the analog outputs (-10dBV or +4dBu).

You can now launch your audio software to record your performance.

- Launch the Cubase LE software and repeat the configuration step described in section 8.1. Recording an instrument. The differences are as follows:



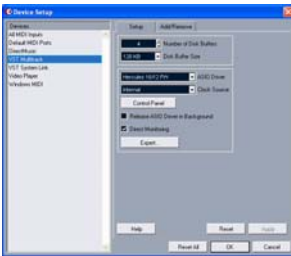
- Make sure to enable all of the inputs that have an instrument/microphone connected (example: input 1 for the singer's mic, inputs 2 to 6 for the drum mics, input 11 for the bass and input 12 for the guitar).
- Rename each track according to the instrument connected to it (example: Singer, Snare drum, Bass, etc.).

As this tutorial deals with multi-track recording, you get a better idea of how beneficial it can be to rename each input and track.




- Create an audio track for each input to be recorded, and rename them in the same way as the inputs.
- For each track, select the appropriate input in the **in** drop-down list.

You are now ready to start recording, apart from one thing: since we have seen that hardware monitoring would be inappropriate in this situation, we will therefore use software monitoring instead, which you will have to configure.





- Click **Devices/Device Setup....**
- Select the **VST Multitrack** heading.
- Select **Hercules 16/12 FW** in the **ASIO Driver** drop-down list.
- Enable the **Direct Monitoring** option.

You have just configured software monitoring with the ASIO drivers, which guarantee minimal latency.

- Click **OK**.
- All you have to do now is enable the  button for each track.

The sounds from all the instruments/mics will be reproduced on your audio monitoring setup. You are now finally ready to record your performance.

- Select all of the tracks by clicking each of them while pressing and holding down the [Ctrl] key.
- Click  at the top of the interface to launch recording and then start playing.
- Click  once your performance is complete.

Your performance has now been recorded, but each track corresponds to an independent audio file. If you wish to save your group's performance in a single file, you will have to do an audio mixdown.



- Select the entire recording using the selection pointers at the top of the interface.

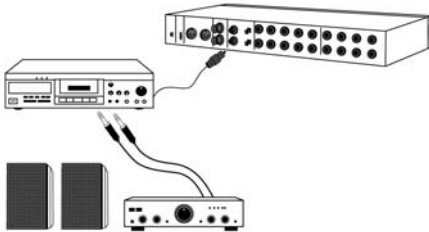
- Click **File/Export/Audio Mixdown....**
- Give your mix a name and then click **Save**.

You now have an audio file containing your group's demo.

Note: this tutorial describes a basic recording, but there are numerous other possibilities, such as adding a MIDI keyboard, using input-output pairs to insert external effects processors (compressor, equalizer), inserting software effects, etc. For more information, please refer to the software's documentation.

8.4. Recording a piece onto a DAT or MiniDisc

You have recorded a performance by your group on your computer, and then reworked it with your audio software to obtain the definitive piece. You may now wish to transfer it to a DAT or MiniDisc recorder to share it with your fellow musicians. This section explains how to transfer your pieces to a digital device.

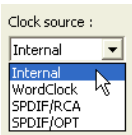


- Connect one of your Hercules 16/12 FW's digital outputs (optical or coaxial) to the corresponding digital input on your DAT or MiniDisc recorder.

- Connect your audio monitoring setup (amp + speakers, hi-fi system, etc.) to your DAT or MiniDisc recorder's analog outputs.

You can now monitor your recording.

- Switch on your computer.
- Press your Hercules 16/12 FW's **Power** button.
- Switch on your DAT or MiniDisc recorder.
- Launch the Hercules 16/12 FW Control Panel software.



- Select **Internal** in the **Clock source** drop-down list.


This allows you to synchronize the DAT or MiniDisc recorder with your Hercules 16/12 FW's clock, thus eliminating any risk of sound distortion during recording.

- Launch the Cubase LE software.




- Click **Devices/VST Outputs**.
- Select **16/12 FW SPDIF RCA OUT L** or **16/12 FW SPDIF OPT OUT L** (depending on the connection you have chosen) in the **BUS 1** drop-down list.
- Click **File/Import/Audio File...**
- Select the file to record and click **Open**.

A new audio track is created, containing your piece.

- Make sure that the audio track's  button is disabled since monitoring will be carried out directly via your DAT or MiniDisc recorder's analog outputs.

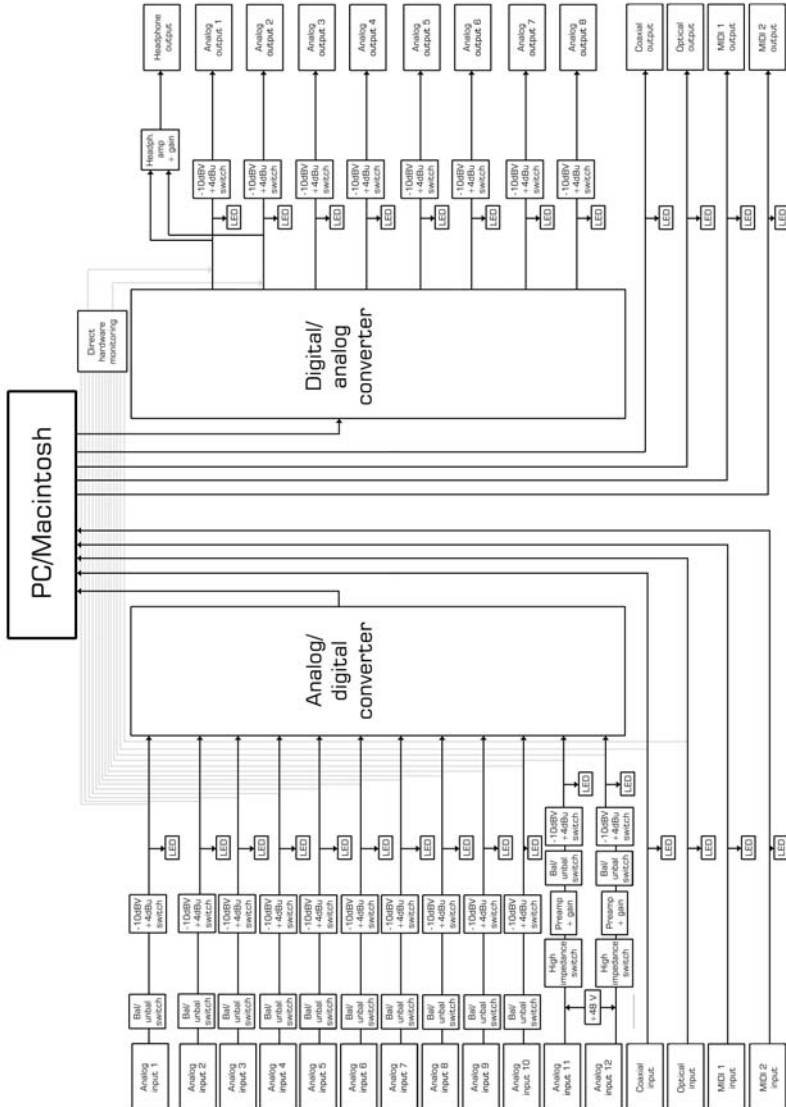
You are now finally ready to record your performance.

- Launch recording on your DAT or MiniDisc recorder.
- Click  at the top of the interface to launch playback.

Recording begins. You can follow its progression thanks to the audio monitoring setup connected to your DAT or MiniDisc recorder's analog outputs.

9. FUNCTIONAL DIAGRAM

In this section you will find the functional diagram for your Hercules 16/12 FW. This diagram depicts the paths of different signals through your Hercules 16/12 FW in a schematic fashion, helping you to get a better understanding of exactly how the system works.



10. TECHNICAL SPECIFICATIONS

General	
Connection	IEEE 1394a/FireWire bus (6-pin plug) via 6-pin/6-pin 450cm FireWire cable + 6-pin/4-pin (mini DV) adapter
Power supply	External 15V/1A adapter
Dimensions	34 x 16.2 x 4.4cm
Weight	1.7kg (with cable and power adapter)
Sample rates	32 – 44.1 – 48 – 96kHz
Sample bit depths	16 and 24 bits
A/D converter	105dB
D/A converter	114dB
Supported drivers	WDM, ASIO 2, GSIF, Mac CoreAudio
Inputs	
2 front XLR/6.35mm jack combined analog inputs	<ul style="list-style-type: none"> ◆ High impedance switch (to 100kΩ) for guitar and bass ◆ Gain adjustment (from 0 to +55dB) on each connector ◆ Global 48V phantom power switch ◆ Balanced and unbalanced modes ◆ Line level at +4dBu or -10dBV
10 rear 6.35mm jack analog inputs	<ul style="list-style-type: none"> ◆ Balanced and unbalanced modes ◆ Line level at +4dBu or -10dBV
2 independent S/PDIF stereo inputs	Optical and coaxial connectors
2 MIDI inputs	General MIDI-compatible
Outputs	
1 front 6.35mm jack stereo headphone plug	Gain adjustment (from 0 to +55dB)
8 rear 6.35mm jack analog outputs	<ul style="list-style-type: none"> ◆ Balanced and unbalanced modes ◆ Line level at +4dBu or -10dBV
2 independent S/PDIF stereo outputs	Optical and coaxial connectors
2 MIDI outputs	General MIDI-compatible
Synchronization	
2 synchronization modes	<ul style="list-style-type: none"> ◆ Master mode: Hercules 16/12 FW controls the clocks of other audio-digital devices ◆ Slave mode: Hercules 16/12 FW synchronizes itself with other audio-digital devices
2 connection types	<ul style="list-style-type: none"> ◆ Word Clock (BNC input and output connectors) ◆ S/PDIF (optical and coaxial input and output connectors)

11. TECHNICAL SUPPORT

If you encounter a problem with your product, please go to <http://ts.hercules.com> and select your language. From there you will be able to access various utilities (Frequently Asked Questions (FAQ), the latest versions of drivers and software) that may help to resolve your problem. If the problem persists, you can contact the Hercules products technical support service (“Technical Support”):

By email:

In order to take advantage of technical support by email, you must first register online. The information you provide will help the agents to resolve your problem more quickly.

Click **Registration** on the left-hand side of the Technical Support page and follow the on-screen instructions.

If you have already registered, fill in the **Username** and **Password** fields and then click **Login**.

By telephone:

United Kingdom	020 7216 0047	price of a national phone call, Monday to Friday from 12PM to 10PM
United States / Canada	514-279-9911	price of a long distance phone call, Monday to Friday from 7AM to 5PM (Eastern time)
Australia	1902 262 514	\$1.98/min, Monday to Friday from 9AM to 6PM
Denmark	82 33 28 58	price of a national phone call, Monday to Friday from 1PM to 10PM
Finland	09 81 71 01 54	price of a national phone call, Monday to Friday from 2PM to 11PM
Norway	23 50 01 16	price of a national phone call, Monday to Friday from 1PM to 10PM
Sweden	08-51992032	price of a national phone call, Monday to Friday from 1PM to 11PM

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This warranty shall not apply: (1) if the product has been modified, opened, altered, or has suffered damage as a result of inappropriate or abusive use, negligence, an accident, normal wear, or any other cause not related to a material defect or manufacturing flaw; (2) in the event of failure to comply with the instructions provided by Technical Support; (3) to software not published by Guillemot, said software being subject to a specific warranty provided by its publisher.

11.2. Additional warranty provisions

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Declaration of conformity

EC COMPLIANCE NOTICE: this equipment has been tested and found to comply with the limits of the Council Directive 89/336/EEC of 3 May 1989 on the approximation of the laws of the Member States relating to electromagnetic compatibility, amended by Directive 93/68/EEC. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

CANADIAN COMPLIANCE NOTICE: this Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

USA COMPLIANCE NOTICE: this equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) This device must accept any interference received, including interference that may cause undesired operation.

These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment on and off, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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