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Blue Dictionary

Or: the amplified harp from A-Z

CAMAC HARPS
FRANCE

Contents

Amp 3
Balanced/Unbalanced Signal 6
DI Box 6
Effects Pedal 7
Effects Processor 8
Effect Send/Return Buttons 8
Electric Harp 9
Electroacoustic Harp 9
Feedback 10
Jack Cable/Jack Lead 12
Larsen Effect 13
Microphone 14
MIDI 14
Mixing Desk 14
Monitor 15
Mono 16
Output 17
PA System 18
Pickup 18
Preamp 20
Splits 21
Stereo 22
XLR 23

A

Amp

= Amplifier. It is a box that amplifies. You can buy inexpensive practice amps, or larger professional amps. Professional-quality amps are called PA systems.

Types of Amp

1. Compact amp: this is basically the "guitar style" combo amp, a box which includes the minimum features of a ¼ inch mono jack plug input, an amplifier and its volume button, and a loudspeaker. Here is an illustration of the AER amp which we sell in our online store. Additional features - increasingly common these days - include:

- additional inputs, such as more ¼ jack inputs which can be used for additional channels (another instrument, or separate sections of an electric harp), or XLR for a microphone (for voice or side instrument), or line-in (for backtrack accompaniment). These additional inputs usually have a dedicated volume button, very useful for balancing the different channels.

- an equalizer section, with 2 or more buttons to adjust the frequencies of the general sound. You can have more high frequencies (which will sound brighter), or more bass frequencies (and sound fuller). It is useful to be able to adjust these, depending on instruments and the acoustics of the room.

- other basic effects, such as reverb, chorus, delay, distortion. You may combine them or not, according to the design of the amp.

- other optional outputs, such as an XLR output to send balanced sound to a larger PA system (see DI box). In this case, your amp can be used as a monitor on-stage. Further useful outputs can be headphones, or line out (for an external recording device).

2. More sophisticated PA systems are made of 2 or 3 parts. These include satellite speakers for the upper registers (sometimes there is only one of these), and a larger box for the bass. Since the bass frequencies are not influenced by direction, you can place the bass box anywhere on stage. The treble satellites should be placed on both sides of the harp/stage.

This system is bulkier than a compact amplifier, but it is usually more powerful. It can easily be enough for a small hall. The amplifier itself is often built into the bass element, from where you adjust the volume of each speaker. It is most probable that you will need a mixing desk between the harp and the amplifier, which is how you will get the best result anyway.

3. Professional PA system. This is what you will find when you perform in a concert hall or on a festival stage. You won't have to worry too much about speakers and amplifiers, because there will be a sound engineer and probably a whole staff of technicians to take care of you. But there are a few things you may need to discuss with them, so it is good to be familiar with a few words like DI box, balanced/unbalanced signal, jack versus XLR, monitors, microphones/pickups.

How to choose your amp: make an appointment with your local music store, bring your harp, and take the time to try as many as you can. The sound result can be very different from one to another, and your ears (and your wallet) will help you to make a choice.

B

Balanced / unbalanced signal: see DI box.

DI box

A direct input box is used to connect your harp to a professional mixing desk.

When you connect your harp to anything, such as an amp, an effects processor or to a mixing desk, you usually use a ¼ inch jack cable. This creates an unbalanced signal.

Professional sound technicians want a balanced signal, because this is more reliable, travels better over longer distances (for example to the sound desk far away at the back of the hall), and is better isolated from external interference, for example from lighting systems.

To achieve this, they prefer to connect their mixing desk using an XLR cable instead of a jack. This includes 3 wires: one of them is the ground, one of them is the signal, and the third one is also the signal, but in a reversed state. This creates the balanced signal.

The DI Box connects your jack cable to the technician's XLR cable and completes the process of balancing the signal. It is basically a small box with one ¼ inch jack input on one side, and one XLR output on the other side.

This box must be powered, either with an electrical power supply, or with batteries. DI boxes' batteries are always low! This causes a poor sound at best, or no sound at all at worst. At this point, the sound tech will claim that something is wrong with the harp because no signal arrives at his mixing desk. It is more likely that he did not replace the batteries in the DI boxes.

Effects pedal

An effects pedal processes your harp's amplified sound by adding effects, like reverb or distortion.

There are three ways to enhance your harp sound with effects. The most sophisticated one is to connect your harp to a computer, and to use software like Live, Protools or Max MSP to modify the sound. If you know how to do this, you do not need to be reading this dictionary, for you are already a sound wizard. If you don't know anything about this technology, return to the question later once you have covered the fundamentals.

The easiest and most affordable way to get effects is to use an effects pedal. The simplest pedals are designed for guitars, and they work perfectly for any instrument, including harps. There are as many pedals as there are effects. For example:

- reverb (the resonance effect you get when you clap your hand in a cathedral)

- delay (the echo you get when you shout in the mountains)

- chorus (the effect you get when you play together two strings with the same note – C# and D flat for example – and get a bigger sound)

- flanger (the kind of sound you hear when you listen through a long tube, with a sinusoidal effect on harmonics moving from high to low)

- distortion (the kind of guitar sound you hear during a heavy metal performance)…

On these pedals, there are a few buttons, which you use to adjust the main parameters of the effect, such as speed,

depth, feedback, etc.

Effects pedals are quite cheap, so you can try them and have fun without having to choose between a “pitch shifter” and a new car. You can use many of them at the same time, connecting the output of one pedal to the input of the next one using short jack cables. Some musicians have up to a dozen of them!

Alternatively, you can use an effects processor.

Effects processor

This is a module, available in 2 sizes (“one unit rack” and “half unit rack”). They are very common in recording studios, and there are dozens of brands, and hundreds of products available. You may need a little more time to get to grips with them, because they include many effects in one piece of equipment. Most of them have a mono input (the harp) and a stereo output (2 mono outputs). The main interest of using an effects processor, apart from the amount of possibilities in one device, is that you can connect it to a mixing desk, and have a separate channel for the effects beside the channels for the direct harp sound.

How to choose your effects processor: make an appointment with your local music store, bring your harp, and take the time to try as many as you can. The sound result can be very different from one to another, and your ears (and your wallet) will help you to make a choice.

Effect send / effect return buttons: see mixing desk.

Electric harp

Solid-body harp without a soundbox, only playable when amplified.

An electric harp is built with one microphone (pickup) for each string. The sound taken by electric harps comes directly from the strings, and not from the body of the harp (soundbox or soundboard). The signal is extremely pure and receives nothing but the vibration of the strings. There is no interference from the noise of the mechanism, pedals, soundbox, feedback (Larsen effect), or another musician who is too loud. It is ideal for those who will play with high level amplification, or who wish to work with effects.

Electroacoustic harp

A harp which can be played both acoustically, and amplified. Any harp on which you put a pickup becomes an electroacoustic harp. This is the cheapest way to amplify a harp.

Alternatively, you can place a pickup on each string, as is the case with the Camac Blue Harps. This gives a cleaner amplification.

You could really call the Camac pedal Blue Harps "acoustic and electric harps". You can play this instrument without any amplification, and there is also a pickup on each string. When you look at the outputs of the Blue Harp, you may notice there are four of them. Three are connected to the three sections, or splits, for the high, medium and bass strings. The fourth output is called pickup, because it picks up the signal of a microphone we have placed on the soundboard, amplifying the entire harp in one.

F

Feedback

Different types of unpleasant, usually unwanted noise arising from amplification.

1. If you are using an air microphone, such as the ones used for voice, audio feedback called the Larsen effect will happen if the microphone is too close to the loudspeakers. The feedback is generated by the microphone taking what comes from the speaker, which is what is taken by the microphone, which is what comes from the speaker… creating a loop, which can be very loud.

2. If you are playing an electroacoustic harp (an acoustic harp with one or more pickups on the soundboard), the soundbox is active because there is a natural resonance from the strings. It is possible that when playing a certain note on the harp, it will make the soundbox resonate in a way that the microphone will pick up louder.

This frequency will be amplified by the speakers, and if the speakers are behind the harp, the soundbox will receive this amplified frequency too. It will then resonate a little more, which will be taken up by the pickups, sent to the PA system, and this creates a cycle which can be very challenging to fix. The best way to solve the problem is to fill the soundbox with some material (foam, clothes, fabric…) in order to remove the natural resonance of the soundbox.

3. The third kind of feedback is very similar to the second, but it happens in the bass. Bass strings are naturally very sensitive to sympathetic resonance, which is why acoustic harpists pay so much attention to damping. If a bass string is particularly responsive to a frequency and starts to vibrate, it can be taken by the pickup (even if you don't hear it), then amplified by the speaker, the which loud noise makes the string resonate even more. Avoid it either by putting something inside the strings to damp them, or damp the string each time you hear the feedback loop start. Or you can detune the string, if all else fails.

There is really only one way to avoid feedback: play an electric harp! It is amazing how safe an electric harp is, because the pickups take only the vibration of the strings, and nothing else – especially nothing from the soundbox or from speakers.

J

Jack cable / jack lead

As in: “is there a mono ¼ inch jack lead out there? I left mine at home”.

This is the basic cable used in amplified music. It includes 2 wires: one for the signal (sometimes called “hot”, or positive), and one for the ground (“cold”, or mass).

The signal carried by a jack cable is called “unbalanced”, and it is fine for short distance connections from the instrument to an amp, an effects pedal or a mixing board. Most combo amps have only jack inputs, as do all guitar effect pedals. Electric harps, acoustic or electric guitars and basses, keyboards, etc usually only have jack outputs. They may be connected to a DI box if they are to be amplified on a big stage.

Jack cables can be either mono or stereo. You can guess if a jack cable is mono from its plug, as there is only one ring (usually black, sometimes white) on the pin itself. This means there is one wire for the signal and one wire for the ground.

Most instruments have mono outputs. Even if they did emit a stereo signal, this would be done using 2 mono outputs, one for the right channel and the other one for the left. It is however very rare that an instrument is equipped with a stereo output. To tune your Camac electric harp, you need to plug it into your tuner using a mono jack cable.

A stereo jack cable can be recognized by its two rings on the pin, meaning there are 3 wires: one for the left channel, another for the right, and the last one for the ground. You will find this style of jack cable at the end of your headphones.

There are also 2 sizes of jack plugs. Musical instruments

almost always use ¼ inch cables. The other size is called a mini-jack, used on computers and portable devices. It is almost always stereo.

A last recommendation about jack cables: a cheap one is a false economy. Don't hesitate to buy a heavy, sturdy, expensive set of jack cables. A lot of the electric harp troubleshooting we have done has been caused by poor jack cables.

Larsen effect: see feedback.

Microphone: see pickup.

MIDI

Musical Instrument Digital Interface. Standardized, music-related computer language.

Mixing Desk

An intermediary between an instrument and its amplification.

A mixing desk is a multi-channel device, which balances the volume between instruments or sections of instruments, and by means of which you can adjust the frequencies of each instrument so that the sound is adapted to the performance venue. A small mixing desk can be very useful for an electric harp.

With only 3 channels, you can fully connect a Blue Harp: you will use one channel for the high strings, another channel for the medium strings, and the third one for the basses. For each of those sections, you will be able to adjust the high, medium and bass frequencies to make the harp sound the way you like, and then you can adjust the volume of each section if you want more or less of each part.

Each channel on the mixing desk has a series of buttons. Starting from the top, you will find the gain (to adjust the amount of signal entering the mixing board) – similar to a preamp. Then there are two buttons called effect send and effect return. After this, you should find two to up to four buttons for the equalization ("EQ":

high, medium, bass). Lastly, you will find the panoramic button. Since the main output of a mixing board is stereo, you can adjust the stereophonic position of the channel. For example, you can put the high notes a little on the right side, the medium in the middle, and the bass notes slightly on the left, which will give a wider stereophonic image of the harp.

Effect send / effect return buttons

An interesting reason to use a mixing desk is the possibility to connect an effects processor. If you look to the many plugs on the mixing board (often on top of the channels, sometimes at the back), you should be able to find the effect send option. This is where the signal will go to the effects processor. You will also find the effect return, where the signal coming out of the effects processor should be plugged in. With the effect send button, you can adjust the amount of sound going to the effects processor, and with the effect return button, you adjust the volume of the sound with effects on it, and how much will be mixed to the original sound.

Monitor

When you are on a big stage, the loud speakers are often far from you, and you cannot hear yourself. Sometimes, if you play with a band, you can't hear yourself because either the volume is too loud, or because there are too many other instruments covering the harp. So, you may need a monitor.

A monitor is the individual loud speaker that you will have on stage for your own use. You can either have your own sound, or the sound of other instruments of your choice. What you hear from your monitor is not related to the sound in the hall, and it is controlled by the sound engineer. When you see artists on stage gesticulating to the boxes at their feet and then to the sound desk, they are asking for a change to their monitor.

You can often recognise a good sound engineer by the fact he manages to give you what you want in your monitor, he achieves it within less than two hours, and it lasts for the duration of the concert.

If you are a great star, you may even get two monitors, one on each side. Heaven.

Mono

Mono sound comes from one channel. The effect is similar to listening with one ear. Stereophonic sound (stereo), quadriphonic or surround sound emanate from two channels or more. Multichannel sound makes a recording or amplification sound very real, like listening with two ears.

Output

Socket (for example on an electric harp) to connect to external things (for example amps, mixing desks). We have mentioned ¼ inch jack outputs (on harps, or sound equipment such as mixing desk, effect pedal, guitar or keyboard), and XLR output (on DI boxes). There are also MIDI outputs, USB outputs, etc.

PA system: see amp.

Pickup

A device that picks up sound in order to transmit it electronically. Camac electric harps have a pickup on each string for a clean, reliable amplification with the minimum of interference or feedback.

Pickups and microphones are essentially the same thing. Generally, something is called a pickup when it is attached to what it is amplifying, like the harp. The word microphone is used for something picking up the vibration of the air.

On Camac electric and electroacoustic harps, we use a piezo pickup. This pickup is made of a crystal heart wrapped in a metal sheet, the whole being compressed by the string with a small pickup bridge in between. Basically, the vibration of the string compresses the crystal at the speed of the frequency of the note (442 times per second for the middle A), which generates a sinusoidal electric signal. This generates sound once it is transmitted to a loudspeaker, the loudspeaker vibrating at the same speed as the initial frequency of the string.

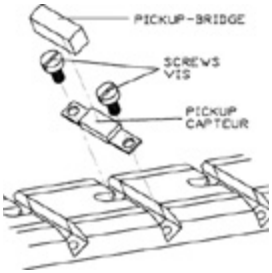
Because the piezo pickup is directly located under the string and reacts to the slightest change of pressure, the sound is accurate and pure. You can also use magnetic pickups, but we did not choose this technology for our harps because of the loss of tone quality, especially for a rich tone like gut strings on a harp.

The other style of pickup we use on our harps is the contact mic or transducer. We place this on the soundboard of an

P

electroacoustic harp. This is also a piezo pickup, but it works in a different way because it is fixed on the soundboard and picks up the vibration of the strings through the wood, and not directly from the strings. One transducer can be enough for one harp, although we recommend two pickups for a pedal harp.

The great advantage of the transducer pickup is that it can be installed very easily on any harp. It can even be removed, if not built-in.



The level of the signal from the transducer pickup is quite low, so it is often recommended to use a preamp. Together with the Ischell company, we have developed a pickup system which combines one or two pickups with a dedicated preamp. There is a single channel system, with one contact pickup and one preamp, and a double channel system, with one contact pickup and one air microphone together with their dual channel preamp. This is the ultimate system we have found to amplify a non-electric harp.

Preamp

Most pickup systems are passive, which means their microphones are not powered by any electrical means (power supply or battery). The only energy they get, to generate electrical current, is from the vibrating strings. This level of this signal is very low, and the lower the signal, the more it needs to be amplified. And here comes a potential problem: when we amplify a signal, we also generate additional noise from the components of the amplifier itself (especially with cheaper ones), which can be heard as a hum or hiss. To avoid this, it is useful to enhance the level of the signal before amplification, and this is what a preamp is for. It pre-amplifies the signal so that the amplifier works in a more effective range, without generating unexpected noise.

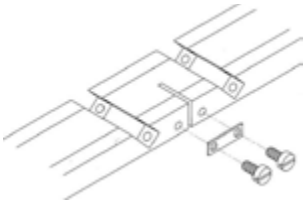
Most mixing desks have built-in preamps, called “gain”.

S

Splits

Splits are divisions on the pickup strip that runs down the middle of the harp's soundboard, so that you can amplify particular ranges on the harp individually (although you don't have to).

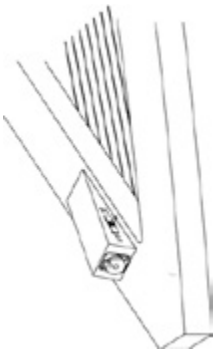
The Blue Harps have 2 splits, i.e. 3 sections for high, middle and bass range. Each is connected to a dedicated output. The harp should then be connected to either a 3-channel amplifier, or to 3 channels of a mixing desk, or to 3 DI boxes which will then go to a stage amplification.



But it is not always easy to have such sophisticated equipment available. Most of the simple combo amps have one channel only, sometimes two. And it is lighter to travel with one harp and one small amp rather than a large sound system. So we have designed an easy way to connect the harp so that the whole range of the harp will come from only one output instead of three. On the side of the pickup bar, you should be able to locate the two splits – which are actually real separations in the bar. On each side of the splits are two threaded holes, which are there to receive a bridge. The gold-plated bridge, when screwed above the split, will cancel the separation and the two sections will be mixed together. You can either keep the basses separated and mix together high and medium, or mix all three sections together, or mix medium and bass and keep the high strings separate.

When the sections are separated (when the bridges are not installed), it is possible to have a different effect on each part, or a different balance of the sound (for example more bass frequencies in the basses and more treble frequencies in the medium).

S



On the electric lever harps, there is only one split in the middle, so this means two sections: the low half and the high half of the harp. Instead of having 2 outputs, we have designed our harps with a stereo jack output and a little 2-position switch above it. When the switch is on the M (mono) position, the output is mono and the whole harp comes out on one channel. When the switch is on the S (stereo) position, the output becomes stereo, with one half of the harp on the right channel and the other half on the left. With the use of a special cable in the shape of a Y, consisting of one stereo jack plug at one end and two mono jack plugs at the other end, you can easily separate the two sections of the harp and thus get the features of being able to balance the sound or the effects.

Stereo: see mono

X

XLR: see DI Box