

AN INTRODUCTION TO THE SERGE MODULAR MUSIC SYSTEM

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ABOUT THIS MANUAL

This manual is an instruction and users manual for the Serge System Modular Synthesizer. It is intended to serve two purposes:

1. A Self-tutorial instruction manual for those who have never used a synthesizer before and for those who have used a synthesizer, but not a Serge, before.
2. A User's reference manual and guide that provides information on how to use each module, how to interconnect modules to produce certain effects and how to interconnect the Serge with other devices.

This manual is arranged into the following sections:

1. The Introduction.
2. Self-Teaching Patch Number One--Getting a Sound
3. The Theory of Electronic Music
4. Self-Teaching Patch Number Two--The Theory of Sound
5. The Serge System Modules
6. Appendices

If you have never used a synthesizer before it is strongly suggested that you read sections 1 and 2, working out the patches as you go. If you are confused at this point, don't worry, keep going. These exercises will give you the basis for understanding the explanations in subsequent chapters.

If you have used a synthesizer, but not a Serge, the patch worked through in section 4 provides a good working knowledge of the basic modules of the Serge.

If you are already familiar with the Serge system, specific information on the different modules and how to patch them together can be found in sections 4,5 and 6.

For information on interfacing to other equipment, refer to the Appendices.

AN INTRODUCTION TO THE SERGE MODULAR MUSIC SYSTEM

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INTRODUCTION

A SYNTHESIZER is a musical instrument, which means that it is a tool for making music. With any tool there are two things to learn: what it is that is being made AND how to use the tool to help in its making. In this case you have to learn about the structure and the nature of the music you are making, whether it be electronic, rock, jazz, classical or what-have-you, AND how to use a synthesizer. However, these two things, the music and the instrument, are highly inter-related. Take the piano for instance, which would not have been developed unless there already existed a certain kind of music (chordal, many voiced). And yet, once developed, the piano changed the kind of music written and played. It is unlikely that Rags would have been developed if there had been no piano.

The same is true for the synthesizer. It was developed originally in the Sixties as a response to certain kinds of music that was already being written and played (tape collage, "classical electronic" and certain kinds of jazz), yet it soon changed the music for which it was built. Before long it found its way into other kinds of music, such as pop and rock. So of course each of these musics changed the synthesizer as well. There is now, for instance, a "phaser" available on most synthesizers-- a device that electronically duplicates certain rock and roll recording techniques.

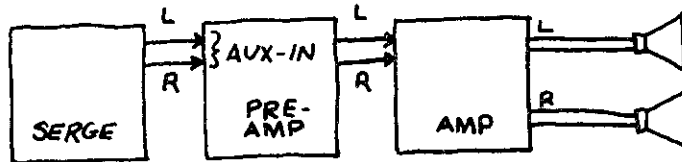
All of this is to say that a synthesizer is best understood within the context of the music in which it is to be played. A good way to learn about synthesizers is to listen to records and tapes of other synthesizer players, to go to concerts of electronic music and to read books available on the subject. In the beginning imitation is a good idea so that one can learn what is considered good standard practice, what is fresh and new, and what is a cliché.

The Voltage Controlled Modular Electronic Music Synthesizer (the instrument's full name) exists in two worlds at the same time: the world of electronics and the world of sound. Although the objective is to produce music, a little of both these worlds must be conquered to be able to use the synthesizer to its full potential. This is because, as will be explained in more detail later, the synthesizer is not really one instrument, but rather, an assembly of smaller ones (modules) which can be hooked together (patched) to create many different larger instruments. The synthesizer player really is, in part, an instrument builder, and just as an electronic organ designer must know something about electronics, acoustics and music, so must a good synthesizer player. However, you do not need to know much about either electronics or acoustics to use the synthesizer to make good music. The synthesizer itself is an excellent teacher of both simple acoustics and elementary electronics.

AMP AND SPEAKER

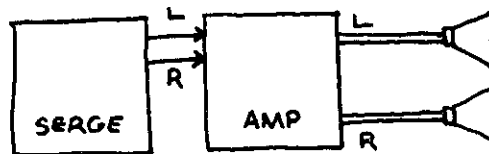
The Serge System does not contain its own amplifier and speaker so it must be connected to such a system to hear any sound. Below are the most common systems and where the Serge connects to them.

COMPONENT STEREO SYSTEM



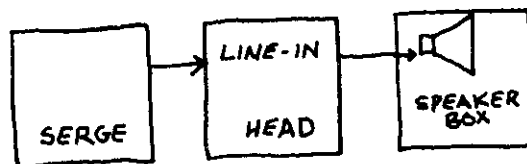
This is the most common home stereo system (though sometimes the pre-amp and amp are integrated into a single larger component.) The Serge should be connected to the AUX-IN inputs in the back of the pre-amp. The Serge can be thought of as another component, comparable in level to that of a reel-to-reel tape recorder. Remember to have both speakers hooked up and to switch the controls on the front of the pre-amp to AUX-IN. Keep the volume down until you have a good sense of the loudness of the Serge so that you don't overdrive your speakers. Most speakers are built for classical music sound spectra. Synthesizers are able to produce sounds that have far more energy in the "high" end and can damage speakers if care is not taken. If there is a headphone output you can use it to listen to the Serge without the speakers. Since it is a "stereo" you can listen to two voices separately by connecting one voice to the left AUX-IN and one to the right AUX-IN.

POWER AMPLIFIER



Sometimes in a studio situation the Serge will be directly connected to a power amplifier. This is not recommended for home use. When this configuration is used, the only controls on the volume are on the Serge itself so it is important that they be kept at appropriate levels so as not to damage the speakers.

STAGE AMPLIFIER/SPEAKER (ROCK AND ROLL AMPLIFIER)

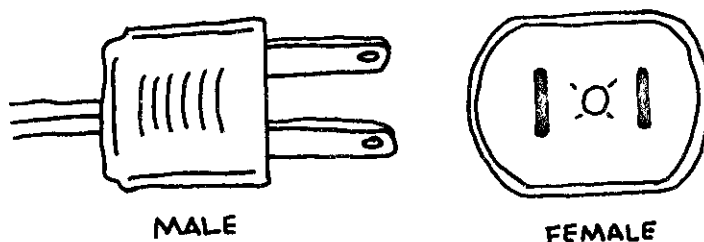


If you are using a stage or rock and roll type amplifier/speaker the Serge should be plugged into the HI-Level or Line level input.

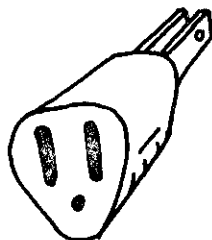
CONNECTING CORDS

Cords are used to connect between the various modules on the synthesizer, and also to connect the Serge to other electronic devices. Every connector on the end of a cord or on a device, has both a Type and a Sex (male or female). Only connectors of the same type and of opposite sex can be connected together. Below are the connectors commonly found in electronic sound equipment.

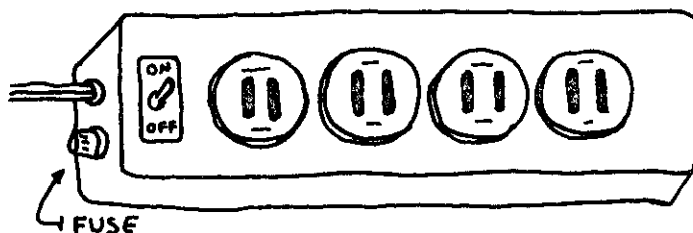
THE AC CONNECTOR



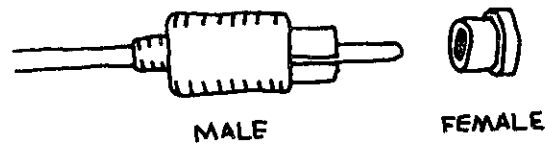
This is the "power" plug and is used, almost exclusively, to get 120 volt AC current out of the wall. If your equipment is not working the first thing to check is whether everything is plugged in. Many AC power plugs have a third, round nib. This is the ground connection. Unfortunately not all AC jacks have a hole to accomodate this nib so an AC adaptor must be used. However in most cases grounding is not required.



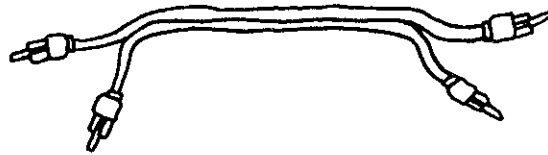
Another problem that arises with AC connectors is that you usually end up with far more males than females. One solution to this is an "octopus" which accepts up to eight plugs and also has the advantage of allowing the user to turn everything off at once. Most octopi also have a fuse which can protect your system from damage. If nothing goes on at all, check to see that the fuse is still good.



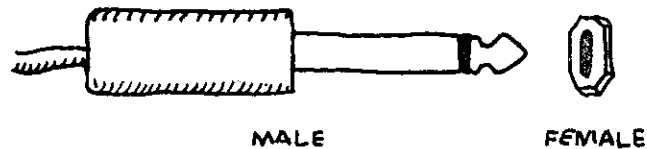
THE RCA or PIN CONNECTOR



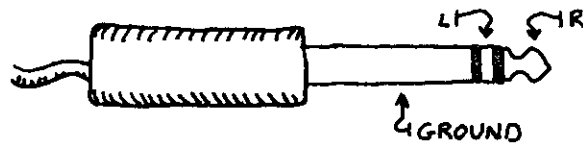
The jacks on the back of most home stereo systems are RCA female. Note that the males of this species have little skirts around them that grip the outside of the females. Make sure that these grip tightly by bending in these skirts just slightly. The skirt is the "ground" while the pin in the center is "hot" and carries the signal. Since they are often used in stereo situations, they often come in a joined pair. When using such a pair make sure that the correct ends are used.



THE PHONE CONNECTOR

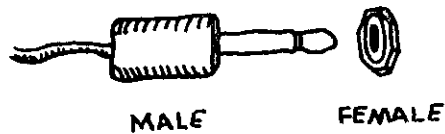


These are the plugs that are found on the end of guitar cords and the jacks that are found on the front of rock amps. (They are also the jacks found in old-fashioned phone systems and hence their name). The shaft of the Phone plug is divided by a narrow black band. The tip is the signal, or "hot", while the upper shaft is ground. A stereo version is also available with two black bands on its shaft. In the stereo version, the lower two segments carry the signal, while the upper section is ground.



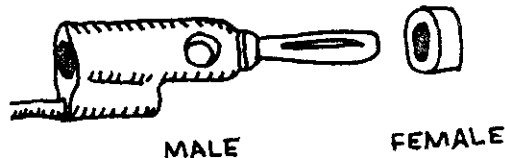
The stereo phone will only work when used with a jack made to handle this type of plug. Typically an instrument input is mono, while a headphone out is stereo.

MINI-PHONES (MINI-JACK)



These are the jacks found on the output modules of the Serge system. (Note: the Serge system uses the American-made version of the mini-phone manufactured by Switchcraft. Mini-phones made in Japan are almost identical, but do not use them since they become intermittent when used with the American jacks. Like the full-size phone plug, the tip carries the signal and the upper sleeve is ground.

BANANA CONNECTORS



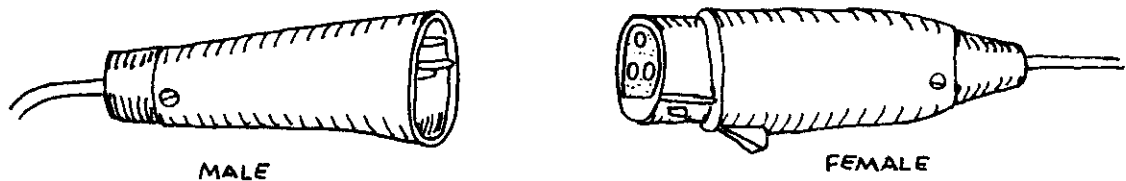
Within the Serge system almost all patching and connecting is done with banana plugs, which are so named because of their curious shape. These connectors are not grounded or "shielded", that is, there is no wrapping of wire mesh around the central wire. The cords are usually color-coded by length.

BARE WIRE

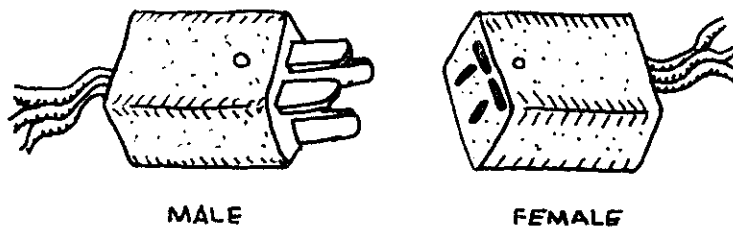


This type of connection is usually only found between amplifier and speaker. Always make sure that the speakers are connected to the amplifier before turning the amplifier on. If the system is a stereo system, make sure that "phase" is maintained by connecting both speakers identically. One of the strands is marked to make this simpler.

CANNON CONNECTORS



The cannon (or XLR) connector is most often found on microphone cords. It is a "balanced" connector with two signal lines and a ground. Note that the male's prongs are within a skirt and that this should not be confused with a female connector. The cannon connector clasps shut and a button or lever must be pressed to disconnect them.



Often found on power supplies, speaker wires and trigger cables because of its inability to be connected backwards. This type of connector is used for wires that need to be connected and disconnected frequently.

MOLEX CONNECTORS

This type of connector is usually used for internal power supply connections since they are not frequently disconnected. Note that the four connections are numbered on the plastic housing.

ADAPTORS

At times it will be necessary to patch between a jack of one type and a jack of another type. There are two ways to solve this problem. The first is with a cord with two different kinds of plugs on the ends, and the second is with an adaptor.

Cords with two different plugs can be purchased or can be assembled without much skill. When making such cords be sure that the grounds of the two plugs are connected together and the signal parts of the plugs are connected together. Perhaps the most common way of dealing with the problem is with adaptors. These are small devices with a jack or plug of one type on one side and another type on the other side. It is also possible to find adaptors that go from a jack to the same kind of jack which are used primarily for making one long cord out of two shorter cords. When purchasing or asking for an adaptor be sure to specify not only the type of jack/plug needed, but also the sex.

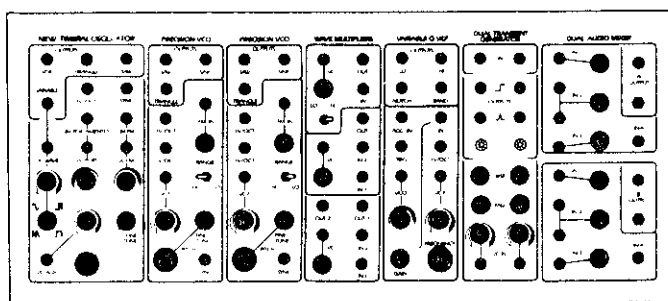
While it is possible to stack one adaptor on another, or to place them in elaborate combinations with various kinds of cords, it is wise to remember that the more connections one has the more likely something will go wrong. In fact, this problem is so common that if no sound is coming out of your system, right after checking to make sure that everything is plugged in, check the adaptors.

In the long run it is worthwhile to purchase the correct cords and adaptors for the job. You will find that they are easy to lose and a box for them comes in handy. You may also find that you lose fewer of them if you can mark them in some personal fashion.

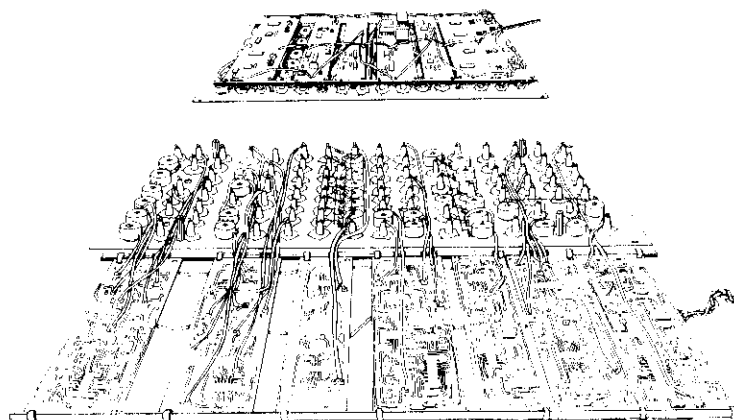
THE SERGE SYSTEM

While the Serge may look like a single machine, it is actually a collection of much smaller devices or, as they shall be called from now on, **MODULES**. This explains the word Modular in the full title: Voltage controlled modular electronic music synthesizer. Except for the internal power supply wires which supply them with the power necessary to operate, each module is **COMPLETELY** independent. They are no more interdependent than your TV and your toaster are when plugged into the same AC wall socket. Unless hooked together with **PATCH** cords these modules remain independent and can be used separately. But the real interest of the synthesizer lies in hooking these modules together.

The Serge is divided into panels that are 17 inches across and 7 inches high. Except for the sequencer/keyboard module, which takes up a whole panel by itself, each panel contains a number of different modules. Each module is surrounded by a line and has the name of the module at the top and the logo "SERGE" at the bottom. Modules with the same name are identical and interchangeable. Learning about a synthesizer is learning about what each module does separately and what they do when all hooked together.



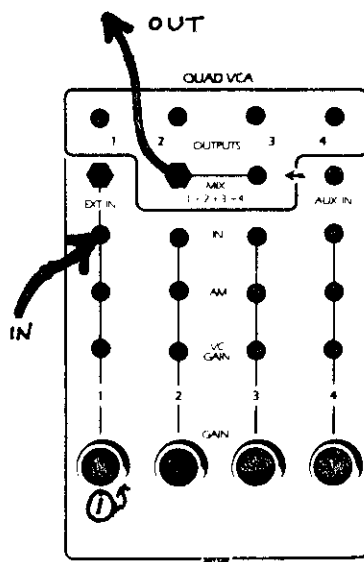
ONE SERGE PANEL



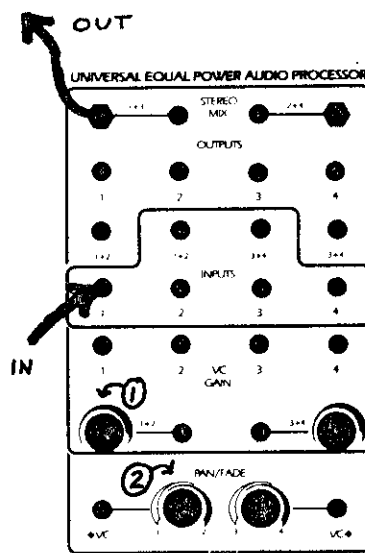
INTERIOR OF SERGE PANEL/RACK

CONNECTING SERGE TO SPEAKERS/AMP

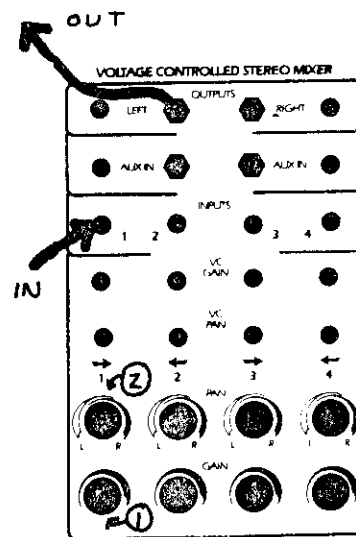
In all Serge systems there is at least one module whose function is to connect the Serge to the amp/speaker system. These are called "output modules" because they take the signals from the Serge and OUTPUT them to the speaker and amps. Output modules have inputs that accept banana plugs from the other modules on the Serge and have either mini-phone, phone or RCA outputs. These non-banana connectors can go directly to the amp/speaker system. Below are diagrams of the various modules that serve this function. Each diagram is labelled to show where to "input" into the module and where to take the "output" from. The output cord goes to the amp/speaker system. Under each diagram are instructions for setting the dials or POTS (short for potentiometer) on the module. It is important that these instructions be followed at this point. In particular, no cords other than those listed should be patched to the output module. In the following section this module is referred to as the Output Module.



① FULL RIGHT



① FULL RIGHT
② FULL LEFT



① FULL RIGHT
② FULL LEFT

If the Serge is not already on, flick the power switch ON now. The amp should be turned all the way down.

You are now ready to make your first electronic sound, which will also test whether all the inter-connections so far are good. After the sound the theory.