

MUSICAL COMPUTER

a. Computers and you. A love story.

Fifteen years ago, the idea of having an at-home studio seemed crazy to most people (Sting, Paul McCartney and Bono do not count) because of the costs and the complications entailed.

Today, the evolution of technology has made great strides. We can all build our own studio if we so propose.

The computer, this friend and sometimes lover, can occasionally bother you so much that you feel like throwing it out the window, (83% of global computer users have lashed out at theirs, and some have even gone further at times!), is responsible for this.

Before the advent of the domestic digital era, the only way to record multiple tracks was on a multi-track analog (except for the intermediate step, the ADAT). But this equipment was very expensive, and therefore reserved for professional studios that could recoup their costs. This was so because the interface AD (analog-digital, or whatever converted sound signals into zeros and ones) had to be of high quality and to function with processing capabilities that computers of the era were not prepared for.

At that time, the only existing digital recording was the Pro-Tools. There has always existed some confusion about this tool, which is the most used worldwide, that I will try to clarify. The Pro-Tools (as it is denominated) is software that runs on a computer, but it is also the AD-DA interface (sound card). In those days, it took care of signal processing, relieving the computers of a tremendous task.

But in reality, the software was (and is) independent of the hardware we use. The Software Pro-Tools is just a sequencer like those discussed above, but it is focused on the audio. Therefore, we can use Pro-Tools cards with any software that we choose (in my case, Logic), or vice versa, the Pro-Tools software with other compatible sound cards.

Today, fifteen years later, it is possible to work with these programs on almost any computer, as the processing capacity has been dramatically increased since the old days. Therefore, we only have to choose the computer and we can begin.

Before we start talking about what we need to set up our new studio, I would like to express some initial thoughts about computers.

¿Mac or PC? ... Computers are divided into two families, on one hand the Mac [Apple] and on the other, the PCs. Each has its own operating system, which in the first case is the Mac OS and Windows in the second. A few years ago the choice was easy; it was Apple, because the computer and its operating system were much more stable. But today's PCs and their new-generation operating systems (from Windows XP SP2) are, if well configured, as reliable as their opponent [Apple]. In addition they have the advantage of a much lower price. So! You have the last word, because either choice is good.



There are certain aspects which must be taken into account when buying a computer to be used for making music. The most obvious is that the better the computer, the fewer problems will occur. The most important aspects are:

- Processor type and speed (at least Core Duo, at any clock speed)
- The hard drive Speed (at least 5400 rpm, ideally 7200 rpm or faster if possible)
- The amount of RAM memory (as much as you can get, at least 2GB)

One last question that is often asked is if a laptop can be used in a studio. The answer is yes, if it is a good one and if the AD-DA card that we use with it is not internal, but is connected via USB 2.0 or Firewire (like most of the interfaces now). The speed of the disc tends to be somewhat lower than its desktop counterpart, but it is more than enough for most of our needs.



b. Is it really so easy? How can one set up a recording studio?

The key parts we need in a studio these days are:

- A computer with CD burner
- A mixer table
- An AD-DA interface (a sound card)
- A MIDI interface
- A pair of monitors
- Good headsets
- Instruments, microphones, music to record

We have already spoken about the **computer**. I propose that the operating system, if it is a PC, should be Windows XP SP2, because the Vista requires more resources, which will be better used in tracks and in effects than on the bottom screen of Windows. The rest of the features are not that important, although instead of spending a lot of money on a big screen (20", 22" or larger) I advise to buy two monitors of 17" or 19" and to join them together. The equivalent is much wider, the price similar and it is going to be infinitely more useful.



The **mixer** is a necessary component because when working with computers we will have virtual mixers. But if we have several instruments or several microphones it would be worthwhile to invest a little money in the right infrastructure (any kind of table or console table will do) where we can plug

in all sound entries and through which all the sounds can later come out.

The number of channels required will be determined by the number of entries that we want to use (one or two for each instrument, depending on whether they are mono or stereo). If they are stereo, we will use two separate channels (L and R) to pan 100% to the left and to the right.

Behringer makes excellent tables (considering the price-quality relation) with a great performance in any range. However, I still like Mackie tables best.



The **sound card** is important, because this will probably be the weakest point in the system. Today most of the AD-DA interfaces are of very good quality.

Some of them even have MIDI embedded (if not, you can always keep it independent).

The M-Audio range offers very good value for money, although in my opinion MOTU (Mark of the Unicorn) remains the best you can find on both interfaces.

The near-field reference **monitors** are at the end of the chain. This is the way to check that what you have recorded sounds good, bad or regular. That is why it is important that they faithfully correspond to reality. Monitors that sound good because they offer many bass, middle or treble tones without offering real sound are for listening to music, not for recording it. The reason is that if you listen (for example) to a song recorded by monitors with added bass tones, you will not worry



about adding bass tones in the mixture... they seem to be there already, right? ... The result? ... A song with a huge vacuum in those frequencies.

Due to this, it is important that you use (and that you check it out with some good **headphones**, if possible AKG) monitors that are relatively reliable. I particularly like ALESIS. They are cheap and very acceptable. Another tip is that they are self-amplified

[i.e.: they do not need an external amplifier]. You will save yourself more than a headache by using them.



You will also need a **microphone**, of course.

The most classic, tough, versatile of all the microphones in history is the Shure SM58. You must have at least one of these. If you want to record with more quality, the brand RODE offers some fantastic micros at very tight prices (NT1 being one of my favourites).

As you can see, all our recommendations to set up a studio have been made from the perspective of a home studio, which does not mean that it should be under-rated at all. The approach has always been focused on value for money.

We could have suggested authentic excesses that would have cost the equivalent of half the GDP of some African countries, but any suggestions we have made are really quite acceptable for any economy.

Think that even though we call it a mini studio, with the most basic system possible, we will still have a lot more technology than that which was used by mythical groups such as The Beatles or Led Zeppelin.

Now, of course, we need the instruments, your music. The sky is the limit, but it is clear that the better the instrument, the better the sound. If you already have, as it seems, a Ramírez MIDI guitar, congratulations! You are on the right track.

c. And now, what should we do?

We have all the elements to set up our studio, but ... How? I will try to explain in a simple way with an example because each studio will be a world apart and can be configured in at least ten different ways. You will see what we would do with a standard configuration.

In our example, we will have the following:

- A PC computer with USB and Firewire connections
- Two self-amplified monitors Alesis M1
- A MIDI interface Motu Express (8x8)
- A M-Audio Firewire 410 sound card (2 ins x 8 outs)
- A Behringer mixer with 16 channels and two buses
- A Kurzweil K2500 keyboard
- A Ramírez MIDI guitar 2QE
- A Roland GR20 guitar synthesizer
- A Rode NT1 microphone and a Shure SM58

- AKG Studio 240 headphones
- Tons of energy to start recording

The first thing we have to do is to find a good place for all our stuff. Assuming that we are going to spend a lot of time using them, they will be better in an easily accessible place and set up in the most ergonomic way possible. This may seem obvious, but once you are working fourteen hours a day with your computer, you will remember this and smile.

When you have everything in place, it is time to begin to wire up. It is important that the MIDI interface is in between your drivers and the computer, so you do not have to have extra long cables. Similarly, for the same reason, the mixer and the sound card should be close.

The first thing is to connect the computers to the electricity. It is curious how often we forget that we need to plug in things and we do not remember to buy the necessary cables. To prevent unwanted noise in our recordings, and if it is not possible (it rarely is) that the electricity cables and the audio ones run separately, at least do not place them together and in parallel, since the audio would capture the current frequency (50Hz) and you would have continuous interference. It is also important, for a very similar reason, that you use strips with earth grounding.

After having connected the computers, it is time to wire them. We start with the MIDI, which is the easiest part. If we did not have the MIDI interface (which works like a “thief” or extension plug or like a MIDI connection strip) we would have to pay more attention to the order when connecting the inputs IN, OUT and THROUGH. But in this case we simply have to connect the OUT outlets of our MIDI hardware to the IN of the MIDI Interface and vice versa, from IN to OUT. To conclude, we connect the MIDI interface to the computer through its USB cable. And that is all!

While hoping that connecting the audio will be as simple as this, you will start to connect all the audio to the mixer.

First you need to know that all those intimidating buttons on the mixer, have a trick to understanding them. The sixteen rows (called channels) are all the same, and are used for the same thing, but on separate channels. So, when you learn to use one of these rows you will know how to use the 90% of the table. The remaining 10% are auxiliary channels, the master track and little more.

Now we will connect our computers to the input channels on the table. It's a good idea to put a label on each channel so that you know at first sight exactly what is connected. My suggestion would be this:

NOTE: The mono channels panning to the centre. The stereo channels, the L (left) to the far left and the R (right) to the far right.

ANOTHER NOTE: Each manufacturer has a different nomenclature, but it refers to the same thing. Therefore, if in my example the master output of the table is called Main Mix, on another table it could be called Main Out, or Master Out, or anything else. But in the end, a rose is a rose by any name ...

We will start with the input channels. Each channel has to regulate its entry-level individually, to sound as loud as possible but without ever distorting.

Channel 1. SHURE SM58 microphone.

Channel 2. Rode NT1 Microphone

Channel 3. Main Out L Roland GR20

Channel 4. Main Out Roland GR20 R

Channel 5. Main Out L Kurzweil K2500

Channel 6. Main Out Kurzweil K2500 R

Channel 7: Out L of Computer

Channel 8: Out R of Computer

Channel 9: M-Audio: Out 1

Channel 10: M-Audio: Out 2

Channel 11: M-Audio: Out 3

Channel 12: M-Audio: Out 4

Channel 13: M-Audio: Out 5

Channel 14: M-Audio: Out 6

Channel 15: M-Audio: Out 7

Channel 16: M-Audio: 8 Out

Now to the exits on the table. We will connect the main ones (Main Mix) to the monitors. The two buses to the two entrances of the sound card (L and R). The headphones to their own exit, and we are ready to begin.

The process, summarized, would be the following. Everything that we play or sing (and which we can hear through the monitors or the headphones) goes to the mixer. From here, through the buses, we send what we want to be recorded to the audio interface (while through the master we can hear everything). At the same time, the audio interface is connected to the computer via firewire.

On the computer, with the sequencer that we have chosen, we can record everything we want and then mix it internally, or we can take it out through the tracks (from 9 to 16) and mix it on our table and then send it back to the computer to master it. All this seems complicated at first, and the truth is that ... it is complicated.

But once you have tested your equipment, if you have understood the basics on how all this functions (which we hope has been properly explained), you will have no problem making it work, and even to change the suggested settings to make your own adjustments.

Until now we had not talked about mastering. Mastering is a process that is done at the end of a mixture to ensure that the sound can be heard as loud as possible without distortion, leaving the material prepared for possible replication in CD, DVD or the format that you choose.

Initially sound qualities are not modified, given that this is the mixer's function. But sometimes, once the mix is completed, there is some-

