

The following appeared in edited form in Muzik ETC in Graham Collins' Synthesizer Basics column. All right reserved.

Up until this point in our series on synthesier basics, we have talked about individual components. Thus far, we've covered Oscillators, Filters, and Amplifiers which comprise (in that order) the main audio path of your average synth. An Oscillator gives us our raw waveform sound, which is then tonally altered in some way by a Filter of one kind or another. The sound is then brought up to an output line level by the Amplifier. Along the way, the various parameters of these 3 components can be altered by a Controller, likely an LFO (Low Frequency Oscillator) and/or an EG (Envelope Generator). The Controllers essentially determine the overall 'shape' of the sound whilst the the 3 main components directly determine the pitch, timbre, and volume of whatever sound we are creating.

That's all well and good... but how the heck do we put all of these things together? What do we do with them? In your typical synth most of the 'putting together' has already been done for you in the form of hardwiring a configuration for the instrument by the manufacturer. That's the general rule. There are exceptions though. Modular synthesizers by definition have a more relaxed configuration that allow you to 'patch' different elements into each other in a much freer fashion. The benefit here is that you can patch things together however you want. The downside is that patching things together the way you 'want' may not produce any sound at all! You have to know what plugs in to what or your musical masterpiece may wind up being a very expensive silence, which is swell if your name is John Cage. Modular synths are very good educational tools in that they allow us to see what each discrete component is and how they interact with other components or modules. This allows new synthesists to get a real grasp not only of how these machines work, but also of how to design a new sound from the ground up. Modular systems are also a source of great flexibility in the recording studio.

Most synthesizers though are not modular in nature, but instead have an architecture that is hard-wired and pre-configured at the factory. A very typical configuration that has been around for many years now (and for some time was something of an industry paradigm) includes 2 Oscillators, 1 Filter, and 1 Amplifier. Throw in an LFO, and an Envelope Generator or two and that about completes the picture. Most machines these days also include built-in programmable digital effects to enhance the sound. Typically, the 2 Oscillators can be detuned against each other, either to form musical intervals or on a smaller scale, simply to get a detuned 'fatter' sound (a chorusing type of effect). The Filter will usually be of the resonant lowpass variety, though on occasion it will be a multimode filter, which essentially allows you to select whether the Filter will respond like a highpass, lowpass, or bandpass. Often today, entry-level synths will still have a configuration not unlike this.

Many synths over the past few years however, have adopted a sort of hybrid system. One that's nearly as flexible as the big old modular systems, but retains the reliability and quick patch recall of a modern synth. Called different things depending upon the manufacturer's choice of terms, we can for our purpose here refer to these systems as 'matrix-assignable' systems. That's a pretty big hyphenated word I just made up isn't it? In short, such systems give you rather advanced flexibility for assigning modulation possibilities within the machine. Instead of using patchcords to connect modules however, you simply assign a modulation source to a destination to complete the connection. So, if you want to assign a pitch-bend wheel to control a Filter's cutoff frequency, you'd go to the synth menu for filters and assign it from the list of sources available as such. Usually but not always, MIDI controller numbers are available as modulation sources. You can think of this as a type 'modular synthesis' really. Except that the 'modularity' lies in the digital realm. Instead of using patch cords to have devices control each other, we can use specific elements within the MIDI language called 'MIDI Controllers' to affect the sound from other devices.. This is pretty cool in that it is an avenue of integration to pursue between MIDI sequencing and MIDI synths that can give you an enormous amount of control over the shape of the sound. You could for example, instead of assigning a simple sine wave LFO to modulate a sound's pitch, assign one of the many MIDI controller's available and then go crazy drawing the exact shape of vibrato you need on your computer screen! The change can even be in exact time with the tempo of the song you are using it in. This area of MIDI control and integration into synthesis opens up many possibilities for us. There are available commercially, many devices which specifically transmit MIDI control information that can be

exploited to good use. Some of these merely make programming sounds into a synth easier, while some offer creative possibilities not previously available.

The next few articles in this series will be dealing with practical and interesting applications for synths, synthophiles, and synthophobes. Don't miss the next article in this series as I'm going to hold myself to task and show you some really great recording-studio tricks you can pull off with a modular synth--even if there isn't a keyboard sound to be found in your band! I also juggle chainsaws.

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