

Development Module - Element 2 - Essay

Discussion of the work and different stages of research, gathering of components and materials, feedback conducted and building of an original musical instrument– the ‘Strudel’. The instrument’s evolution from the initial idea to the first finished prototype, the experience of playing the instrument, reflections and ideas for improvements for future development, design, branding and marketing ideas.

In this section, I will discuss the conception, research, ideas and building of ‘The Strudel’ (or ‘Der Strudel’) – an amplified DIY musical-box with a built-in adjustable reverb unit and connected to an analog delay circuit, essentially creating a sort of an analog synthesiser, allowing the creation of an array of interesting, dreamy and nostalgic sounds-scapes, adding unique and organic sounds to future productions whilst serving as an instrument which loops short compositions or hooks.

When the assignment brief was first published, I was pleased with the option given to build a physical, electronic and analog instrument based on my own imagination, self-expression, inner-world and personal taste.

Personally, I enjoy building chores and DIY projects, plus I imagined that I would have more head-room to come up with an idea which I would feel passionate towards, as my computer skills are somewhat limited, or perhaps not developed enough to design something a bit more complex. That being said, I simply wanted to build something which would have a unique design and with which I would enjoy playing and incorporating into my own music.

In searching for inspiration I contemplated sounds that inspire me in several ways—artistically, emotionally and spiritually. Contemplating those sounds that really made an impact on me as a child discovering music, three came to my mind fairly quickly: the sound of a musical-box, spring reverb and analog delay. An idea was starting to emerge!

My idea was to build an electric musical box, using a DIY musical box mechanism, operated by using fitted card stripes printed with a stave and a hole-punch which would be used to customise the instrument and feed it whatever melody you wish it to play. I would install the mechanism to a wooden box, build a spring reverb around it and add an analog delay circuit.

The sound of the musical-box had caught my attention at a very early age. Actually one of my earliest memories is of me at 3 years old observing a musical-box, studying it in awe and being immersed in its sounds. Until this day I don't know what piece that box was playing, I am sad to report. Over the years I acquired a small collection of musical boxes and I was very proud to include one of them (playing Louis Armstrong's 'What a Wonderful World') in the intro to the track 'Nothing but Sound' on my debut album 'Mercury Retrograde'. I have also enjoyed playing with Spitfire Audio's musical-box samples included with their excellent free 'Labs' library, but it has never felt like the real and natural instrument.

As a guitarist, from an early age learning blues and rock I was obsessed with the sound of the electric guitar, a fascination which would last a life-time. I remember bringing to my guitar teachers as many CDs as I could get a hold of which featured specific songs and sounds I was desperate to learn how to produce. Fuzz tones, Wahs, tremolos, modulation, but above all— reverb and delay.

Growing up listening to music from the 1950's and 60's, the most apparent feature in those mixes was beautiful reverb, washing them with colour and character, creating a dreamy and nostalgic atmosphere which has been ingrained in my soul and will linger on in my heart forever e.g. the reverb on Elvis Presley's voice, elevating his legendary performances to divine realms and the reverb-drenched guitar solos of the Shadows or the overall sound of the Jefferson Airplane. The music was glorious, and to me seemed even perfect, but it was the reverb which caught my attention more

than anything. In time I studied different sorts of reverbs and experimented with them. Whether plates, echo chambers or springs, I love them all. However nothing excites me more than a classic vintage Fender Twin Reverb which is, of course, a spring reverb.

Creating spring reverb is a fairly easy task. It consists of simply pulling a spring in a space where sound is being produced, and Voila!

In order to build a spring reverb onto my instrument I have purchased 30mm screw-in brass cup-hooks and M6 forged eye-bolts threaded rings, resin and catenary wire hanging screws, which I thought would be strong enough to hold and endure the tension of a pulled wire spring whilst not being too dominant or visible in the overall design. At that moment, a decision was made that all the parts would be brass, which is a personal aesthetic preference.

Another idea was to secure the hanging screw, drilled into the wall of the wooden box, with a wing-nut to either widen or loosen the spring to control its sound and change its character. Eventually I decided to go with a matching M6 brass knurled thumb-nut, a grip knob for both convenience and style, as those golden coin-like-looking knobs were a better fit to the emerging vintage style and look of the instrument (plus anything looks better than a wing-nut).

Then I bought a box of assorted tension, expanding and compression springs in different lengths, wire-diameters and diameters with which to experiment, trying to achieve different reverb sounds. My guess was that a tension spring with wire-diameter of 0.5mm and below should give the best results, which has proven to be true having had over 200 different springs to experiment with, which was an interesting experience.

I ordered a wooden box sized 20x25 centimeters and an 18-note DIY musical-box kit which wasn't the most expensive, yet definitely not the cheapest.

Once the musical-box kit had arrived, I started experimenting with it, writing different melodies and trying out different harmonies and spacing, finding that even despite short spacing between the notes, the mechanism played the melody much slower than expected.

The idea of having to write the music and then punch holes on a card stripe sounds tedious and it very much is! Even for an experienced professional musician who can transcribe music rather quickly, this process gets tiresome and simply tiring.

An idea was starting to form that perhaps I could add a midi output and connect a small electric motor or engine and build it in a way which would allow a midi-controller keyboard to play the actual machine, so any music could be played in real time which is definitely something to consider for the next version of the instrument. Later on I found out that someone has come up with a similar idea which also allowed pre-written midi files to be played by the musical-box mechanism, making it possible for anyone to play and fiddle about with the instrument even without knowing anything about music or how to play an instrument. This would allow them to enjoy the instrument and put it to use very quickly and easily. In the meantime I have decided to stick to the original plan although knowing it would be somewhat cumbersome.

Moreover, the Musical-box mechanism proved itself to be quite temperamental over the first few trials, being inconsistent with pitch, randomly excluding written notes and playing the wrong note at times, proving that I should have gotten a more expensive and perhaps a larger musical-box mechanism. However at this stage I decided to carry on with what I had got.

As I was experimenting with the musical-box mechanism, I decided that I wanted to loop the card strips that had been inserted into the mechanism, to allow a constant flow to play without having to stop every 30 seconds to put the card strips back into the machine to play from the top. At first, I used sellotape to loop a card strip but the sellotape was too thick to go smoothly through the mechanism to allow it to loop, so a roll of clear, ultra-thin seals was soon purchased, which did the trick perfectly.

The next decision to be made was regarding the amplification of the instrument.

The easiest way was to place a Piezo microphone on the mechanism and that would suffice. However, I wanted the sound to be more unique and perhaps feature more options and variables. The original idea was to go on along the line of vintage sounds, so old guitar pick-ups were considered.

Eventually, I came across a five-band acoustic guitar preamp equaliser with two different microphones: one is a Piezo 'under-the-saddle' pick-up, and the other

simply described as 'c-mic', assuming it to be a small condenser microphone.

The preamp and equaliser unit features a 'Blend' option between the two microphones, essentially allowing control over the mix between the sound of the musical box mechanism and the amount of reverb on the instrument's signal reverb unit which was exactly what I wanted to create.

Once the wooden box had arrived in the post one rainy morning and after receiving most of the components and opening dozens of parcels and boxes, the assembling of the instrument had officially started. Before drilling any holes, the 9-volt battery-operated preamp unit was tested and I started experimenting with different positions and locations of the two microphones in the box, trying to find the ultimate configuration.

Ultimately placing the 'under-the-saddle' directly on the Musical box unit which was positioned on the bottom right side of the box, whereas the other microphone is directed at the top, where the spring was to be located, seemed to be the way to go forward. Luckily, the musical-box mechanism has an opening right next to the actual keys which fits the Piezo 'under-the-saddle pick-up perfectly, as if it was specifically made for that component.

I started marking the different locations and positions of the different components with a pencil. In the first hole in the back of the left wall of the box, I inserted an eye-bolt wire hanging screw and locked it in place using a matching knurled nut. I screwed a 30mm cup-hook on the opposite side and then I rushed to try the first spring which was 6 centimeters long with a 0.5mm wire-diameter. The result was instant and simply beautiful, especially when the box was still empty with nothing else yet installed. The box had produced a wonderful reverberation which I have enjoyed singing into. I also enjoyed tapping on the lid and side of the closed box as if it was a percussive instrument, experimenting with the different sounds which twisting the knurled nut on the left-hand side has allowed.

Another passion I decided to include in the instrument was analog delay.

I am a big fan of vintage sound and my fascination with psychedelic pop and rock from the 1960's and 70's, which has influenced my life and musical work tremendously from a very early age, led me to listen to my favourite guitarists such as Pink Floyd's David Gilmour, Led Zeppelin's Jimmy Page or Jimi Hendrix, creating spacious and mystified sound-scapes that I have studied carefully later on, trying to find the perfect delay tones. As a touring guitarist and frontman of a neo-psychedelic indie band, I have used three different delay boxes in my pedal-board chain resulting in an ever-expanding collection of old boxes and machines. My absolute favourite is the MXR M-118 with the Reticon R5101 Bucket-Brigade component, also known as the 'Green Brick'. I happen to have two of those, one model from 1979, which is on almost all of my productions in one way or another, and the first model ever made from 1978. Whether tape delays, such as the slap-back-echo on John Lennon's vocals or an analog in-built circuit, this effect that manipulates time and space, adding magic, colour and mystique to any tone or instrument, has been an ultimate passion of mine.

Looking into building an analog delay circuit has seemed like quite a challenge, and after a tutorial session with my tutor Ciaran Robinson, who told me that I was looking at "at least three weeks of soldering", I have decided that for the prototype, I would use one of my delay boxes, focusing on the incredible DOD FX90 analog delay box from the 1980's which features the Bucket-Brigade technology. It was a safer bet particularly given my very limited soldering and electronics work experience. Making that decision, I have dedicated a designated place for the DOD delay box on the lid of the box, right next to the preamp/equaliser unit.

Drilling into the wooden box and carving shapes on the bottom left of the lid, and the back of the left side to place both the preamp/EQ and the output jack/battery holder—were not easy tasks, as the seemingly soft and thin wood was actually fairly sturdy and stubborn, resulting in one broken coping-saw, a couple of superficial cuts, plenty of tiny splinters in my hands and good old blood, sweat and tears.

At first, after watching quite a few videos on wood-craft online, I decided to buy and use a chisel for the task, using a heavy duty meat-tenderiser and then a hammer, but soon enough I had realised that it wasn't the best idea.

Eventually I drilled a small hole on the lid tin in which to place a coping saw to create

a rectangular shape for the EQ/volume control/tuner bit. This was quite a challenge, yet a success. Making the hole for the battery holder/output jack was a different story, as the side walls of the box are thicker than the lid and bottom. After cutting a couple of inches into the back of the left wall of the box, my coping saw had broken and fallen apart. Exhausted yet determined, I have continued carving into the box using a drill and the chisel which ended up saving the day. The carving was far from perfect, but just a little bit of sanding made it look decent, and once the preamp/equalizer and battery holder/output jack were inserted and safely secured and screwed into the box, there was, to my tremendous relief absolutely no way to tell how chaotic and play-by-ear that process had been. (I had already accepted that it would perhaps turn out to appear somewhat 'wonky', which I planned to explain as a characteristic feature while, at the same time, seriously considering a re-build). The instrument had started to take its shape, particularly after I secured the preamp's cables, using 4mm cable/wire clamps with fixing nails, I was very pleased with the way the instrument came along at that stage.

I came across the beautiful heavy brass musical box key from the 19th century online which I thought was a nice touch. It has contributed to the retro-esque and nostalgic nature of the instrument, turning it into an historic piece in a sense. Once the key had arrived I noticed that some adjustments to the original winder to the original DIY musical box unit needed to be made in order to fit that historical piece to the instrument.

At first, the rounded holding point of the musical box did not fit in the space at the bottom end of the key, so it had to be cut off, for which task I have used a hacksaw. Due to the size of the vintage musical box key, which has a large holding ring, the only way to allow it to twist properly, was to place it in the center of the left side of the right wall of the wooden box. This dictated that the DIY musical box mechanism was to be heightened by 6 centimeters. At first I tried attaching a cardboard box which conveniently was the right size. Into the cardboard box I inserted some wrapping plastic, paper and bubble-wrap, trying to stuff it with as many materials as possible. I placed the DIY musical box mechanism on top of the cardboard box and secured it with small nails I had around the house.

Finally, I placed some sellotape underneath to test and see if it worked before glueing, nailing or screwing anything. Unfortunately, despite the extra added weight

and mounting, the cardboard box did not stop moving, so I cut a small piece of wood to replace and secure it to the box.

After struggling to achieve the desired height, I randomly found a pine Half-Pyramid (because every house needs one?) in the nearest Homebase which seemed right for the job. Indeed after just a little bit of sanding, it was a perfect fit. I have secured the sanded pyramid to the box using 'Gorilla' mounting tape, and had the DIY musical box mechanism safely screwed on top.

Measuring 6 centimeters from the base, I drilled a hole on the wall of the box, inserted the vintage brass winding key and placed the musical-box's handle into the key, which worked quite well.

In order to bring colour and more texture and to further personalise the piece, I decided to cover the instrument with layers of velvet in my favourite colour which is red/marooned,crimson. This addition allows insulation and thickens the instrument's tone. It would perhaps prevent feeding back because the volume of both microphones is significantly different. The piezo microphone despite its small size and the attached pop/noise shield produces a much higher volume.

Finishing with decorative vintage brass-made box corner protectors, screwed into the four corners of the box which hold the red velvet pieces in place and add to the overall classic vintage Victorian style of the instrument. They are that perfect final touch and, in my opinion, have worked very well.

Finally, I have designed a logo to place on the lid, above the EQ, which is a decision I made early on in the process in order to personalise the project (plus I would always take the opportunity to take on a small design project).

Naming this instrument was a must, especially when thinking about designing a logo, I was thinking of a name that would capture the essence of it all, a musical instrument being based on those sounds that created my initial infatuation with sounds and ignited a lifelong love, or -might I say - obsession with music and sound design, which I have turned into a career. The thought of a product which includes "my favourite things", made me think about 'The Sound of Music', a Musical which affected me to a large extent as a child, particularly the song 'My Favourite Things', and I considered it to be an apt name. However, I found it to be quite a mouthful, so I started looking into the song and its lyrics, finding colourful words such as "schnitzel

and noodles”, or “crisp apfelstrudel”, and then it hit me—

‘Der Strudel’, what a lovely analogy between a famously loved Austrian dessert, which is a delicious pastry, filled with absolute goodness, served with fresh vanilla ice cream to a musical instrument which encapsulates well-loved, comforting sounds, designed to bring a sense of nostalgia and magic.

The strudel being a round pastry, beautifully represents the shape of the punching-card loop and symbolises a return to my roots and origin. It also includes a graceful nod to my Austrian nationality and heritage through my dear late grandfather and his unique family. Their love of culture, musicianship, philosophy, and their ever-lasting thirst for knowledge as a virtue, and code to live by, have influenced me tremendously. It is also a nod to a generation that although it is gone, has left wonderful memories, ideas and aesthetics.

Once the name was decided upon, I started searching the web for appropriate images and created a quick mood board. Finally I selected two images of old victorian posters, a drawn, delicious-looking serving of proper apfelstrudel and a picture of a Betty Boop- look-alike mermaid from Valhalla creating some sort of magic, which I placed on the left side of the plate as if she is breathing life into it. Finally I wrote the name in two different gothic German fonts that I found online, giving it all a cream background. Then I layered it all with a texture of old paper for the final touch.

I printed four copies of the logo design on a sheet of high quality self-adhesive matte white vinyl paper, to cut around and I placed it very visibly on the instrument’s lid.

It was finally time to plug in the freshly built instrument and give it its first spin (pun intended).

The delay box (also operated by using a 9-volt battery) was placed in its designated location on top of the lid, chained to the instrument using a patch-cable and onto a Fender ‘Champion’ guitar amplifier with its reverb turned off, and there it was, the ‘Strudel’, hot out of the oven, producing deliciously warm and comforting sounds that transported me into a meditative state. Brilliant moment of joy and pride.

Some issues still concerned me: I was unsure about the playability of the instrument; I had realised that perhaps a larger, or more expensive mechanism would have been better; I decided that the use of some sort of plastic or glue to attach the instrument’s handle to the vintage brass key permanently would make the winding of the

mechanism smoother. Another problem was the issue of having to apply many twists to produce the next note. This had seemed to worsen once the original handle was chopped off to allow it to connect to the vintage brass winding-key. Having to apply many twists made the songs unintelligible. This was disappointing as it made the songs for which I had made card strips in order to demonstrate the instrument for the video presentation ('My Favourite Things' and Frank Sinatra's 'My Way') quite irrelevant because the mechanism would not play them properly. Eventually I used a 'Free-fall' card strip with random notes and harmony, written and punched sporadically with hardly any spacing between the notes to allow a proper demonstration.

Also, the more I have used the instrument, the hole on the right side which holds the winding-key had expanded to a point where it has become completely loose, so another 30mm cup-hook was installed underneath and a screw with a small spring attached to it were placed to secure the winding key in place.

Another idea for a future version was to unite the electronics so a single power source would be applied for the whole instrument. This would avoid the use of batteries for ecological reasons. There could also perhaps be an on/off switch.

This project has been a very enjoyable challenge, which resulted in a musical instrument which I am very proud of, featuring some of my favourite sounds and a design which stands out, catches the attention and creates an atmosphere as it sits in the corner of my studio flat. The design, along with the instrument's name and the logo opens many windows and options for marketing. I can clearly see the logo easily selling as a poster or printed on mugs and T-shirts, marketing this instrument as a very niche, novelty item. Perhaps I will come up with a fictional story and characters behind it, adding more and more depth, marketing pre-made punched card strips to a variety of songs or patterns, harmonic progressions and even offer a service to produce bespoke card loops to clients, playing any piece of music, whether popular or original.

It is an instrument with the potential to cater to professional and amateur producers and musicians alike, allowing lots of space for imagination. I honestly doubt if different people would ever produce similar sonic/musical ideas using it, which makes it a very personal instrument that has the ability to entertain non-musicians and children. Personally I would have been overjoyed to have such an instrument to play with as a child.

The research and building process has brought some great ideas for future development and improvements to the next version, along with new ideas for future building projects.