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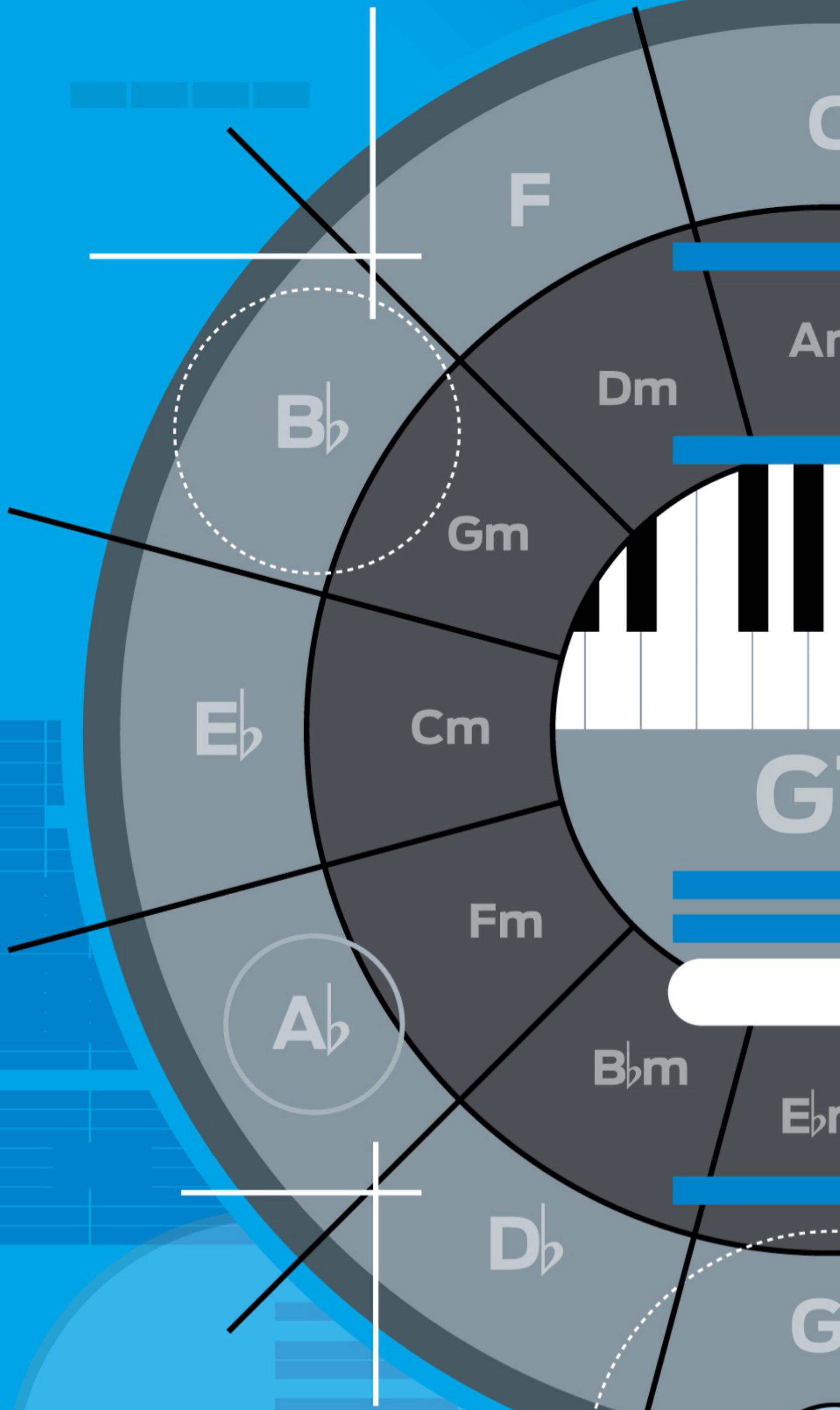
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welcome

The term 'music theory' is known to strike fear in the hearts of computer musicians, conjuring up images of stuffy classrooms, clusters of confusing musical notes and incomprehensible languages.

However, with all this music-making power sitting on your hard drive, there's no excuse not to fully grasp the fundamental building blocks of music. Yes, you *can* get by without any theory skills... but how much better would your tracks be if you could program those MIDI notes with gusto and tickle those ivories with purpose?

> "A mega-compendium of music theory knowledge"

So if words like 'chords', 'scales', 'modes' and 'inversions' fill you with dread, fear not. We've cherry-picked the finest tutorial features from the pages of *Computer Music* and *Future Music* – each guide created specifically for the computer-based producer – to bring you this mega-compendium of music theory knowledge.

And if our step-by-step guides aren't enough, you also gain access to a treasure trove of digital content, available from FileSilo – simply log in, register issue **81** and get downloading. Not only can you follow along with tutorial files in audio, MIDI and video formats, but you can even download *Computer Music*'s exclusive **cm** Plugins collection – over 80 virtual instruments and effects created by the industry's best software developers.

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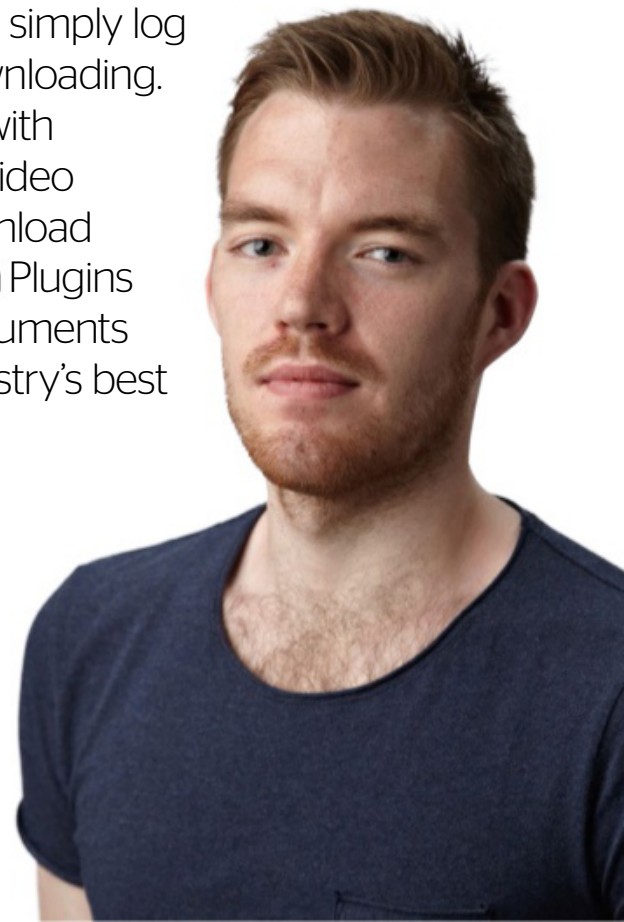
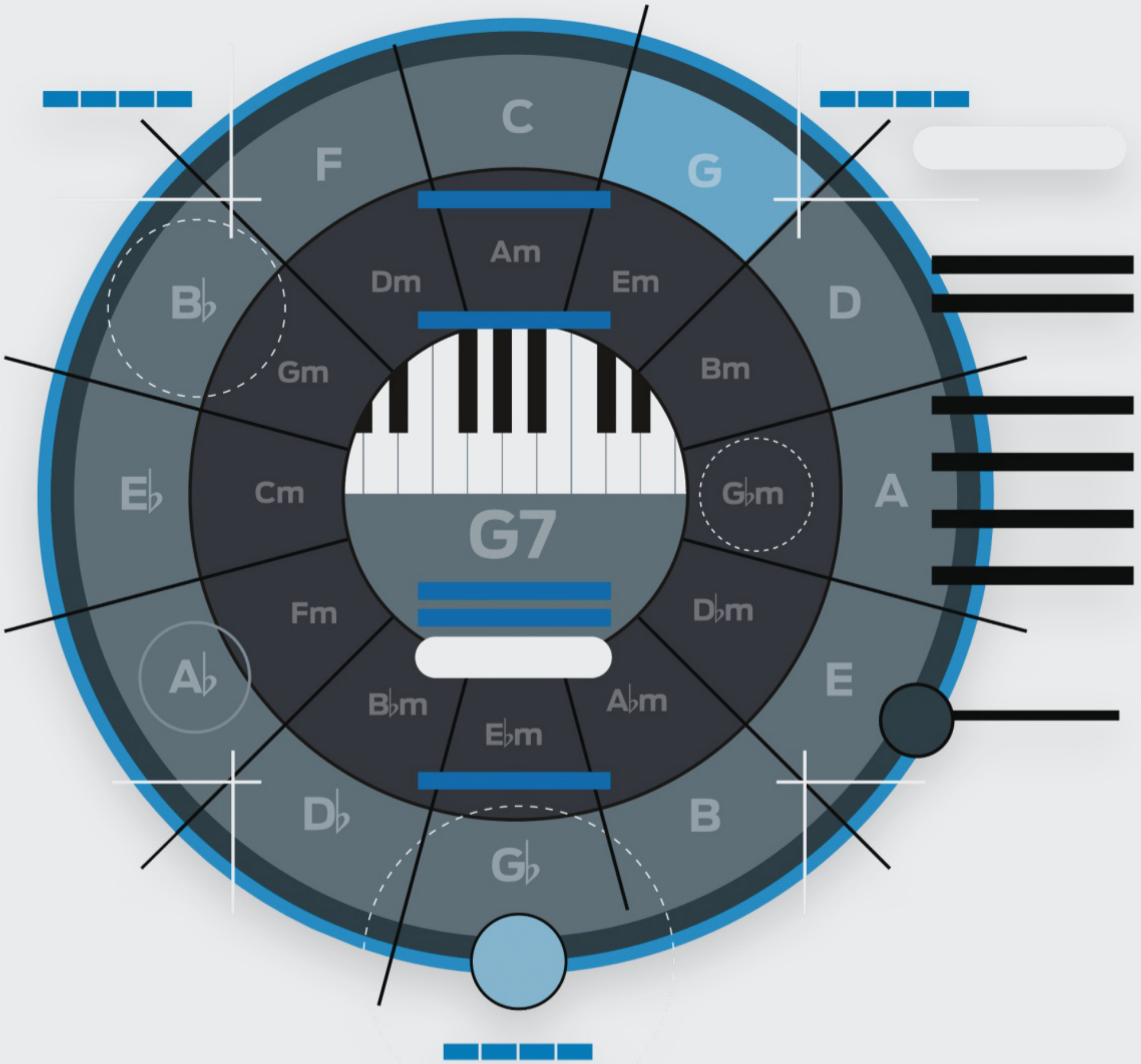
Joe Rossitter **Editor**

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FIRST EDITION

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The Producer's MUSIC THEORY Handbook

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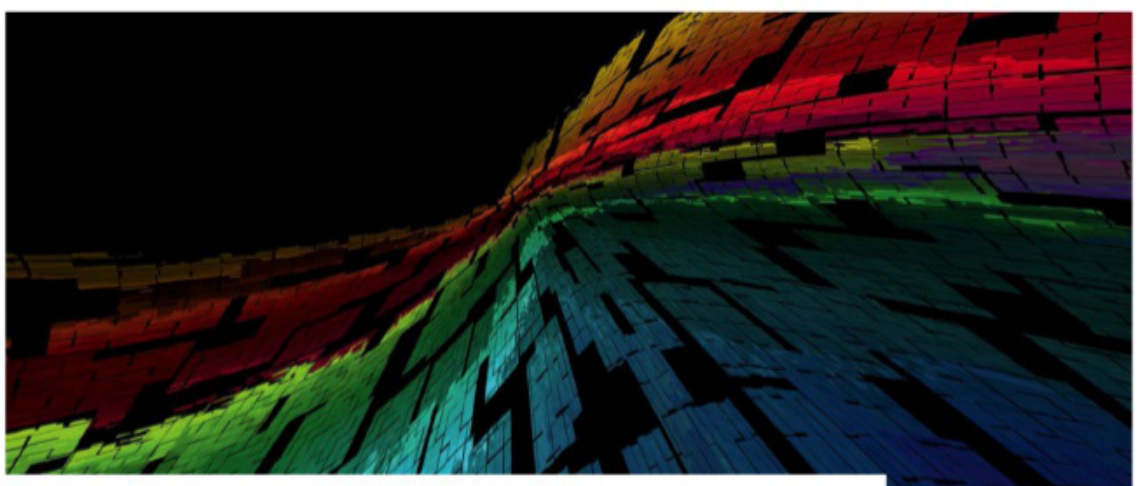

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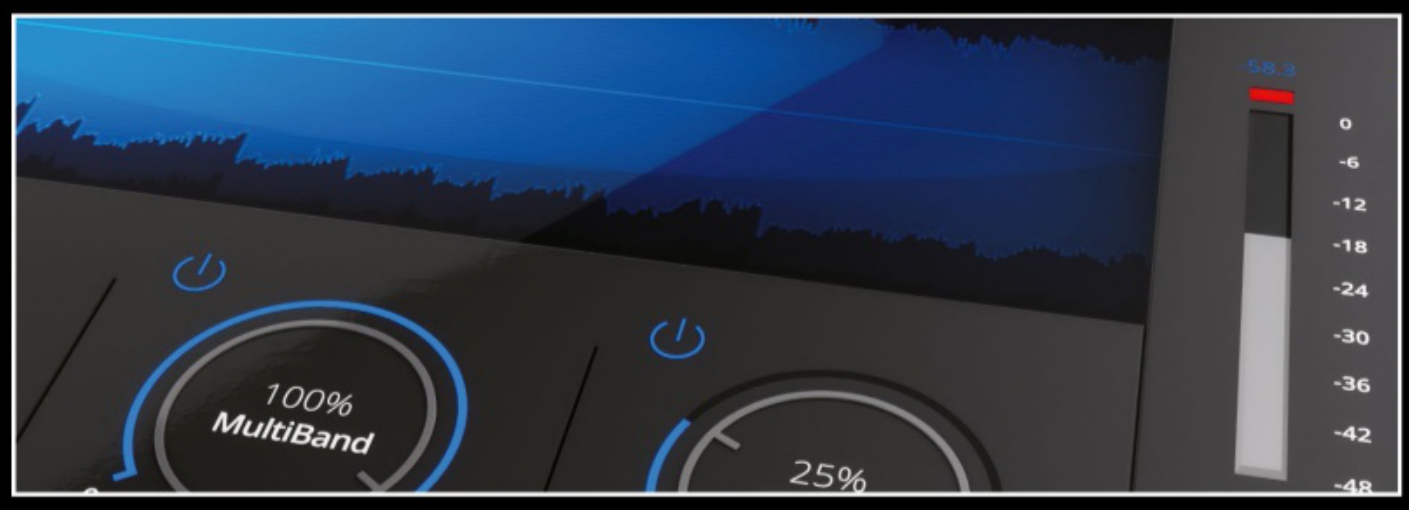

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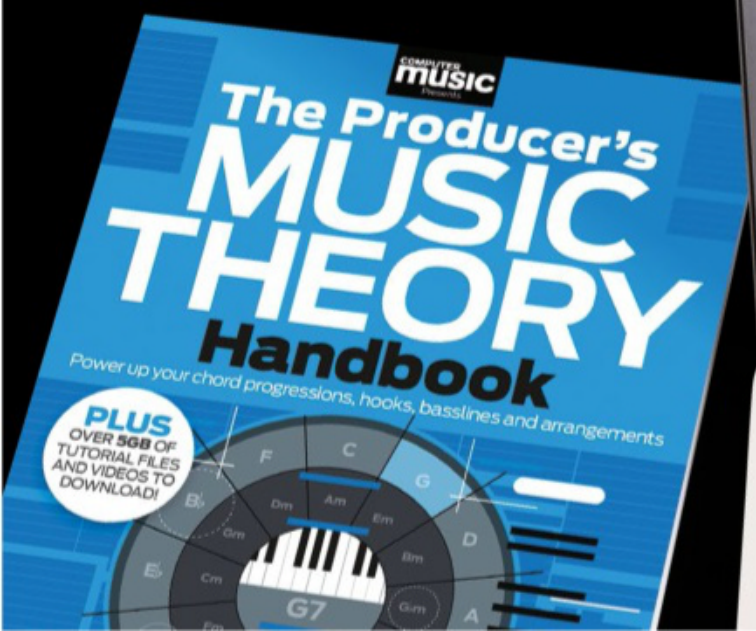

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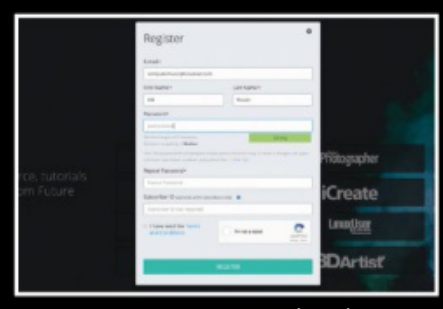

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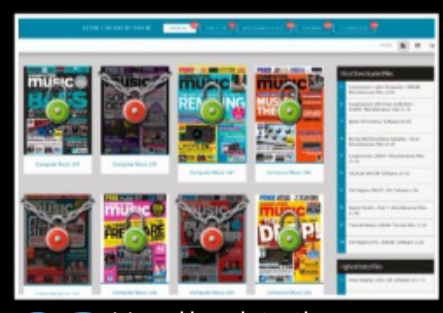

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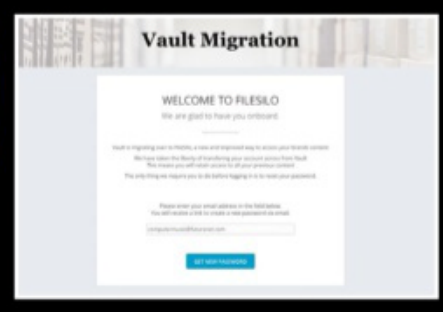

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The Producer's Guide to CHORDS & SCALES

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Take the mystery out of music theory and give your tracks the ultimate musical power-up with the computer musician's definitive crash course

An unforgettable vocal melody. A moving chord sequence. An infectious bassline. Nailing just one of these could leave your listeners humming your tunes and whistling your melodies, eager for their next hit of your audio crack. Back it up with a killer production, and you could have another kind of hit on your hands!

But the truth is that many computer musicians put the technical side of production first. With sonic standards always evolving, and endless plugins and techniques to master, why wouldn't you? Well, see it from the listener's point of view: they can't sing along to sidechain compression or dance to multiband distortion!

To keep your listeners coming back for 'just one more listen', you'll need to hook 'em with a catchy combination of notes. So how's it done? Do we just hit keys at random until a great tune pops out? Well, you could, but there's an easier, faster way, and that's by using tried-and-tested note combos as a guide. Yep, chords and scales!

Now, if there's a two-word phrase guaranteed to paralyse producers with fear, 'music theory' is it... and no wonder: most learning material is textbook-dull, full of jargon, and simply not designed for computer musicians. We've long recognised such problems here at **cm**, with our ever-popular *Easy Guide* series packing in over 150 tutorials to date. But what if you need a one-stop primer to get you up to speed? You need it easy, you need it fast, and you need it *right now*! Well, here it is!

With this tutorial, you'll be making amazing evocative melodies and jazzing up your chord progressions in no time. You'll learn everything from basic major and minor scales to inversions, suspensions, seventh chords, key changes, modes, exotic scales, and loads more. We'll show you which notes go where, with audio examples, MIDI files, and videos packed with clear annotations and extra explanation. All with zero music notation in sight, and a minimum of jargon.

As if that's not enough, we bring you the CM MIDI Construction Kit, comprising almost 2000 ready-made scales and chords in every key. These include our scale 'templates' that show you which notes to use, making composition a breeze!

Notes, octaves and intervals

Before fumbling around with chords and scales, let's get a grip on the stuff they're made up of: notes and intervals. There are only 12 different notes, and they repeat all the way up the piano keyboard (or piano roll). The piano is easy to visualise, with one key per note, but music theory principles work the same for every instrument.

Whichever note you start on, if you go up 12 notes from there, you're back where you started, playing the same note, but one '**octave**' higher – it sounds the same but higher pitched. In addition, the pitch difference between adjacent notes is always the same, called a '**semitone**' (also known as a half-tone or minor second). A difference in pitch between two notes is called an '**interval**' – so far we've covered only two intervals: the octave and the semitone.

It all begins with a C

The 12 notes are named C, C♯, D, D♯, E, F, F♯, G, G♯, A, A♯ and B. After that, the sequence starts over at C, as we've reached the octave point. '#' means '**sharp**' and is essentially shorthand for 'plus 1 semitone', telling us that A♯ is the note immediately above A, for example. Notes with no sharp symbol – C, D, E, F, G, A, B – are called 'natural' notes and are the white keys on a piano. The black keys are C♯, D♯, F♯, G♯ and A♯. Notice that B/C and E/F have no sharp note between them. Also, C (rather than A) is considered the 'default' or 'first' note in music theory, not A.

Some notes lead a shady double life, as the five sharp notes can *also* be described as '**flat**', the symbol for which is 'b', meaning 'minus 1 semitone'. So A♯ can be called B♭, for example – same note, different name! The full run using flats would be: C, D♭, D, E♭, E, F, F♭, G, A♭, A, B♭, B.

If you're finding it hard to take in, just get comfortable with the sharp naming scheme first. Most music software uses only sharps anyway, so to make sure our tutorials translate to your software, we're going to use sharps pretty much throughout (even where they might be considered 'wrong' in traditional music theory).

Let's go after the interval

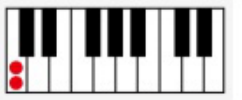
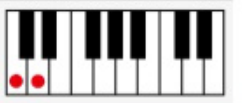
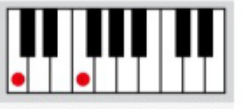
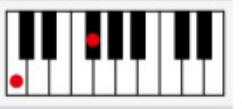
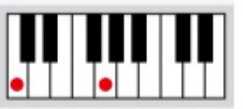
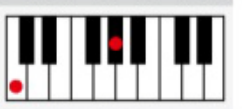
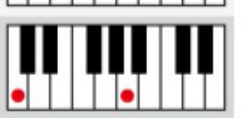
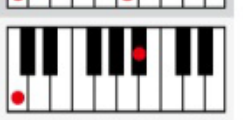
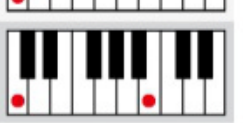
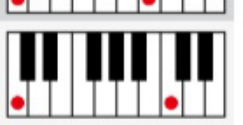
It's time to look at the other intervals – we've put a table of the intervals (from 0 to 12) over on the right-hand side of the page.

Notes played one after the other make a 'melodic interval', and no matter which of the notes you play first, it's the same interval – we'd just call it ascending or descending. When the notes are played at the same time, that's a 'harmonic interval'.

Each interval has its own sound. The '**unison**' and '**octave**' intervals sound very clear, since they're playing the exact same note – no surprise. However, the next clearest are the 7- and 5- semitone intervals, known as a '**perfect fifth**' and a '**perfect fourth**' – the reason for this naming will become clear soon, we promise!

> "Memorising each interval and being able to identify them will help massively"

Next, the 4- and 3-semitone intervals – named '**major third**' and '**minor third**' – also sound musically satisfying, with a 'happy' and 'sad' feel respectively. Memorising each interval and being able to identify them by ear will help massively in making music, and a common trick to help with this is to associate each interval with the opening notes of a well-known tune. For more, see **bit.ly/IntervalIdeas**.

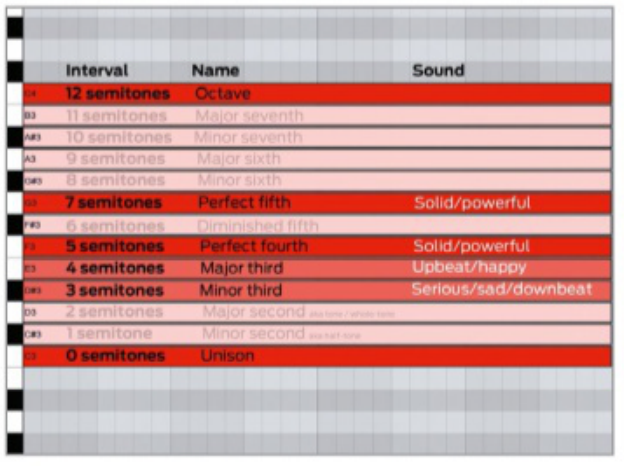
Interval name	Number of semitones	
Unison	0	
Minor Second	1	
Major Second	2	
Minor Third	3	
Major Third	4	
Perfect Fourth	5	
Augmented Fourth/ Diminished Fifth	6	
Perfect Fifth	7	
Minor Sixth	8	
Major Sixth	9	
Minor Seventh	10	
Major Seventh	11	
Octave	12	

> Step by step

1. Listening to and understanding musical intervals

1 > Let's hear intervals in action. Load Dune CM in a new project, select preset **32: Fat Saw Bass RH**, set **Volume** to **25%** to prevent clipping, then load **Interval Demo.mid** on its track. Play it to hear a 1-semitone interval (a **minor second**) between C and **C♯**, first as melodic intervals (ascending and descending), then as a harmonic interval (both notes played together), then a short riff.

2 > This pairing sounds quite "dark", and the harmonic interval is kind of jarring on its own. Select all C♯ notes and move them up one step to **D** for a 2-semitone interval (a **major second**), which sounds less harsh, but still not that musically pleasing. Now move the Ds up to **D♯** – this 3-semitone interval, a **minor third**, is a lot more satisfying, with a sad, serious quality. Our riff sounds more like actual music now!



Interval	Name	Sound
12 semitones	Octave	
11 semitones	Major seventh	
10 semitones	Minor seventh	
9 semitones	Major sixth	
8 semitones	Minor sixth	
7 semitones	Perfect fifth	Solid/powerful
6 semitones	Diminished fifth	
5 semitones	Perfect fourth	Solid/powerful
4 semitones	Major third	Upbeat/happy
3 semitones	Minor third	Serious/sad/downbeat
2 semitones	Major second	
1 semitone	Minor second	
0 semitones	Unison	

3 > The 4-semitone **major third** also sounds very listenable, with a happy, upbeat quality. There are two more stand-out intervals: 5- and 7-semitones, called a **perfect fourth** and **perfect fifth**. Aside from the octave, these two intervals have the purest, most solid sound, if a little less evocative than the minor and major third. See our bonus video (1b) to find out why some intervals sound more 'natural'.

Major scales

A scale is a set of notes picked from the full 12, and the most basic, the chromatic scale, contains *all* 12 notes. The note you start the scale on – called the **'root**' – gives the scale its name. **Fig 1** shows all the notes of the C chromatic scale stacked together on a piano roll, so you can visualise the set of notes (you'd never normally play all the notes like this). The final octave note is included for completeness – there aren't actually two Cs in the scale.

Making music with the chromatic scale can sound rather, er... experimental. What we really want is a smaller set of notes that 'play nice' together, and the most fundamental scale for this is the major scale – like most 'normal' scales, it contains seven different notes. We build it by starting on any note and selecting notes using a pattern of semitone (1 note) and tone (2 note) intervals: **2-2-1-2-2-2-1**. Check out **Fig 2** to see what we mean – the notes we've 'selected' for the scale are in red, and the ones we haven't are in white.

Fig 3 shows our complete C major scale, **C D E F G A B C**. The C major scale has no sharp (or flat) notes, and it coincides exactly with the white keys on the keyboard. This is because music theory and keyboards have been designed around the C major scale.

The important thing to remember is that it's the 2-2-1-2-2-2-1 pattern that creates a major scale, so concentrate on that first – you can learn the notes as you go.

Every scale has its own sound and feeling, and the major scale is upbeat and "happy" in character. There are lots more scales to use, of course, and that's when things can start to get confusing. To make your life easier, we've prepared the CM MIDI Construction Kit within this issue's Tutorial Files. It's packed with MIDI scales and chords to guide you – let's try it now and see what the major scale can do!

Fig 1

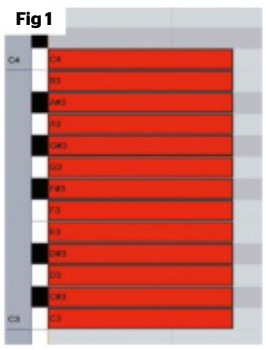


Fig 2

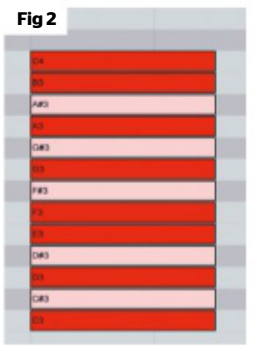
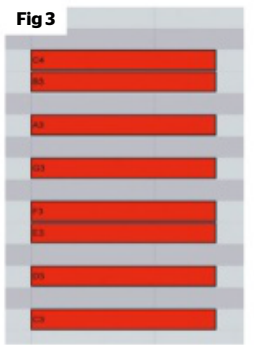
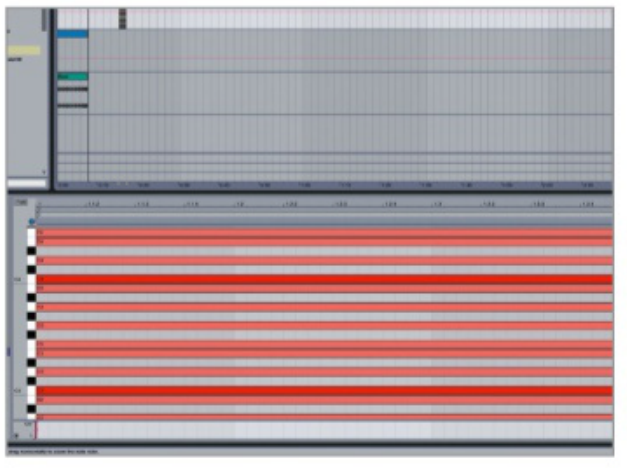


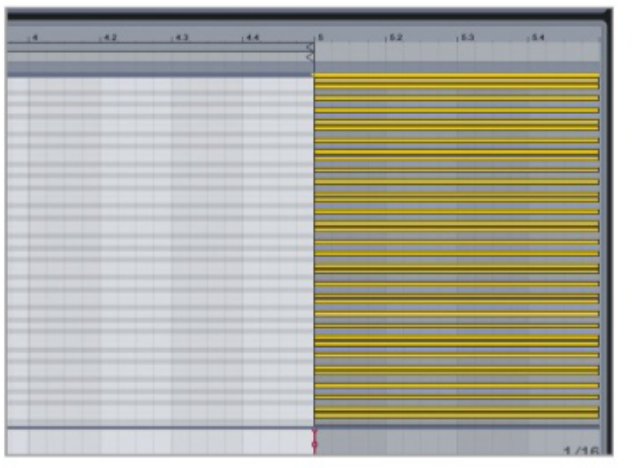
Fig 3



Every major scale uses the same pattern of interval jumps: 2-2-1-2-2-2-1

> Step by step 2. Instant music-making with the CM MIDI Construction Kit

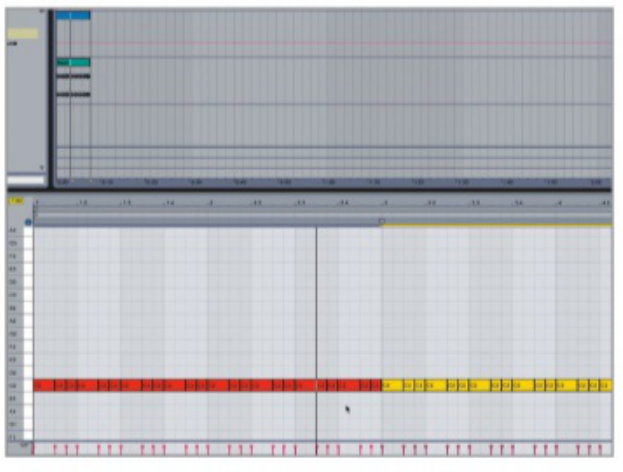


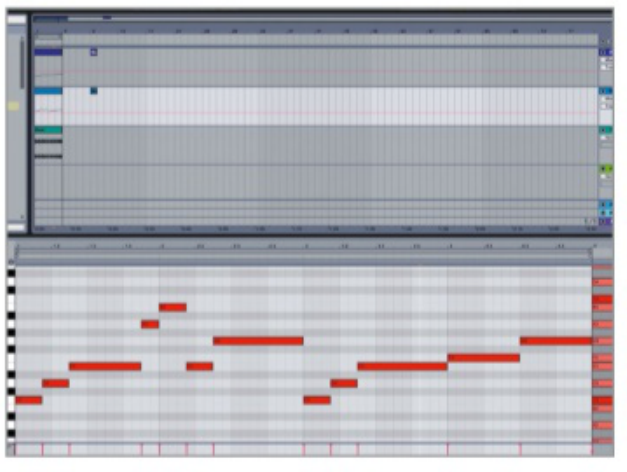


1 > Let's write an upbeat 80s pop loop with the C major scale. Load **Beat.wav** in a 126bpm project, loop it, then create MIDI tracks named Bass and Melody. Load them with Bazille CM and Dune CM, with presets **02 Basses - Ark Sawker Punch** and **110: Synth Stabs RH**. Put Reverberate CM on the Melody track, set the Bass and Melody track levels to **-14dB** and **-18dB**, and put D16 Frontier on the master bus.

2 > Now create four-bar MIDI clips on the Bass and Melody tracks, and import **MIDI Construction Kit » C » Major Template.mid** alongside those clips. Don't play it, though – it's for use as a visual guideline only. It features sustained notes on only the notes of the C major scale. We've included tons of scales in this format, and we'll use them throughout our tutorials.

3 > How you use these clips as a guideline depends on your DAW software, but here's a method for Ableton Live: Select all the notes, copy them, then paste them into the Bass MIDI clip starting at bar 5 – this is outside of the clip's loop points, so we'll never hear the notes. With the small blue **headphones icon** (just upper-left of the piano roll) enabled, click each note from C3-C4 to hear the C major scale.





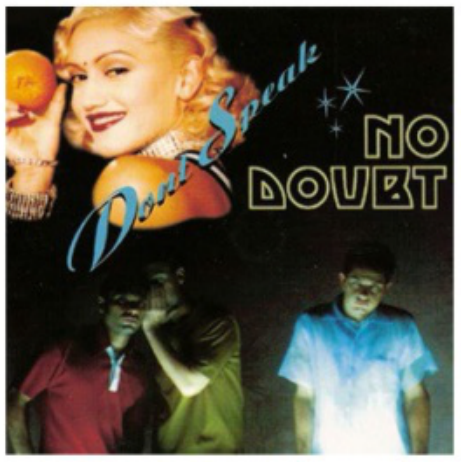
4 > In Ableton Live, you can click the **Fold** button to hide all notes that don't have a MIDI note already, so now we'll see only the notes in C major – perfect! To provide a foolproof backing for our melody, program a bassline using only the root note, C2 – a repeating pattern of one eighth-note then two 16th-notes will work.

5 > Repeat steps 3-4 to set up the C major template on the Melody track and draw in your own melody. When you're done trying it out, program our pattern above – we've turned off the Fold function here in case you're using a different DAW. This melody uses all seven notes of the C major scale, so you can hear the scale's full range of tonality, and how it sounds against the root note, C, in the bass.

POWER TIP

>Major insights

Switch off the Fold function in Live – if you're using it – and check out the intervals between the notes C-E, C-F and C-G – these form three of the four 'core' intervals we showed you in the previous tutorials: 4 semitones (major third), 5 semitones (perfect fourth) and 7 semitones (perfect fifth). You can see how they got the numerical part of their names now too, as they are the third, fourth and fifth notes of the major scale! Now move the notes on the Bass track so bars 1-4 are based on C, E, F then G, for a common yet satisfying sequence. We even based the sustained 'main' notes of our melody on these!



Hear No Doubt's break-up anthem *Don't Speak* in a major key at bit.ly/DSmajor

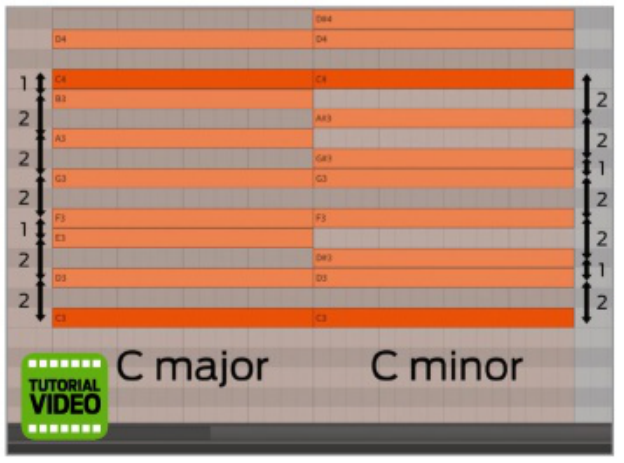
Major vs minor

In this page's tutorials, we show you how using a minor scale instead of a major one can totally transform the 'feel' of a piece of music. Finding the scale that conveys your musical intentions is important, then.

The major scale is generally the choice for an upbeat, happy, sound, while minor scales offer a more serious, downbeat, sad vibe. There are many exceptions, of course, but if you're wondering why your dark DnB bangers sound way light, or your happy hardcore tunes are flat-out depressing, it may simply come down to knowing your major from your minor. To get an idea of the difference it makes, check out these famous songs transformed between major and minor via the magic of software: bit.ly/MAJtrnMIN

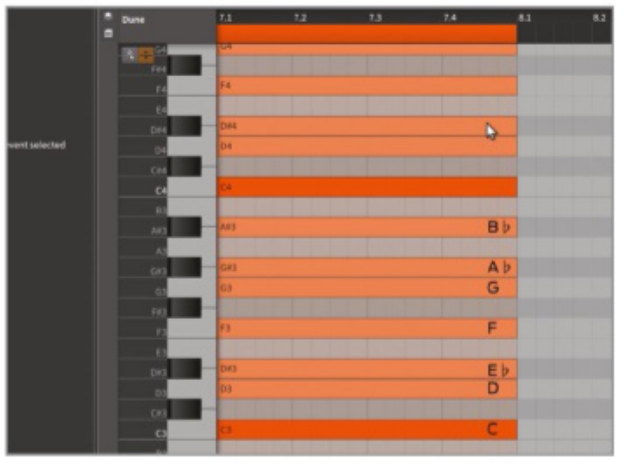
By the way, there are a couple of variations on the standard – or 'natural' – minor scale covered on this page. We'll get to them later on in the article.

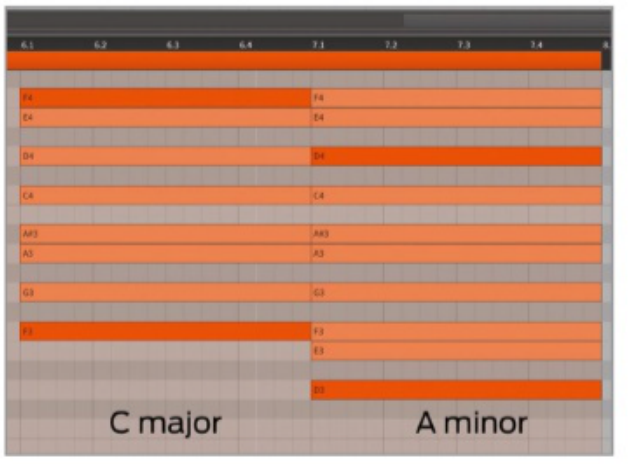
> Step by step 3. The minor scale, and how it relates to major



1 > Load a basic synth patch such as Dune CM's **103: String Section**, then import **C Major & C Minor.mid.** This contains both scales played in order, so you can get familiar with their sound, then two-octave 'stacks' of both scales' notes, so we can compare them. Major uses the semitone pattern **2-2-1-2-2-2-1**, while minor is **2-1-2-2-1-2-2**. So C minor is C, D, D♯, F, G, G♯ and A♯.

2 > In the minor scale, the 3rd, 6th and 7th notes are one semitone lower (ie, they are flattened). These notes are therefore key to the sound of both scales – if you don't use them at all, your music will sound neither major nor minor! The 3rd note most strongly defines the major/minor sound, being a major third (4 semitones from root) or minor third (3 semitones).

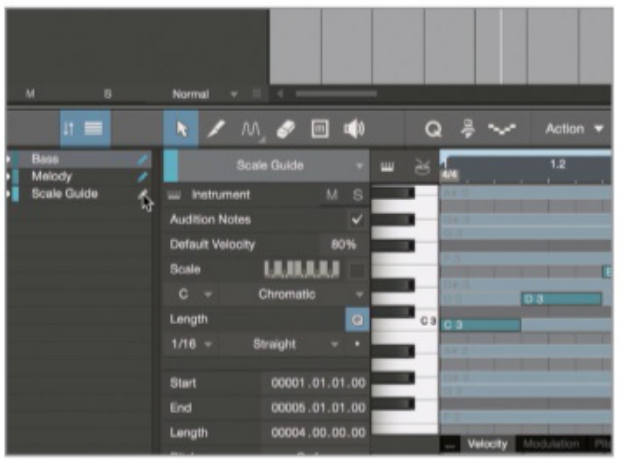


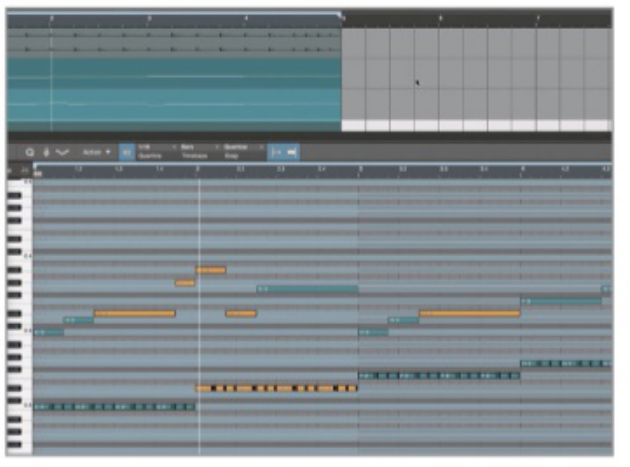


3 > C minor is trickier than C major as it uses a number of black keys. We've also got D/D♯ and G/G♯ in the same scale – a real no-no in proper music theory! If we use flats instead, we get C, D, E♭, F, G, A♭, B♭, giving a neat alphabetical run. Most music software uses only sharps, so don't get too hung up on this!

4 > Finally, here's another way to look at minor scales. Select the C minor scale stack, and move it down 3 semitones – the root note becomes A, making A minor. C major and A minor use the exact same notes (all the white keys), so if you know C major you know A minor – just start on A instead of C.

> Step by step 4. Rapidly reworking a tune from major to minor





1 > We're going to take the tune from our earlier major scale demo and alter it to use the minor scale, giving it a whole new feel. Follow step 1 of the earlier tutorial 2 to set up the plugins, then import **Bass.mid** and **Melody.mid** onto their respective tracks. This song is in C major, so let's use our MIDI Construction Kit to show us the notes for C minor.

2 > Create a new MIDI channel called Scale Guide, then import **C » Scales » C Major Stack.mid** onto it, extending the notes to fill four bars. We're going to use this to find which notes from our existing C major scale aren't in the C minor scale. In our DAW, Studio One 3, we can set things up so we can see – but not edit – the minor MIDI stack.

3 > The minor scale differs from the major scale in that the 3rd, 6th and 7th notes of the scale are flattened by one semitone. We need to find the notes that aren't on the C minor 'grid' of the Scale Guide track and drop them a semitone. Select all occurrences of notes **E**, **A** and **B**, and slide them down one semitone to hear our tune take on a less jolly and more serious feel.

Chord basics

So far we've looked at playing single-note melodies with a bassline underneath. Play a bunch of notes together, though, and you create rich musical textures: **chords**. The most basic chords are three-note **triads**, and they're dead easy to build.

First we need a scale – we're going to use C major, but it works in the same way for any other scale, including minor ones. Now we pick a root note for the chord, then alternately skip and pick notes until we have three of them. Numerically, the formula is **1-3-5**. So for the first chord in C, we'd pick these notes in bold: **C** D **E** F **G** A B. That gives **C-E-G**. The other triads in C major are: D-F-A, E-G-B, F-A-C, G-B-D, A-C-E, B-D-F. In total, that's seven chords, which we can number 1-7 for reference. The three notes of a triad are called root, third and fifth.

Now take a good look at the chords' intervals – see step 3 below. Chords 1 (**C-E-G**), 4 (**F-A-C**) and 5 (**G-B-D**) all have a major third as their first interval, which makes them '**major chords**'. We name them **C major**, **F major** and **G major** – or simply C, F and G.

These triads are the most common chords. Based on the major/minor scale, they can be built with an easy formula

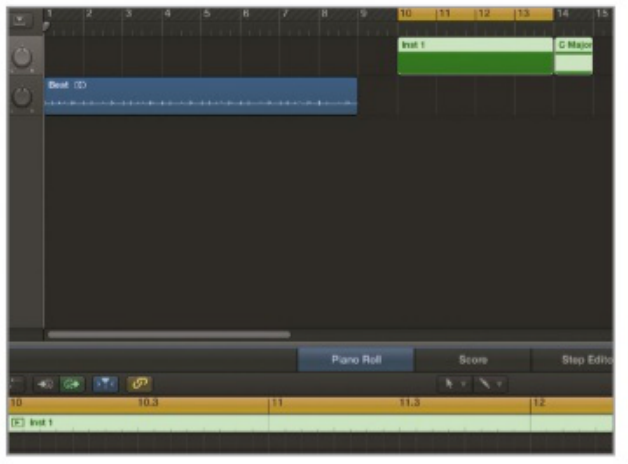
Chords 2 (**D-F-A**), 3 (**E-G-B**), and 6 (**A-C-E**) are minor chords – that's right, chords based on the major scale aren't necessarily major chords. We call these **D minor**, **E minor** and **A minor**, also known as Dm, Em and Am.

We can also use a formula based on semitones to create any major or minor chord. Major is root – major third – fifth, so **root-4-7**. Minor, on the other hand, is root – minor third – fifth: **root-3-7**.

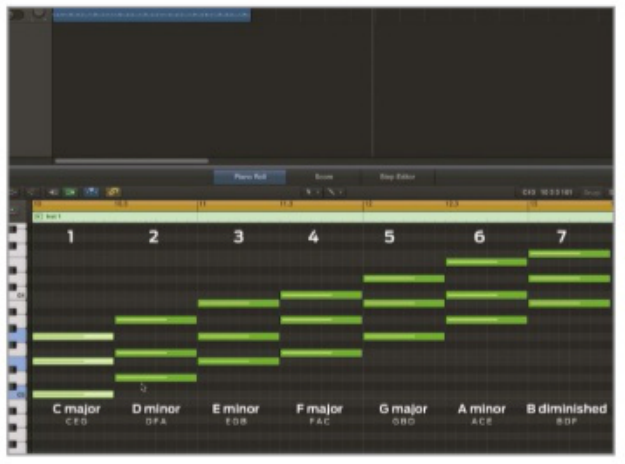
Chord 7 (**B-D-F**) is a bit different. It's made of two minor thirds stacked up, and it's called **B diminished**, or Bdim. Diminished chords are often used to create moments of tension that are 'resolved' to a more harmonious or 'stable' chord, such as chord 1. For the walkthrough below, we'll take you through it in video form.

> Step by step 5. Instant chord construction: major, minor and diminished triads

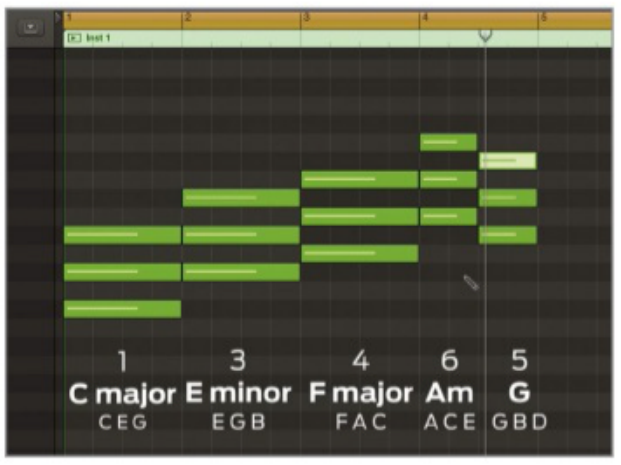
1 > Let's build the most basic chords, triads, and use them in a chord progression. Load Dune CM on a MIDI instrument track in your DAW, and select the **022: Earth Views RL** preset. Load **Beat.wav** on an audio track and set tempo to **100bpm**. We'll use our MIDI Construction Kit once again to guide us, this time showing you how it's done in Logic Pro X.



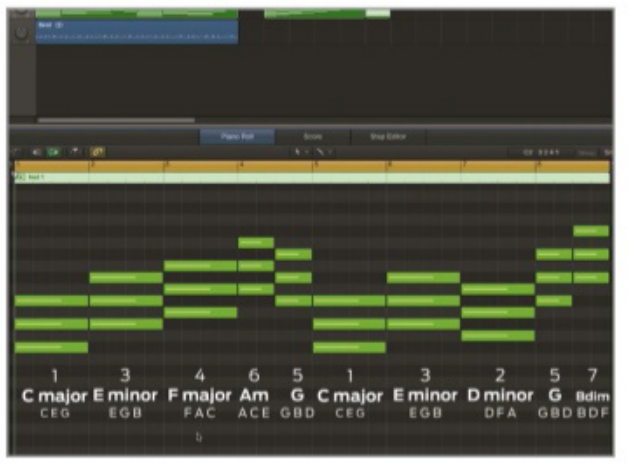
2 > On the Dune CM track, create a four-bar MIDI clip starting bar 10, loop it, then import **C > Scales > C Major - All notes.mid**, starting bar 14. Select both clips and double-click them to open the Piano Roll editor. You can now use the stack of notes as a visual guide, or click the **collapse mode icon** (just right of the View dropdown) to restrict programming to only the notes in the scale.



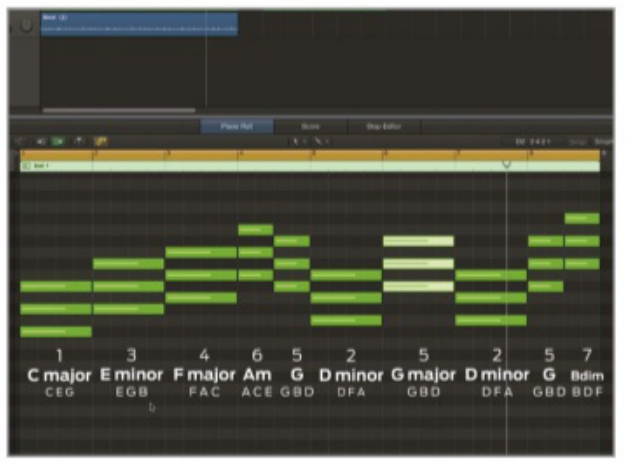
3 > To create triads, we use a simple 1-3-5 pattern. Draw in the first note of the scale on **C3**, then miss out the D, draw in the **E**, skip over the F, and draw in G. This gives us **C major: C-E-G**. Carry on up the scale and create the rest of the triads using this 1-3-5 pattern, and we get the other six C major triads: D major (**D-F-A**), E minor (**E-G-B**), F major (**F-A-C**), G major (**G-B-D**), A minor (**A-C-E**) and B diminished (**B-D-G**).



4 > Let's make an eight-bar chord sequence – create a new MIDI clip from bars 1-9, and loop it. For bars 1-3, program chords C, Em then F. We want a 'turnaround' in bar 4 to bring us back to chord 1, C, and a classic method is to use the 5th chord of the scale right before it – going from chord 5 to 1 is a very strong progression, and it's technically called a perfect cadence. So program chords **Am** and **G** during this bar.



5 > We've used all the triads except chord 2, Dm, and that pesky B diminished triad, chord 7, so let's try and work those in during bars 5-8. Program bars of C, Em, then Dm, then half-bars of G and Bdim to fill the final bar. The B in Bdim is called the leading note, and it has a strong 'pull' to resolve to the next semitone up, C, which is why it makes a good transition back to chord 1.



6 > Let's make our sequence less predictable. Going from chord 5 to chord 1 sounds super-strong – so strong, in fact, that if we *don't* go to chord 1, it will sound unexpected. Change bar 5's C chord to Dm, and bar 6's Em to G, so we get a 'back and forth' between chords 2 and 5, leading up to our 5-7-1 turnaround. Finally, load **CM Arp.fxp** patch in Dune CM for an arpeggiated take on our tune.

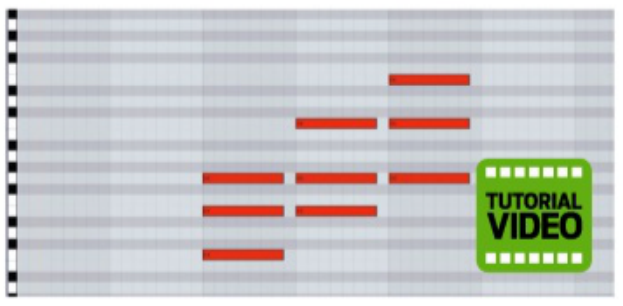
Six more chord tricks

Mastered major, minor and diminished chords? Tackle this lot next!

6. Smoother sequences with inverted chords

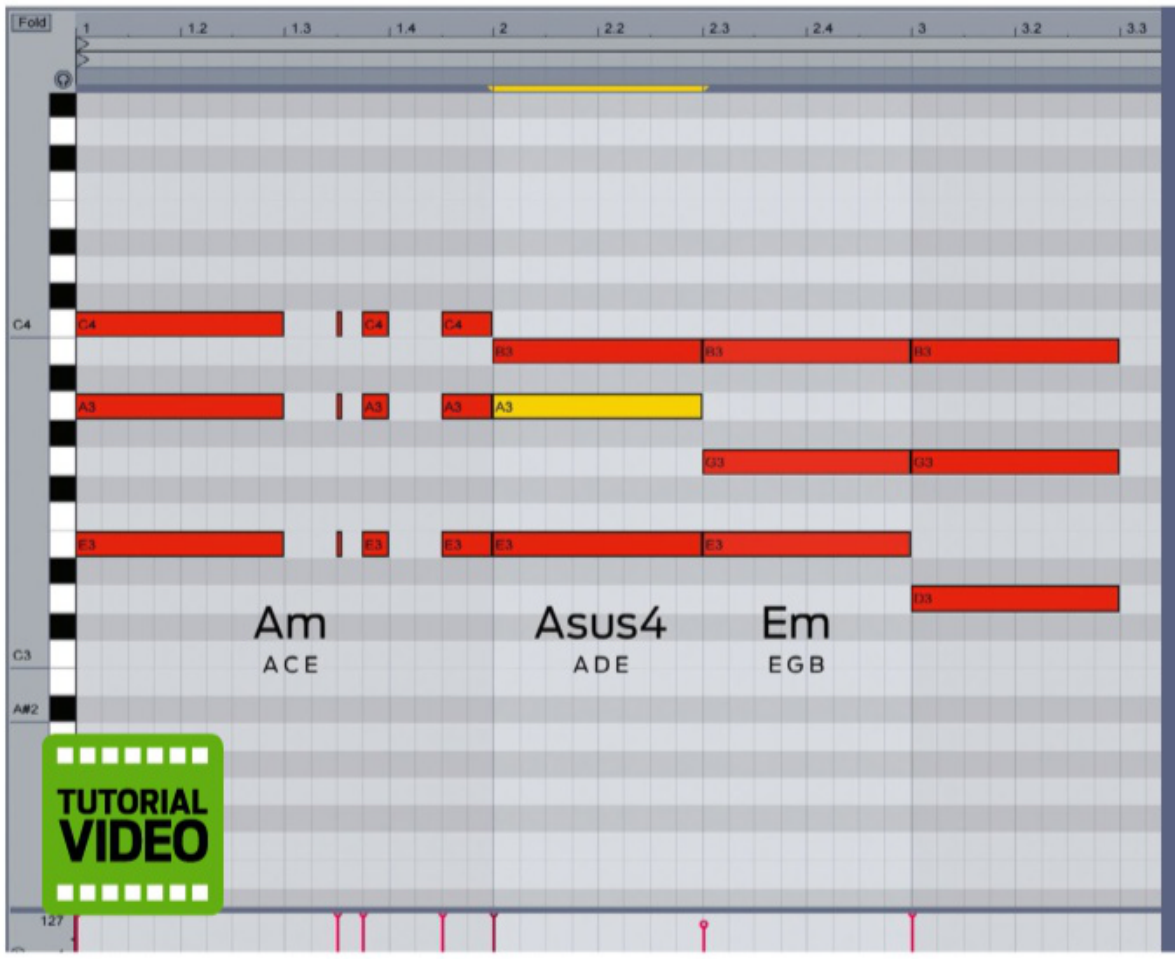
A normal C major chord is C-E-G, but you can easily change it to E-G-C, called the 'first inversion', or G-C-E, the 'second inversion' – the bass note has changed, but it's still the same chord, with the same root note, C. This can be used to create much smoother chord sequences. To try an example, create a 100BPM project and load **Beat.wav**; then use **Chords.mid** to trigger Bazille CM's **Computer Music » Joe Rossitter » Richmond Keys** preset.

This C minor progression uses basic non-inverted triads. Select the lower two notes of all chords in bar 1 and 3, then transpose them up one octave – most DAWs have a shortcut key for this, such as Shift-Up. Now hear how much smoother the progression is, since there's less movement from chord to chord. In the final bar, select all notes above (and including) D4, and drop those one octave for a cool descending chord progression. You may start to hear melodies in the chords' movement – there's one going on in ours, so duplicate the top note of each chord and place them one octave up, for an instant melody.



7. Borrowed chords

The occasional chord from a different scale – or key – can give your progressions an element of surprise. Borrowed chords are an easy way to achieve this, and they are simply chords taken from the parallel minor or major key. So if your sequence is in A minor, you would borrow chords from A major; if you're in D major, you'll take them from D minor, and so on. See our video for a practical example!



8. Transitions with suspended chords

Take a normal major or minor triad – it doesn't matter which – then move its third up to play a perfect fourth, and you have a suspended 4 chord, or sus4 – the formula in semitones is root-5-7. Because it lacks a third, the chord sounds neither major nor minor, with a spacey, ambiguous feel. It's often followed by the regular major or minor chord, creating a satisfying resolution.

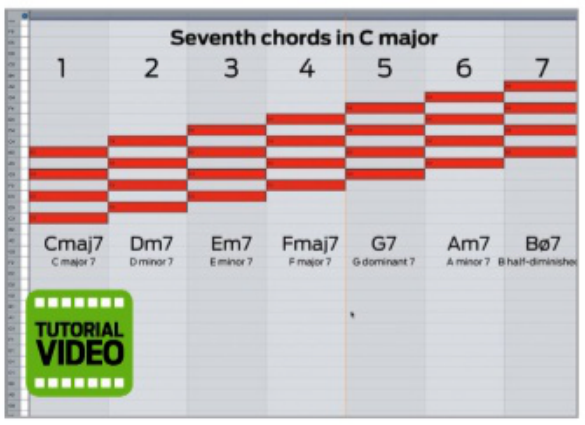
To go full classical, 'prepare' the suspension by preceding it with a chord that contains the suspended note. In our A minor example, we play Am (A-C-E), Esus4 (E-A-B), Em (E-G-B). A is the prepared note, shared by Am and Esus4, resolving to the G in Em.

Now, until you actually resolve the chord, nobody knows whether it's going to be major or minor, and you can add a surprise twist by resolving to a minor chord instead of a major, making it a borrowed chord. You can do it the other way around, of course, resolving to major where a minor is expected.

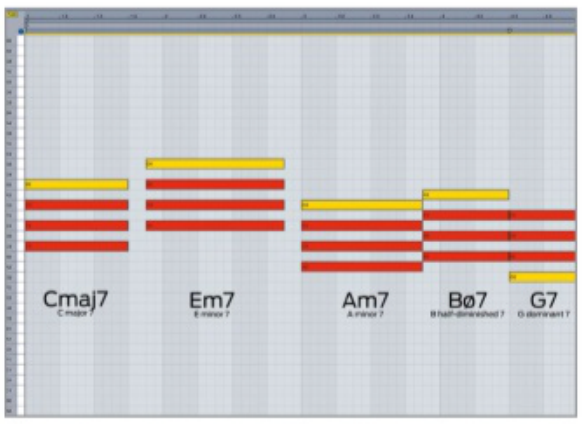
> Technique

9. Seventh chords

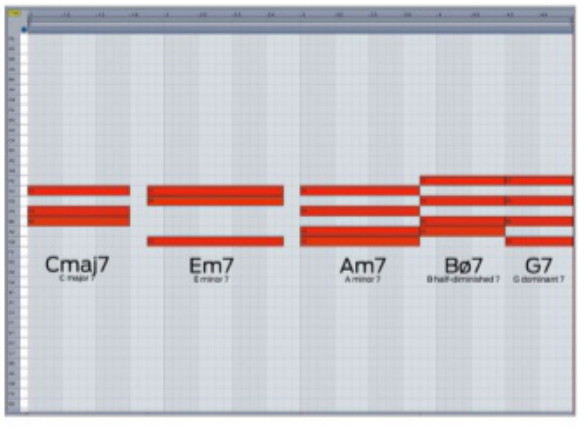
If it's jazzy sophistication and smouldering sensuality you're after, it's time you tried seventh chords



1 > Triads use the 1-3-5 formula, but if you continue stacking alternate notes, your next stop would be **1-3-5-7**, comprising a root, third, fifth and seventh. This makes a seventh chord, and shown are those built on the C major scale – we're using our scale template, so only notes in C are shown.



2 > **C major demo - Normal triad chords (chords).mid** is a triad sequence. To make sevenths, we extend the pattern of alternating notes, adding an extra note on top of each chord. For the final half-bar chord, add the note to the bottom instead, so we have two different chords in that bar. Our added notes are in yellow.



3 > Seventh chords can sound dense, but you can remove the fifth to slim them down. They can be inverted, too, for a smoother flow. Combine these tricks for sweet progressions, as in our finished sequence above. Our video goes into more detail on seventh chords and their type.

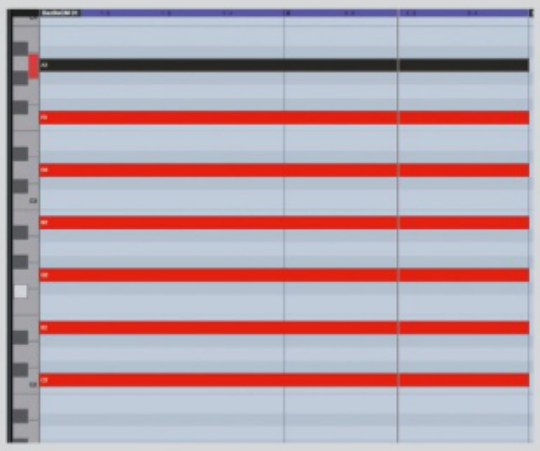
> Technique

10. Other extended chords

TUTORIAL VIDEO

Just as you can stack an extra third on top of a triad to add the seventh, you can keep piling thirds on top to introduce ninths, elevenths and thirteenths. We haven't discussed intervals this large yet, but they give us the same notes as a second, fourth and sixth, just one octave higher. On the right is C major 13: C-E-G-B-D-F-A.

If you just add on the ninth interval, without the seventh, you have an 'add 9' chord (which you'll read more about in the technique below.) See the video for more detail.



> Technique

11. Making 'add' chords in a snap

TUTORIAL VIDEO

You can create custom chords that aren't sevenths or extended chords by simply adding in extra notes, usually the 2nd, 4th or 6th. These chords are called add2, add4 and add6. There's also the add9 chord, which is the same as the add2 chord except the added note is an octave higher, rather than sitting right next to the root note. In our video and audio example, we first turn a C major chord into an add2 by adding its 2nd note, D... Then we transpose the added note to make add9. This works well to transition into the E minor 7 that follows, since that chord also contains a D.

Numeralogy

You may have seen chord sequences written using Roman numerals, rather than naming them (C, Em, etc) or numbering them the usual way. Chords 1-7 of the major scale would be written I ii iii IV V vi vii°, while for minor, we'd have i ii° III iv v VI VII. Upper case tells us it's a major chord; lower case is minor; the small circle means it's a diminished chord. The beauty of this method is that chord sequences aren't tied to a specific key, so progressions can be discussed and compared independently of the key the song was originally in. Musicians can also use this notation to play a given progression in any key. To avoid overloading you with jargon, we've stuck to plain old 1-7 in our tutorials, but it's good to know about this alternate method, and to give you a leg-up with the concept, we've added the numerals to the filenames of our Triads Chord Sets.

MAJOR

I ii iii IV V vi vii°

MINOR

i ii° III iv v VI VII

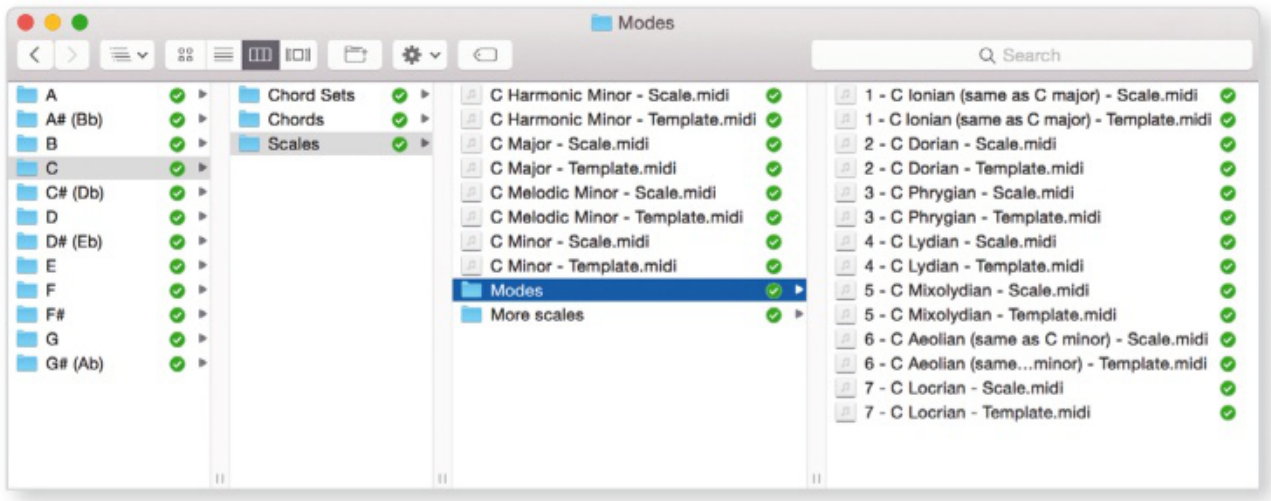
Chords cheat sheet

Music theory knowledge is awesome when you have it, but for many of us, recalling scale patterns and chord shapes can be a creative drag.

To keep your sessions flowing, we've created the CM MIDI Construction Kit, a massive pack of MIDI chords, scales and templates. Let's take a look at what's inside this amazing musical toolkit, and how you can use it to make better music now. You'll find it inside the **Tutorial Files** folder.

First, folders are arranged into the 12 musical keys (ie, root notes – we'll talk more about keys on the next page), and inside each is three folders. The **Chords** folder contains useful chords based on the root note, each sustained for a bar – just drag them into your DAW. Our 'cheat sheet' below also gives you a handy overview of common chords.

The Chord Sets folder contains the triads, sevenths, ninths, elevenths and thirteenths derived from the standard major and minor (ie, natural minor) scales. Where relevant, we've included an alternative scale set using a flat key signature. These use the same MIDI notes, just with different filenames.



Use the CM MIDI Construction Kit as your guide to the world of theory – there's a template for everything

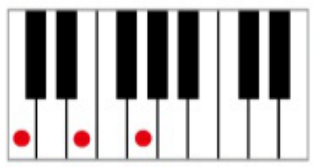
The **Scales** folder offers up four common scales: major, (natural) minor, melodic minor and harmonic minor. You also get all seven commonly used modes, and a range of other scales, from everyday to exotic. Every scale comes in two formats: a straightforward run up the scale so you can hear how it sounds, and our special 'template' format. These templates contain every note of the scale in every octave, sustained for one bar. They are for use as a guide only – avoid playing them as it won't sound pleasant! How you use these will depend on your DAW, but you'll find suggestions spread throughout our tutorials. There's also a handy text file in the MIDI Construction Kit folder with more specifics, as well as a video overview.

Stuck for a chord?

Try these! Here's a recap of some of the most commonly used chords. Intervals are given in a numerical format – you can assume they are the 'major' or 'perfect' varieties unless modified with a preceding flat, making them minor or diminished intervals

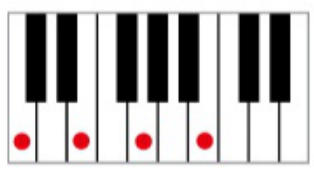
Major

Intervals Root-3-5
Semitones Root-4-7
Example naming C
Example chord
C-E-G



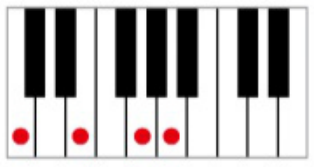
Major seventh

Intervals Root-3-5-7
Semitones Root-4-7-11
Example naming Cmaj7
Example chord
C-E-G-B



Add 6

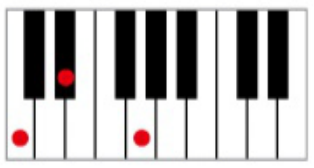
Intervals Root-3-5-6
Semitones Root-4-7-9
Example naming Cadd6
Example chord
C-E-G-A



A major chord with an added 6th, sometimes written as C6. You can also add the 6th to a minor chord, eg, Cm6 would be C-D♯-G-A (C-E♭-G-A)

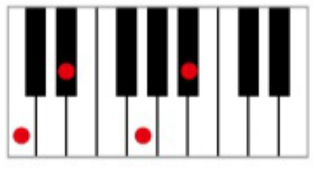
Minor

Intervals Root-♭3-5
Semitones Root-4-7
Example naming Cm
Example chord
C-E♭-G C-D#-G



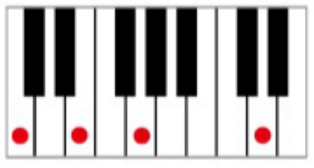
Minor seventh

Intervals Root-♭3-5-♭7
Semitones Root-4-7-11
Example naming Cm7
Example chord
C-E♭-G-B♭ C-D#-G-A#



Add 9

Intervals Root-3-5-9
Semitones Root-4-7-14
Example naming Cadd9
Example chord
C-E-G-D



The major ninth (D in our example chord) is a major second an octave higher. Without this transposition, you have an 'add 2' chord instead

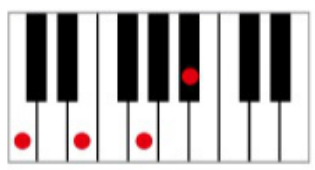
Suspended fourth

Intervals Root-4-5
Semitones Root-5-7
Example naming Csus4
Example chord
C-F-G

Has no third, so is neither major nor minor, giving a spacey, unresolved quality. Can be resolved using the expected major or minor chord (above)

Dominant seventh

Intervals Root-3-5-♭7
Semitones Root-4-7-10
Example naming C7
Example chord
C-E-G-B♭ C-E-G-A#



This chord occurs in the major scale by building a seventh on note 5 (eg, G7 in C major), and is a strong chord for transitioning back to chord 1

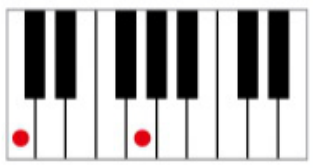
6/9

Intervals Root-4-5-6-9
Semitones Root-4-7-9-14
Example naming C6/9
Example chord
C-E-G-A-D

A major triad with an added 6th and 9th interval.
It's possible to leave the fifth out if things are getting too crowded

Power chord

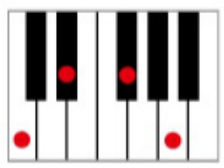
Intervals Root-5
Semitones Root-7
Example naming C5
Example chord
C-G



Just two notes, often repeated in higher octaves, this is the chord of rock and heavy metal. It has no third, so is neither major nor minor

Diminished seventh

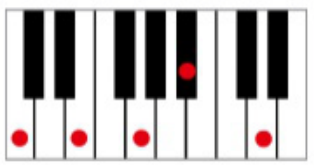
Intervals Root-♭3-♭5-𝄫7
Semitones Root-3-6-9
Example naming C°7
Example chord
C-E♭-G♭-B𝄫 C-D#-F#-A



Three minor thirds and two tritones make this disturbing chord the stuff of horror soundtracks – see tutorials 9 and 14 for examples of its use

Dominant ninth

Intervals Root-5-♭7-9
Semitones Root-4-7-10-14
Example naming C9
Example chord
C-E-G-B♭-D C-E-G-A#-D



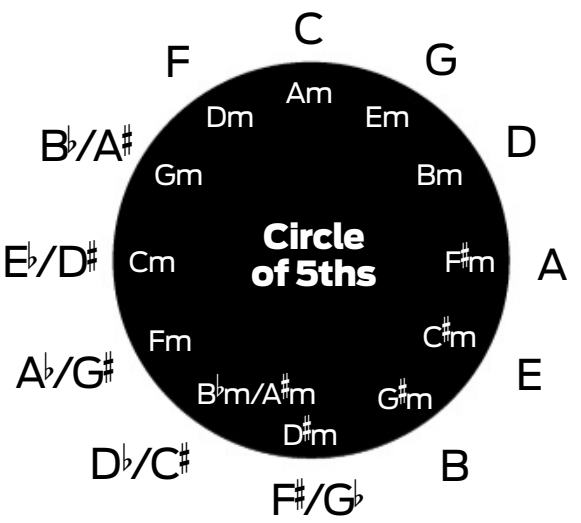
The fifth can be left out if the chord is too dense.
Like the seventh chord, this has major and minor varieties too

What are keys? What key am I in? Try the circle of fifths!

A key is just another way of saying what scale you're using. If your song is based on the C major scale, it's in the key of C major. But for every major scale, there's a relative minor with the same notes, so what's stopping the song being in the key of A minor? The difference is that in C major, C feels like the 'home' note or chord – called the '**tonal centre**'. The song will likely begin and end on this note/chord, and will return to it at the start of sections. A song in A minor will likewise build outwards and return to Am. These 'rules' are often broken, mind you.

Changing key mid-song can re-energise things or flip into an unexpected new part. This can be accomplished by taking a section, duplicating it, and transposing the copy. A one semitone shift in either direction, for example.

For a more considered approach, we can move to a destination key that shares notes



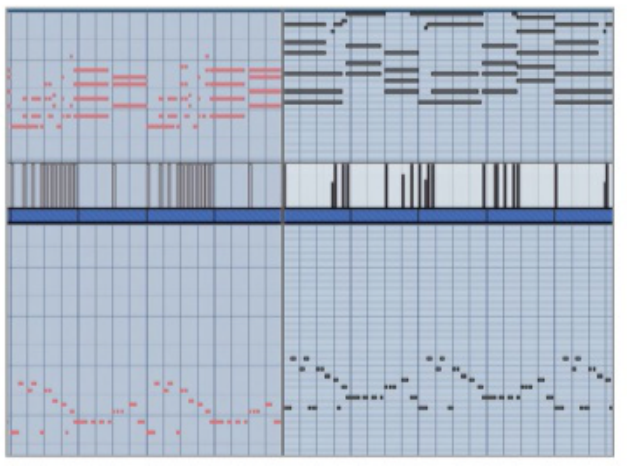
with the current one. For C major, the most similar keys/scales would be G major (uses F♯ instead of F), and F major (B♭/A♯ instead of B).

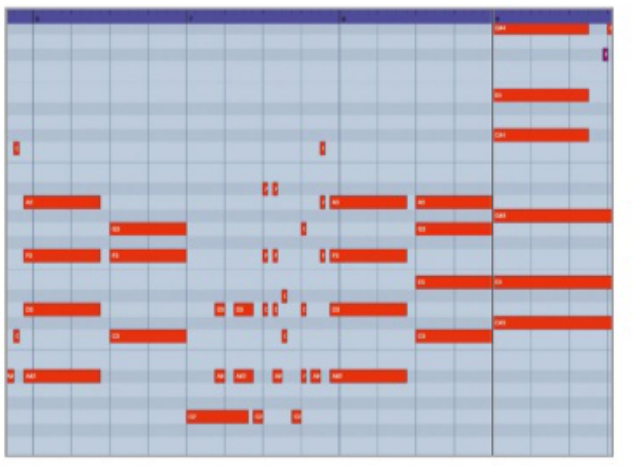
From C up to G is an ascending perfect fifth, and from C down to F a descending perfect fifth. Interesting! In fact, to find the 'closest' two scales to any major or minor scale, just go up or down a perfect fifth.

This results in the **Circle of Fifths**, a superb songwriting tool, which is shown in our diagram. Adjacent keys are most similar, and the further around the circle you go, the more disparate and unrelated they become. So, for C major, good choices for a key change would be F and G (+/- 7 semitones, a perfect fifth away), and going one more step in each direction, D and B♭/A♯ (+/- 2 semitones, a major second).

To transition from a major to minor key, or vice versa, we just use the relative minor/major relationship – minor keys are shown on the inside of the wheel. For more, see **cm**221's *Easy Guide* on the Circle of Fifths.

> Step by step 12. Key changes

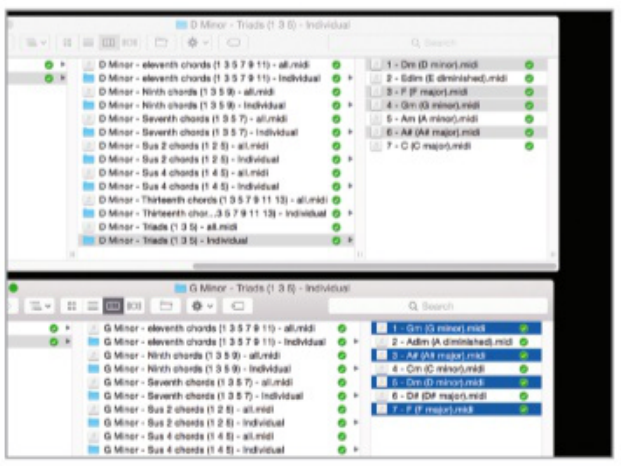


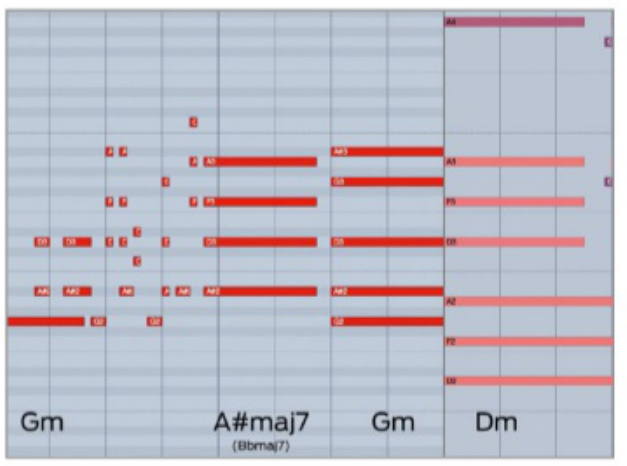


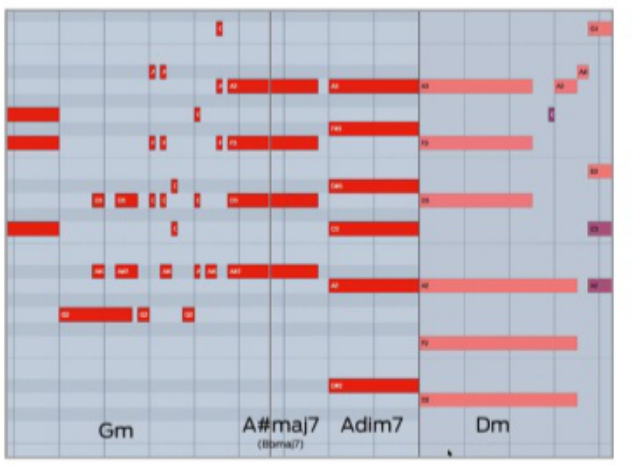
1 > Let's see how easy it can be to kick up the energy levels in a song with a key change. Import **Beat.wav** on an audio track in a 124bpm project, then import **Chords.mi**d onto a track with Bazille CM's **04 Poly » HS DXzille Piano** patch, and import **Bassline.mid** on a track with Dune CM's **010 Chorus Bass RL** preset. Pop a D16 Frontier limiter on the master bus, too.

2 > This tune is in the key of G minor, and the chords are Gm, A♯maj7 (B♭maj7), Csus4, Gm, A♯maj7, Cadd6. We'd like a key change at bar 9, when the solo comes in. Basic key changes can be achieved just by transposing entire sections, so let's try that first – cut the MIDI clips at bar 9, and transpose the entire section from bars 9-17 up and down for an unexpected shift, like our song is changing gear.

3 > Good settings to try are 1, 2, 5 and 7 semitones, either up or down. When you've tried it out, settle on -5 semitones, which puts the second half of our track into D minor. That's it – our key change is done! The transition between the two parts could be improved, though. Let's focus on the final chord of the first section, Cadd6. Solo the chords track so the bassline doesn't throw us off.







4 > Take a look at the triad Chord Sets for D minor and G minor in our MIDI Construction Kit – the triads shared by both keys are Dm, F, Gm and A♯, so these will make good transitional chords. Let's try them all. Dm is the first chord of the incoming riff anyway, so it has no real impact. F isn't bad, but let's keep going.

5 > A♯ is a continuation of the preceding A♯maj7, so it sounds like not much is happening. Finally, Gm works really well. In the key of D minor, Gm is chord 4, so it creates a transition from chord 4 to chord 1 (called a plagal cadence). Now unsolo the chords and transpose the bassline -5 semitones, which not only fits the chord but also echoes the actual bassline of the second part of the track.

6 > Another way to bridge keys is to use chord 5 of the incoming key – for Dm, that'd be **Am** (**A-C-E**). Now add the seventh, **G**, making Am7... then move the **C** up to **C♯**, giving A7, a dominant seventh, a classic choice for transitions. Next, move the **A** up to **A♯** for a diminished seventh... and transpose the whole chord **-1 semitone** to make Adim7. Don't be afraid to fool around with chords like this until you hit the spot!

Taking the mystery out of modes

Among many musicians, modes have a reputation as mysterious and hard to understand, but if you understand the major/minor relationship, then you're already halfway to understanding modes. You may even have used modes in your music without realising it. Our tutorial below lays it all out for you, but let's look at some examples you may have heard.

The first mode is **Ionian**, beginning on the first note of the major scale – yep, it *is* the major scale! Typically upbeat and positive in vibe, but it doesn't have to be – Adele's *Someone Like You* could hardly be described as a joy-fest, for example, but it's very much in A major.

The **Dorian** mode is similar to the good-old natural minor, except the sixth is major instead of minor, giving a melancholy sound. Probably the most famous example of a Dorian-based song is *Scarborough Fair*, and you can also hear it in Tears for Fears' *Mad World*, Chris Isaak's *Wicked Game*, and Daft Punk's *Get Lucky*.

Modes are used in many tracks you may know, so it's not hard to get a handle on their distinctive sounds

The **Phrygian** mode's first two notes are just a semitone apart. It has a distinctive flavour associated with Spanish music such as flamenco...but did you know that the *Knight Rider* theme tune is also in Phrygian?

Next, the ethereal and spacey **Lydian** mode. 80s guitar rock shred-heads loved to explore modes, and Joe Satriani noodled the heck out of this one on *Flying In A Blue Dream*.

The **Mixolydian** mode is like a major scale with a minor seventh – Guns 'n' Roses *Sweet Child o' Mine* uses it during the verses.

Aeolian is the natural minor scale by another name – you've heard this one plenty of times!

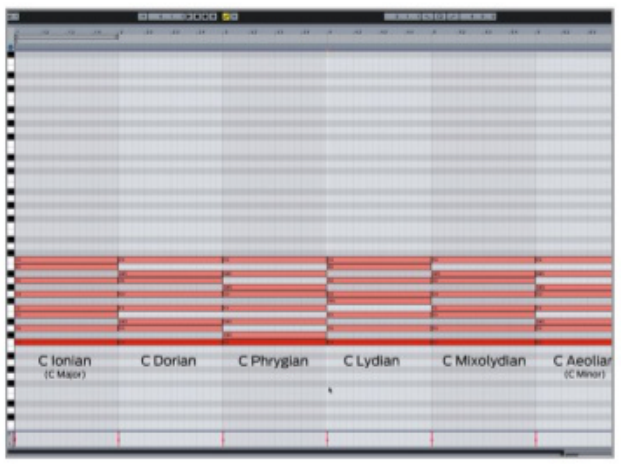
Locrian is the least-used mode of all, as it sounds kind of disconnected, tense and unresolved. This scale can be heard in the verses of Bjork's *Army of Me*, Judas Priest's *Painkiller*, and The Strokes' *Juicebox*, though most of these do not use all the notes in the scale.

> Step by step 13. Taking the mystery out of modes in a flash

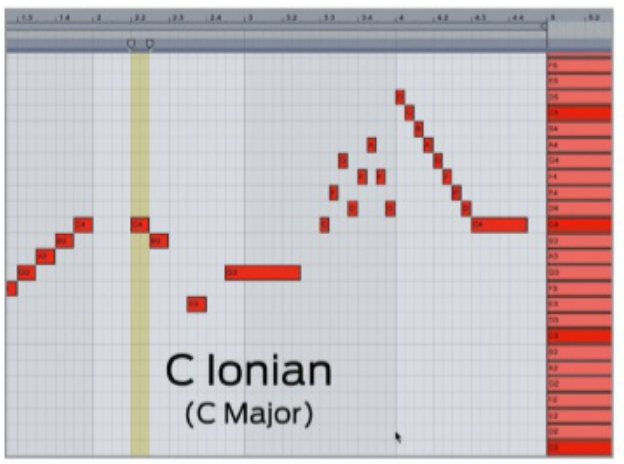
1 > We've focused on the basic major and minor scales so far, as they're the most commonly used. We also showed you how they're really the same scale, starting from a different note. Did you know that there are five more scales hiding inside the major shape, though? Let's uncover them! To get started, load Bazille CM and select the patch **03 Leads - AF AnaLead**.

2 > From the MIDI Construction Kit, import **C » Scales » C Major Template.midi**, placing it on bar 1. Delete all the notes below C3. Enable your DAW's note audition feature and click notes C3 to C4 to hear the C major scale. Now select all notes from A3 and upwards, and copy them to bar 6. Click notes A3 to A4 to hear the A minor scale – all we've done is change the starting note, but it has a different feel.

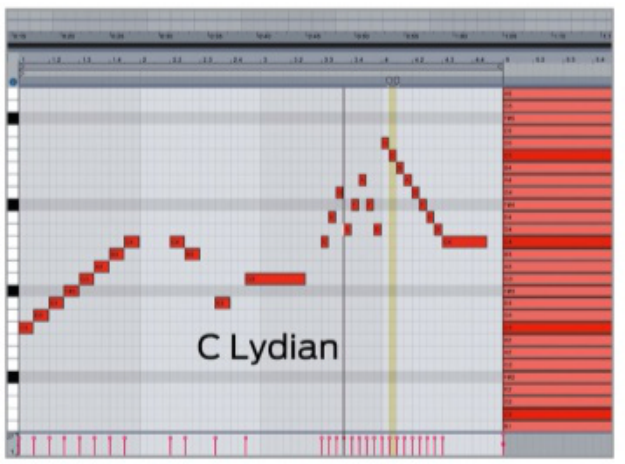
3 > So what if we create scales starting on the *other* five notes of C major? Well, that's what modes are! From the stack of C major notes, copy notes D3-D4 to bar 2, E3-E4 to bar 3, F3-F4 to bar 4, G3-G4 to bar 5, and B3-B4 to bar 6. We've now created the scales **C Ionian**, **D Dorian**, **E Phrygian**, **F Lydian**, **G Mixolydian**, **A Aeolian**, and **B Locrian**. Ionian and Aeolian are simply the major and (natural) minor scales.



4 > Click through the notes of each mode in order to hear these new scales. Let's put them all into the same key, C. Select and slide each stack of notes down so it starts on C. We can now see their interval patterns side by side. Everything we've showed you about scales and chords so far can be applied to these five new scales. And our MIDI Construction Kit contains scale templates for all modes in every key.

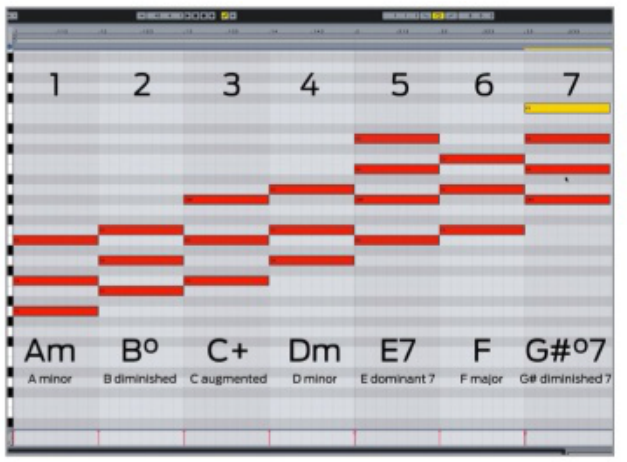


5 > Now let's hear how they sound – import **Drone.wav** onto an audio track, set tempo to 100bpm, and loop it. This loop features only one note, C, so we can hear how the modes sound against it. Either program your own patterns using the scale templates, or load our demo MIDI files from the **Tutorial Files** folder. C Ionian is the upbeat major sound we've already covered.



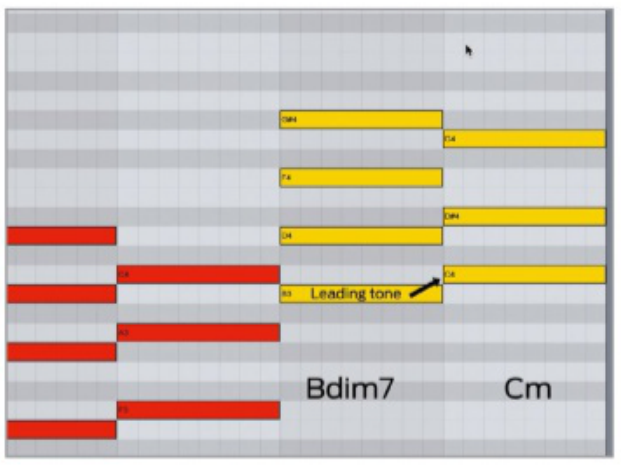
6 > Dorian is similar to the minor scale but has a bit of a jazz/blues feel going on with the major instead of minor 6th. Phrygian is often associated with Spanish music. Lydian has an unresolved, dreamy character. Mixolydian appears in rock and blues a lot. Aeolian is the good-old natural minor scale. Locrian has a dark, unresolved quality and is probably the least used mode.

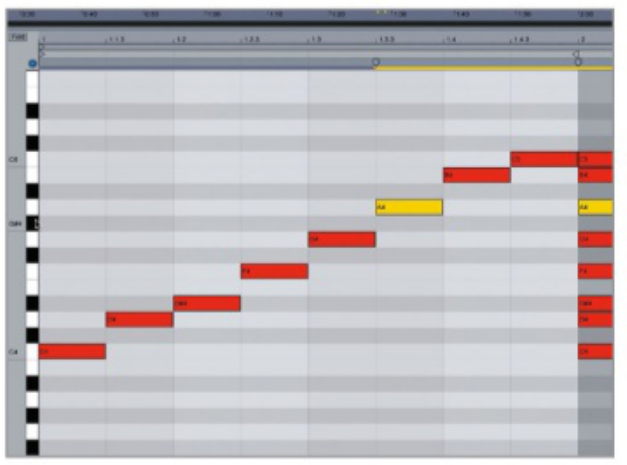
> Step by step 14. Natural, melodic and harmonic minor scales



1 > There are actually three types of minor scale: natural, harmonic and melodic. The **natural minor** is the standard, widely used minor scale we've stuck to so far. By sharpening the seventh, we create the **harmonic minor** scale – as shown. This scale has the pattern **Root-2-1-2-2-1-3**. That 3-semitone leap gives it a recognisable sound with a serious neoclassical vibe.

2 > The harmonic minor scale has some highly useful properties when we build chords on it. Chord 5 becomes major instead of minor, and can be extended to a dominant seventh chord. By building further on note 7 of the scale, we get a diminished seventh, an excellent chord for transitions, rooted on the leading tone so that it leads back, or 'resolves' to chord 1.





3 > In A harmonic minor, chord 7 of the scale would be **G♯dim7**. But if you invert it, it becomes identical to **Bdim7**, **Ddim7** and **Fdim7**. These four share the same notes and are basically the same chord. So you can consider any note of the chord as a leading tone to take you not just to Am, but to Cm, D♯m or F♯m.

4 > Melodic minor is like harmonic minor but with the sixth note sharpened too, getting rid of the 3-semitone step which is sometimes undesirable. Classically, the melodic minor scale was used when ascending, and the regular natural minor for descending, but in modern music the scale may be used for both directions.

Chord considerations

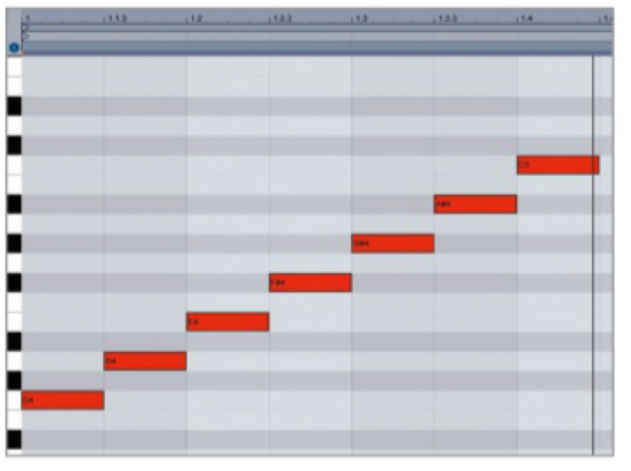
Figuring out which chords to use with exotic scales can be tricky, but there are plenty of approaches to ease the pain.

First, when using a minor key, you don't have to choose between natural, harmonic and melodic then stick with it. For example, when writing in natural minor, harmonic minor's dominant 7 on chord 5 and diminished 7 on chord 7 can be borrowed as needed. Check out our earlier tutorial video number 9 at 0:40 – we did exactly this to smooth our progression.

For more obscure scales where the chords are giving you headaches, there's a simple solution: forget chords! You can create plenty of movement with a monophonic bassline, for example. A slight step up from there would be power chords, which use just a root and fifth. Rock and metal guitarists have got tons of mileage out of weird scales by shredding them over power chords or repetitive riffs that don't have a particularly strong tonality to begin with. Check out Meshuggah for one of the most extreme examples of this approach – guitarist Fredrik Thordendal often lays down melodically complex solos over riffs comprising one or two notes. The solo (3:15) in *Vanished*, from 1995's *Destroy Erase Improve*, is a great example.

Finally, a little dissonance never hurt anyone, and sometimes a scale and chord combination that theoretically shouldn't work actually sounds great in context.
Try it and see!

> Step by step 15. Pentatonic scales and beyond



1 > Pentatonic scales, as the name suggests, use only five notes per octave. The **major pentatonic** is the major scale with the fourth and seventh notes missed out. So in C, we leave out F and B, giving us the scale **C D E G A**, shown here. The **minor pentatonic** is the natural minor scale without the second and sixth notes – **A C D E G**.

2 > Add a note to the minor pentatonic, between the fourth and fifth, to create the **six-note blues scale**, shown above. Add a note between the second and third of the major pentatonic for the less-used major equivalent. Theses scales are great for riffs, melodies and solos, and with fewer notes to clash, they're easy to work over progressions.

3 > There are lots more scales to explore. **Phrygian Dominant** is a mode of Harmonic minor, and so has a similar feel. The **Whole Tone** scale, shown, is made up entirely of 2-semitone steps, and has a real spaced out vibe. **Hirajoshi** is adapted from Japanese koto music – it's got five notes, making it a pentatonic scale. These scales and more are in our MIDI Construction Kit.

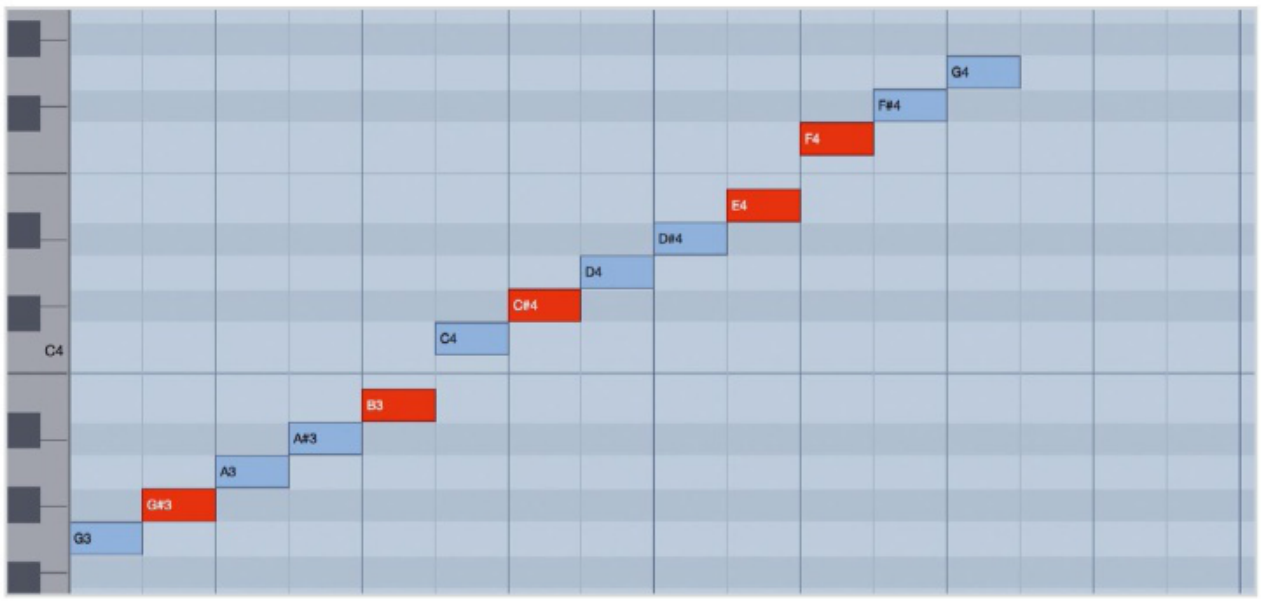
Scales cheat sheet

By this point, you may be struggling to keep up with the multitude of scale patterns – they certainly *look* similar, even if they don't sound it. To help you keep a lid on it, we've put together a cheat sheet of scales. And remember, our MIDI Construction Kit is rammed with scale templates in every possible key. If you're still unsure how to use them, here's some concrete advice.

In Ableton Live, copy the template's stack of notes so it lies just outside your MIDI clip's play/loop markers. Use it as a visual guide or enable Fold to restrict the piano roll to notes in the scale.

Logic Pro X works similarly: place the template MIDI clip alongside the one you're working on, and select both clips to view them in the Piano Roll. Click Collapse Mode to restrict programming to the scale's notes.

In Bitwig Studio, you have a few options. If using single-clip edit mode, paste the template outside of the clip's playable range. For multi-clip edit, paste the template into a separate clip outside your loop points. Drum Editing mode restricts programming to notes of the scale. Another method is to place the clip on a track with no instrument loaded, then enable Multi-Layer editing and lock that track. The notes will show as a visual underlay.



Cubase's scale guide, here highlighting the notes of G harmonic minor in blue – the red notes are out of key!

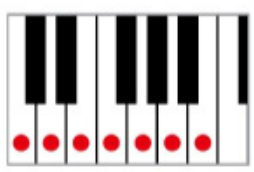
For Studio One 3, load the template on a MIDI track with no instrument, then click Track List (four horizontal lines). Enable the leftmost Show (circle) icon for the template track and those you want to edit. Disable the Edit (pencil) option for the template, and it'll show only as a guide.

Cubase users can load the template alongside the MIDI they want to edit as a guide, again, ensuring it's outside of loop points; but Cubase has its own scale guide feature – to use it, add a Chord Track, disable Automatic Scales (in the Inspector), click Show Scales (on the track), add a scale event and choose a scale. Now set the colouring mode in the Piano Roll to Chord Track, and notes within the scale will be blue, while those outside it are red.

Find a scale in a flash

All the scales from our tutorials in one handy place! We also give you the scale example in sharps too, for easy transferrance to your piano roll. Alternatively, find all these scales in MIDI format in every key in our MIDI Construction Kit!

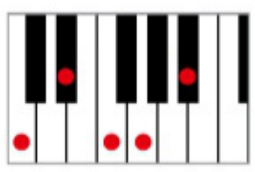
Major (aka Ionian mode)



Pattern 2-2-1-2-2-2-1
Intervals Root-2-3-4-5-6-7
Example C D E F G A B

The most fundamental scale; music theory is centred around it. Sounds upbeat/happy, with its major third, four semitones from the root

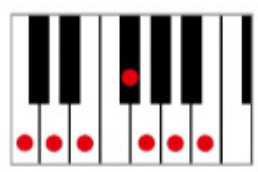
Pentatonic minor



Pattern 3-2-2-3-2
Intervals Root-♭3-4-5-♭7
Example C E♭ F G B♭

Like natural minor minus the 2nd and 6th notes. A major equivalent can be created by leaving the 4th and 7th out of the major scale

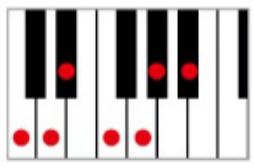
Lydian mode



Pattern 2-2-2-1-2-2-1
Intervals Root-2-3-♯4-5-6-7
Example C D E F♯ G A B

The major scale's fourth mode – start C major on F to get it easily. The raised fourth gives the Lydian mode a really dreamy, ethereal feel

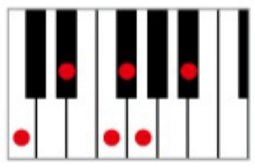
Natural minor (aka Aeolian mode)



Pattern 2-1-2-2-1-2-2
Intervals Root-2-♭3-4-5-♭6-♭7
Example C D E♭ F G A♭ B♭

Of the three types of minor scale, this is the most common. The sounds is sad/downbeat with the minor third, three semitones from the root

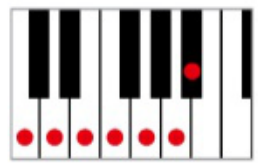
Blues scale



Pattern 3-2-1-1-3-2
Intervals Root-♭3-4-♭5-5-♭7
Example C E♭ F G♭ G B♭

The pentatonic minor with an extra note added in. It's used in blues music, but it's great for rockin' solos and melodies of all kinds

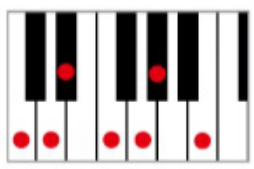
Mixolydian



Pattern 2-2-1-2-2-1-2
Intervals Root-2-3-4-5-6-♭7
Example C D E F G A B♭

The fifth mode of the major scale isn't far removed – the Mixolydian mode is just like the major scale but with a minor seventh. Very useful

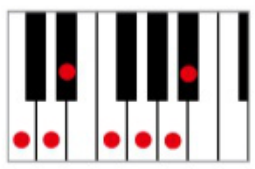
Harmonic minor



Pattern 2-1-2-2-1-3-1
Intervals Root-2-♭3-4-5-♭6-7
Example C D E♭ F G A♭ B

The same as the natural minor, but with the seventh note moved up one semitone. Sounds neoclassical, Baroque or faux Egyptian/Middle Eastern

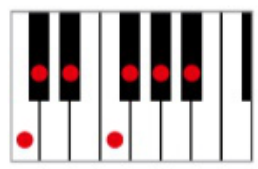
Dorian mode



Pattern 2-1-2-2-2-1-2
Intervals Root-2-♭3-4-5-6-♭7
Example C D E♭ F G A B♭

The second mode of the major scale. Similar to natural minor, but with a major sixth. Note its symmetrical pattern of intervals

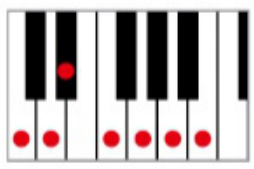
Locrian mode



Pattern 1-2-2-1-2-2-2
Intervals Root-♭2-♭3-4-♭5-♭6-♭7
Example C D♭ E♭ F G♭ A♭ B♭

You can play C major starting on B to create B Locrian. It's the least used mode, with the diminished fifth giving it an unresolved feel

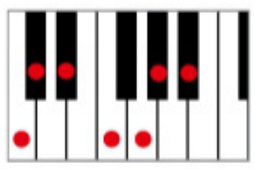
Melodic minor



Pattern 2-1-2-2-2-2-1
Intervals Root-2-♭3-4-5-6-7
Example C D E♭ F G A B

Also known as jazz minor, it's like the bottom half of natural minor with the top half of the major scale

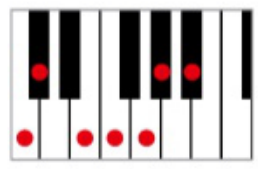
Phrygian mode



Pattern 1-2-2-2-1-2-2
Intervals Root-♭2-♭3-4-5-♭6-♭7
Example C D♭ E♭ F G A♭ B♭

The third mode of the major scale. The one-semitone interval between the first and second notes gives it a dark vibe

Phrygian Dominant



Pattern 1-3-1-2-1-2-2
Intervals Root-♭2-3-4-5-♭6-♭7
Example C D♭ E F G A♭ B♭

Similar to Phrygian but with a sharpened third note. Playing harmonic minor from its fifth note will give you this shape – dark and exotic

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9 pieces of fast theory advice

A bunch more theory tips to put into practice the next time you're looking for a boost of musical inspiration

Try out your synth's chord memory function – if it's got one – to give yourself some quick one-finger action

01 HARDCORE MEMORIES

If scale modes are scary, then chord modes must be truly trouser-soiling stuff, right? Thankfully not – chord mode or memory is the name of a classic synth feature where a chord is triggered with one key. In traditional implementations, the chord is simply transposed up and down, so it doesn't stay diatonic (in key). However, it's a sound that's featured in countless dance and rave tracks, proving that music theory rules are there for the breaking! To achieve it, use a synth with a chord memory (eg, AudioRealism's Redominator), duplicate or transpose a MIDI chord (there's tons in our MIDI Construction Kit!), or use a chord sample in a sampler.

Instant compositional results from artificial intelligence

02 CHORD PROCESSING UNITS

Building chords and using scales can seem more like a brutal maths exercise at times – so why not get your computer to do the hard work? This month's B-Step CM plugin, for example, makes it easy to try riffs based on chord sequences. Xfer Records' Cthulhu is another fine option for exploring progressions. Cubase's Chord Track and Chord Assistant can even tell you what chords ought to come next! Ableton Live isn't quite that smart, but its MIDI Effects make it easy to stay in key and generate instant chords. Many other DAWs feature similar MIDI plugins. Other software, like Autotheory and AutoTonic, sits between your MIDI keyboard and DAW to keep your noodlings strickly diatonic. RapidComposer, Cognitone Synfire and WaveDNA Liquid Music can even help with the composition process.

03 JUST THE TONIC

To keep things nice 'n' easy, we've referred to the notes and chords of a scale as numbers 1-7. We mentioned the Roman numeral naming system a while back, too. but guess what? There's yet *another* bunch of terminology for referring to notes – aka degrees – of a scale, and the chords built on them. For a major scale, they are Tonic, Supertonic, Mediant, Subdominant, Dominant, Submediant and Leading Tone. The minor scale uses Subtonic instead of Leading Tone. Cryptic or what?! A discussion of these names is beyond the scope of this feature, but in short, they tell you how the degree functions in a progression. The Dominant (5th), is so named because it's the second most important besides the Tonic (1st), while the Leading Tone (7th) leads nicely back to the Tonic (1st). If you recall, we touched upon these 5-to-1 and 7-to-1 transitions in earlier tutorials.

04 WORLD'S STRONGEST EARS

Knowing how to lift weights and what to eat for optimal strength won't make you strong, and it's the same deal with music theory: you need to put it into *practice* and train your ear for the best results. As an exercise, try recreating a favourite song in your DAW – see how close you can get the notes and chords. Or render out notes, intervals, scales and chords as MP3s, then put them in playlists on shuffle. Try to identify or match them on your MIDI keyboard. Don't expect to identify specific notes by ear, though – that's perfect pitch, and it's very rare, so don't sweat it!

05 RIP UP THE RULEBOOK

One of the absolute best things you can do with music theory knowledge is... to forget all about it! Yep, ditch all the rules and regulations and just get on with making music. With even a basic understanding of theory, you'll find that things come together more naturally, even if you're not thinking about specific chords and scales while writing. And when you do get stuck? Or can't quite get that melody to gel with the chords? *That's* when you apply music theory, to get the creative process rolling again. Finally, don't be afraid to do something that – perhaps very deliberately – goes totally against everything you've learnt in this guide. After all, music would never have evolved if composers had stuck to pre-established rules.

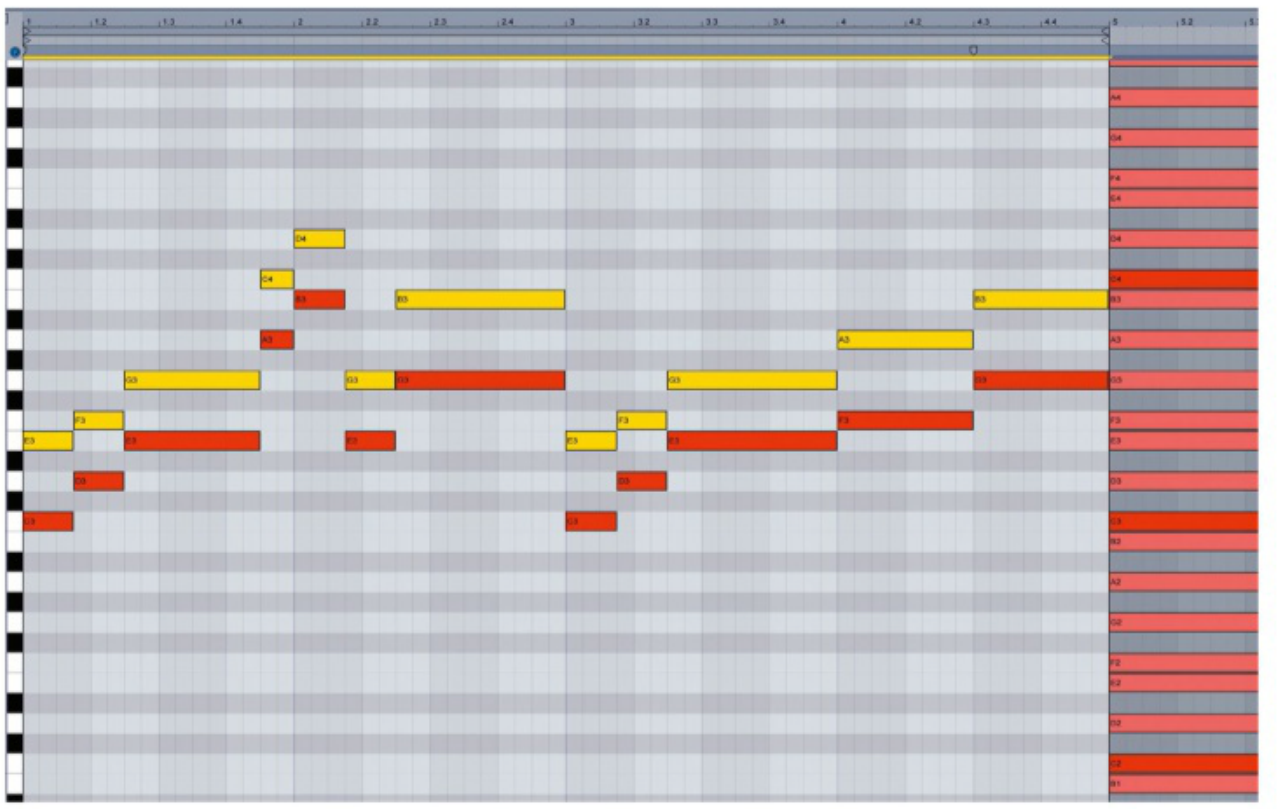
06 MIXED MODES

When you first get familiar with modes and scales, you may feel the urge to stay locked into the "right" notes for the whole song, to maximise the effect. After all, any deviation could leave you in a sort of musical no-man's land that's neither one scale nor the other! Couldn't it...? Nah, not really – songwriters move between modes and scales all the time. This can either be done in a 'passing' sense, such as brief connecting chords or notes (semitone steps work well). Or it could be as extreme as writing a melody that outlines a new key with each chord. Don't be afraid to take off the harmonic stabilisers and wander into a different scale if it feels right.

07 KEY DECISIONS

No one key is musically superior, but there are reasons for choosing one over another. First, some musical instruments are easier to play in certain keys. And some can *only* play specific keys, such as a harmonica or harp. Vocalists may find a given song easier to sing if it's transposed to a higher or lower key, to move it into their comfortable range.

Electronic musicians don't have playability worries, but the key used will determine the frequencies of the main notes in a song. Many dance tracks are in keys F to A (major or minor), so that when the bass plays the first note of the scale, it's in the optimal sub bass range, 45-55Hz.



Here's the C major melody from way back in tutorial 2, harmonised in thirds – the harmony notes are in yellow

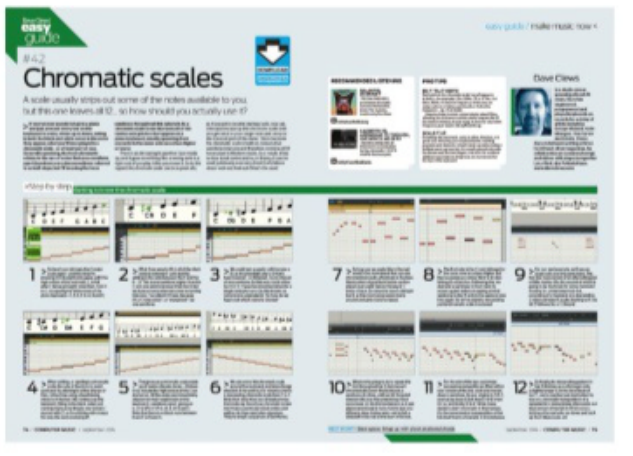
08 INSTANT HARMONIES

Want to create a harmony for your lead line? A simple approach is to duplicate the line and move it up or down a perfect fifth or perfect fourth. This basically ensures a diatonic (that means 'in key') result. The only exceptions would be things like adding a perfect fifth on top of the 7th note in a major key, which should be a diminished fifth. In practice, though, it's often either left as-is, moved to a different in-key note, or avoided altogether. For even sweeter harmonies, stack in thirds instead. It's just like building notes into triads, but using a Root-3 formula rather than Root-3-5. Make sure the harmony notes are in key – you'll end up with a mixture of minor and major third intervals. Our scale templates can help here!

Singer straining to hit the highest or lowest notes? Try transposing the music to another key until they can

09 EASY DOES IT

Our fast guide only scratches the surface of music theory, but we hope it's given you a taste for juicy chords, progression tricks and wild scales. When you're ready to broaden your knowledge, our famous *Easy Guide* series is your next stop. Every edition is packed with wise words, expert video and groan-worthy puns from **cm**'s resident keyboard wizard Dave Clews. And with over 40 episodes stretching right back to **cm**192, and a new edition every month, you'd be mad not to fill in your back issues collection and subscribe right away to avoid missing out on this essential material!



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Jargon guide

Music theory's tricky enough without the lexicon – get your head around the lingo with our quick dictionary

ASCENDING
Rising in pitch, or going up the piano keyboard from left to right

CADENCE
A short sequence of notes or chords at the end of a musical phrase

CHORD
More than one note is played at the same time

CIRCLE OF FIFTHS
A diagram charting the relationship between the twelve notes/keys in the chromatic scale

DESCENDING
Falling in pitch, or going down the piano keyboard from right to left

DIMINISHED FIFTH
An interval of a perfect fifth flattened by one semitone, eg C-G♭ or A-E♭

DOMINANT
The fifth note of a scale, an interval of a perfect fifth above the tonic. Also, a chord built on this fifth note

EXTENDED
Extended chords contain extra notes added from further up the keyboard. A major ninth chord, for instance, contains root, third, fifth, seventh and ninth

FLAT
Determines that a note should be one semitone lower in pitch

HARMONIC INTERVAL
Notes of different pitches played together at the same time, as opposed to one after the other

HARMONY
A tune that complements a melody when played at the same time. Also refers to the relationship between a series of chords

INTERVAL
The difference between two note pitches. Intervals are named according to the number of letter names they span, eg from C to D is a second, C to F is a fourth, etc

INVERSION
The order of notes in a chord is changed. A first inversion would see the root shifted up an octave to the top of a chord

KEY
The scale on which a piece of music is based. The key takes its name from the tonic, or first note of this scale

MAJOR SCALE
The most common scale in Western music. A series of eight notes with a set pattern of intervals: 2-2-1-2-2-2-1

MAJOR SECOND
An interval of two semitones between two different notes. For example, C to D is a major second interval

MAJOR SEVENTH
The interval between the root note and the seventh note (or 'degree') of a major scale. Equivalent to eleven semitones

MAJOR SIXTH
An interval of nine semitones between two different notes. C to A, for example

MAJOR THIRD
An interval of four semitones between two different notes. Examples include C to E, G to B, D♯ to F

MELODIC INTERVAL
When two notes of different pitches are played one after the other – in other words, a two-note melody

MELODY
A sequence of notes played one after the other to produce a tune

MINOR SCALE
The sad-sounding sequence of notes you get when you play a major scale from the sixth note upwards.

MINOR SECOND
An interval of one semitone between two notes. For example, C to D♭ is a minor second interval

MINOR THIRD
An interval of three semitones between two different notes. For example, C to E♭ is a minor third interval, as is G to B♭

MINOR SEVENTH
The interval between the root note and the flattened seventh note (or 'degree') of a major scale. Equivalent to ten semitones

MINOR SIXTH
An interval of eight semitones between two different notes. For example, C to A♭ is a minor sixth interval

MODE
A type of scale built by starting another scale from a note other than its root

OCTAVE
An interval of twelve semitones, at which the two notes have the same 'quality', just one higher and one lower

ROOT
The lowest note of a chord or scale. C is the root note of a C major chord and of the C major scale.

ROOTLESS VOICING
When an extended chord is played with the root note missing. Used a lot in jazz and gospel music

SCALE
A sequence of notes going up or down the keyboard with a particular pattern of intervals between them

SECONDARY DOMINANT
The name given to a chord based on the fifth, or dominant, note of any key or scale other than the tonic key

SEMITONE
The smallest interval in a chromatic scale, or the distance between any two notes on the piano keyboard

SEVENTH
A four-note chord formed by adding the seventh note of the scale to a triad that already contains a root, third and fifth

SHARP
Raised in pitch by one semitone. We've tried to stick to sharps instead of flats in our tutorials, in keeping with MIDI standards

TONE
Short for 'whole tone', an interval of two semitones

TONIC
The first note, or 'root' note, of a scale

TRANSPOSE
To shift a piece of music, note or chord up or down in pitch by a certain number of semitones

TRIAD
A chord made up of three notes. A major triad contains a root, a major third and a perfect fifth

UNISON
An interval that's not an interval – in other words, the interval of zero semitones, the same note played twice. **cm**

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> When it comes to making music with your computer, the keyboard is surely the number one choice for capturing MIDI data. Sure, you can program notes in one at a time in step input mode, or paint them into your DAW's piano roll editor using a brush tool, but for getting your musical ideas out of your head and into the computer quickly and efficiently, there's no question that the keyboard (in the ubiquitous form of the MIDI keyboard controller) is the ultimate weapon of choice.

Besides which, playing keyboards is just an incredibly fun thing to do. So, if you really want to take proper control of your DAW, we reckon it makes sense to get acquainted with it at least to the point of being able to play in simple riffs, chords and melodies. Over the next few pages, then, we've put together a complete beginner's guide to the keyboard. You'll find advice on what to look for when buying your first keyboard, some pointers on basic technique, a few exercises to get you started and increase your overall dexterity, lots of useful information about chords and scales, how to optimise your synth presets for control over particular performance parameters, and how to get to grips with all those mysterious knobs and buttons that you'll find on the average MIDI controller keyboard.

Just like with the guitar, there are many different techniques that can be adopted depending on the kind of keyboard instrument or part you're dealing with. Playing a synth solo uses a very different skillset to performing a classical piano piece, for example, and effective clavinet and organ parts all require their own specific version of the basic piano technique.

Add in extra controls and considerations like sustain pedals, pitchbend and modulation wheels, and you have a fair variety of different skills to get to grips with. So if you've ever wanted to conquer the keyboard and become the next Jools Holland or Alicia Keys, but not really known where to start, you've come to the right place!

Key moments in keyboard history

The earliest known piece of music written for keyboard dates from around 1360, about the time that the first keyboard instruments – the clavichord and the harpsichord – began to appear. It's sobering to think that the classical composers of the Baroque era – notable examples of which include JS Bach, who composed some of the greatest keyboard music ever written – did not have access to the modern piano as we know it, or indeed any form of piano, as the earliest examples date from the late 18th century. Pipe organs became standard in churches, while string-based keyboard instruments like clavichords, harpsichords, spinets and virginals were fashionable for well-to-do drawing rooms of the day.

"Early synths played a note at a time"

The clavichord was a small, rectangular wooden instrument that contained a set of strings that were plucked with a small blade or 'tangent' whenever a key was pressed. The design of the keyboard itself evolved from having seven keys per octave to the current design that features 12, including the black notes, or 'accidentals' as they're known.

The more sizeable harpsichord was largely an attempt to produce a greater volume of sound. Many harpsichords featured double keyboards, but still lacked the ability to vary the dynamics of the performance, due to the fact that the strings were plucked.

The forerunner of the modern piano was invented around 1780, mainly in response to this lack of expressiveness. It featured what we know today as a velocity-sensitive keyboard: the player could vary the volume depending on how hard the keys were struck, and the strings were whacked with hammers rather than being plucked. However, these early pianos had light wooden frames, lightly-sprung key action, leather hammers and short sustain; compared to the iron-framed, weighted-action, felt-hammered, long-sustaining version of the instrument we know today.

Piano power

The piano was a big hit with performers and composers of the time, pushing clavichords and harpsichords to the sidelines. It wasn't until the 20th century and the advent of electricity that we started to see new instruments and innovations such as the Hammond tonewheel organ, the Ondes Martenot (a sort of early keyboard synthesiser/theremin hybrid), the Fender Rhodes and Wurlitzer electric pianos, the Mellotron (a tape-based precursor of the modern sampling keyboard) and early synthesisers such as the EMS VCS3, Roland Modular and Moog Minimoog. These early synths were monophonic – ie, only able to play one note at a time, which was great for basslines and solos – but it wasn't until the Yamaha CS80 and Moog Polymoog appeared in 1976 that synths became the mainstay of two-handed keyboardists the world over, culminating in iconic milestones of the digital era such as Yamaha's DX7 and the Roland D-50.

Today's keyboardists have a huge list of influential players to take inspiration from, going back almost 100 years to the jazz greats of the 1920s, through the rock 'n' roll era of the 1950s, 70s prog rock and beyond. Here's a timeline of some of the great players from the last century – check out some of these guys' work and you'll definitely pick up plenty of pointers.

© Getty

Norah Jones is a noted piano and organ player

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Greatest players of the 20th century

1950s

Jerry Lee Lewis (Rock 'n' roll pioneer)
Little Richard (Rock 'n' roll legend)
Fats Domino (Blueberry hill icon)
Ray Charles (Rhodes innovator)

1960s

Thelonious Monk (Bebop legend)
Oscar Peterson (Blues maestro)
Ray Manzarek (Doors keysmith)
Stevie Wonder (Pop/soul hero)

1970s

Herbie Hancock (Jazz supremo)
Rick Wakeman (Prog rock wizard)
Elton John (Glam rock royalty)
Jon Lord (Deep Purple)
Keith Emerson (Emerson, Lake & Palmer)
Chick Corea (US fusion giant)
Joe Zawinul (Weather Report)
Billy Joel (Pianist / Songwriter)
George Duke (Genre-hopping jazzer)
Bernie Worrell (Funk magician)
Jean Michel Jarre (French synth icon)
Geoff Downes (Asia / The Buggles)
Tony Banks (Genesis)
Richard Tandy (ELO)
Jools Holland (Squeeze, Jools Holland Big Band)

1980s

Greg Phillinganes (Session supremo)
Billy Currie (Ultravox synthman)
Jan Hammer (Miami Vice icon)
Thomas Dolby (Mad professor)
Mike Lindup (Level 42)
Nick Rhodes (Duran Duran)
Richard Barbieri (Japan/Porcupine Tree)

1990s

Bruce Hornsby (Pianist/songwriter)
Harry Connick Jr. (Modern jazz pianist)
Alicia Keys (Singer/pianist)
Jordan Rudess (Dream Theater virtuoso)

2000s

Norah Jones (Jazz singer/pianist)
Jamie Cullum (Jazz singer/pianist)
Matt Bellamy (Muse genius)

KEYBOARD BUYER'S GUIDE

There are many different types of keyboard out there. So when buying, you'll need to consider exactly what it is you'll be using it for. There are hardware synthesisers designed for live performance or for the studio. These generate their own sounds internally, and thus need to be connected either to a PA system for use on stage, or plugged into an audio interface so the sounds they make can be recorded into a computer.

Then there are the personal home keyboards, generally targeted more towards the home entertainment market, such as Yamaha's Tyros range, with hundreds of built-in sounds, auto-accompaniment features and built-in speakers for monitoring in a domestic environment without the need for any additional hardware or computer.

It's a fair bet that most readers of this magazine will probably be more interested in a MIDI controller keyboard. This is the type of keyboard that makes no sounds on its own, but is designed to be hooked up to a computer via USB or Bluetooth in order to control the softsynths that run within the confines of your DAW, and generate the MIDI data that your host records and plays back whenever you enter a keyboard part.

How many keys?

A standard piano has 88 keys, spanning over seven octaves, and while there are plenty of controller keyboards out there of this size, in many cases the average home or project studio keyboardist will be able to get away with something with a much smaller footprint. Controllers start from 25 keys (two octaves), through 49 (four octaves), 61 (five octaves) and 76 (six octaves). A 25-key unit will be fine if all you need to do is bash out the odd drum, bass or solo part with one or two fingers, but if you're a two-handed player, the minimum you'll be comfortable with is a 49-key option, as even with octave-shift buttons, you'll find the range of a 25-key model fairly limiting. Above that, the more keys the better – it's always good to go for as many keys as you have the room for, we say.

The other question is whether or not to go for full-size keys or micro keys. Micro keyboards are conveniently small enough to squeeze into a laptop bag, but although that's handy for inputting keyboard ideas on the move, small keys are more fiddly and harder to play than full-size equivalents. If you have the space, we'd always recommend a unit with full-size keys for studio use, simply because they have a more conventional feel – important if you want to take your playing to the next level. All in all, we reckon you should look to spend at least £100 or so for a decent spec, full-size 49-key controller; or more if you want one with other modern features.

Korg SV-1 £1399

The fabulous Korg SV-1 stage keyboard is available in both 73 and 88-key versions

Akai LPK25 Wireless £59

This dinky controller fits in a laptop bag and connects via Bluetooth for ultimate portability

ROLI Seaboard RISE 49 £1000

Like a row of hotdogs in a wetsuit, the innovative RISE 49 offers boundless realms of expression

Nektar Impact 88+ £249

Remarkable value for money for a full-size, semi-weighted action 88-note board

NI Komplete Kontrol S49 / S61 MkII £499

Native Instruments' newly-updated, S-series controllers feature twin hi-def LCD screens and illuminated keys

Nord Stage 3 88 £3459

The ultimate all-rounder for live/studio use, with a hammer-action, fully-weighted 88-note keyboard

Anatomy of a keyboard

We're all familiar with black and white notes – but what do all those knobs, sliders and flashing buttons do? Let's find out...

PITCHBEND WHEEL
Allows you to bend notes while playing

DRUM PADS
Smackable pads for programming drum parts

LCD DISPLAY
Shows info about the currently selected control

ROTARY ENCODERS
Assign these knobs to control parameters in your DAW

FADERS
Assign these to variable parameters, such as channel volume

MODULATION WHEEL
Apply vibrato or other parameters to the current sound

KEYS
Standard-size, piano-type keyboard for inputting notes

OCTAVE SWITCHES
Shift the notes you're playing up or down one octave at a time

TRANSPORT CONTROLS
Navigate your DAW project directly from your controller

SWITCHES
Programmable switches for DAW functions like mute/solo etc

PSU SOCKET
For plugging in an external power supply

USB SOCKET
Connects to your computer for both MIDI data and power

MIDI IN/OUT
Traditional five-pin sockets for transmitting and receiving MIDI data

EXPRESSION PEDAL INPUT
Plug a pedal in here to control volume and other parameters

SUSTAIN PEDAL INPUT
Connect a sustain pedal for realistic piano-style playing

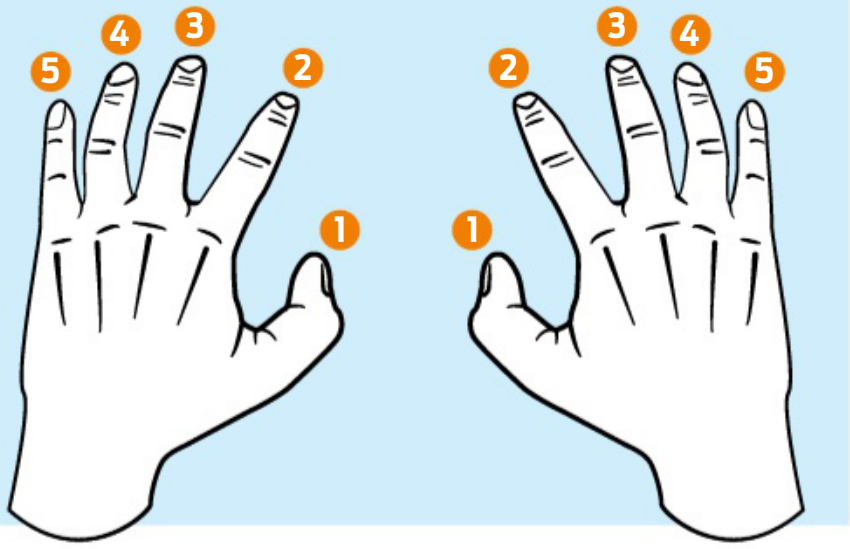
Beginners, start here!

When starting to learn the keyboard, it's a good idea to get basic hand positions nailed early on, as it'll make playing easier in general, and prevent you from falling into bad habits in the long run. In terms of simple ergonomics, it might seem obvious, but you need to be sat (or standing) facing your keyboard, positioned roughly in line with the centre – around middle C. If you're sitting, make sure that the seat is high enough that your wrist and elbow are slightly higher than the level of the keyboard when your fingertips are on the keys. Similarly, if you're standing, adjust the height of your keyboard to achieve the same result.

Generally speaking, if you're playing two-handed, you'll be focusing your right hand on the area of the keyboard around middle C and above, and your left hand will be positioned mainly in the lower area of the keyboard to the left of middle C, taking care of the bass notes. This will often be played in octaves, using your thumb and pinky an octave apart.

> "Get basic hand positions nailed early on"

Throughout this feature, we'll be referring to finger positioning using this numbering system

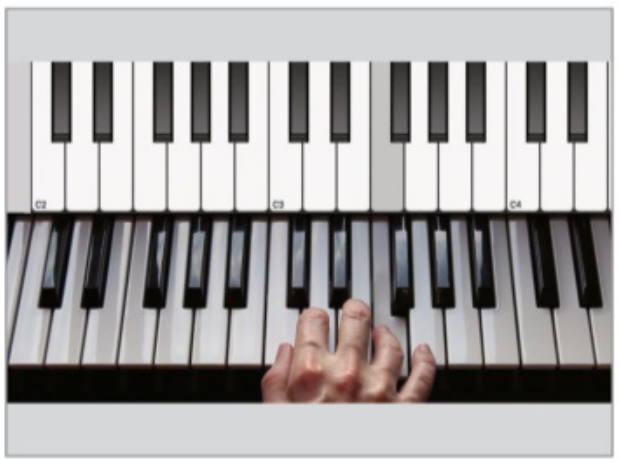


> Step by step 1. Basic hand positioning

1 > To begin with, start with your right hand. Keeping your hand and fingers relaxed, place your right hand lightly on the keys, with the left side of your thumb on **middle C** and the tips of your fingers resting on the next four white keys (that's **D**, **E**, **F** and **G**) to the right.

2 > Draw your fingers back a little so that they're slightly bent, keeping each fingertip resting lightly on its own key, positioned equally between the left and right edges of each key. Make sure your wrist is relaxed, but not so much that it's completely drooping down below the level of the keys. Keep it raised slightly.

3 > Maintaining this position, press down with just your thumb to play **middle C**. Keep the other fingers as still as you can, and avoid sticking your fingers out straight in weird directions as you play. Lift up and press down again to play the note a few more times, getting used to not moving the rest of your hand as you do so.

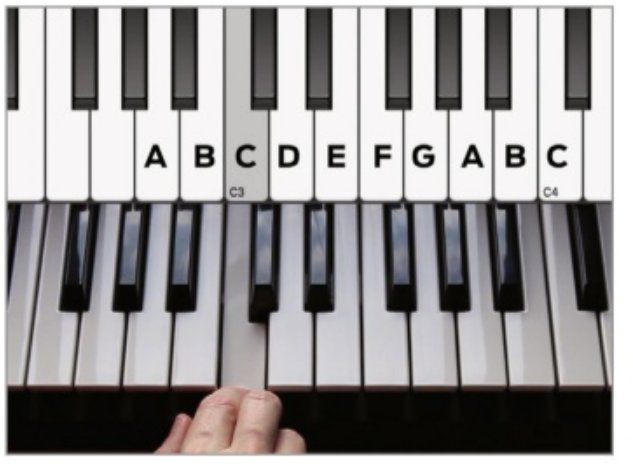


4 > Next, as you release your thumb up from middle C and let the key rise up again, press down with your index finger to play **D**. To avoid the notes overlapping, think of it like how you'd use the pedals when changing gear in a car – C is the clutch, and D is the accelerator. As the clutch comes up, the accelerator goes down, and vice versa.

5 > Now try the same thing going from D to E, lifting the D up as you press down on the **E** with your middle finger, again keeping the rest of your hand as still as possible. Then go from E back to **D** again, then down to **C**, in reverse order. Keep playing slowly up and down through **C**-**D**-**E**-**D**-**C** a few times to try and get the feel of it.

6 > As you get more confident, add the notes **F** and **G** into the equation, playing them with your ring and little finger. As you play up and down the five notes **C**-**D**-**E**-**F**-**G**-**F**-**E**-**D**-**C**, try to make your fingers 'walk' from one key to the next, so that the notes transition together smoothly. Keep things really nice and slow and even to start with.

> Step by step 2. How to recognise the keys



1 > As you look down at the keyboard, check out the black keys. Notice how they're arranged in a regular pattern – a group of two, followed by a group of three, followed by a group of two, another group of three and so on. In fact, they're arranged in alternating groups of two and three like this all the way along the keyboard.

2 > The white note immediately to the left of each group of two black notes is a **C** – the one situated in the centre of the keyboard is **middle C**. C is important because it's the starting point for anyone learning the keyboard. The key of **C major** contains no sharps or flats in it, so it has no black notes for you to worry about.

3 > There are seven main note names for the white notes, starting with **A** and continuing through **B**, **C**, **D**, **E**, **F** and **G**. Travelling along towards the right end of the keyboard, the next white note up from C is **D**, then **E**, **F**, and **G**. After G, it just wraps back around to **A**, followed by **B**, and finally a repeat of **C** one octave higher.

> Step by step 3. Playing a C major scale

1 > Moving on, it's time to adopt the proper fingering for a C major scale. This lets you play all of the white notes up to the octave above middle C (**C**-**D**-**E**-**F**-**G**-**A**-**B**-**C**) smoothly and evenly. Start with your hand in the starting position described previously and play **C**, **D** and **E** with your thumb and first two fingers.

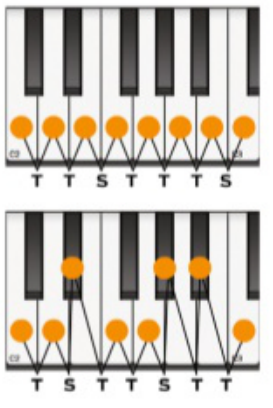
2 > Now, move the thumb up from C to **F**, keeping the middle finger on the **E**, passing your thumb under your first two fingers. As you release the E, press the **F** key with your thumb and move the rest of your hand back over to the right to adopt the starting position once again, this time with the thumb on the **F** key.

3 > You can now play **G**-**A**-**B**-**C** with fingers 2-3-4 and 5, ending with your pinky on top **C** to complete the scale. To descend, simply play **C**-**B**-**A**-**G**-**F** with fingers 5-4-3-2 and 1, ending with the thumb back on **F**. Then bring your fingers over your thumb and hit **E** with your middle finger, followed by the index finger on **D** and thumb back on **middle C**.

4 > If you're feeling brave, you can go for the two-octave version – 1-2-3 (thumb under), 1-2-3-4 (thumb under), 1-2-3 (thumb under), 1-2-3-4-5, ending up with your pinky on **C5**. The critical thing with all scales is to start out slowly, and master playing the scale evenly at a slow tempo before speeding up. Don't be tempted to go too fast too soon!

Interval patterns for major and minor scales

Love 'em or hate 'em, there's no better method of keyboard practice than scales for improving overall dexterity. Major and minor scales are specific sequences of eight notes, defined by the patterns of intervals between those notes. By applying this pattern as a kind of formula, we can work out the major or minor scale for any key. The formula for a major scale is T-T-S-T-T-T-S, where S stands for an interval of one semitone (the smallest possible interval on the keyboard, between any two adjacent keys) and T stands for tone (an interval of two semitones). So, using C major as an example, we'd start on C, move up a tone (two semitones) to D, another tone to E, then a semitone to F, another tone to G, and so on until we get the whole scale; C-D-E-F-G-A-B-C. Apply the same formula to the key of D major, and we get D-E-F#-G-A-B-C#-D. For a natural minor scale, the formula is T-S-T-T-S-T-T, so C minor would give us C-D-Eb-F-G-Ab-Bb-C, and D minor D-E-F-G-A-Bb-C-D.



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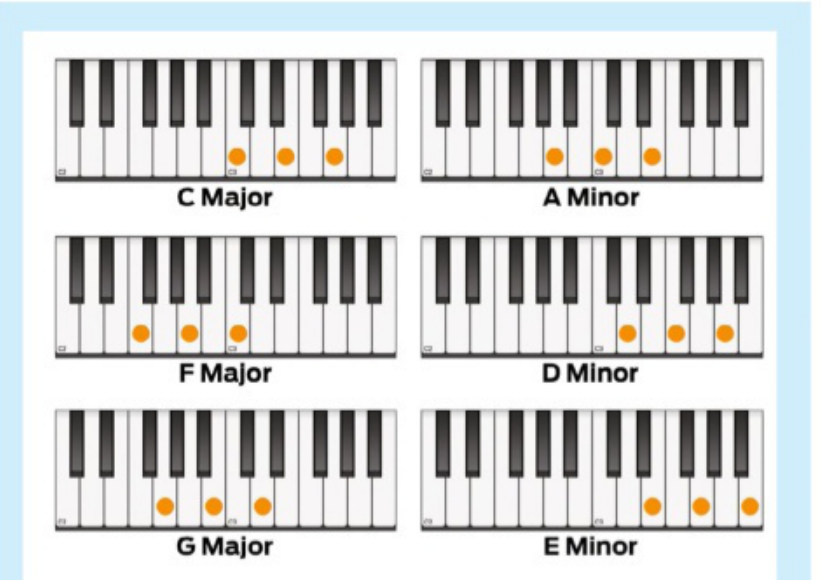
Chord formulas for major and minor triads

Now we know how to construct major and minor scales, we can take the notes within them and start stacking them up together to play chords. While it's possible to form simple two-note chords, the most basic form of chord in common usage contains three notes, and is known as a triad. Like scales, triads come in major and minor flavours, depending on the scales their notes (also known as chord tones) are taken from.

Take the C major scale as an example. It contains the notes C-D-E-F-G-A-B-C, as we've seen. If we use numbers to label the notes (or *degrees*) in the scale from 1 to 8, we can use these numbers to create formulas to build chords from. For instance, in a C major scale, C=1, D=2, E=3 and so on, until B=7. So, to build a C major triad, we need the notes numbered 1, 3 and 5 from the major scale; in other words, C, E, and G = C major. The same idea works when building minor triads from minor scales, too. Take the scale of A natural minor (which uses all the white notes too, from A to A): A-B-C-D-E-F-G-A. Taking the notes numbered 1, 3 and 5 from this scale – A, C and E – gives us an A minor triad.

Looking at it from the point of view of the intervals between the chord tones, the formulas are root + 4 semitones + 3 semitones for a major triad, and root + 3 semitones + 4 semitones for a minor triad. Using a combination of major and minor triads, it's possible to play thousands of popular songs, so they're pretty useful things to know!



Get to know major and minor triads – the building blocks of popular music

> Step by step 4. Tackling major and minor triads

1 > So far, we've only been playing single notes, so let's try some chords. We'll start with a **C major triad** – a chord made up of three notes from the C major scale, namely the root (C), major third (E) and fifth (G). This can be played from our basic starting position shown in the previous tutorial – thumb on middle **C**, middle finger on **E** and pinky on **G**.

2 > Once you've got the hang of pressing down these three keys without your other two fingers getting involved, move the whole thing up so your thumb is on D and play **D**, **F**, and **A**. That's D major, right? Wrong! Hear how it sounds sadder somehow? That's because you're actually playing a D minor triad, made up of D (root), F (minor third) and A (fifth).

3 > It sounds different due to the minor third interval between the D and the F. The quality of the third – major or minor – determines whether the triad is a major or minor chord. Here, the minor third between D and F produces that sad, minor sound. To make it a major third, move the third finger a semitone up to **F#**. Try it now to play **D**, **F#**, **A** – that's D major!

4 > So, major triads consist of root, major third and fifth, while minor triads are made up of root, minor third and fifth. Try it with an F chord – F major is built from **F**, **A** and **C**, while F minor is made up of **F**, **Ab** and **C**. The only change is that third going from major (**A**) to minor (**Ab**).

5 > There are three ways to play each triad, depending on which note you put your thumb on. Go back to our C major triad for a second. As played in step 1, with our thumb on **C**, middle finger on **E** and pinky on **G**, we're in root position – so-called because our thumb is on the root.

6 > To get the first inversion of C major, we move the thumb to the next chord tone up: **E**. The G is now covered by the index finger, and the pinky moves to the next C note up – **E**, **G**, **C**. Move up again, with the thumb on G, middle finger on C and pinky on E, to get the second inversion – **G**, **C**, **E**.

> Step by step 5. A tricky finger-independence exercise

1 > To grow as a keyboard player, you need to get used to your hands doing different things at the same time, and fingers as well. Remember the beginner's exercise where we walked through the notes C-D-E-F-G-F-E-D-C? To help develop finger independence, we're going to revisit this, but with a twist. First, assume the position shown above.

2 > The idea is to hold down a different note each time and play through the notes that surround it, without lifting off the held-down note. Sounds easy, but it's actually pretty tricky, and is a great exercise for developing finger independence. Start by playing the **C** and **D** together with your thumb and index finger. Easy enough so far...

3 > Keep holding your thumb down on the C key, but lift off the D and play the **E** with your middle finger, followed by the **F** with your ring finger and **G** with your pinky – holding **C** down with your thumb the whole time. Then walk back down again from **G** through **F**, **E** and **D** without lifting your thumb, so that the C note sustains throughout.

4 > Play through this sequence four times or so, then play the **C** and **D** together once again, only this time lift your thumb off C while keeping **D** held down with your index finger. Play the notes either side of **D** in a smooth up/down sequence once more, this time skipping the held-down D note and playing **C-E-F-G-F-E-C**, keeping that index finger held down.

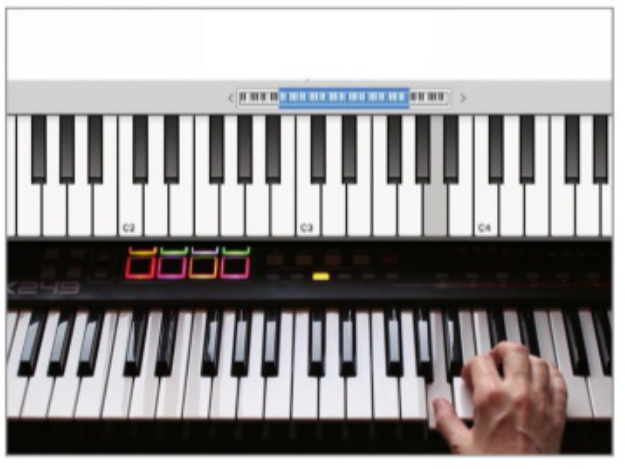
5 > Continue moving on through the other fingers, holding down **E** and playing around that, then **F** and playing around that, and so on. It's much harder than it looks, and it doesn't sound very nice while you're playing it, but stick at it. Keep it slow at first, and eventually you'll train your finger muscles and motor response accordingly.

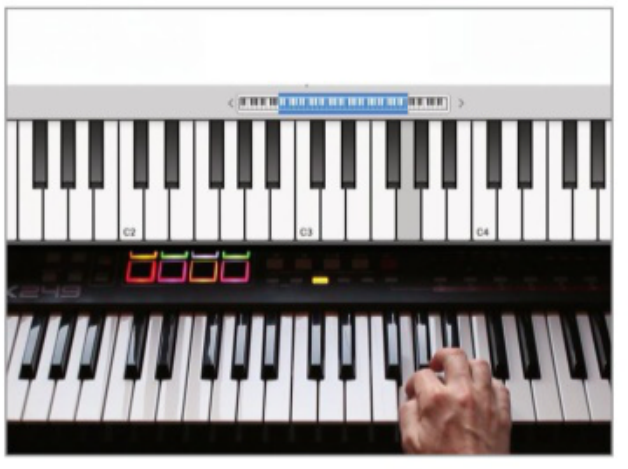
POWER TIP

>Two-finger challenge

A fun variation to help with this exercise is to place your hand on a tabletop and get a friend to call out random pairs of numbers – say, '2 & 5', or '1 & 4' – then lift up only the corresponding pair of fingers, keeping the others flat on the table. This can be quite a challenge, even for experienced players! After a bit of practice, you can do one hand at a time, or both at once if you want to make things more interesting.

> Step by step 6. Major-to-minor scale arpeggio exercise





1 > One way to practise scales is to alternate major and minor scales while simultaneously moving down the keyboard from right to left. Here's an exercise that does just that. Starting from the C above middle C, play a one-octave **C major** scale up and down the keyboard, using the fingering **1-2-3, 1-2-3-4-5-4-3-2-1, 3-2-1**.

2 > When you're back on the C you started on, don't stop there – continue down another two notes, through **B**, to land on **A**. Do this by crossing over your thumb while on C and landing on the **B** with your index or middle finger, before shifting your thumb onto the **A**. From there, you're poised for a one-octave A minor scale, so go ahead (**A**, **B**, **C**, **D**, **E**, **F**, **G**, **A**)!

3 > Having completed the A minor scale, keep descending through G to **F** (crossing over the thumb) and play an F major scale (**F**, **G**, **A**, **Bb**, **C**, **D**, **E**, **F**). Continue dropping down a couple of notes each time, until you're at the bottom. You can alternate between major and minor scales like this, or play all major or all minor scales in one pass to vary things up a little.

Sustaining interest

A real acoustic piano actually has three pedals – from left to right, the soft pedal, sostenuto pedal and sustain pedal – but when you're tackling piano parts on a computer music setup with a controller keyboard, the only pedal that's essential to getting an authentic result is the sustain pedal, which is used to make the notes ring out longer.

On a real piano, there's a row of felt dampers that prevent each string from ringing out when it's not being played. If you hit a key briefly with the sustain pedal up, the note won't sustain after the key is released, because when you release the key, the damper for that note falls back into place, cutting off the note. With the pedal down, however, the row of dampers is moved away from the strings, so any note you hit will ring out for as long as the string continues to vibrate, or until the pedal is released and the dampers return to their normal position.

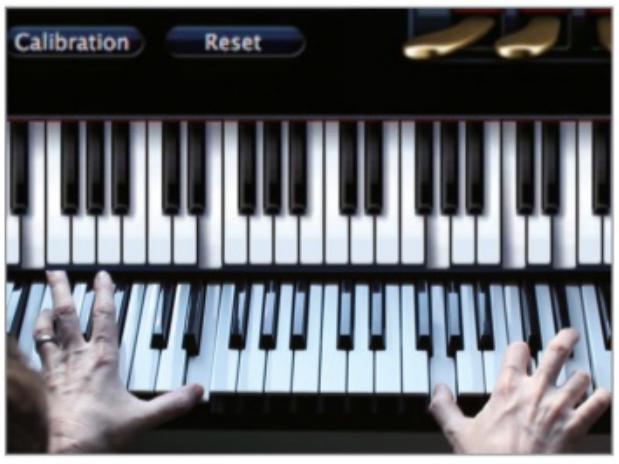
A sustain pedal, such as the Casio SP-20, can be bought for a minimal outlay

In synth terms, it's the equivalent of increasing the release time of your amplitude envelope, but the effect is turned on and off at will by operating the pedal. There's a knack to combining the timing of the pedal moves with the way your hands are playing the keys – it has to be timed so the notes don't all merge together in a clangy, stodgy mess.

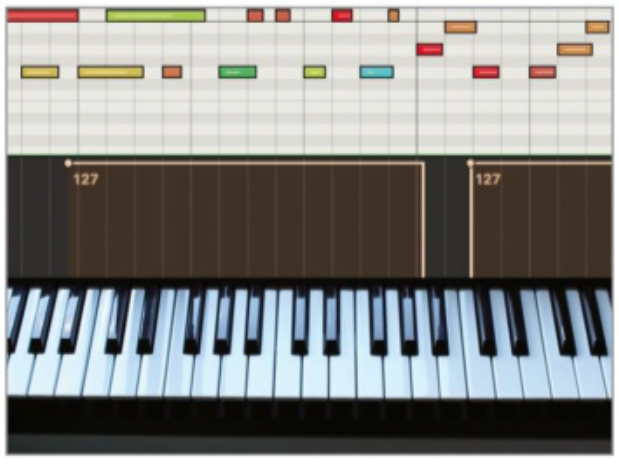
Most keyboard controllers don't come with sustain pedals as standard, so you'll have to invest in one separately. A decent one should only set you back around £20 or so, but you'll need to check that the polarity is compatible with your controller. A pedal wired with the wrong polarity will work the opposite of how it's supposed to (notes will sustain with the pedal in the 'up' position and be dampened with it held down), so make sure you buy the correct pedal, or one that can be switched to suit your keyboard.

> Step by step 7. Using a sustain pedal

1 > Most keyboard controllers have a sustain input jack that will take a sustain pedal. As long as your pedal is switched to the correct polarity for your keyboard, once connected it should behave so that notes ring out with the pedal down, and are cut off when you release the pedal back up. Some controllers can be switched to suit.



2 > The main purpose of the pedal isn't to make your playing louder, but to prolong notes while your hands are moved away from the keyboard in readiness to play the next note. This makes for a smoother transition between notes and chords, but you need to be careful not to overdo things. Here's a full-on, two-handed piano part with no pedal.



3 > As a further illustration, the above diagram shows the same piece with the pedal down all the time this time. The status of the pedal – which is basically an on-off switch – is shown in this editor window at the bottom of our DAW's piano roll editor. As you can hopefully hear, it all starts to get a bit much, especially in the low end.

4 > The answer is to find a compromise between the two approaches. Use the pedal sparingly, but effectively enough to enable a smooth transition between chords. Usually, lifting it up in the fraction of a second before you play the next chord in a sequence is the way to go. As it's a continuous controller message in your DAW, you can touch up any mistakes or overhangs in the MIDI editor later.

5 > As well as closing up gaps between chords, sustain is also useful for things like flourishes, big finishes and swanky cocktail-bar arpeggios up and down the keyboard. Check out this example of a Rick Wakeman-esque arpeggio played with and without the sustain pedal. It works here because all the notes are versions of the same chord played in different octaves.

6 > The sustain pedal isn't just reserved for piano parts, though – it'll have the same effect on 99% of other keyboard sounds too (Hammond organs being the exception, in which case it usually controls rotary speaker speed). Use it to create eerie, sustained plonky textures, or to smooth the transition between chords in a pad part, like in our example here.

> Step by step

8. The minor blues scale – the one extra scale you need to learn

1 > The easiest jump-off point for learning how to play keyboard solos is the minor blues scale. To build it, we just take a regular natural minor scale. Here's E minor as an example – **E**, **F#**, **G**, **A**, **B**, **C**, **D** and **E**. The intervallic pattern for this scale, as described earlier, is T-S-T-T-S-T-T.

2 > That's far too many notes, so let's convert it into a minor pentatonic scale. Pentatonic means 'five notes', and our scale currently has seven, so we need to lose two. To make a minor pentatonic, we just remove the second (F#) and sixth (C) degrees, leaving **E**, **G**, **A**, **B** and **D**.

3 > Finally, to get our E minor blues scale, a sharpened fourth degree. The fourth degree of the E minor scale is A, so we need an **A#** in there. This gives us **E**, **G**, **A**, **A#**, **B** and **D** – the E minor blues scale. To apply it to any key, the formula is 1-3-4-4#-5-7. Practise this a lot – it'll serve you well!

Basic synth solo techniques

Although basic competency on the piano is key, playing synths demands the adoption of one or two extra techniques you won't be able to practise on the piano. Like, what are these weird-looking wheels to the left of the keyboard? What's aftertouch and how do I use it? For now, we'll address one of the main differences between synths and the piano – the fact that some synth sounds are monophonic. This means they're only able to play one note at once, and this in turn means there's a range of techniques you can adopt when putting together a rip-roaring synth solo or a funky synth bassline. How they work depends on how the synth sound you're currently playing has been set up – whether or not the amplitude envelope retriggers whenever you play a new note, for instance, or whether or not portamento (glide) has been enabled. You can make monophonic sounds respond differently in subtle ways.

> Step by step

9. Playing a monophonic synth

1 > Here are a few special techniques you can bring to bear while playing monophonic synth sounds, to achieve specific effects. In this example piece, we're using SynthMaster CM's **LED 80s Rock Saw** preset to solo over a backing track, using notes from the C minor blues scale (**C**, **Eb**, **F**, **F#**, **G**, **Bb**, **C**).

2 > Here, our notes are played distinctly, separated out so that each has its own attack portion – each note retriggers the synth's amplitude envelope. There are gaps between each note, and none overlap. This means that portamento won't have any effect, as the notes must overlap to work.

3 > If you play the part legato, by running the note lengths together so that the end of each note overlaps the start of the note that follows, the synth's amplitude envelope is only triggered at the start of the first note. This results in a smoother sequence – great when you dial in portamento (or glide) for extra 'slidiness'.

4 > This means that, rather than playing short notes on the C each time, you can make things easier by simply holding down the C key and playing all the other notes in the part. When you release each note, the C resumes. This is great for playing fast trills more easily, as you only need to move one finger instead of two.

Bending the rules

In the early 70s, there was a fair amount of 'expression envy' from keyboard players towards guitarists. After all, guitarists could coax maximum expressiveness from their instruments, bending strings to produce a cool, smooth shift in pitch – awesome for soloing, in particular. So, to even things up a little, the Minimoog introduced a pitchbend wheel so that keyboardists everywhere could emulate that. The knurled plastic wheel to the left of the keyboard was used to shift the overall pitch of the whole instrument, but early adopters needed to be a bit careful, as although there was a central detent position for returning things to the normal pitch, initially these wheels weren't spring-loaded, so had to be returned to the centre position manually – tricky! Other designs sprung up – ribbon controllers and joysticks, for example – but it wasn't until the 80s that Jan Hammer finally nailed the combination of keytar, distortion, pitchbend and modulation to really make a synth sound like a guitar solo.

> Step by step 10. Setting up and using the pitchbend wheel

1 > Most synth presets are programmed so that your pitchbend control bends the pitch of the notes, but often the amount of bend applied at full stretch needs to be adjusted. To do this, set the synth's pitchbend range. Here's Bazille CM's **HS Bass Punch Bag** preset, set to **+2 / -12 semitones**.

2 > Now, if you play a note and move the pitchbend wheel to its fullest extent either way, the pitch of the note will shift up two semitones or down 12. Hold down a **C** and bend the pitch up by moving the wheel fully upwards. We're now playing a **D** – 2 semitones higher. Bending it all the way down, however, produces a **low C**.

3 > Now you can incorporate bends and manual vibrato into your leads and basslines. So, for a Stevie Wonder-style Moog synth bassline in the key of E minor, you can apply upward bends to the third, fourth and seventh degrees (**G**, **A** and **D**). You can also do a full 12-semitone downward bend to achieve octave slides, like we've done here on the **A** note.

4 > A manual vibrato effect can be achieved by holding a note and rapidly flicking or tapping the pitchbend wheel just enough to change the pitch slightly, like how a guitarist applies vibrato to a note by wiggling the string back and forth. We've applied this to the long **G** note at the start of bar 2 of our bassline riff.

> Step by step 11. Setting up the mod wheel to control vibrato

1 > The modulation wheel's traditional use is for adding vibrato to a sound by increasing an LFO's depth of control over oscillator pitch – but it can be used for other things, such as adjusting filter cutoff. In our example, Bazille CM's **Init** default sound has no parameters assigned to the mod wheel, so moving the wheel has no effect on the sound.

2 > Let's set it up to control vibrato. Vibrato is achieved by using one of the synth's LFOs (low frequency oscillators) to modulate the pitch of the main oscillators. The Mod wheel is already linked to **LFO Depth**, indicated by the orange text field below the Amp Mod control in the LFO 1 section – we just need to turn the control up to the **max**.

3 > The target for the modulation will be the pitch of oscillator 1, so we draw a virtual cable between the **LFO**'s output and the **Freq Mod Depth** control (**PM Coarse**) in the Osc 1 panel. Turn this control fully right, then select **Cents** from the **50 Semi** menu. Moving the wheel introduces vibrato, the speed of which is controlled by LFO1's **Rate** control.

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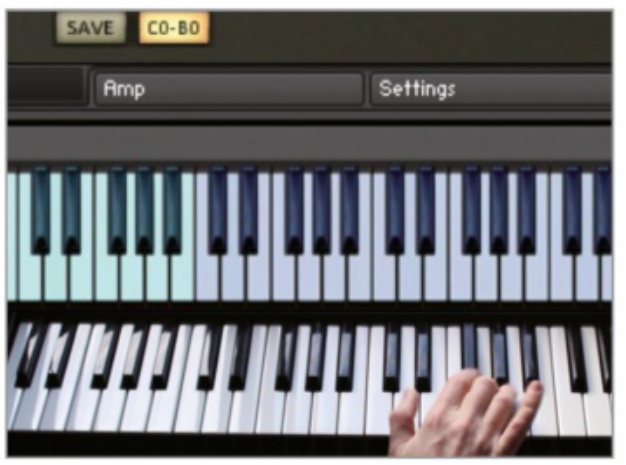
Vintage vibes

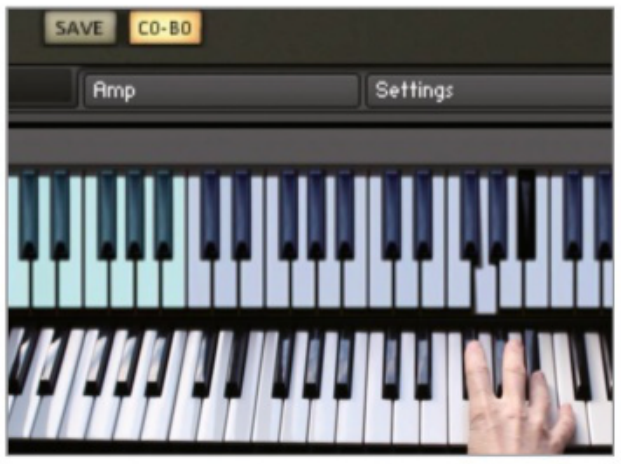
Thanks to the genius of software developers, who've managed the mind-boggling task of replicating almost every vintage keyboard made in plugin form that can be loaded into a DAW and conjured up with the click of a mouse, today's computer muso has never had it so good when it comes to getting their hands – literally – on pretty much any exotic or esoteric keyboard from days of yore. Manufacturers such as Native Instruments, Arturia and Modartt have come up with brilliant products like Komplete, Analog Lab and Pianoteq to name but a few, meaning that the entire gamut of sought-after keyboard sounds from Wurlitzers and Rhodes to Mellotrons and Minimoogs are accessible at a fraction of the cost of the real thing. If you want the real shimmering tones of a Hammond B3 organ through a Leslie rotary speaker, or a Stevie Wonder clav sound, you got it! However, for a really authentic sound, it pays to know a little bit about how each would actually be played, as they each demand their own different piano/keyboard technique.

> Step by step 12. Organ technique

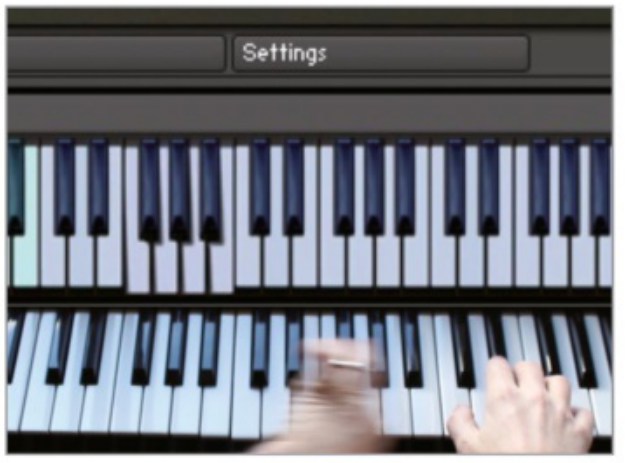
1 > Organ keys are like on/off switches – the only way to make them sustain is to hold them down. The sustain pedal is instead often used to switch the speed of the Leslie speaker effect. Here's an NI Vintage Organs B3 Kontakt Player preset, playing sustained chords while switching speaker speeds with the pedal.



2 > Organs have no pitchbend feature, so to emulate guitar strings being bent, organ players started including grace notes, rolls and slurs into their playing. To play a grace note, quickly flick the note one semitone to the left of your target note, using the finger to the left of the one you're about to use to play the main note.



3 > This approach blends well with staccato, funky, rhythmic chops, particularly when using the sharpened fourth degree of the minor blues scale (as described on p33) as the grace note, sliding from there onto the fifth. Combine this with a held-down flattened seventh, and you have the beginnings of a classic organ riff, as shown here.



4 > Another classic organ technique is the glissando, achieved by running your hand up and down the keys. You can use the side of your fingers or the back of your hand for this, but the trick is to merge it smoothly into whatever follows. Here we're sliding up the keyboard with the left hand, hitting a pre-shaped C minor chord (**C**, **Eb**, **G**) with the right.

> Step by step 13. Clavinet technique

1 > Perhap the funkiest of all keyboard instruments, the clavinet responds well to short staccato playing. We'll add a clav part to the example from a previous tutorial, using Pianoteq 4's **Clav CL1 Basic** preset, with some compression added to harden up the attack of the sound. Start by forming a G major triad (**B**, **D** and **G**) with the right hand, as shown.

2 > With your left hand, form an octave on two low E notes, effectively making an **Em7** chord when both hands are played together. Imagine playing bongos with a 16th note pattern, but only connect with the keyboard on some beats. Alternate between the two notes in your left hand, working them into the rhythm individually along with the right hand.

3 > Split the chord in your right hand between your thumb on **B** and your index and pinky fingers on **D** and **G**, then rock between the two halves of the chord. The key to a good clav part is the 'bounce', hitting the keys with short, clipped strikes. Once the basic rhythm part is established, we can fill the gaps with right hand riffs and runs from the E minor blues scale.

Aftertouch explained

Aftertouch – also known as pressure – is another type of MIDI controller message that keyboard controllers can generate. Like pitchbend, aftertouch isn't grouped in with the continuous controllers that constitute CC numbers 1-127 (like pan or MIDI volume), but instead has its own classification as an independent type of MIDI signal. It produces information based on how hard you press the keys down *after* you've initially played them, and it's this data that can be assigned to various parameters in your synth to control things – eg, changing the LPF cutoff frequency for making more realistic brass swells, altering the pitch of a guitar sample for string bend effects, or increasing the depth of an LFO for adding vibrato.

There are two types of aftertouch, the most common of which is *channel* aftertouch. This is when a series of force-sensing resistors beneath the keys of your controller measures the average pressure being applied to the keybed and produces a MIDI control signal based on this changing value. Effectively, this means that the harder you press, the higher the value of the generated signal. The second type, known as *key* or *polyphonic* aftertouch, relies on the same principle, but this time each key on the controller generates its own signal, outputting a value that corresponds to that key, rather than the average of the keyboard as a whole. This increases the expressive potential considerably, as every key can send different values as you play. This type of aftertouch used to be quite rare, owing to the amount of data it can generate, but is now supported by an increasing number of devices like Keith McMillen Instruments' QuNexus and CME's Xkey USB Mobile MIDI Keyboard.

Keith McMillen's QuNexus supports polyphonic aftertouch

Many synth presets will already have some kind of aftertouch response built in, but knowing how to add this facility to tailor the behaviour of a particular sound that doesn't already feature it is definitely worth knowing.

> Step by step 14. How to make a synth patch respond to aftertouch

1 > Most modern keyboard controllers are capable of generating aftertouch, but to check whether or not yours does, launch your DAW and press down firmly on some keys on your controller, while watching your computer screen. If your DAW's MIDI activity indicator flashes as you press down and release, you're generating aftertouch data.

2 > If the test works, you know you can program aftertouch response into a patch in any synth that supports it. For example, if we load up Dune CM's **022 Earth Views RL** preset and play a few notes, we can hear that there's no change to the sound when we press down on the keys after the initial impact, so no response to aftertouch has been set up.

3 > We can use aftertouch to open the filter, so the sound gets brighter as we press down on the keys. In Dune CM, aftertouch is labelled as **ATouch**, and is assigned to your desired parameter in the main modulation matrix window in the LCD panel in the centre of the synth's control panel. Click the button labelled **Mod Matrix 1>12** to access this.

4 > Clicking on the **Source** column in the first empty row of the matrix (row 4 in this case) reveals a list of all the applicable sources for us to choose from. To select aftertouch, choose the **ATouch** item from the menu. It can be found by looking for the fifth one down from the top.

5 > We want the aftertouch data to control the filter's cutoff frequency, so select **Filters > Filter Cutoff** in the **Destination** column. The routing is now all set up, so set the amount of effect generated when we press down on the keys. A setting of about **+50** is a good starting point. Enter this in the centre column.

6 > Now, when we hold a note down, we can control the opening and closing of the filter by how hard we press on the key. In the case of channel aftertouch, since the effect is generated by one long sensor beneath the keys, you only need to press with one finger, not all of them, when holding down a chord.

Setting up those knobs on your controller

When synthesisers first appeared, the thing that players loved most – apart from their sound, obviously – was their tweakability. Those rows of knobs and buttons on the front panel just itched to be messed with during a performance. The modern computer-based equivalents of analogue synths are much less tactile by comparison. Moving virtual knobs on screen with a mouse just isn't the same – not to mention tricky to accomplish in the middle of a solo.

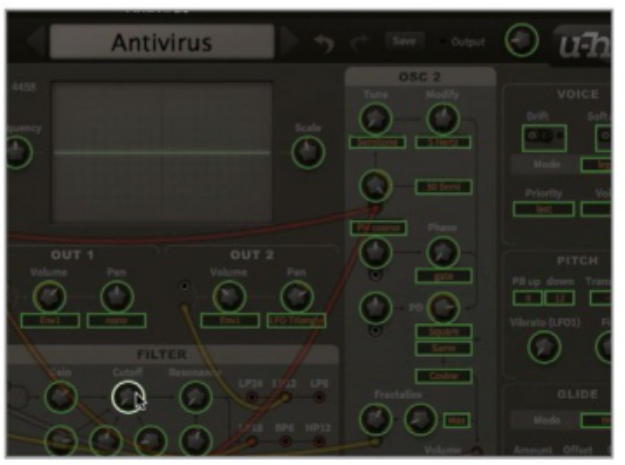
Luckily, controller keyboard manufacturers have caught onto this, and many current models sport a generous array of user-assignable hardware controls that can transform your favourite software synth's flat, virtual control panel into a properly tweakable, hands-on experience.

The controls on your keyboard will most likely fall into three main types: rotary encoders, faders and switches. If you need to adjust within a set range of values, a fader, with its easily visible start and end points, is a good bet. However, if the current parameter setting differs from the fader's physical position, there may be a big jump in values when you move it. Conversely, rotary encoders rotate continuously through 360 degrees, incrementing or decrementing values by one from wherever the current parameter value is set, so if you need to adjust settings without a big jump, a rotary encoder will do the trick. Meanwhile, switches are more suited to on/off controls like mute or solo buttons.

All you have to do is tell the synth what it needs to do when it receives a continuous controller MIDI message from a particular control. Here's how to set up the knobs and faders on your controller so that you can use them, not just to perform and change sounds in real time, but to record those changes into your DAW for posterity.

> Step by step 15. Assigning MIDI knobs to software parameters

1 > Let's look at how to assign a hardware control on your controller keyboard to a particular software synth parameter. In our first example, we're going to assign filter cutoff in Bazille CM to a rotary encoder on our Akai MPK249. To begin, load an instance of Bazille CM into your DAW and select the **Antivirus** preset.

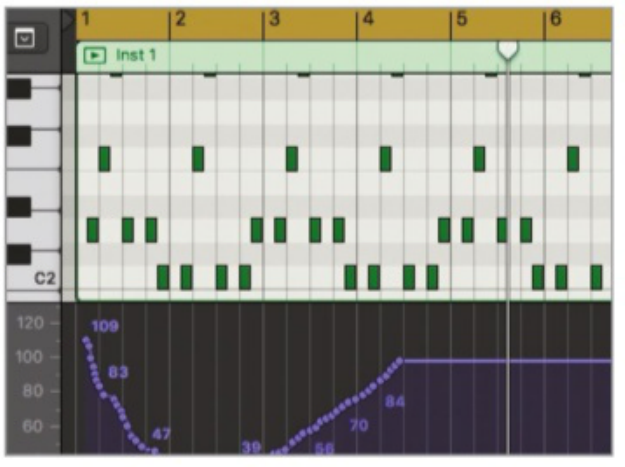


2 > Click the cog icon in the upper right corner to enter the MIDI CC **Learn** mode, in which we can match the MIDI controller messages transmitted by hardware controls to any parameter that's illuminated green. We want to assign filter cutoff, so click the filter cutoff knob in Bazille CM's central filter panel.

3 > Next, simply move the desired control on your device to set up the link – doing this lets the synth know to map the controller message transmitted by the knob you just moved to the parameter you just selected. If you play the sound and wiggle the control, you'll see and hear the filter opening and closing accordingly.

4 > As another example, here's how to do the same thing in NI Massive. It's a similar approach, but this time each control has its own separate 'learn' mode, as opposed to a global mode for the entire synth. In this case, simply right-click on the control you want to assign and select **MIDI Learn** from its popup menu.

5 > Again, wiggle the control you want to use on your device for that parameter. Here, we're assigning one of the macros in the **1991** preset to a rotary encoder on the Akai MPK249. If your controller has enough encoders, try assigning all eight macros to a separate control and see what kind of fun you can have, tweaking them as you play.



6 > Once assigned, you can record the changes into your DAW as automation, meaning that they'll be played back in all their glory. This is such an easy way to get movement into your tracks that once you've worked out how to assign your favourite controls in your favourite synths, you'll never want to go back to static sounds again!

Eight more keyboard tips

SLOW IT DOWN

If you're trying but struggling to capture a really tricky keyboard part, remember that technology is on hand to help. Using a DAW has the huge advantage of being able to slow down the tempo of your tune. Capturing more difficult parts at a slower tempo, then speeding things back up again, will make you look like one of Jordan Rudess' lesser-known cousins.

PADDY POWER

Generating notes from a set of drum pads, (such as Maschine's note mode or the MPC-style 4x4 grid of pads found on Akai's MPK series of controllers) can yield interesting results, as it divorces the normal relationship you hold in your head between note pitches and the piano keyboard and frees you up to create truly random phrases.

LEARN YOUR SKALES

Native Instruments' Komplete Kontrol series of controller keyboards feature coloured LEDs above the keys, that can be used to indicate the notes that make up different scales – useful when practising. You can set them to a visual guide, showing you the notes you need to hit to play the scale, or you can set the keyboard to map any note to the next nearest note in the selected scale, making it impossible to hit a wrong note. There are MIDI software remappers that can do this for you too, such as AutoTonic or Mosaic's AutoTheory.

SEABOARD SHUFFLE

One of the more radical innovations in the MIDI controller world recently is the ROLI Seaboard, a collection of versatile sensors swathed in a neoprene outer skin, transforming the conventional keyboard that we know and love into a single slab of rippled, squishy silicone. Each 'keywave' responds to five different gestures that can control vibrato, pitch bend or key pressure, opening up a whole new world of expressiveness. It takes a little bit of work to get the best out of it at first, as the lack of a distinct physical boundary between notes means that you'll need to step up the accuracy stakes when playing, but the enhanced expressive potential is more than worth it.

Unlock creativity by programming melodies with pads

Looking for a keyboard to help you learn scales? Komplete Kontrol's coloured LEDs will guide your practising

HARPEJJING ON

The harpejji is an innovative electronic stringed instrument that's kind of a keyboard-guitar hybrid, played by tapping or 'hammering' on the strings at particular locations. Why is this of interest to keyboard players? Because the fretboard is marked with white and black notes in a keyboard layout, giving keyboard players access to a whole new way of achieving a guitar-like sound – plus techniques like vibrato, string-bending and slides – but with notes arranged in a familiar format.

STAY IN TIME

To ensure that you end up being able to play in time as well as hitting all the right keys, practising with a metronome when doing exercises will go a long way to helping you lock down your timing. Or, if you find this too boring, try programming little sketch tracks in your DAW to groove along to, made up of a tasty drum beat, a bassline and maybe even some accompanying chords.

HAMM IT UP

Assigning the faders on your controller to the drawbars on your virtual Hammond organ plugin will allow you to vary the tone of the sound as you're playing – a classic technique employed by veteran players of the real thing. Many software emulations of Hammond organs are also programmed to use input from a sustain pedal to switch between fast and slow Leslie rotary speaker speeds.

EXPRESS YOURSELF

Adding an expression pedal to your lineup will allow you to use it to control volume. Essentially a foot pedal devoted to the transmission of MIDI volume (CC#7) data, an expression pedal will let you create authentic swells, both in and out, when playing organ parts. You can also use one to add ultra-realistic crescendos to brass and strings patches. cm

Getty Images

The legendary Stevie Wonder is a fan of the harpejji

HOW TO WRITE PERFECT HOOKS

Turn a good song into a surefire hit with our huge guide to crafting attention-grabbing lead lines, standout riffs and catchy melodies

> Music's a funny old thing. You work, you learn, you obey all the rules, and sometimes... nothing. That track you're working on might be perfection – a textbook example of your genre. Kick, hard and punchy; snare, thumpin'; vocal, lush and well recorded. You've done everything your favourite production mag has taught you, but still... it just doesn't quite cut it. It's good, but it's not *great*.

You see, making a hit song – the kind that blows it into the stratosphere – has always been a balancing act. Audiences are looking for two opposing things at the same time: your track has to be just like everything they've heard before, but just a little different enough to give them something new. Too samey and you've not challenged them enough; too bold and experimental, and congratulations, you've just alienated everybody on the dancefloor.

So what's the missing piece of the puzzle? Well if you've not guessed it by now, dear reader, you are in need of a *hook*. This magical element is going to give your song the 'X factor' – something to grab the listener's attention and act as the focal point of your masterpiece. It's the recognisable vocal that everyone can sing along to; it's the synth line that nobody else could have come up with; it's the inescapable groove that burrows into people's minds and will simply not let go. It's different, it's unique, and it's what makes your track *your track*. It's Bon Jovi shouting *Living on a Prayer*, it's the bassline in *Billie Jean*, and it's the infectious guitar and drum groove of *Get Lucky*.

OK, simple, so just craft the catchiest riff anyone's ever heard, get your audience hooked on your grade-A musical crack, and wait for the dollaz to start falling from the studio ceiling, yeah? Well sorry to burst your bubble, but it's not as straightforward as that. Hooks are the holy grail of music, and you never know what's going to work out and what's going to fall flat on its face. With this massive guide, though, we're going to turn the odds in your favour by showing you everything you need to know.

Hook theory basics

Ask a hundred big-shot songwriters how they come up with their hooks, and you'll get a hundred different answers. But when it comes to writing a solid, catchy earworm, two things remain consistent: first, often you just have to get lucky, and second, you'll know it when you hear it – just like your audience.

Generating memorable hooks can be a challenge for even the most experienced tunesmith, and vast amounts of time have often been spent in pursuit of the ultimate hook.

The challenge is to find something that's completely unique, while at the same time fitting into the familiar musical landscape; memorable enough to be recalled, but not so infectious that it becomes annoying. So let's run through a few initial considerations that will help get your priorities straight.

Keep it simple

When trying to come up with a dynamite hook, simpler is often better. Memorable motifs tend to be the ones that most people find easiest to remember – the sort of thing you only have to hear once to be able to sing it back. That's the reason we use the word 'hook': it's meant to lock instantly into your brain and lodge there.

> "From Beethoven to Beyoncé, the rule of simplicity holds true"

From Beethoven to Beyoncé, the rule of simplicity holds true. Overstep your audience's comprehension and you've blown it. So what about the *musical content* of your ear candy?

Notes and chords

There are two main schools of thought when it comes to 'composing' a hook. Some writers prefer to come up with a melodic hook first, then fit an appropriate set of chords underneath, while others prefer to start out with a chord progression and come up with something that fits over the top. None of these are better – as with most aspects of composition and production, it's mostly a matter of personal taste and experimenting to find the method that works best for you.

Even a one-note hook needs its note choosing wisely

If music theory isn't your strong suit, it's probably easier to start with an existing set of chords and sketch out your line instinctively. This approach also has the benefit of allowing you to use MIDI transformers such as AutoTonic CM (free with the mag this month) to lock incoming MIDI data to a scale or key that you know will work with the chords, giving you the freedom to just plonk away randomly and come up with something that sounds great. If you need a few pointers, look no further than our exhaustive guide to *Chords & Scales* in **cm**234.

So now that we have a workflow in mind, we want to reconsider the hookmeister's mantra: 'simplicity is key'. But what does that actually mean in practical terms? Well, at its simplest, even though it might seem like a bit of an uncool approach at first, sometimes the more childish and nursery-rhymesque your motif is, the better.

So following that logic, the simplest type of hook is the monotone chant, that just sticks on one note and hammers it home with a catchy rhythm. Let's take a look at how you might go about it.

Ground up: a one-note hook

Rhythm and syncopation are as important as the notes that form this type of hook, but we'll get deeper into rhythm later on. For our first consideration, which note do you actually pick?

The most obvious choice would be the root note or tonic of the key you're in, but the most obvious isn't always what works best. For instance, check out the chorus hook in the recent Little Mix single *Shout Out To My Ex* (**bit.ly/LMshoutout**) as an example. It's in the key of F major, but the hook is centred around the fifth (the note C). By going for the fifth rather than the root, it's given the whole chorus a particular feeling – there's tension, caused by the need to resolve back to the root, which would be absent if the hook were based on F in the first place.

You can also get great results by picking a note that's somehow at odds with the track – a flattened seventh for example. If the tune is in the key of C major, you could try a repeated B♭ note as your hook.

As you add more notes to your hook, it makes sense to stay within the boundaries of the parent scale of the key you're in – in other words, the set of notes that define the key of the song. The more notes you add, the more complex your hook will become, together with the added risk of it becoming less memorable, so finding the happy medium is your overall goal.

> Step by step 1. Building a monophonic lead synth with Bazille CM

1 > Load up an instance of Bazille CM in your DAW and keep the Default patch loaded. We're going to make a monophonic lead sound, so in the Voice section, switch from Poly to **Mono** mode. Our sound only uses one oscillator, so in the Osc 1 section over on the left-hand side, change the waveform from Saw to **Square**.

2 > Move the cable from the input of **Out 1** to the input of the **filter** section. Then drag a cable from the **LP12** output of the filter section to the input of **Out 1**, replacing the one you moved. This places a 12dB/octave low-pass filter between the oscillator and the output. Set the filter **Cutoff** to **120** to trim off some of the upper harmonics, making the sound smoother and less bright.

3 > In the Glide section, set the **Mode** parameter to **Rate** and the **Amount** to **31**. This will add a nifty pitch swoop to the front of each note. In terms of effects, the default delay effect works fine just as it is. Click the **Save** button at the top right to save the preset – we can use it in another tutorial later on.

Baiting the hook

We reckon that these five factors are the crucial ingredients for a unique and memorable tune

Riffs & melodies

Whether it's a synth, guitar or vocal line, a kickass melody or repeated riff that no one's ever heard before can make a hugely effective hook, and also give you plenty of fodder to spin out the rest of a track. Classic examples include *Sweet Child O' Mine* (**bit.ly/GnRsweet**) and *Stayin' Alive* (**bit.ly/BGstayin**), both hugely recognisable and repeatable. A good modern example of this is Jonas Blue's recent hit *By Your Side* (**bit.ly/JBbyYS**), which builds itself up to a highly infectious chorus melody.

Rhythm

A rhythmic hook could be a drum or percussion pattern, such as the contentious one in Thicke and Pharrel's *Blurred Lines*, or Justin Timberlake's *Like I Love You*. In the case of the JT example (**bit.ly/JTlily**), the sparse backing track lets a loose drum groove shine through. The combination of the drum track and that chopped-up acoustic guitar makes for a smash hit.

Repetition

Hooks generally benefit from a healthy dose of repetition, to reinforce the musical idea in the listener's brain. Venerable songsmith Sting is a big fan of tenaciously going on and on and on and on until it feels like he can't go on any longer, and the early catalogue of The Police is fittingly rife with repetition – from the relentless chorus of *I Can't Stand Losing You* to the raucous *So Lonely* (**bit.ly/PoliceSL**) and of course *Roxanne*, whose repetition was parodied in (**bit.ly/RoxFaster**).

Lyrics

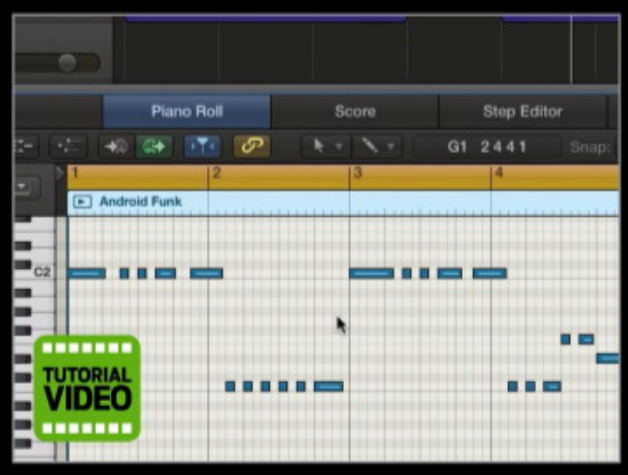
Sometimes, all it takes to form a hook is a catchy lyric. In *Work It* by Missy Elliot (**bit.ly/MEworkit**) for example, the line "I put my thing down, flip it, and reverse it", is... flipped and reversed, to make "it's your frimly dippy frem anyet". Absolute nonsense, but you just can't help wanting to sing it back. And you don't even have to use actual words, as proved by Blur's *Song 2*, (**bit.ly/Blurr2**) which simply relies on the "Woo-hoo!" to drive its point (if it has one) home.

Sound

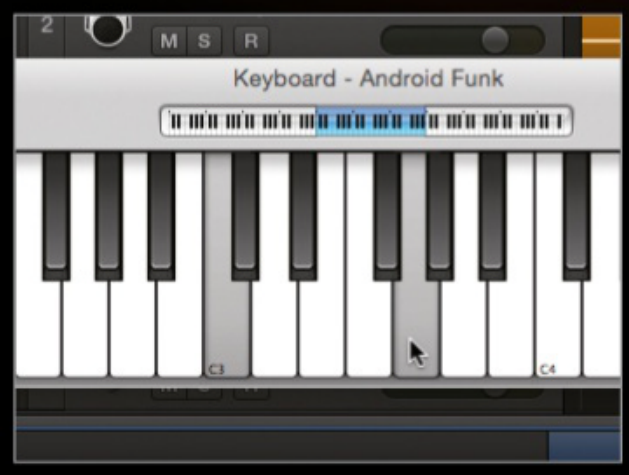
Characterful sounds can often be hooks in themselves – case in point, Duck Sauce's *It's You* (**bit.ly/DSitsyou**). Love it or hate it, there's no sound quite like that squeaky synth, and for better or for worse it'll stick in your head. Gary Numan's *Cars* is a fine example of a hook arising from a unique sound, although over the years it's become less unusual. More recently, the many synth hooks currently on display in the charts that are fashioned from vocal audio is evidence that voice manipulation has been a big influence on music. You can still do great things with the simplest of sounds, however, such as the little monosynth hook in Clean Bandit's *Heart On Fire*.

> Step by step

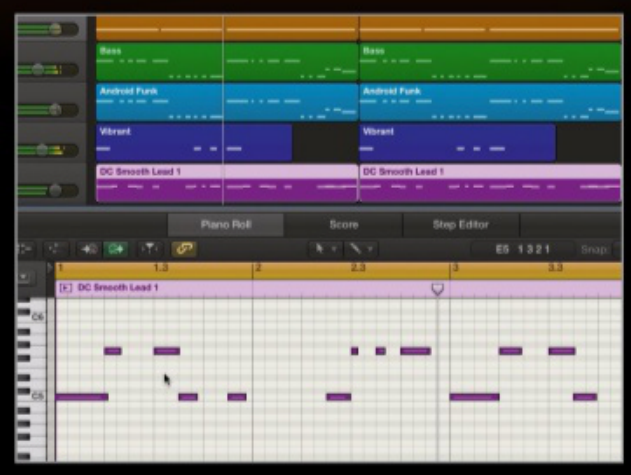
2. Using basic music theory knowledge to build a simple hook



1 > The first step is to determine the key of the track and find the root note. There are various ways to do this, but the easiest is to plonk about on a keyboard until you hit a note that sounds like it's the tonal centre of the piece. Our track shown here is grooving along in C minor, so the root note, or 'tonic', is probably C.



2 > Our next step is to find the dominant, or fifth degree of the parent scale. You can find this by taking your root note (C in this case) and counting up seven semitones (black or white keys on your keyboard) from it. The note you land on – G in this case – will be the dominant.



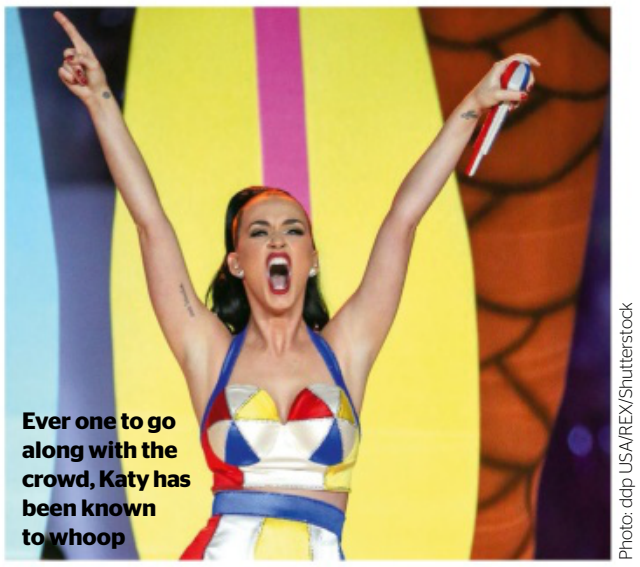
3 > Play in a rhythmic part that alternates between these two notes, such as the one shown here. The great thing about alternating between the tonic and the dominant like this is that it will work equally well over a major or minor key. This is because a key's major or minor quality is determined not by the tonic or dominant, but by the third degree of the scale.

The Millennial Whoop

Let's get down to the nitty gritty by taking a look at a few real examples of hooks from recent years. The Millennial Whoop, as it's come to be known, was identified as 'a thing' recently, after cropping up over and over again in the last few years (**bit.ly/millWhoop**).

Basically, the 'whoop' is an element of a vocal hook that involves a shift in the melody from the fifth note in the scale to the third note and back to the fifth once more. For instance, if your song is in the key of C major and your melody swings from a G note (the fifth note of the C major scale) down to an E (the third note of the C major scale) and back up again, there you have it. Examples can be found in a huge number of recent hit songs, across many different genres, from artists like Katy Perry (*California Gurlz*), Little Mix (*Hair*), Chris Brown (*Turn Up The Music*), One Direction (*Live While We're Young*), Kings of Leon (*Use Somebody*), Owl City (*Good Time*), Fifth Harmony (*Anything Is Possible*) and the Lumineers (*Ho Hey*) to name but a few. It's popular not just because it sounds upbeat, celebratory or euphoric, but because it feels familiar, easy to sing along to and remember. Which is, after all, what a good hook is all about!

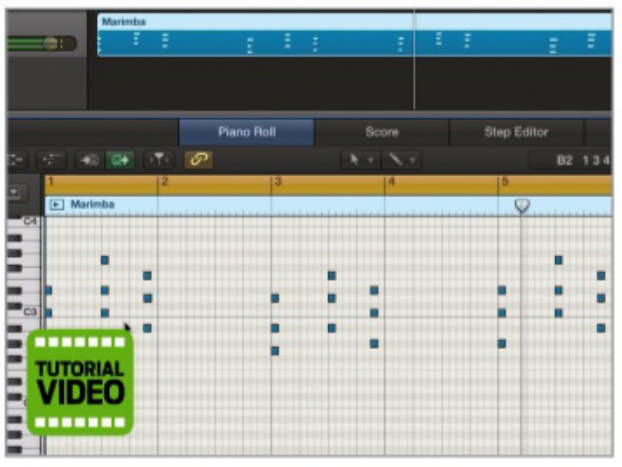
That said, the enormity of its use over the last five years in particular has saturated the market somewhat, so it might be time to give it a bit of a wide berth for now. Use the Millennial Whoop at your peril!



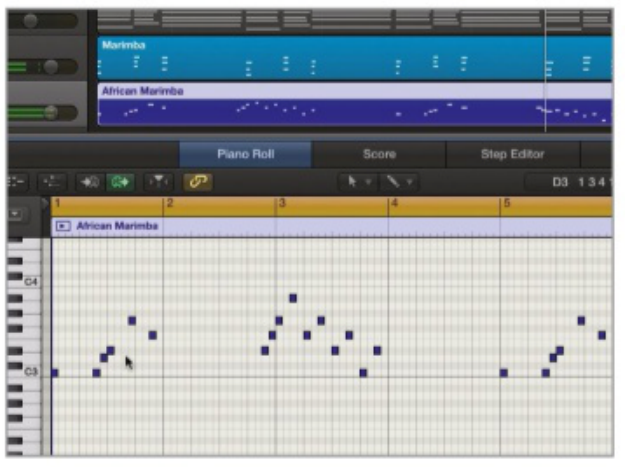
Ever one to go along with the crowd, Katy has been known to whoop

Photo: ddp USA/REX/Shutterstock

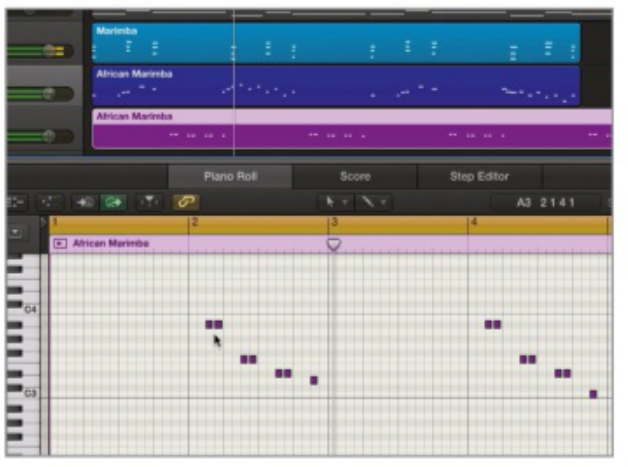
> Step by step 3. Building a complex hook from layers



1 > Here's a chorus section of a track that features just drums, bass and piano, in the key of C minor. We'll start building our hook by simply replacing the chords that the piano is playing with short, staccato versions of the same chords played by a marimba sample. This marimba part could also be used on its own as the intro to the song, for instance.

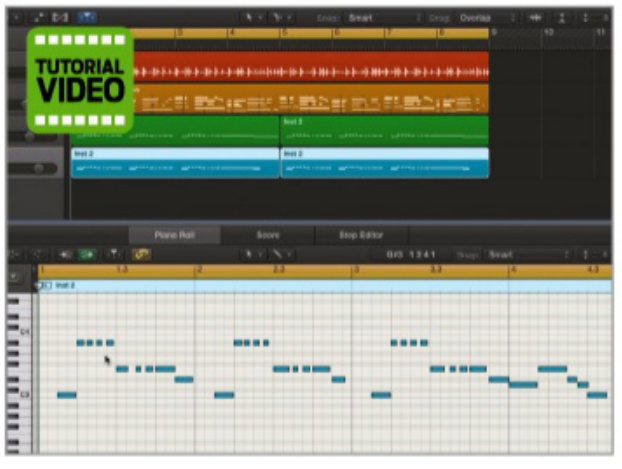


2 > Next, we program in a single note riff on a different track, also loaded with the same marimba sound - the factory African Marimba preset from Logic Pro X's EXS24 sampler. To match the rest of the notes in our track, this riff is constructed using notes from the C minor scale.

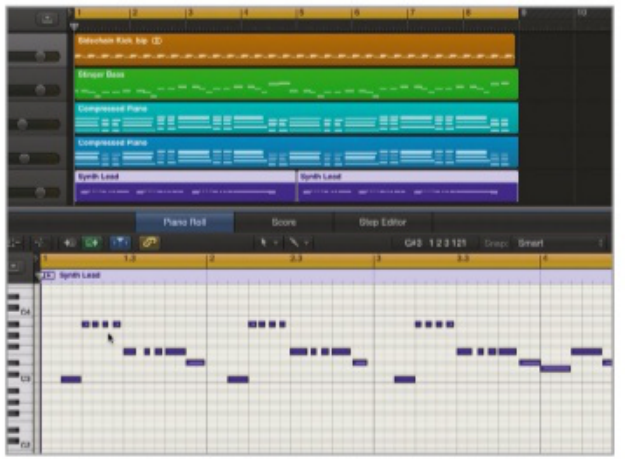


3 > In the gaps, we program a little answering phrase to fill in the gaps between the main hook. We can either use the same marimba sound for this – as it suits the part and could work to make a complex, all-marimba hook – or we could use a different sound for this part, for a kind of 'duelling hooks' effect. Something like a mono synth sound, for instance, or even a sung vocal hook.

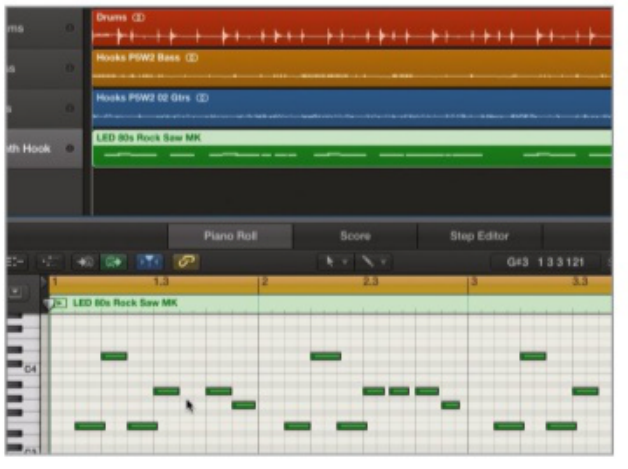
> Step by step 4. Using the same hook in different genres



1 > The synth hook in this tropical house-style track uses a combination of an analogue synth lead sound and a vocal sample that's been treated in Logic Pro X's Alchemy to produce the kind of radio-friendly sound that can be heard on many current hits. You can find the MIDI file for the part in the **Tutorial Files** folder on FileSilo..



2 > Here, the same hook can be found fronting this disco house tune, played by a different analogue synth lead that's more suited to this style. We've simply imported the MIDI file and changed the sound to suit the track. Both tracks are in the key of C minor, so the part works well in both settings without any transposition.



3 > For this rock tune, we've transposed the same MIDI file up four semitones to the key of E minor. We're using the **LED 80s Rock Saw MK** lead synth preset from Synthmaster CM for this one. We've also removed some of the shorter notes and lengthened some others to fill the gaps. This simplified rhythm works better with the faster tempo of this track compared to the previous two.

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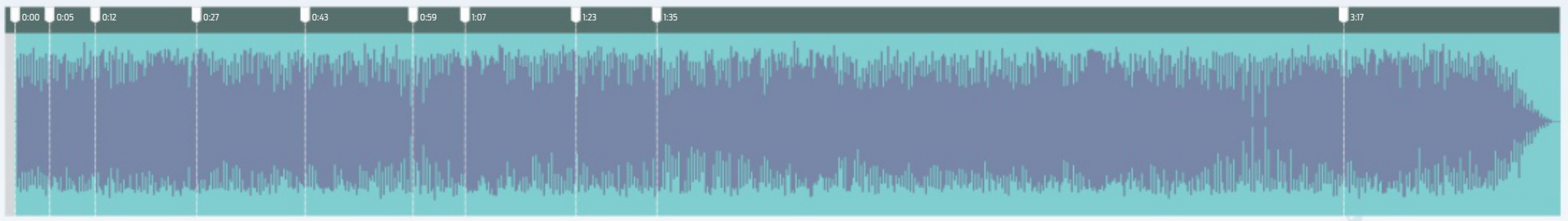
Four famous hooks dissected

Find out what makes this quartet of classic tracks so damn catchy



ARTIST
Lipps Inc

TRACK
Funky Town

bit.ly/FnkyTn

An oldie-but-goodie, this 1979 slice of disco/funk fusion is a masterclass in how to assemble multiple hooks into one smash hit

0:00 This tune's rhythm track, from the word go, is a hook in itself, with rapid-fire, dual-tone cowbells clattering over a solid disco beat played on a live kit. At the same time, a beautiful round Moog synth bass kicks things off with an insistent eighth-note sequence of alternate octaves on C.

0:05 We're straight in with the main synth hook: a bright, bleepy monophonic synth sound played in the mixolydian mode over the key of C major. This means that, although the song is in the key of C major at this point, the synth part has a B♭ rather than the B normally found in C major.

0:12 After just four bars, the riff is joined by another great hook - the vocoded lead verse vocal, playing another single-line melody, also in C major. The synth lead fills in the gaps after the first two lines.

0:27 "Well, I talk about it..." in comes a regular, three-part harmony vocal, repeating "talk about it" four times, stepping down a note each time.

0:43 "Gotta move on...", the three-part harmony continues, repeating this C B♭ C phrase over the first three notes of the main synth riff as it continues for another six bars.

0:59 Here we get a rhythmical hook – four bars of white noise stabs, probably from a Minimoog. The chorus bassline also makes an early appearance in the last two bars, as does a seemingly random 'peep-peep' on a whistle!

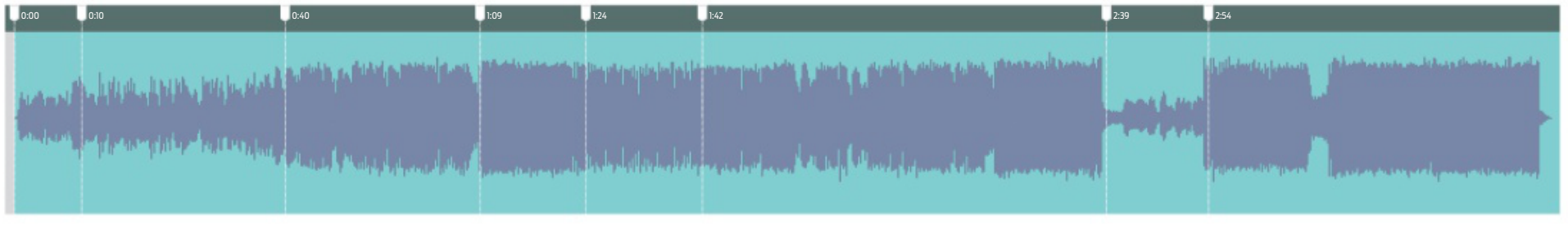
1:07 It's chorus time! Heralded by a glorious, full-stereo guitar lick that pulls us into the key of C minor with a funky Cm7 chord – yet another hook.

1:07 Meanwhile, the lead vocal, without harmonies this time, takes us in a whole new direction, entreating "won't you take me to Funkytown?" using notes from the C minor blues scale.

1:23 Essentially an instrumental repeat of the chorus, this section features a unison string section playing the chorus melody in place of the lead vocalist.

1:35 Bada-ba-ba-bakow! go the guitar and snare drum in unison, playing an F major chord stab to announce the middle 8. This happens four times, with a bluesy sax riff filling the gaps.

3:17 The final hook is a male vocoded version of the chorus lead vocal that takes over from the female lead for the "won't you take me to" line of the final sung chorus. We could analyse this track all day, thanks to its catchiness... but we gotta move on.



ARTIST
Calvin Harris

TRACK
Outside

bit.ly/CHoutside

Curious one this, as it features an instrumental chorus that drops the lead vocal melody while a killer string hook takes centre stage...

0:00 The main instrumental hook comes in two different incarnations, the first of which we're treated to from the outset. Twin picky guitars kick things off, one playing arpeggiated B♭, Gm, Dm and C chords while the second picks out what will eventually become the main hook. The two heavily processed guitar parts intertwine beautifully, continuing on throughout the entire first verse, providing the backdrop to Ellie Goulding's vocals.

0:10 "Look at what you've done..." Enter the lead vocal, singing a melody in the key of D minor. The phrases in the melody are largely made up of simple runs up and down the notes in the scale. A powerful hook bounces between alternating F and D notes – "there's a power in what you do..." before ending on a "wo-ah".

0:40 Now we get the second version of the main hook, with the same melody previously taken by the picky guitar now played by a combo of synth and live, unison strings with a healthy dose of portamento (glide). The rest of the track begins to build in intensity up to the next section, while Ellie Goulding sings the main chorus hook ("I'll show you what it feels like, now I'm on the outside") over the top. The main lyric is punctuated by the "oh-ah" vocal hook after every line. Chorus? Pre-chorus? It builds like a bridge musically, quarter-note handclaps and snare rolls building the tension, ready for...

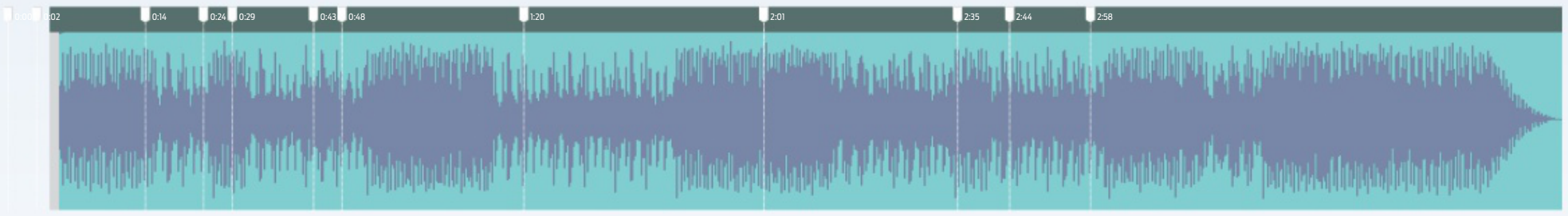
1:09 ...the drop! The vocal drops out and the main hook repeats in full force over a stepped-up groove, with four-to-the-floor kicks and that bendy string hook more prominent and pronounced.

1:24 The track drops down to the second verse, with a reprise of the picky guitar hook and the same vocal melody repeated from the first verse.

1:42 "I'm holdin' on ... never enough for me". This answering backing vocal in three-part harmony halfway through the verse is a choice little piece of ear candy that gives us something new.

2:39 After a repeat of the verse, pre-chorus and chorus, we drop back to a middle-eight section made mainly from the arpeggiated guitar from the intro, with a new vocal hook laid over the top. This has the same lyric as the chorus vocal, but uses a different melody.

2:54 In a final repeat of the pre-chorus section, we get a new backing vocal hook with a harmonised "aah-aah-aah" part that complements the main lead.



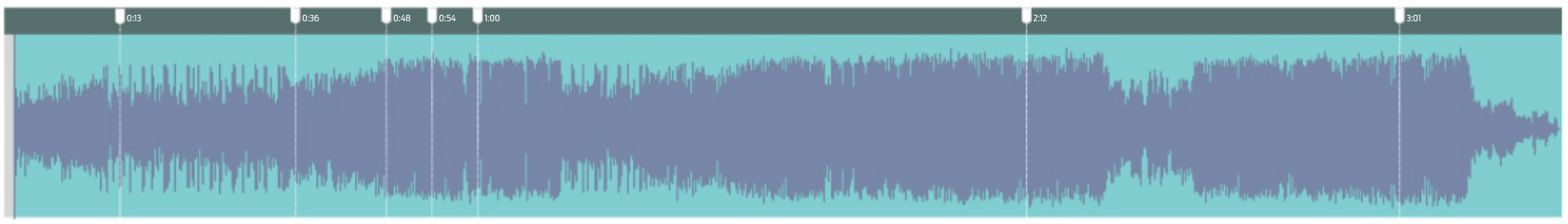
ARTIST
Beyoncé

TRACK
Crazy In Love

bit.ly/BeyCrayJay

This corker, released in 2003, is a great example of how one great sampled hook can provide the foundation for a worldwide smash

0:00 The main sampled hook of the tune hits the ground running, with full-on blaring horns and ride cymbal-led samba-style percussion. In the key of D minor but alternating between B♭ and G major chords, this is lifted entirely from the Chi-Lites' 1970 song *Are You My Woman? (Tell Me So)*.
0:02 The main hook is joined a moment later by some freestyling Jay-Z, who introduces the tune with a few throwaway lines.
0:14 "Uh-oh uh-oh uh-oh oh no-no!" This famous vocal hook takes over from the horns, with the percussion loop continuing beneath. The rhythm of the "uh-oh" hook is based on the part that would normally be played by go-go bells in the Samba genre on which the percussion groove is based, explaining why it fits so well in the track.
0:24 In comes the main hook again, just for two bars, to set up the first verse.
0:29 Out drops the brass hook to be replaced by the verse vocal, the percussion loop and the odd horn stab taken from the sample. The vocal melody in the verse is centred mainly around only three notes – D, C and E – from the D minor scale.
0:43 There are a couple of 'one-shot' hooks in this record – little ear treats that only happen once – and this is one of them: a sampled voice saying "yeah", with a quarter-note delay added.
0:48 Our first proper chorus, with the main brass riff pounding back in, and Beyoncé gives it "Got me lookin' so crazy right now…", again using only three notes (F, G and D) for the entire chorus vocal hook.
1:20 Another one-off hook: the spoken verse lyric: "Who he think he is?"
2:01 Jay-Z does his thing over brass stabs and percussion.
2:35 The "uh-oh" hook returns beneath this part of the rap section, this time with added phaser effects!
2:44 For the middle-eight, we get a new vocal hook over the intro chords; "You got me lookin…". This lyric is sung half-time, and this time we've added in an A note to the melody. Three-part harmony backing vocals chime in with a G7 chord on the words "crazy", "baby", "foolish", and "do this".
2:58 Another new vocal hook adds the lines "but your love's got the best of me, baby you're makin' a fool of me", with lots of soulful harmonies added in.



ARTIST
The Chainsmokers

TRACK
Don't Let Me Down

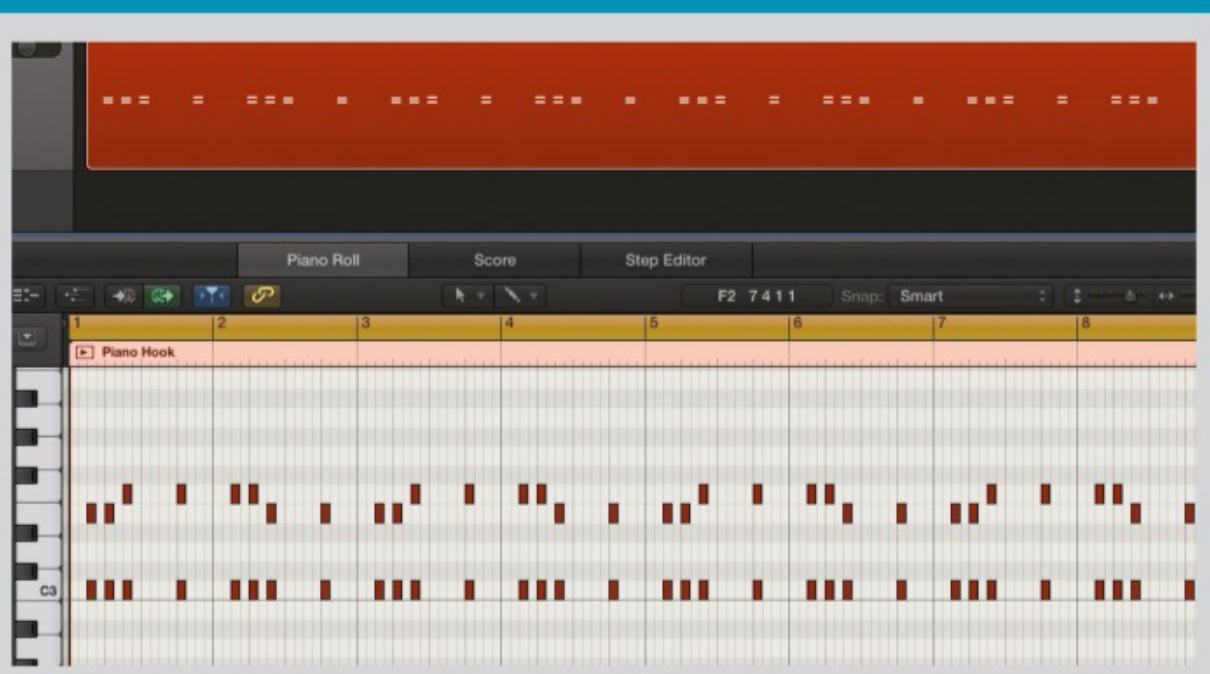
bit.ly/CSdlmd

This gem from the unhealthy-sounding New York duo is packed with more hooks than a fisherman's tackle box, as we discover below

0:00 One of the tune's main hooks is the first thing we hear – a sultry-toned picky jazz guitar riff, underpinned after four bars by long bass notes sustaining the root note of the underlying chords (E B F♯ G♯m). The riff picks out the third in each chord as each change happens – a good tip for generating hooks of your own.
0:13 Entering smoothly over the guitar hook, Daya's verse melody is a very simple one, and thus very memorable, involving the notes B, G♯ and B♭. This suggests that we might be in the key of G♯m here, as these are the first three notes in the G♯ minor scale.
0:36 "I need ya" sings Daya, three times before adding "right now". This repeated, three-note hook (E D♯ C♯) takes up the first half of this section, ending with the "now" on a B note. Stepping through scale tones in sequence like this is another useful hook-generation method.
0:48 The second half of this section, the "It's in my head" lyric, breaks out the melody a little over a kick and clap loop. The "here when I need" line shares two notes (B and G♯) that are a major sixth apart – always a nice, dramatic interval to place into a melody.
0:54 "Don't let me, don't let me" mirrors the three note "I need ya" trick from the previous section, but higher up in pitch, using B, B♭ and G♯, before settling on the F♯ for "down".
1:00 Preceded by a final "Don't let me down" (G♯ E, D♯), the drop is where all hell breaks loose. The weird bendy synth line is another really ear-catching hook, the unique sound making it memorable despite – or is that *because of* – the heavy portamento smearing the pitches of the notes. The chorus vocal melody is based around the same three notes that bring in the drop (G♯ E D♯), and repeats throughout with a few minor variations. Somewhere in the background is a group of guys singing "Hey!" on the offbeats.
2:12 The middle-eight section brings us a new keyboard hook played by a brassy synth sound like a miniature fanfare, hopping from three C♯ notes up to D♯ over double-speed kicks. We also get another new vocal hook – "ooh I think I'm losing my mind now, yeah".
3:01 With the middle section chords forming the song's outro, a higher version of the brassy synth riff helps round things off nicely.

Quick-fire hook ideas 1

Every hook is different – will one of these effects be the silver bullet for your next catchy motif?



> Technique 5. Rhythm and repetition

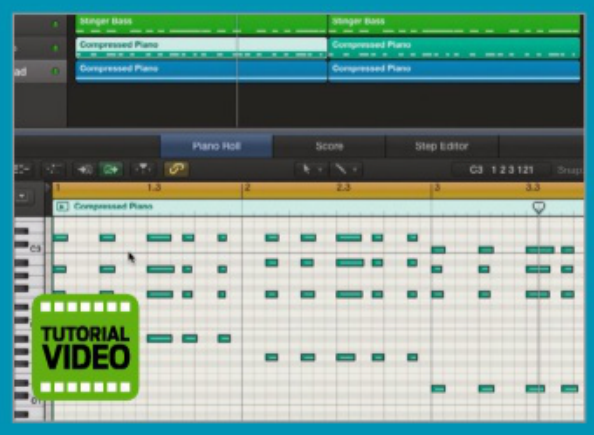
So that they stick in the listener's brain to keep them coming back for more, hooks generally need to be short and easily repeatable. Throughout the history of pop music, its repetitive nature has often been a target for criticism, yet it's what helps to hammer a hook home so that the song endures. The key is to use the right amount of repetition, so that it does the job without crossing over into being annoying. If you can tap into a rhythmic feel that's the kind of thing you might hum while walking to the shops for a loaf, then so much the better. The "Bam bam be dam bam bam be dam dam" hook in Rihanna's *Disturbia* is a good example of this idea.

> Technique 6. Melismatic vocals

Stretching a word or single syllable out over multiple notes is known as a melisma, and it's a technique commonly found in pop music. The most widely-known classical or folk example is probably the singalong "Glo-o-o-o-o-o-o-o-o-o-o-ria" chorus from *Ding Dong Merrily On High*, but there are many more recent examples from the field of popular music. Annie Lennox, for example, wondered "*Why-y-y-yy-yy-y-y-y*", and Bruno Mars is another guy who likes a good melisma ("24 carat magic in the ai-i—i-i-ir"). While you've still got to fill in the notes, you won't need to come up with lyrics.

> Technique 7. Overlaying hooks

Why stop at one hook? Here's a way to combine multiple ideas into one overarching theme



1 > Sometimes you can combine short, rhythmic hooks and long, flowing ones to great effect. Here's an example piece not too dissimilar to a recent chart hit. It's just drums, bass and keys at this stage.

2 > Now let's hook it up with a funky, rhythmic vocoder chant, singing "Yeah, we just wanna rock with you". The rhythm dovetails nicely with the piano part, and the vocoder is a blend of two sounds, each triggered by a version of the pad part.

3 > Now we add a long, flowing melody, played here by a synth, but which would ordinarily be the kind of part that would be sung by a vocalist. The long notes float over the top of the vocoder chant, ascending gradually without getting in the way of things. Double hooks!

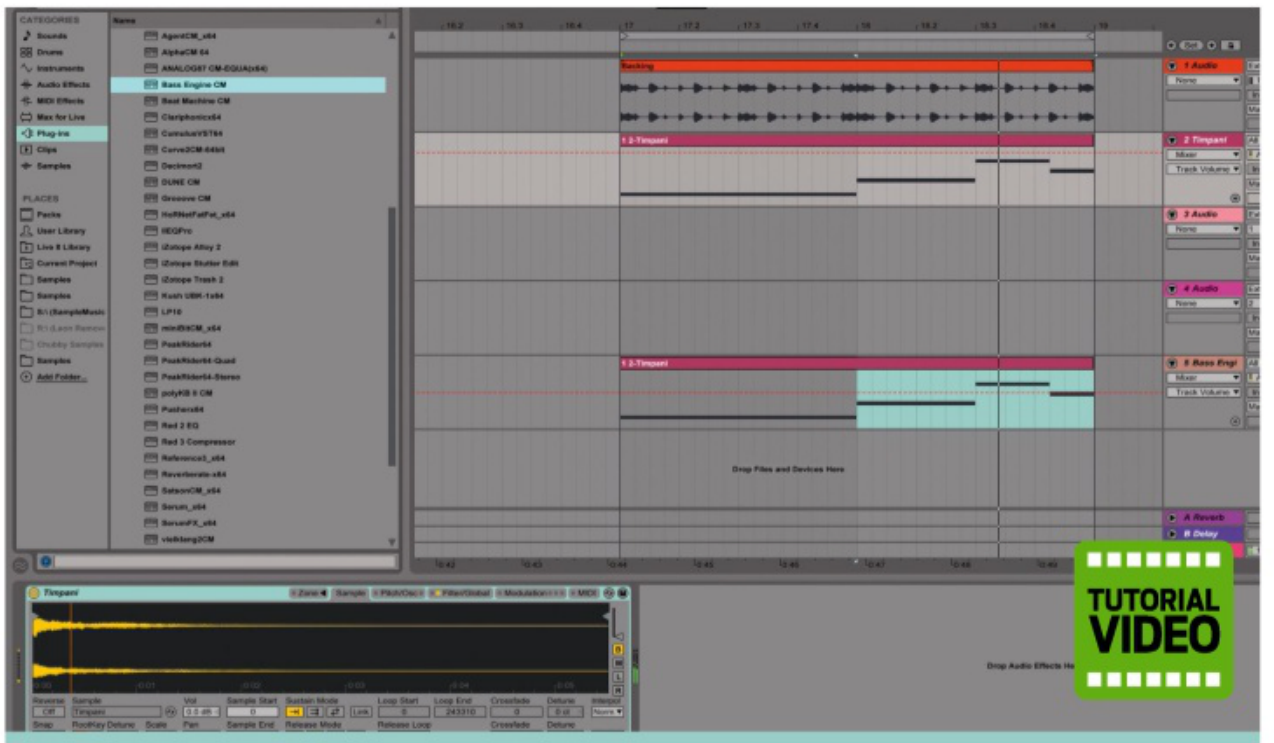
Percussive and rhythmic hooks

Beat out a new furrow with these drum and perc ideas

8. Tonal perc

Club-destined underground genres such as tech-house and techno usually forfeit obvious lead melodies, full-blown vocals and instrumentation; instead, simple percussion riffs and atonal 'call-and-answer' sounds are sequenced to create raw, rugged, driving drops.

For a popular minimal house trick, start with a tuned electronic percussion hit such as a clave or 808 cowbell – this can either be a drum sample loaded into a sampler, or synthesised using any synth – then lay down a hyper-basic, hypnotic riff that works nicely over a simple beat-and-bass groove, forming the core melodic focus of the drop in the absence of a traditional hook. To make the perc lead's pitch rise or fall during key sections of an arrangement, assign the sample's pitch to a MIDI knob, then record in unusual variations on the fly. Also assign other insert effects' parameters such as reverb time and ping-pong delay feedback to MIDI dials for further intensity-swelling potential.

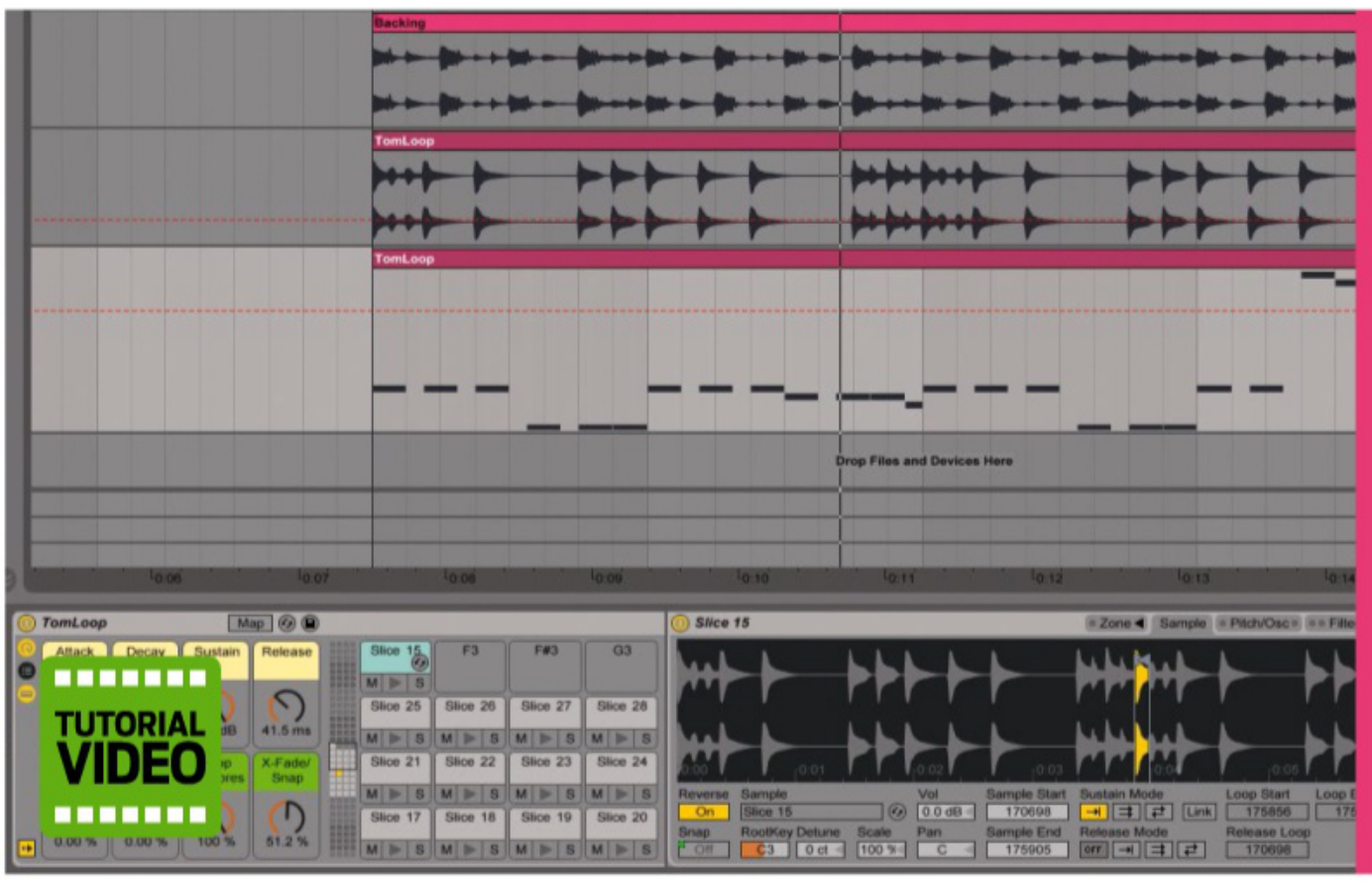


9. Action drums

Want to inject an epic Hollywood feel into your tracks? Then try out cinematic percussion as your main hook! Fire up an epic movie drum sample library, reach for your MIDI drum pads, then bash out a raucous rhythm of timpani drum hits, booming bass drums, crashing gongs and tension-building toms. Limit and sidechain the hits to fit them with your kick and snare, and layer a simple sine wave or 808 sub underneath to fill out the bottom end.

10. Tribal workouts

Nothing is as primal, driving or relentless as a melodically-sparse drop crammed with drum rhythms. Many styles of house, techno and electronica take inspiration from tribal, African and Brazilian grooves, so for a feel similar to tracks such as GotSome's *Zulu* or Mele's *Ambience*, have a go at making a hook from a montage of bongos, congas or toms. Program one-shot samples, chop up and rearrange loops from sample packs, or even grab a mic and record your own percussion! If there's a drum hit you use repeatedly in the riff, copy it to a new channel and make subtle variations – reverse, filter, modulate, you name it!

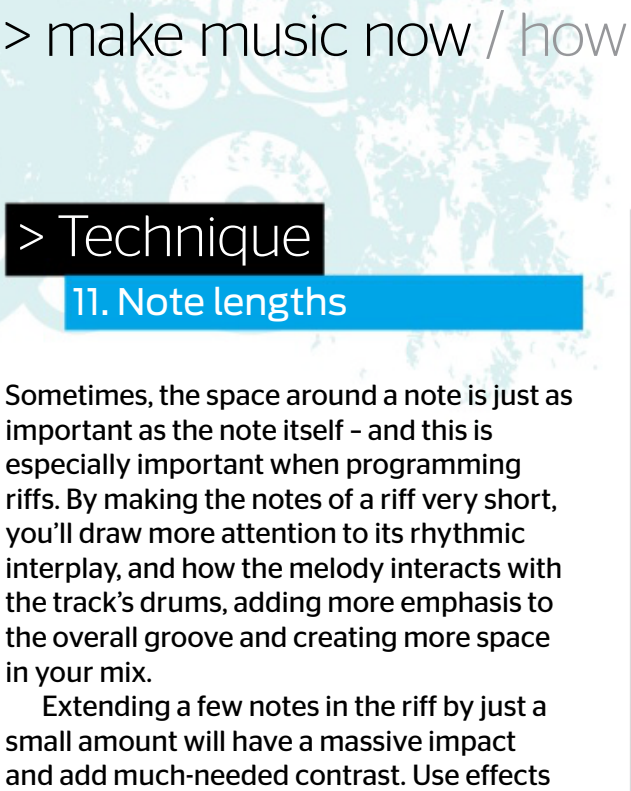


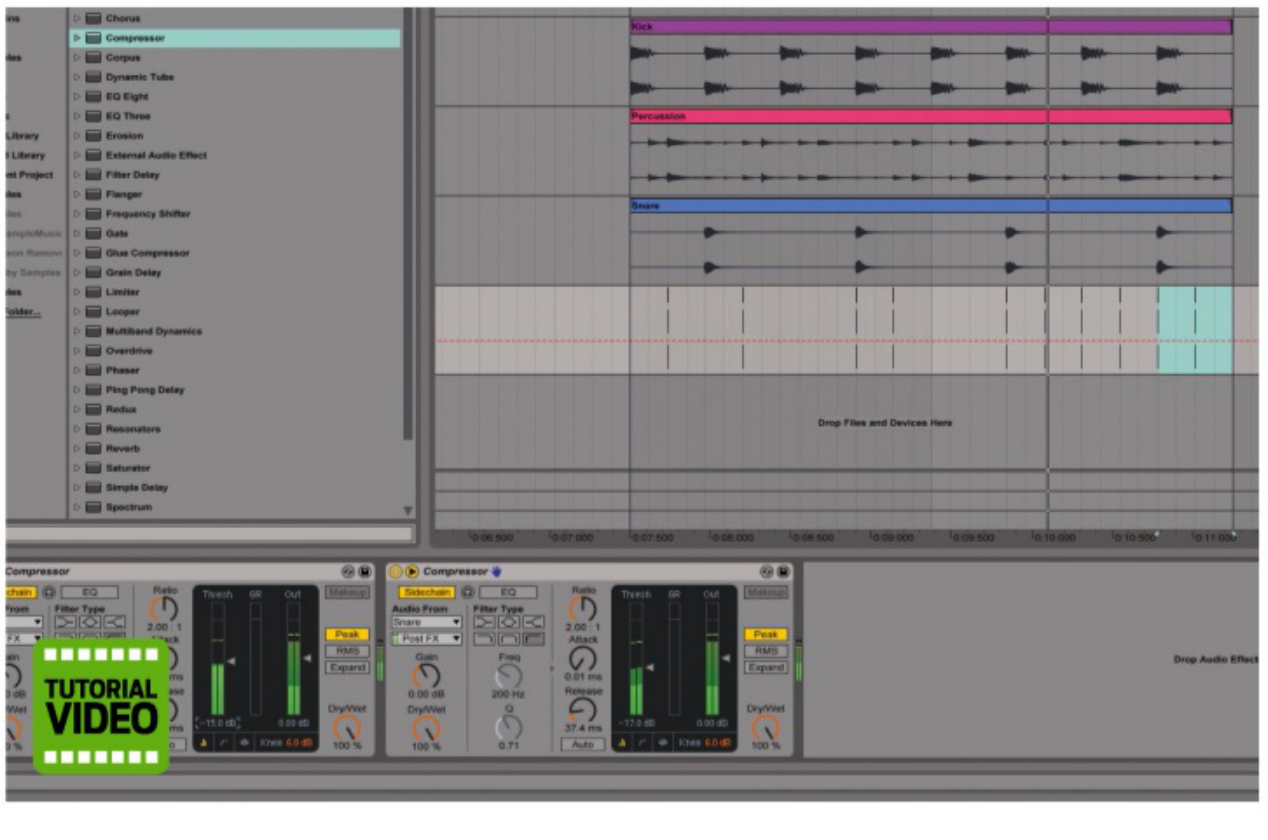
> Technique

11. Note lengths

Sometimes, the space around a note is just as important as the note itself – and this is especially important when programming riffs. By making the notes of a riff very short, you'll draw more attention to its rhythmic interplay, and how the melody interacts with the track's drums, adding more emphasis to the overall groove and creating more space in your mix.

Extending a few notes in the riff by just a small amount will have a massive impact and add much-needed contrast. Use effects such as delay or reverb with a short feedback/decay time to add subtle ambience between the notes without messing up the carefully-constructed groove; and add a crescendo by automating up the synth's amp envelope release time, swelling the synth open before a breakdown or at the end of a 16-bar section.





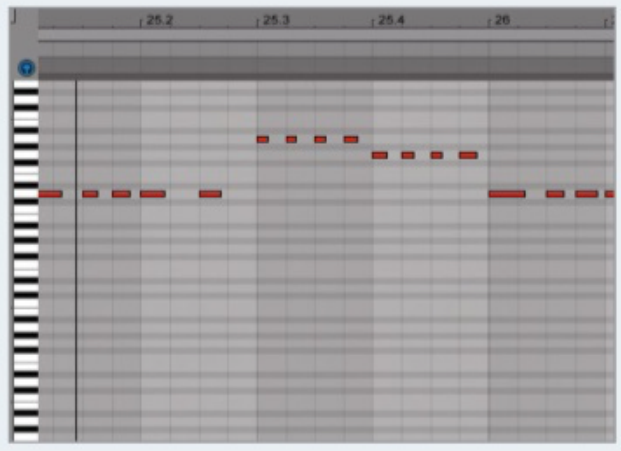
> Technique

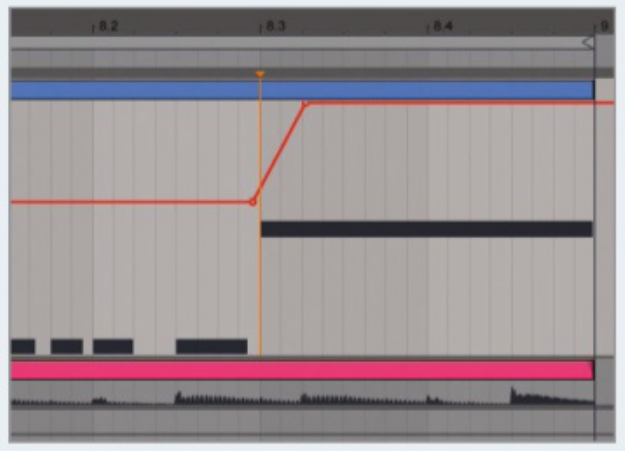
12. Transient impact

Need to give a synth hook more punch and impact? Try layering a sharp transient over the start of each note. To prevent transient collision in the mix, use the punchy elements that occur at the same time (kick, snare, hats, etc) to trigger sidechain compression on the transient layer – dial in a fast attack and a slightly slower release for around 6dB of invisible gain reduction. Create your own attack layers with short bursts of synthesised white noise – or check out cm 217's *Layering Toolkit* pack for tons of transient samples.

> Technique

13. St-st-stuttering vocal hooks!





1 > Stuttering sampled vocals are a dance music staple. To begin, load **Vocal.wav** into a sampler , then add a little performance reverb and delay via sends – we'll use Ableton Live 9's built-in effects, but feel free to experiment.

2 > Set the sampler's amplitude envelope **Release** time to **8ms**, This keeps the release tight when a note stops. Play a riff in via a MIDI keyboard: by jamming in short 16th-notes, we can repeat just the start portion of the vocal for a st-st-stuttering effect!

3 > Finally, we add some variations at the end of the phrase by programming a longer MIDI note, triggering the entire length of the vocal phrase for variation. We also push the delay send amount up during this longer segment for spatial 'bloom' and impact.

TIPS FROM THE PROS

Delta Heavy

When it comes to writing crowd-rockin' riffs and melodies, DnB outfit Simon James and Ben Hall are two of the best in the biz. We grilled them for their top hook-writing tips...

cm: Do you guys have any background in music theory? Or do you create your melodies using trial and error?
DH: "We mostly create melodies through stages of development and tweaking after an initial idea. Sometimes you nail it first time and then spend days slowly working in a circle as you try to improve it... but other times you just make it worse and have to revert back to the original!

"It also depends on whether you create the melody with the finished sound you want to use, or develop the sound afterwards. With electronic music the sound is just as important, if not more important than note selection, so it can be a process of refining the sound and/or melody rather than just working on the notes."

cm: Do you have a particular way of working when trying to nail a solid, memorable lead? Perhaps writing the lead synth first helps the other parts fit into place? Or do you lay down beats and bass before jamming out leads?
DH: "You want it to be memorable and simple. It totally varies at what point in the song's development the melody is written. Sometimes we'll have a sound we like and write a melody; other times we won't realise the tune is lacking a melody until later in the process. If you were being efficient and clever, then getting the main focus of the track nailed first and then writing around it is ideal, but a lot of tunes are often a process of trial and error. You may end up finding that your idea doesn't even vaguely resemble what you started with."

cm: It's often said that "less is more" when writing catchy, dancefloor-focused tracks. How do you nail that perfect balance of catchiness and minimalism?
DH: "Constant refinement and a fresh pair of ears. The first listen after a break can tell you instantly whether the melody or whatever kind of hook you're creating is right, especially if you've gone way over the top and made it too complicated. To nail the balance, getting the basic idea down is key and then you come back to it again and again, tweaking different elements until it all feels like it's sitting comfortably together."

cm: A DnB track's melodic focus is often a combination of many elements – for example, a bass riff, lead synth and vocal chops that all work together to create an overall 'hook'. How do you go about creating this interplay of melodies?
DH: "Firstly, it's a good idea to sit down and have studio day when you just make or find some cool synth patches – when you want to write a tune you'll have an arsenal of sounds to draw from and quickly put things together.

"Secondly, it's good to have an initial idea in your head of how they can interplay together. From that it's a process of trial and error again. In DnB, people often use complex synths that have a lot of movement. I've found that after getting an initial idea, bouncing down the parts to audio and then trying different bits can help you achieve that perfect interplay of sounds. It feels like a game of Tetris."

cm: What's your approach when creating catchy, memorable vocal hooks?
DH: "If you are going to mess around with the vocal like it's an instrument, then taking an acapella and creating the idea is the best way to do it, so it can be the focus of your track. Doing it the other way around means you can often be playing catchup and bending it to fit the rest of your track, which hard when it's the focus. If it's a natural, song-based vocal hook, it's always good to have a vibe to work with, even if it's quite basic. We'll often lift the finalised acapella and write a new backing to it – almost like a remix."

cm: Do you have any tips or tricks for writing memorable hooks and drop leads?
DH: "Don't labour too long over melodies if they aren't working. Songwriting is a numbers game, so the more songs you write, the more chances of coming up with great material you have. It's partly a question of vibe and perspective, both of which you will lose if you keep slogging away at the same tune.

"Looking back at the toplines and melodies in our tunes that have been finished, they've mostly come very quickly. This doesn't change the advice about tweaking and slowly working on them, but you have to have a good basis."

www.facebook.com/deltaheavyuk
www.ramrecords.com

Singing samplers

Tons of current pop songs feature vocal samples played in a melodic fashion, often alongside traditional sung vocals. Even a cursory browse of today's hottest hits will turn up countless examples, but try Major Lazer & DJ Snake feat. MØ's *Lean On* (**bit.ly/MLDSlean**) for a textbook one. The squeaky, high-pitched vocal solo beginning at 2:12 is constructed from vocal notes played back in a sampler. Right at the end of the song, you can hear a brief acapella from MØ that is likely part of the source material. (And by the way, sample-spotters: the "eh-eh-ohh" hook at 0:49 is actually a one-shot from the Vengeance Essential House 3 sample pack!)

Hooks created in this way have a hummable, singalong catchiness. To make your own, source a sustained vocal note, load it in a sampler, loop it if necessary, then use it to play riffs and leads. It can take some experimentation to locate suitable vocal sounds, and while your song's main vocal track is the most logical sound source, don't be afraid to use acapellas from completely different singers if it sounds good.

If you're working with a vocalist rather than using prerecorded material, ask them to perform a bunch of one-note vocal sounds for use in this way. It may not seem like it – to your singer especially – at the time of recording, but having off-the-cuff cut-ups like these can prove a real goldmine when it comes to writing a track.

For variety, set up multiple patches and switch between them during the hook. For instance, you might have a sustained loop for your main, a vibratoed note for expression, and a nonsense vocal phrase to add flavour. Some vocal sounds will work better in certain octave ranges, too – especially relevant since you'll often transpose vocals far away from their natural pitch!

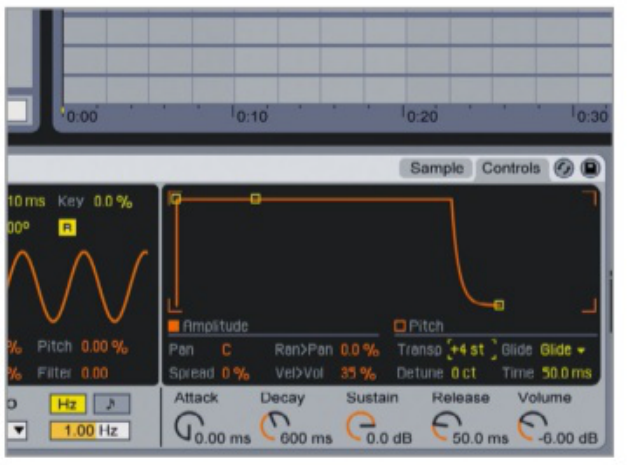
Now let's show you how it's done, first building a patch before writing a melody with it.

Mix the human voice with production techniques for thoroughly modern, Major Lazer-style results

> Step by step 14. Crafting a DJ Snake-style sampled vocal patch

1 > Chopping up a song's main vocal line to use as sample fodder is nothing new, but modern pop tracks are taking this approach to extremes. Let's create our own DJ Snake-style sampled vocal melody. Load the WAVs beginning "**Pop...**" onto audio tracks in a 95bpm project, then stick a D16 Frontier limiter on the master bus. The vocal comes from Loopmasters' Kate Wild Vocal Hooks & Acapellas Volume 2.

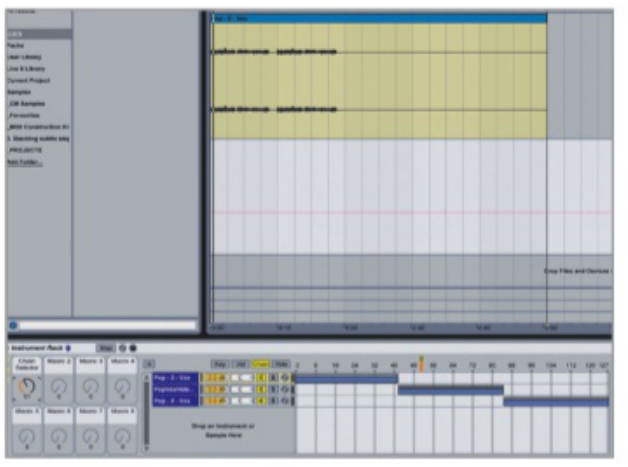
2 > First, we need to pick a single vocal sound out of the acapella to use as the basis of our sampled hook. The best way to do this is to load the entire file into a sampler, then adjust the start point until we get a position that responds well to jamming via MIDI. We're using Ableton Live, so we load the audio clip into a Simpler. Make sure **Warp** is **off**, **Classic mode** enabled and **Volume** set to **-6dB**.



3 > The start of the second line works well ("I hide away a..."), so adjust the sample start/end markers to encompass this section. Enable the sampler's monophonic mode – in Simpler, set **Voices** to **1** – then activate **Glide** in the Controls section. This allows us to create cool pitch glides by playing overlapping notes. While we're at it, we set **Transpose** to **+4** to bring it to concert pitch.

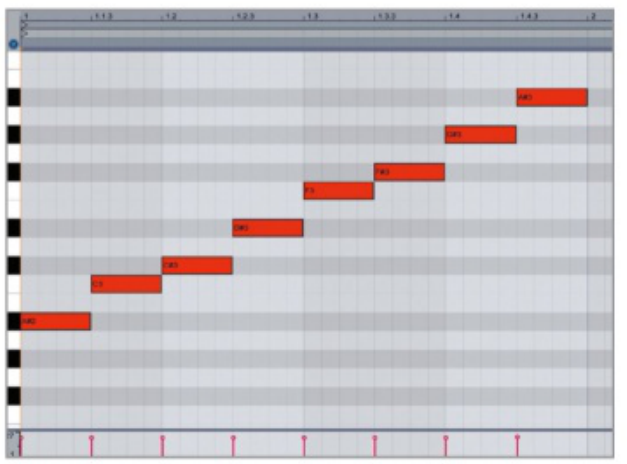
4 > Now let's create a variation by changing the sample start point. Put the Simpler in a Rack (click its header, then press **Cmd/Ctrl-G**), then duplicate its Chain and solo the new Chain as above (if you're using a different DAW, you can accomplish a similar thing by duplicating the whole track). We adjust the sample **Start** point again to locate a vibratoed note, "of", then set **Transpose** to **-1** to tune it.

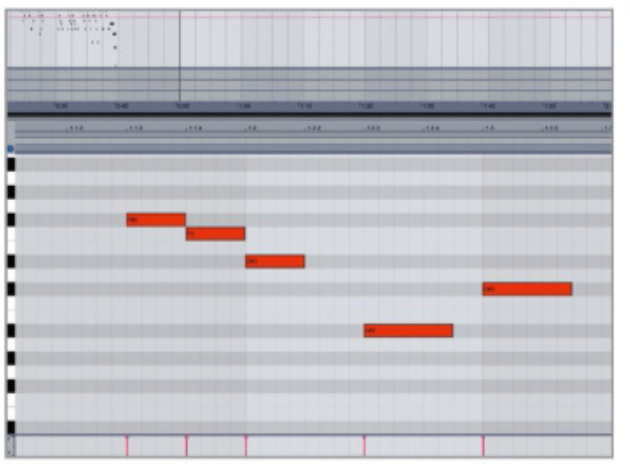
5 > For a third variation, we make a duplicate of the first Chain once again. Looping the body of the initial "I" syllable should give a sustained sound that's great for melodic play, so turn on **Loop** and adjust the **Loop** and **Length** parameters to its left so the later part of the sound is looped, turning up **Fade** to smooth the start/end overlap. The loop is too short though, giving a noticeable buzzy quality...



6 > To get around this, we use a high-quality timestretch algorithm to lengthen the clip (**PopVoxHideStretched.wav**), then reimport it into the sampler as before. To finish, we open the Rack's Chain view, set the first Chain to cover the full range, **right-click** and select **Distribute Ranges Equally**, then map the **Chain Selector** to **Macro 1**. We can now use Macro 1 to flip between our three variations on the fly.

> Step by step 15. Programming a DJ Snake-style sampled vocal hook

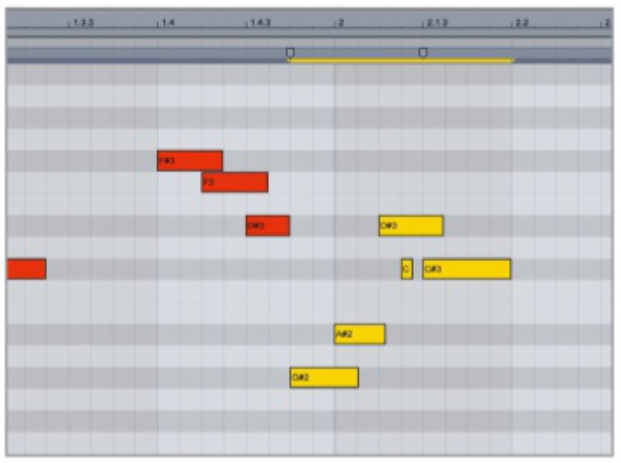


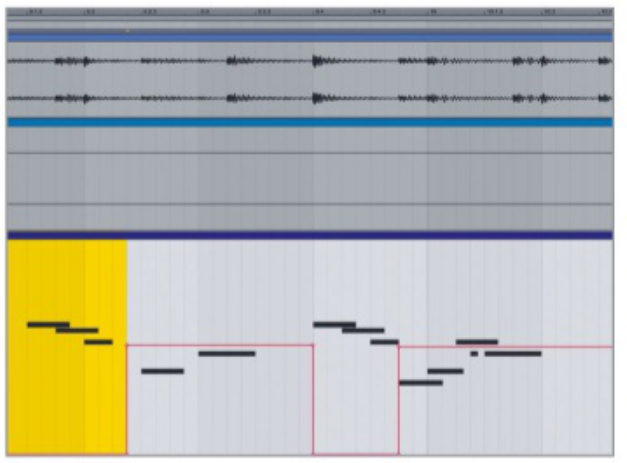


1 > In the previous tutorial, we built a DJ Snake-style sampled vocal patch with three variations. To follow along, load the WAVs beginning "**Pop...**" as before in a 95bpm project, plus **PopVoxPatch.adg** in a Simpler instrument. Create a new eight-bar MIDI clip starting at bar 9, and set the **Chain selector** to **64** to select the sustained vocal sound.

2 > The backing is in A♯ minor (aka B♭ minor), using the chord sequence A♯m, C♯, F♯, G♯. So our melody will be based on the notes of the basic A♯ minor scale: A♯, B♯, C♯, D♯, E♯, F♯, G♯. In the DAW, this will be notes A♯, C, C♯, D♯, F, F♯ and G♯, shown above. See **cm**234's guide to *Chords & Scales* for an in-depth look at these concepts and more.

3 > We can create a strong melody by incorporating the strongest notes of the scale: the first, fourth and fifth. That gives A♯, D♯ and F, which we lead into from the sixth, F♯, to give a bit of flavour. We then go to C♯, which coincides with the move to the C♯ chord halfway through the bar. Our lick starts on the offbeat, adding interest to an otherwise very basic idea.



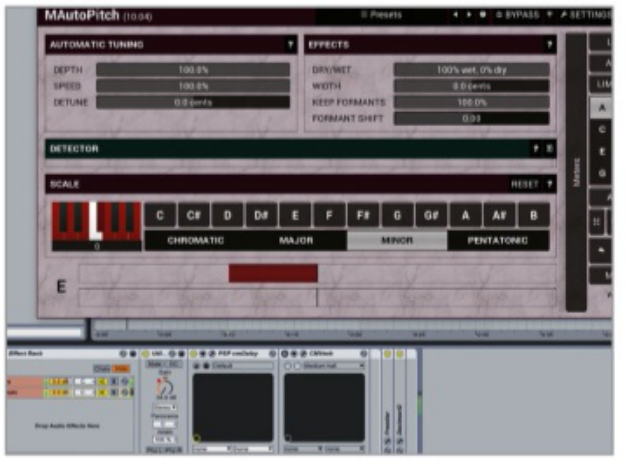


4 > Next we repeat the whole lick at beat 3, this time starting on the downbeat – this gives a different rhythmic emphasis while retaining familiarity, which aids catchiness. We've also thrown in G♯ and D♯ notes. You can overlap certain notes or throw brief extra notes in during sustained notes, to create effects with glides.

5 > The complete eight-bar hook combines one-off licks and runs with repetitive figures – we've included it as a MIDI file and Ableton Live clip. For variety, automate the Chain Selector to switch between the three sampled variations and automate the Glide parameter to change bend speed. See these in action in the video.

6 > Let's finish it off with some effects. In the video, we add Reverberate CM twice, for reflections and room spaces, then we whack on a D16 Group Frontier Limiter with its **Threshold** at **-30dB** and **Output** at **-24dB** – this extreme squashing gives an obvious pumping effect between the notes.

> Step by step 16. Three more processed vocal hooks



1 > The distorted vocal hook in tracks like Neiked ft. Dyo's *Sexual* almost sounds like a different instrument altogether. To make your own, load a vocal snippet in a sampler, then add a short reverb with plenty of wet signal mixed in, followed by distortion. We used FabFilter's Saturn to distort the lows and highs separately. Play the sample an octave or two higher than its natural pitch.

2 > Desiigner's heavyweight hit *Tiimmy Turner* uses auto-tuning for a robotic vocal. Get the effect for free with MeldaProduction MAutoPitch, with **Depth** and **Speed** on full to brutally snap every note's pitch to the nearest full note. Select a scale for more musical results. We've applied it to a vocal from Loopmasters' ace Iconical Vocals Volume 2 pack.

3 > Downwards formant-shifting gives a deep, authoritative vocal, as in Crnkn's *Heart*. Carrying on from the last step, we decrease MAutoPitch's **Formant Shift** to **-6**. Light bitcrushing adds dirty digital roughness. Note that our backing track comes from the Hybrid Trap teaser pack in **cm**238's free 1GB Loopmasters samples.

> Step by step 17. Designing a bendy trap lead from scratch

1 > Let's make a bendy, high-pitched lead sound for trap, dubstep or grime using any DAW and Xfer Records' Serum (there's a demo available from **xferrecords.com**). Set the **BPM** to **80**, then import **Backing.wav** from **Tutorial Files**. Add Serum onto a fresh MIDI channel and import **Lead.mid** to trigger the synth.

2 > Turn Serum's channel fader down to **-7dB** to keep levels in check, then open the synth and set Oscillator A's wavetable type to **Analog_BD_Sin** – a clean, solid sine tone. Next, push the **Unison** amount to **3** and **Blend** to **50**: this stacks and detunes three unison voices for an instantly bigger, wider sound.

3 > We'll add a spectral oscillator into the mix to give the lead some extra harmonics and movement – turn on Osc B and choose the **Spectral » Bowed Metal** wavetable. We'll use Oscillator A to frequency-modulate Oscillator B's Warp dial – select **FM (From A)** from Osc B's Warp menu, then use **LFO 1** to modulate the **Warp** dial by an amount of **45**. Gritty!

4 > A touch of portamento will make the riff notes lazily glide into each other: turn the **Portamento Time** (bottom right) to around **100ms** and set the **Mode** to **Always**. To finish, add a splash of space by opening Serum's FX page and turning on the **Reverb** effect.

> Step by step 18. GrimeBoy hooks with AudioThing miniBit CM

1 > Retro, lo-fi leads are great for grime or dubstep hooks, so let's use AudioThing's miniBitCM to design one. Set the **BPM** to **70** then import **Backing.wav** from the **Tutorial Files** folder. Add miniBit CM to a new MIDI/instrument track, then drop **Lead.mid** on the channel to trigger the synth. We like the **Flute Ish** preset's classic video game sound.

2 > To crunch the lead up, load D16 Decimort 2 (there's a demo available from **d16.pl**) to the MIDI track, then dial in a Resampler **Frequency** amount of around **2.7kHz** for a grittier, more lo-fi timbre. Set the **Quantizer** resolution down to **12** to add bite, then push the **Jitter** amount to around **6%** to add extra digital errors and noise.

3 > A pitched delay will give our hook a unique sound. Add Soundtoys Crystallizer (demo at **soundtoys.com**) to the MIDI track and change the **Delay** time to **1/16th** notes and the **Splice** time to **1/32nd** notes. Crystallizer now grabs a shorter slice of the incoming audio. Finally, push the **Pitch** up to **1200 Cents** and rein the **Mix** back to around **10%** to add a cool delay pitched an octave up.

The need for leads

Aside from the key and scale of the notes played, the timbre of a lead or hook tends to define the genre it's used in. For example, an EDM/big room banger will typically call for a glossy, reverb-soaked synth that's pushed right to the front of the speakers while also containing plenty of impressive stereo width. When creating lead sounds of this style, use harmonically rich oscillators such as sawtooth or square waves, alongside plenty of unison, detuning, layering and effects to give a dense end result that dominates the mix.

In contrast, urban styles such as grime typically use subtle, thin, 'cheap' synth timbres. For 8-bit vibes, there are oodles of Commodore 64 SID chip-inspired sample packs out there, while our own miniBit CM is a great starting point for those 8-bit source sounds, which can then be roughed up further with distortion and bitcrushing.

When balancing your lead sound's frequencies and perceived mix density, always consider the other sounds present in the track. If your lead vocal dominates the centre of the mix, design a thinner lead synth that sits further out to the sides. In contrast, an instrumental dance record will need the lead hook and chords to take centre-stage, so dial in the appropriate weight and thickness in the absence of competing parts.

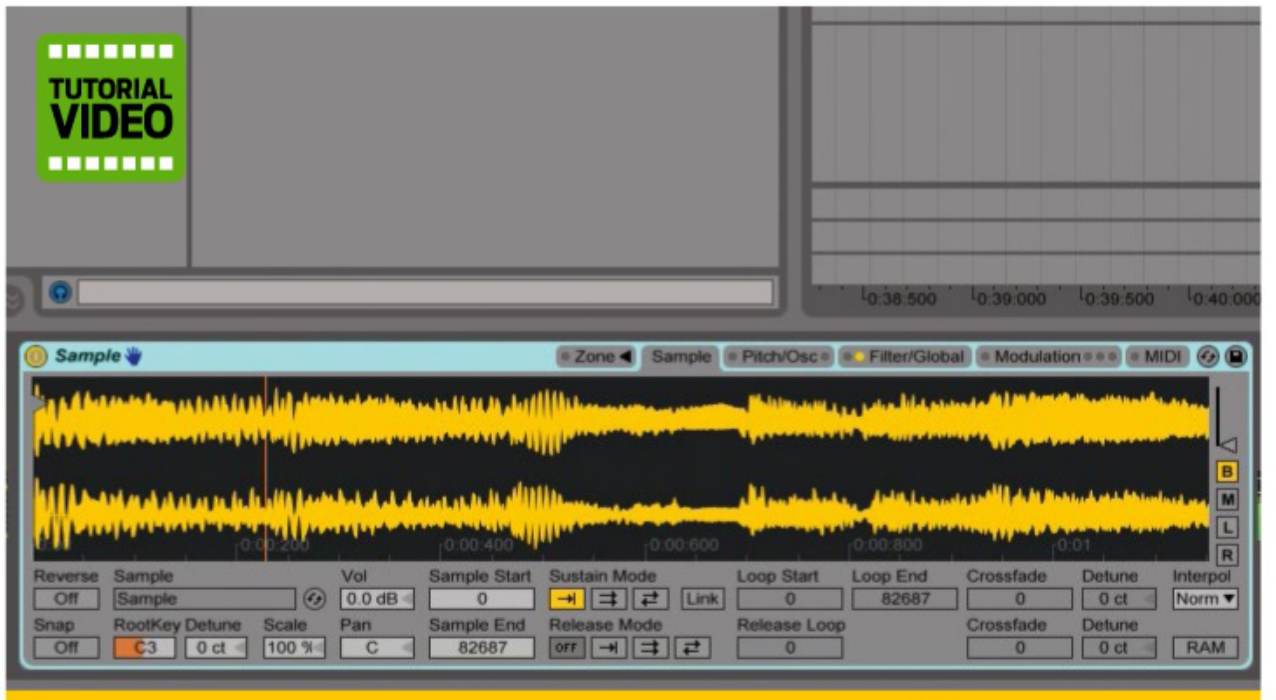
Quick-fire hook ideas 2

Get some lightning-fast inspiration for your next hook

19. That bass

There's one kind of hook that's guaranteed to screw up faces and unite a dancefloor: a fat, filthy synth bassline! In fact, genres like drum 'n' bass, UK garage and bassline house almost entirely rely upon a simple-yet-catchy bassline doing its thing over a supporting beat. A prime example is DJ Hazard's *Bricks Don't Roll* (**bit.ly/DJHbricks**), a modern DnB anthem guaranteed to get a whole rave singing along.

When bassline is the only main melodic element of a track, it has to work musically *and* rhythmically – spend plenty of time refining the timing and pitch of your notes to create a catchy bass hook that fits like a glove with the drums. One-sound riffs can get repetitive over time, so automate your basses' synth/sampler parameters or fade supporting layers in and out as the track progresses to keep its timbre evolving.



20. Making a riff from a sample

Manipulating and replaying samples from other records can be controversial, but electronic producers have been doing it since the birth of dance music for one reason: it works! If you take a piece of an entire instrumental section from another track, your riff will have other elements layered in as part of the sample, all adding up to a complex, interesting sound.

21. Call and answer

By interplaying a few different hook sounds together, you can create a catchy and original 'call and answer' lead montage for any track, similar to the lead sounds of artists such as Pendulum and Feed Me.

Typically, the best approach is to pick one sound for the 'call', with two alternating sounds for the 'answer' – for example, a cinematic timpani followed by a trap synth hook that alternates with a 8-bit-sounding grime lick. When creating a cut-and-paste lead of this sort, tie the disparate leads together into one single unit by layering a single solid low-frequency layer underneath – we recommend a simple sine wave sub bass or 808 bass drum, but feel free to experiment with other sub tones. See **cm**234's *Three-sound sweet-spot* technique for more inspiration!

One-finger wonder: the chord stab

Music technology has brought about many possibilities, and just one of them is the ability to trigger entire chords by pressing just one key on the keyboard. Later, many polyphonic synths included a 'chord memory', which could trigger juicy seventh chords and multi-octave voicings from one key press. Play a D and you'd get, say, a D minor 7 chord... hit E and get Em7, and so on.

A yet more common approach is to sample a chord, and this has given us everything from cheesy 80s orchestra hits and deep house organ chords to horn-like rave blasts and reverberant techno stabs. Absolutely *loads* of iconic 90s dance hooks were made in this way: think 2 Unlimited's *Get Ready For This*, T99's *Anasthasia*, Landlord's *I Like It* (actually pre-90s – but only just!), Spectrum's *Brazil*, and... well, the list never ends. Many of these stabs are as legendary as the tracks they first appeared in, and sampled chords remain commonplace today.

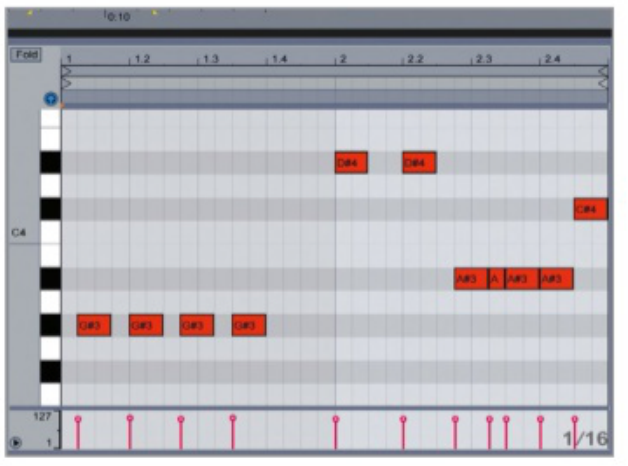
The 'locked' chord voicing means that, if you want to stay in key, you're restricted to certain notes/chords. In natural minor keys, for example, only the first, fourth and fifth chords are minor, so in A minor, you could use only A, D and E (producing chords Am, Dm and Em). Likewise with major keys, only the first, fourth and fifth chords are major.

The Roland Alpha Juno did much to facilitate one-finger chords

So how do you write a decent hook with such crippling restrictions? First off, you can use borrowed chords from the parallel key – for instance, C major is the parallel of C minor. You could also change key during the hook – the first half in C major, and the second half in D♯ major, for example. At a push, you could use a major triad to voice the top part of a minor seventh chord (or a minor triad to form the top of a major seventh).

Having said that, if you're fretting over the diatonic details while writing a hook for your hardcore throwback banger, then your priorities are all wrong! Get that index finger pumping on the keys and let the music take you. If you get stuck or it's not quite sounding right, *then* try using music theory to get back on track.

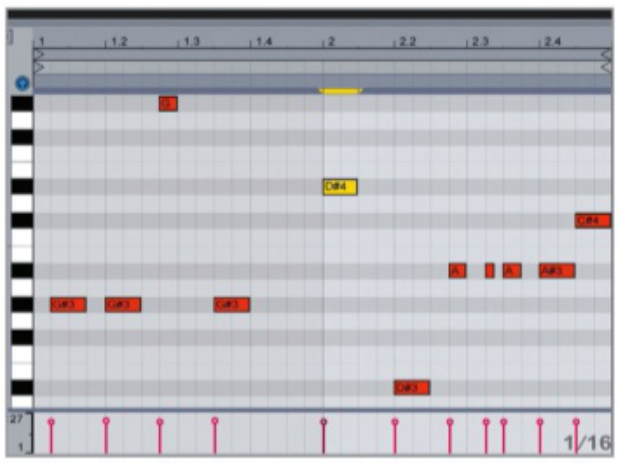
> Step by step 22. Creating your own classic chord stabs



1 > Using a single chord shape throughout an entire riff or hook is a classic technique found in many rave and house tunes. Results can range from simple and satisfying to complex and intense. To give it a go yourself, start a 125bpm project, load **HouseBeat.wav** on an audio track, Dune CM on a MIDI instrument track, and then stick D16 Group Frontier on the mater bus.

2 > In Dune CM, load the supplied preset **AmnesiaOrgan**, then add a Reverberate CM with the preset **6: Metallic Whispers** and **Predelay** at **0.040s**. We want single notes to trigger full chords, just like the 'chord mode' on old synths, and most DAWs have a chord MIDI plugin that'll do this – in Ableton Live, it's the **Chord** MIDI Effect, so add it to the Dune CM channel.

3 > Set Chord's **Shift 1** to **+3** and **Shift 2** to **+7** to stack a minor third and perfect fifth on top of the root note, giving a standard minor triad, which works well in many genres. Now play or program single MIDI notes to trigger the chord. A basic riff approach is to choose a handful of main notes that work together, then focus on tapping out a catchy syncopated rhythm with them – here's what we came up with.



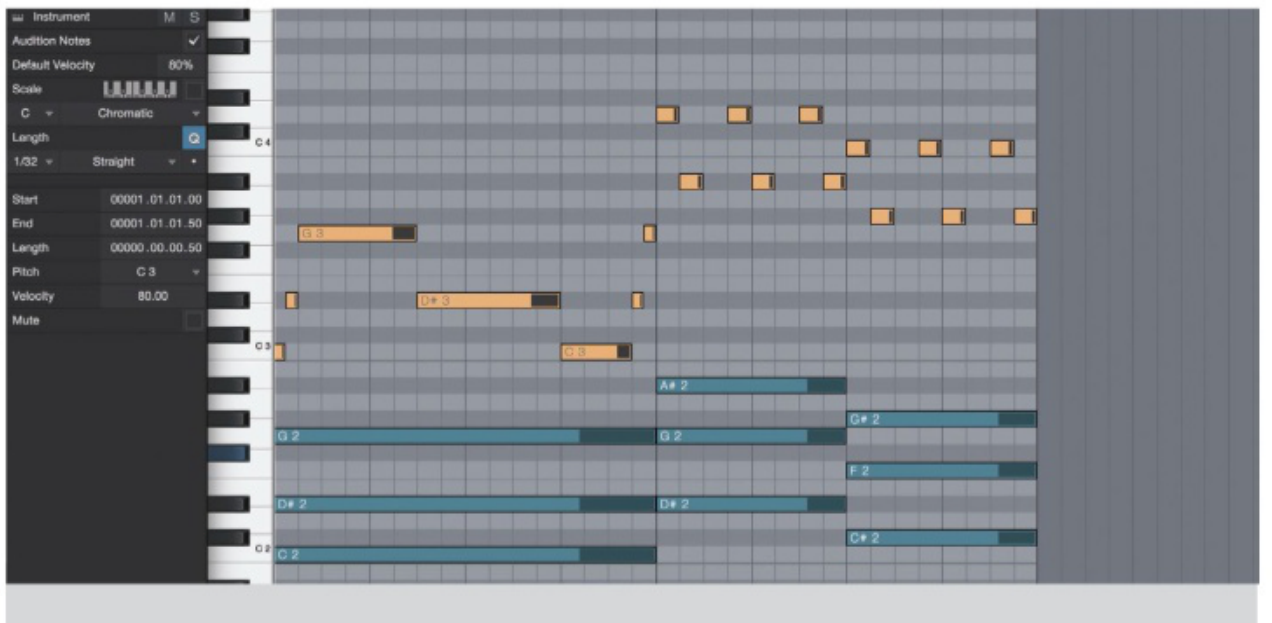
4 > Try transposing notes up or down an octave and adjusting note lengths to add interest. For an instant bassline, create a MIDI instrument track with Bazille CM loaded with the **Computer Music » Joe Rossitter » House FM Bass** preset, turn the channel down to **-11dB**, copy the riff to it, and transpose it down **2 octaves**. You might need to nudge certain notes up or down an octave to make it work.

5 > Changing the chord transforms the feel. Minor sevenths (**0-3-7-10**) and 9ths (**0-3-7-10-14**) work great for smooth, jazzy house tracks. Remove some of the lower notes if it's too thick and dense. A major triad (**0-4-7**) gives an upbeat, happy vibe – ideal for old-school rave and hardcore. Diminished triads (**0-3-6**) can work for a touch of evil.

6 > Once you're happy with the chord, you can resample it, then play your single-chord stab from a sampler instead. This also gives you the opportunity to layer up other sounds such as vinyl crackle to create a more characterful stab. Effects like reverb/delay will become a permanent part of the stab (you can add another reverb/delay if needed), and the end result will be super-solid and consistent.

Quick-fire hook ideas 3

Four more instant tips for your catchiness quest



> Technique

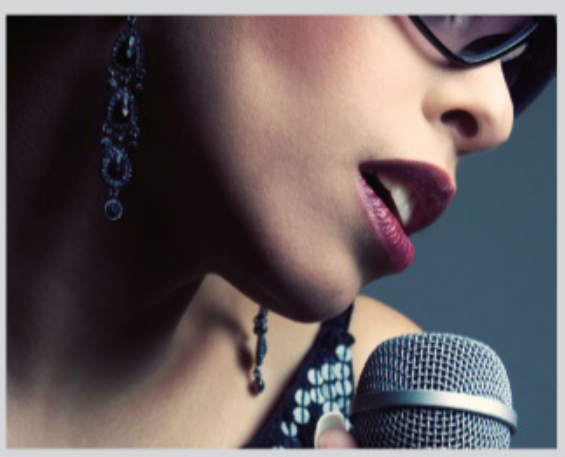
23. Arp and away

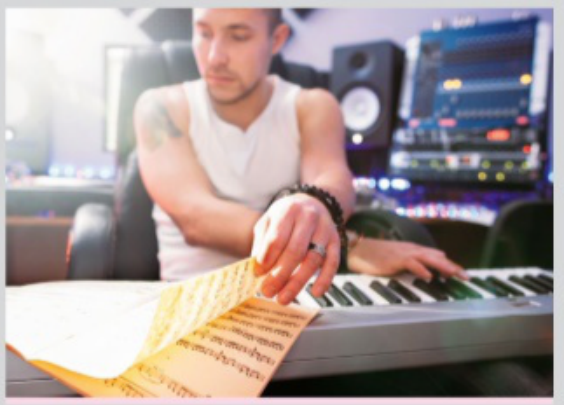
Got the chords down but struggling to find the notes? Try an arpeggio-based approach to melody writing, using the notes of the chords to form a tune. That doesn't mean blasting through every chord note in a three-octave 16th-note blur, but rather using one or two notes per chord, or bridging main melody notes with arpeggios, as shown. This approach worked out so well on the keyboard hook for Abba's huge *Gimme! Gimme! Gimme!* that Madonna just had to nab it for *Hung Up*.

> Technique

24. Sing it!

Got a great basic melody going around in your head? Or a simple two-note line you can't help humming over the chords? Grab your microphone – even an in-built one is good enough for this – and record it straight in before your inspirational moment is gone forever! Then use audio-to-MIDI to turn it into MIDI data. Great hooks are often both simple and singable, so coming up with ideas in this way gets you off to a flying start on both counts.





> Technique

25. Get your hooks in!

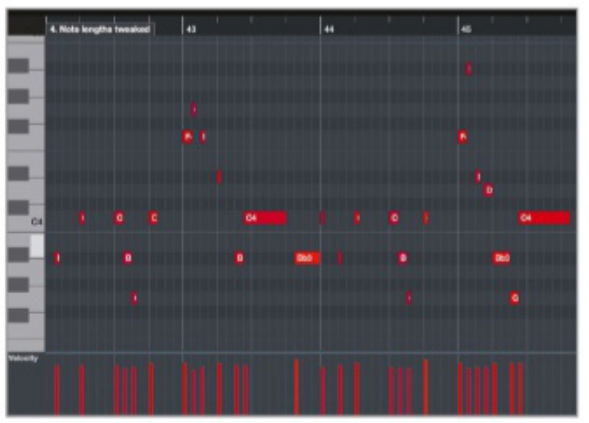
Are you spending hours laying down beats, chords and basslines, then hitting a wall when it comes to laying a great hook on top of them? Try taking a totally different approach: delete the lot, start over, and begin with the hook! Hooks need to stand up on their own, and this method ensures that yours will at least do that. Devote an entire session to making cool hooks in isolation – don't let anything sidetrack you. When you're done, pick the strongest idea to start a new track with.

> Technique

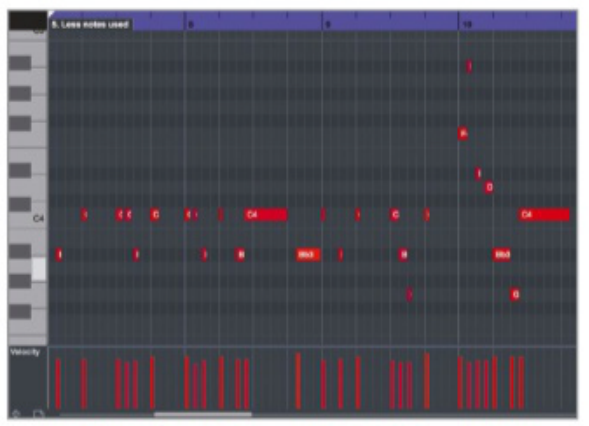
26. Rhythm-first melodies

It's easy to overlook the importance of rhythm in creating catchy melodies, but here's an easy method that puts the beat first...

1 > Forget about scales, keys and arpeggios for now, and locate the song's main root note. Play your backing track on a loop and tap out a complementary rhythm on the key, making it as catchy as possible on its own. When you've got something, record it to MIDI.



2 > Now go through the riff and move each note up or down to create a melody. You may need to quantise and adjust note lengths to get the feel you're after. Parts played in on a single note will have a staccato feel, so you may want to lengthen the notes. In our riff, though, the staccato sound works well.



3 > Finally, don't be afraid to rely heavily on the rhythm. There are plenty of famous hooks that rely on just a few notes, with variety instead coming from the rhythm, lyrics or tonal variations, or the underlying chords and bassline. Here's a simplified version of our hook, which we think is more compelling.

Easy tips for instant hooks

Our resident theory pro Dave Clews has a few tips to help make your tunes hookier than a pointy hatstand

INVITE AUDIENCE PARTICIPATION

Anything that gets your listeners singing along qualifies as a hook, so don't rule out catchiness for the sake of credibility. Love it or hate it, the "I get knocked down" chant from Chumbawamba's *Tubthumping* ticks all the boxes when it comes to outright hookiness, cementing its status as a karaoke and wedding disco favourite pretty much for eternity. So if all-out world domination is your aim, don't be afraid to set your sights a few notches down the coolness ladder if you need to!

SUMMARISE THE SONG

Get the idea behind your song across in just a few words, in combination with a melodic hook, and you'll be well on the way to something memorable that will resonate with listeners. Try to keep the lyrics as relevant as possible to the subject material when coming up with your hook.

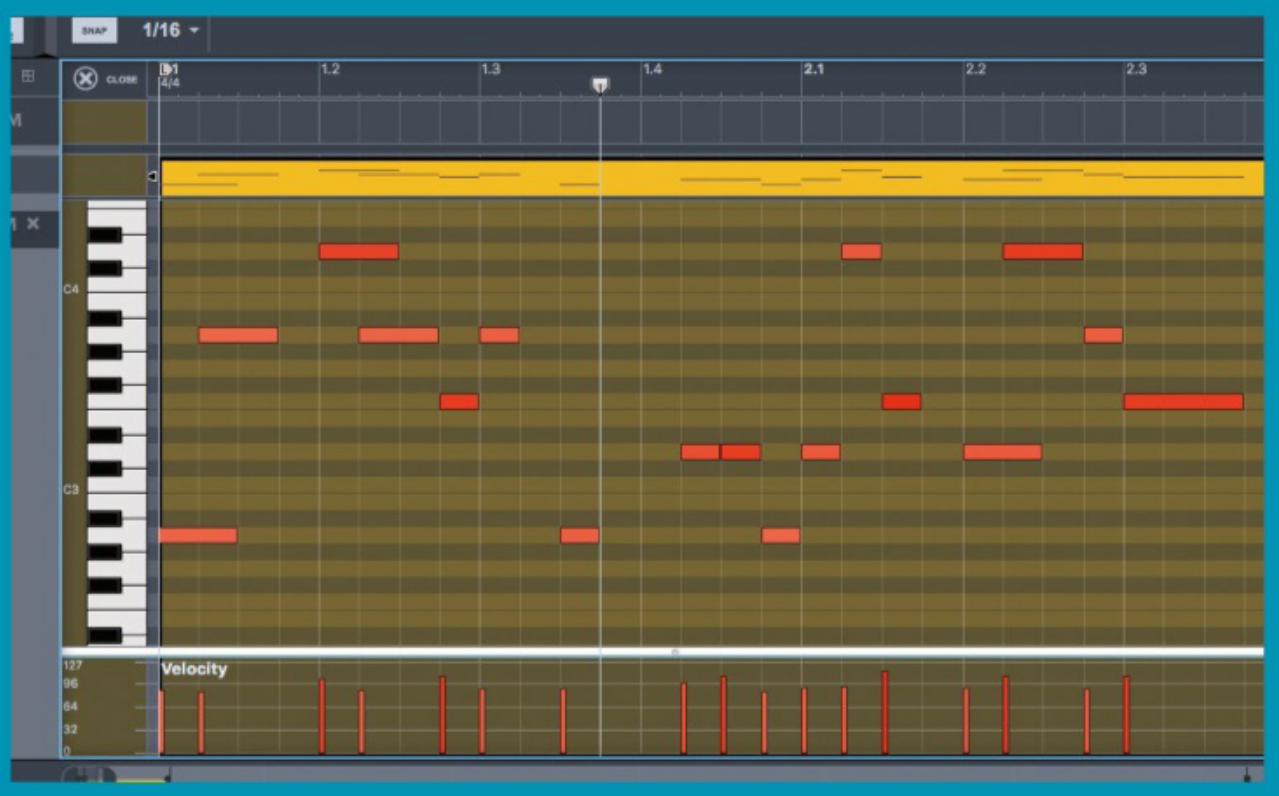
If it's just not flowing on one instrument, grab something completely new

SIMPLIFY

Short, simple hooks tend to be more memorable than longer, more complex ones. Take an ear break from your track and, if you can't remember the hook after ten minutes away, it might be time to simplify. Can you say the same thing with fewer words or notes? Or maybe break the rhythm up into staccato phrases?

PLAY AN UNFAMILIAR INSTRUMENT

It might sound daft, but if you write your hook on an instrument that you can't actually play very well, the chances are you'll come up with something that's just the right dose of simple. The majority of your target audience won't be musicians themselves, so lack of musical prowess can sometimes be a strangely relatable quality. This effect comes from your naivety with the instrument in question being at odds with what a trained professional would play – you won't be doing anything by the book, or even have a clue what 'the book' says, and very often, the result is a hugely creative flurry of novel music!



As we keep saying, keep it simple – and what better way than limiting the choice of notes you can use?

LIMIT NOTE CHOICES

Stick to a limited palette of only two or three notes and see what you can come up with. It doesn't matter if you don't know the key of the song – just find two notes that you think work with the track and swap between them, using them to make a little phrase. Take the guitar hook in the tags of *My Favourite Game* by The Cardigans, for example – it's only got two notes, but the unique guitar tone and the way in which it's played make it memorable.

GO BACK IN TIME

Look at some of the classic hooks in vintage pop songs and use these, in combination with updated sounds and/or rhythms, as inspiration. You might find you like the rhythm of one hook from a 60s hit, but that it really comes alive when played using different notes with a Sylenth1 preset, for instance. The important thing is to stay on the right side of outright plagiarism, so you don't end up in trouble with the estate of the artist in question!

GET MEDIEVAL

Many current pop hooks can trace their roots from ancient Celtic folk tunes from the Middle Ages. This makes a good source of inspiration, as not only are these tunes well out of copyright, they tend to be easy to remember due to them having to be passed down verbally through generations. Amongst today's crop of current hit tunes, you'll find a number of hooks that sound like they've been derived from 15th century Scottish folk songs. And *In The Name Of Love* by Martin Garrix and Bebe Rexha, rather brilliantly, even features an updated version of the nose-thumbing "ner-ner-ne-ner-ner" playground catcall from yesteryear!

Garrix' interpretation of a schoolyard classic shows just how viral the oral tradition can still be today

PRESET TO STUN

And finally, while it may be a dirty secret for some, where better to look for sounds than in factory and third-party preset packs? If you start with an instant hook from an expert sound designer, you can always make it your own with some further tweaking.

Straight from the hooksmith's mouth

Hear first-hand how a pro songwriter gets her results

To deliver some insights into the world of the professional hitmaker, we grabbed some downtime with one of the UK's most versatile and prolific songwriters, Karen Poole. Beginning as one half of Brit and Ivor Novello-nominated, platinum-selling pop duo Alisha's Attic, Karen has had over 25 Top 10 hits and has worked with artists including Kylie Minogue, Will Young, Sugababes, Annie Lennox, David Guetta,
Lily Allen and many others. Her latest collaboration is the new Galantis single *Rich Boy*, out on January 27th.

cm: Has your method / approach to songwriting changed over the last 15 years?
KP: "Yes. I do more dance stuff than I've ever done, and we write just hooks a lot these days. I very rarely sit down with somebody on an instrument and jam a song. It's very rare, sadly – I miss it! I generally also do less stuff with artists now, as albums are actually much less common these days. It's a singles-based market taking over, which means there's more pitching songs, and more focus on having 'the single', but I guess the pressure of writing a single is a good one."

cm: What's your favourite method of working when you write?
KP: "I'm quite an overthinker with toplines, and I always have been – I can be infuriating to work with! I think the dance stuff I do (with people like Becky Hill, etc), seems to come quicker, and I feel a little more free to just be a little more 'off the cuff'. It's a new way of writing but I enjoy it.

"I normally always come with a melody first and work backwards from there, but sometimes – especially for the dance tracks – I have a concept or title idea first. I love working with great co-writers too, and often work with other young topliners. I have a small circle of people who I love, who bring something fresh to my writing and complement what I do, which makes the whole process a lot easier."

cm: Can you describe the workflow on a typical writing session?
KP: "I generally write the hook melody first. It's essential for the melody to be amazing, and I work hard at getting that first. Then quite often I'll take the verse melody and lyric at the same time so it feels more free. But again, it depends on who I'm with and the style of music. Sometimes there's a whole track to write to, and other times the producer just has a basic beat and chord structure. It really is different every time.

"With an artist, it's very often a more thought-out, less sporadic approach, as it involves what they want from the song and the message they want to bring. In that scenario, I encourage the artist be in the driving seat."

cm: Who inspires you as a writer?
KP: "Prince! Every time. But there are many current writers I love, like Greg Kurstin, Sia, Pharrell, Max Martin etc, who are genius. I've also had a love of R&B since my childhood, so I can listen to old 90s stuff all day long!"

cm: You've had an enviable career as a singer and a songwriter. Do you play an instrument?
KP: "Well, I noodle, but no. I have a weird theory that if I become too musical I'll lose my instinct. Quite often I sit with a musician and say 'No, the happy chord there should be sadder.' Terrible metaphor, but what I mean is, I'm really musical instinctually, rather than theoretically. I know exactly when it's not right and always have opinions on track dynamics and sounds, etc, as well as backing vocals and all things vocal and harmonic. But I don't really ever feel the need to be a player."

cm: So would you agree that a great hook comes more from instinct and feel rather than a deep-seated knowledge of music theory?
KP: "100%! Having said that, people like Max Martin have a very formulaic and mathematic approach with their writing and it's amazing. I guess I'm somewhere in between."

cm: Where do the hooks come from? Do you hear inspiration in the music you're writing to, or do they just pop into your head?
KP: "Oh god – I don't really know. I would like to say I'm not really in control of what comes out of my mouth. If I hear an amazing track it's very inspiring, but equally I like writing over a simple drum beat. It's a 'feel' thing, I guess.

"Stuff has to feel right and click somewhere. I know immediately if the chords aren't conducive to me getting a good melody.

"I like minor chords. I remember the producer Bloodshy once saying, "Just give her a few minor chords on a beat and leave her alone if you want a good song outta her!" He was right! My melodies are too twee on major chords."

cm: Do hooks come to you while you're doing other stuff? Making tea? Driving? How do you capture them? Is your dictaphone your best friend?
KP: "Driving, yes. I'm constantly writing when driving, and recording on my dictaphone. Not at home though, weirdly. Hardly ever. It probably has something to do with having a seven-year-old running around the house!"

cm: Do you have any favourite 'go-to' methods for coming up with hooks quickly?
KP: "Yes – old faves. Soulful old-school melodies are my natural place on dance tracks, so I fight to stay away from them and work harder, but I don't really have a definite method. Melodies normally come quickly – it's the lyrics I find harder." **cm**

Photo: Hayley Madden/REX/Shutterstock

GENRE-BUSTING MUSIC THEORY!

Scared of scales? Puzzled by progressions? Fear no more – get to grips with the musical framework behind 13 essential genres with our definitive guide

> Over the past few pages, we've featured a beginner's guide to chords and scales (*The Producer's Guide to Chords & Scales*, cm234) and a huge tutorial on creating catchy hooks (*How to Write Perfect Hooks*, cm240). Now it's time to build upon those solid foundations and break apart the underlying language of music.

It may conjure up images of dusty lecture halls presided over by ancient professors shedding equal parts dandruff and chalk dust, but music theory is a vital component of everything we, as computer musicians, deal with on a daily basis. Whether it's a floorfiller from the latest superstar DJ, or the baroque equivalent from centuries ago, the one common link between all pieces of music is the framework of scientific principles and well-worn tradition that make up their collective DNA. These were discovered thousands of years ago by early brainiacs like Aristotle and Pythagoras, and have constantly evolved and developed ever since.

People often hold the idea of learning theory at arms' length because they fear it will make them over-think the music-making process, affecting their instinctive feel and performance. But just because you know a bit of theory, it doesn't mean you're suddenly going to have limited inspiration – if anything, it's often better to have the knowledge and be able to judge when and when not to apply it. So, over the next few pages, we'll use basic music theory knowledge to deconstruct the scales, chords, notes and rhythms used in some of the most popular musical genres of yesteryear. After that, we'll dive into the piano roll and show you how to put some of that knowledge into practice when composing modern electronic music, using 'traditional' genres as inspiration for crafting new compositions from scratch!

So, fire up your DAW and grab your plugins as we compose several track sketches for some popular contemporary genres. You also get tutorial files (audio examples, MIDI files and video), so you can follow along with every step.

DOWNLOAD

Get the videos and tutorial files on your PC/Mac at **filesilo.co.uk/computermusic**

The evolution of modern popular music

Over the last century, we've seen an incredible evolution of the production and consumption of popular music, the beginning of which can trace its roots back to the earliest experimental wireless musical broadcasts, which were made in the 1900s. These brought music in general to a whole new audience – its new, readily available, free-to-air nature was embraced by millions globally as the 20th century progressed and the technology used in the capturing and broadcasting of new music improved along with it.

From around 1910, recordings of blues music derived from the American deep south began to gain global appeal, while the 1920s heralded the beginning of the jazz era, with superstars like Fats Waller and Louis Armstrong emerging. Milestones in musical development came in rapid succession, such as George Gershwin's *Rhapsody in Blue*, which, in 1924, represented an unprecedented fusion of the classical world and the radical new sound of jazz, with its ragtime rhythms and prominent use of the blues scale. Further landmarks include 1940s swing, with Glenn Miller's big band sound; Leonard Bernstein's *West Side Story*, setting the template for Broadway musicals to come; and the chaotic rhythms and virtuosity of bebop jazz musicians such as Charlie Parker and Dizzy Gillespie.

> "Milestones in musical development came in rapid succession"

The Shirelles' *Will You Still Love Me Tomorrow?* is a classic example of diatonic 60s pop

Yet it was the 1950s that provided the biggest evolutionary leap, as the contrasting rigidity and regularity of the rock and roll beat became popular. The new, post-war market of affluent teenagers with cash to spend on records, record players and transistor radios provided the perfect environment for the new genre's speedy gestation. The first acknowledged rock and roll record, Jackie Branston's *Rocket 88*, was released in 1951, and other artists including Chuck Berry, Jerry Lee Lewis and Bill Haley were quick to feed the appetite of the growing market of teenagers. By 1959, rhythm and blues as a genre had matured, spearheaded by Ray Charles' distinctive blend of jazz, country, rock and roll and gospel-tinged soul vocals.

Musical evolution

The explosion of new pop songs written and recorded during the 1960s is at odds with their relative simplicity. The majority were based on a set formula drawing from a blues template, with a limited palette of chords, a straightforward, 4/4-based rhythm and a standard instrument selection of bass, drums, guitar and keyboards. Few people did more to progress pop music as a whole throughout the 60s than The Beatles, who began the decade as a mop-haired skiffle outfit and ended it as pioneers of innovative recording techniques (as covered last issue in our *Studio Pioneers* feature).

After this, pop music began to evolve and splinter into multiple sub-genres, such as progressive rock, glam rock and disco. Punk exploded into life in the mid-to-late 70s. The advent of digital sampling technology in the early 1980s provided the tools for a new generation of artists to lay the foundation for hip-hop, synth pop and new wave.

The emergence of properly effective DAWs in the mid 90s paved the way for the musical landscape we know today, in which most recordings now have a computer involved somewhere in the chain, and a bewildering array of dance music sub-genres have since taken root, from nu-disco to breakcore. Yet, incredible though this period of constant evolution has been, one thing has remained consistent throughout; the basic principles of music theory!

Music theory resources for electronic musicians

If your music theory knowledge could do with a bit of brushing up, we advise you check out the following resources, to help get you up to speed...

cm234's cover feature, *The Producer's Guide to Chords & Scales*, packs in a whopping 15 pages, 17 expert videos, a MIDI Construction Kit with almost 2000 ready-made chord and scale templates in every key, a handy cheat sheet of intervals, chords and scales, and a jargon-free glossary of common music theory terms.

Also, in every issue of **cm** you'll find Dave Clews' *Easy Guide* tutorial (plus video and files), which features a different music theory topic broken down and demystified every month.

And of course, there are numerous resources available online for you to dive into – here are some of our recommendations.

Our massive *Producer's Guide to Chords & Scales* makes for a great introduction to music theory

HookTheory.com

This site delivers interactive online analysis of hundreds of commercial releases, from Abba to Zedd. Just search for a tune, and if it's there, you can hear extracts and follow along with a "theorytab" chord chart that picks out the chords and melody in real time as the track plays – a brilliant way to see how hit songs are pieced together.

www.hooktheory.com/theorytab

MusicTheory.net

Home to a great range of free online content, which, combined with a couple of premium apps for learning music theory, can be a great way to supercharge your knowledge and train your ears.

www.musictheory.net

YouTube

A huge resource of educational videos on every music theory topic imaginable can be found on the 'Tube, as you probably know already! Search the whole site for videos covering your preferred topic, or check out some of the channels listed below...

www.youtube.com

Music Tech Help Guy

www.youtube.com/user/musictechhelpguy

Music Theory Guy

www.youtube.com/user/musictheoryguy

Music Online UK

bit.ly/MusOnUK

Furmanczyk Academy of Music

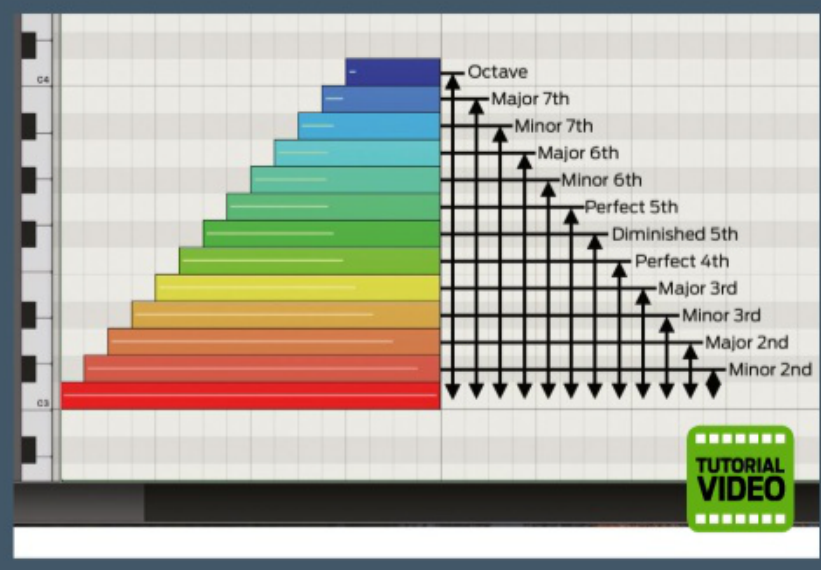
www.youtube.com/user/Lypur

Music theory primer

Theory basics explained from a piano roll perspective

1. NOTES

The raw material of music, notes are the building blocks from which all chords and melodies are created. Each note has a duration and a pitch. In the piano roll, the length of each note event in the display directly relates to its duration, while the pitch is represented by its vertical position. In Western music, there are a total of twelve notes per octave, named A, A♯, B, C, C♯, D, D♯, E, F, F♯, G and G♯. The sharp notes, or 'accidentals', fall on the black keys, while the regular or 'natural' notes fall on the white keys. As well as sharps, the black keys can also be flats – i.e. B♭, D♭, E♭, G♭, and A♭. Whether a given note is deemed sharp or flat largely depends on the current scale or key.

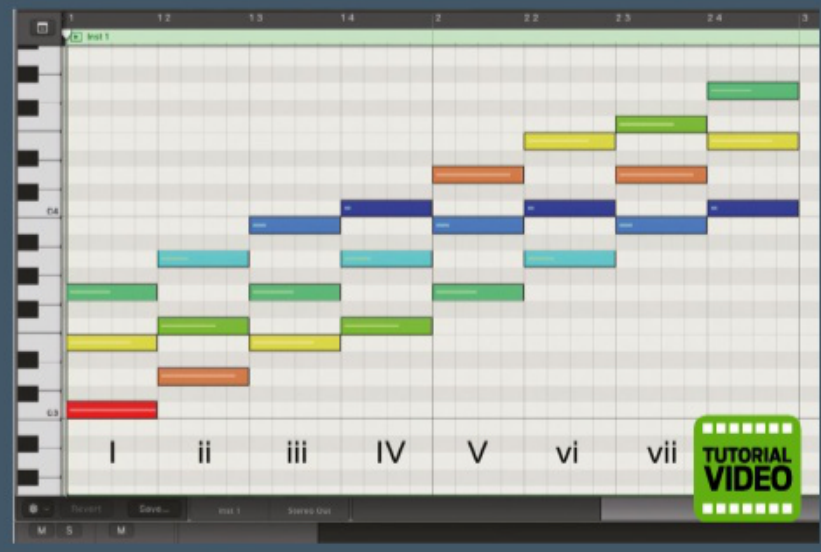


2. INTERVALS

On the piano keyboard, two notes immediately next to each other are a semitone apart in pitch. The distance in pitch between any two notes is known as an interval, and each interval has a particular name, according to its size. For example, an interval of just one semitone is known as a minor second, while an interval of seven semitones is known as a perfect fifth. The diagram above shows the names of all possible intervals within an octave – they can either be melodic (between a sequence of consecutive notes in a melody) or harmonic (between notes in a chord). If two notes have the same pitch, they're said to be in unison.

3. SCALES

A scale is a sequence of notes (known as 'degrees') that provides the raw material for a piece of music. The intervals between the notes follow a set pattern that depends on the type of scale. The first scale everyone encounters when learning music is the major scale (pictured above), which follows the interval pattern T-T-S-T-T-T-S, where S is a Semitone, and T is a Tone (two semitones). The C major scale is made up of all the white notes on a piano keyboard, but other major scales (starting on different notes) include black notes – G major, for example, contains one sharp note, F♯, while F major contains one flat note, B♭. The other most common scale is the minor scale, which has the interval pattern T-S-T-T-S-T-T.



4. CHORDS

A chord is defined as two or more notes sounding at the same time, but in basic theory terms, we generally take it to mean three-note chords, or 'triads'. In Western music, chords are generally made by stacking up alternate notes from the scale – taking the first, missing the next, taking another, missing one and taking one more. The image above shows the C major scale from the left-hand pic now 'harmonised' – every chord contains alternate notes of the C major scale. Some of the chords are major (a gap of four semitones followed by a gap of three) while some are minor (a gap of three semitones followed by a gap of four). One of them (vii) is 'diminished' (gaps of three and three).

The artists' choice

We've scoured the airwaves to expose the musical preferences of four successful commercial artists

DEADMAU5

The progressive house icon (aka Joel Zimmerman) has a distinctive style that hinges on his production workflow and the way he builds his chord voicings – the order in which the notes are arranged across the keyboard. He tends to rely on progressions that feature mostly major chords, but arranged and voiced in a way that makes them sound minor (such as the beautiful *I Remember*: B - Dmaj7 - Gmaj7 - F♯ - Dmaj9 - Gmaj7). Joel often finishes off with a prominent, majestic-sounding shift from a minor chord to a major chord (*Some Chords* – A♭m, E, E, F♯, A♭ – or *Ghosts N' Stuff* – B♭m, A♭, F♯, E♭. That minor-major shift crops up often, and because of his programming style, a four-note chord will be spread over three or four octaves rather than bundled in the centre of the keyboard.

Joe Skipper/epa/REX/Shutterstock

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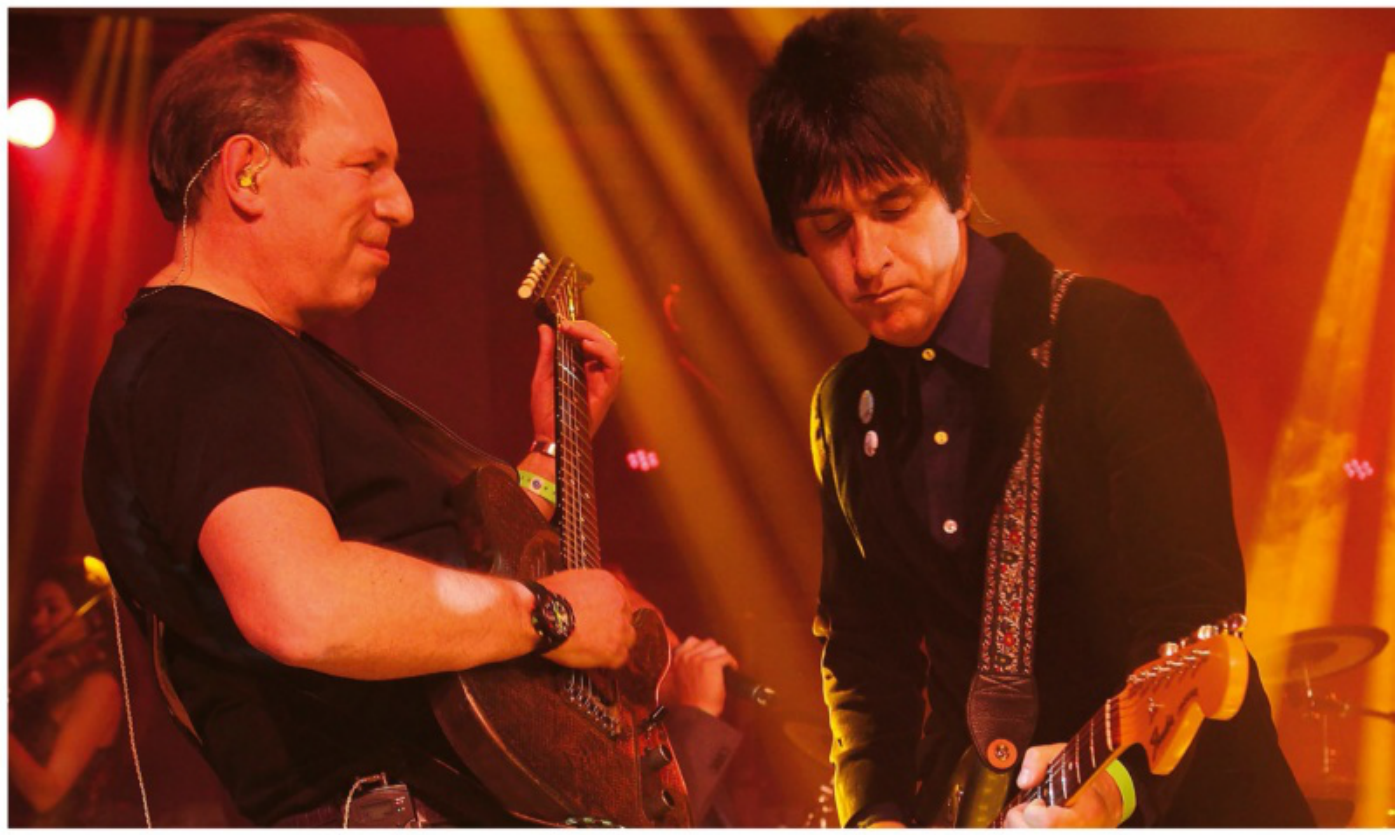
PRINCE

His canon of songs forms a remarkable legacy that will undoubtedly stand the test of time, and is filled with all manner of classic songwriting techniques. Although much of his work was in the pop, R&B and funk genres, most Prince songs could easily pass the acoustic test – ie, you can strip away all the production and still recognise the song when played on an acoustic instrument such as guitar or piano. They're also pretty timeless, a quality that owes a fair amount to the simplicity of the basic underlying chord structures. Taking the famous power ballad *Purple Rain* as a typical example: the chord structure is relatively simple, giving us four chords in the verse (B♭, Gm, F, E♭) and the same four in a different order in the chorus (E♭, B♭, Gm, F). Melody-wise, the song relies on a Gm blues scale, with the first notes in the verse striking a D/D♭ blue note, and the last notes before the chorus repeating an E♭ over the F major, effectively making an F7.

HANS ZIMMER

Of all the Hollywood film composers active today, Zimmer is one of the most well known, and for good reason: his scores have accompanied over 150 blockbusters, including *Gladiator*, *Inception* and *Man of Steel* – a remarkable achievement for someone who claims not to be able to read music. Although incredibly imaginative and prolific musically, Zimmer's real strength is in using sound in innovative and unusual ways. To accompany the Joker's scenes in *The Dark Knight*, for instance, he used a single long cello note, together with guitars played with pieces of metal, gradually rising in pitch to convey a sense of mounting tension and fear. Although he strives to avoid repetition in his work, Zimmer seems to favour minor keys, often bucking the trend by juxtaposing them against comedic scenes that would normally suit a major key. Somehow, it works!



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CHAINSMOKERS

The Canadian duo have dominated the mainstream of late with a string of classy productions. From a theory point of view, they tend to favour progressions that feature a mix of three basic major and minor triads, but often with a sustained note tacked on at the top to give the chords a more extended sound. For example, the chords to *Closer* alternate between D♭, E♭ and Fm, but with a high E♭ added to each one, effectively making it D♭9, E♭ and Fm7. This is coupled with a simple yet insistent vocal or synth hook built from only two or three notes, proving the old adage that simple is effective.

Progressions: common recipes

Pop music's broad appeal lies in the fact that the songs are memorable, and therefore easy to sing along to. The easiest way to make a song memorable is to base its chord progression on a template that has been proven to be repeatedly successful over the years.

The most basic progressions are known as diatonic progressions, meaning that the chords they contain only use notes found in the scale on which the key of the song is based. For more information about diatonic harmony, see Dave Clews' *Easy Guide* in issue 211 of *Computer Music*. Here we have three of the most popular and enduring diatonic progressions, which are behind literally thousands of songs common to all genres.

I–vi–IV–V

In key of C major: C–Am–F–G

The recent UK chart success of *I'm the One* (by DJ Khaled featuring Justin Bieber & Chance the Rapper) just goes to show that you can't beat the classic simplicity of the I-vi-IV-V progression. Instantly relatable and exceptionally versatile, you can have a Number One single on a backing track made up of a fingersnap sample and a rubber band playing the root notes of these chords. As well as also being found in Train's *Play That Song*, Justin Bieber's *Baby* and Sean Kingston's *Beautiful Girls*, this progression is also the basis of *Heart and Soul*, a simple piano duet that's one of the first things anybody learns to play on the piano, which is probably why it literally strikes a chord with so many people.

I–V–IV–V

In key of C major: C–G–F–G

This timeless progression can be found in classic pop songs including the Four Seasons' *Big Girls Don't Cry*, The Beatles' *Baby's in Black* and Eric Clapton's *Wonderful Tonight*.
The main reason it's such an effective combination is because it features all three of what are known as the 'primary' chords – a bit like primary colours. The I chord is known as the Tonic, the IV is called the Subdominant and the V chord is the Dominant. Notice that these three chords are three three major chords from the harmonised major scale, but they can be translated into any key. They form the basis of thousands of tunes, and are especially popular with blues, folk and country rock artists.

I–V–vi–IV

In key of C major: C–G–Am–F

Why have one example when you can settle for about a hundred? In a YouTube video that went viral in 2011, Australian comedy outfit *Axis of Awesome* ably point out the usefulness of this particular progression when it comes to writing pop hits. Mashing together a medley of 47 songs that are all based on this sequence of chords, what's interesting about the exercise is that the original key of the source songs turns out to be irrelevant. Due to the fact that the melodies all work over the same chord sequence regardless of key, the band are able to stay in one key (D major) and play the same chords throughout, while simply jamming the melodies over the top, having transposed the songs.

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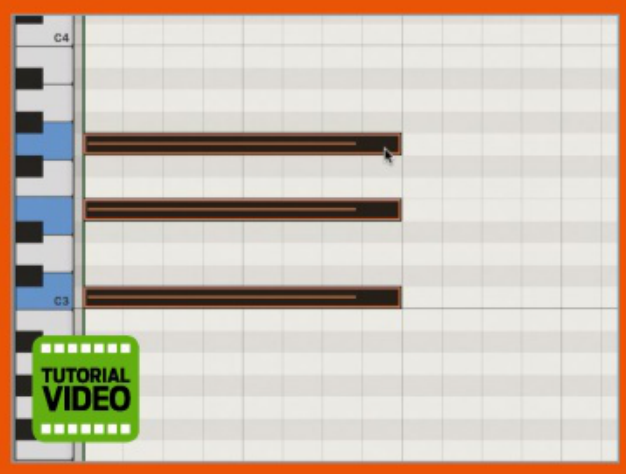
Major & minor triads

Popular music can be categorised into a multitude of genres, but since we don't have space to include all of them in this feature, we'll be using fairly broad strokes in our distinctions between particular styles. Probably the broadest is mainstream pop and R&B, the kind of thing you hear on the radio every day, and possibly the genres that rely the most on regular major and minor diatonic triads. This palette of chords can produce millions of combinations, which is why so many classic pop songs can be boiled down to relatively simple progressions of basic chords like these ones.

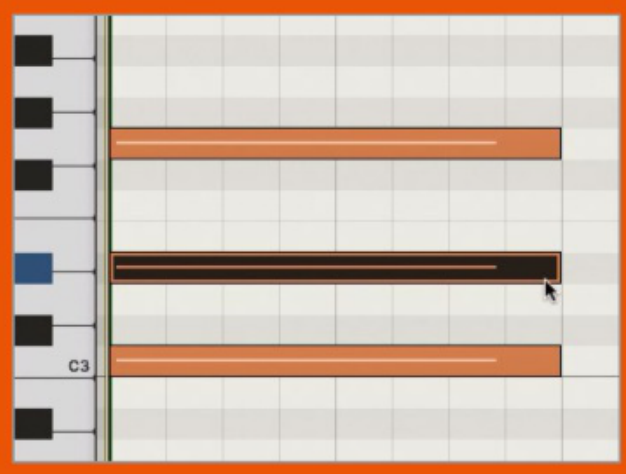
Rhythmically speaking, the broad genre of pop and R&B can assume many guises, from slow power ballads through mid-tempo jams to full-on dance-style tracks. Plenty of recent releases have featured minimal drum tracks consisting of sparse handclaps and percussion, while others have adopted a kind of Caribbean dancehall feel, with an irresistible beat made up of pushed snare drums laid over a 4/4 kick. Melodies, meanwhile, tend to be simple affairs using mainly a handful of notes from the parent scale, dependent on whether the song is in a major or minor key.

Pop and R&B's simple progression-based style makes it great for exploring triads

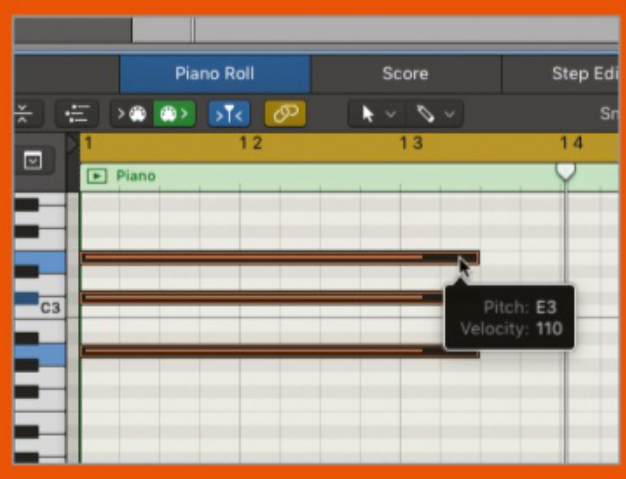
> Step by step 5. Making a Pop/R&B progression with triads



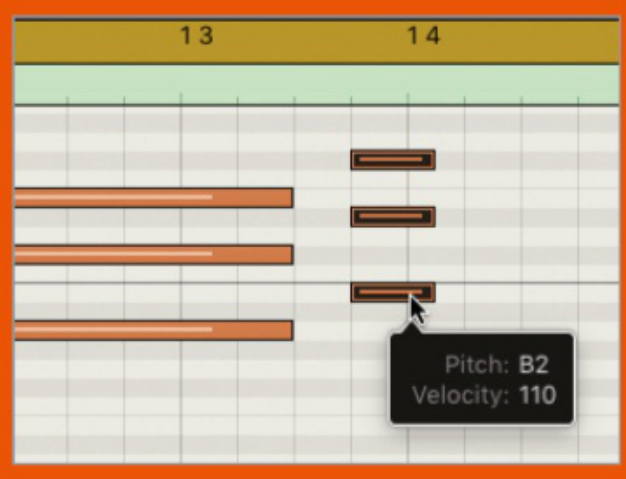
1 > You can make a major chord in any key by using a specific formula based on the intervals between the notes in the chord. First, we need to pick a root note – let's start with C, as shown here. For the next note, we need a major third interval, so we count **four semitones** up to end up on E. Then we count another **three semitones** up, finishing on G. In the end we have **C**, **E** and **G**, which is a **C major** chord.



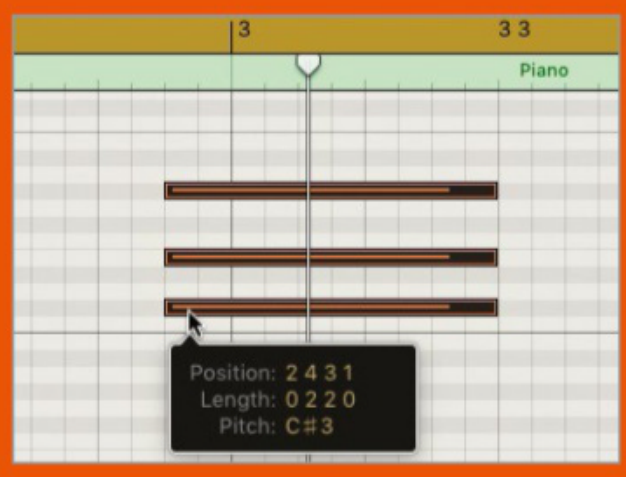
2 > It's the interval between the middle note and the root that determines whether a triad is major or minor. In the chord we just made, the interval was a **major third** (**four semitones**), making it a major chord. If we decrease the interval by one semitone, making a **minor third** (**three semitones**) between this and the root, then the triad becomes a minor chord comprising **C**, **E♭** and **G**, which is **C minor**.



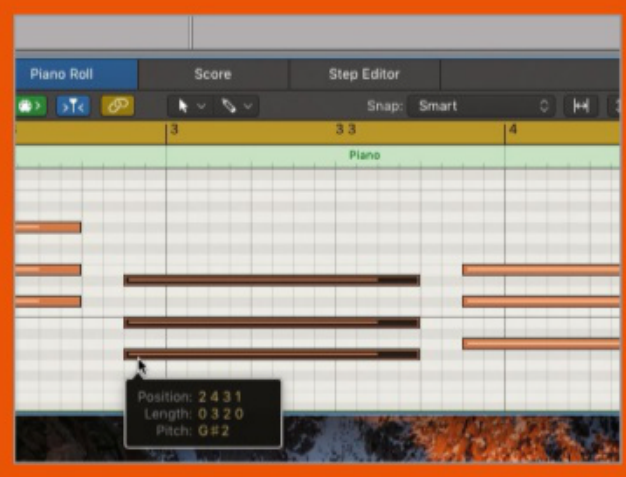
3 > To show how these formulae work in any key, let's program a typical pop progression of minor and major chords, beginning with A major. Our root note is **A**, and we want to make a major chord, so we count up **four semitones** – an interval of a major third – to **C♯**, and add this note to our chord. Another **three semitones** brings us to **E**, completing our first chord: **A-C♯-E**, which is **A major**.



4 > Our second chord is a passing B major at the end of the bar, so we copy the A major chord we just made and paste it into position at 1.3.4.1, then shift the whole thing up two semitones. Because the intervals between the notes in the chord remain the same, raising it in pitch by this amount from A to B creates a **B major** chord – **B-D♯-F♯**.



5 > We'll make the next chord a minor one – C♯ minor. Taking **C♯** as our root note, we count up an interval of **three semitones** (a minor third), landing on **E**. From there, we go up a further **four semitones** to land on **G♯**, completing the **C♯ minor** chord – **C♯-E-G♯**. Our next chord is also minor, so we copy and paste the C♯ minor into position at 2.4.3.1.

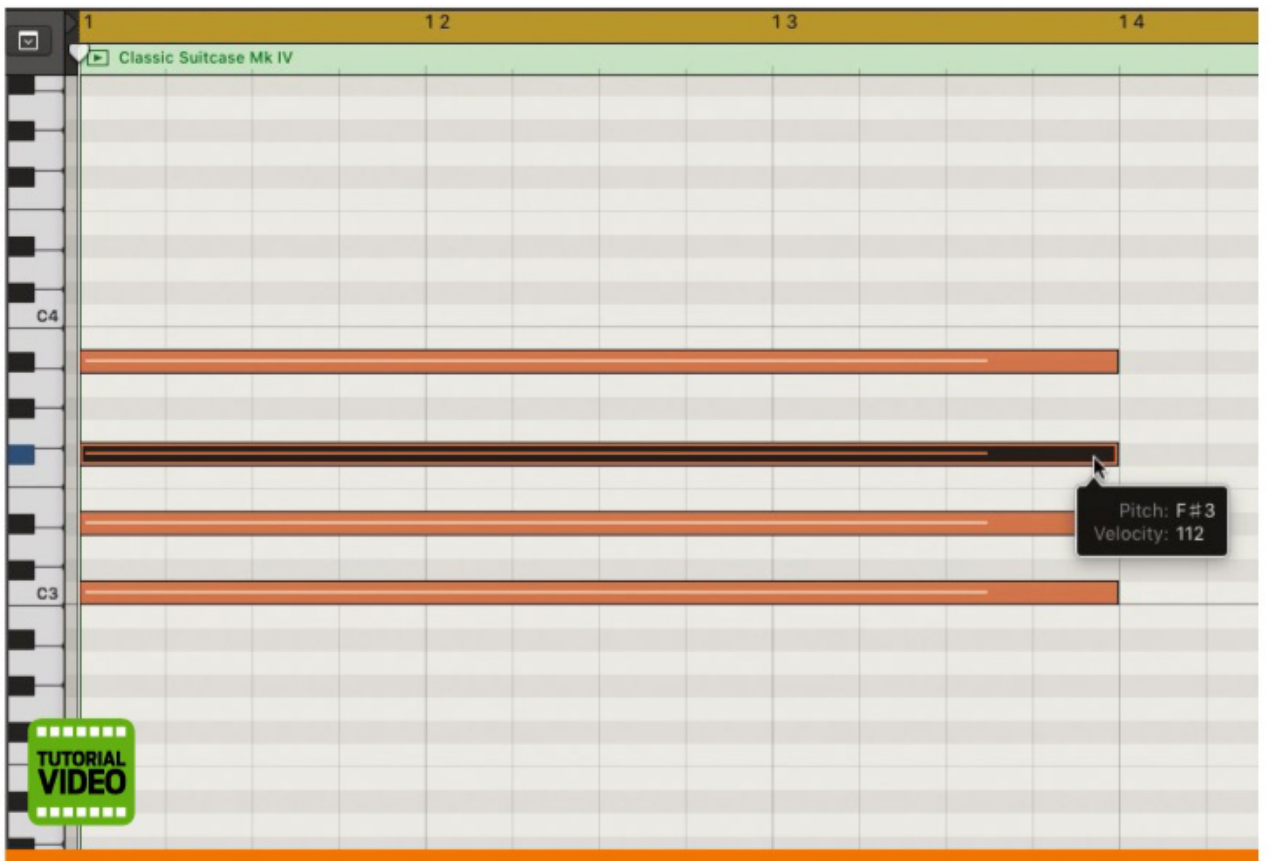


6 > This new chord needs to be a low G♯ minor, so we simply transpose all three notes in the chord down by **five semitones**. Since this preserves the chord's internal structure of intervals between notes, the result of the transposition is a **G♯ minor** chord – **G♯, B, D♯**. All we need to do to complete the progression is copy an A major chord from the first bar to the end.

From a music theory perspective, jazz, gospel and funk are probably the most technically advanced genres, with exotic chord names like 'minor seven flat five' and 'augmented seven sharp nine' thrown about with abandon.

We're not going to go too deep down the rabbit hole in this feature – and indeed there are entire books dedicated to the subject on its own – but essentially, jazz is all about altering the chord in some way to make it sound different, while at the same time maintaining the basic harmonic progression of the tune. Occasionally, just one note – usually a fifth or ninth – will be altered, or maybe a chord will be swapped out for a totally different one that has the same function in the progression – a tactic known as substitution.

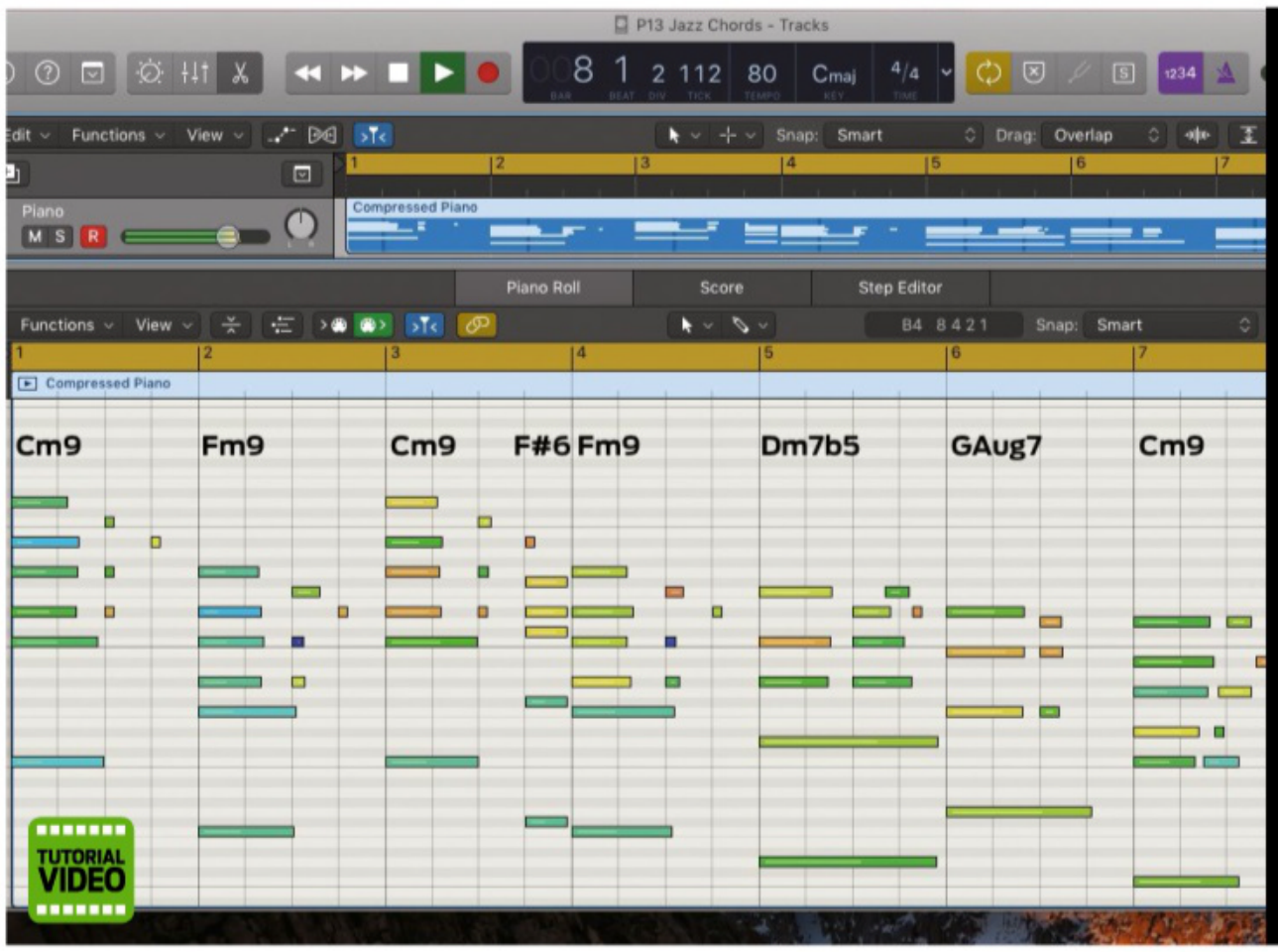
On this page, you'll find formulae to some of the more common altered chord types you'll need to be aware of if you intend to start exploring this type of sound.



6. The m7♭5 chord formula

The minor seven flat five (m7♭5) chord is the jazz muso's secret weapon. It's derived from a regular minor seventh chord but with the fifth moved down in pitch (flattened) by one semitone.

The formula for a regular minor seventh chord is 1-♭3-5-♭7, which in the key of C would give us C-E♭-G-B♭, as we've seen. However, if we also flatten the fifth, we get 1-♭3-♭5-♭7, or C-E♭-G♭-B♭ – Cm7♭5.



7. Jazz chords

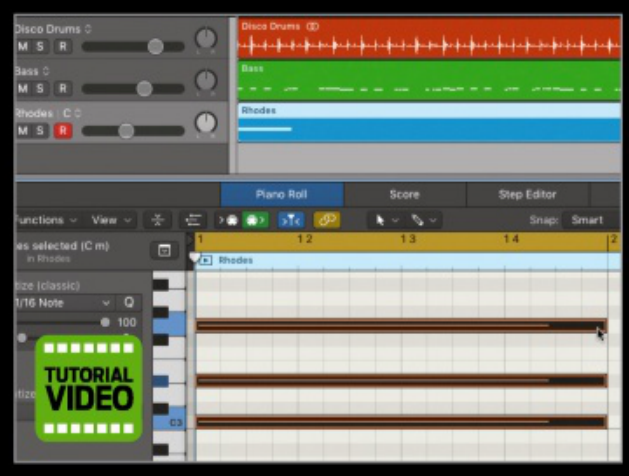
We've composed a short progression using some of the more common chord types in jazz, funk and gospel styles. The first four bars are alternating **Cm9** (C-E♭-G-B♭-D) and **Fm9** (F-A♭-C-E♭-G) chords. However, just before the second Fm9, we've inserted a passing chord – **F♯6** (F♯-C♯-D♯-F♯-A♯. Passing chords are chords that you 'pass' through to get from one chord to another – the F♯6 works because its notes are nearly all one semitone away from those of the target chord (Fm9).

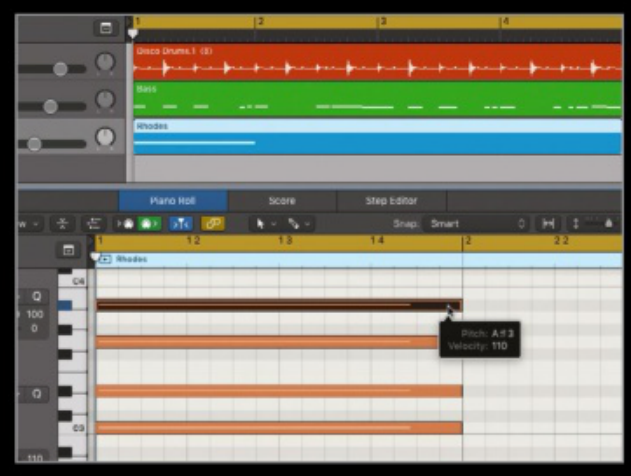
Following this, we have **Dm7♭5** (as detailed above), then a **Gaug7** in bar 6 – this is a G7 chord with a raised fifth (G-B-D♯-F), but with the G removed from the right hand and played only in the bass. Bar 7 contains another Cm9, then we ramp up the tension in bar 8 with a **Gaug7♯9** (G-B-D♯-F-A♯). To make this stonker of a chord, simply form a regular ninth chord (1-3-5-♭7-9), then raise both the fifth and ninth by one semitone.

With its metronomic 4/4 beats, synth basslines and electronic percussion, disco evolved throughout the 1970s, eventually becoming the forerunner of house. It was disco that most successfully married the new sonic possibilities of the synthesiser to the traditional sounds of strings and brass, sustaining the use of orchestral instruments in pop until synths finally took over completely in the new wave explosion of the early 80s. Disco embraced orchestral instruments, with bands such as Earth, Wind & Fire using strings in particular to great effect.

Two of the greatest exponents of this technique were Nile Rodgers and Bernard Edwards, the production masterminds behind Chic, Sister Sledge and many other disco classics. Making prominent use of soulful major and minor seventh chords, they hit on the perfect blend of slick 4/4 grooves, funky, extended minor guitar chords (such as B♭m11 or A♭m9), clever basslines and great pop string arrangements that ultimately epitomise the sound of the disco era.

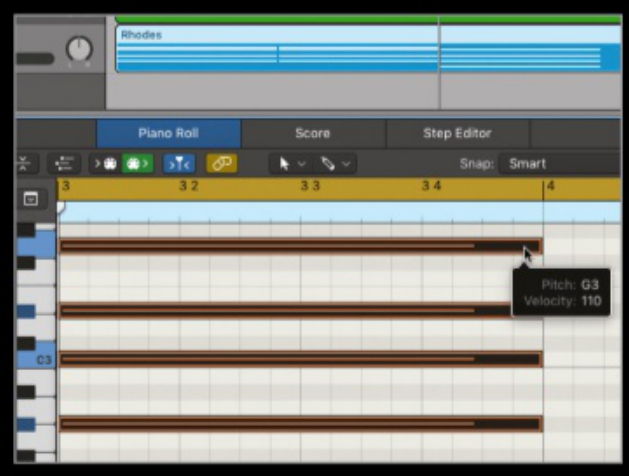
> Step by step 8. Introducing major and minor 7ths

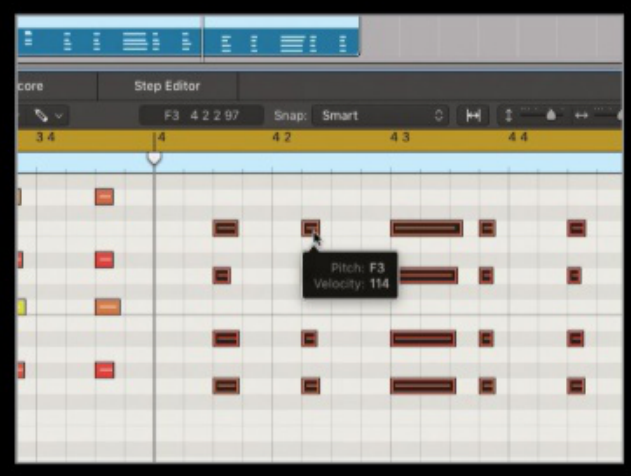




1 > The minor seventh chord is disco's best friend, as we'll demonstrate in this mini-sketch, which contains a suitably disco-licious rhythm track of drums and bass. We're going to add some Rhodes electric piano chords, starting with Cm7. To make this chord, start by creating a regular **C minor** chord, inserting the notes **C**, **E♭** and **G** as seen previously.

2 > A **minor seventh** consists of a minor triad with an added flattened seventh degree. This means that we take the seventh note in the major scale, lower it by one semitone and add it to the chord. The seventh degree of the C major scale is **B**, so we flatten this to **B♭** – three semitones up from G – and tag it onto our existing C minor chord to get **C**, **E♭**, **G** and **B♭** – **Cm7**!

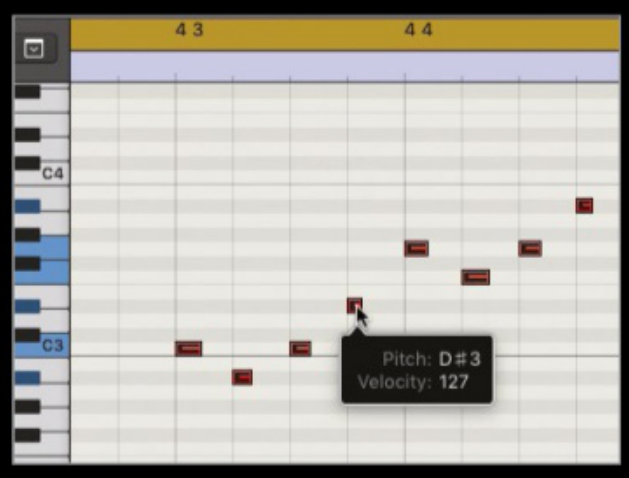


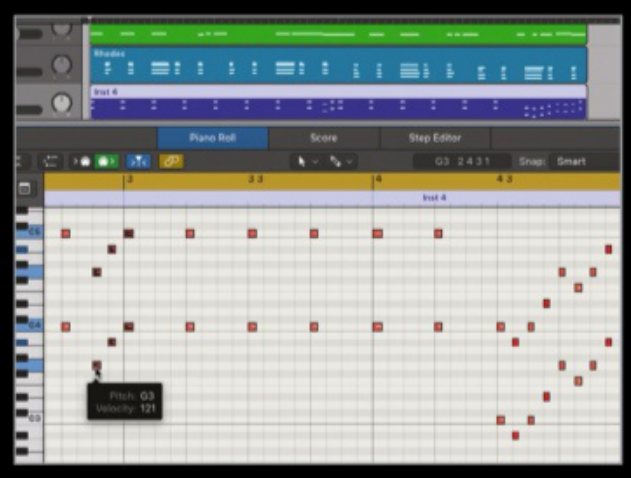


3 > A **major seventh** consists of a major triad with an added seventh degree of the major scale. So let's insert an A♭maj7 over the A♭ bass note in bar 3. Following our major chord formula, we pick **A♭** as the root note, add **C**, and then **E♭**. Next we add the seventh degree of the A♭ major scale – **G**, to make **A♭-C-E-G** – **Amaj7**.

4 > Let's conclude with a Gm7 in bar 4. The **minor seventh** formula is 1, ♭3, 5, ♭7, so with G as our root note this time, we get **G, B♭, D, F** – **Gm7**. So far, we've merely been blocking out the chords, placing them on the downbeat, but to make things a little more disco, we could use a pattern like the one shown here to fit with the rhythm of the drums and bass parts.

> Step by step 9. The disco string run with repeated high note





1 > A repeated high string note is a good way to maintain tension through a series of changing chords, in the same way that house tracks often contain a long, sustained single string note. In the project from the previous walkthrough, we load up a suitable realistic string patch – we're using Spitfire Audio's Albion One – and program a stab on **C4** every quarter-note.

2 > Half way through the fourth bar, we've inserted a run – a short 16th-note arpeggio based on the notes of the minor pentatonic scale (see the next page for more on this). In the case of **C minor**, the key we're in here, these notes are **C, E♭, F, G and B♭**. So our run of eight 16th-notes is made up of two similar four-note riffs, namely **C B♭ C E♭** followed by **G F G B♭**.

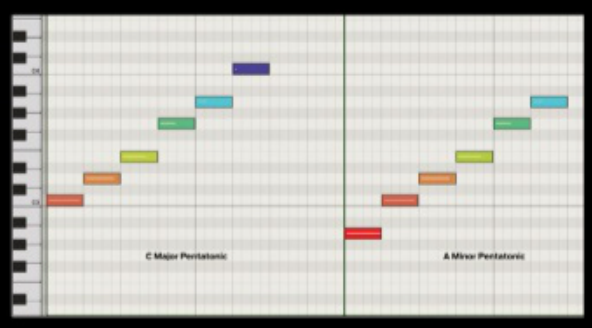
3 > We've used a 'spiccato' sound with lots of attack, great for stabs and fast runs, with the notes programmed at high velocity to give maximum bite. To add breadth and realism, we copy and paste all the notes in the part up an octave. We also add interest by inserting short three-note (**G B♭ C**) pickups at the end of every two bars to break up the monotony of the repeated C.

Pentatonic scales

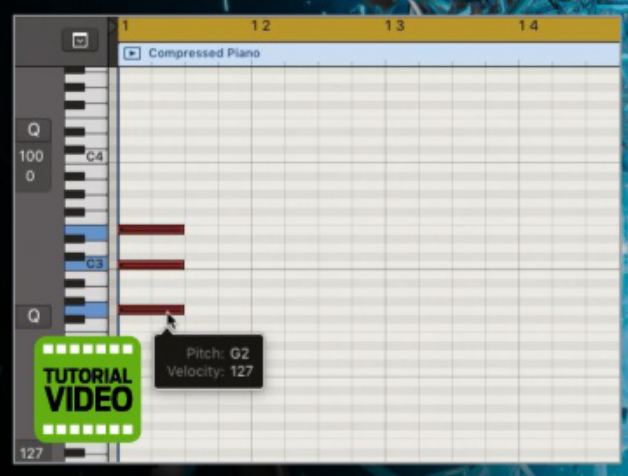
These incredibly useful five-note scales are heavily relied upon in all genres of music, but particularly pop. Because of their simplicity compared to a normal seven-note major or minor scale, they're often used to introduce beginners to the world of improvisation.

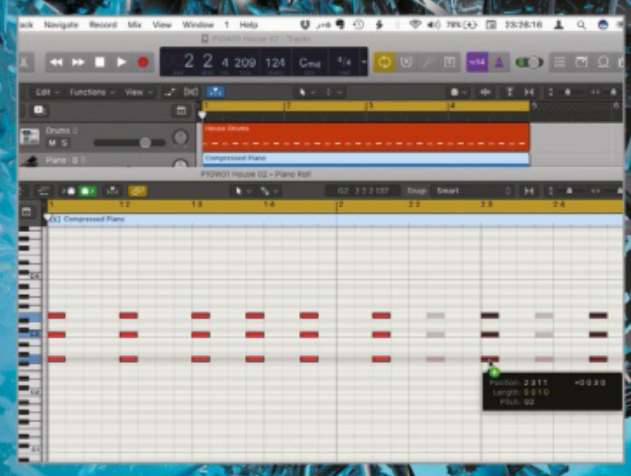
To create major and minor pentatonic scales, imagine removing the notes B and F from the keyboard. If you then play a C major scale, you'd get C D E G A – the C major pentatonic scale. And if you played A C D E G, the result would be the A minor pentatonic scale. So a major pentatonic can be thought of as a major scale with the fourth and seventh degrees missing, while a minor pentatonic can be thought of as a natural minor scale with the second and sixth degrees missing.

The reason these scales work so well over many chord progressions is that they contain either chord tones found in major or minor triads, or common extensions. As a bluesy bonus, if you add a sharpened fourth to the minor pentatonic, you get the famous blues scale, which is perfect for riffing and soloing over almost anything.



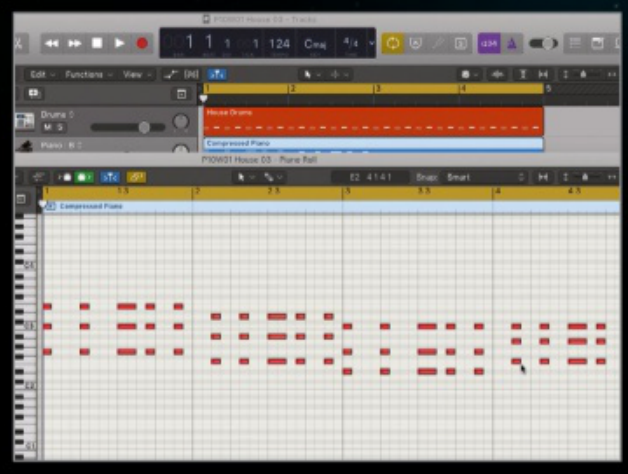
> Step by step 10. Classic Chicago house – spread piano chords

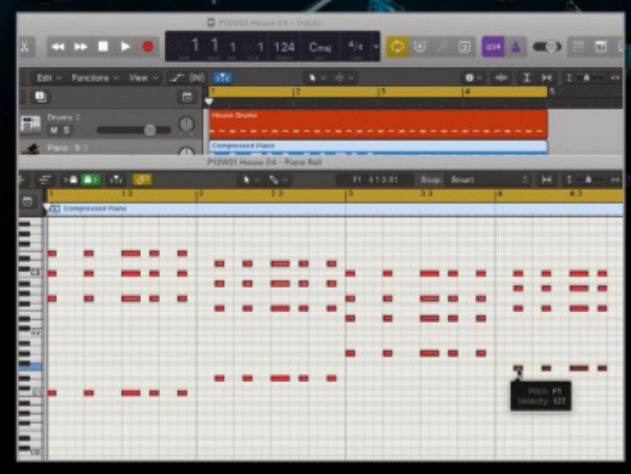




1 > Two-handed piano jams are the staple diet of classic house, so let's look at how to program one from scratch. Start with an empty project or DAW session at about **124bpm** and create a software instrument track loaded with a piano sound. Open the piano roll and draw in the notes **G2**, **C3** and **E3**. Make this C major chord last for a duration of one 16th-note.

2 > Copy and paste the chord seven times, for eight chords in total, one on every quarter-note beat over two bars. Select the fourth chord in each bar and move them one 16th-note earlier. Then move the first two chords in the second bar two 16ths earlier, and the third chord three 16ths earlier. Lastly, copy and paste the final two chords three 16ths later.

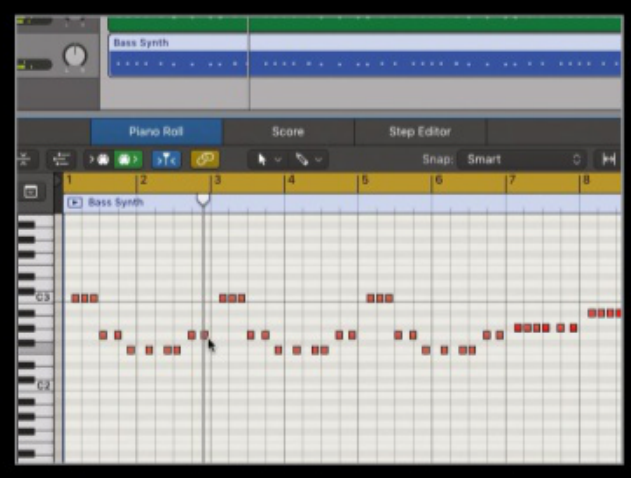




3 > Next, double the duration of the third chord in each bar to two 16th-notes. Copy and paste these two bars to make a four-bar section, then transpose the chords in bar 2 down by two semitones to make **B♭ major** (**F-B♭-D**). Rearrange the notes in the third chord to make a 1st inversion **C minor** (**E♭-G-C**), then make the fourth chord an **F major** (**F-A-C**).

4 > Now for the magic. Copy and paste the lowest note of each chord to form a left-hand bassline. Place the new notes on **C1** in bar 1, **E♭1** in bar 2, **A♭1** in bar 3 and **F1** in bar 4. By adding new bass notes to the original right-hand triads to form new chords, this effectively transforms our vanilla C-B♭-Cm-F progression into a house-tastic **C-B♭11-A♭maj7-F**.

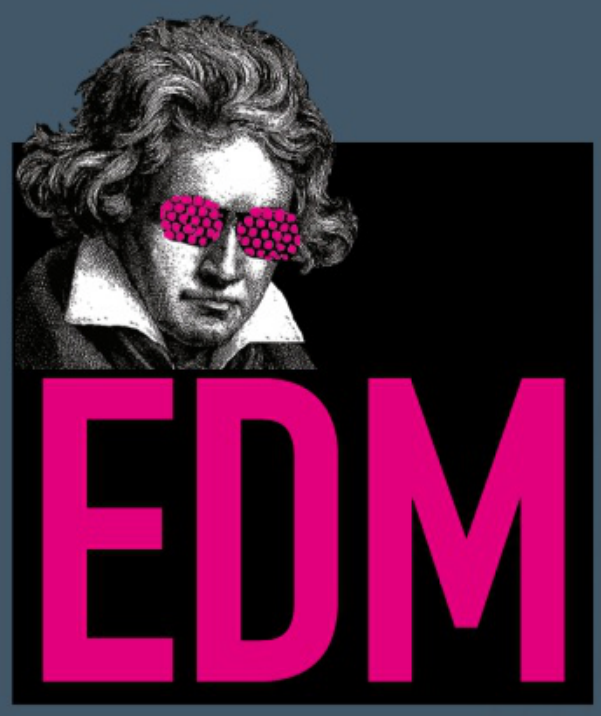
> Step by step 11. Detroit techno-style fixed interval chords



1 > Detroit techno, a more electronic-sounding offshoot of house, often made use of the chord memory feature of certain synths, which enabled you to play a particular chord shape with a single key. This kind of fixed-interval chord progression can be emulated in Dune CM. Start by loading up an instance of the synth in our techno example project.

2 > What makes Dune CM particularly appropriate for this is that it includes oscillator waveforms pre-programmed at specific intervals to replicate certain chord shapes. For example, preset **057: Mellow House RL** uses waveform number 60, which is programmed in the shape of a minor chord – so when you hit a C note, you get a C minor chord!

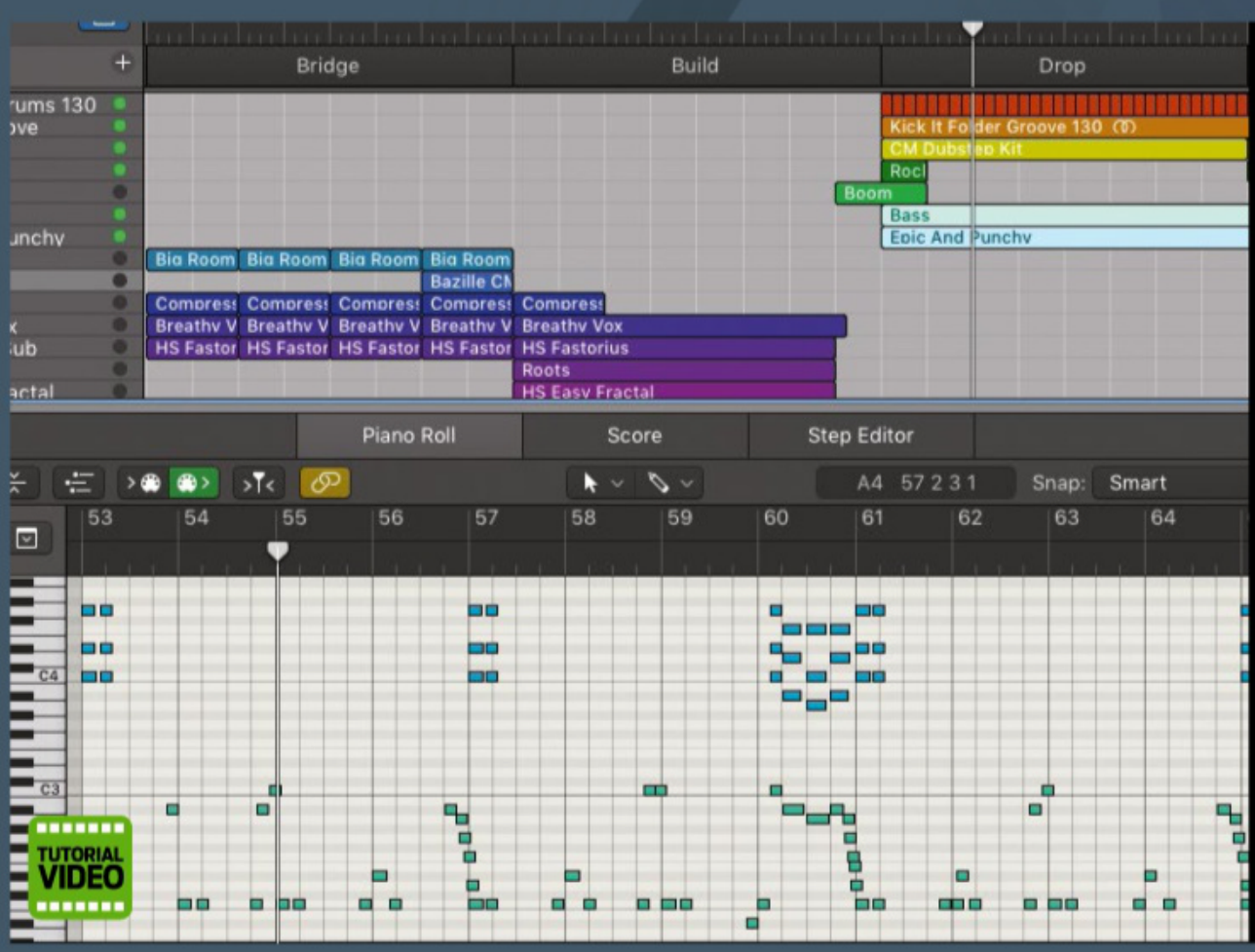
3 > This means that when we copy the bass track in our project and paste it onto our Dune CM track, the bass notes play an auto-generated progression of minor chords that gives us that signature techno sound, namely Cm-Gm-Fm-Gm-A♭m-B♭m. This kind of progression probably isn't one you'd be likely to come up with using a conventional sound!



EDM as a genre is something of an umbrella term. Standing for electronic dance music, EDM encompasses house, trance, electro, dubstep, drum 'n' bass, complextro and pretty much everything in between. That makes it a huge genre to analyse as a whole, but from a theory standpoint, the most obvious common traits tend to be a general leaning towards minor chords and the heavy use of chromatic harmony – in other words, chords that use notes that don't belong to the scale of the key the song is in. The biggest breakaway from the norm that's accompanied the rise in EDM's popularity is in the realms of song form. Intros and outros have been stripped down and extended to make tunes easier for DJs to mix in and out of, while traditional verse-chorus-bridge forms have been elbowed aside in favour of more dancefloor-friendly structures, with more abstract arrangements, builds and drops.

12. Arpeggios

Most DAWs feature an arpeggiator of some description, generating rapid runs of notes from held-down chords. If you know what the chords are in your track, they're a very useful way of adding a bit of sparkle to proceedings. Here, we've got Logic's Arpeggiator MIDI plugin playing an ascending/descending 32nd-note arpeggio over four octaves to announce the build-up to a drop. The chord we're playing is a 2nd inversion of A♭9 (C-E♭-A♭-B♭).



13. The one-note drop

The drop is the equivalent of the chorus in EDM parlance (see **cm**242's cover feature for more on this), and it's the part of the track that delivers a maximum-impact resolution to the tension of the build that comes before it. For that reason, the drop tends to be musically minimal, based mainly on a single note or chord that digs in hard from the outset, allowing the listener to focus primarily on the energy of the beat and the bassline. For maximum impact, there should be a degree of tonal contrast between the build and the drop, and this is often achieved by including fewer bass elements in the build. When it comes to chord changes, the fewer the better, to allow focus on 'character' sounds. We've added interest to this section by using fragments from a bunch of cut-up musical loops, all in the key of C minor.

Mad about the house

If you were to run a competition to find the genre with the most sub-genres, house would probably emerge as the clear winner. Enormously popular right from its genesis in the Chicago nightclubs of the late 1970s up to the present day, house has splintered off into multiple versions of itself over the intervening decades. Here's a brief rundown of just a few of them...

Classic (Chicago) house
Original 4/4 beats, 808/909 drums, funky synth basslines, pea-soup hi-hats and percussion.

Deep house
A blend of funk, jazz, soul and traditional house elements; tends to be slightly more complex musically.

Progressive house
Blending trance elements with traditional house style, prog is now one of the most mainstream styles.

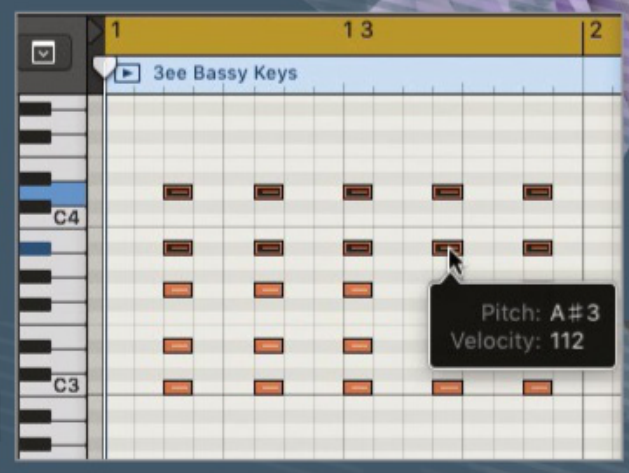
Tech house
A fusion of techno's sparse rigidity and the soul and funkiness of house.

Electro house
Radio-friendly mix of house, techno and electro-pop at about 128bpm.

Tropical house
Mid-tempo grooves and sunny, feel-good vibes – very commercial.

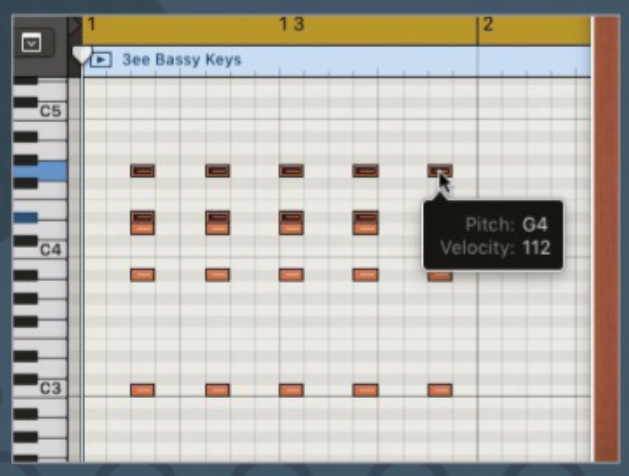
Bassline house
A combo of traditional house and UK garage rhythms shot through with heavy, wacky bass noises.

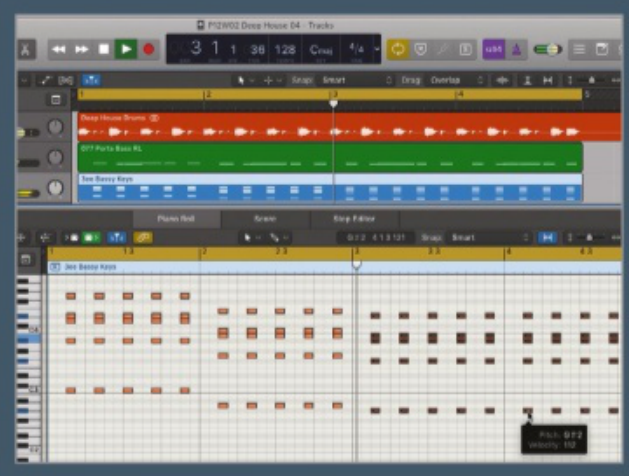
> Step by step 14. Deep house m9 chords



1 > Minor ninth chords have a brooding intensity to them – perfect for deep house. This example project consists of a **128bpm** drum track with a bassline built on the notes **C**, **A** and **A♭** – the root notes of the chords we're about to create. Using Bazille CM's **3ee Bassy Keys** preset, we'll start with a regular **C minor** triad (**C E♭ G**) playing a pattern of three 16th-notes.

2 > The minor ninth is known as an extended chord, as it uses notes that fall outside the octave range we usually pick notes from. If the G in our C minor chord is the fifth, we need to add two extra notes – the seventh and ninth – to extend the chord. In this case, the seventh will be **B♭** (ten semitones up from C) and the ninth will be **D** (14 semitones up from C).

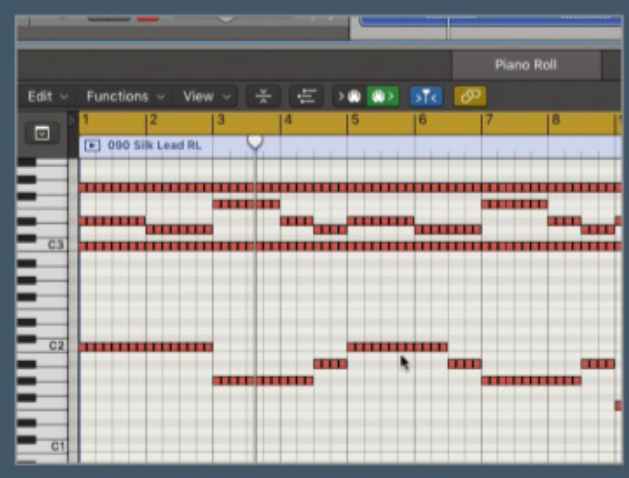




3 > Now we have a bar full of Cm9, let's alter the voicing slightly to give it a brighter, more open sound. The voicing is simply the order in which the notes in the chord are played on the keyboard, so grab the second and third notes up from the bottom of the chord – E♭ and G – and transpose them up an octave.

4 > After this, we can copy and paste this bar to occupy a four-bar section, matching the length of our bass part. To match what the bass plays, we transpose the Cm9 chord in bar 2 down three semitones to make **Am9**, then drop the chords in bars 3 and 4 down four semitones to get **A♭m9**.

> Step by step 15. Progressive house eighth-note chords



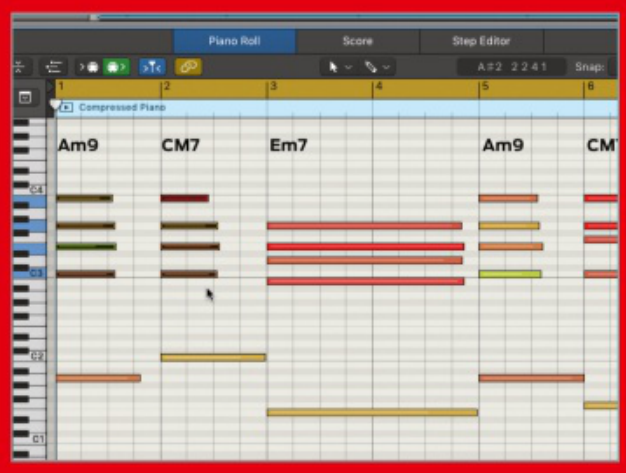
1 > Rigid, pumping eighth-note chords can be found in most genres, but are particularly effective in progressive house. To illustrate, we're going to add some chords to a typical 4/4 prog house beat using a tweaked version of Dune CM's **090 Silk Lead** preset. Start by programming a Cm (**C-E♭-G**) on 16th-notes.

2 > Make sure all the notes are the same velocity, then copy and paste to end up with a chord on every eighth-note beat, as shown. Adjust the **Release** of the synth's amplitude envelope and the filter **Cutoff**, so that you hear a pulse rather than a constant chord against the beat. Then copy the lowest notes and paste them an octave lower for a bassline.

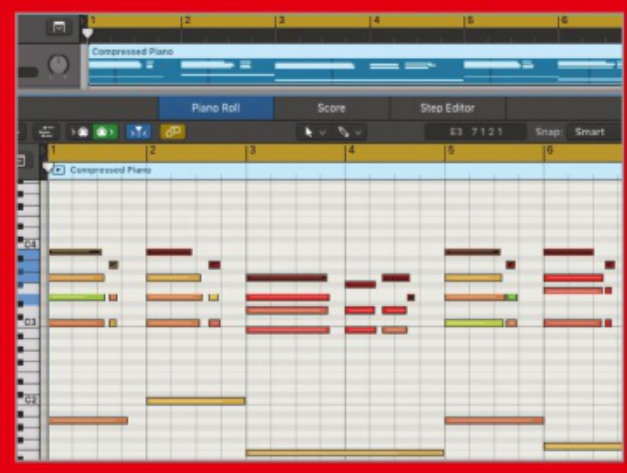
3 > Now, experiment by changing the chord slightly, moving the middle note (the third – E♭) down one semitone to **D** to create a **Csus2** chord, or up two semitones to **F** to create a **Csus4** chord. You can also move the bass note around the C minor scale while doing this, to make a more interesting progression overall, like the one shown above.

> Step by step 16. Uplifting liquid DnB chords

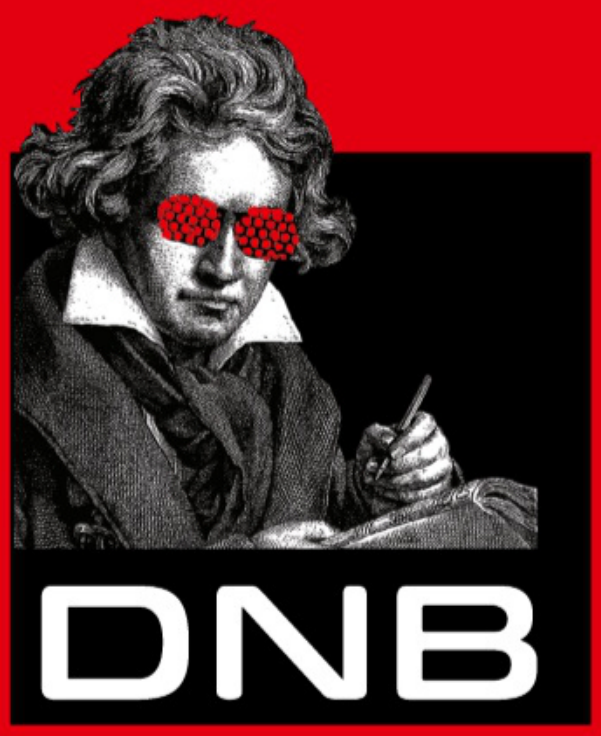
1 > Extended chords – such as major sevenths and minor ninths – work well for a bit of uplifting ('liquid') DnB. Using the 175bpm **DnB Drums.wav** as a drum track, we've programmed an eight-bar bassline, using Enzyme CM's **BASS Incendiary** preset. We're using notes from the key of A minor – A, C, E, A, F, E – with one new note every three eighth-notes.



2 > Over this, we're going to use the piano chords Am9, Cmaj7, Em7, Am9, Cmaj7sus4/F, E. To begin with, we just insert a new chord on the downbeat of each bar. Notice how Am9 and Cmaj7 are basically the same chord (**C-E-G-B**), but playing these four notes over a C bass rather than A effectively transforms Am9 into Cmaj7.



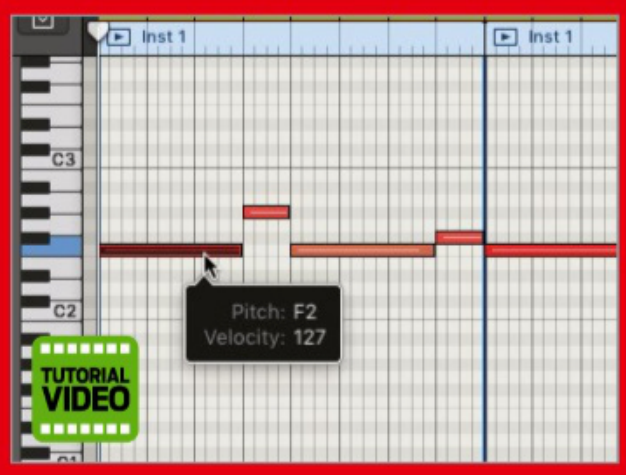
3 > With the changes blocked out, we can start to introduce some melodic movement by adding extra, incidental chords that just slightly alter the top notes of the existing chords. By rounding off with an E major instead of the expected Em7 (stealing a trick from Deadmau5), we've added an optimistic, upbeat ending to our minor progression.



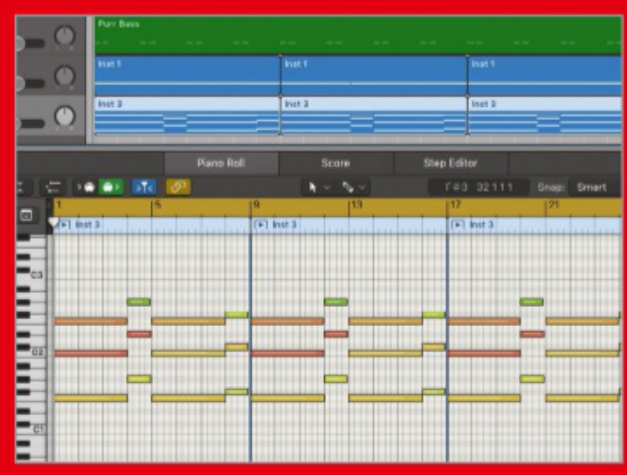
In the drum and bass genre, as the name would suggest, the main focus is on how the drums and bass interact. Typically motoring along at signature white-knuckle speeds of around 170-176 bpm and featuring ribcage-rattling bass tones, amongst the many offshoots of the genre that have evolved, such as jump up, drumstep and techstep, there are two distinct sides to the drum and bass coin.

The smoother side of DnB consists of the uplifting 'liquid funk' style, often relying on jazz-funk-influenced chords and tending to feature the kind of euphoric progressions you might find in a trance tune. On the other side of the coin, the darker style of DnB that has come to be known as 'neurofunk' relies on a heavier production style, with more emphasis on sound design and crazy distorted, swooping bass sounds rather than complex chord progressions.

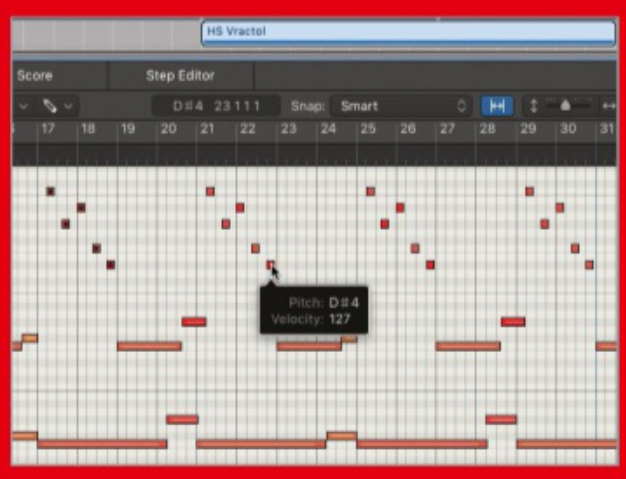
> Step by step 17. Composing a dark neurofunk DnB intro



1 > Neurofunk is as much about sound design as actual music theory. A typical intro centres on building tension and menace, so we create a mysterious-sounding eight-bar part using Massive's **Stinga** preset, as shown, using the notes F, A♭, F and F♯. At 175bpm, the bars tick by pretty rapidly, so we repeat the region out to a length of 32 bars.

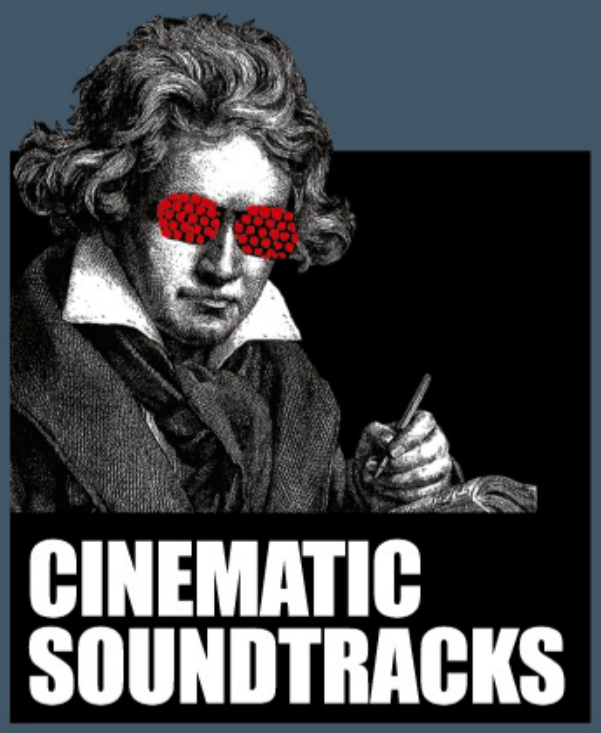


2 > Next, we layer in Curve 2 CM's **Echo Organ** preset, playing the same part but this time using power fifths – three-note combinations of root, fifth and octave that can be played over both major and minor keys, due to their lack of a third. We then turn to Bazille CM's **Purr Bass** preset for some tense, rhythmic stabs – two every two bars – on a low F.



3 > After eight bars, we bring in another Bazille CM preset – **Bass Growler** – playing a portamento octave version of the drone from step 1. After eight bars of this, we add some drum hits from a sliced-up loop, playing a reverb-laden, half-speed kick and snare pattern, together with some bleepy synth atmospherics.

4 > Finally, we tag on an eight-bar build consisting of a new drum loop, a riser FX sample and a double-frequency Purr Bass part. We also send all the synth and bass tracks to a bus hosting an automated high-pass filter. This will give the kick and bass elements in the drop more impact when it comes in. Cue the drop!



In the early 20th century, as new recording and broadcast technology prompted a shift in mainstream popularity from classical to folk, blues, ragtime and jazz, one final refuge for classical composers was the blossoming movie industry. Just as its previously widespread audience started to wane, the niche market of classical soundtracks for movies was born, establishing a style and sound that's still relevant today. Modern film composers like James Horner, Hans Zimmer and Danny Elfman all take cues from classic soundtracks of the 30s and 40s, with orchestral instruments front and centre in the mix. Current movie soundtracks still rely heavily on the orchestral sound, taking inspiration from Romantic-era composers such as Tchaikovsky and Prokofiev, as well as modern classical composers like Copland and Schoenberg.

The proliferation of superb orchestral sample libraries, such as Spitfire Audio's offerings, make the modern-day film composer's life much easier, allowing them to get a solid idea of how an arrangement will sound before a single musician gets to see the score. This technology also puts the epic orchestral movie-score sound within reach of those of us who lack the space or budget to mic up and record a 100-piece orchestra in the living room!

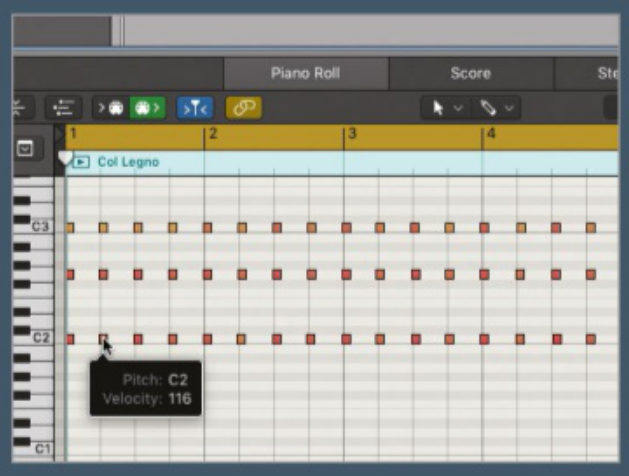
Film composers are skilled in conveying and reinforcing the right emotional response to match the visuals they're accompanying. This can be achieved by adopting particular styles and scales to suit – fast-paced, dynamic stuff for action sequences, for example; or swelling, string-laden cues for romantic scenes.

In the walkthrough below, we're going to build a simple orchestral cue from scratch with Spitfire's Albion One, using a special scale called the Lydian mode. Essentially a major scale played from its fourth note rather than its first, the Lydian mode is very useful for light-hearted, quirky-sounding cues and thus ideal for romantic comedies or even cartoons – Danny Elfman's famous *Simpsons* theme is a great example of the Lydian mode in action.

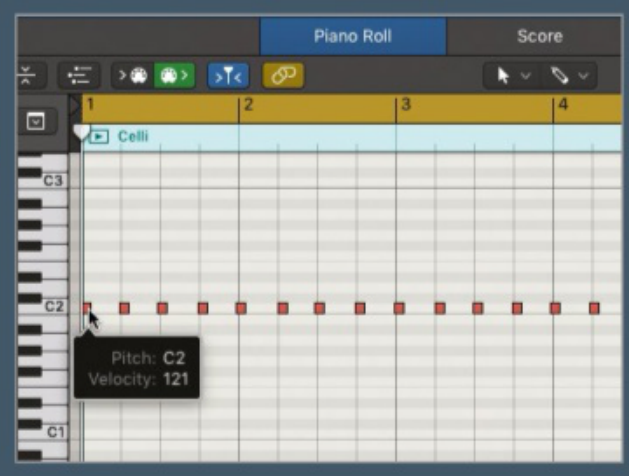
> Step by step

18. Using articulations and theory to craft an orchestral soundtrack

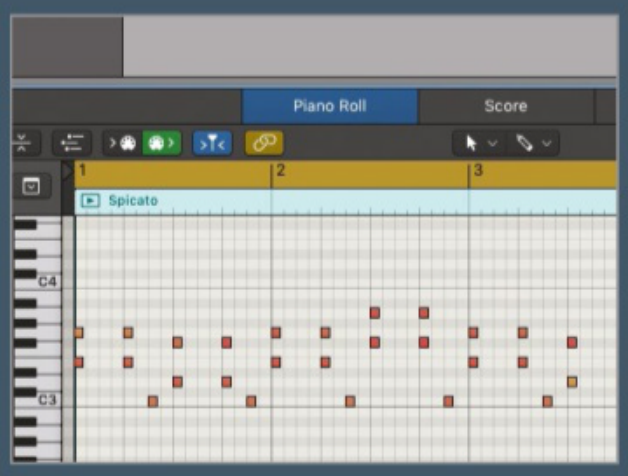
1 > Like most tracks, it's often easiest to start with a rhythm part, so here we've loaded up the **Pizzicato** articulation of Albion One's Strings patch. Pizzicato is a plucked articulation, and we kick things off with a rhythmic eighth-note pulse, playing power chords – C3, G3, C4. This is the equivalent of a major triad with no third, just the root and fifth.



2 > Next, we duplicate the part with a **Col Legno** sound – violins played by hitting the back of the bow against the strings, a great semi-percussive sound for rhythmic parts. Rather than simply duplicating the previous part, though, we re-play the notes, leaving the quantise off to retain the feel of a group of live musicians playing together.

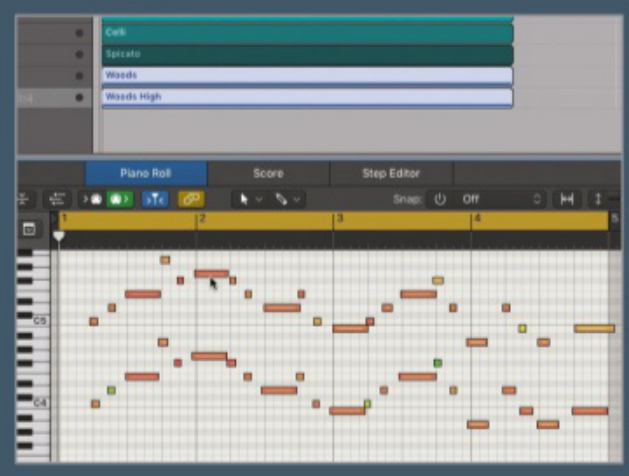


3 > For some bottom end, we underpin the existing parts with cellos and double bass. Using Albion One's **Strings – Low Octaves** patch, a single note on the MIDI keyboard triggers a sample of the same note played by a cello and a double bass an octave lower.



4 > Now for a rhythmic spiccato string part, meaning to bounce the bow off the strings. The part we've programmed here is derived from alternating C major and D major chords. This pattern of alternating major chords, with roots two semitones apart, is a popular device for introducing a movie's main character.

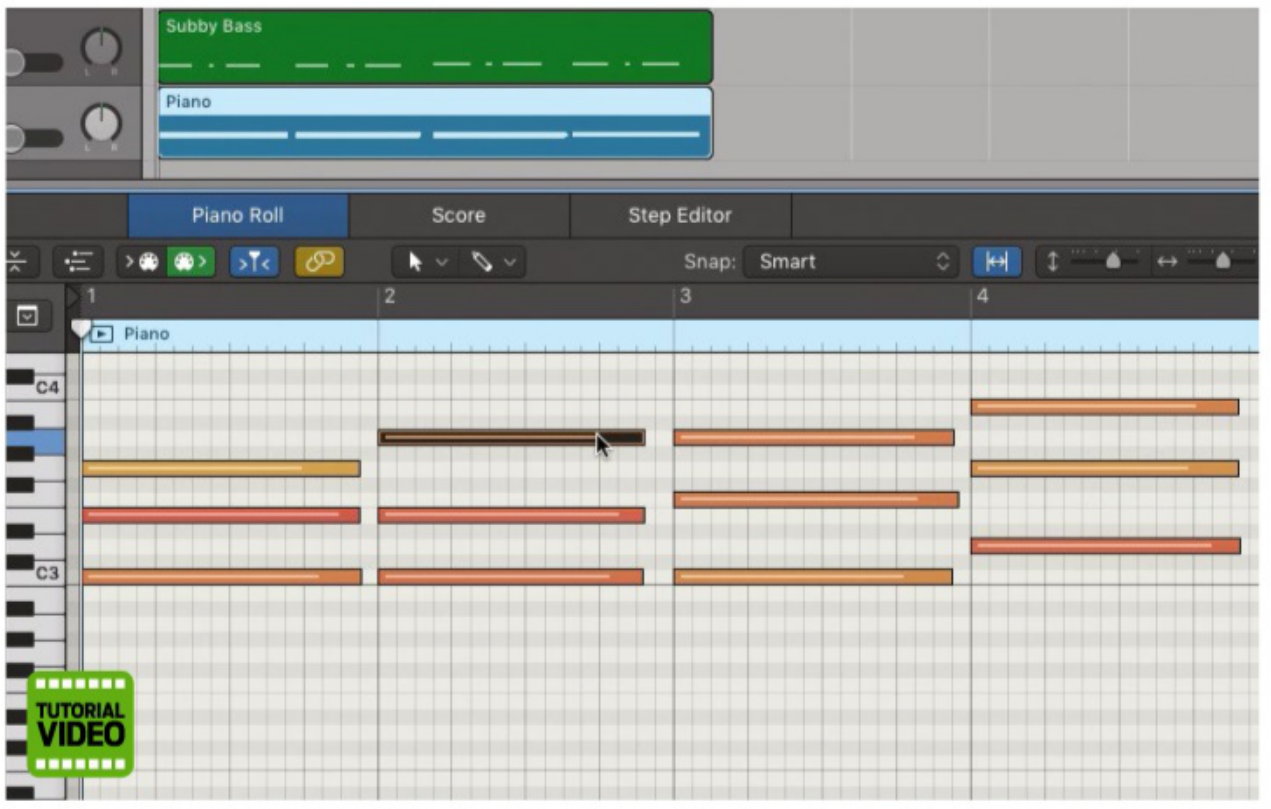
5 > The Lydian mode is a version of a major scale played from its fourth note instead of its first. For example, a G **major scale** (**G A B C D E F♯ G**) played from its fourth note – C – is spelled **C D E F♯ G A B C** and known as **C Lydian**. So what we've ended up with is a version of the C major scale with a sharpened fourth degree – F♯.



6 > C Lydian has an inbuilt wistful, optimistic and humorous quality. It works with the track so far because that sharpened F fits with the F♯ in the D major chord hinted at by the spiccato part. We use a high woodwind sound to play in a quirky melody using notes from C Lydian (emphasising that F♯) – perfect for the first glimpse of our romantic heroine, for instance.

Nine top theory tips

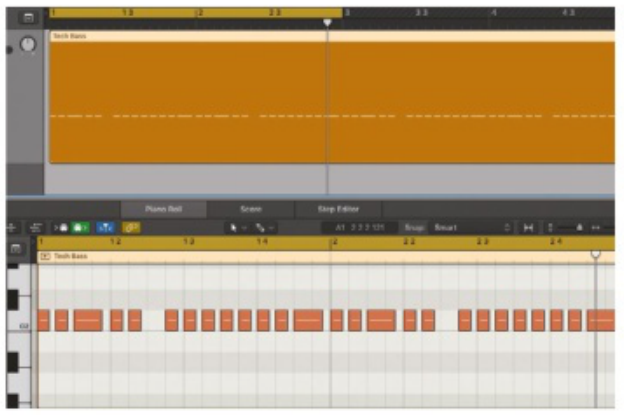
Incorporate stylistic tricks into your tunes with these genre-busting tactics that can be applied to any musical style



Swapping out one chord for a very similar alternative can be a great way to subtly spice up a progression

01 R&B SUBSIDIARY CHORDS

Subsidiary chords share two or more chord tones, and thus can be switched out for each other because they share the same harmonic function. In this example, we have a I-I-IV-V progression in C major (C-C-F-G). To find the subsidiary chord of a major triad, we simply raise the fifth by a whole tone. So the subsidiary of C major (C-E-G) is A minor (C-E-A). This can now be substituted for the second C major chord in our progression, giving us I-vi-IV-V (C-Am-F-G).



Break up 16th-note sequences for rhythmic variation

02 TRANCE AND TECHNO: 16TH-NOTE SEQUENCES

Like most dance music, trance and techno are most comfortable in a 4/4 rhythm, which is usually pinned down by a solid kick drum on all four beats in the bar. This provides the perfect backdrop for 16th-note bass and synth sequences to drive the rhythm along. Rather than just filling the whole bar with a note or chord on every beat, however, create different rhythmic effects by removing notes here and there, then shifting or lengthening the remaining notes to create space around the kick drum beats.

03 POP: MODULATION WITH PIVOT CHORDS

In a music theory context, modulation means moving to a different key, and it can be achieved in several ways. One method is to use a chord common to both keys as a 'pivot' chord. This enables you to have a verse in a minor key (Am, for example) and switch to the relative major key (C) for the chorus. Luckily, relative keys share all the same diatonic chords, making this kind of modulation fairly straightforward. So a prechorus in the key of Am that ends with a G major chord (the VII chord of Am and the V chord of the key of C) will resolve to a C major chord, allowing you to kick off the chorus with the tonic of the new key of C major.

04 REGGAE: THE 'SKANK'

Reggae has a very distinctive sound that's defined by a few signature elements, including the 'one-drop' kick drum plus sidestick rhythm pattern, deep bass guitar tones and tape echo dub delays. Probably the most recognisable reggae trademark though, is the off-beat 'skank' – a rhythm part made up of a chord, usually a major or minor triad, played on every even-numbered eighth-note. Extended chords such as major and minor sevenths are also often used, but suspended or diminished chords crop up less often. In terms of instrumentation, the skank is normally handled by the guitar, piano or organ. When an organ is used, there's also the option to go for a two-handed shuffle. This involves playing staccato chords in a choppy eighth-note pattern but leaving the downbeats empty – ie, Rest-Left-Right-Left-Rest-Left-Right-Left. With the right organ sound (usually a Hammond B3-style tone), the result is a very percussive groove that complements the rhythm section's overall emphasis on the third beat of the bar.

05 BLUES: SOLOING TIPS

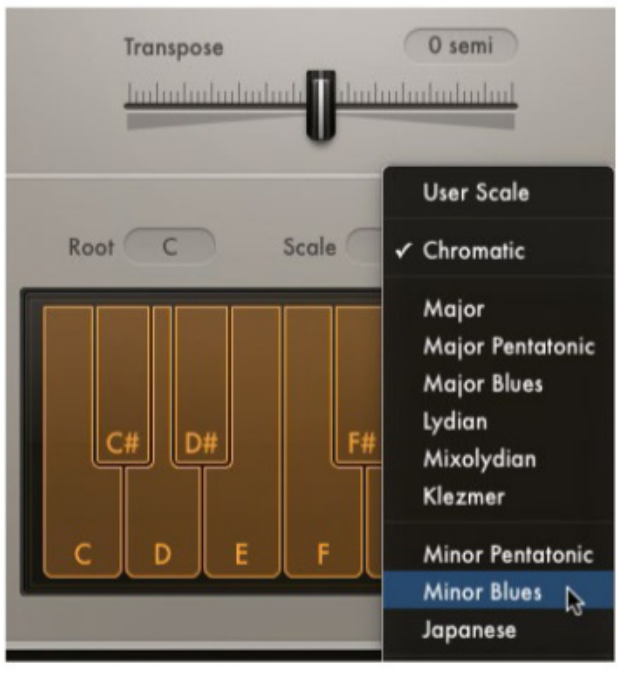
When soloing over minor progressions, using either the minor pentatonic (1, ♭3, 4, 5, ♭7) or minor blues (1, ♭3, 4, ♯4, 5, ♭7) scales, all five notes in the minor pentatonic fit over any chord in the standard blues progression, so you can stick to one scale and it should work. The major pentatonic scale (1, 2, 3, 5, 6) can be used to solo over progressions containing major triads, 7th and major 7th chords, because it lacks a 7th degree. However, the major pentatonic scale only works with one chord at a time, meaning that you should use the A major pentatonic scale when soloing over A7, for example, but when you switch to D7, you should use the D major pentatonic.

06 FUNK: MINOR 11TH POLYCHORD

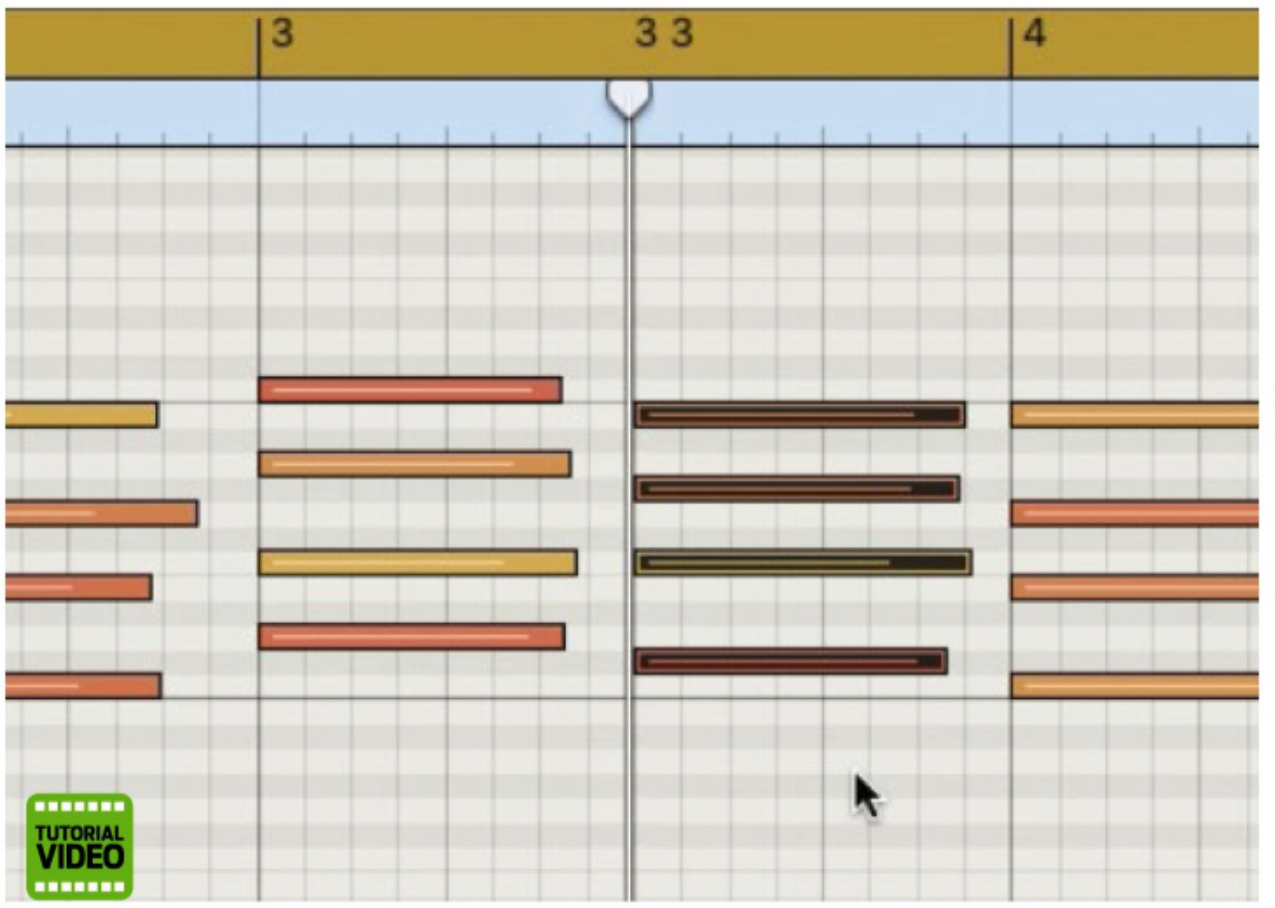
Minor eleventh (m11) chords are great for spicing up jazz or funk progressions, and they can be formed in two ways: by spelling out the six-note formula 1-♭3-5-♭7-9-11 (which for a Cm11 is C-E♭-G-B♭-D-F), or by playing two triads together to make a polychord. For an m11, play a minor triad with the desired root with your left hand (Cm in this case), then work out the note a whole tone below the root (B♭) and use your right hand to play a major triad based on it (B♭). The result? Cm11!

07 MIDI TRANSFORMATION FOR ANY GENRE

Use a MIDI transformer app (such as AutoTonic or AutoTheory), a dedicated MIDI plugin or scale lock mode in your DAW to fix MIDI input data to the key of your song. Used properly, these devices make it impossible to play a note out of your selected key and scale, so you can plonk around randomly on the keys and still end up with something useable. You *do* have to work out the key your song is in, mind, and which scale you want to use; but even if you know a lot about theory, you can get some unexpectedly cool results using this technique.



Use MIDI transposition in your DAW and you'll never play a wrong note again!



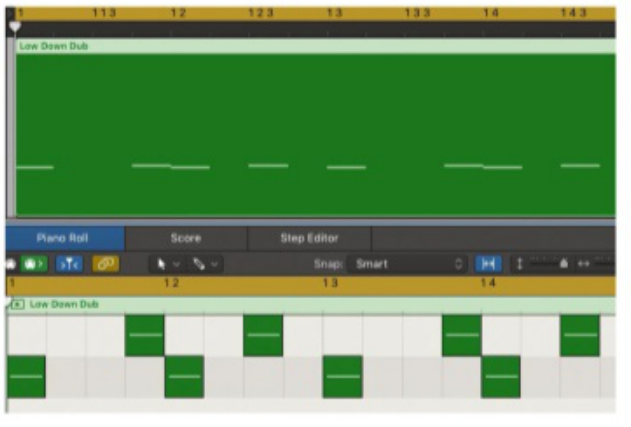
The selected chord was G major, but replacing it for a D♭7 lends a jazzier way to get back to the tonic C major

08 JAZZ: TRITONE SUBSTITUTIONS

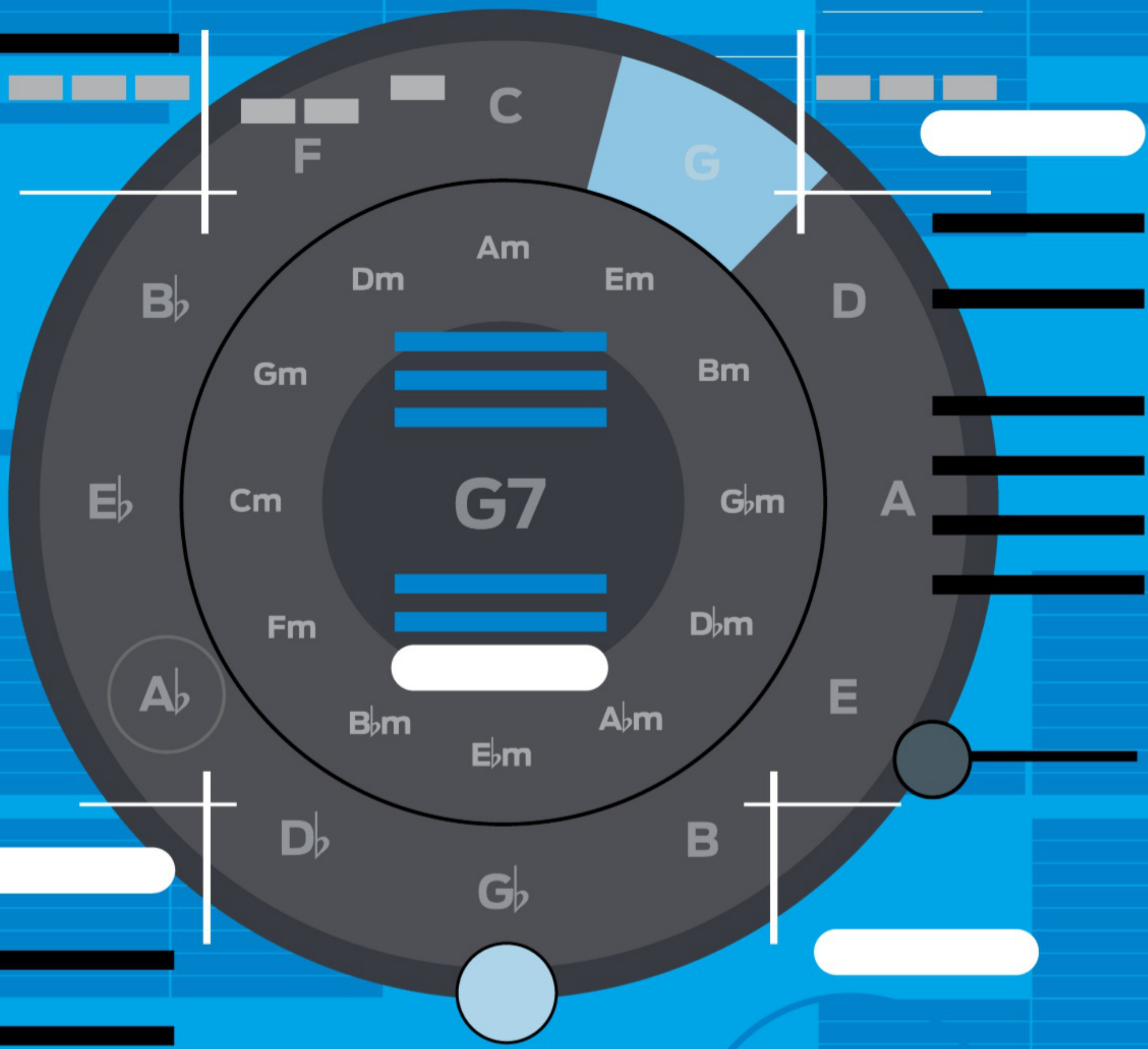
Substitution means replacing one chord with another one that performs the same harmonic function, and tritone substitution is a popular example of this in jazz. A tritone is an interval of three whole tones (six semitones), so in a tritone substitution, a chord is replaced by one whose root note is a tritone away from the root of the original chord. In our example, we've got a ii-V-I progression in the key of C major: Dm, G, C. We can replace the V (G) with D♭ – three whole tones down from G – for a jazzier, ii-♭II-I sound that still resolves nicely back to the C.

09 DANCEHALL-POP: DEM BOW

Unlike traditional Caribbean dancehall songs, dancehall-pop music fuses authentic dancehall rhythms with material found in mainstream pop music, such as repeated choruses, melodic tunes and vocals with lashings of hard pitch correction. The rhythm this genre uses is known as 'dem bow riddim' – it features a 4/4 kick drum at a medium tempo, with the 16th-notes of each bar divided into accents on 3+3+2+3+3+2, usually played on the snare to give a pushed, rolling feel to the track. **cm**



An authentic dancehall-pop rhythm takes this shuffled pattern as the basis of its drum track


C
G
D
A
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B
G♭
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E♭
B♭
F
Am
Em
Bm
G♭m
D♭m
A♭m
E♭m
B♭m
Fm
Cm
Gm
Dm
G7

MUSIC THEORY MADE EASY!

It's not as scary as you think – follow our guide and you'll be writing better tunes in no time

> If there's one thing guaranteed to polarise a room full of computer musicians, it's music theory. With just one mention of a dominant seventh or a double flat, the MIDI keyboards come out, and the two sides line up against each other and proceed to fight to the death until just one remains, gasping for breath in a heap of piano wire.

OK, so it's not quite that bad, but there's definitely a divide nonetheless. Some musicians preach the importance of theory but never get any tracks finished, while the other side shun the lexicon and knuckle down – but their tracks don't always sound quite... 'right'.

Here at **cm**, we're firmly in the middle. It's the emotion that counts, but we know that a dose of useful knowledge can inspire a truly unique track. Music theory is just that: *theory*. It explains why certain notes work together, but they still work together if you don't know *why* they do. That's why we believe that you should develop your theory skills while actually making music – after all, it's too easy to use your lack of knowledge as an excuse for lack of output. It's important that you don't get lost down the theory rabbit hole, and instead actually get around to making some kick-ass music, equipped with good old-fashioned learning to back it all up.

So what are we going to do about it? Well, over the next 14 pages, we're going to distil music theory down to the elements we think are most important in the track-building process. And we're going to put our money where our mouths are by showing you how these crucial elements come into play while building an actual track. We'll start with a skeleton 'sketch', with no harmonic content, that you can go grab from the **Tutorial Files** folder and use in any DAW. Using this basic starting point, we'll then demonstrate real-world uses of the most crucial theory techniques as we build and develop the track.

This feature and its accompanying videos will focus on the practical basics of theory, but if you want to get up to speed with the topic in more detail, be sure to check out a few choice *Computer Music* back issues, or treat yourself to a monthly subscription (see p128). Aside from semi-regular cover features on music theory, you'll find our in-house expert and pun extraordinaire Dave Clews breaking down a specific topic each and every month in his long-standing *Easy Guide* column.

Our starting point

We've created this entire project using only C notes. Go get the MIDI files, plugins and projects from FileSilo to follow along, and we'll build the track up using theory...

GET THE FILES

Download the files for this track from FileSilo (**filesilo.co.uk/computermusic**) – they're in the **Tutorial Files** folder. You'll find the initial MIDI files for each track, plus the amended MIDI files for any changes we make in any given walkthrough – just replace the originals in your project when required.

GET THE PLUGINS

You might already have the requisite **cm** Plugins installed on your system. If not, head to FileSilo or grab the installers from this issue's covermount DVD, then install them on your PC or Mac.

01 ARRANGEMENT

This track's a fairly basic dance arrangement of nearly seven minutes. It's nothing special, but it's what you do with the notes that counts, isn't it? Since we're working in MIDI, the tempo doesn't particularly matter, but keep it around **114–125bpm** to get results like ours. Throughout our videos, we're running at **120bpm**.

02 NOTHING BUT C

Every single note in this project starts out as a C note – there are no other notes in the entire project (other than drums, of course). It might sound weird as you play through it for the first time, but this actually gives us a perfect blank canvas to show you how to use theory to build something from nothing – and something *musical* at that!

03 DRUM ELEMENTS: AUDIO FILES

We've used our own drums for this track, and we've included them in the **Tutorial Files** for you to get a rhythm going straight away. However, if you want to get your own beats in there instead, we've also included a MIDI file of our drum pattern for that purpose. We recommend using XILS-lab StiX CM – the excellent drum machine from **cm** Plugins – to get something started.

04 KEYS AND CHORDS: PHONEC CM

With its drifting, retro, VHS-styled sound, Phonec CM has us covered for these sultry chords. Just grab the **Organics** preset from the menu in the lower right. We'll get going straight away on the next page, and start learning about how chords work with this lush patch.

05 LOW AND HIGH LEAD SYNTHS: THORN CM AND CURVE CM

There are two lead synths in our project that play similar parts. The 'Low Synth' is a patch from Thorn CM (**Lead >> Pluck >> Warmer**), while the higher synth is a preset from Cableguys' Curve 2 CM: **Bloopy (CG Edit) LE**, found on page 2 of the synth's preset library.

06 PAD SYNTH: ENZYME CM

Using the preset **PAD Eerie**, Enzyme adds an atmospheric synth layer that gives some texture at the start of the track, and comes back in towards the end to fill out the mix when some extra complexity is needed.

07 RISING SYNTH PART: PHONEC CM

This slow sound (Phonec CM's **Making Contact** patch) rises up in pitch to the C note we've programmed. When timed right, it acts as both a riser effect and also a melodic note as other instruments come in to do their thing. Phonec CM's not just used in the first drop and the following build – it's also used to make some more interesting effects during the long second verse, too.

08 SYNTHESISED BASSLINE: BAZILLE CM

With the **HS Max Bassroom** patch loaded, **Bazille CM** provides low-end weight, plus attack and 'definition' when played with quick note combinations like the ones we've programmed here. When this bass part first comes in, it's playing longer, sustained notes, but this quickly gives way to a rhythmic pattern that follows the main song whenever it does play.

09 NEW MIDI FILES FOR EVERY WALKTHROUGH

Anywhere that we amend an instrument part in one of our tutorials, we'll include the new version in the **Tutorial Files** folder. With this, you can either replace the original outright, or add it as an extra track then compare it against the initial version.

10 HIGH-PASSED MASTER

We've included several project files for a few leading DAWs. We've automated a couple of high-pass sweeps on the master channel. If you're building the track in a different DAW using our MIDI files, you'll have to program these sweeps yourself: the first creeps up slowly from the track's start until bar 41, and the second goes from halfway through bar 175 and drops back in just before bar 179.

11 SIDECHAINED ELEMENTS

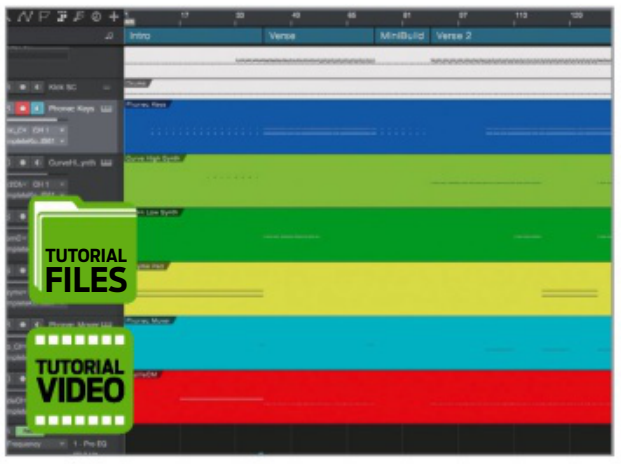
We haven't given every element the full mixdown treatment, but we've added sidechain pumping (with the key input from a silent kick drum track) to help parts rhythmically fit together a bit better, and to help you make your chord choices with some context. If you want to recreate this yourself, route a (silent) kick channel playing on every beat to a compressor on the Chords (Phonec CM) channel and the Pad (Enzyme CM) channel.

12 THE REST IS UP TO YOU

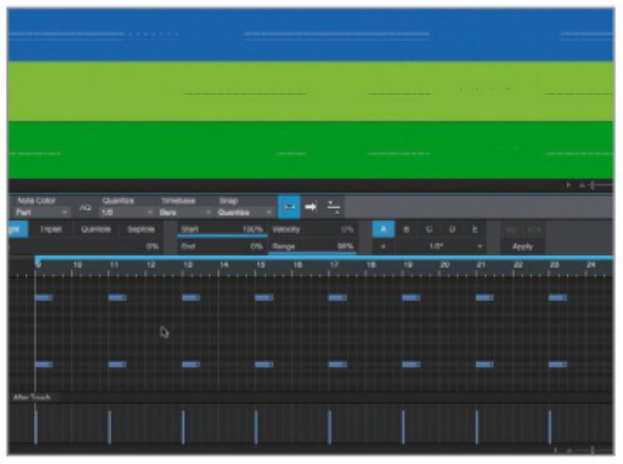
Fancy restyling the drums, adding elements or swapping them around? Please do! Want to polish up the track and give it a proper mixdown? Go ahead!
We're focusing purely on music theory knowledge throughout this feature, but feel free to give the tune your own stamp.

> Step by step

1. Exploring basic three-note chords and building a progression with them

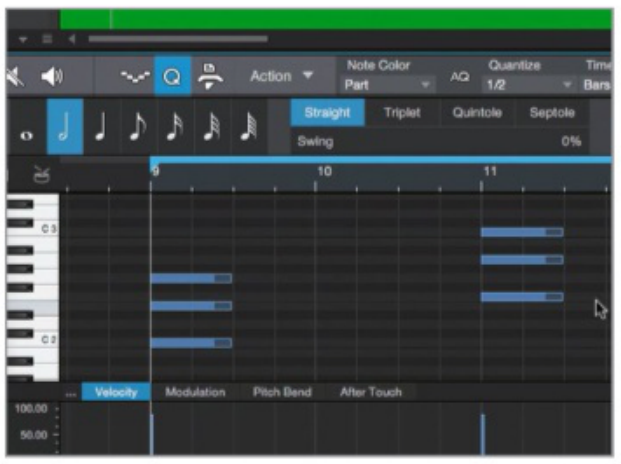


1 > Let's look at chords. For now, we'll just use simple three-note major and minor chords. We won't go too deep yet – we'll just show you what these chords are and how to make them – but our later walkthroughs will help clarify how to choose chords in the right context. Load up our sample project, shown on the previous page.

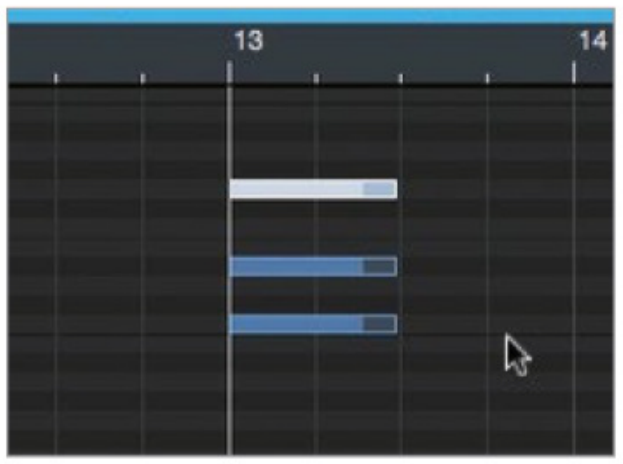


2 > The **Chords Keys.mid** track is triggering Phonec CM. Right now, every chord is two **C** notes, spaced an octave apart – pretty boring! A chord is played by playing two or more notes at the same time. For the first eight **C** chords in the MIDI part, delete the top note so we can build something new.

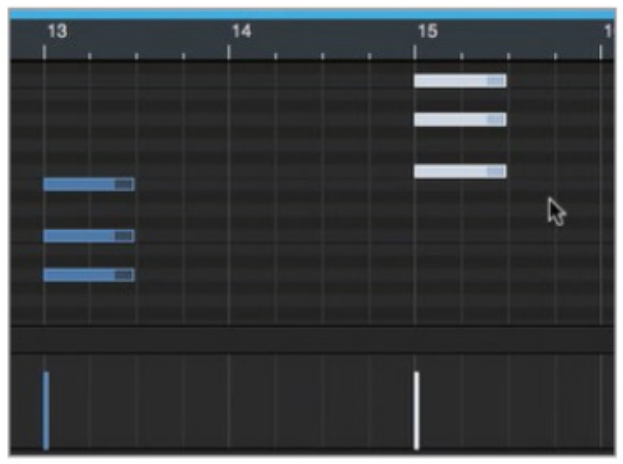
3 > There's a world of possible note combinations, but here we'll focus on the most common by creating specific three-note chords – aka 'triads'. We'll start with a **C major** chord. Take the **C** note and duplicate it four steps up to the note **E**. For the third note, duplicate that **E**, and move it up by three steps to **G**. Our **C major** chord contains the notes **C-E-G**.



4 > Next we'll duplicate this chord, moving all three notes to make the chord **F-A-C**. This chord is **F major**. Although we have different notes, the pattern between them remains the same – from the first note, **F**, we go four steps up to find our second note, **A**, and then three steps up to find our third note, in this case **C**.



5 > If we continue to move this chord to other notes, we'll still get a major chord, because of the pattern between the notes. Move the chord notes to make it a **G major** (**G-B-D**). Now we'll make a minor chord as the third chord, namely **C minor**: **C-D♯-G**. Compare it to the **C major** at the start – the only real difference is the middle note.



6 > Again, what makes this chord minor is the pattern between the notes (up three, up four). We move it down to make it an **A minor** (**A-C-E**), then program our last chord as an **F major** (**F-A-C**). We then duplicate this chord progression for the entire track on this instrument. Check out the video to see and hear it all in action, and grab our new MIDI chords track in the **Tutorial Files** folder.

More three-note chord flavours

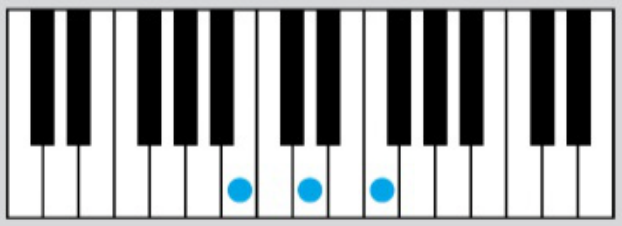
With so many notes available, major and minor chords are just the tip of the iceberg. We'll take you through four-note chords later in this feature, but here are a few more three-note chords you can use to spice things up.

A **diminished chord** is made by taking the root note, moving three semitones up, then another three semitones up. The diminished chord sounds 'unsettling', and can be good for transitions between sections.

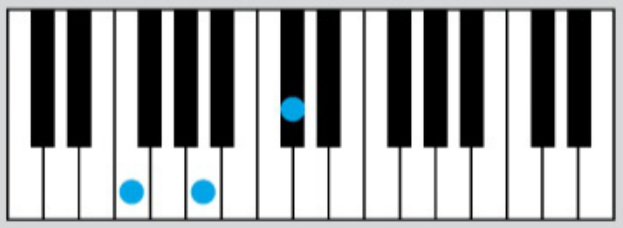
An **augmented chord**, on the other hand, takes the root note, adds one four semitones up, then another four semitones up. The sound of the augmented chord is mysterious – it's great to play after a major chord by moving the first note one down, Beatles-style.

How about going for a **suspended fourth** chord? With this one, the gap between the first two notes is bigger than that between the second two. Start off by moving five semitones up, then another two semitones up. It's a major chord with the second note raised, basically. It's somewhat reminiscent of church hymns, and it sounds like it wants to resolve back to that major chord.

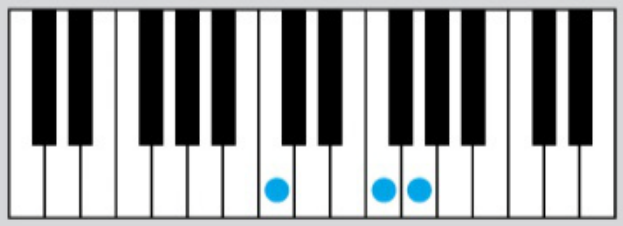
Similar to the suspended fourth, a **suspended second** takes the second note of the major chord and moves it down two semitones – jumping up two semitones from the root, then up another five semitones.



A diminished chord starts at the root note, moves three semitones up, then another three up



An augmented chord travels four semitones from the first note, then another four semitones



Try a suspended fourth chord out before the major chord, formed by moving the middle note one step higher

Keys and scales

Pay attention now – if you learn one thing about music theory, it should be this.

There are 12 notes on a piano keyboard: C to C and repeat. But in almost all music, the point is to not use all of them. Most often in Western music, seven from those 12 are used.

Put basically, if you restrict all the notes you play to that specific selection of seven – that 'scale' – everything you play will be in key. It won't automatically sound awesome, but it's half the battle.

But here's the thing: the question of which seven notes you use is very important. You can't just use any seven, and the seven notes are what define the musical scale you're using.

The major scale can be found by playing the white notes from C to C, but it's the pattern between notes that matters

If you play all the white notes on the keyboard (C D E F G A B C) in order, then you've just played a C major scale. If you play the white notes from A to A, you've just played an A minor scale.

The pattern of the gaps between the notes determines what the scale is. Scrutinise that C major scale and you'll see the pattern of jumps between notes is 2-2-1-2-2-2-1 – ie, the first jump goes from C to D, missing out C♯, while the third jump goes from E to F, not missing any notes out.

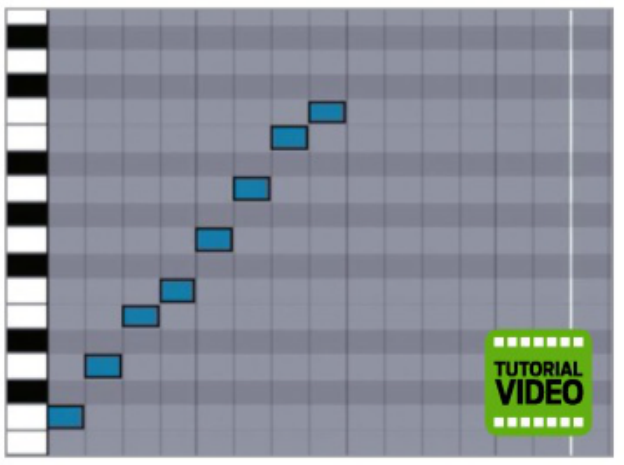
Starting from D, you'll play D major if you keep that same pattern (2-2-1-2-2-2-1). So from D, jump to E (missing D♯), and next to F♯ (missing F), then to G (missing nothing). The whole D major scale is D E F♯ G A B C♯ D.

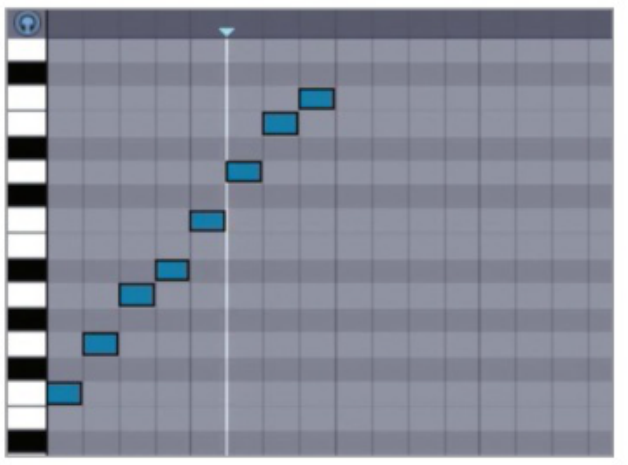
The minor scale has a different pattern, making jumps ordered 2-1-2-2-1-2-2

Let's look back at that A minor scale (all the white notes from A to A). The pattern for a minor scale is 2-1-2-2-1-2-2.

In the walkthrough on the right, we'll start to take you through this concept in context, giving you an extra handle on chords and scales using a DAW's piano roll.

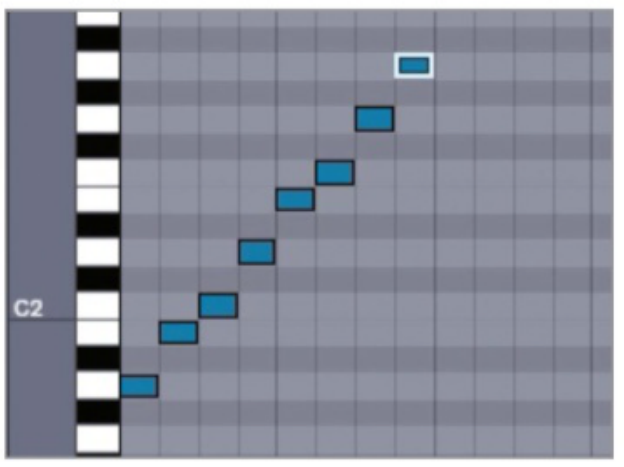
> Step by step 2. Defining a musical scale with a set of notes

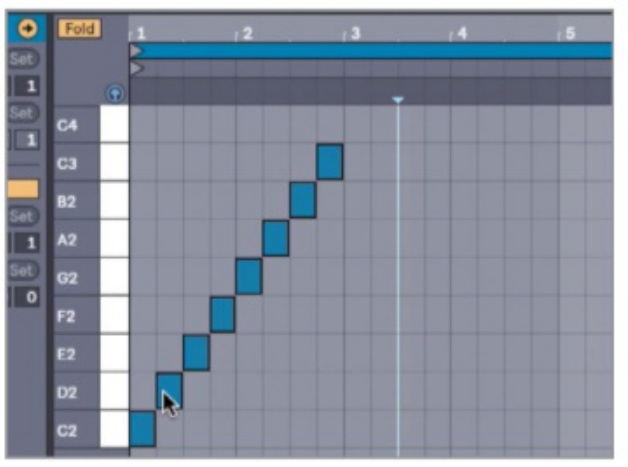




1 > Getting all the notes in your project to conform to the same musical key is one of the most useful skills you can learn when creating music, We start by defining the **C major** scale – that's all the white notes played from **C** to **C**, ie, **C D E F G A B C**. This run of notes will probably sound very familiar to almost anybody with even a smattering of musical knowledge.

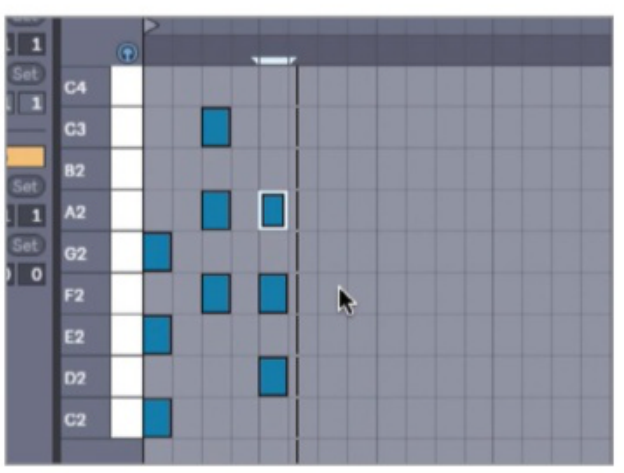
2 > If we move the same pattern up the keyboard and play it from **F** instead of **C**, we land on the **F major** scale – so that's **F G A B♭ C D E F**. We're no longer sticking to the white notes, as this rule applies only to **C** major, and no other major scale. What matters here is the pattern created between each step of the scale. For these major scales, the pattern between the notes is **2-2-1-2-2-2-1**.

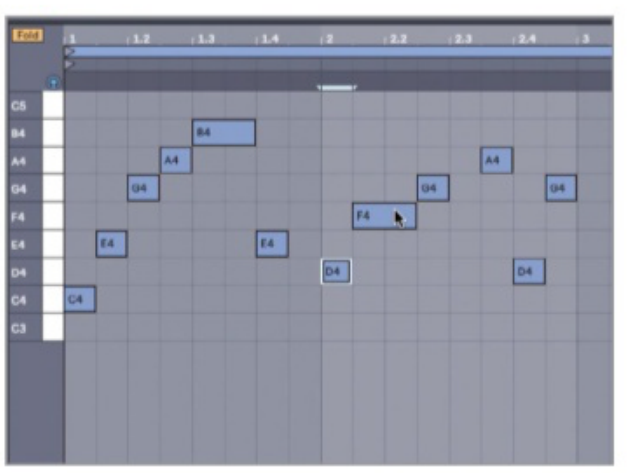




3 > Now we'll construct a minor scale. Similarly, if we use all the white notes from **A** to **A**, we end up with the **A minor** scale – **A B C D E F G A**. Again, it's the pattern of jumps between the notes that makes the scale minor, and in this case that pattern is **2-1-2-2-1-2-2** – the 'all white notes for A minor' rule is just a handy way of remembering how to formulate it.

4 > Let's get our heads back into **C major** again, drawing the scale in for the Low Synth part. So the point of the music 'being in C major' is that every instrument only uses notes from this scale. In Ableton Live, we can use the **Fold** function to make all unused notes disappear, which can make working with scales easier.



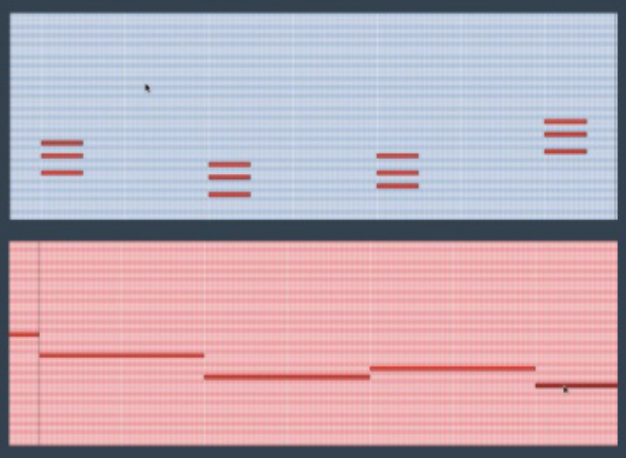


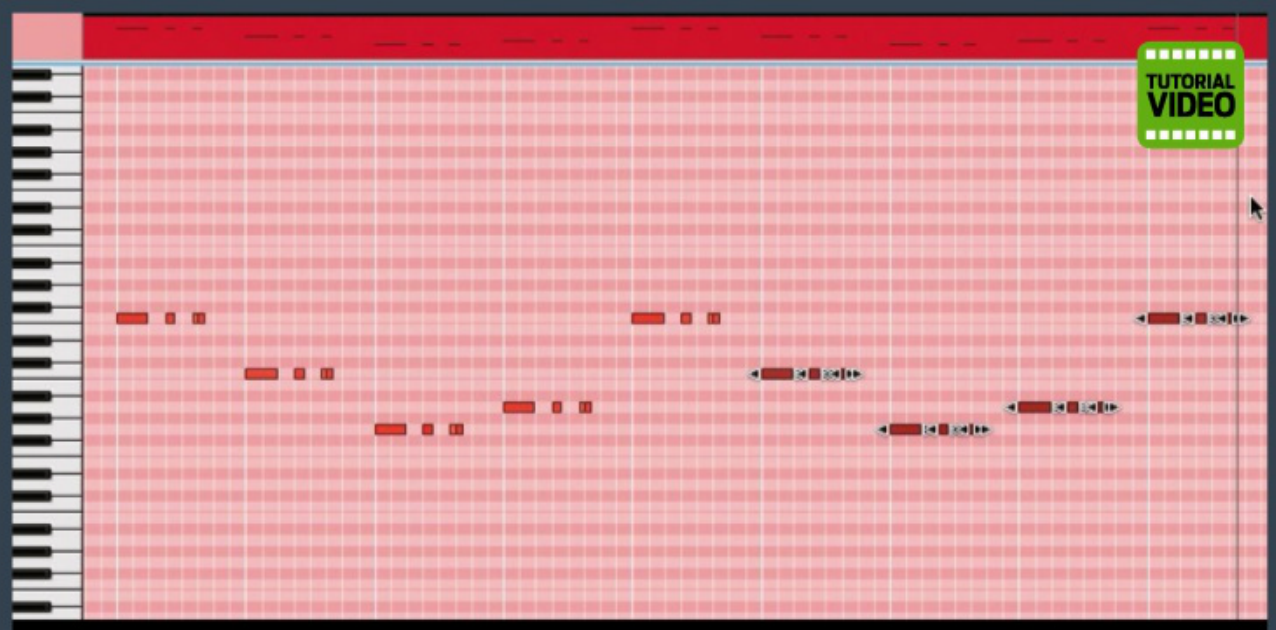
5 > So we can program any pattern of those white notes into the Low Synth, and it'll be playing in **C major**. Above, we've set up some chords to play. As long as every note played is in the same scale, things will tend to sound pretty good together. Notice how our chords are spaced out between scale notes and don't use adjacent notes at the same time.

6 > We move to the High Synth part and **Fold** the piano roll to the **C major** scale again. Once more, we can draw in practically any notes from those available, and when played together with the Low Synth chords, the instruments will be in key. Anything you program will sound reasonable... maybe not perfect, but it'll at least be in key.

Bass theory

Is it just a melody, but lower? Sort of, but there's more to it than that...





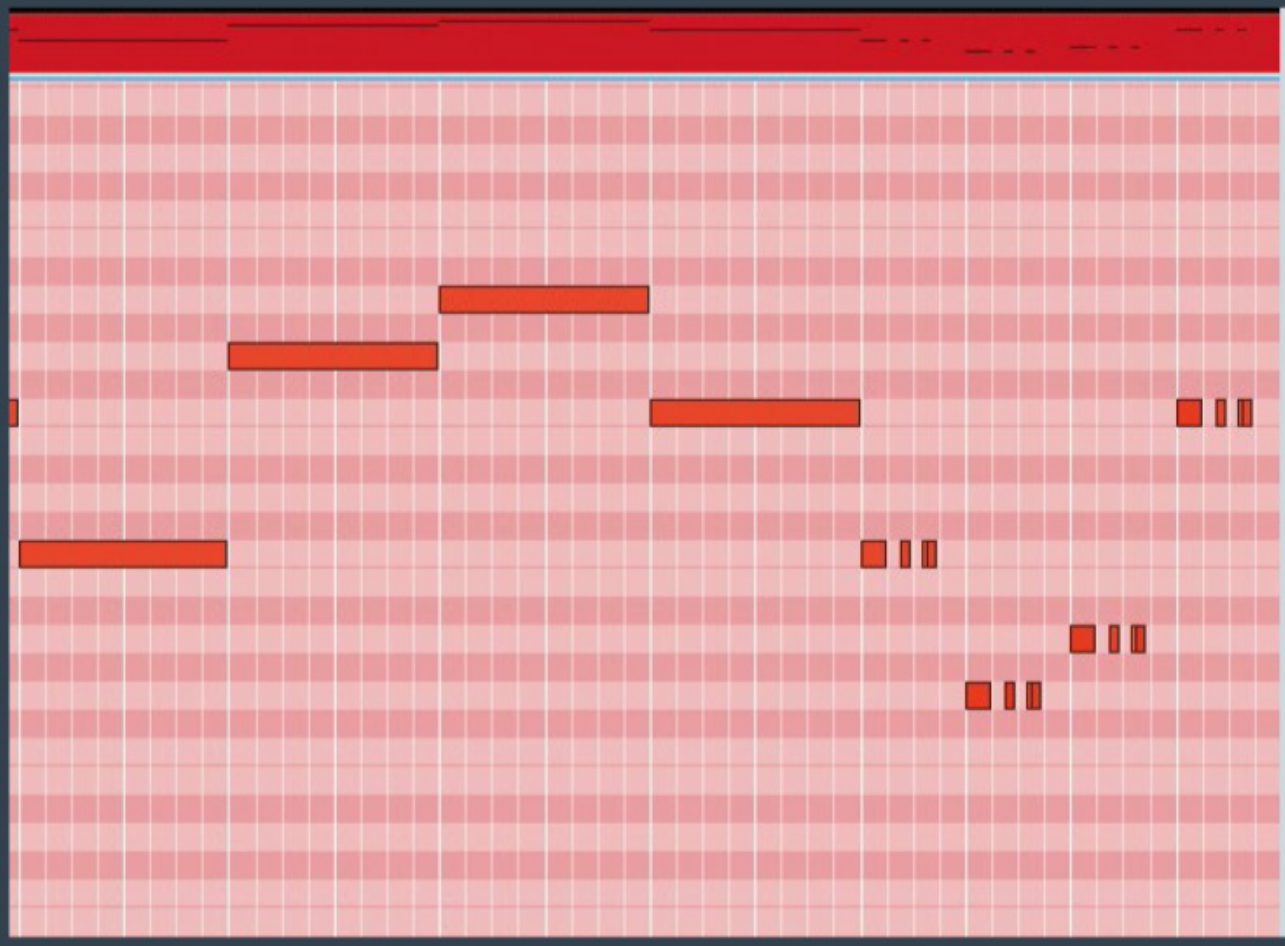
Resting on the root note

If you've loaded our new MIDI parts for the first walkthrough, the chords sound nice, but they're not backed up by the bassline, which continues to just play **C** notes. So what do we do? Since we were sticking to simple three-note major and minor triads when we created those chords, all we have to do is copy the lowest note of each chord (aka the 'root note') for our bassline. So where our chords are **Cmaj – Gmaj – Amin – Fmaj**, our bassline playing underneath them will simply go **C–G–A–F**. Since, at this point, the chords don't really change much throughout the track, we can copy the same group of four bass notes throughout the entire project.

Once you've done the *Extensions* and *Inversions* walkthroughs, come back here and experiment with the bassline – there may be new lowest notes for each chord later on, but it's still the root (**A** in an **A major** chord, **C♯** in a **C♯ minor** chord, **F** in an **F minor** chord) that will be the most solid choice for a bassline.

Considerations when crafting a bassline

The way you program bass notes will change depending on the sound you use. If the character of your bass patch lies in its complex modulation, your notes should often be long and low. If it's a solid, weighty, subby bassline, the length of the notes you use may change. If a 'punchier' bass has higher-frequency transients at the starts of notes, use it to pick out a rhythm, as in the screenshot above.



The lowest of the low

Modern software instruments aren't limited by note ranges, which begs the question: how low can you go? In our video, we position the intro bassline in a higher octave than the main bassline, which gives the main 'drop' a powerful sense of weight and impact.

While we could've gone even lower than that (with the **F** note straight after it), having the final note of the phrase a little higher helps the next note – the **C** at the start of the repeated phrase – to hit a little harder when it drops in.

Our lowest notes extend down to about 49Hz – the low **G**. In the real world, the lowest note a loudspeaker system can reproduce effectively is a low **E** (41.2Hz). We're staying above that here, but if you're going lower, remember that not everybody will be playing your music back on super-powerful club sound systems.

Crafting hooks and melodies

A mainstream track won't get very far if it doesn't have that special *something* – that unique element that a listener can grab onto and identify time and time again. Something that's familiar, yet new. A *hook*, essentially.

Your tune's hook could be a vocal phrase, a repeated melody, or even a funky beat, but for the purposes of this section, we're going to be concentrating on melodic material.

So what makes a melody? We'll start off with the basics. Simple melodies (and even plenty of complex ones) tend to start and end with the 'tonic note' – that's the note that starts the scale you're in, such as C in C major, or G♯ in G♯ minor.

But you can't just use one single note throughout... as our initial project testifies! A melody is also about moving away from that note. Without wanting to sound too airy fairy, it 'tells a story' by starting at the tonic note, moving away from it, then finding its way back at the end. Of course, it's the journey that counts, rather than the destination.

Melodies also tend to make use of phrases. Over four bars, you might encounter four separate phrases, with gaps (or at least less action) in between them. These phrases are often linked in some way musically, acting as 'call and response' pairs, or 'question and answers' pairs, if you prefer to think of it that way.

Another handy rule of thumb is to end your middle phrase (halfway through the melody line) with the 'fifth' note. This is the fifth degree of the scale, ie, seven semitones up from your scale's tonic note – that's the G note in the C major scale or the A♯ note in the D♯ minor scale. We won't get bogged down in the details, but this reinforces the listener's urge to get back 'home' to the tonic note by the end of the melody, and helps it all make a lot more musical sense in general.

But these basic melodic rules leave a little something to be desired. They apply to easy ideas such as nursery rhymes, but the real art in modern music is to mix things up a bit – to subvert the listener's expectations. Once you've learnt the building blocks of melody, it's time to break the rules and hit the listener where they least anticipate it: use unusual rhythms, unexpected turns from note to note, and never-before-heard sounds to get deep into your audience's skulls.

Even then, though, go too far with your musical experimentations and you'll risk alienating everyone. It's a fine balance to strike, but it's what being a musician is all about.

Melody generators

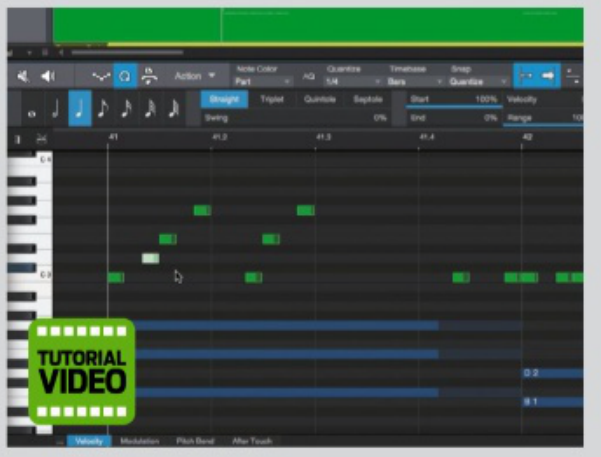
Three ways to come up with a melody from scratch

> Technique

3. The rhythm-first method

Sometimes, laying out the rhythm with one note helps you get started, and from here, all that remains is the final 50% of the task. Experiment with different notes in the already-interesting rhythm you've laid down, and it's hard to go wrong.

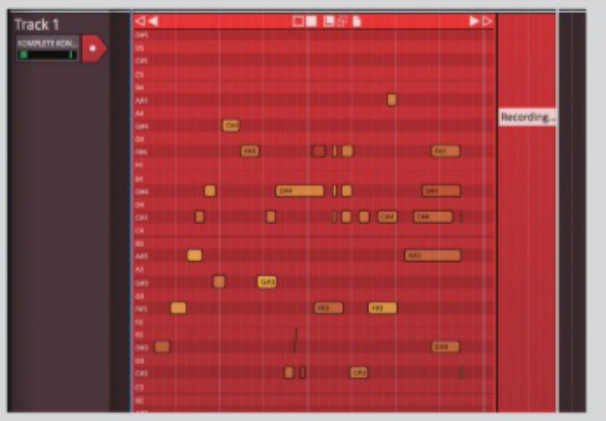
Our project is a great example of building a melody with this method. As we've laid down the whole thing using just C notes, with the rhythms already programmed, all we need to do (as seen in the video) is move the notes up or down. There's still plenty of refining to do though, of course...



> Technique

4. Recording then editing

It's not all about textbook theory. Set your music to loop, work out the scale you're in (and therefore the notes you need), and get down and dirty with your MIDI controller. Even if you're not Mozart, there are very likely to be salvageable snatches of inspiration in there. And with the magic of the modern DAW, you can experiment with what you've recorded, then tweak to improve your result. Hint: duplicate melody clips before changing them to give yourself a variation to use later on!

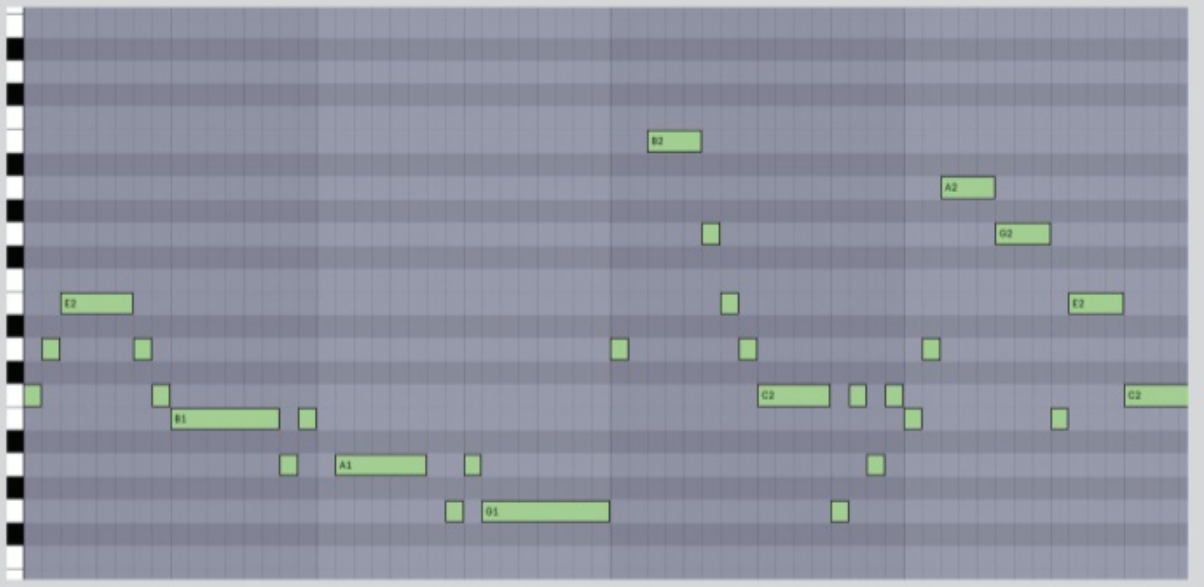


> Technique

5. Ramp up the contrast

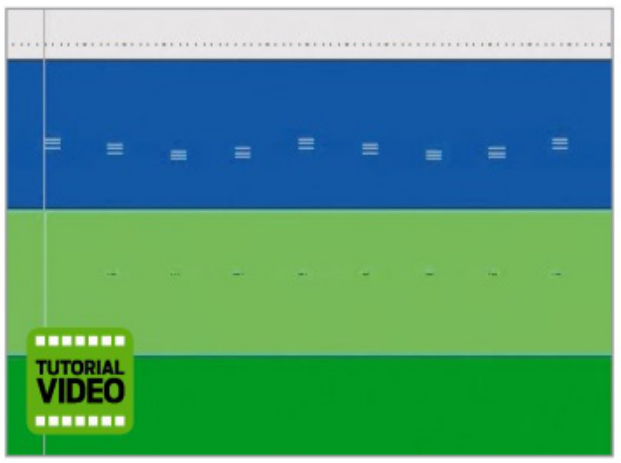
If melodies are a fight between something a listener's heard before and something they haven't, then one great weapon for the 'unusual' side of the equation is contrast. Moving in smaller steps rather than big leaps is usually standard, but making large jumps between notes will help your melody stand out against the crowd.

On a similar tip, treat your melodic phrases in the same way: if you've just gone up to higher notes, go down to lower ones next time round. If you've just played a phrase full of short, staccato notes, go for a lingering section of longer, held notes to slow things right back down. In the search for something interesting, contrast is king.

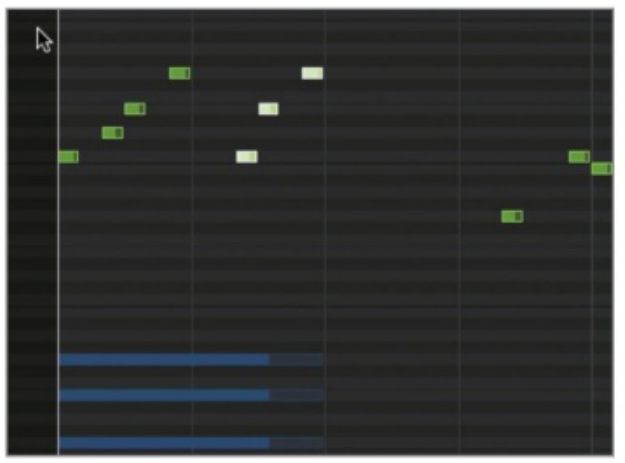


> Step by step

6. Consolidating the melody and creating variations

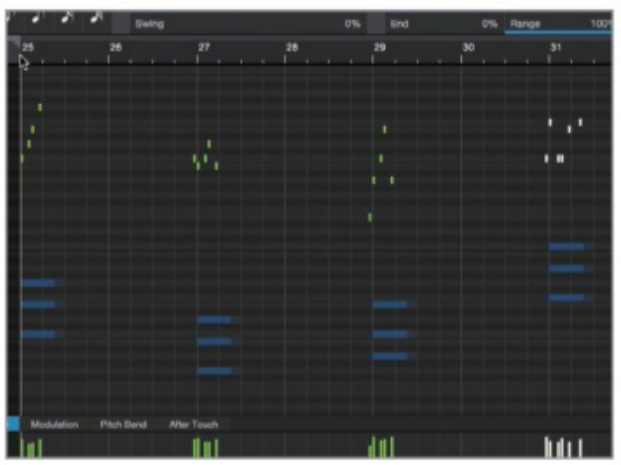


1 > Aside from our main melody line, there are also spaces in the track for smattering a few notes in the intro and breakdown sections. These are currently still just playing **C** notes. The intention for these is to provide a few hints of what the melody will be in the intro section, and some reminders and echoes of it during the breakdown.

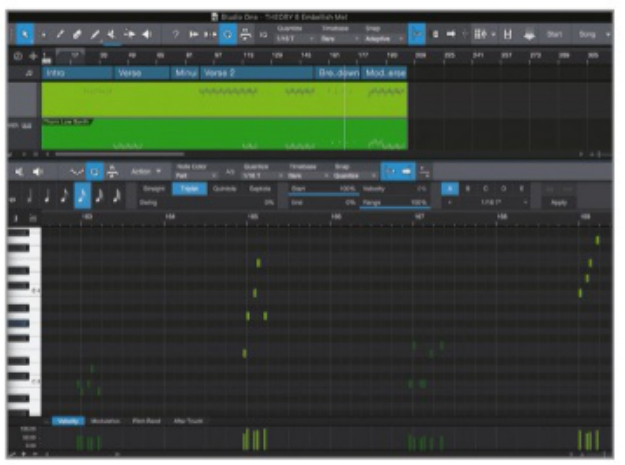


2 > We cut out one of the four-bar melody duplicates from the High Synth line and bring it over to replace the original **C** notes here. Once we've got it lined up, we delete the last three notes from the first phrase of the melody, leaving just the first four notes, then a gap after them.

3 > During the intro, the chords move at a different rate, slowed down to half speed. We move the second phrase up to join the second chord, and again remove the second half of the phrase, turning it into a little hint for the melody to come. Keeping it quick, simple and snatchy is the aim here in the intro section.



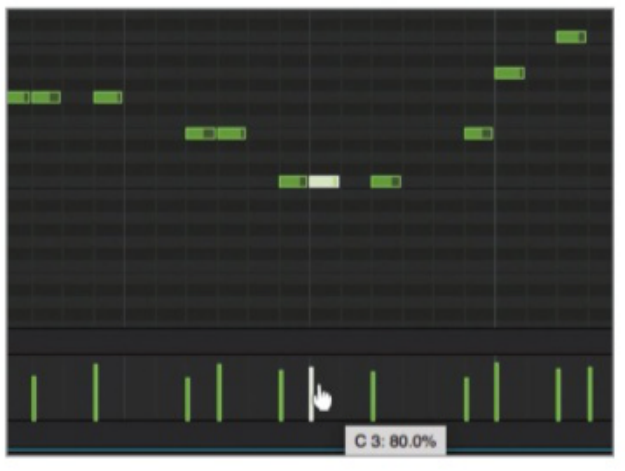
4 > We continue in the same vein for all four phrases of the melody, lining up their first halves with the chords, as above. The whole effect is a gradual exposition unravelling what's to come, but it still fulfils its musical function in the track as an interesting element in its own right, keeping the intro animated with a sense of 'building up'.



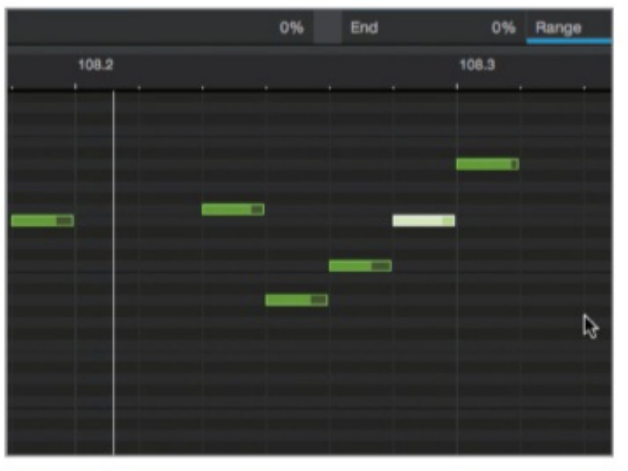
5 > In the breakdown section, we do basically the same thing, but this time we distribute the same phrases between the high and low synths, bouncing the phrases between higher and lower octaves. Doing so keeps this part as a low-key, stripped-back breakdown, but also offers something new in comparison to the first time we heard it in the intro.

6 > We've got a melody worked out for our two synth parts – one plays it lower while the other one plays it a little higher. That's all well and good, but the track is long and the melody starts to grind after a while. It's time to change it up and create an alternate version to keep the track spinning without becoming samey...

7 > We chop out the melody line halfway through verse two, and get to work making a copy to provide variation – an alternate take on the melody so far. We start by adding some extra notes between the first and second phrase for the melody to 'fall down into'.



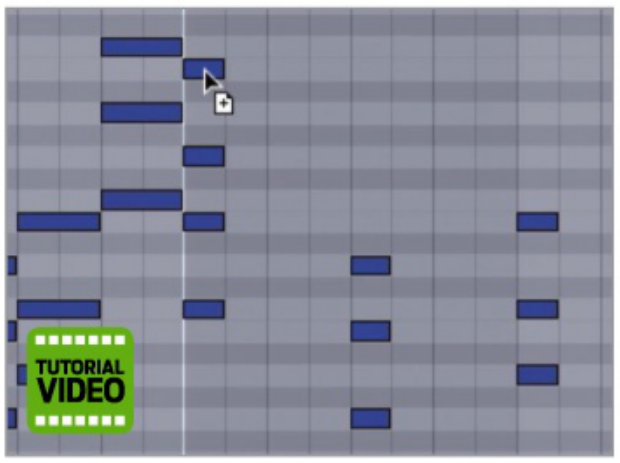
8 > In the second phrase we create some more doubled notes, where there were previously single notes, or nothing at all. Judging by the feel of this track, turning up the velocity for the second note helps the quick-fire double make itself heard best.



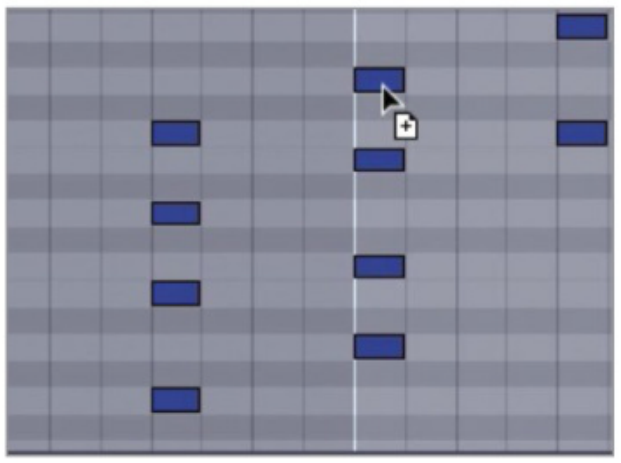
9 > Try a bigger embellishment in this second line, creating an arpeggio-style run of notes at the end of the fourth phrase to cap things off. Duplicate this new melody clip through the end of the second verse and outro, trying different octaves for the high and low synth parts.

> Step by step

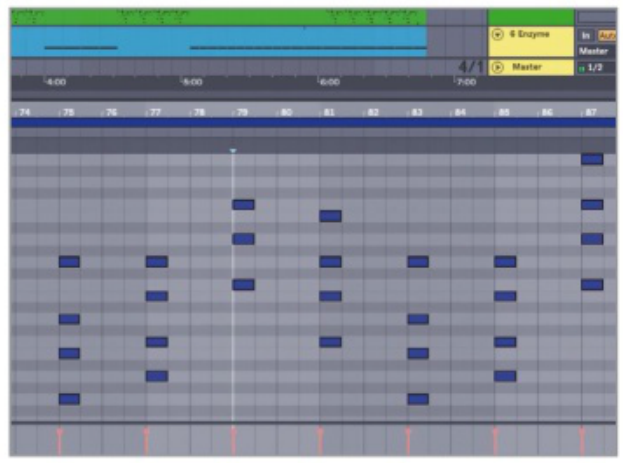
7. Using chord extensions to add flavour



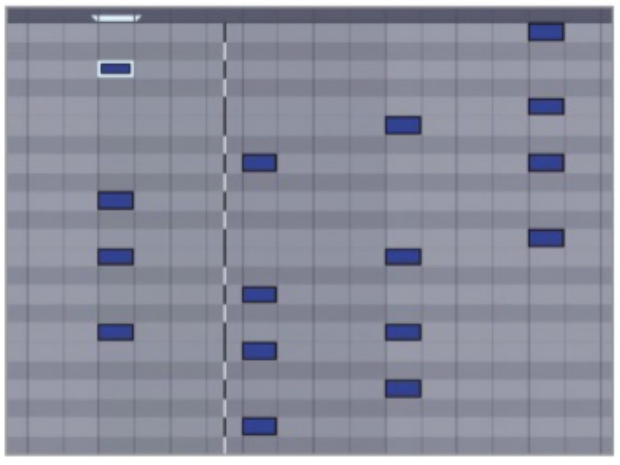
1 > We can make our chords more interesting by adding extra notes... but not just any. We've been dealing with basic three-note triads so far, but we're going to spice things up before the second verse hits by using four-note chords. Start by duplicating the top note of the **C major** chord four semitones up to **B**.



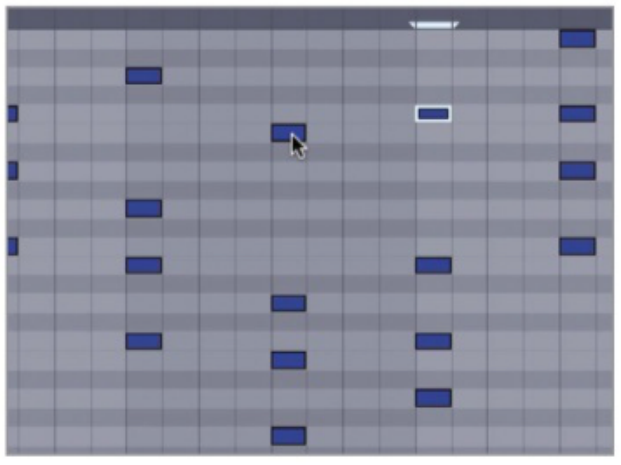
2 > This new **C-E-G-B** chord adds a new feeling to the first chord of the progression. If we try doing exactly the same with the **G major** and **A minor** chords, though, the note wouldn't be in key. This time, we move the top note up three steps instead of four.



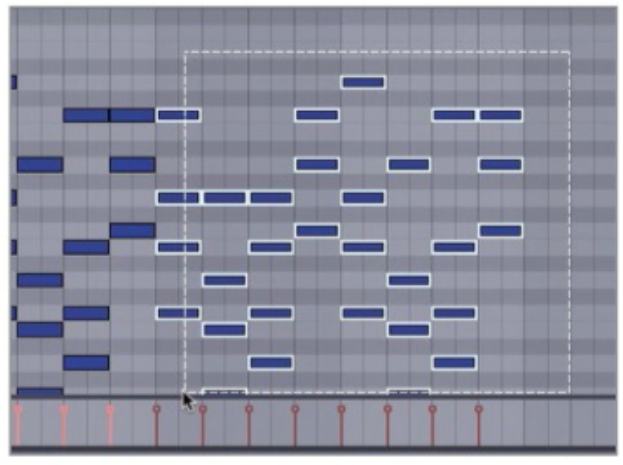
3 > We can extend the **F major** chord by adding an extra note four semitones up. This is a great chord to 'lead on from'. For this reason, we decide to use this chord as the last in a group of eight, rather than in a group of four. We duplicate the first four, then remove the extension from the **F** the first time around.



4 > Chord extensions don't have to stop there. For the second **G major** and **A minor** chords, we move the top note up even further, hitting **A** for **G major** and **B** for **A minor**. Finally, we also extend the second **C major** chord in the group of eight with a higher-up **D** note.



5 > The chords have become a bit too 'jazzy' for the track. We take the **G** and **A** chords' highest notes elsewhere, making **G major** (**G-B-D-B**) and **A minor** (**A-C-E-C**). These chords aren't technically extensions, as the higher notes already belong to the original chord, but it still gives extra complexity.



6 > Finally, we start duplicating these alternate, more complex chords out to the rest of the sections in the track. They'll feature from the first breakdown, into the second verse, and beyond into the track's outro as well.

Extended chords

We've given you a very practical demonstration of chord extensions in the walkthrough above, and while we're generally avoiding too much jargon this issue, this is a topic that would benefit from a few concrete definitions.

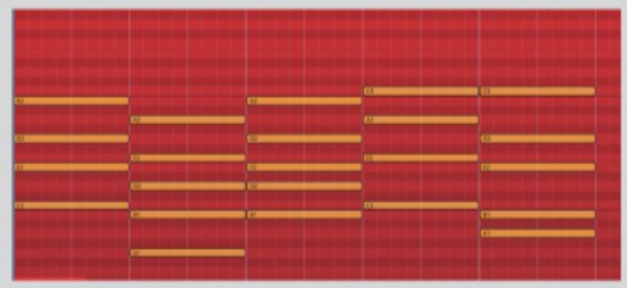
The first two types of extended chords are **seventh chords**. A **major seventh** uses the standard triad pattern for a major chord and then adds a note four semitones on top. So that's **C-E-G-B**, for example. A **minor seventh** is similar, but adds three semitones on top of a minor chord – say, **C-E♭-G-B♭**. One more variant is the **dominant seventh**. This is a mixture of the two, in many ways, taking a major chord but only adding three semitones on top. **C-E-G-B♭** would be an example of that.

If you look through a standard major scale, the notes available to you mean that the major seventh is a natural candidate for the C chord, while the D minor and E minor chords will easily turn into minor sevenths. You can easily build a major seventh on the F, but the G encourages that lovely dominant seventh chord.

Moving things further up, you can build on the seventh chords by adding three or four semitones (whatever's allowed by the key you're in) to build a ninth chord. **C major 9th** would be a five-note **C-E-G-B-D**, with the 'ninth' reaching into the next octave. **D minor 9th** would be **D-F-A-C-E**.

And if you decided to miss out the seventh note and just add the ninth to the original chord (as in **C-E-G-D**), that'd be called an **add 9** chord. These chords continue building in just the way you'd expect, with 11ths (or 'add 11's) or 13ths, right until you come back to the tonic note – and things start repeating as you get higher and higher.

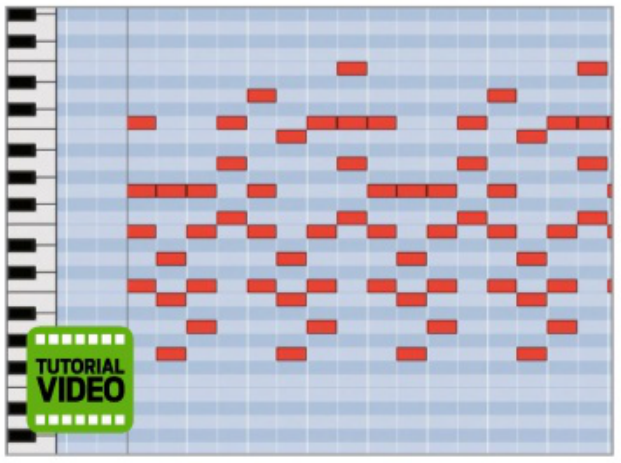
Of course, these chords can be inverted like any other (as we'll show you on the next page), but when doing so, watch for clashes between adjacent notes – extensions can get a bit messy with so many notes hanging around.



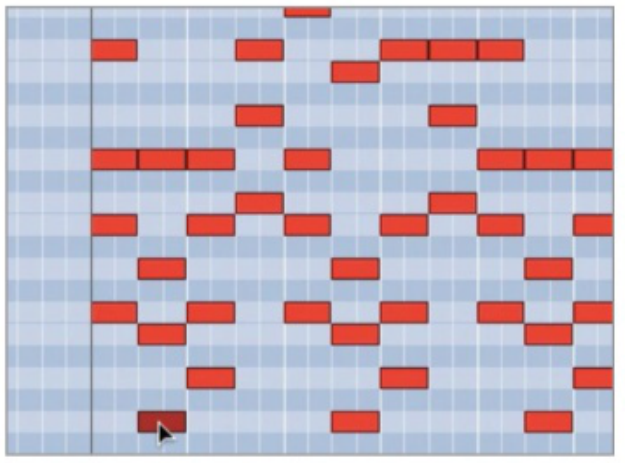
A range of extended (and inverted) chords that are possible when using the C major scale

> Step by step

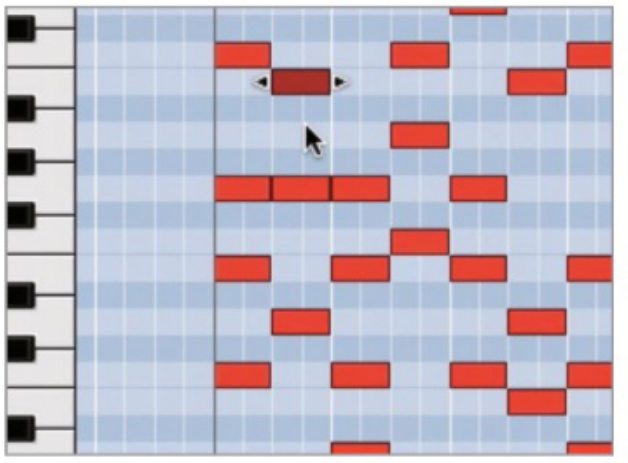
8. Chord inversions – how (and why) to shuffle chord notes



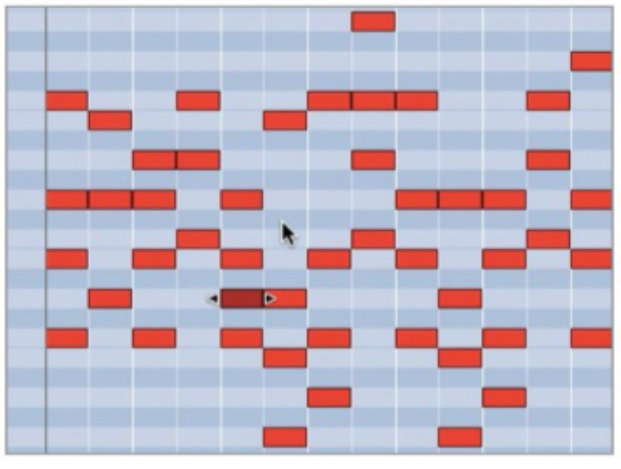
1 > Have a look at the chords in the last walkthrough (load ours from the **Tutorial Files** if necessary). Notice a couple of things: for one, they cover a broad range from note to note on the piano keyboard (about two octaves), and they lurch from high to low and back. Let's tidy this up for a smoother effect...



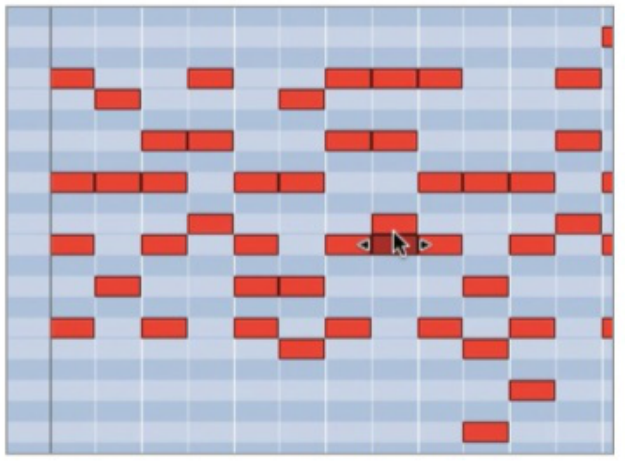
2 > We're going to aim to bring them into just one octave range, from **C** to **C**, matching the **C** chord at the start. For our second chord (**G major**), we'd like to move the lowest **G** note up an octave to the higher **G**... but there's already a **G** note playing up there. Instead, then, what we'll do is delete this lowest **G** note.



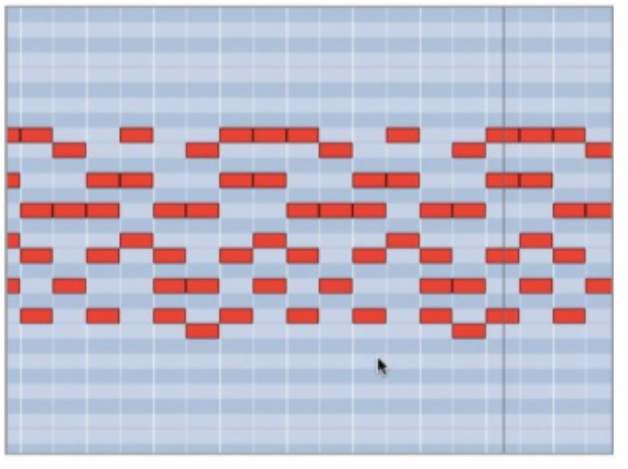
3 > Now the lowest note of the chord is a **B**. We move this note to the **B** an octave up, bringing it into the same **C**-to-**C** range we're shooting for. Moving one note up or down doesn't actually change the nature or character of the chord – what defines this is which notes are present, not where they fall.



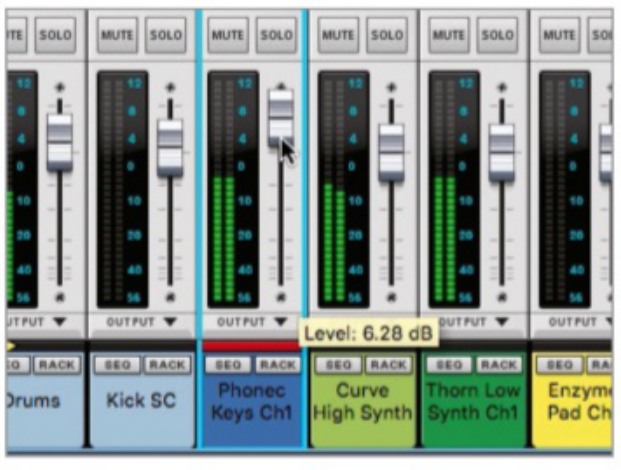
4 > We continue by moving the low A in the **A minor** chord up higher, and then the extended **D** in the next **C major** chord down lower. Already, we can see that our chords are more closely grouped than the originals playing after them. Now we've brought the notes closer together, the chords sound a lot smoother.



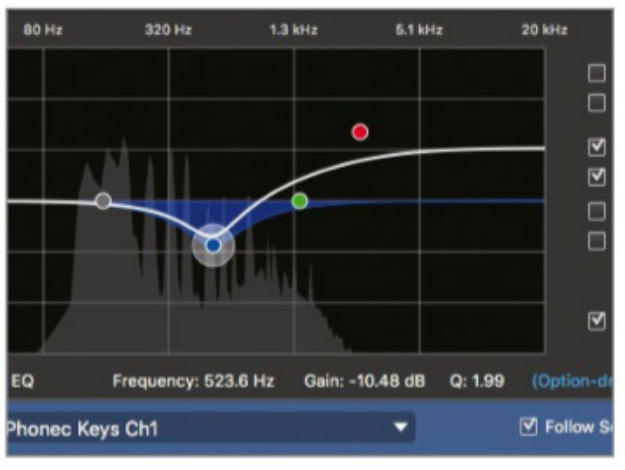
5 > Moving on, we move a **G** up an octave, an **A** up an octave, and an **E** down by an octave. This **E** (the extension from the **F major** chord) has landed right next to the **F** above it, though – that sounds a little worse than before. Move that new **E** down to the **D** below it, then duplicate these inverted versions of the chords throughout the rest of the track.



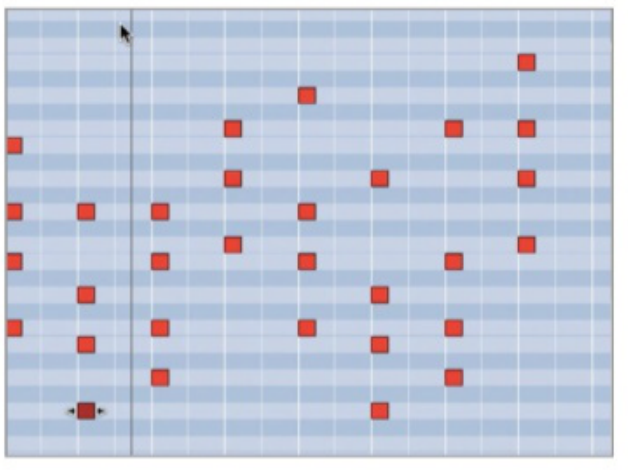
6 > So why does this work, exactly? Well, it stops 'lurching' between higher and lower notes (imagine playing such far-apart notes on a real keyboard!), as the jump from note to note is smaller. If this was a four-voice sung chord progression, and you were singing the second highest note, you wouldn't need to move your voice very far between each note.



7 > Here's a more technical reason: when chord notes fall within a similar octave range, more space is created for other instruments in terms of frequency content, meaning you may be able to push the level of your inverted chords up a bit higher in the mix.



8 > Also, when chord notes lie in the same octave range, the job of EQing becomes easier. You'll have more mix space to work with, as the chords' harmonics will lie in a similar frequency range. This helps you pocket your musical parts more effectively within a busy track.

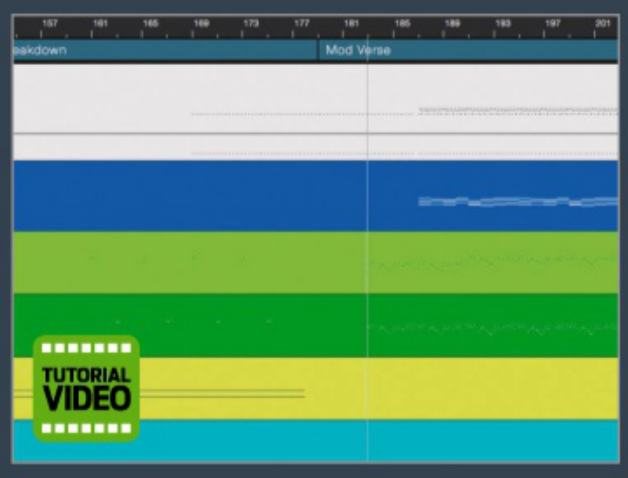


9 > However, not all chords need to be inverted. We've left our extended chords in their original orders for our breakdown and build-ups, where fewer instruments compete for space. At these points, we can let the original chords shine through for a change of feeling.

Four strategies for changing key

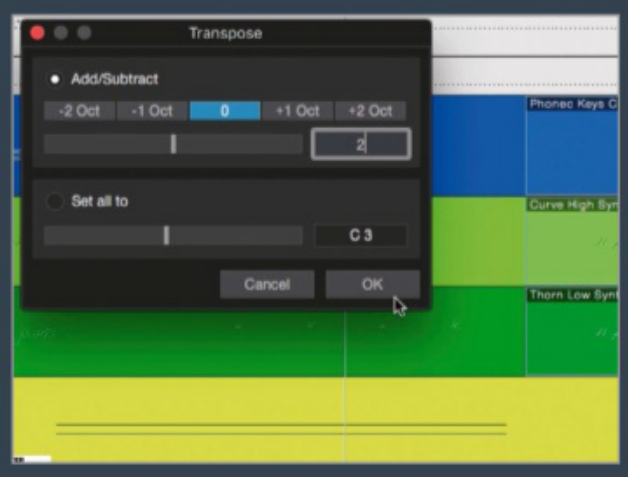
> Step by step

9. Break it down, build it up again...

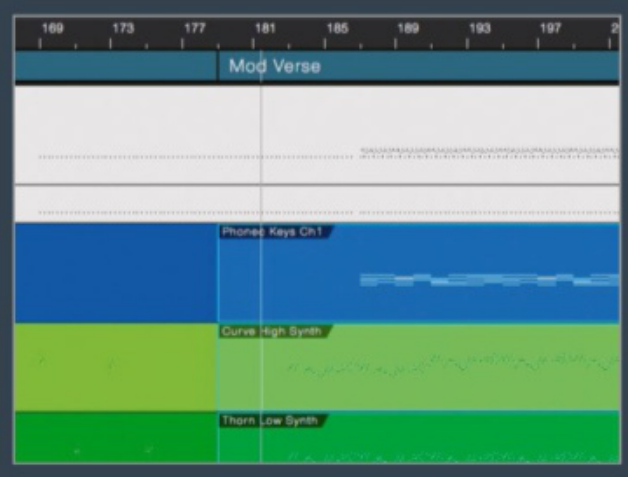


1 > At the end of the track, we want to change things up a bit and switch to a different key. But how do we do that? In the original track, we have this breakdown, after which the music restarts, and builds back up again...

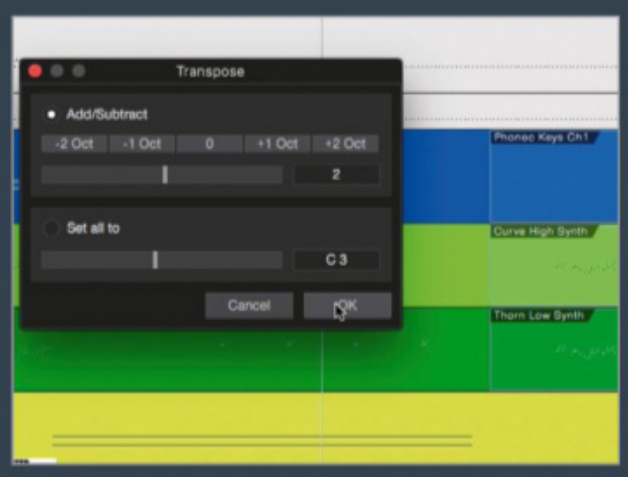
2 > With this drop in the music, it's quite an easy setup to build things back up, only this time in a different key. First of all, we cut out the outro parts for the Chords, High Synth, Low Synth and Bassline parts...



3 > As we're using Studio One here, we can right-click the separate MIDI clips, hit **Transpose** and move them up by, say, **two semitones**, which shifts all these elements into the key of **D major**.



4 > Because the music fades out, takes a little break and then starts building again, this works quite well. After everything drops out, the bass starts at **D**, not **C** where it's been all along, and emphasises that we're in a whole new key.



5 > Since the patterns between all the notes remain the same, we can move to practically any key in this abrupt way. Another **two semitones** up and we hit **E major**, which provides an even bigger change after spending a long time in C.

POWER TIP

> Why change key?

Our track is about seven minutes long, and that's a long time to listen to a **C major** scale going around and around. The key to keeping the audience hooked is to make things interesting. When we go into the outro, we're essentially repeating ourselves, and changing key at this point is one way to surprise the listener. There are other ways to do the same thing, but changing things up like this is a distinctly musical way to inject extra life, pace and energy into a tune.

> Shared chords

Here's another way to make a smooth, logical and musical transition. Let's use the example of changing from C major to D major once again.

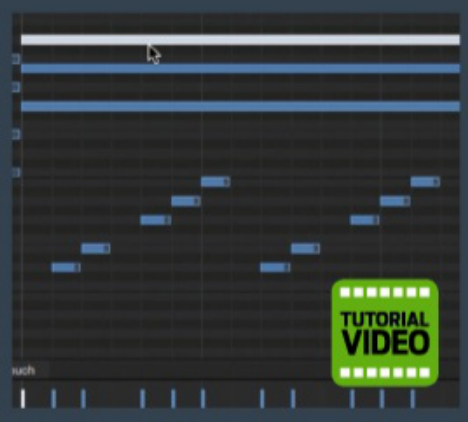
If you program out the notes of both these scales and inspect them, you should see that the two have similarities and differences. C major has a C and F while D major has C♯ and F♯. On the other hand, the two scales do share a few notes: D, E, G, A and B.

The idea behind a shared chord (sometimes called a 'pivot chord') is to use notes belonging to both the scales – the original and the destination – to form a chord to transition between the two. This chord will act as the last chord in C major, but it's also an acceptable one in D major, so it works for a smooth transition.

So, for our remaining notes – D, E, G, A and B – what chords would qualify as the pivot chord? Two obvious triads are G major (G-B-D) and E minor (E-G-B) – these provide a better transition between the two keys.

Once you've got a chord worked out for the transition, there's nothing stopping you extending it and inverting it, as demonstrated on the previous two pages. Using the same available notes, E minor could be extended to E-G-B-D, while G major could be extended to G-D-B-A, for example – and any of these can be inverted as you see fit, depending on the exact transition between the previous and next chords.

In the video, we demonstrate this with G major, eventually resting on a combo that falls between the A minor chord before and the C major after.

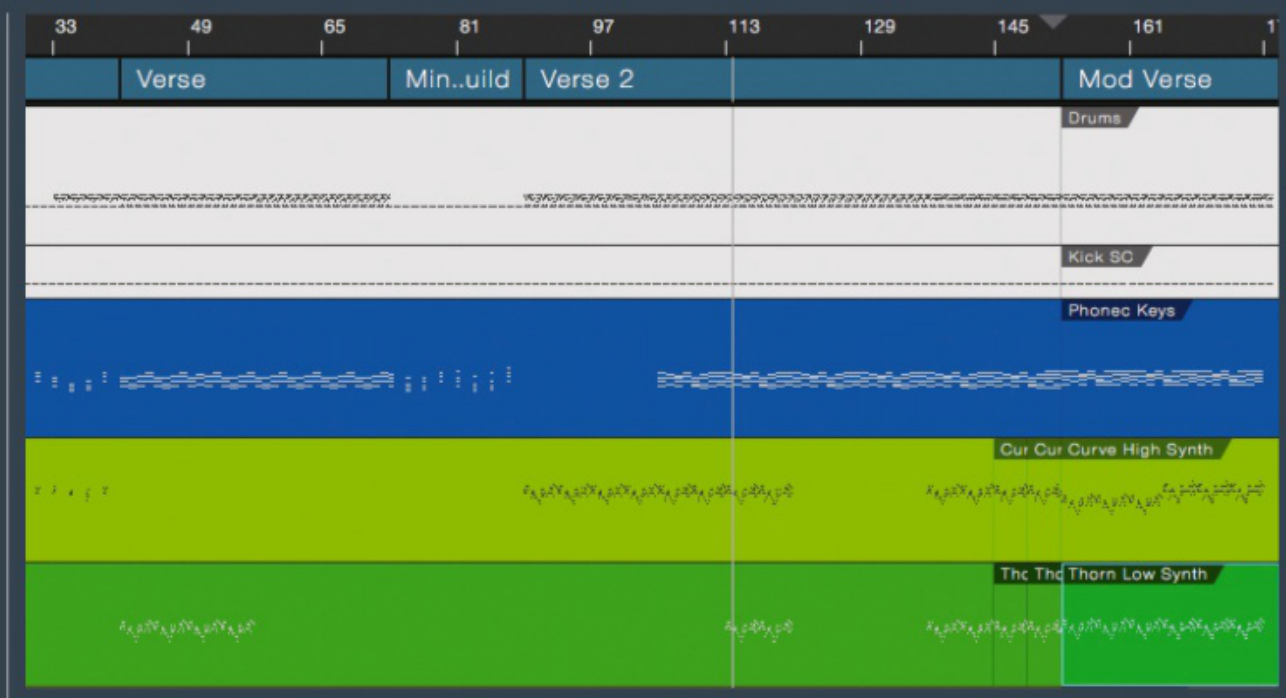


In our video, we show you how to make smooth transitions between two scales

> Getting technical

There are a few more 'traditional' music theory techniques you can use to make a key change more interesting and less clunky. The first is to use a transitional chord that's the 'dominant' of the destination key. Put simply, that means the chord with its root note on the fifth degree of the destination scale. In our C major to D major transition, the fifth note of the D major scale is A, making our transition chord A major – A-C♯-E. This chord doesn't fit into the C major scale, but theory-wise, it's still a valid one to use for the switch.

There's also a note choice that can help when programming a melody for the key-change transition. The 'leading note' is the top note of the destination scale, just before it returns to the tonic. So in C major (C D E F G A B C) it's the B note. In D major, as with our example, you'd be looking at C♯. The idea is to get the leading note to, er, *lead* into the destination scale by involving it in the final phrase of melody before the key change, and playing as the last note, right before the keychange happens.



> The sudden gear change...

One more way of changing key, often known as the 'trucker's gear change', is the abrupt, foolhardy and jarring way of getting things done. Put simply, you just *do it*: change the key suddenly, without warning, jolting the listener into a new mode.

This is a tactic to use with caution, as it's very reminiscent of the effect you'd hear from the members of a certain boy band, wearing all white, getting off their stools when the song they're singing changes key. That's not to say you can't make it work, of course... but do be careful!

The knowledge you need

We've gone through our entire track, transforming what were once just C notes into a whole musical arrangement, all the while throwing you the theory knowledge you need to do the same.

So what now? Don't forget to try transposing the entire track. We've kept to C major for demonstrative purposes, as it's easier to see how the scale functions using all the white notes – but try transposing every note in the entire tune by the same amount, and experimenting with anchoring it in different scales. Remember to check the lowest notes when you do this, though: make sure you're hitting the right bass notes.

We've gone further ourselves, too. We've made small refinements and messed with fine details, and over the page we'll describe every small change and how it works to make the whole track better. We've also included a playthrough video of our finished version to check out yourself.

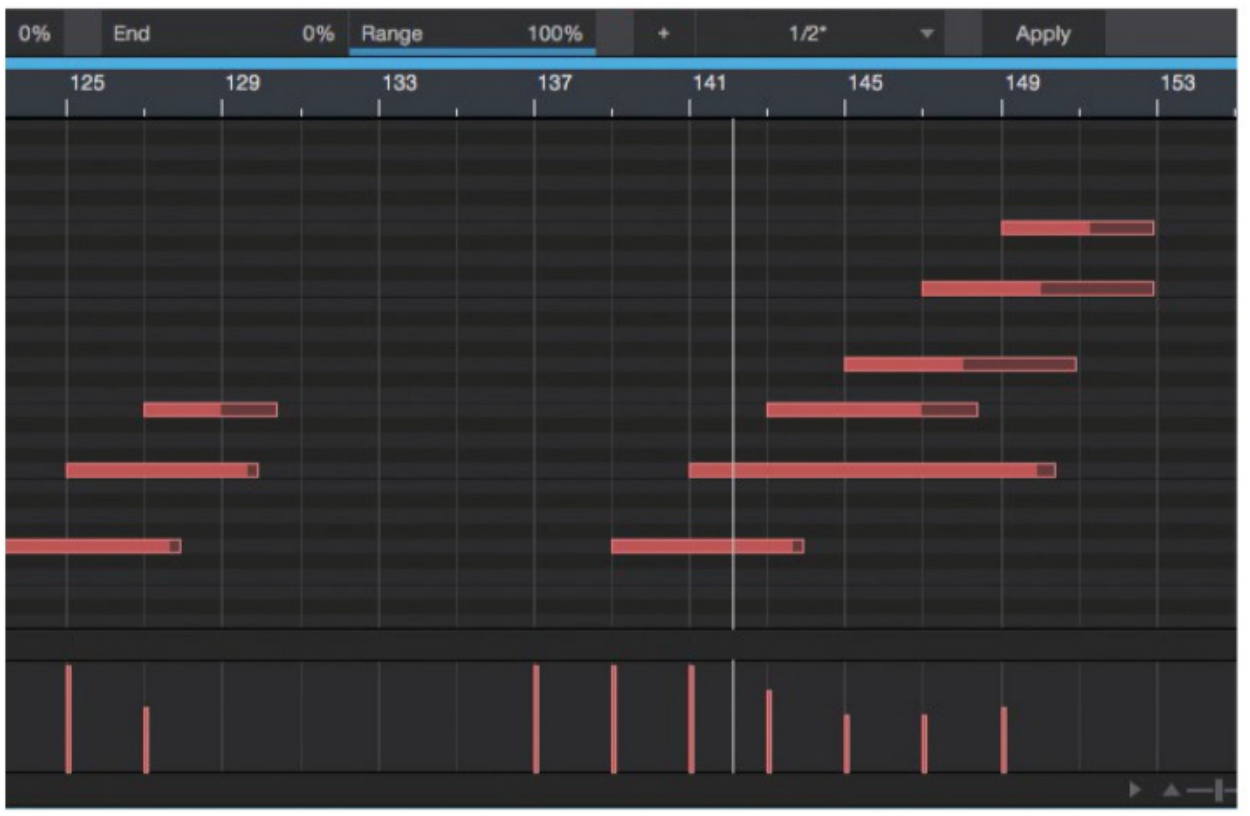
Need more theory knowledge, then? There's plenty every month in cm thanks to Dave Clews' *Easy Guide*, and we've also put out a few music theory features over the past couple of years. For more on *Chords and Scales*, check out cm234, or to learn how to *Play Keyboard Like a Pro*, why not check out our huge hands-on video course in cm255?

We've also got you covered for arrangement tips and inspiration topics. *Arrange the Perfect Track* (cm229) will guide you through the process of turning loops into tunes, and *Finish Tracks Faster* (cm235) will help you get it all done in less time. You can grab these issues, complete with their videos, in digital form via Apple or Google Play Newsstand, or on Zinio.

You can learn more about music theory every month with cm – pick up a print or digital subscription on p128

Polishing up our track

We've nearly reached the finish line! Let's put the final touches on this track, dish out a few theory-led arrangement tricks along the way, and walk you through a final playthrough at the end...



We take fine control over velocities and timings of notes to get the Phonec CM riser in key with the rest of the track

01 GETTING RISERS AND FX IN KEY

Throughout this whole process, there's one element of the track that we haven't actually touched: our Phonec CM rising synth part. This creates a rising tone that ends at the note being held down. We can work with note pitches, lengths and velocities to use this build for different effects at different times: as the intro leads into the main loop, Phonec CM rises to a **C major** chord, and does the same thing just before the mini-build. As verse 2 rolls on, Phonec CM throws out a few ascending notes (as pictured above) to keep things interesting.

02 THE FIFTH OF FOURTH

We also haven't really touched our Enzyme CM pad sound, which has been playing two **C** notes throughout. This can help with a pad sound, because it allows a bit of musical 'information' to slip out in the intro without firmly committing to one scale.

Another way to keep things tonally ambiguous is to use fifths and fourths. If you study the **C major** and **C minor** scales, you'll notice that they share certain notes: **C**, **F** and **G** (they also share **D**, but we'll ignore that for now). **F** and **G** are the fourth and fifth notes of both scales, and so playing these doesn't really commit us to either a major or minor key. This means we can bolster the pad part in the intro by adding a **G** (to create a chord with the notes **C-G-C**).

This helps establish the track as being 'in **C**' from the start, but we only want it to be obvious that we're specifically in **C major** once the chords start. This way, we're slowly unravelling the nature of our track.

03 MORE LITTLE EMBELLISHMENTS

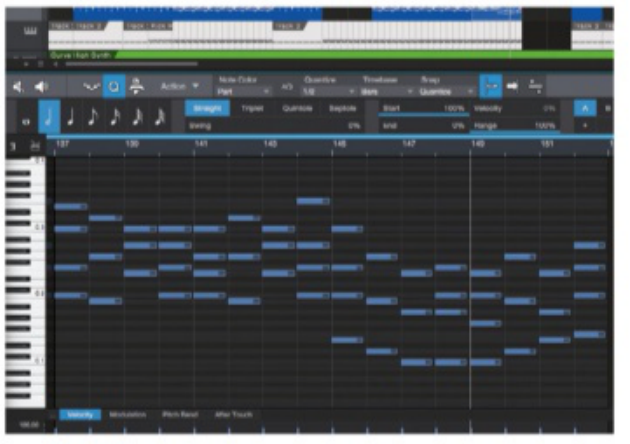
Our melody still needs a bit more touching up to ensure it doesn't get too repetitive. During the first verse, it's fine to repeat the same melody, as we're introducing listeners to what our track is like. The second verse changes things up a bit already, playing the melody with the higher synth instead of the lower one – but to our ears, it feel like there's room for more flair and virtuosity.

To solve this, we've gone through the second verse, making slight variations on the core melody in order to keep things as interesting as they possibly can be, providing a bit of extra spice to ears that have heard this melody line before. Changing things up with a completely new (or similar) melody would also work here.

04 INVERTING FOR NEW DIRECTIONS

When things are building up or down to a new section, we might want chords to rise or fall. For example, at the end of the second verse before the breakdown, our risers take things up, but maybe we can bring the chords lower to cool things down a bit.

Instead of lowering the notes into the octave below, we take some of the notes and invert them, as pictured below. This means we get to change the range of the chords without altering the character of the chords themselves, providing a sense of movement when everything else stays the same.



By inverting chords into another octave range, we can make the exact same chords travel in a new direction

05 PLAYING CHORDS WITH OUR PAD

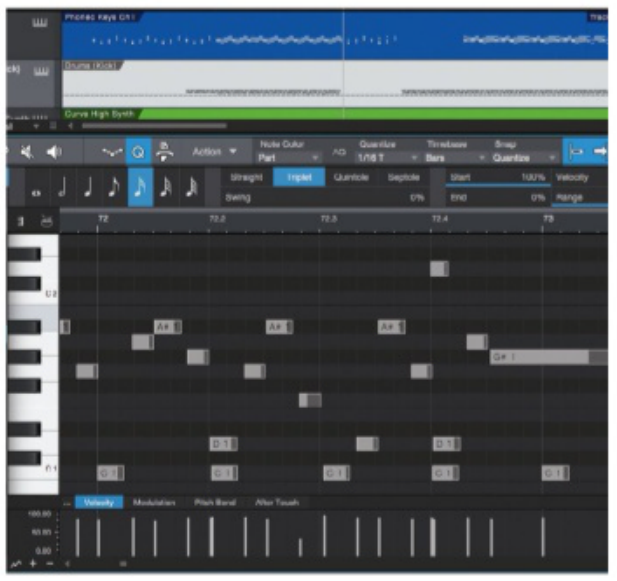
Throughout the track, the pad has been playing a tonally ambiguous **C-G-C** chord. This fills out some space behind the mix, and allows the other instruments to carry the harmonies and melodies... but by the time we get to the breakdown, we need to ramp up interest and change somehow.

For this reason, we've experimented by having the pad play chords at this point. We use chords very similar to those played by the main Chords track, allowing us to get a new element moving where it otherwise wasn't. Since the breakdown is designed to be more atmospheric, a complex pad sound playing chords will add the lush interest we need.

06 REWORKING THE BASS PART

Another repetitive element in the track is the bassline. It uses held notes for the intro, but then repeats the exact same pattern throughout the rest of the tune. For the second half of the second verse, we've switched up the pattern while keeping the notes the same. This new pattern still plays every beat, only it plays on the offbeat, hitting between the kicks instead of on top of them. This adds extra pace to the tune at this point, as the bass part feels far springier and more reactive to the kick.

Later on, when the outro comes along, we've kept the original bassline but reinforced it by picking out an extra note. Again, this picks up the pace, so to speak, and provides a little extra 'push' for the final section of the track.

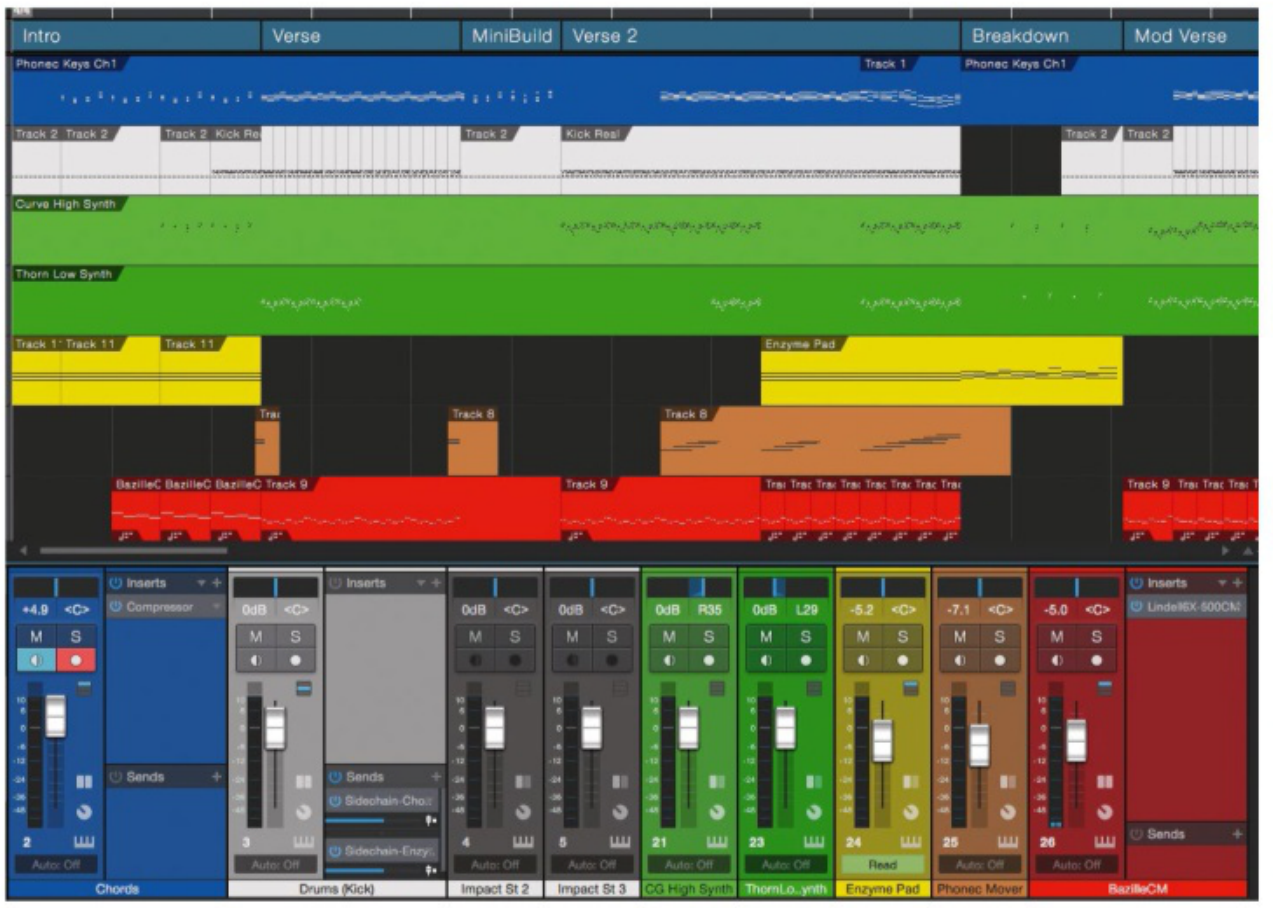


Drum fills at the ends of sections are a tried and tested way to keep things moving as you transition

07 FILLING IN THE GAPS

We haven't spent much time talking about drums and rhythms so far, as they're slightly outside the scope of the theory in this feature – but, of course, drum variations are crucial for creating an interesting arrangement that keeps on rolling.

Our drum files in **Tutorial Files** already change with the track, but we've created some slight variations, too. In the second half of the first verse, after the melody drops out, we've dropped extra snare hits to keep things pacy, and we've also added some extra hits just before the breakdown. We haven't gone for full fills, per se – just extra hits to highlight other beats.



Getting things to gel together in the mix is now just that much easier, since we brought things into line with theory

08 MIXING MUSICALLY

A bit of panning will separate those Low and High synths, which often play in the same octave. Lindell's 6X-500 CM is great for providing some saturation and getting the low-down bass notes to pop through on small speakers. Sidechaining the chords and pad parts against the kick adds 'pump', and you can also automate the send level from the kick to increase or decrease this effect in busier or lighter sections. Automating the volume for elements that play in the intro and breakdown also helps keep the focus on them.

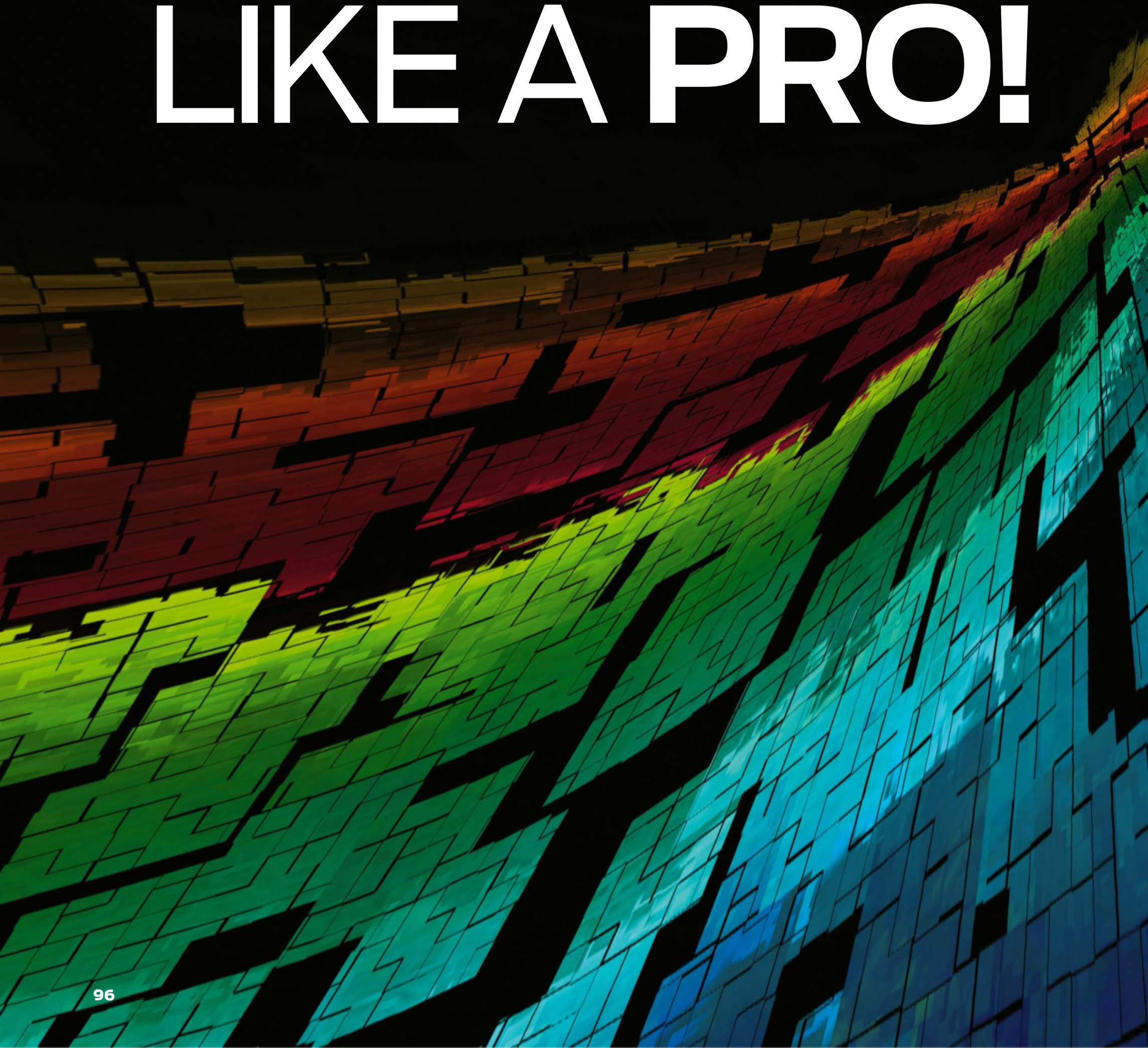
09 WATCH THE FINISHED TRACK PLAY OUT

Woo-hoo! We did it! We've built an entire track using music theory knowledge, and we've made a few small remaining tweaks using some specific techniques.

We've included a video of our final track playing through so that you can see and hear the finished result, and reference the points we're making on these last two pages. You can grab it in the **Tutorial Videos** folder, and don't forget to check out the **Tutorial Files** for every stage of the project as well – these will shed extra light on the decisions we've made throughout this feature, and give you a sound basis to compare the notes we've chosen to the notes you've chosen. **cm**

Download this issue's Tutorial Videos to hear our completed track in all its glory – changes 'n' all!

ARRANGE TRACKS LIKE A PRO!



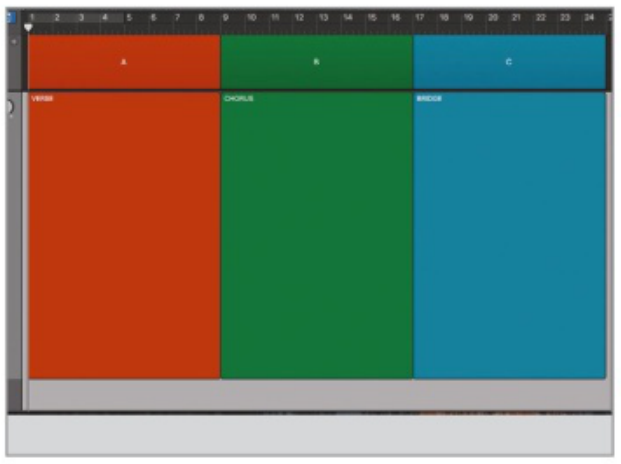
Want to avoid your music sounding formulaic? Get to know the nuts and bolts of arrangement with our guide

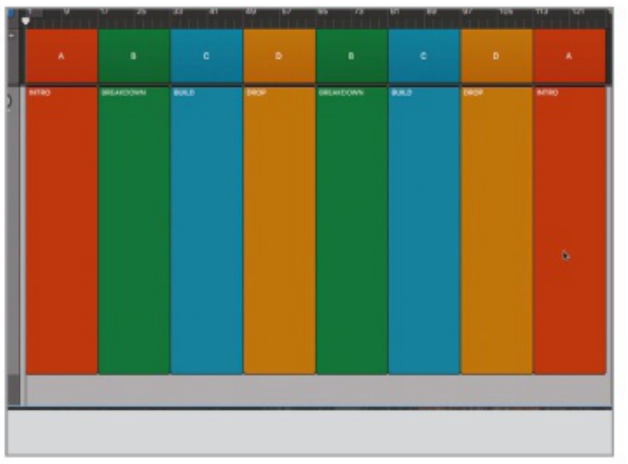
It's often been said that the best way to get something done is simply to *begin*. However, while that may be true for many things, when making songs on a computer, getting started is all too often the easiest part – it's being able to properly *finish* a track, taking it past the 'loop of doom' stage, that's the most difficult part of the process. For example, how many times have you started a project and made it as far as creating a spectacular four or eight-bar region, only to get stuck at the point where you have to start thinking about actually moulding it into a finished song? If you're anything like us, you'll most likely have a hard drive (or seven!) packed with unfinished ideas that started from flashes of inspiration but never got beyond that initial 'cycle mode' stage.

A lot of the time this comes down not to an overall lack of ideas, but to difficulty with the arrangement process – the sequence in which the different sections of your song are laid out. When it comes to engaging with your audience and provoking that essential 'reach for the repeat' response in your listeners, coming up with an effective arrangement is undoubtedly as important as the construction of the individual sections themselves.

Although today's DAWs put endless instruments, effects and track counts at our fingertips, it's all too easy to fall into a solely loop-based workflow that can actually stifle, rather than inspire, the ability to extend single regions out into a fully-arranged song. And that's where we come in! Within this mammoth, 15-page 'arrangement workout' feature, you'll find plenty of ideas for developing half-formed sketches into fully-fledged tracks. We'll give you loads of inspiring suggestions for getting out of that rut and finishing your songs, revealing a boatload of supplementary tips and techniques along the way. So fire up your DAW, and let's see if we can't come to a suitable arrangement, shall we?

> Step by step 1. Basic pop structure





1 > Arrangement from the point of view of the average computer musician mainly refers to the order in which the sections of a song are sequenced. Using the alphabet to represent these, one of the most well-used structures in pop is the **ABABCB** format, made of three sections: verse, chorus and bridge.

2 > The **A** section represents the verse, while the **B** section represents the chorus. At the simplest level, a song might begin with a verse of eight or 16 bars, followed by a chorus of a similar length, to give a basic AB structure. This whole segment would then be repeated with a second verse and chorus, giving us **ABAB**.

3 > The **C** section is a kind of breathing space in the middle, known as the 'middle eight' or 'bridge'. This gives the listener something different before the chorus repeats again at the end of the song. This segment is known as the outro chorus – so ultimately we end up with **ABABCB**.

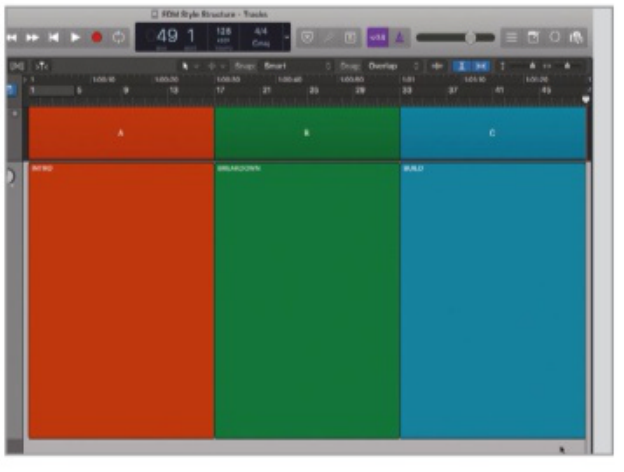
> Step by step 2. Standard pop structure

1 > A more sophisticated arrangement would expand on the basic form shown above, including extra sections for a bit more variety. It's common to have a dedicated intro section, for example. Represented here by the letter **D**, this is commonly eight bars long and serves to introduce the song.

2 > Another extra element used a lot is the prechorus (also sometimes known as the bridge – we know, we know!). This is a section that links the verse and chorus, usually with a buildup, either musically or lyrically. Using a prechorus (shown here as the section **E**) is a very effective way to expand a basic arrangement.

3 > For a twist, why not stick a short 'reset' section between the chorus and the second verse? This section, known as a 'tag' and shown as the **F** section, can be a repeat of the chorus chords with a different hook over it, or simply a two-bar fill section. The resulting arrangement would be **D**, **A**, **E**, **B**, **F**, **A**, **E**, **B**, **C**, **B**, **B**.

> Step by step 3. EDM-style structure



1 > Your typical EDM song is structured so that the energy ebbs and flows dynamically. To keep the dancefloor full, you get high peaks and deep troughs in the form of builds and breakdowns, with high-energy, full-on drops sandwiched between. This equates to a format that can be shown by the letters **ABCD**.

2 > The **A** section is an intro of suitable length for a DJ to mix into – usually 16 bars or so – after which would come a breakdown or **B** section, which could be a stripped-down container for a verse vocal, say. Following this, you might have a long-ish build, represented here by the letter **C**, ramping up the tension before...

3 > ...the drop, shown by the letter **D**. The EDM equivalent of the chorus, the drop, is where the beat 'drops' and the infectious hook kicks in. This completes the ABCD segment, the last three sections of which may be repeated again, before the song rounds off with a DJ-friendly repeat of the intro serving as the outro.

ANALYSIS

Stay – Zedd feat. Alessia Cara

Zedd's recent hit, *Stay*, is a good example of a traditional song structure with an EDM-inspired twist, adding an additional instrumental drop chorus after what would ordinarily be a standard chorus, but which in this case is almost completely made up of acappella vocals. This would have been an unusual step even five years ago, but producers are continually experimenting and pushing the boundaries of the traditional song form. The three-minute pop song format currently offers a wider canvas for dynamic exploration than ever. Pounding drums now yield to atmospheric breakdowns more frequently than just once in the middle of the song, and innovative use of technology such as pitch warping, Auto-Tune and Melodyne, together with new instruments like iZotope's VocalSynth 2, are making it possible to craft new song sections that don't rely on conventional vocals – of which this tune is a perfect example. Here's a breakdown of the arrangement.

0:00 INTRO

A looped and pitched-up sample of a male voice humming an intricate lick serves as the introduction to the song, cycled over four bars and backed with the two main chords that go on to provide the backdrop to the verse, prechorus and bridge sections.

0:09 VERSE 1

The delicate verse vocal melody enters over a synth pad and that continually looping hum. All the main sections from this point in the song onwards are eight bars long.

0:28 PRECHORUS 1

After a percussion fill, things start to build over a backdrop of minimal percussion: mainly reverbed finger snaps and clattering, low-pass filtered, high-pitched snares.

0:47 CHORUS 1

Here's where it gets interesting. We're expecting a full-on chorus, but the track falls away completely, leaving us with just the acapella vocal chorus hook, backed by computer-generated BVs. The only other musical element is the bass that punctuates a single root note with every chord change. Machine-gun snare fills prolong the second four bars to lead us to...

1:05 DROP 1

In come the drums and the rest of the track, expertly arranged swooping synths taking over from the vocals. Intricate fills keep us interested from the rhythmic point of view. A sampled 'uh' and one line of lead vocal half way through seem to be all that's needed vocally at this point.

1:24 TAG

A one-bar rest, over which the reverb and delay overhanging from the drop die away, helps us reset in readiness for the reintroduction of that looped sample and verse two.

1:27 VERSE 2

Gradually opening filtered percussion and a subtle vocal countermelody are all that really set the second verse apart from the first, but the development in terms of the progression of the song is still noticeable.

1:45 PRECHORUS 2

The development continues. This prechorus is discernible from its predecessor by the addition of a fuller drum track with kicks and offbeat tambourine, together with big piano chords filling out the musical side of things.

2:04 CHORUS 2

This chorus, too, comes across as a breakdown, sounding almost the same as the first but with the addition of the ticking clock sample throughout, and a fuller synth pad part that appears earlier in the section.

2:23 DROP 2

Other than some additional high-end percussion in this second version, the two drop sections are pretty much identical.

2:42 BRIDGE

Musically the same as the intro, verse and prechorus sections, the bridge is mainly synth pad, vocal and picky guitar line, until the kick drum reappears again four bars in, ushering in a short build-up to the final drop chorus.

3:01 DROP CHORUS

The full-instrumentation, sing-along chorus section that the whole song has been building to. To keep it to a radio-friendly length, there's no double-length outro chorus, merely a single eight-bar section that fuses the vocal hook from the chorus with the music of the drop.

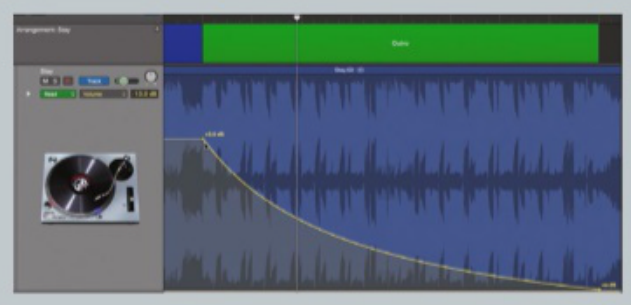
3:19 OUTRO

Practically a musical mirror image of the intro, the identical four-bar outro brings us back to earth with a downward-facing vocal adlib, ready for the anticipated hit of the repeat button.

Zedd's *Stay* combines EDM-style and traditional arrangement approaches to great effect

Fading away

For a number of reasons, the fadeout – a gradually diminishing, repeated hook – used to be the go-to way to end a pop song. The legendary SSL mixing consoles found in large studios in the 80s had a magic 'Auto Fade' button in the centre section, and there was even an urban myth amongst studio folk in the 90s about the existence of a world-class session fadeout artist, known as Johnny Bag'o'Doughnuts, who would put a top-notch fadeout on your song for the session fee of... yep, a bag of doughnuts. Yet although reports indicate that the peak year for the fadeout was 1985, since then it seems gradually to have fallen out of favour with producers across all genres, with only a handful of recent chart hits ending with a fade. So why is this?



Thanks very much, fadeout, but your services are no longer required...

Well, in terms of current trends, the fadeout has obviously had its day, but there may be deeper reasons for its decline than mere fashion. According to veteran 70s recording engineer Ron Albert: "The fade happened because we had to give the DJ a cue that the record was ending, so they could talk over that and segue into the next record. If the record company decided an album track would become a single, we'd usually have to edit and fade it to keep it under the three-minute mark. It was all about radio."

In this digital age of streaming, however, music consumption has changed immeasurably, to the point that songs are now a completely different product, so it looks like the fadeout may have faded out for good.

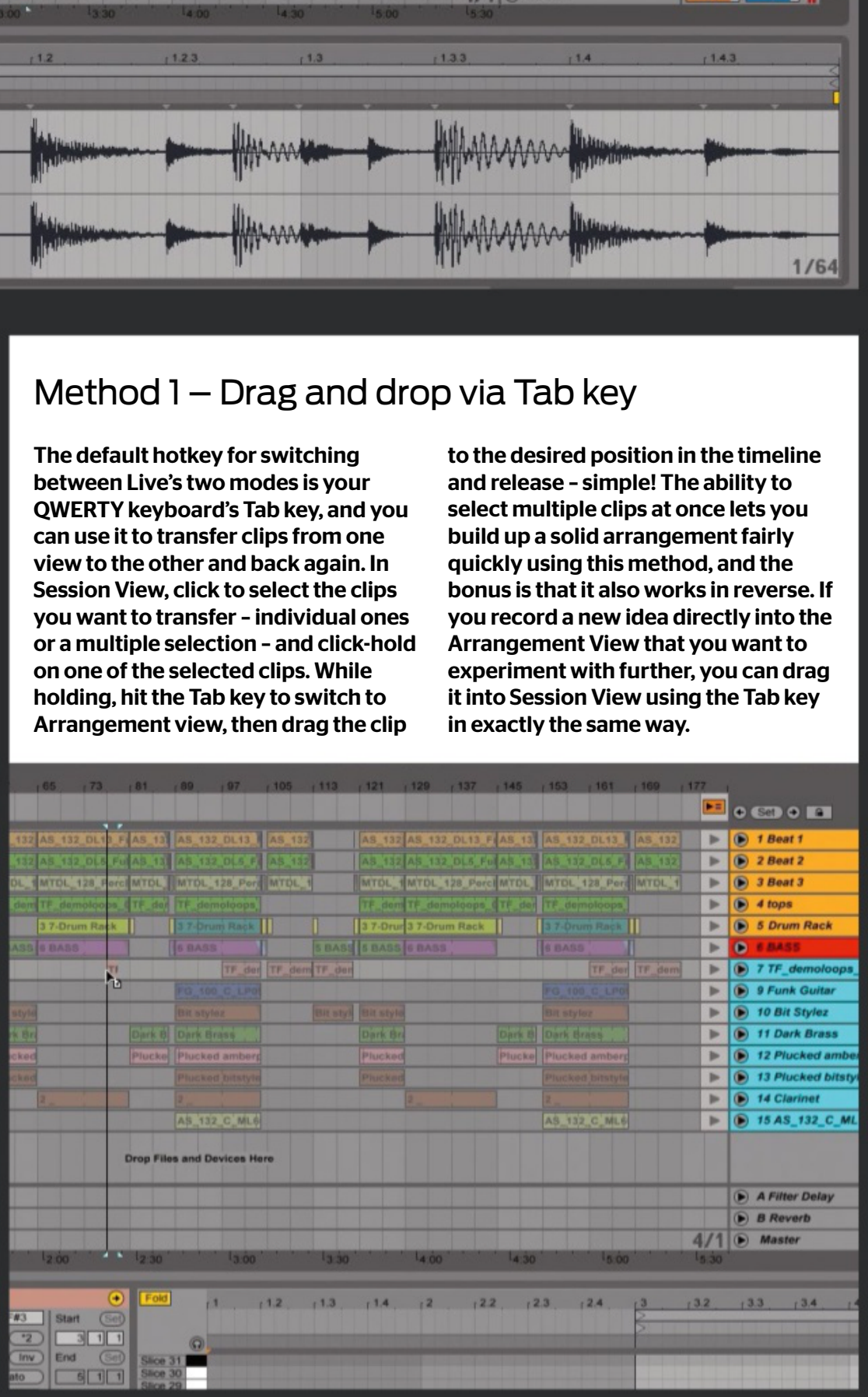
Arranging in Ableton Live

Arrangement View

Live's Session View is a mighty sketchpad for assembling clips into multitrack sequences, but if you've transitioned to the DAW from a traditional, linear-based arranging background, its loop-based nature can at first seem restrictive when it comes to developing ideas into fully arranged tracks. This is where the Arrangement View comes in, enabling you to chip away, move things around and generally finesse and finagle your project into something that sounds like a finished record with a proper beginning, middle and end, rather than a set of repeating loops. But how do you get clips into the Arrangement View to start with? Here are the two main methods to consider...

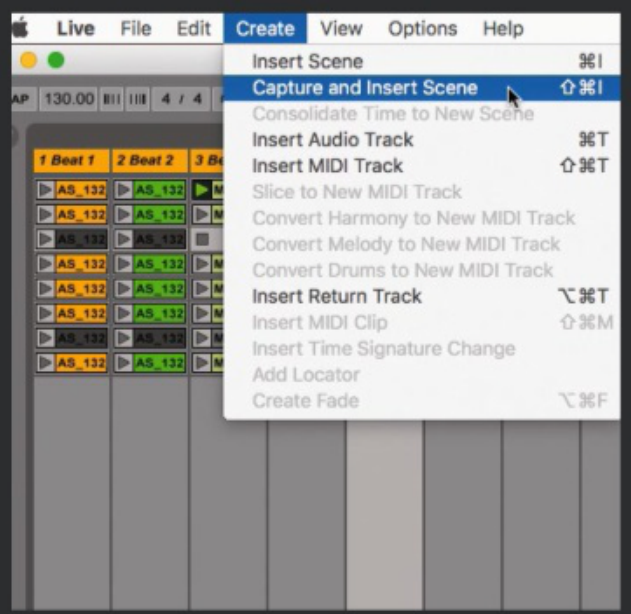
Method 1 – Drag and drop via Tab key

The default hotkey for switching between Live's two modes is your QWERTY keyboard's Tab key, and you can use it to transfer clips from one view to the other and back again. In Session View, click to select the clips you want to transfer – individual ones or a multiple selection – and click-hold on one of the selected clips. While holding, hit the Tab key to switch to Arrangement view, then drag the clip to the desired position in the timeline and release – simple! The ability to select multiple clips at once lets you build up a solid arrangement fairly quickly using this method, and the bonus is that it also works in reverse. If you record a new idea directly into the Arrangement View that you want to experiment with further, you can drag it into Session View using the Tab key in exactly the same way.



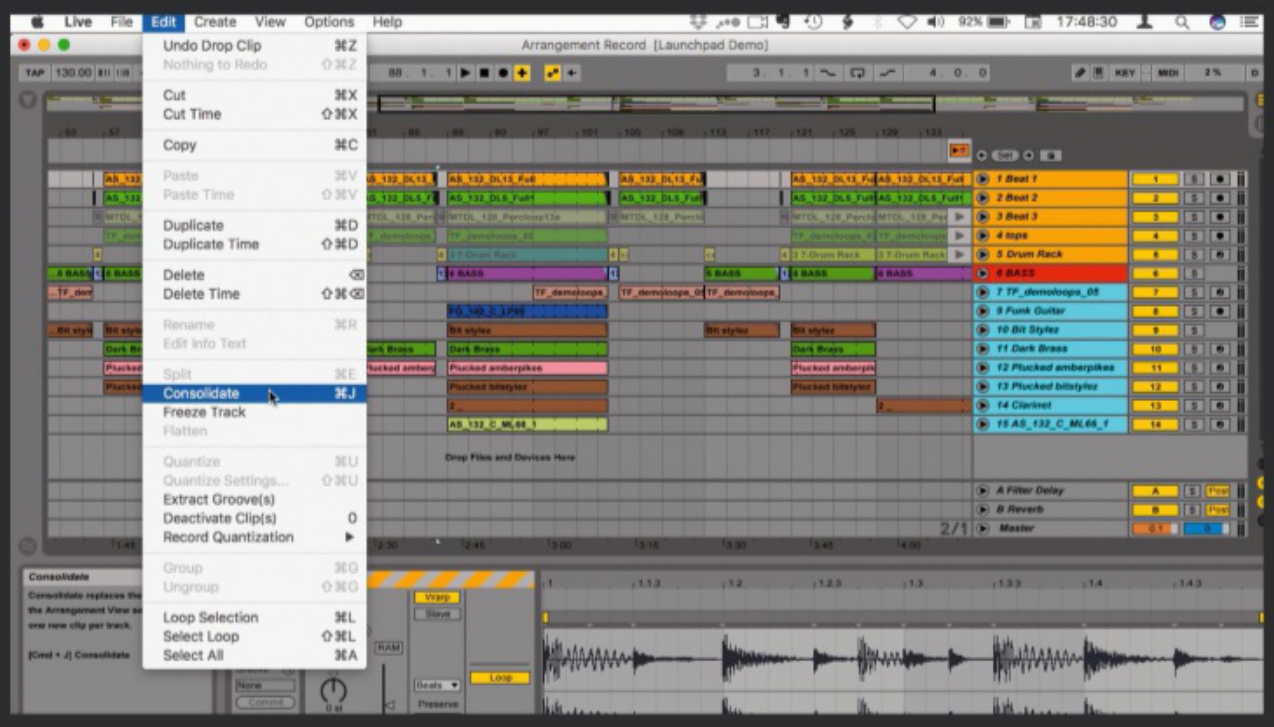
Method 2 – Arrangement record

You can also trigger Session View clips on the fly and record the result directly into the Arrangement View. Ensure all tracks in the Session View are disarmed for recording, and that the Arrangement View's Cycle mode is disabled. Hold down Shift and click the Record button in the transport bar – Live will wait until you trigger your first clip, then start recording your moves. As you jam out a performance, a corresponding set of regions will be recorded onto the tracks in the Arrangement View. This works especially well with a hardware controller. Once finished, press the Stop All Clips button in the master channel to end the recording and switch to the Arrangement View, where you can tweak the performance and complete your track by recording new parts, transition effects and percussive punctuation directly in at the correct points in the song.



The scenic route

If using the Arrangement View doesn't appeal, you can still use the Session View to generate arrangement ideas in the form of Scenes. If you have multiple clips laid out in the Session View, experiment with different combinations by playing one clip at a time, then mixing it with others one by one. When you hit a combination that works, turn it into a Scene by selecting Capture and Insert Scene from the Create menu. Give it a suitable label (verse, breakdown, etc), then try a few more combinations of different clips. Once you've built a few Scenes, try playing them in different sequences to sketch out rough arrangements.



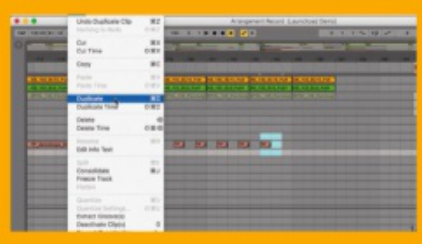
Consolidation service

Live's Consolidate command (Cmd/Ctrl-J) is really useful for tidying things up in the Arrangement View, especially if you've ended up with loads of tiny little clips scattered everywhere – it replaces a selected range of material on a track with one new clip. Not only does this look tidier, but it's also useful when, for example, you have a linear sequence of clips that work well together as a part. Consolidating these into one long clip allows you to drag its edges to create further repeats. On audio tracks, Consolidate renders the selected clips into one single piece of audio, replacing the existing clips in the Arrangement View.

Ableton Live arrangement tips

KEEP 'EM SEPARATED

If your project contains a lot of tracks, create a blank track and place it between two distinct groups of tracks as a visual separator. This keeps things tidy and lets you home in on specific areas of your arrangement more quickly.



COPY THAT

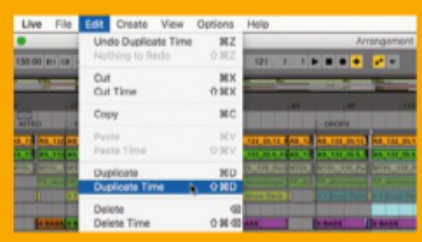
Live's Duplicate command (Cmd-D on Mac, Ctrl-D on PC) is a handy tool for knocking out arrangements quickly. It essentially duplicates the selected area directly after the selection – in other words, it's brilliant for repeating sections.

FOLD IT UP

For a quick tidy-up of the Arrangement View, Alt/Option-click one track's fold button to fold all the tracks in your set. Find it next to the track name in the track header column on the right of the screen.

MARKER RESPECT

Use markers to mark where specific song sections occur. Create them by clicking a track, hitting Set above the track headers, moving the marker flag to the desired position, and renaming it.



TIME TRAVEL

The Duplicate and Delete Time commands not only work on the region highlighted by the loop bracket, but move subsequent regions earlier or later, extending the track or closing up gaps, depending on which command is used.

Trying out new arrangement ideas

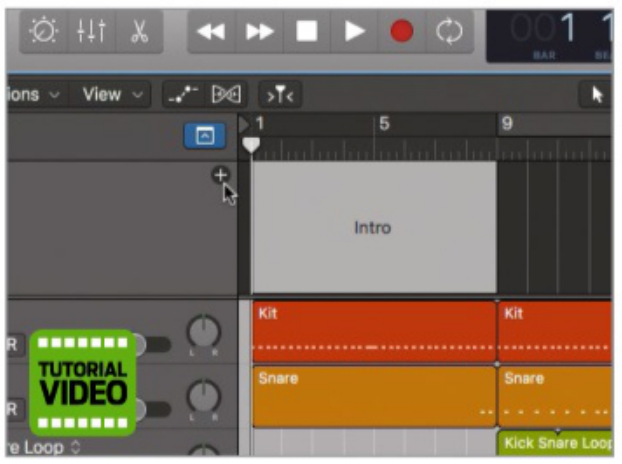
Apple's Logic Pro X has evolved into a true production powerhouse since the company acquired it from Emagic, back when dinosaurs roamed the Earth. One of the many developments that have been added to the app over the years is the addition of a dedicated Arrangement track, intended to make it easier to come up with new arrangement ideas with the minimum of fuss and bother, by literally picking up chunks of your song up and moving them around on the timeline into whatever order you like.

The Arrangement track works by treating song sections as single entities to be relocated at will – picking up a section collects all of the regions on all of the tracks contained vertically within it. Not only is this great for playing around with arrangements of your own tracks, it's also a brilliantly simple way of creating extended versions of songs you like – drag the MP3 into Logic, sync it to the grid using the Adapt Project Tempo to Region Tempo command, then get rid of that annoying trumpet solo and extend that catchy outro chorus to your heart's content!

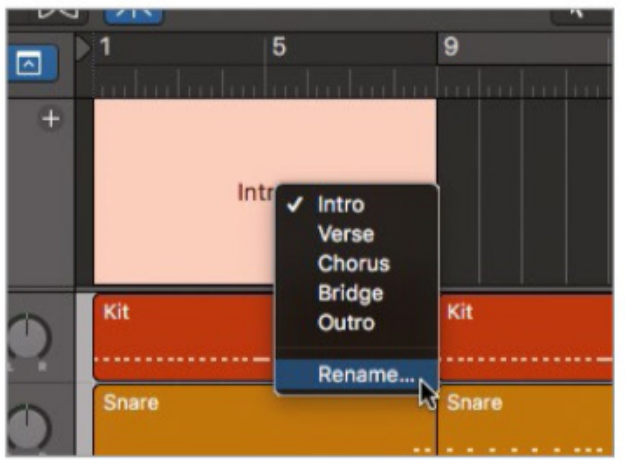
To see the Arrangement track, you first have to make sure it's set to be visible in the Global Tracks area that appears above the regular track headers in Logic's main window. To do this, simply hit the Alt-G key command to reveal the Global Tracks Configuration popup, and tick the Arrangement checkbox. Once the track is visible, you can reposition it vertically in the global track list (so you can situate it directly above the main window if you like), and make it taller by dragging the divider above the track headers downwards.

Logic Pro's Arrangement track is a real timesaver when it comes to song construction

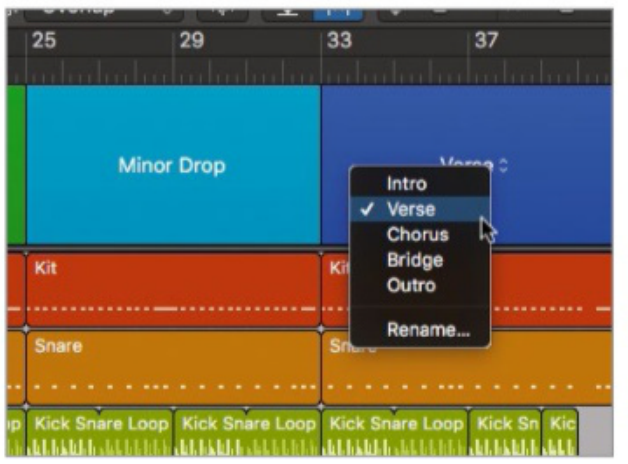
> Step by step 4. Using Logic's Arrangement track



1 > Open **Global Tracks** to reveal the Arrangement track. Hit the **+** button in order to create a new arrange marker, and drag the right edge out to the required length of your first song section. The default length for a new arrange marker would be eight bars.

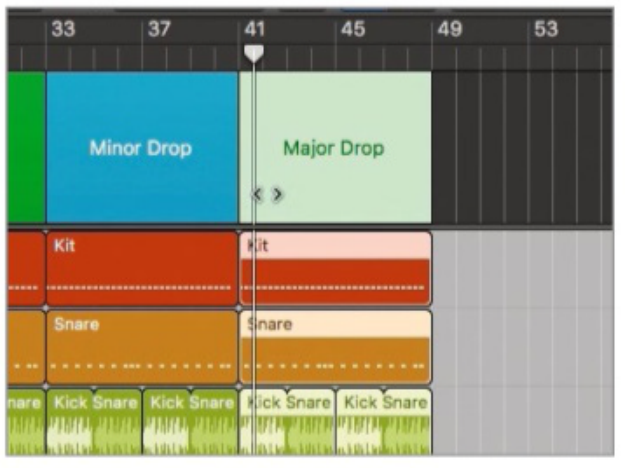


2 > New markers are titled automatically from a menu of existing names. Choose one that suits, or rename it by choosing **Rename** from the menu. You can also colour code regions by pressing **Option-C** and assigning a colour to each highlighted marker.

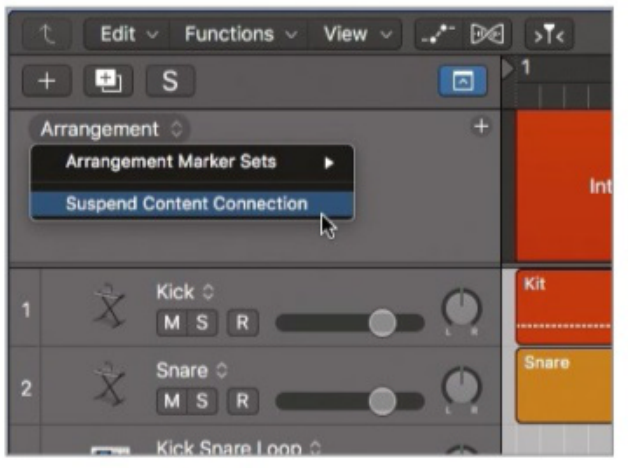


3 > Construct the rest of your Arrangement track by hitting the **+** button, dragging new markers out to the required lengths and renaming them as you go. Each new marker will always appear 'glued' to the right-hand edge of the previous marker.

4 > Now for the cool bit. To move a whole section from one place in the song to another, simply drag it along the Arrangement track to its new location. The other markers will snap together to fill the gap so that the new arrangement flows seamlessly.



5 > To copy a marker – in order to create another chorus, say – hold down the **Option** key while dragging. The new copy will be placed before the start of the marker over which you release it.



6 > Delete an arrange marker by hitting **Backspace** twice – first to delete the regions below it, then the marker itself. To delete markers without deleting the regions of the song that are associated with them, select **Suspend Content Connection** before hitting the button.

3 GIFTS INSIDE!

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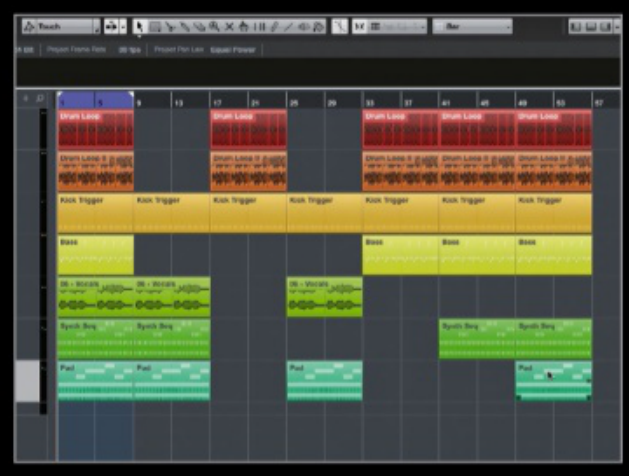
Song-building tricks in Cubase

Steinberg's Cubase can rightly be thought of as the founding father of the linear timeline DAW. The first version appeared on the Atari ST way back in 1989, ushering in the standard blocks-on-a-timeline song arrangement approach so familiar to us all today. So, you'd expect all the necessary tools for flinging songs together in the traditional way of cutting, pasting and moving blocks of audio and MIDI data around the screen. However, there's an additional trick up Cubase's sleeve when it comes to trying out new arrangement ideas, and it harks back to the numerical, pattern-based methods employed by its erstwhile rival, Emagic Creator (the ancestor of Logic Pro X). Combining the best of both approaches, Cubase's Arranger Track enables you to define regions of your song as named Arranger sections that can then be strung together into a list of events. You can swap regions around any way you like, and once the Arranger Track is activated, the program will play them back in the assigned order. Ideas can be saved and compared quickly and easily to determine whether or not that extra four-bar tag works coming out of the second chorus into the bridge, for example.

> Step by step

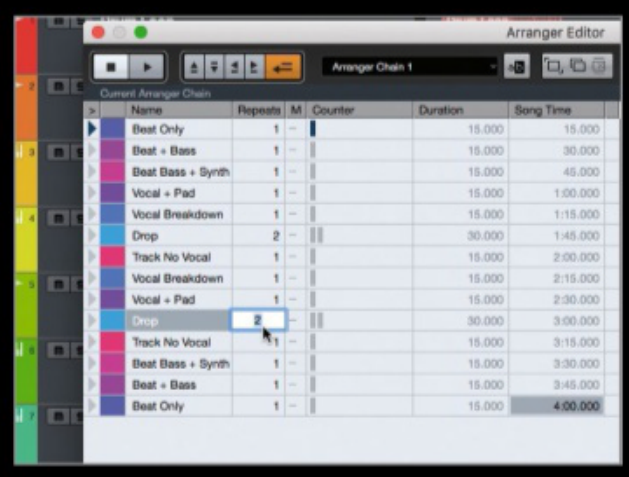
5. Using Cubase's Arranger Track

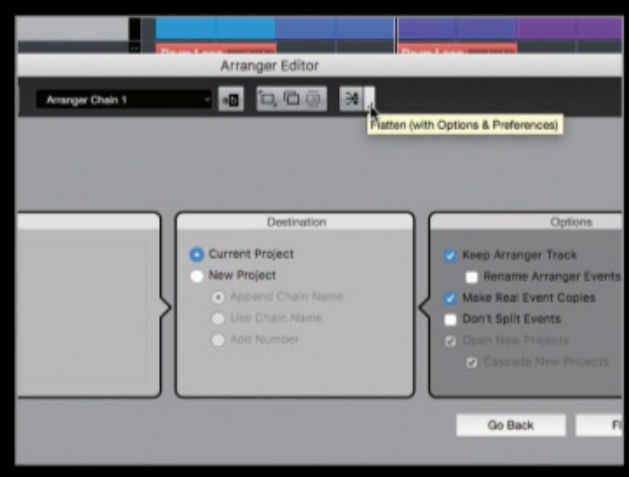


1 > Here we have a simple track made up of beats, a bassline, a vocal sample and a couple of synths. It's essentially an eight-bar loop at the moment, so to thrash out an arrangement, we need to define some sections. We start by selecting all regions in the loop and repeating the whole thing a few times.

2 > Now we go through each new section and remove a few regions to create multiple versions of the loop made up of different combinations of parts. For example, here we've made one that just includes vocal and synths, another with just the beat, a third with only the vocal and pad, and so on.

3 > Next, select **Project » Add Track » Arranger** to create an Arranger track (you can only have one per project). With the pen tool, click and drag along the Arranger track for the length of the first section. This creates our first Arranger region. Click the **Name** field in the upper left corner and type in a suitable name.





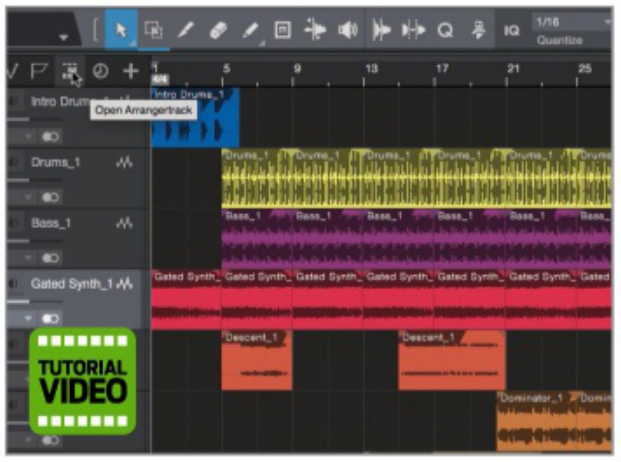
4 > Continue to define and name regions for the remaining sections in the project, then click the Arranger track's **e** button to bring up its editor. You should now see a list of the defined sections or 'Arranger Events' in the right hand column. Click the **Activate Arranger Mode** button to enable the Arranger Track.

5 > Double-clicking or dragging any of these events into the left hand column places them into the current Arranger chain. If you hit **Play** with the Arranger active, the sections will play in the specified order. Type numbers into the **Repeats** column to set how many times that section will play back before moving on to the next event in the list.

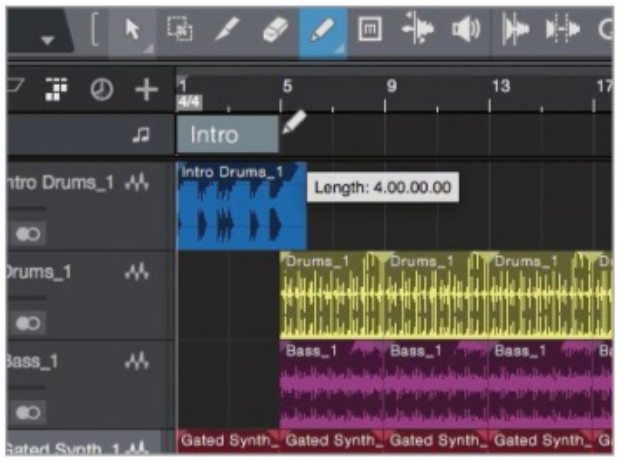
6 > When you've arrived at an arrangement you like, you can make it permanent by clicking the **Flatten** button. This translates the order of events into a regular layout of regions in the existing project, or exports it out to a new project. There are also options to keep the Arranger Track active in the rendered project, or remove it after flattening.

> Step by step

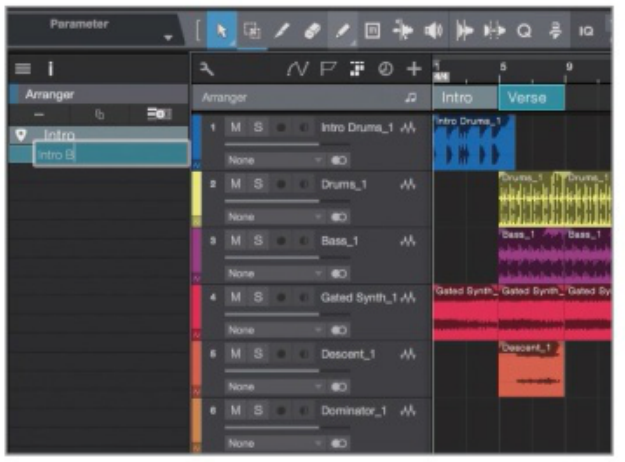
6. Using Studio One's Arranger Track



1 > The Arranger Track in PreSonus Studio One is a bit like a hybrid of the versions found in Logic Pro and Cubase. The first step to using it is to call it up by clicking its activation button in the toolbar. This makes it visible above the timeline.



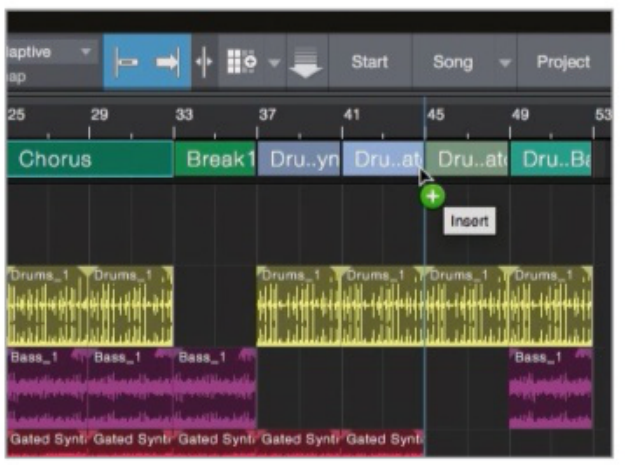
2 > To create an Arranger region, select the **Paint** tool and drag from the start point to the end point of the section of your song. A new region will be created with a default name that you can change to whatever you like.



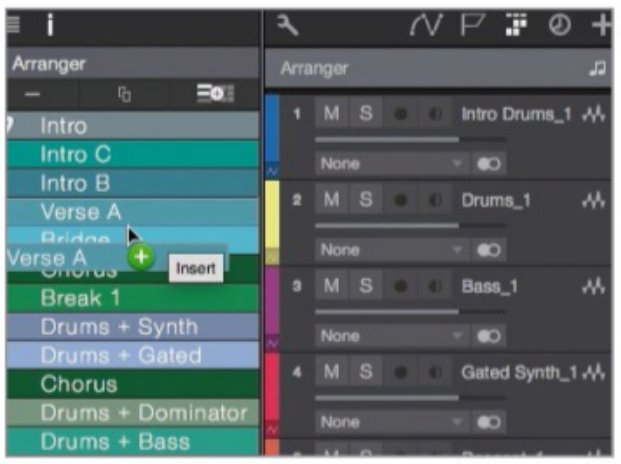
3 > To change the name of the region, click the Arranger Track's header to reveal the inspector panel on the left of the screen. You'll see your new region at the top of the event list. Double-click its name and type a new one.

4 > Continue creating regions to fit the structure of your project in its current state. You can drag the edges of an existing region to resize it without affecting the content in the tracks area, but don't try to drag them around at this point, as any content below will also move.

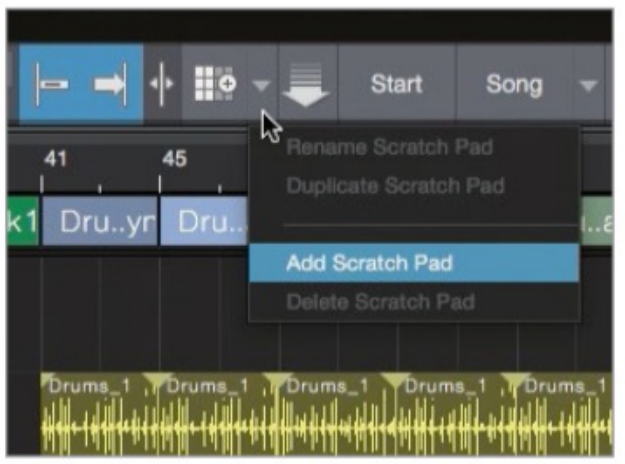
5 > Once you've built up a trackful of Arranger regions, there are two ways to move them around. The first is to drag them to new positions within the Arranger track. A helpful tag appears to let you know whether you're about to replace an existing section or insert the one you're moving before or after it.



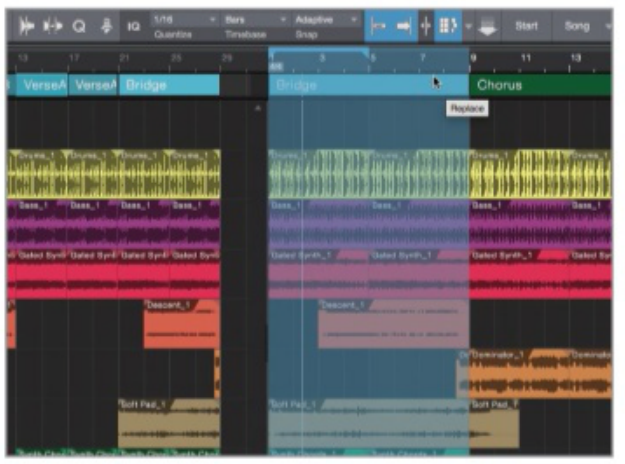
6 > When a region is moved, all the content below it moves to the corresponding location. In order to copy a region instead of moving it, simply hold down the **Option** key while dragging. Hitting the **Backspace** key deletes the selected region but not its associated content.



7 > The second method of rearrangement involves the Event List in the Inspector. You can rearrange the order in which the regions that appear here are played back by moving and copying them in a similar way to how you would usually do it in the Arranger Track.



8 > Studio One has a final trick up its sleeve in the form of Scratch Pads, which allow you to try out new ideas in a separate area without affecting the main project. Create a new one by hitting this button in the upper right corner.



9 > Drag sections from the main area's Arranger track into the Scratch Pad's Arranger Track to copy them into it. These can be messed around with however you like without affecting anything in the main area, giving you free rein to experiment.

Using transition effects

Putting an arrangement together by assembling sections like building blocks is the accepted way of creating songs on a computer, and for good reason – it works! Like most skills, though, there's a certain knack to doing it well, and simply sticking a bunch of regions together so that they play back in order is inevitably going to sound a little mechanical – unless you apply a little extra attention around the edges to finish things off and smooth over those all-important transitional areas.

Putting a bit of thought into the points where the sections actually join together can make a huge difference to the overall flow of the finished song, accentuating the dynamics of an arrangement and helping it sound like it isn't just a bunch of sections arbitrarily jammed together.

There are plenty of transitions and effects to be found in sample libraries, or amongst the treasure trove of sounds that come with your DAW. Alternatively, you can create your own from scratch in the form of synth 'whooshes', drum fill effects or spot delays.

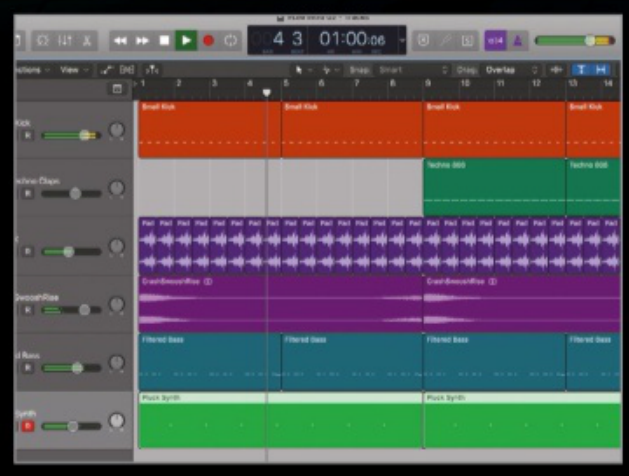
Whatever tricks or techniques you choose to use, effective transitions always glue everything together, so that your arrangement not only sounds more like a finished piece of music but also keeps the listener engaged along the way.

As ever, if you're struggling to find what you need, this very mag offers many free options

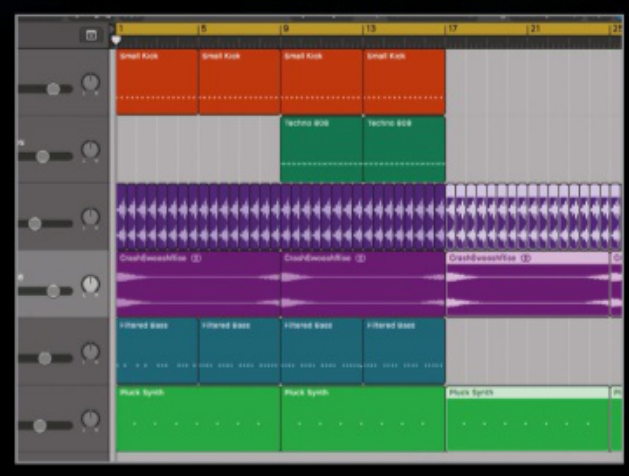
> Step by step

7. Building a dance music intro

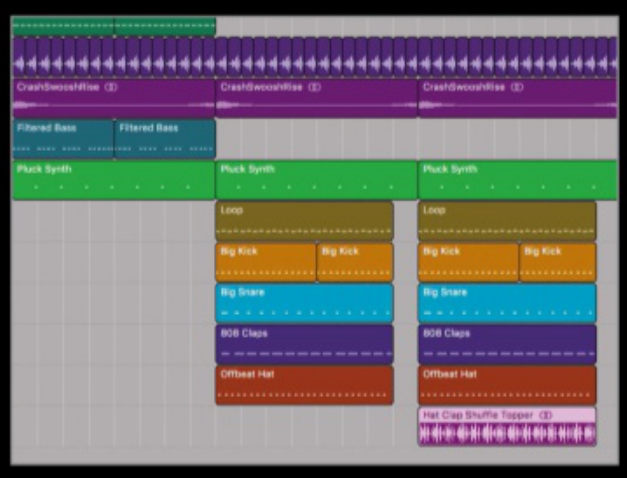
1 > A typical club track's intro can last around a minute, so to keep things evolving, we can build things up by adding new elements every eight bars. Here we've got a 128bpm eight-bar section made up of a compressed kick drum, an ambient pad effect, and a crash/swoosh effect placed at the start of the section (also reversed at the end).



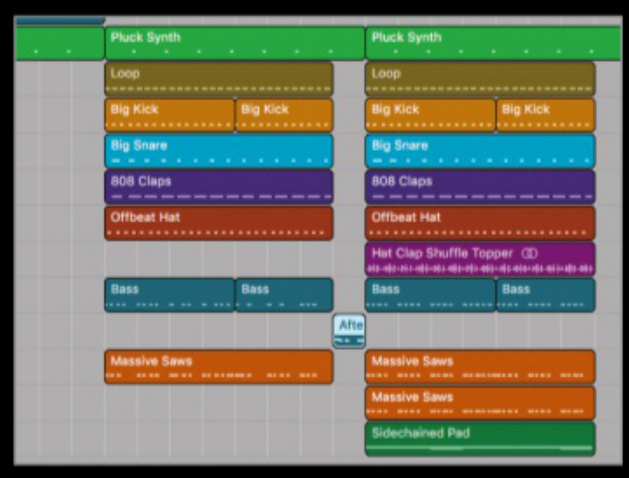
2 > We add some musical elements right from the off – a band-pass filtered version of the first bar of what will be our main bass riff, and an offbeat plucked synth note. Let's copy this whole chunk to give us 16 bars in total, and add reverbed 808 claps doubling the kick drum part to the second eight bars.



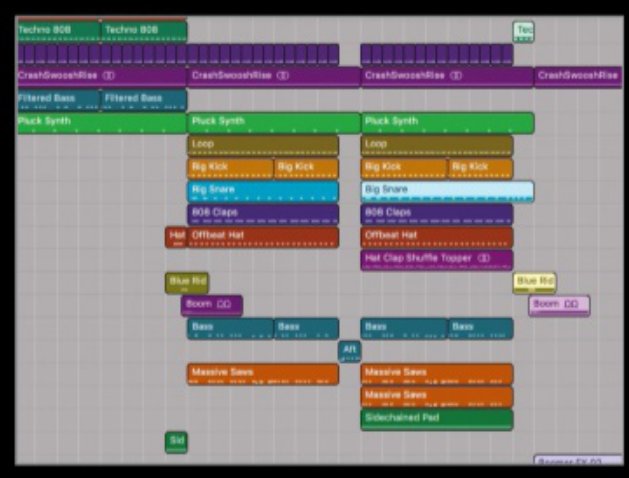
3 > We now have one 16-bar section, so let's create another, more instrument-heavy 16 bars to complete our one-minute intro (32 bars lasts for one minute at 128bpm). We start by copying the looped pad and swoosh effects, together with the pluck synth, across twice to total 32 bars, leaving the filtered bass, claps and compressed kick in place.



4 > The new drum parts for this section include a bigger kick drum, a kick-snare loop, a big snare doubled with an extra track of claps, and an offbeat, eighth-note hi-hat. These last only seven bars in each of the last two sections, leaving gaps at the ends for fills to be put in place. The last section adds in an additional hi-hat/clap loop.



5 > In this section, we introduce the full, unfiltered bass part and add the drop synth hook. This is reinforced in the last eight bars by an extra synth and a sidechained pad underpinning the chords. We link the two eight-bar sections by inserting a bass riff – with automated filter cutoff – in the gap at the end of the first section.



6 > The transition between the two halves of the intro is enhanced by opening the filter on the bass part and adding a swelled pad chord. We mute the looped pad in the last bar of each of the last two sections, while in the last bar a four-beat snare fill with a heavily-reverbed last beat precedes a boomer effect that introduces the verse breakdown.

12 arrangement effects

Use these tools to design great transitions and variations for new song sections

Reverb

Throwing a snare into a long reverb on the last beat of the bar before a breakdown makes for a smooth transition as the long tail dies away into the next section. Pretty much any reverb plugin will work for this – we particularly like D16 Group's Toraverb 2.

Steinberg LoopMash

Only available with Cubase, there's nothing quite like LoopMash for general beat mangling. It's its talent for creating stutter and repeat effects on the fly with just a tap on your MIDI keyboard that makes it a great arrangement tool, however.

steinberg.com

Delay

Delay is, of course, an essential item in any producer's toolkit – a ping-pong, quarter-note delay works brilliantly on risers and downlifters, and a synced repeat can add life to the dullest of synth parts. For a great result, try u-he's new Colour Copy or Eventide's QuadraVox.

iZotope VocalSynth 2

iZotope's VocalSynth has all but revolutionised the way chart hits are made. Blurring the boundaries between vocals and, er, synths, it affords you endless scope for creating variations on existing song sections.

timespace.com

Filter

Most filters or single-band EQs will be able to handle the task of filtering down drums during breakdowns and builds, but as stock plugins go, Ableton Live's Auto Filter is a particularly good one for this job. It's an absolute doddle to set up and use, and sounds great.

Sugar Bytes Turnado

This brilliantly mental plugin is a bit like an audio blender – fill eight slots with a selection of 24 separate plugins, then modulate their depths using a mini built-in sequencer known as the Dictator. Fantastic for random, glitchy transition effects when you need a quick idea for a fill.

sugar-bytes.de

Flanger

Flanging has been with us since the dawn of time, but that doesn't make it any less effective for producing a startling dynamic effect that can really switch up a section of your track. Every DAW comes with a flanger, so try it on percussion or vocals for instant satisflangtion!

AIR The Riser

A synth-based transition designer instrument specifically built to produce risers, falls, swells, fades and more. Based on a three-oscillator synth engine with multieffects, and with over 300 presets to get you started, it's a great go-to resource for the time-restricted transitionist.

airmusictech.com

kiloHearts Trance Gate

Available free with **cm**261, Trance Gate is a gem of a plugin for quickly dialling in gated effects that work on just about anything. Used as a spot effect in odd places, it's a handy tool for generating quirky chunks of ear candy between different sections.

kilohearts.com

GlitchMachines Fracture

This free, cross-platform glitch plugin comes with a ton of presets, so if glitch is your thing, it's a great source of inspiration for general weirdness. Take a two-bar section of audio and mangle it to the edges of recognisability in just a couple of clicks.

glitchmachines.com

Apple Step FX

A remnant of Apple's acquisition of Camel Audio (and thus only available as part of Logic Pro X), Step FX provides Chorus, Delay, Distortion, Filtering and programmable gating all in one tasty bundle, and can transform the dullest of synth parts into inspiring rhythmical grooves.

apple.com

Inear Display Eurydice CM

A freebie available with every issue of this magazine, Eurydice CM combines Buffer, Filter, Delay and Crusher processors to create wacky transition effects you probably won't hear anywhere else. Our advice is to strap a brickwall limiter across its output before you start experimenting!

filesilo.co.uk/computermusic

Caution – reversing!

Reversed reverb is a tried-and-tested technique for enhancing transitions between song sections. Some reverb plugins – Rob Papen's RP-Verb 2, for example – actually have a reverse mode built in, which makes dialling in this kind of effect a very quick and painless process. Don't worry if you don't have access to anything like that, though, as your DAW will be able to reverse any piece of audio with a mouse click or three, so it's never been easier to create your own reverse reverb effects from scratch, using any reverb plugin.

Start by isolating the downbeat of the section you want to lead into – the first beat of the drop, say. Select just that snippet, then either bounce, consolidate or copy/paste it onto a new audio track as a new audio region. Next, apply a reverb plugin to the new track – any reverb will do for this, so a standard proprietary effect like Logic's Chromaverb or Live's Reverb should suffice. Dial the reverb's decay time up to a healthy amount – this can be as much as ten seconds – and set the mix balance to 100% wet, so that you're hearing no dry signal at all.

Next, render the effect to a new audio file. This is done in Logic by using the Bounce in Place command, or in Live by using the Freeze Track and Flatten features, for example. What you're looking to end up with is a new audio file that contains the whole ten seconds' worth of reverb tail. Once you have this, use your DAW's reverse feature to reverse the region so that it starts off with no sound at all and slowly builds up to the initial hit.

Now you just need to position it correctly on the grid. Slide the region along so that it ends in the right place – usually right before the downbeat you selected for processing – and trim the region's left boundary so that it begins at the correct point relative to the rest of the song.

Because this technique is so easy to pull off, you needn't limit it merely to transition effects – it makes a great lead-in effect for lead vocals too, and you could, in theory, with a little imagination, use it on just about anything you like.

Logic's ChromaVerb – or any other reverb plugin –is all you need for reverse 'verb

Ableton Live's Frequency Shifter is just the thing for getting a rise-r out of a dull section of any track

Create risers with frequency shifters

A frequency shifter plugin is great for creating riser effects. Most DAWs offer a pitch- or frequency-shifting plugin that will do the job, or check out p18 for a roundup of third-party pitchshifters. Begin by taking a snippet of a musical element of your track, repeating it over eight bars and rendering the resulting eight-bar section as a new piece of audio. In Ableton Live, do this by right-clicking the track name and using the Freeze Track and Flatten commands; insert the Frequency Shifter on the track; then set its Mix control to 100% Wet and the Mode parameter to Ring. Click the Frequency control to reveal its automation lane in the Arrange area, and create two automation nodes – one at each end of the eight-bar audio region. Set the first node quite low down, and the second up towards the top of the lane to create the riser effect. Garnish with a sprinkling of creative effects!

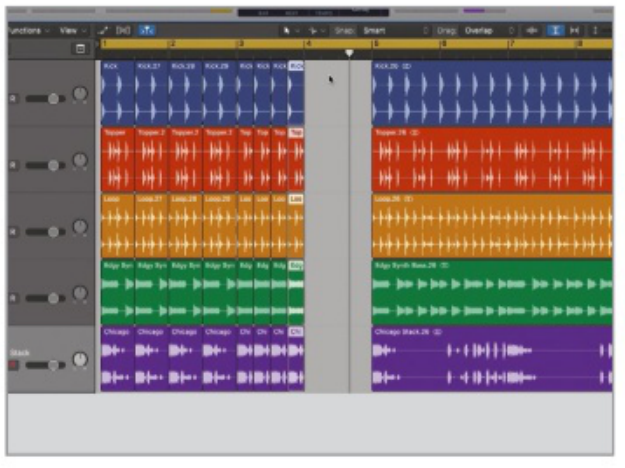
Turntable stops in Logic and Live

The 'deck stop' – an effect simulating hitting the 'off' button on a turntable mid-track – is a popular trick, and easy to create in Logic Pro X using the Fade tool. All you have to do is draw a crossfade across the portion of audio you want to place the effect over, then change the fade type in the region parameter box to Slow Down. That's it – although it's often a good idea to render the effect to a new audio file once you're happy with it, to solidify the effect.

The same effect is achievable in Live, too, though it takes a bit more work to pull off. Start by selecting the area you want to process, then use the Split command to separate it into a new region. In the region's parameter box, make sure Warp mode is enabled and set to the Complex Pro algorithm, with the Formants control set to zero. Enable the Envelope controls and choose Transposition Envelope from the type menu. On the red line that appears in the waveform window to the right, click to create two automation nodes – one at either end of the region. Leave the first one where it is and drop the second one down to -24. This will pitch the segment smoothly down two octaves over the course of the edit. Change the shape of the curve by holding down the Alt key and dragging the automation line.

Logic Pro X and Live both offer their own ways to stop the listener in their tracks with this turntable-style trick

> Step by step 8. Creating a repeated build-up by hand in Logic Pro

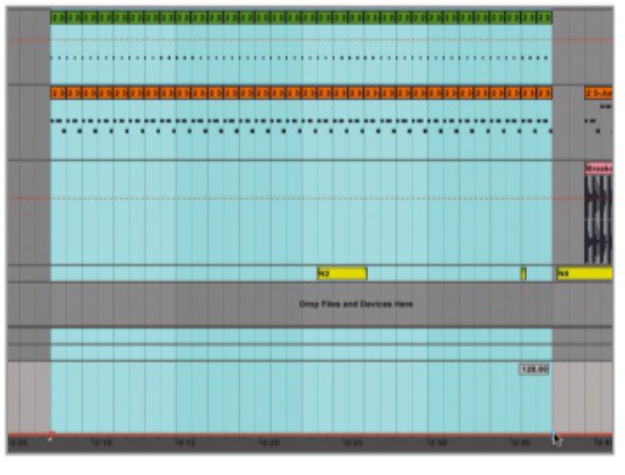


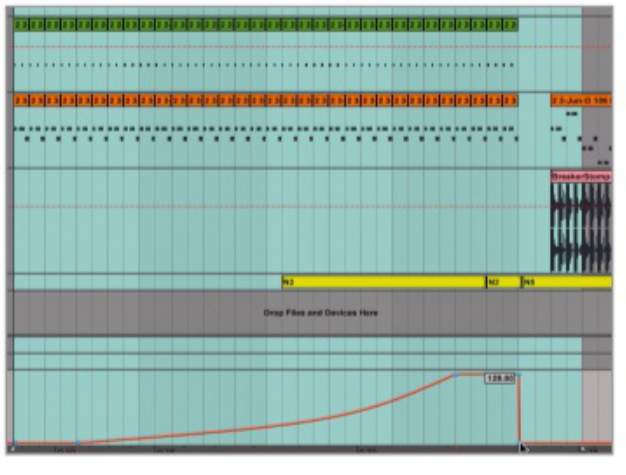
1 > Here's a simple eight-bar drop section of a track that we'll use for a basic repeated build. First, copy all the regions and paste a second copy of the entire section after the first. Then drag the right edges or split the regions to delete everything after the first half-bar.

2 > Duplicate this first half-bar four more times to get five in total, filling the first two bars of the build, with another repeat on the downbeat of bar 3. Shrink this to a single beat, and add another three copies of this shorter section to fill the third bar with four repeated beats in total.

3 > Last bar: shrink the regions further, to half size again, and create four 16th-note repeats, then again for a further eight 32nd-note repeats. This fills the rest of the bar, but an alternative might be a heavily-reverbed snare on beat 4 of the last bar to bring in the subsequent drop.

> Step by step 9. Extreme tempo modulation in Live





1 > Repeated builds are even more dramatic with extreme tempo automation. In Live, go to **Master** and choose the **Mixer** and **Song Tempo** options. Then set the values in the Tempo Range boxes to the song tempo – **128bpm** here – and **999bpm** in the right box.

2 > This sets the range of values displayed in the automation display. The red line at the bottom of the graph now shows our song tempo. Click the line to create two automation nodes: one where the effect should begin, and one where the original tempo returns.

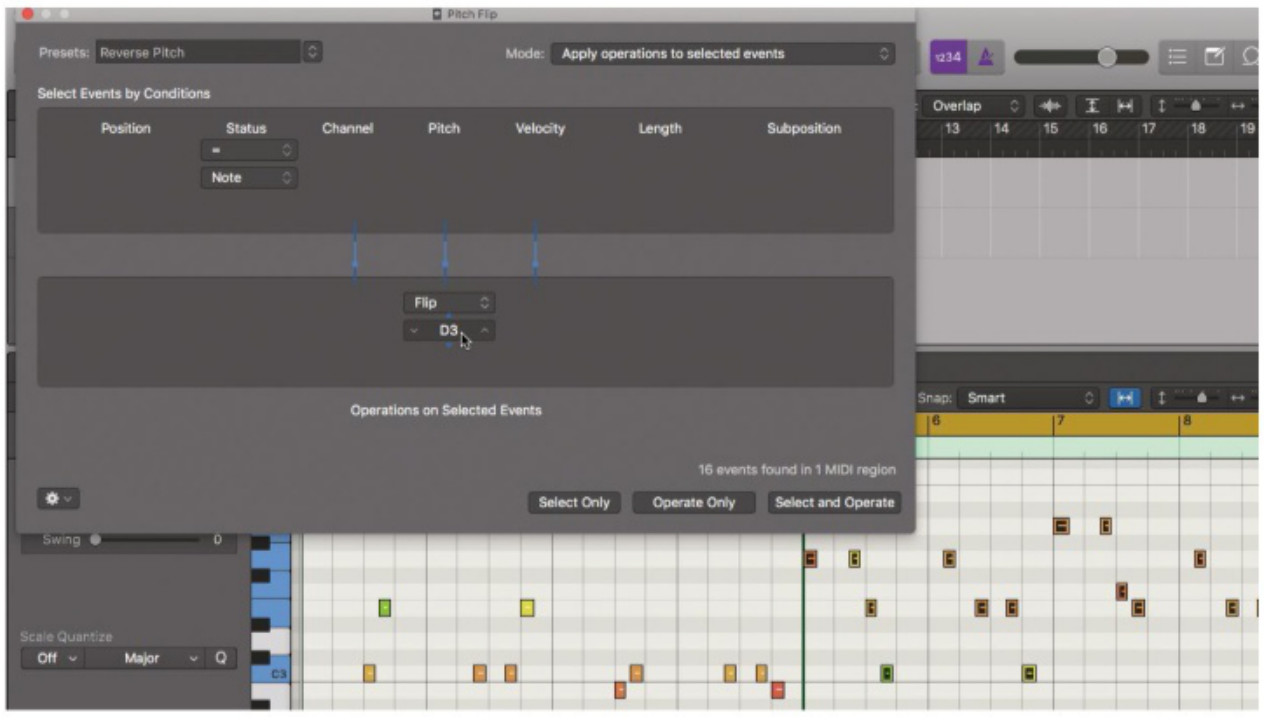
3 > Lift the second node up to the top of the graph, then hold the **Alt** key and push against the line to bend it into a curve. Lastly, set the global quantise to **1 bar**, then, using the Pen tool, draw a flat line at the bottom of the graph where you want the song's original tempo to return.

> Step by step 10. Creating fills with Cubase's LoopMash FX

1 > Available in Cubase, LoopMash FX is a version of LoopMash that can be used as a standard plugin effect. Here's a project in which the drums are just a single loop. Insert LoopMash FX across the drum track by clicking the track's insert slot and selecting **LoopMash FX**.

2 > Create a new MIDI track. Then, in the Inspector, set MIDI output routing to **Drums: Ins 1. LoopMash FX – MIDI In**. Play your MIDI keyboard and you'll see the performance key indicators light up. Each key triggers an effect, from repeats and stutters to reverse, vinyl and staccato.

3 > Set the track playing and record your input triggers to create fills at the appropriate points. You can also use MIDI keystrokes to change the timebase of effects. It's easy to adjust placement and length of your triggers after you've recorded them in the piano roll.



Pitch reversal is a staple of songwriting, and these days your DAW can do the leg work for you

Flip the pitch

Short of ideas for new sections? What if we told you you could make a complete new section with an entirely different mood by inverting your existing melody? Pitchflipping, or pitch reversal, is a technique by which you find a central axis or mirror point – often the midpoint between the root note of the key you're working in and the note a perfect fifth above it – and use it like a fulcrum to literally flip the notes around, so that they retain their grid positions and durations, but change their pitch. What you end up with is a completely new melody with a different vibe, yet still derived from the same song. If you start out with a melody in a major key, it becomes minor, while minor key melodies become major, and so on. So, if you have a verse melody in a minor key, you could flip it to a major key for the chorus – a common songwriting technique. Whether this is done with a vocal or an instrumental part, it can have a big effect and be a great way of generating alternative bridge or prechorus parts. You could play the vocal melody in as a synth line, then invert it to produce a keyboard hook for a tag or a solo section, for example.

Logic Pro X, shown above, has a nifty 'reverse pitch' feature that asks for an axis pitch, then works everything else out for you. In the example shown above, we've got a simple melody in the key of A minor. To generate our flipped version, we've simply duplicated the region, selected the notes in the piano roll editor and chosen the MIDI Transform » Reverse Pitch option from the edit window's Functions menu. This brings up a selection dialogue that asks us to input the note pitch around which we want to flip our notes. To get this result, we typed in the note D3 and hit Operate. Hey presto: a whole new melody!

If that doesn't work out, for even wackier results, why not try your DAW's pitch randomising function, if it has one? For more information about a similar technique to this one, known as negative harmony, check out our resident music theory expert Dave Clews' *Easy Guide* on the topic in **cm**257.

Strip it back

An alternative approach to coming up with new sections for a tune is to take a loop or a section that already contains plenty of tracks – this could be achieved by creating a full drop section first, for example – then work backwards, progressively removing elements to find combinations of parts that you already know will work together, but with a more minimalistic approach. For builds, try just repeating the first bar or two of your musical elements over existing percussion parts. Or dive into a copy of an existing MIDI part and gradually remove notes a few at a time – this will have the effect of the part gradually growing from just one or two seemingly random notes or chords into a properly arranged part.

Listening to stripped-down versions of the drop is a good way to inspire new ideas for other sections of a track, particularly prechorus builds, intros and bridges. The combination of just drums, vocal hook and nothing else, for example, is often a winner, so if you're stuck for variation ideas, just drop all the music out for eight bars or so and see what happens!

When in doubt, sometimes the answer is just to take things back a notch...

Filter flow

Automatable low-pass filters are probably one of the most important tools ever to have appeared in the computer musician's toolbox. Rather than simply fading the volume up, gradually opening out filters on synth, percussion or vocal parts over the course of an eight- or 16-bar phrase has become a standard for introducing new sections, and for good reason – it's a technique that always works brilliantly. Now that most DAWs feature sophisticated parameter automation, getting a filter to open over the desired section is usually just a matter of assigning the plugin's cutoff parameter to an automation curve and drawing in the appropriate breakpoints. When doing this, choose a plugin with additional distortion control, and dial in a little analogue warmth to fatten the sound as the filter opens.

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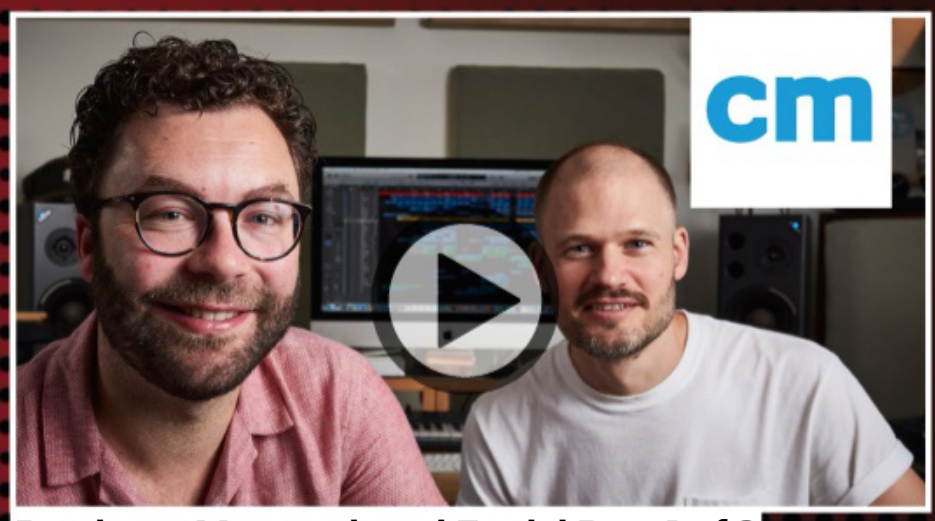

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More tips for breaking out of the loop of doom...

01 REMIX YOURSELF

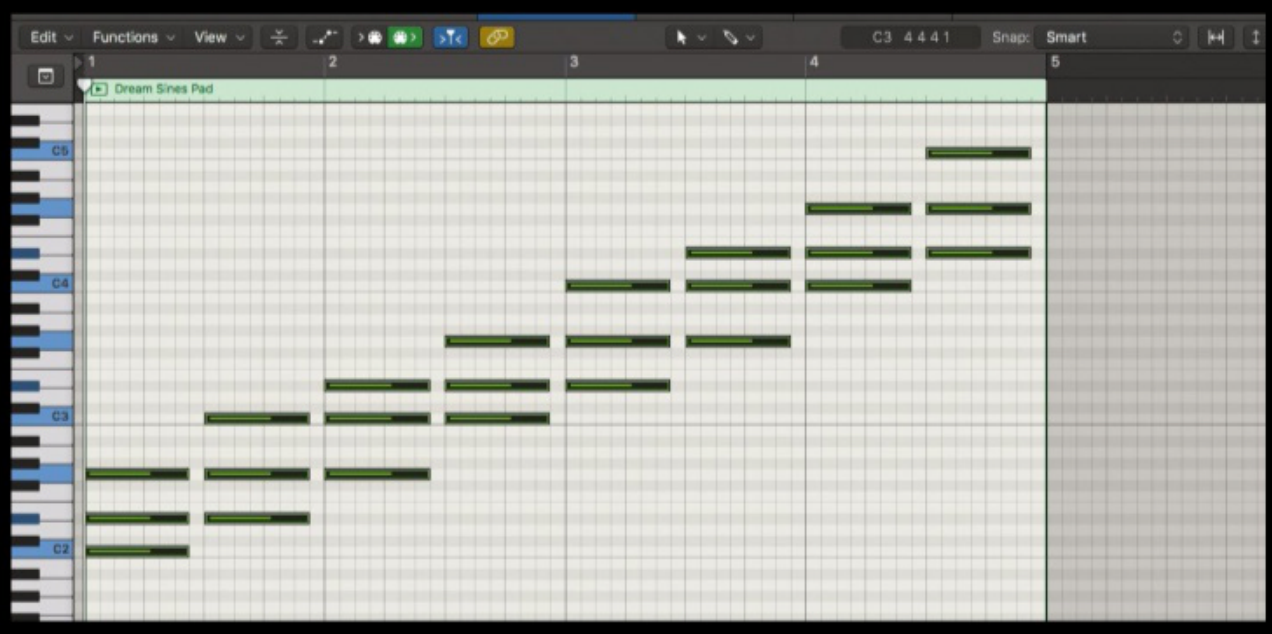
Get some self-induced inspiration by taking one of your own songs, stripping away the music, then coming back after a day or two and remixing it. Listening to the vocal acapella after a while may help distance you from the original version enough to come up with something new. As it's your own song, you can then choose to either keep the original vocal or replace it, then write a completely new song over the top of the new backing track.

02 JAM SESSION

Your computer is a powerful recording device with acres of hard-disk space, so why not make the most of it and record long synth 'jams' to audio? If you're lucky, this can capture some great moments, creating a wealth of inspiring material that can organically influence arrangement decisions. Chop these nuggets out and use them as one-off ear-candy moments to keep your arrangement fresh.

03 INVERSION THERAPY

Chord inversions are your friends – you can fashion a decent prechorus by inverting the verse chords so that they play higher up the keyboard as the section progresses. Simply playing the same chords in different positions on the keyboard provides variety without actually changing the chords themselves.



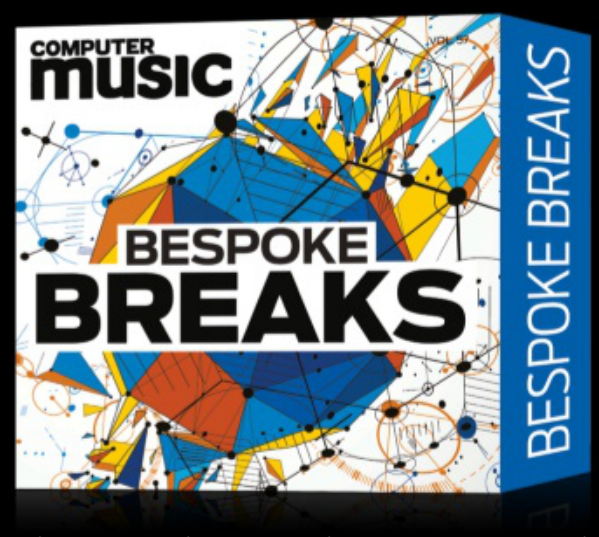
Believe it or not, all of these are C minor chords – they're just inversions going up the keyboard

04 BUILDING BRIDGES

Make a whole new section for your song by copying an existing section, dropping out the drums and just changing one chord. This worked well for the Chainsmokers in their recent hit, *Side Effects*: they took the prechorus chords, swapped a Cm7 for an Fm7, and hey presto! – a bridge section was made! When the chorus re-enters, a new vocal melody over the existing chorus track keeps things fresh.

05 SOUND ADVICE

As well as the structural side of things, there's a lot that can be done with the instrumental parts you use (or don't use) in your track to keep things interesting, and new sounds are always inspiring. Copy and paste the drums from your solitary eight-bar loop, dial up a new synth or a set of presets that you rarely use on one of your existing synths, or strap a seldom-used plugin over the channel and use the new sound to inspire a fresh part.



Using samples – like the ones given away each month with *Computer Music* – can prove inspirational

06 RISER ABOVE IT

When it comes to getting hold of risers and transition effects to keep your arrangement moving, there's absolutely nothing wrong with plundering sample libraries and other resources. What's more, you don't have to use straight-up risers as-is – instead, try using a sample of a long cymbal crash or noise 'downlifter', flip the audio back to front with your DAW's reverse function, then nudge the reversed audio into place on the timeline. Fade and shape the swell's volume for instant 'whipping' effects.

Subtractive arrangement might make your track look like *Breakout*, but it's a reliable, easy technique

07 TAKE IT AWAY

Kick it old-school with subtractive arrangement! This tried-and-tested method dates from linear DAWs, and it still works just as well today. Start with a looping section of four or eight bars that represents the busiest section of your song – usually the chorus. Duplicate along the timeline to form a grid of regions lasting the length of the song, then work through from the intro, removing or muting unwanted parts. Keep going until an arrangement starts to appear, then refine the transitions.

08 MAKE A PASS

If you're using eight- or four-bar sections as building blocks to sketch out the foundations of your arrangement, run a few single-pass overdubs all the way down to 'cement' them together. These could be things like drum fills and cymbal crashes, vocal adlibs, keyboard riffs, live knob twiddling on an analogue synth or MIDI controller, etc – basically, any track recorded as a continuous performance that infuses your song with unique, one-off moments, contributes to the development of the track and makes it evolve as it plays. This will keep the listener interested and reduce the repetitiveness that block-based arrangements can sometimes suffer from.

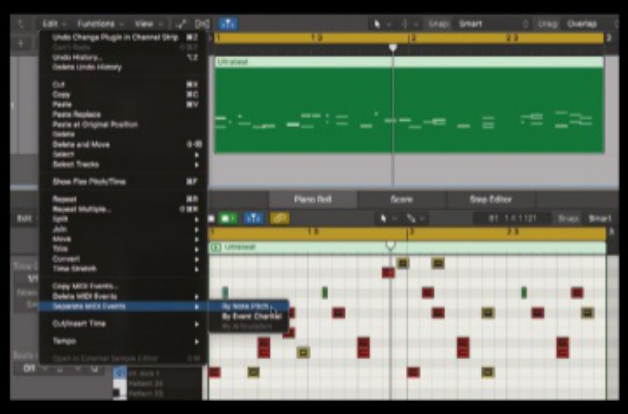
Overdubbing passes of fills, synth edits or other sonic effects can liven up grid-based arrangements

09 GET HANDS-ON

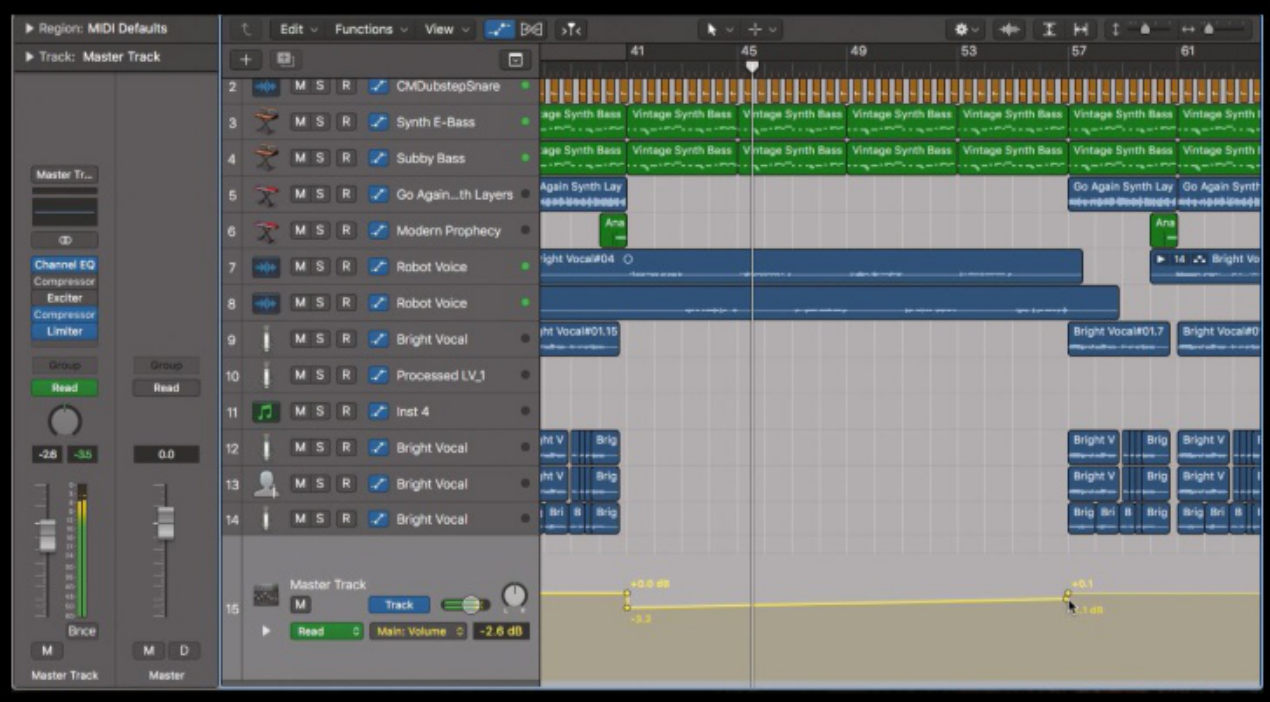
If all you've got is a repeating eight-bar loop that you can't break out of, try using automation as a performance tool. Copy and paste your loop into a three- or four-minute long block of repeats, then assign the volume levels of eight of the most prominent tracks to eight sliders on a hardware MIDI controller. You could also assign the channel mute switches to appropriate buttons if your controller has them. Then set your DAW's automation system into Write or Touch mode, start the track playing and hit those faders. Often the live performance element of having physical controls beneath your fingers as the track plays will spark some latent creativity, and give you organic motion.

10 PARE IT DOWN

Writing a seven-minute song isn't necessarily a bad move, but there's often no need to go to great lengths – literally – to pepper your track with loads of different sections if it doesn't need them. Many current chart hits are edited down to the bare minimum, coming in at under three minutes long. Don't need that intro? Bin it and just start the track with a synth noise leading straight into the first verse. And having only one singalong chorus at the end has the effect of making your listeners want to play the whole thing again just to get to that bit – and that can't be bad, can it?



Separating multiple drum kit elements out to individual tracks will give you added arrangement flexibility



Subtle variations in dynamics can help balance the relative levels of builds and drops

11 DYNAMIC IMPACT

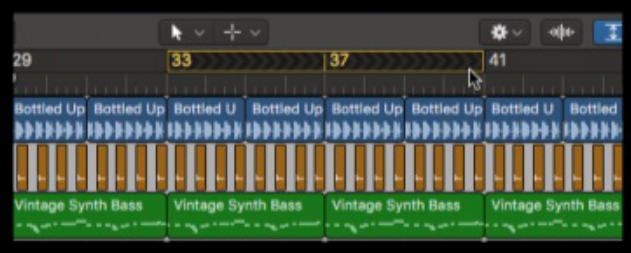
If your drop is lacking in impact, try varying the dynamics of the track subtly between the drop and preceding build. Use automation to drop the overall level of the track by 1-3dB at the start of the build, maybe increasing the volume of the impact effect on the first beat to compensate for the sudden change in level. Then ramp the level back up by a dB or so during the build, before snapping back to the original level on the downbeat of the drop. Boom!

12 KITTED OUT

If you're constructing song sections by copying and deleting MIDI regions, it makes sense to have a separate track for each individual drum kit sound if possible, as that not only gives you flexibility for processing during mixing, but also lets you mute and bring back in individual elements of your track more easily when arranging. If you have regions containing multiple drum events – kicks, snares and so on – on single tracks, most DAWs have the ability to separate them out onto individual tracks – such as Logic's Separate by Note Pitch command.

13 SKIP CYCLE

A quick way to check out an arrangement idea without actually changing anything is to use your DAW's 'skip cycle' mode. This is where, instead of looping the cycle range, the playhead jumps over it, missing it out entirely – a good move if you want to see how the chorus sounds coming in straight after the verse, skipping the prechorus, for instance. Most DAWs have a version of this – for example, in Logic Pro, just hold down the Cmd key while dragging to set the range; or in Cubase, just swap the left and right loop locators around.



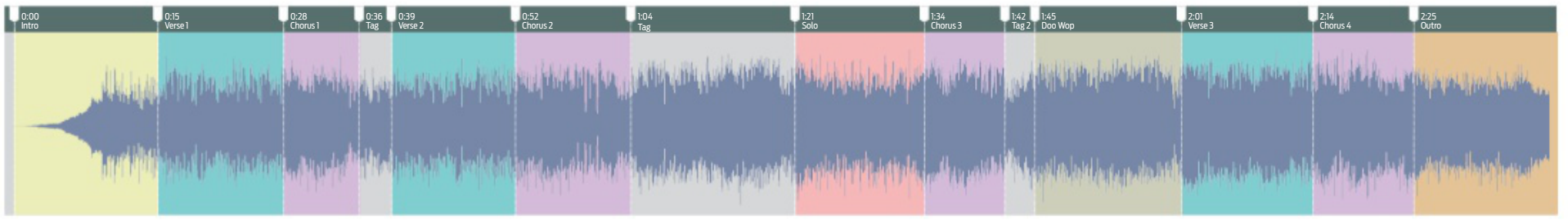
Skip cycle does what it says on the tin: it misses out the cycled section and skips to the next bit

14 LISTEN AND LEARN

Analyse the arrangements of some of your favourite tracks. Listen to what other producers have done and try to figure out the mechanics of the track and why it works the way it does. The more you do this, the better you'll get at pinpointing the minor details that all make a big difference. To get analytical, import an audio file of the track into your DAW, and use markers to mark out the sections. Then you can see how the song develops, and which elements appear in which section. cm

Classic arrangements deconstructed

Learn what makes four landmark tunes tick, second by second

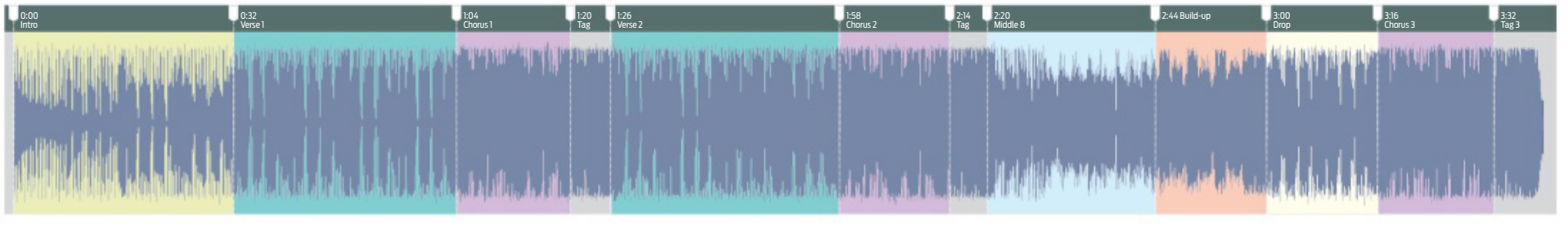


ARTIST
The Beatles

TRACK
Back In The USSR

This side-one opener from The Beatles' 1968 '*White Album*' possesses a fairly straightforward classic rock/pop structure, albeit with one or two tweaks.

0:00 **INTRO** The song begins with the sound effect of a jet plane coming in to land, followed by a four-bar intro on an E7 chord that neatly anticipates the A chord on the downbeat of the verse.
0:15 **VERSE 1** The song gets into its stride as Paul begins to narrate the back story, about how he flew in from Miami Beach and didn't get to bed last night. The verse section lasts eight bars, made up of two repeats of the A - D - C - D chord progression.
0:28 **CHORUS 1** The chorus is slightly unusual here, as it only lasts a total of six bars – the first three made up of a rearrangement of the existing chords from the verse section – A - C - D – followed by a repeat of the chorus vocal hook "Back in the USSR", and a final two-bar link into the second verse.
0:52 **CHORUS 2** After a second verse that is, musically, a carbon copy of the first, we get the second chorus, complete, like the first, with vocal hook and lead guitar riff to distinguish it as such. However, this time round, the "Back in the USSR" vocal hook gets not one repeat, but three, extending the length of this chorus to an even more unorthodox seven and a half bars.
1:04 **TAG** At this point we get a completely new section, made up of Beach Boys-style backing vocals and Paul extolling the virtues of Ukrainian girls and how they leave the west behind. The new D - A - D - Bm7 - E7 - D7 - A chord progression covers eight bars, followed by an extra, two-bar A - E turnaround that sets up the subsequent guitar solo.
1:21 **SOLO** The lead guitar takes over from the vocal, playing a raucous, bendy solo over a straight set of verse chords. This section is the same length as all the other verse sections, coming in at eight bars, followed swiftly by a repeat of the first, six-bar chorus and another ten-bar tag section.
2:01 **VERSE 3** A final eight-bar verse section has the vocal describing snow-peaked mountains way down south, joined by a screaming lead guitar part playing rapid notes on a high A. This is followed by a final, six-bar chorus section.
2:25 **OUTRO** The outro section simply pedals on an A blues riff with lots of "Woo-oo-oo" backing vocals for six bars, before ceding to more jet plane sound effects to round off the perfect 2:40 pop arrangement.



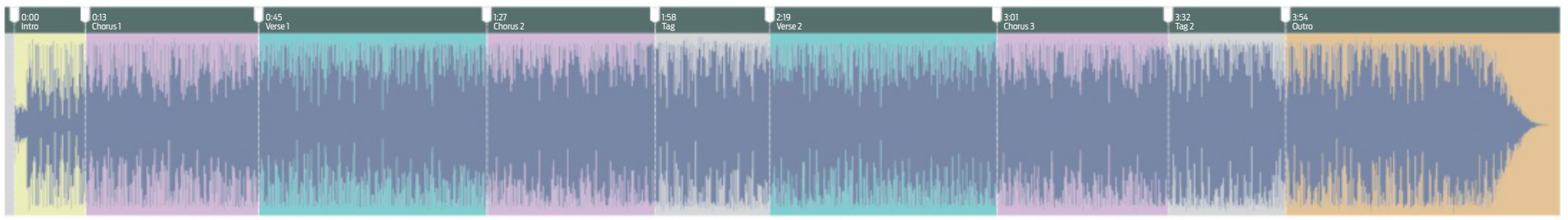
ARTIST
Chemical Brothers

TRACK
Go

bit.ly/ChemBroGo

This recent cut from the Chems strikes the perfect blend of EDM stylings and mainstream song arrangement.

0:00 **INTRO** A solid beat, heavily reverbed percussion and analogue filter sweeps make up the first eight bars of this tune, after which we're more than set up for eight bars of monotonic bassline playing a string of 16th-notes on D, with an ear-bending B♭ - G - A♭ motif every fourth bar. Meanwhile, Q-tip cues up the verse rap vocal with "Can't think/sleep/breathe" over the last four bars.
0:32 **VERSE 1** The drums and bassline continue unchanged as Q-Tip gets into his flow, his rap doubling the rhythm of the bassline and accompanied by a high-pitched synth sound that bends upwards in pitch as each line is delivered. The vocal creeps up in intensity over the 16 bars, building up tension before the chorus hits.
1:04 **CHORUS 1** Heralded by a sung "O-oh" vocal on the downbeat, a flurry of stabby synth parts and an unforgettable lead synth hook, Q-Tip's laconic delivery continues over the chorus, which is technically eight bars long. After the eight bars, however, we find the same delayed resolution technique found in the second chorus of *Back In The USSR*, repeating the "We're only here to make you..." line four times before the payoff of "Go!" on the downbeat of the next section. This makes for an extra three-bar 'tag' at the end of the chorus, totalling 11 bars.
1:26 **VERSE 2** The 27 bars from this point on are musically the same as the last 27, save a tambourine loop and a few extra synth noises for variety. We get another 16-bar rap verse followed by an identical eight-bar chorus and three-bar tag, except this time round...
2:20 **MIDDLE 8** ...the "Go!" leads into a new section that feels like a middle 8, but is actually four bars of repeated "Go!"s, the intro percussion and some synth noise. This leads to the middle 8 proper, at which point the drums drop out, replaced by Q-Tip's "Can't think/sleep/breathe" refrain from the intro, and the bassline now played higher up.
2:44 **BUILD-UP** In this eight-bar section, the high bass synth continues pedalling on D, and Q-Tip quotes some lines from the first verse, while a sonorous synth note rises in pitch and frequency, ramping up the tension
3:00 **DROP** An eight-bar instrumental verse with the drums back in full effect and the bassline played by a new, more analogue, reverberent synth sound.
3:16 **OUTRO** The song finishes with just a regular chorus plus three-bar tag, with all instrumentation switched back to that of the first two choruses.



ARTIST

2Pac featuring Dr Dre

TRACK

California Love

(ORIGINAL VERSION)

bit.ly/2PacCalLove

Featuring a typical structure for the genre, with relentlessly ticking head-nod groove and pounding piano hook, mated to some amazing talkbox jamming from Zapp!'s Roger Troutman, it's easy to see why this classic West Coast hip-hop anthem was a massive crossover hit in 1995.

0:00 **INTRO** The song kicks off with Troutman's solo talkbox "California Lo-ove" vocal bringing in the beat at 0:03. We then get four bars of drums, bass, piano and horns, establishing the main musical backbone of the track. From here on out, over the course of the rest of the track, additional supporting parts may come and go, but that piano riff never lets up.

0:13 **CHORUS 1** The horns drop out and the talkbox chorus vocal hammers the hook for a further 12 bars, adding some two-part harmony here and there. One of Dre's signature shimmering synth sounds props up the tonality, while over the repeated "We keep it rockin'" line, at the end of this section, an ascending brass line serves to announce the forthcoming rap verse.

0:45 **VERSE 1** The first 16-bar rap verse is taken by Dre. Bar the odd whistle, the first eight bars is musically unchanged from the initial intro loop, but the second half features a couple of extra synth parts and the odd talkbox ad lib.

1:27 **CHORUS 2** This chorus adds more to the first chorus' musical landscape, with some ad libs answering the hook, and female backing vocals adding an extended "oo-oo-oo-ooh" line.

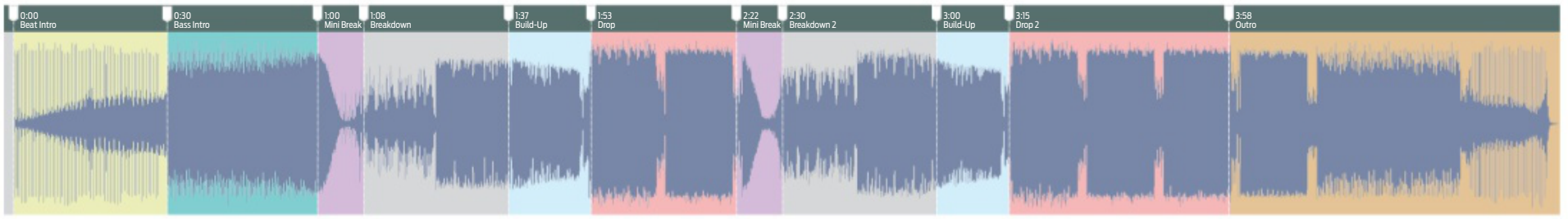
1:58 **TAG** "Shake, shake it, baby" says Roger, adding a further talkbox hook.

The unstoppable piano riff and drum loop thunder on unchanged for another eight bars, complete with the horn stabs from the intro.

2:19 **VERSE 2** It's 2Pac's turn to take the mic, which he does with aplomb over the same 16-bar section of backing track that Dre has at his disposal in verse 1.

3:01 **CHORUS 3** This section, and the repeated eight-bar "Shake it, baby" tag that follows it, are musically and structurally identical to the preceding chorus and tag, bar the odd ad lib.

3:54 **OUTRO** Everything seems to calm down a bit at this point – the two rap verses have been dispatched and the chorus hook hammered home, so all that remains is to fill the remaining 20 bars of loop with plenty of talkbox and rap ad libs as the track gradually swaggers off into the Californian sunset – job done!



ARTIST

Martin Garrix

TRACK

Animals

bit.ly/GarrixAnim

This Number One EDM hit combines hands-in-the-air euphoria with a snarling 4/4 kick and distinctive percussive riff for unashamed dancefloor destruction.

0:00 **BEAT INTRO** The track keeps it minimal for the first 16 bars, with just a high-passed kick and onbeat ride to provide the DJ with a metronome with which to mix. A bubbling, reverbed synth line is filtered and opened out.

0:30 **BASS INTRO** The full bass weight of the kick and synth arps are dropped into the mix. Garrix builds the tension with a strange rising synth and long reversed cymbal swell.

1:00 **MINI BREAK** This four-bar mini break provides 'ear refreshment', preparing the listener for the imminent introduction of the breakdown melody. This is stamped by a huge bass fall, swelling reverse reverb and a ticking clock slowly winding up.

1:08 **BREAKDOWN 1** The track's main breakdown, initially filtered to lower the energy level. The ticking clock acts as a metronome, while swelling, reverbed synths from the intro shoot out from behind the main riff. After eight bars, the lead synth's filter is opened, allowing the huge chords to take centre stage, with massive Pryda snares punctuating.

1:37 **BUILD-UP** These eight bars are all about building the tension to the max. A snaking hoover-style riff and laser zaps rise and accompany the snare build, leading into a final one-bar gap with a practically naked spoken vocal sample and sucking reverse effect.

1:53 **DROP 1** First-time listeners would expect the drop to continue the breakdown's melody – but they'd be wrong. Instead, Garrix strips away the high-frequency intensity and throws in a monstrous 4/4 kick and an entirely new riff. Each section of the track gradually ramps up the intensity before the next part drops it back down to quickly start the process all over again.

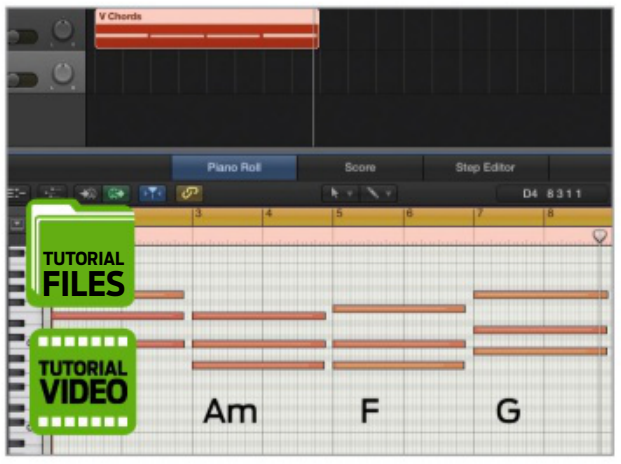
2:30 **BREAKDOWN 2** After another calming four-bar mini break, the epic synth chords drop back in, along with a repeat of the build-up from earlier.

3:15 **DROP 2** Again, this section mirrors the first half of the track, with the same distorted kick and woody riff, but it's 16 bars longer. There's a scream sample after eight bars, and rising zaps that mirror the lead riff to build tension.

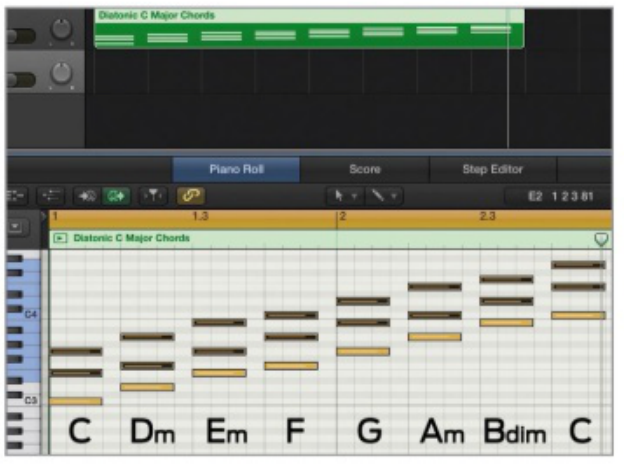
3:58 **OUTRO** After a one-bar edit, where the ticking clock briefly re-emerges, we're back into the bubbling synth theme from the intro. As the track nears an end, Garrix again filters the bass from the mix to strip away weight and provide contrast. Unexpectedly, a cartoonish 'boing' sample finishes the track off.

> Step by step

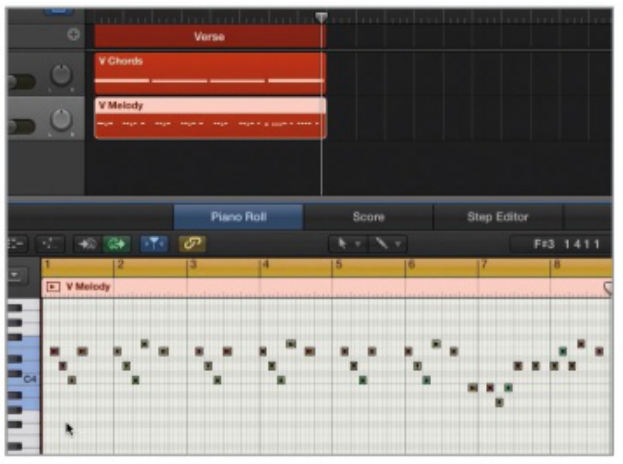
1. Changing/extending a basic chord progression into an arrangement



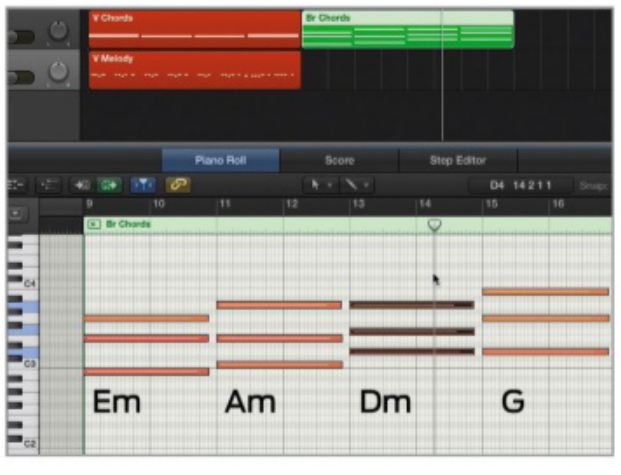
1 > Let's take a simple musical idea and mould it into a basic arrangement for solo piano – this will allow us to focus on musical arrangement techniques, rather than production-based ones. Here's an eight-bar section containing the progression C - Am - F - G, each chord lasting for two bars. To start our song, we'll call this the verse section.



2 > Note that the chords we're using are all diatonic to the key of C major. This means that, if we take all the notes in the C major scale and build chords by stacking alternate notes as shown, we end up with seven diatonic chords: C, Dm, Em, F, G, Am and Bdim. 'Diatonic' just means that the chords contain only notes from the parent scale of the key we're in, which is C major.

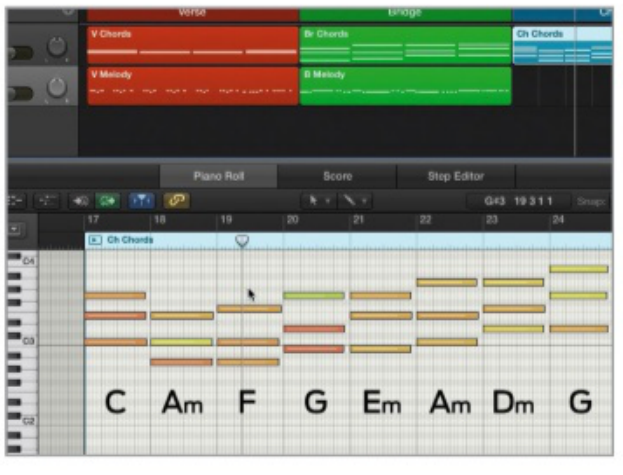


3 > Here's a cool little verse melody that fits over the top (we can sort out the lyrics later!). The melody also uses notes from the C major scale, so we know that it'll work with our chords. We now have a complete verse section, so let's construct a bridge that'll form the link between it and the chorus.

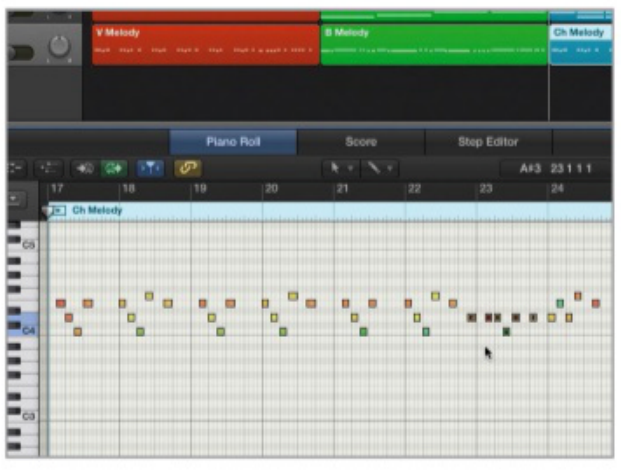


4 > The bridge will be the same length as the verse (eight bars), and we'll use the same number of chords of the same length (two bars each); but we need different chords to take us up to the chorus. To create a variation, we duplicate the verse section and change two of the chords, using more from our diatonic palette. C becomes Em and F becomes Dm, giving us Em - Am - Dm - G.

5 > Melody-wise, the bridge could do with being quite different to the verse, to distinguish it further as a separate section and lead up to the chorus. So we could do with something that ascends up the keyboard pitch-wise – which will build tension and excitement – and also has a different rhythm to the verse melody. Something like this will do the trick. Get a better look at it in the video!

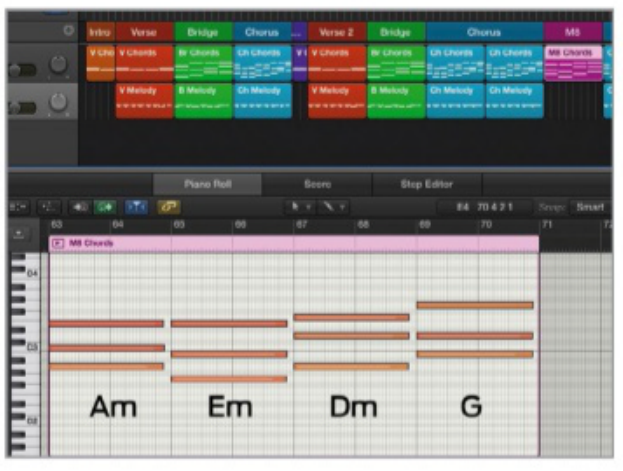


6 > For the chorus, we want the chords happening twice as often – in other words, driving the song along and making the chorus more impactful and exciting than the verse. We use the same progressions from the verse and bridge, but just shorten the chords from two to one bar each, squeezing them into an eight-bar section to form the progression C - Am - F - G - Em - Am - Dm - G.



7 > Since we've simply resequenced the same chords from the verse and bridge sections, the melody we used for the verse will also work for the chorus. So we duplicate the part and, just for variety's sake, adjust a note here or there in the second half so that it works better with the chords we took from the bridge section.

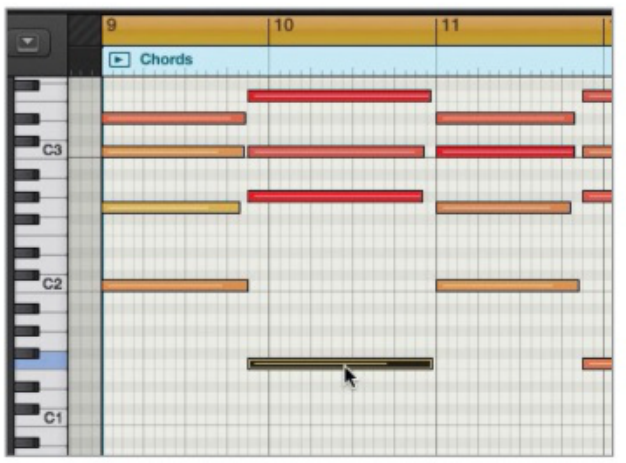
8 > Now we have the main chunk of the song in place, we can work more on the actual arrangement. We start by adding a two-bar tag after the chorus – just two bars of the tonic chord C will do the trick – after which, we can repeat the entire verse-bridge-chorus section again. For luck, we also double the second chorus to 16 bars.



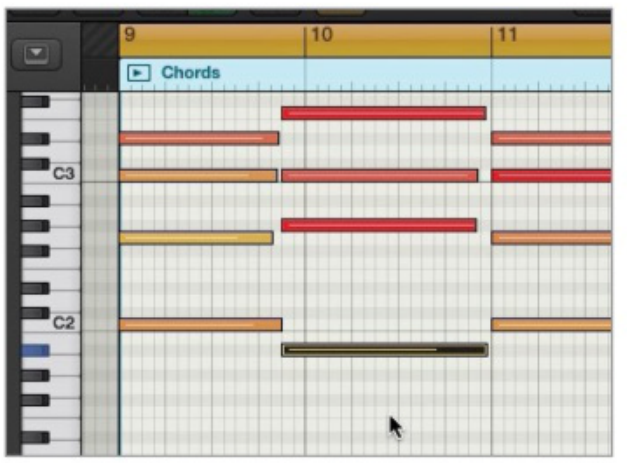
9 > In the middle 8, we go to an Am for the first chord for a change of mood, followed by Em, then Dm, then G to bring us back into the C on the downbeat of the chorus. The outro is just two repeated choruses, and our final task is to fashion a four-bar intro section from the first half of the first verse.

> Step by step 2. Changing bass notes under static chords

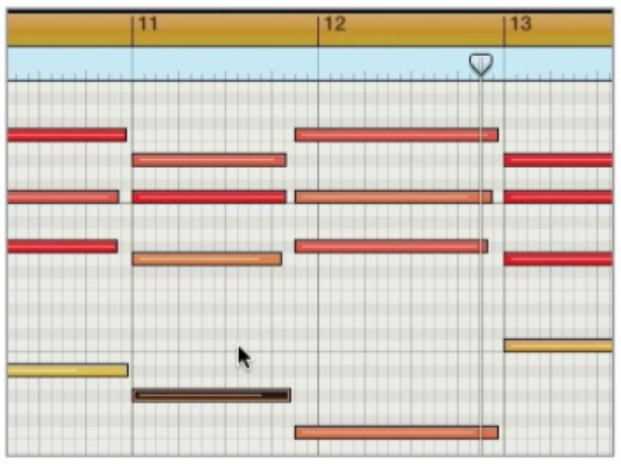
1 > It's possible to fashion new song sections from existing ones simply by changing the bass note under each chord, effectively creating new chords. To illustrate, here's an eight-bar section containing a basic progression made up of alternating Cm and Fm chords. The left-hand part is currently just playing the root note of each chord: C for Cm and F for Fm.



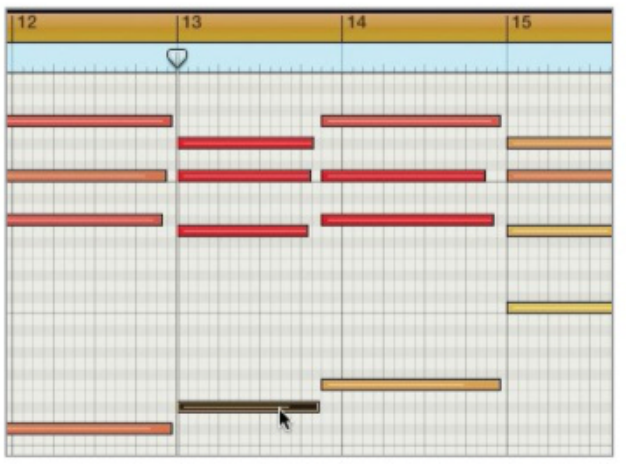
2 > We copy and paste the section into the next eight bars to make what will eventually become a chorus part. Then, leaving the top three notes of each chord exactly as they are, we can start moving the bass notes around to make new chords. The first C note can stay as it is, but our first victim is the F beneath the first Fm chord in bar 2.



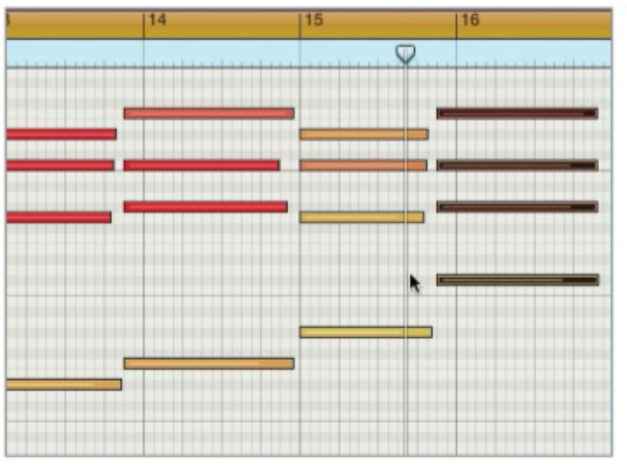
3 > We change it to a B♭, which sounds good and fits well. Our original F minor contained the notes F-A♭-C, the first, third and fifth notes of the F minor scale (F-G-A♭-B♭-C-D♭-E♭). Adding the B♭ means our chord is called an Fm11, because if you keep counting past the octave to the B♭, its the eleventh note. Our Fm11 chord reads B♭-A♭-C-F.



4 > The bass note in the third bar moves from C to A♭, making an A♭maj7 chord (G-C-E♭ from the C minor chord, coupled with the new A♭ in the bass). As with the previous Fm11, our chord appears in spread or 'open' voicing – A♭-G-C-E♭ – rather than the 'closed' voiced A♭-C-E♭-G. Similarly, we then shift the F in the next bar down to D♭ to make D♭maj7.



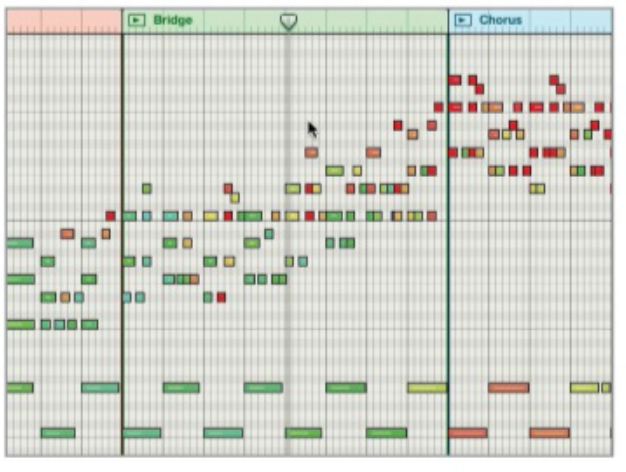
5 > The C bass note in the fifth bar becomes an E♭, making what's known as merely Cm with an E♭ bass, or Cm/E♭. As it happens, the F in bar 6 can remain where it is, since Fm works well as the next chord in the progression. The pattern that's emerging now in the left-hand piano part – that is, the bassline – is an ascending part from the low D♭ back up towards where it started on C2.



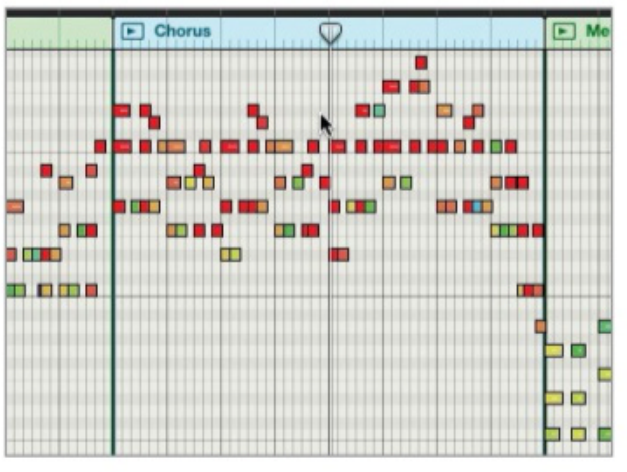
6 > Finally, we change the C bass note in the seventh bar to an A♭, making another A♭maj7 chord with the same open voicing as the one in the third bar, and we shift the final F in the eighth bar to a high D♭ to create another D♭maj7 chord. The result is a more musically interesting section with a more defined, 'fall and rise' shape that takes the listener on more of a musical journey.

> Step by step 3. Using inverted chords and dynamics

1 > Occasionally, all you need for a song is a couple of chords. By inverting the chords and playing harder or softer to shape the song's dynamics, you can do a lot with a little. This verse section contains eight bars of just Cm - F, played very softly and simply in two positions low on the keyboard. We can develop this without complicating things with more chords...



2 > We can use the same chords for the bridge, but increase the dynamic and rhythmic intensity of the playing and move slowly up the keyboard, shifting (or inverting) each chord's lowest note up one octave with each change to impart a three-dimensional build – increased loudness, rhythmic complexity and pitch – all without changing the actual chords.

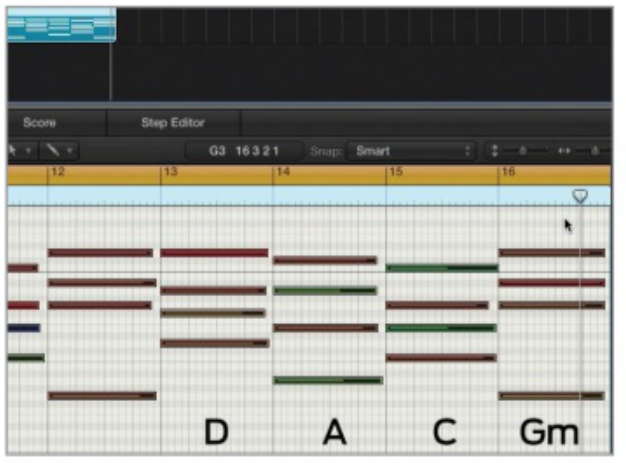


3 > For the chorus, we can remain on the same chords, but now we're playing loudly in a higher register, using lots of dynamic articulations and incidental notes. Towards the end of the section, we can bring it back down the keyboard again to the level that the second verse will be at. In this way, it's possible to construct an entire song from just two chords.

> Step by step
4. Raising the chorus a whole tone

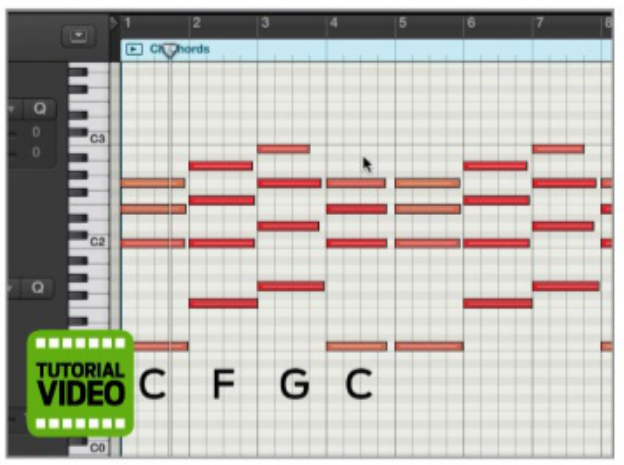
1 > Having different sections of a song in different keys can be an effective way to craft a more interesting arrangement. One example is to have the verse and chorus sections in different keys. Here's a typical C - G - B♭ - Fm verse progression over eight bars. It's in C major, but it uses two borrowed chords from the key of C minor, namely B♭ and Fm.

2 > Duplicating the section and transposing it into a new key is a quick and easy way of creating a new section that gives the illusion of arriving at an uplifting new set of chords – even though all we've done is used the same chords and merely shifted the whole thing up two semitones, from C to D in this case.

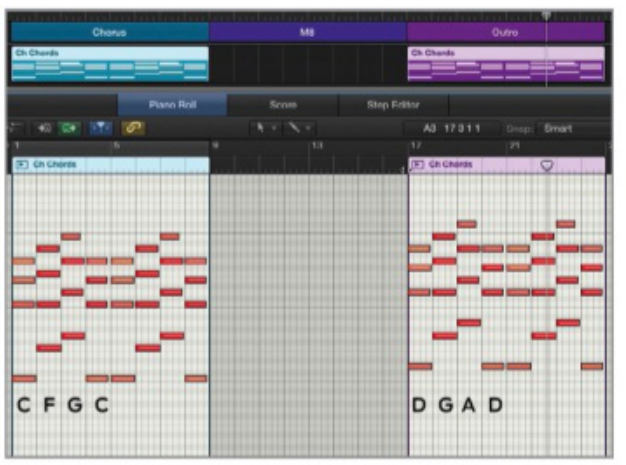


3 > The new progression (D - A - C - Gm) comes in with an abrupt transition. A keychange with no preamble like this is often known as the 'trucker's gearchange'. It actually works well in this scenario, as it gives the chorus an extra bit of impact. A bonus is that the final Gm chord resolves nicely back to the C on the downbeat of the second verse, after the chorus.

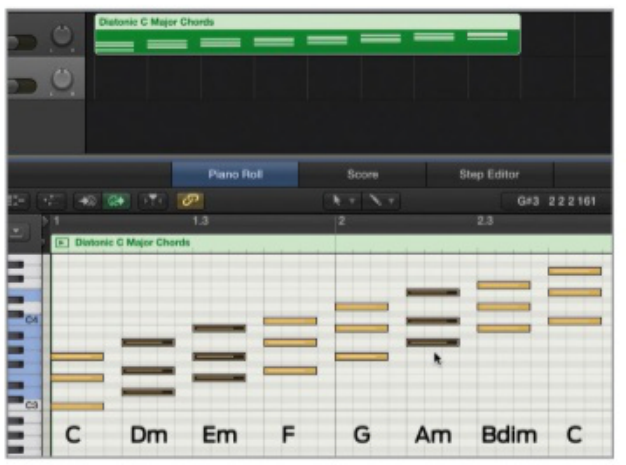
> Step by step
5. Modulating to a new key from M8 to outro



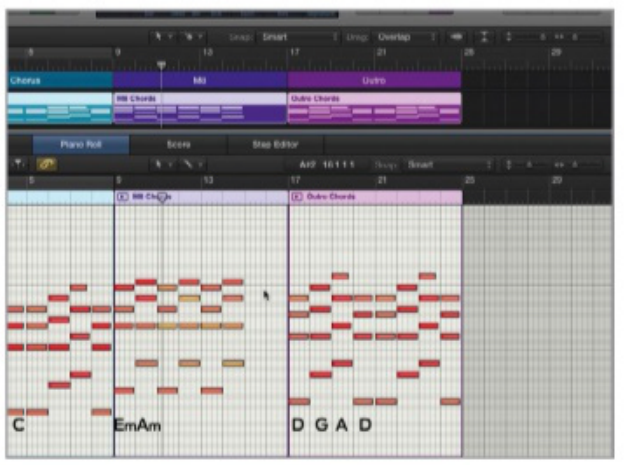
1 > A key change can be very effective for raising the excitement level towards the end of a song, and the middle 8 can be a great place to do it. Here's a C major chorus played with simple block piano chords of C - F - G - C. We duplicate this to make an outro section, then create an eight-bar gap in which to create our middle 8...



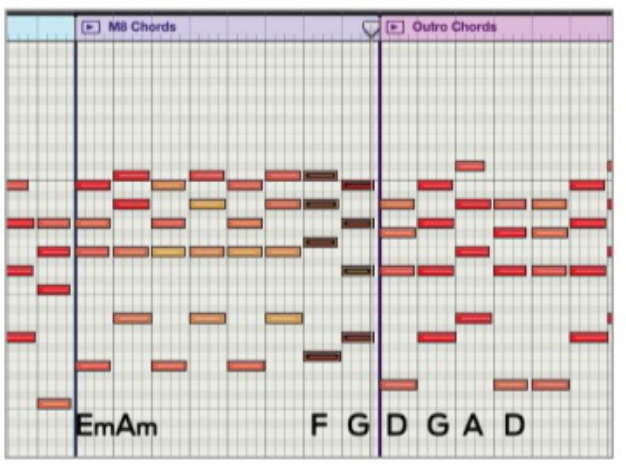
2 > Let's end up with the outro chorus playing in the key of D major – a whole tone above the previous chorus. We transpose this outro chorus' chords up a tone, from C - F - G - C to D - G - A - D. We'll set up our key change during the middle 8, as opposed to the abrupt 'trucker's gearchange' demonstrated in the previous walkthrough.



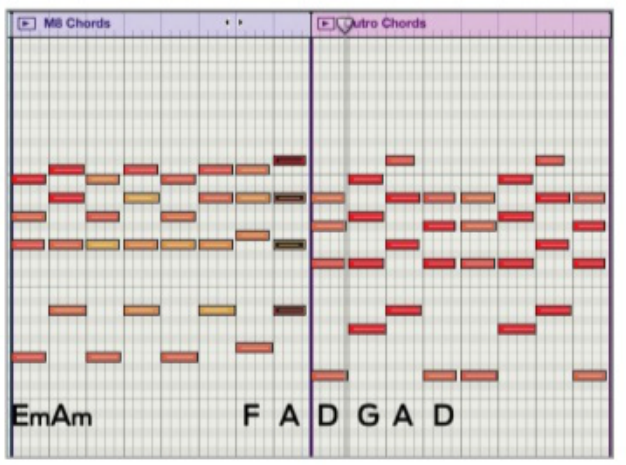
3 > So, now to fill the gap. Since the track up to this point has been in a major key, it would be good for the middle 8 to introduce a complete change of mood, so we'll choose some minor chords to go here. We can do this without actually changing key just yet, by selecting two of the minor chords that are diatonic to C major: Dm, Em or Am.



4 > We create a pattern comprising one bar of Em followed by one bar of Am, and fill the first six bars of the middle 8 section with it, leaving the last two bars blank. This is where the transition to the key of D major is going to happen, but first let's imagine we're staying in C major for the outro. If that were the case, how might we end the middle 8?



5 > We could use a bar of F and a bar of G, since ending on the G provides a strong resolution back to the C chord (since G is the dominant and C is the tonic). This would work well if the downbeat of the next section was a C major chord, but it's now going to be a D major chord.



6 > So instead of finishing on G, we need a chord that will resolve strongly to D major. The dominant of D major is A major, so let's substitute that last G major in the middle 8 for an A major. This works because – like our new key – it's a whole tone above the original chord and flows nicely into our new D major outro. **cm**

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BRUSH UP ON MUSIC THEORY

Let's face it, most music theory is stuffy and off-putting. Here are a bunch of principles you can put to good use – no jargon, just simple techniques

Scale up and forget

Scales and keys are simple – instead of creating a track using all of the 12 available notes, you create it using seven. The patterns between the notes are what define a scale. If every instrument in a track is playing only from that same set of notes, then you should be in key. The root note is the focal note of the track – D in D major, for example – the one that comes right at the start and end of almost every musical phrase. Start at your root, and move the keyboard in the pattern 2-2-1-2-2-2-1 to play a major scale. For a minor scale, the pattern is 2-1-2-2-1-2-2. As examples, move up all white keys of the keyboard from C to C and you'll play the C major scale; go from A to A and you'll have played the minor scale.

What chords can I use?

If you've got yourself a scale, it's not hard to figure out which chords will go with it. Again, your chords will only be made from the notes of the scale you've chosen. A basic 'triad' is made of three notes, moving up the scale but skipping a note every time. If you're using C major (all the white notes on the keyboard from C to C), your first triad will be C-E-G. Start at a note: C, miss one (D), play one: E, miss one (F), play one: G.

What about flats and sharps?

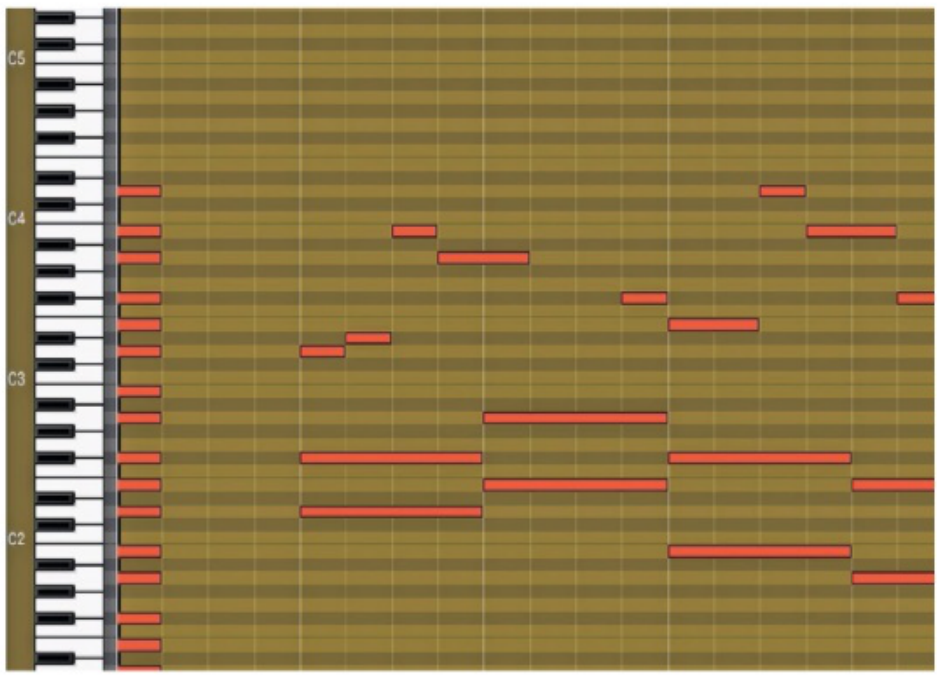
Anyone who's ever sat down at a keyboard will be able to tell you that Db and C# are the same note, but music theory has different ideas. Music theory's job is to name things, and the difference is only in the name. These notes are exactly the same, and it's only for advanced purposes that they're given different names – even then, they're the same note, just referred to differently. Don't let the theorists' will to name things discourage you from experimentation.

More chords to try

Basic triads are fine, but for a bit more musical sophistication, try adding more notes to them (again,

Smooth moves

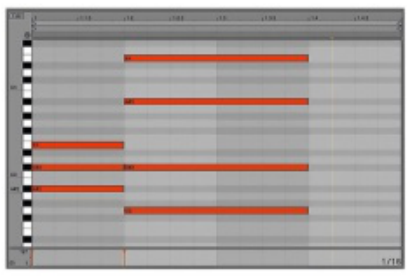
A sequence of chords will sound best when the notes make fewer huge leaps between chords. If there's a huge difference in height between chords on your piano roll, there's usually an inversion (see right) you can make to bring all the notes closer together. In the picture, the first two chords are in normal position, and the second two are inverted. The second pairing puts the notes of each chord closer together, and this makes for a far smoother transition and sound.



Simple stuff with pentatonic scales

Musical scales don't have to even contain seven notes – perhaps the simplest scale for listening to and creating music with is the pentatonic scale. Start at F# and play all the black notes, and you have the F# pentatonic scale. Therefore, to start at any note, you just need to know that the gaps between notes go in the pattern 2-2-3-2-3. Pentatonic scales are simple but can be extremely compelling.

skipping every other scale note) to make sevenths, ninths and elevenths. Next give suspended chords a go – these involve taking the middle note of the triad and moving it up or down by one scale note.



A sense of tension

A diminished chord has three notes separated by a gap of three – eg, F-G#-B. When it comes to 'standard triads', they bear more resemblance to minor than major but, with the notes separated by the same gap of three, and the top and bottom separated by a gap of six, diminished chords are especially disturbing and aggravating. For this reason, they're great to place at the height of tension, potentially best used during a build-up, though sometimes just as good as a connecting-chord between two normal triads. For an even more suspensive note combination, try adding another note on the top, again separated by three steps – the diminished seventh.

Chord Inversions

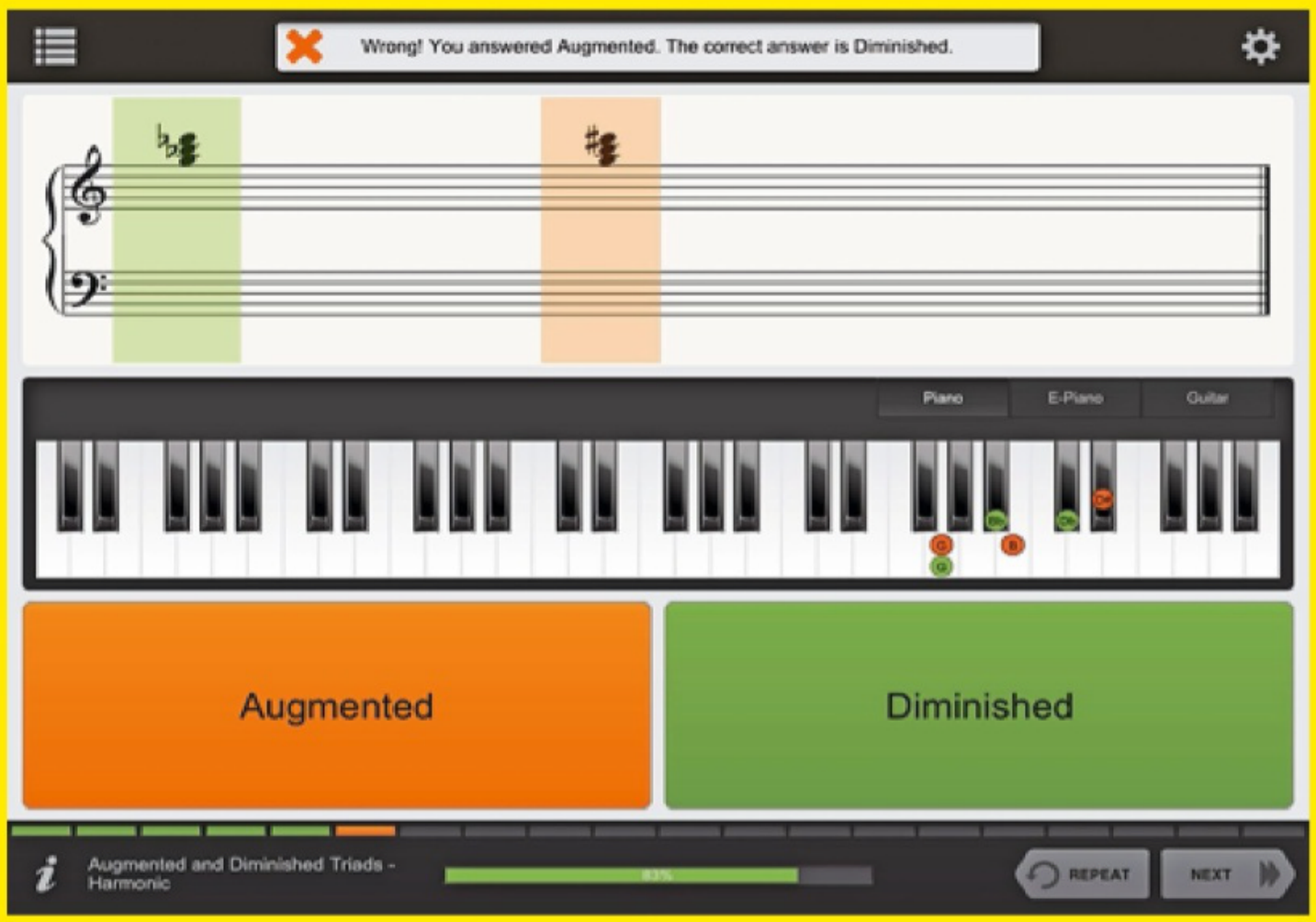
Inversions are, put simply, the idea of playing a chord with the notes in the 'wrong order', so instead of playing a D major D-F#-A, you could play it A-D-F#, and still maintain the exact same feeling. One way to use inversions to good effect is so that the lowest notes match a bassline below it; another good use is in the tip below…

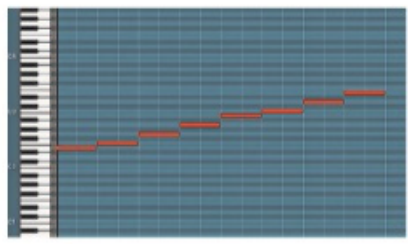
Two ways to change key

Changing the key of your track in the middle is a way to make things interesting. So how is a key change performed? The first and simplest way is to just abruptly change it from one bar to the next, with no warning. The second way is to introduce the next key just after playing a chord that this key and the current key share. Transitioning from G major to A major, to give an example, can be done using the chords Bm (B-D-F#) or D (D-F#-A), as both keys share these notes and chords.

Ear training

One of the best ways to know and understand the useful parts of music theory is to get yourself on a course of ear training. Using websites or apps specially designed for the task, you can quiz yourself on different note combinations and chords in quick quizzes based on sounds. Pretty soon, when having to think about the combinations of notes presented, you'll start to absorb the different relative sounds, and back at your DAW, you'll be able to reach for 'that note in your head' a lot faster.





A la modes

When you've had your fill of standard major/minor scales, try some modes. Remember how C major and A minor were both played using the same notes, just starting at different places? Well, there are five more starting points you can use, and each is known as a mode. It's unusual to find music played in a mode rather than in a major/minor scale, but this is one way to keep things interesting.

Keep it in key

If you're having trouble keeping to a key, your piano roll might be able to help. In Ableton Live, for example, you can wrap the piano roll to show only the notes that have been programmed into it so far, hiding the others. Add to this the fact that you can also drag notes back to before the first beat, and you can program in the notes of your scale before you start, drag them back behind the first bar, and 'Fold' the notes so you can only program acceptable notes. Many hardware controllers and sequencers allow you to do a similar thing. NI Maschine, Ableton Push and Novation Circuit all feature scale modes that 'fold' all the notes in a key across a grid of pads.

10% Inspiration, 90% Perspiration

Have you ever heard the inspiration/perspiration saying? It suggests that for a successful result you need a great idea but that, in order to do it justice, you need a whole lot more hard graft. The way this concept translates to music making is open to interpretation but, as this feature suggests a whole range of ways in which you can develop your ideas to produce something new and innovate, let's focus here on the concept of perspiration…

What might need hard graft in order to turn good ideas into better sounding ones? Well, by far and away the biggest one is music itself. Notes, chords, melodies, harmonies, instruments, arrangements, meter, time signature, key signature and lots more besides. Music history is littered with highly successful music makers who would have described themselves as precisely the opposite; artists who happen to have been able to express themselves through music, despite not knowing how to read it or play an instrument. So you can succeed and write interesting ideas without formal musical training. But, for many, that's an excuse for a lack of hard work, rather than a creative or fertile idea in its own right.

> To learn music, the resources available for free online are limitless

If you don't agree, let's ask a different question instead: 'Why don't you want to learn the rudiments of music?' Or: 'In what way will your musical ideas be damaged or diluted by learning more music?'. Imagine you're a novelist, trying to describe a particular scene. Let's suppose your vocabulary is limited to half the number of words of another author. Whose idea is likely to be richer, more articulately described and more able to form a compelling image?

If you have any fear that learning more 'music' will in any way lessen the potency of your musical ideas, worry not; it simply won't. Musicians who have learned an instrument and studied music theory are developing key skills as they do so; they're learning ear training, honing their sense of chord recognition and rhythm, while being able to assess and critique music they hear more intuitively and rapidly. They can often sort the good ideas from the weaker ones in a piece too, feeding their own imaginations with increasingly strong and inspired ideas in the process.

But this doesn't only apply to 'music' itself; indeed, the technology we use for capturing our ideas is just as central. Do you know how to bring musical ideas to life with MIDI Expression data or lines of automation? Do you know how to capture a great-sounding vocal with a microphone matched to the tone of your singer's voice, or how much the acoustic of your control room is impacting into your recordings? Are you sure you need to buy that new synth plug-in when you've not yet delved beyond the presets of the one you bought last month?

This might all read as harsh and very much the voice of 'tough love' but in reality it's not a chore to get better and to learn more about a subject you love. Writing an inspired musical phrase is a wonderful thing, but so is shaping it carefully in post-production to make it shine and sing and create an even greater level of emotional depth. The good news is that for those keen to further their musical knowledge, we've never had it so good. Aside from 'traditional' music lessons, the resources available for free online are limitless. Musical and technical knowledge will never hold you back; rather, both will unlock and expand your creativity.

Passing Notes And Enriched Chords

It's easier than you think to extend and enrich the harmonic language of a track. Sometimes you just need notes 'outside' a chord

Recording a chord progression is often a great way to start a track but we're not all the most nimble keyboard players and, in our desire to make sure we hit the right notes in the right places, we often end up recording 'block chords' where the flow from one note to the next isn't our first priority. That's no problem, particularly if we go back to our recording and take a pair of scissors to it, chopping notes to create melodies and looking for 'passing notes', which help our chords blend more sinuously from one to the next. In the following walkthrough, we're going to look at how to build a melody and extend the interest in the bass end of a chord progression we've recorded in real time. You can also see an extended version of this idea in video form this month…

> We're starting with a basic synth-string chord progression where each chord moves up or down with roughly the same shape. The result is pleasing enough but there's no sense of melody here, or of the harmony being in any way unusual or rich. It sounds pretty standard.

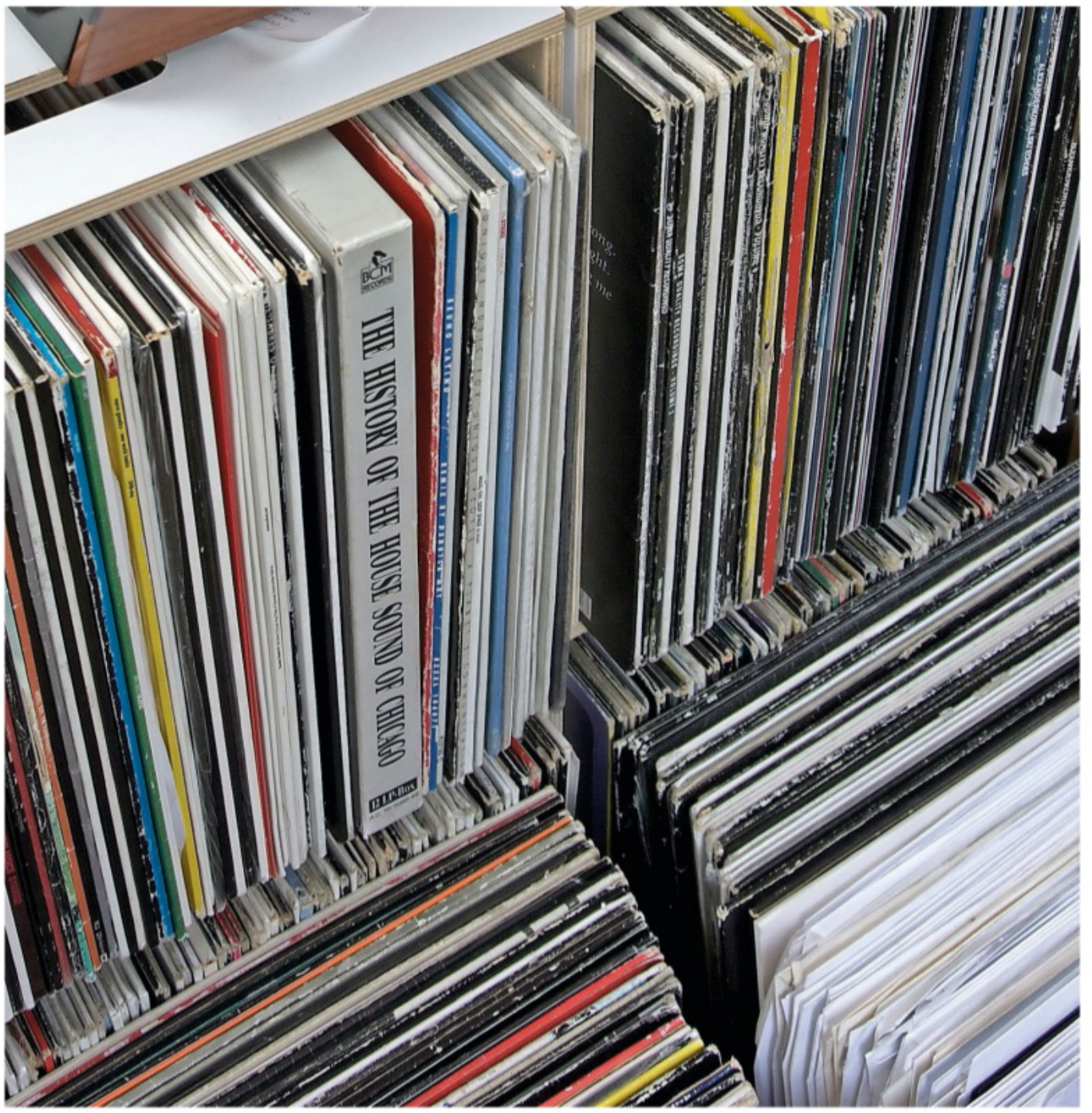
> Using the Scissors tool in any DAW, you can cut holes into the top line of your chord progression and fill in the gaps between note steps, leave a note hanging over from one chord to the next, or add extra notes to enrich your harmony. We're trying both ideas here.

> Next, in the bass, we add some passing notes between chords. Using the Scissors tool we chop a couple of low notes a beat early, filling in the hole with a step between the two original notes. We add a sub bass to help hear these moves, as the string sound lacks definition.

Moving Beyond Pastiche

Most of us gain our first musical inspiration by learning to play a track we like. There's nothing wrong with familiarising yourself with the creative process by copying something else, as it helps us understand many of the rudiments of music: chord progressions, melody, meter, tempo, groove and much more. However, copying or even pastiche-ing music (writing something which sounds like something else) doesn't bring much that's new to the creative process or to the world of music in general.

Avoiding copying something relies on the fact that your musical understanding goes beyond the framework set by the track which inspired you. So, once you've got the chords for a specific track under your fingers, go and learn another song. And another, and another. And then try mixing up the chords from the first song with those of the second and the third and the fourth. Similarly, don't feel you need to copy the groove of that first track into your piece. How might your track sound with a groove subtly similar – but fundamentally different – to the fifth song you've learned? Once you've begun to fill your brain with a number of different chord shapes and progressions, you'll start to feel that the language of music is one you can play with.



Listen and absorb as much as you can – your ideas will be richer for a deep gene pool of ideas

Another, more fertile, way to explore this idea is to ask yourself: 'How does this piece of music I find inspiring, make me feel?'. The mood of a track is crucial and requires a step back from specific chords, melody and tempo, tapping into something more innate – emotion. Do you want to write something sad, uplifting, celebratory, driving…? If you can identify the way a track feels, then writing something in the same mood has little to do with copying chords, melodies or even sounds and instrument choices. Instead, you're framing a concept genuinely worth copying. It's a subtle distinction but, taking this route, you're far more likely to write something genuinely new.

Slow down and hurry up

Learning a musical instrument and how to write and produce music is a time-consuming process and, of course, we all start from a position of no experience or knowledge, which we gain slowly and steadily until our tracks and productions become more sophisticated. However, with each step in the direction of this 'academic' approach to musical improvement, it's easy to forget that when we're inexperienced we tend to make some interesting musical discoveries. If you can't play the guitar, for instance, but you're asked to strum a chord, it's unlikely to be E major or G minor, but instead a mismatch of notes which might just sound interesting. Similarly, not knowing the 'tried and tested' order of insert plug-ins required for a vocal chain means that, by experimenting, you might end up with an even more interesting musical result.

The only 'problem' with becoming masters of our DAWs and the musical instruments we practise regularly is that we load our brains with what we might call 'muscle memory', with our fingers reaching for known, familiar patterns which have worked before. It can be hard to rally against this sometimes, which is why we've all had moments of sighing deeply, bored by our own lack of inspiration. Watch how a child delights at picking up an object they can pluck, bash or otherwise extract a noise from and you'll realise that sometimes all we need is to tap into our inner child. It's easier to make interesting, inspiring discoveries when you're in uncharted territory. Slow yourself down by grabbing any instrument – one you can't play – or by downloading a free DAW which you don't know how to use. Slowing yourself down might well hurry up the part of your brain craving inspiration.

DOs & DON'Ts of Inspiration

DO:

> Take regular breaks. We all suffer from mental blocks when producing music and towards the end of a long day whether or not to include that new synth line can feel like a huge decision. Go for a walk, give it 30 mins, and go back. Suddenly, that decision will be easy. A fresh perspective is always helpful.

DON'T:

> **Only write the starts of tracks. We've all been there, with 100 great track starts in our computers with no idea how to get a track finished. Developing an idea is harder than starting one and is a skill in itself. Don't give up.**

DO:

> Collaborate. Tired of your own ideas? Spend time with someone with alternative ones. It's amazing how someone with a different approach and different skills can bring out the best in your own ideas.

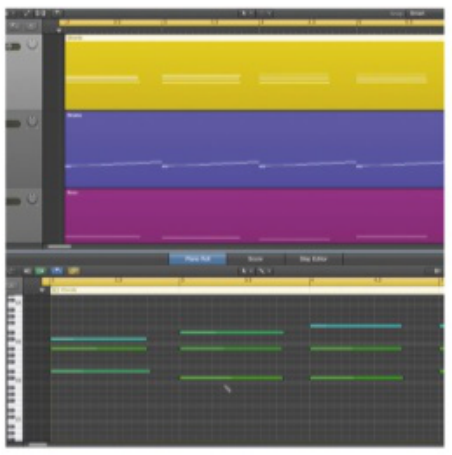
DON'T:

> **Let anyone telling you your tracks are weird or unusual get you down. That's the aim! Be proud of your originality.**

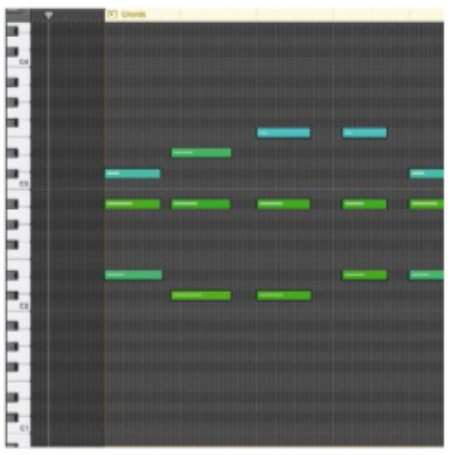
Using 'Pushed' Chords

Rhythm isn't only defined by your beat patterns. It's also defined by where chords, stabs and harmonic elements fall

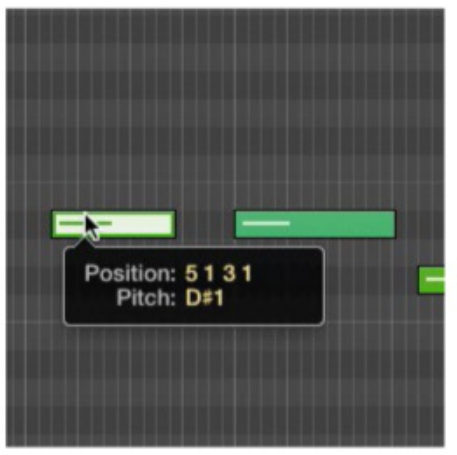
There's no doubt that any drums or percussion in your projects will do most to define the 'rhythm' of your tracks but the position of chords and even melodic notes will play a crucial role too. As such, if your chord parts only fall on the down-beats of each bar, you may well find that the overall sense of rhythm your track has is diluted or made predictable. 'Pushing' chords so that they fall a little early or late can make a big difference, by keeping your listeners on their toes. Better still, as soon as you're freed from the 'curse of the bar line', you have an opportunity to add something much more unique to your tracks.



> Here, we've got a little track formed of three instruments – synth chords, bass and a shuffling drum pattern. As the chords all fall on the down-beat of their respective bars, the overall effect is quite 'block-like' and rigid. It also becomes easy to predict where each chord will fall.



> Let's make things less predictable by pushing the position of some chords. Even a push of 1/8th note either early or late can make a big difference and we're trying both approaches here, moving some chords before the down-beat and some after it. We're making the 'pushes' a little different second time around.



> This works well but the bass now sounds strange, as it continues to fall on the down-beat each time. By shifting the position of each note to match the pushed chords, things feel more complete. Pushing chords doesn't only work with downtempo music; try it with tracks operating at faster bpms too.

Work with film and other media

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The job of a soundtrack composer is, of course, to write music which responds to the action onscreen. So, while there's plenty of room for musical creativity in this role, it's equally true that there is a structure, a framework and a foundation for the music itself. Not only that but a soundtrack composer has to take key musical elements from the picture. If there's a scene set in the Middle East, or Paris, or Mexico, it's not unlikely that sounds from these regions will be incorporated into the mix. As a result, for soundtrack composers, no two projects will ever be quite alike and there's something for us all to learn from this when we're making music of our own.

It's a great idea, if you're struggling for new ideas, to bring a movie file into your project. Any screen capture software will allow you to grab a video from YouTube or Vimeo. Following the dynamic undulations of a film, making intuitive decisions about sounds you want to use and how you're going to build up and then decrease the sense of drama in your music will provide a framework for your work which will help get you up and running. When you have a track which is operating under its own steam, there's nothing to stop you abandoning the film itself and just concentrating on your production in its own right. But try to avoid doing this too soon, as the longer you work to picture, the more your ideas are likely to come from 'outside' your existing musical experience and you therefore produce something innovative and new.

> If you're struggling for new ideas, try bringing a movie file into your project

Film isn't the only 'external' media you might find inspiring. Have you ever tried writing a track in response to a photograph or a compelling novel? While this might seem unusual, it's actually no different to writing a track because you've been inspired by another piece of music. And it's far less likely that you'll be too directly inspired (and therefore wander into the murky world of pastiche and copying) if your source material is non-musical.

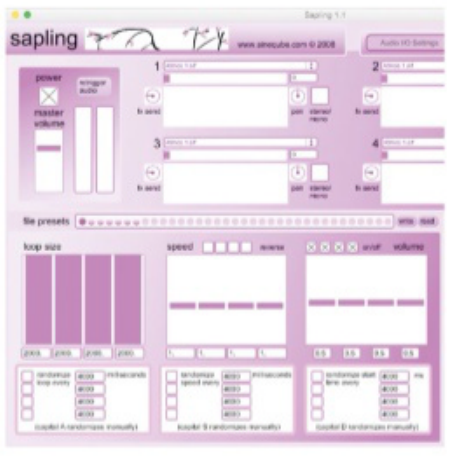
Another advantage of letting another media type influence your project is that you're likely to write 'less'. If you're working on a music project, the feeling that every single moment needs micro-managing and filling with content can often be overwhelming. Yet music's history is full of gaps, musical rests and pauses and moments where everything gets stripped right back to make the bigger moments seem even more dramatic. There's no light without shade, no loud without soft…

And there's another advantage… Some of the most interesting conversations you'll have about music will be with creative people who work in other media. Film makers, photographers, animators, even writers are all dabbling with the same concepts – how to tell a story, how to structure it, frame it, highlight it, soften it, darken it… all the things we musicians do with the music we write. Whereas the conversations you have with like-minded musicians will always be underpinned by a specific sense of technical and musical knowledge, working with creative types outside of music will force you to find other ways of expressing your interests and musical exploits. And in reaching for the right words, you'll think about what you do in a different way and that, in turn, will feed back into your music making. Plus, those conversations might lead to collaboration, another regular source

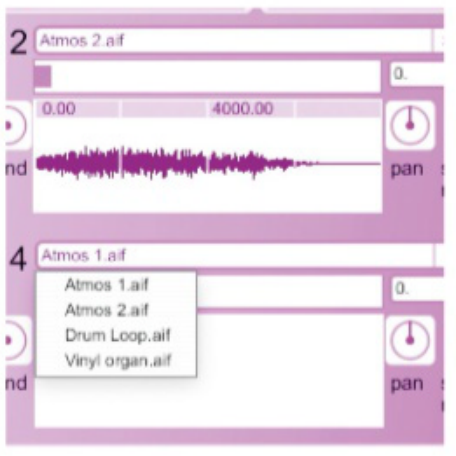
Embracing The Concept Of Random

There are lots of musical benefits to unexpected things happening during the production process. Here's just one approach to working with random

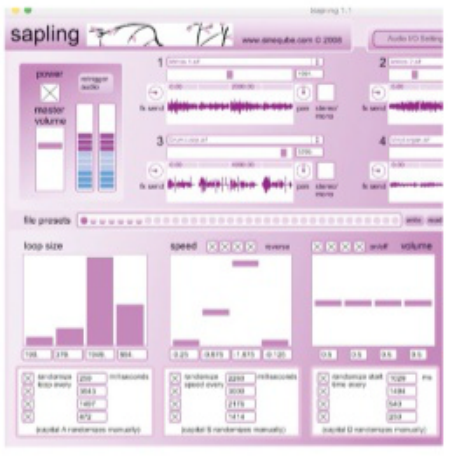
Sometimes, we just want something unexpected to happen. And it's not easy to manufacture such moments when we're sitting in a studio all by ourselves; how can we create the unknown when we're solely responsible for what happens in our tracks? One way is to engage with technology whose remit is to throw unpredictable ideas into the mix. NI's Reaktor is a good example, as is Cycling 74's Max/MSP. But if you're looking for a freeware alternative, we'd advocate Sapling. It's easy to use but its sounds are as unexpected as you could wish them to be and, in creating a texture, you might hit upon a sound or a loop or an idea which provokes another and another and another. You can do anything with the layers you create in programs like this – see them as 'whole tracks', or import their audio files into a bigger project.



Download Sineqube's Sapling. Prepare a folder of AIFF files of any audio you like. We suggest a minimum of four separate sounds as you can work with up to four sound sources at once. Drag and drop your folder of sounds onto the space in the top right-hand corner.



Use the drop-down menus for each sound slot (1-4) to assign one of these sounds to each number. Press the space bar to hear sound playback begin, looping around the entire duration of each file. Each sound slot provides an Aux send to the in-built reverb and a pan dial.



Check all boxes to Randomize Loop Size, Speed and Volume. Set a millisecond length for how often these parameters will change. Set an Audio record path in the bottom right, then click Start Recording. You'll have a ready-made soundscape to bounce other ideas off.

The Magic Of Pivot Chords

Stuck in a rut of reaching for the same chord progressions? With a little lateral thinking and some ‘pivot chords’, you can bust out of the norm

This chord progression couldn’t be more ‘standard’. It starts with a major chord (C), drops to A minor, drops again to F major and then resolves back to C. We’ve heard it a million times and it’s sounding a little tired. However, contained within each chord of this progression is the note ‘C’, as the root of the first chord, the third of the A minor and the fifth of the F chord. Let’s use this note as the key to unlocking a more interesting chord progression.

Let’s start by swapping the second chord for an A flat major. The notes contained within this chord are A flat, C and E flat, so we can use that C in the middle as a pivot – the continuation of that note should ensure that, while the chord move is a little more unusual, it doesn’t sound completely alien. So, compared to the original A minor, both the A and the E drop by a semitone to provide the A flat major chord.

The third chord is currently F major but we can add a slightly darker feel to the harmony by switching this to F minor. This gives us two notes to ‘pivot’ from; both the C and the A flat from the A flat major chord can stay this time, with only the top note needing to move up to F. This adds a greater sense of richness to the progression overall.

The fourth chord feels like it’s in a hurry to get us back to C major and it might be more interesting to give our chord progression more of a twist before heading back to the first chord. Let’s swap it for a C minor but one with an E flat in the bass, so that it doesn’t feel quite as ‘grounded’ as the previous chords. As it’ll still be a ‘version’ of a C chord, we can still use the note C as a pivot.

This creates a very different mood, partly because the chord is minor and partly because it’s not rooted in the same way now that it’s got the third of the chord at the bottom, rather than the root note. This is called a first inversion chord, as is any chord with the third at the bottom (major or minor). A chord with the fifth at the bottom is called a second inversion. You can hear the second inversion chord of C minor in the tutorial audio clip.

It often works well to underpin the central note of a pivot chord in your arrangement. Here we’ve added drums and bass to flesh things out a bit, but we’ve also added an electric guitar part which only plays the note C in octaves, while also adding another, more sustained electric guitar which swells up to each chord change. This also only plays C. Reinforcement of the pivot note helps to smooth out any ‘unusual’ chord moves and glues the harmony together.

REMIXING IN KEY

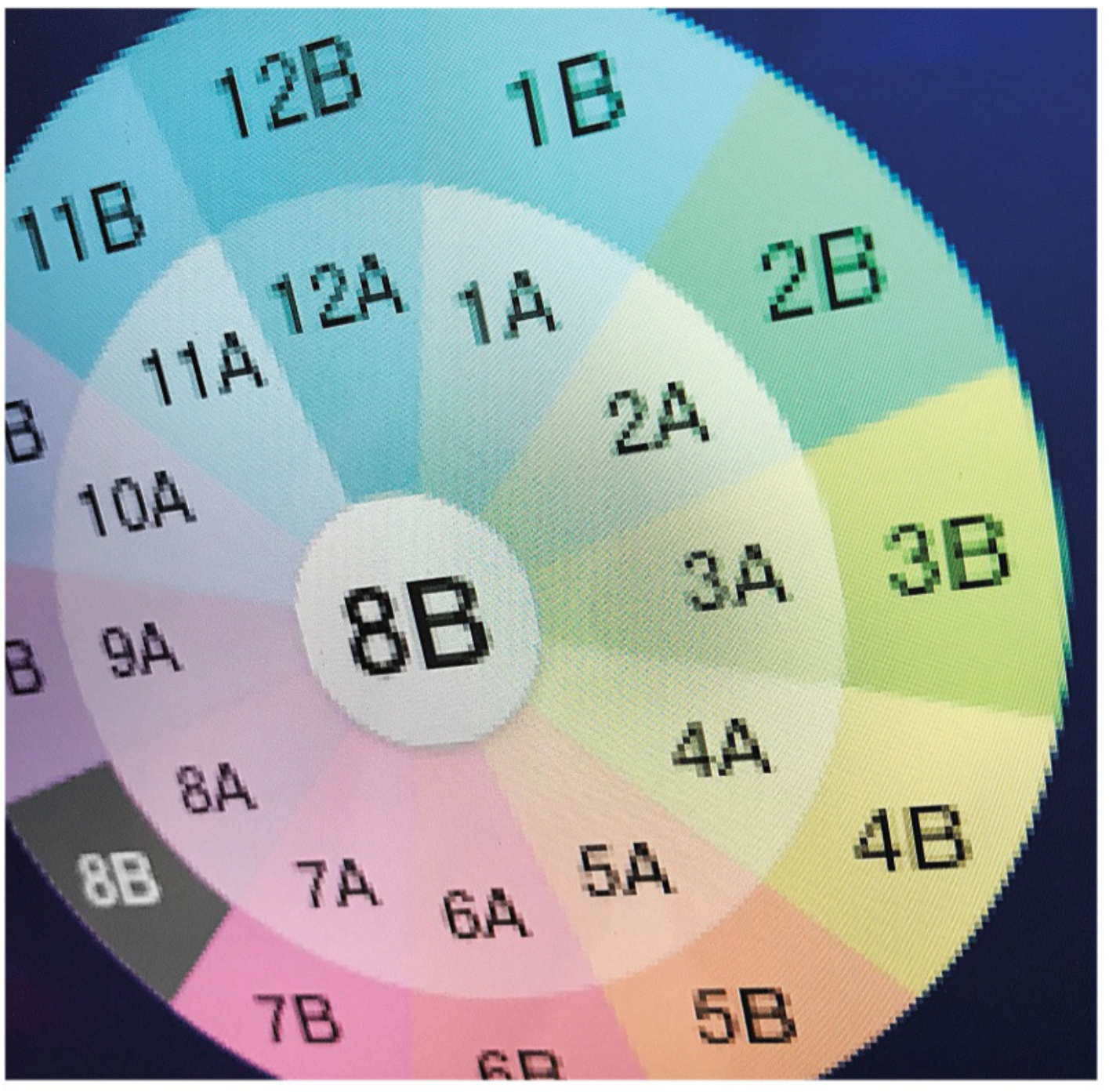
Musical key is a consideration for every remix. At the most basic level, it'll be needed to make sure that all the elements you add are in key with the elements you've brought over and the original track itself.

But music theory can come in very handy if you're going above and beyond the usual remit. Playing with the key signature of the original song and stamping a new one on your own version is an audacious thing to do, and if you don't do it right you can fail miserably.

If you're going to mess with the key of the track, you've got two options: the first is to manipulate pitches, transpose samples and force it into a completely new scale. Using modern tools like Melodyne, Auto-Tune or even quite basic DAW or sampler timestretching features, it's not exactly hard to make a remix conform to your designs by brute force. Transposing elements by several semitones or even whole octaves is certainly one way to make a statement.

The second option is to use a relative key. This is a more clever but quite technical way to do things, and it makes use of the original elements as they are, without the need to tweak any pitches. The relative minor key of C major, for example, is A minor. These two scales share the same notes, but the scales just start at different points. C major is C D E F G A B C, and A minor is A B C D E F G A. Thus, anything from C major will also sound good in A minor.

Every note played by all the elements of your track should fit into your destination key – take some time to work it out



You can take this concept even further. Analyse what notes the elements you're bringing over from the original song are made up of. Your selections may contain all seven from the original key, or may contain less. If they contain, say, five notes in total, your key can be any one that contains those five notes. Use a tool like a Scale Finder (bit.ly/ScaleFinder) to enter the notes you have at your disposal and identify the keys they can fit into. Search only 'normal' scales for the best and most logical results.

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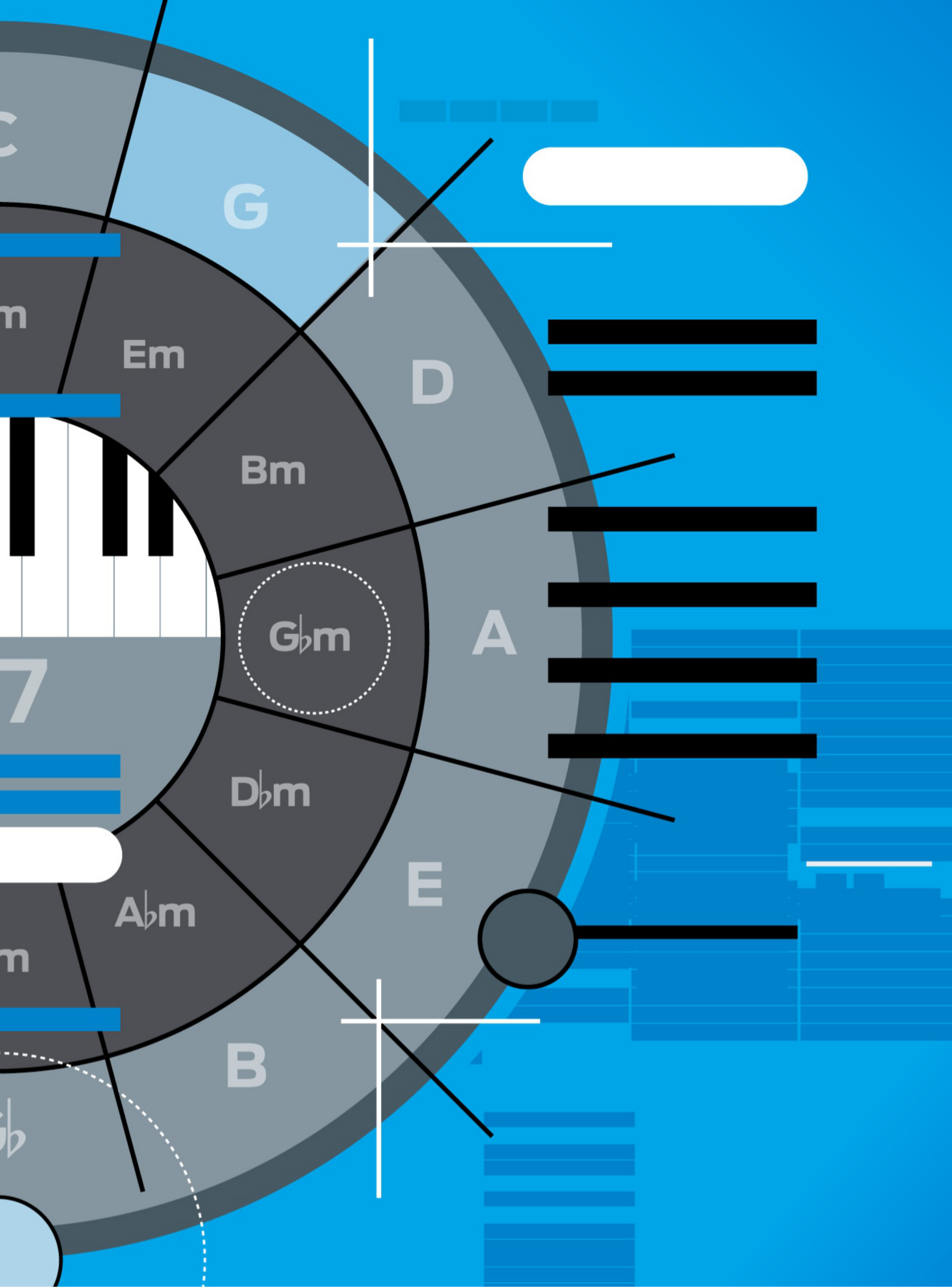
C
G
m
Em
D
Bm
G♭m
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B
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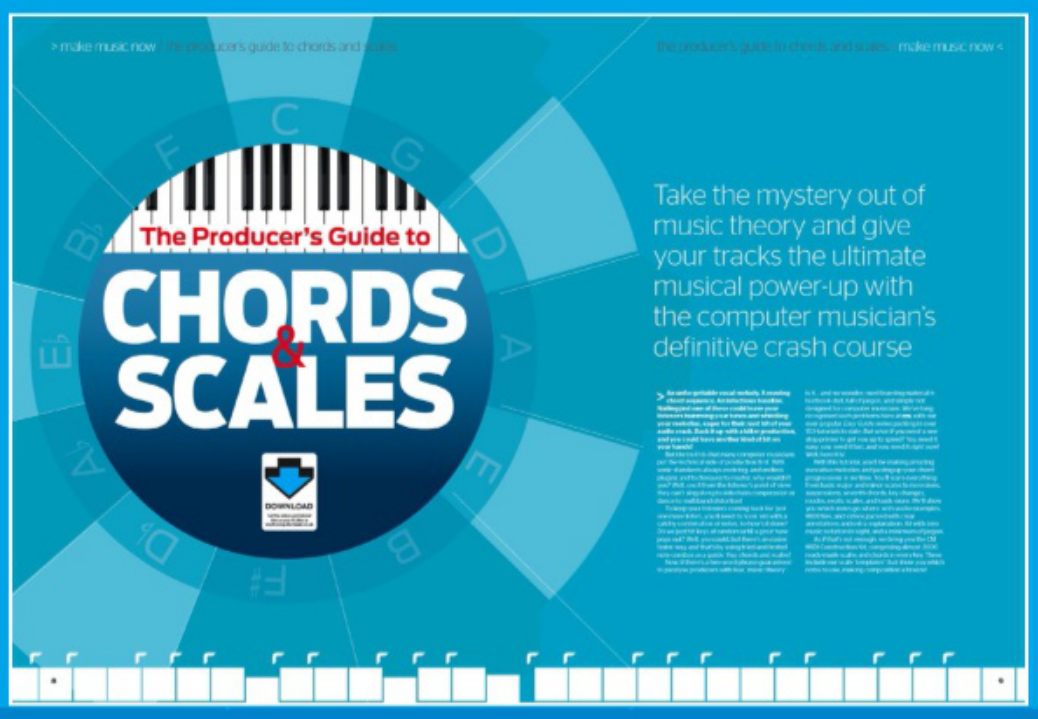
COMPUTER music Presents

The Producer's MUSIC THEORY Handbook

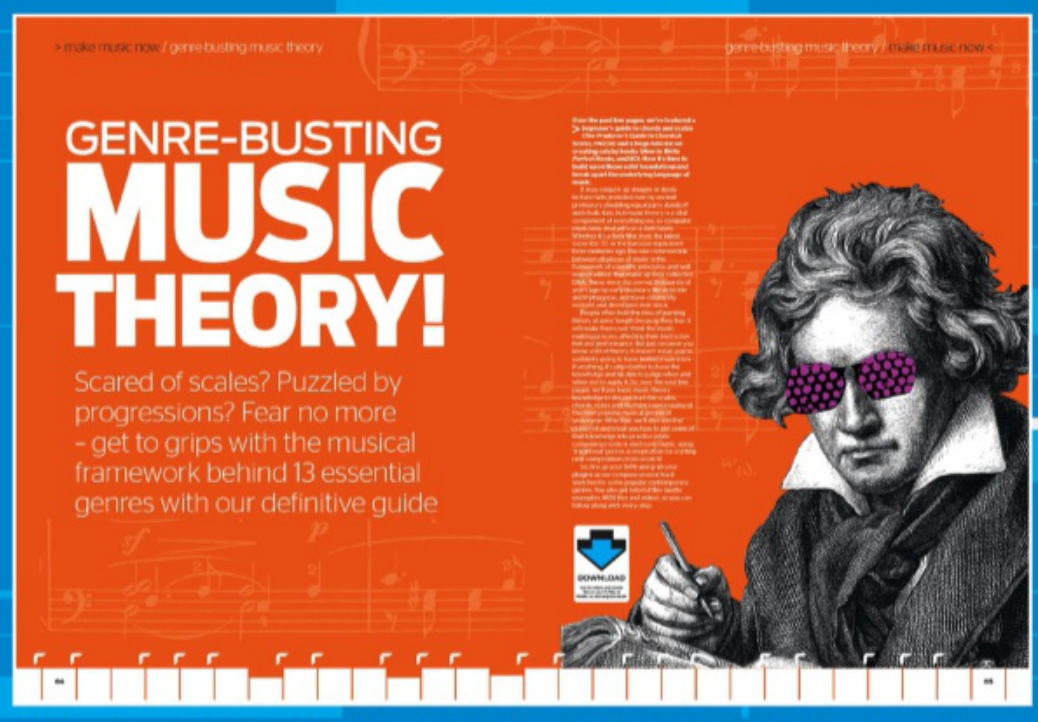
Power up your chord progressions, hooks, basslines and arrangements



> LEARN CHORDS AND SCALES

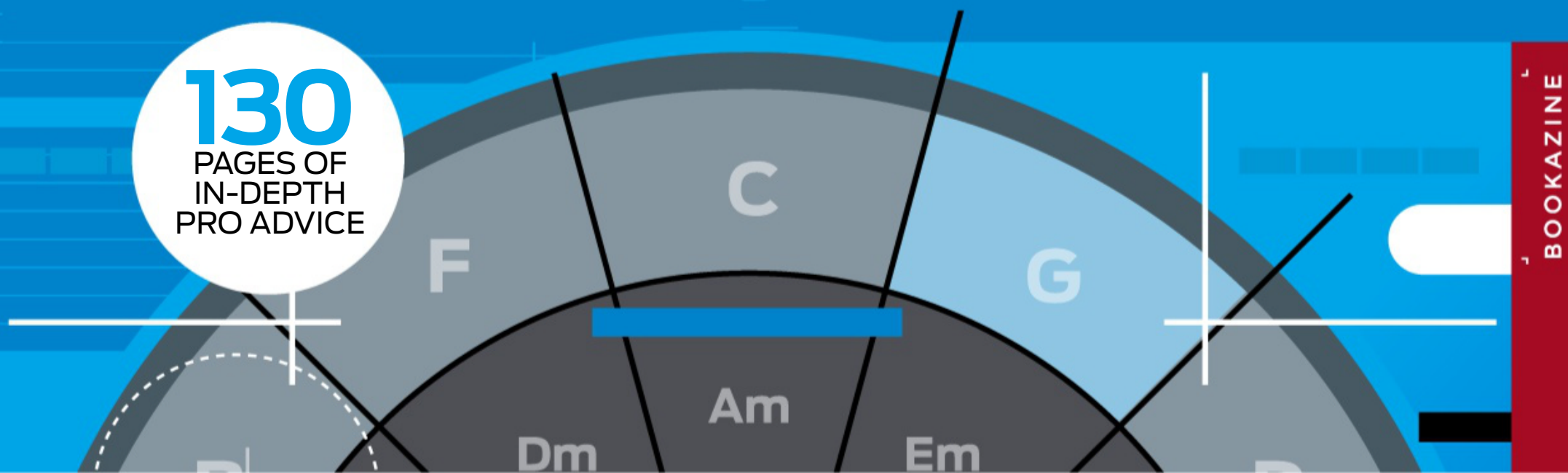
> WRITE CATCHY HOOKS

> PLAY KEYBOARD LIKE A PRO



> TEAR GENRES APART

130 PAGES OF IN-DEPTH PRO ADVICE



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