So we have looked at analogue synthesis and why the sound is warm, FM synthesis and mentioned why it sounded cold, the sample playback and manipulation systems used by Korg and the sample + synthesis techniques that were beginning to take over the synthesis world. While the new digital systems were precise and didn't drift out of tune and had memories, so that sounds could be recalled and played perfectly every time, they still sounded weak compared to analogue, in part due to a growing dependence on samples and also due to the perfect reproduction of synthesized waveforms every time a key was pressed on a keyboard. Something had to change, but first manufacturers had to find a new direction… Once again, Korg and Yamaha took the lead.

First off was Korg with the Oasys, an advanced synthesizer that could change its synthesis engine(s) by simply loading another. While this alone was quite remarkable, one of the synthesis engines was something that many had talked about, but no one had the processing power until now, physical modeling.

At the same show that Korg showed the Oasys, Yamaha showed the VL7 and VL1, another 2 synthesizers that used physical modeling. The VL7 was geared towards wind and string instrument sound creation, while the VL1 was for percussion instruments, suddenly there was a race on as to who would be first to get a machine to market.

As it turned out, both Korg and Yamaha released products at the same time, Yamaha with the VL7 and Korg with the never before seen Prophecy, a small monophonic synthesizer with a number of controllers on its case and a sound that analogue purists had been crying out for, for many years.

But before we go in depth with the synthesizers themselves and what they eventually lead to,

lets go into how the system works.

Physical modeling works by re-creating how the physical construction of an instrument affects the air within and/or around it. For example, on the VL7, you could create an instrument out of parts of other instruments, such as the body of an oboe with the head of a saxophone, to see either how a saxophone would sound if plucked or bowed, or how an oboe would sound if blown. Within the system would be a number of pre-defined models, such as plucked or bowed for strings, and a number of blown models for reed instruments, both brass and woodwind, along with models such as piccolo, recorder and flute. Different physical modeling synthesizers would have different physical models, but the system itself always remained the same, the only limit was the Digital Signal Processing (DSP) power available in 1995. Now on to the synthesizers themselves.

The VL7 was a large synthesizer, but was in many ways the worse part of 2 worlds, unless you knew how to really control it; the sound it made was lifeless and static. Without using a number of controllers, there was just no life to the sound. The other problem for the instrument was that it was monophonic; this was down to the fact that the sound required a lot of DSP power, and this was expensive at the time of launch. Taking the VL7 apart reveals a board almost covered in Yamaha custom DSP chips for calculating what will happen to the sound. Compared to today's processors, this synthesizer is a little underpowered, but in 1995 this was the most processing power you could get for £2995.

Korg released the Prophecy on to an unsuspecting public, taking some of the ideas from the Oasys and packing it in to a small 2.5 octave keyboard, with a number of controllers and knobs to adjust the sound being played in real time, just like in the days of analogue synthesizers. The real power here though, was in the synthesis models chosen, including plucked string models (Ideal for plucked bass sounds) and a fairly accurate analogue synthesizer model. Suddenly the world woke up to the sound of the Prophecy, and at £999, it was at a price many could afford.

While this was a purely digital synthesizer, it captured the sound of the old analogue systems better than any other digital synthesizer on the market, allowing people to get the analogue characteristic sound without paying nearly 4 times the price of the Prophecy for some true analogue synthesizers at the time.

Like the VL7, the Prophecy was monophonic, and for the same reasons, the cost of adding more DSP power to add more polyphony at the time was prohibitive. While everyone seemed to love Korg's new mini-synthesizer with the monster sound, many were waiting for the monster synthesizer from which the Prophecy came, the Oasys, however it would be a long wait.

As mentioned above, DSP power in 1995 was limited compared to what is available today, and while the idea behind the Oasys was brilliant, the machine itself never worked in the real world, even if Korg did get it working, the cost in 1995 would have been in the tens of thousands of pounds, a price that would not have been practical to go to market with at the time. Instead, Korg broke the idea down into smaller more marketable products, the first of

which was the Prophecy, followed by the Trinity a few months later.

While the Prophecy was based around modelling plucked, bowed and analogue synthesis models (With some Frequency Modulation thrown in for good measure), the Trinity was more an advancement of Korg's earlier sample based synthesizers, all be it with filters, effects and waveshaping additions to the sound engine. There was an optional expansion board to add the Prophecy sound engine to the Trinity range, but this still fell short of the Oasys concept shown earlier.

The Oasys itself was not entirely abandoned, and a card to go into a computer was released in 1996 called the Oasys PCI, which contained the Oasys synthesis engines, but also showed up the weakness of a modeled synthesis engine. When one of the more complex synthesis models was used, the number of voices available would drop to just 1 or 2 due to most of the available processing power being used to generate the sound itself, but the concept was now proven and was a preview of things to come. In 2006, a new version of the Oasys was launched, with the feature set of the original, and a number of enhancements such as larger touch sensitive colour screen, more processing power than the original could ever have had back in 1995 and real time controllers on it's rather classy surface. The new Oasys was effectively a music computer, running a customised version of Linux for it's operating system, finally showing off what the Oasys concept could do, but even in this day and age, at a price.

As processors became more powerful, more and more companies started using different modeling systems for their synthesizers, including Roland, Korg and a number of other manufacturers. Mostly, these emulated the analogue synthesizers of old, but the emulation was now improved to the point that these DSP based synthesizers sounded as good as true analogue systems.

Another side effect of this latest synthesis revolution is the software studio, something we will cover next time.