THE
BOOK
OF
SUMMIT

novation

THE SKY'S THE LIMIT

The power of two Peaks combine to become a sound designer's powerhouse

The simplest way of describing Summit is 'two Peaks in one'. This reference is to Summit's predecessor, called Peak, an eight-voice desktop polysynth that met with critical acclaim when it was launched in 2017. But though the 'Twin Peaks' tagline has a nice ring to it, Summit is actually much more than just two synths in one. As you'll discover in this piece, Novation's flagship 61-key polyphonic synthesizer builds on the technology developed for Peak and adds some major functionality upgrades, placing it in a league of its own. In this article, we shed light on how Summit expands on Peak's already phenomenal capabilities, and where Chris Huggett's design genius – supported by the Novation product team – helped to make it the most powerful Novation synth ever made.

The story of Summit is one of evolution. The synth, though dripping with modern features, is intrinsically linked to Novation's past landmarks. The most recent of these, of course, is Peak. But Summit also shares commonalities with the Bass Station II, SuperNova and the original Bass Station: Novation's first synth from 1992. The linchpin to all these Novation designs is Chris Huggett: revered synth designer and figurehead of British music machines, who has been designing synths since before Novation existed. In fact, some of Summit's features can be traced to Huggett's work on the much-loved OSCar synthesizer, a classic analogue synth from the early 1980s.

With Summit's predecessor Peak, Huggett and the Novation engineers had initially envisioned a keyboard synth. But in the subsequent product development process that saw it reimagined as a desktop unit (without keys), lots was done to maximise its performance as a compact but powerful synth that would integrate seamlessly in a multi-machine setup. As such, design decisions were made based on the physical attributes of Peak. Among these was limiting the number of top-panel controls – purely due to available space and ergonomics. Another important consideration in Peak was internal capacity. Densely stacked PCBs expand the surface area for components, but Peak is still packed to the brim with electronics. Despite these design hurdles, Peak was not compromised, and it did not disappoint. As a hugely versatile desktop polysynth released during the boom of modular music making, Peak quickly became a staple for everyone from techno producers to sound designers and live performers.

THE CLIMB

So Peak set the stage for Summit. And the sky was the limit for Chris Huggett and the Novation design team; designers now had more top-panel real estate and cavernous internals capacious enough to host Peak's circuitry several times over. "Summit built upon Peak's great design and added more instant control by giving an entire knob section for FM synthesis and arpeggio options," remarks Patricia Wolf, a producer, sound designer and Peak lover, who was asked by Novation to create some of the factory patches for Summit. "As a result, you have to do less Mod Matrix digging, making sound design and expressive improvisational modulation more accessible and intuitive."

Within Summit resides two complete Peak engines, providing a 16-voice polyphonic, two-part multi-timbral architecture. With three New Oxford Oscillators per voice (48 oscillators in total!), two dual-stage multimode analogue filters per voice, two phenomenal digital effects engines, four LFOs, and a hugely powerful Mod Matrix, Summit is a serious machine. But totally new in Summit is bi-timbral functionality, which allows for split or stacked patches for keyboard-divided or layered sounds, or for the entire synth to be switched between two separate and independently controlled setups – perhaps one as an effects processor for an external input source. (Summit has audio inputs, which can be routed through the filter and effects.)

Chris Huggett chose Field Programmable Gate Array (FPGA) chips to be the beating heart of Peak in the very early stages of its design phase. There are two identical FPGAs within Summit, which are interconnected to form a powerful master

processor that handles almost all of the synth's audio processing, I/O, routing and effects. Digital New Oxford Oscillators are capable of subtractive, FM and wavetable synthesis.

Adjustable drift and divergence parameters emulate the inherent and often desirable instability of analogue circuits. As a result, Peak and Summit can make sounds ranging from pure analogue-sounding basslines to futuristic soundscapes. In itself this is not new technology, but their integration inside the FPGA has enabled their design to be extended to enable optimum waveform synthesis. Because other virtual synths use discrete 'off the shelf' DAC chips, which are restricted to running at sample rates of either 48kHz or perhaps 96kHz, they often have aliasing issues, especially when synthesising higher frequencies. The FPGA's ability to generate waveforms at the oversampling frequency – up to 512 times the traditional rate – ensures that Summit's waveforms, like Peak's, are pure at all frequencies, free from digital artifacts, no matter how aggressively the pitch is modulated. This leads to waveforms that are audibly indistinguishable from their analogue forebears.

Dave Spiers from GForce Software was one of the external sound designers who contributed to the factory sound patches, so he was one of the first people on the planet to witness Summit's power and potential. "For me, Peak and especially Summit have an addictive quality about them," he remarks. "Obviously that's due to their functionality, but it's also due to the panel layout. There's a flow to creating sounds and musical parts to both instruments which can be as immediate or as deep as you want, thanks to the Mod Matrix. Even when I'm not in front of them, I regularly find myself thinking 'Hmm… if I modulate X with Y, it should sound like…' You know an instrument is special when you walk away and still think about its possibilities!"

"Summit takes all of Peak's great ideas & expands it into a powerful studio centerpiece."
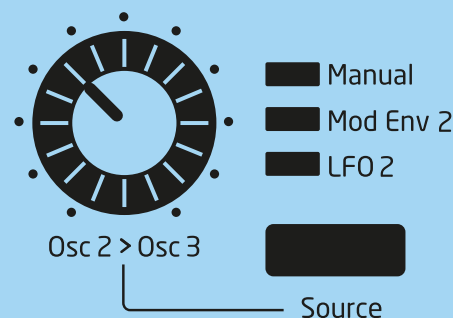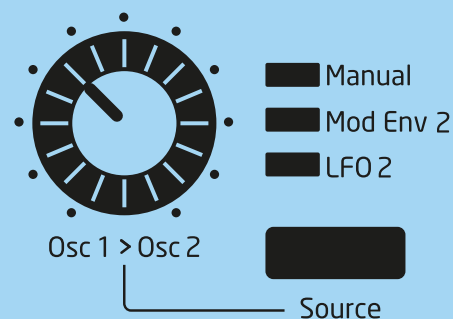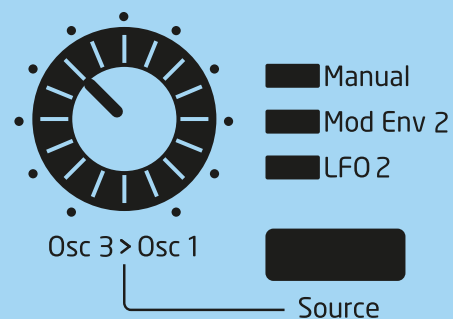
Patricia Wolf

PLAYABILITY

The implementation of the dual synth engines has made Summit an explosion of possibilities in a battleship of a synth that's as comfortable as a sound design tool as it is on stage. "Obviously its five-octave keyboard makes it instantly more playable," says Danny Nugent, Summit's product manager. "But there are lots of other things that make it great for players." The ability to create splits and build layered multi patches takes the power of two Peaks and multiplies them to make an exponentially more powerful machine. "It will wow anyone familiar with Peak's sonic abilities," remarks Dave Spiers. "It certainly blew me away – I found myself imagining sounds I might coax from Summit before I'd even laid my hands on it!"
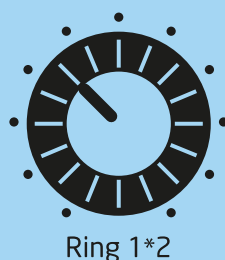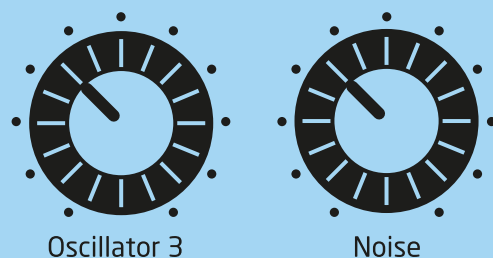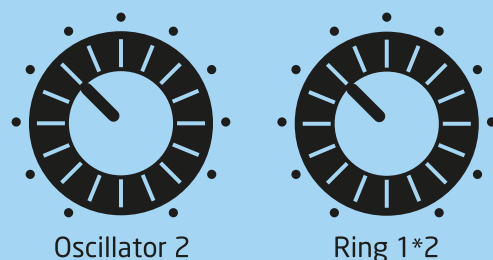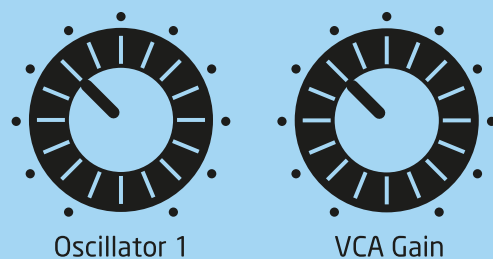
ACCESSIBLE
F M

FM

Osc 3 > Osc 1

Manual
Mod Env 2
LFO 2

Source

Osc 1 > Osc 2

Manual
Mod Env 2
LFO 2

Source

Osc 2 > Osc 3

Manual
Mod Env 2
LFO 2

Source

MIXER

Oscillator 1

VCA Gain

Oscillator 2

Ring 1*2

Oscillator 3

Noise

Frequency Modulation (FM) functionality is not a new feature for Summit. FM is built into Peak, but users need to navigate through menus and configure the Mod Matrix manually to set it up. But in Summit – thanks in large part to the enormous expansion of front panel space – FM controls are exposed with dedicated knobs and buttons. "Bringing the FM engine to the front panel, rather than in the Mod Matrix, makes the FM components more of a playable thing once again. Rather than having to set up FM in a nerdy manner by digging into the menu system, the controls are there on the front panel," says Danny Nugent.

This brings huge benefits for Summit users: quicker workflow for sound designers, and instant FM-ability for synth performers who like to have one oscillator modulate another, for example. Another important point, for those of us who like to get carried away with sounds, Danny adds, "as with most FM synthesis, it can get pretty noisy pretty quickly, but with the front panel controls, you can easily just pull it back and keep playing."

"Giving the FM section its own controls meant that I experimented more & created some sounds that I just can't believe were possible!"

Patricia Wolf

WAVE TABLES

Wavetables were considered key to Peak's success, and their implementation is the same in Summit. Danny Nugent explains more: "The wavetables allow Summit to go beyond the traditional analogue wave shapes of triangle, saw and square. They really show off the digital side of the instrument, being able to sweep through complex wave shapes. The sound designer can then sculpt away at these complex sources with the analogue filters or create motion by modulating the wavetable position. The great thing about Wavetables is that they allow for re-creation of classic instrument types such as organs, brass and string sounds. Or they can sound very contemporary, creating harsh digital bass and leads or complex evolving pads and drones. I personally have had lots of fun making didgeridoo and dial-up internet sounds with them!"
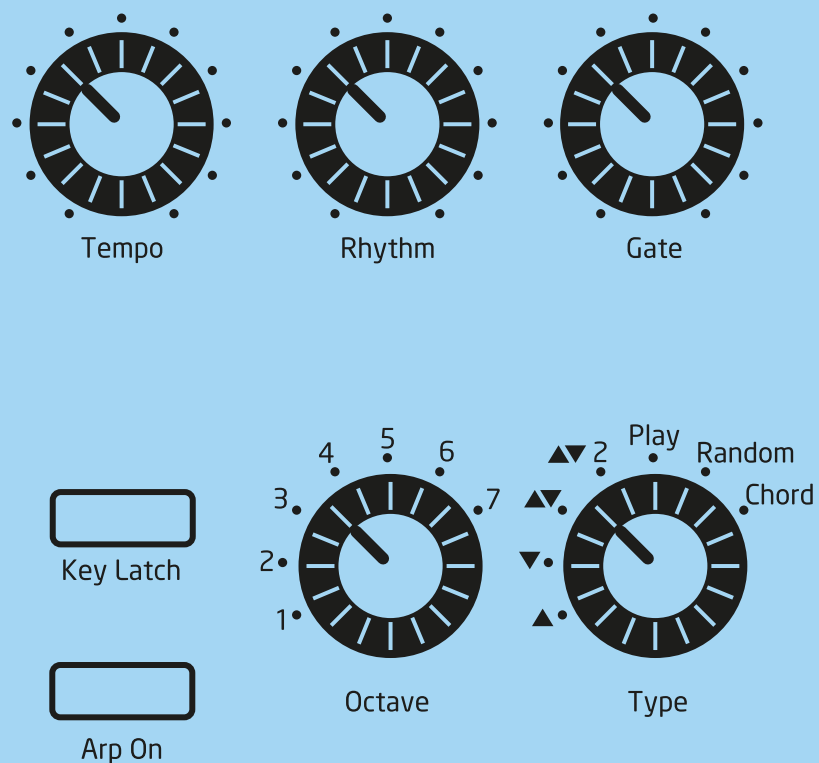
Osc   Env   LFO   Arp/Clock

Mod   Voice   FX   FX Mod
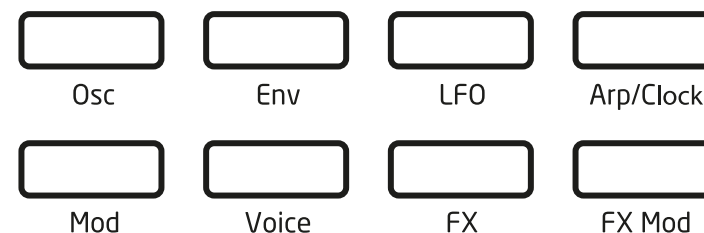
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OSCILLATOR 1        3/8
WaveMore      Granular▶
FixedNote     Off
BendRange     +12
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◀   Page   ▶

ARPEGGIATOR
UPGRADE

ARP

Tempo

Rhythm

Gate

Key Latch

Arp On

4   5   6

3   7

2

1

Octave

▲▼ 2 Play

▲▼   Random

▼   Chord

▲

Type

A nother feature that gets an upgrade in Summit is the arpeggiator. The front panel arp controls are expanded, which greatly increases the ease at which sound designers and live performers can set up and manipulate arpeggiator patterns. Dave Spiers admits, "the chord arpeggio, layers, rhythm and gate-time functionality has become a bit of a secret weapon – I think it's borderline genius! I'm not the world's most dexterous keyboard player, but I love rhythm and I'm obsessed with chordal textures. One of the things I absolutely love about the chord arpeggiator mode is creating a Multi patch where both Layer A and B use the chord arpeggio, but where each is playing a different rhythmic pattern, and each has a different sound. The counterpoint that's possible is jaw-dropping and can lead to some amazingly inspirational happy accidents." Spiers goes on to recall a fond feature of the OSCar, "I've always loved having the arpeggiator gate parameter as a real-time control, and with Summit this is available on the front. So, together with the rhythm knob, and the ability to quickly switch between layers, it opens up the potential for really complex and beautiful rhythmic chordal textures – all available at your fingertips and in real time. And when you suddenly start altering the octave transpose knob on one or both layers… woah… goosebumps!"
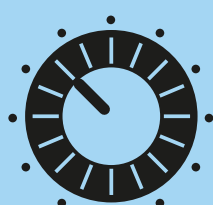
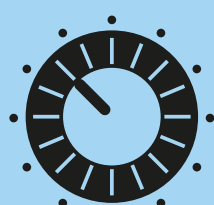"The chord arpeggio is borderline genius."

Dave Spiers
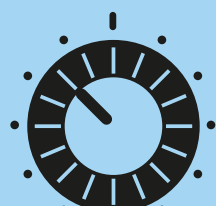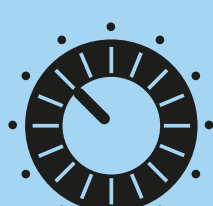
DUAL FILTER
/FILTER
SEPARATION

FILTER

LFO 1 Depth

Osc 3 Filter Mod

Key Tracking
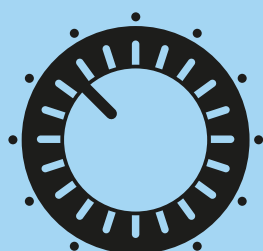
Env Depth

Resonance

Overdrive
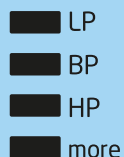
Amp Env
Mod Env 1

Source

12 dB
24 dB

Slope

Frequency

LP
BP
HP
more
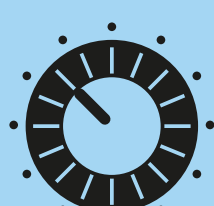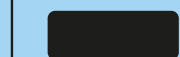
Shape

Summit's filter is slightly different to Peak's, for several reasons. Firstly, there are two independent filter modules in Summit, thanks to there being two full Peak engines under Summit's hood. (There are two 12dB multimode filters per voice.) Secondly, Summit possesses filter implementation that can be traced back to one of Chris Huggett's most revered synths: the OSCar. Key to this is 'filter separation'. "The Summit filter is a real workhorse," Danny Nugent explains. "It can be gentle, squelchy and acidy, or really scream with the resonance all the way up. The lineage of its sound has come from the EDP Wasp, through the Bass Station and Bass Station II. [All designed by Huggett]. Now, with the filter separation, it links to the OSCar and provides new sonic worlds of formant filtering and parallel filters."

Nick Bookman, long-serving Novation hardware engineer, elaborates, "With the way Peak was designed, the electronics didn't allow independent control of the dual blocks within the filter. This functionality is something that Chris Huggett did himself with the OSCar. It's just splitting the control path to allow us to get the particular control over both elements of the filter. We dearly wanted to do it ourselves on Summit, so through a combination of knowing what's gone before and asking Chris nicely to implement it on Summit, we were able to adjust the circuit design to allow us to use that architecture that he pioneered with the OSCar. As a result, filters can either be in series or in parallel, and there is now a filter separation control. So you can simultaneously control the cutoff of both elements within the filter from the same source. What that gives you is particular vowel-type sounds, even though it's not technically a vowel filter."

Danny Nugent continues, "you can have a low-pass filter running into a band-pass filter, for example, or you can run them in parallel – this is configurable from the menu. This can give you a vocal formant-esque sound, which was one of the things that made OSCar really unique. This feature is something that you don't normally get on a hardware synth; normally those sounds would come from a vocal formant filter plugin or using a wavetable or something."

"With the new Parallel filters, vowel-like sounds are a cinch, whereas on many synths they can be nearly impossible to obtain."

Dave Spiers

DISTORTION
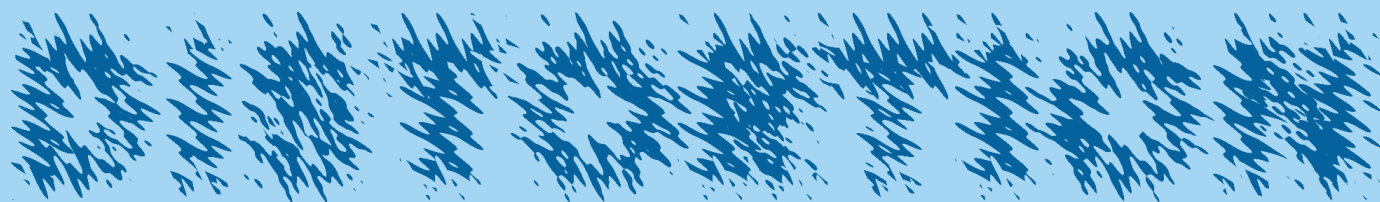
DISTORTION

DISTORTION

DISTORTION

DISTORTION

Distortion is an important tool in sound design, and the source of the distortion within the signal path will determine the timbre of the sound. Summit has analogue VCAs and three stages of analogue distortion: prefilter, post-filter, and post-VCA. "The three distortions allow you to be flexible with where you add harmonics to the signal," says Nugent. "The pre-filter drive gives you that boost before you filter and is great for warming things up. The post-filter drive can add grit, as it works on a per-voice level so it can easily be manipulated via modulation. The final distortion acts on all the voices summed together, like sticking a stomp box on the output. This can can give some interesting characteristics as you start stacking up notes. Of course it's possible to add distortion at all stages if that's your thing!"

"Summit can create everything from corpulent basses to sublime pads to searing leads, to complex evolving textures to ice-cold digital sounds to gnarly FM."

Dave Spiers

"I love the immediacy and tactile nature of Summit. You can delve into and shape the sounds without having to get lost in menus."
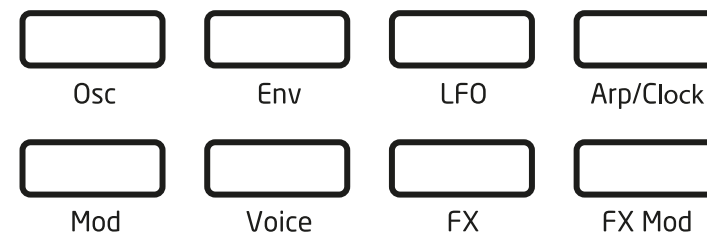
Hinako Omori

V E R O F
S A T E F F
I T L I E C I T
T Y S

Thanks to Summit's dual blocks of stunning digital effects, Summit users are able to have more control over their sound, and even dedicate one 'part' of their synth to being a stand-alone effects processor. Nick Bookman – whose role on on Summit was as a hardware engineer, but was deeply involved in designing Peak – puts Summit's dual-part effects architecture into perspective. "Each of Summit's two synth engines has a dedicated effects processor, which is a block with identical reverb algorithm, delay, chorus, and analogue distortion. There are several ways that these can be used within Summit. In dual mode, you have twice the number of effects for building complex soundscapes with a load of effects. When using the effects in single mode, you're only using one of those effects blocks, so you've got 16 voices fed to one of the effects blocks. This leaves you an effects block free for using traditionally as an effects unit – and with Summit's audio inputs, you can be routing other audio from your music-making setup into Summit's effects."

Osc   Env   LFO   Arp/Clock

Mod   Voice   FX   FX Mod

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REVERB              7/8
RevSize      64      ▶
ModDepth     64
ModRate       4
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◀ Page ▶

THE WHOLE PACKAGE

"The way the sounds unfold and morph over time with all the control you can have just fascinates me endlessly."

Patricia Wolf

The raw processing power contained within Summit is impressive, but it only makes sense when considered in context of the other of facets of Summit's design. There's the high-end keybed, which is the the same aftertouch-enabled, synth-action type found in the flagship Novation SL MkIII controller keyboards. This gives Summit a responsive feel that cries out to be played. Then there's the build quality, which is very high because Summit (like Peak) is designed to be taken on the road where life is tough and gear gets bumped in transit. "Summit is a proper instrument," explains Spiers, "and Peak and Summit certainly show a significant step forward for Novation in terms of instrument build quality."

The sum of all parts afforded by Summit – sound, adaptability, playability, and complexity when you need it – is a treat for Spiers: "For me it's the combination of power, immediacy and versatility. The instrument sounds great and it can be as deep or immediate as you want it to be. The layout is easy to grasp and everything you need to make great sounds is in front of you in a visual feast. Last, but by no means least, it can create everything from corpulent basses to sublime pads to searing leads, to complex evolving textures to ice-cold digital sounds to gnarly FM. To have all those possibilities at your fingertips in one beknobbed instrument is pretty staggering. But to top it all, Summit is fun to use. That's a hugely important feature."

SUMMING UP

So hopefully this gives you an idea of Summit and just where it could take you on your musical adventure. By now, we hope you know that Summit is not just another digital synth with lots of voices and effects. Summit is yesterday's *and* tomorrow's synth; today. It's a revolutionary instrument that is steeped in British synth heritage. But we would say that, we made it — through blood, toil, tears and sweat. The best we can do is leave it to our sound designers Dave Spiers and Patricia Wolf to sum up in their own words.

Patricia Wolf: "I just get lost in the richness and intricacy of it. I had never owned a synth that allowed me to layer my patches before, and it was exciting to hear how complex the sounds get when you do it! The way the sounds unfold and morph over time with all the control you can have just fascinates me endlessly."

Dave Spiers: "Summit is the instrument that puts a great British company right back into the forefront of great synthesis design and build quality. Ultimately though, its legacy is in the hands of those who use it. They're the ones who determine if an instrument (or even a patch from an instrument) becomes iconic or not. Given Summit's fun factor, sonic versatility and everything else I've talked about, I already think it's probably the greatest British polysynth to date."

"You know an instrument is special when you walk away from it and still think about its possibilities!"

Dave Spiers