

Diminished seventh chords (4 note chords)

The **Diminished chord** has the spelling : root – minor 3rd – flat fifth. It is a triad (only three notes) along with major, minor and augmented chords.

The **Diminished 7th chord and the half diminished 7th chord** both have one note more than a diminished chord triad.

Diminished 7th chord = Diminished chord + major 6th note (also known enharmonically as the diminished seventh interval, hence the chord name)

Half diminished 7th chord = Diminished chord + minor 7th note

The diminished 7th chord

Diminished 7th chord has the spelling : root – minor 3rd – flat fifth – major 6th
7th chord usually implies the presence of the minor 7th interval.

E.g. minor 7th chord is a minor triad + the minor 7th note

The seventh chord or dominant seventh chord = major triad + minor 7th note

In the case of diminished 7th chord, we would expect adding a minor 7th to a diminished triad, but in reality it is a **diminished triad + major 6th note**.

The major 6th note is also called the diminished seventh. That is how we can justify the deviation from naming conventions.

Diminished seventh = diminished triad + major 6th note (also known as diminished seventh note)

Example: the D diminished 7th chord

Table shows the sequence of notes and associated table of intervals:

root	m2	M2	m3	M3	4	#4/b5	5	m6	M6	m7	M7	Root
D	D#	E	F	F#	G	G#	A	A#	B	C	C#	D

From the table we find out the note in the chord based on the interval formula: root - minor 3rd - flat fifth - major 6th

D half diminished seventh = D diminished triad + major 6th note (diminished seventh)

= (root - minor 3rd - flat fifth) + major 6th

= D F Ab B

D diminished seventh chord (root - minor 3rd - flat fifth - major 6th): **D F G# B**

Symbols for the diminished 7th chord

Ddim7 or **D°7** (D diminished 7th chord)

Remember this in contrast to D **dim** or **D°** - which refer to the D diminished chord (D F G#: only three notes, no diminished seventh / major 6th note).

Equal interval between each note

D diminished seventh chord has the notes **D F G# B**

The intervals between each note:

1. D and F: minor 3rd [D D# E F: root-minor2nd-major2nd-minor3rd]
2. F and G#: minor 3rd [F F# G G#: root-minor2nd-major2nd-minor3rd]
3. G# and B: minor 3rd [G# A A# B: root-minor2nd-major2nd-minor3rd]
4. B and D: minor 3rd (between diminished seventh note and the root/octave) [B C C# D: root-minor2nd-major2nd-minor3rd]

From each note of the diminished 7th chord till the next, is an interval of a minor 3rd.

That is, the notes of a diminished 7th chord divides the 12 notes between octaves, into 4 equal divisions of minor 3rd intervals.

This means the notes of any diminished 7th chord can form a diminished 7th chord starting from any of its notes as root.

Example: the 4 dim 7th chords from notes of Ddim7

Diminished 7th chord is a diminished 7th from **any of its notes**.

G# diminished 7th chord : G# B D F (root G# - minor 3rd - flat fifth - major6th)

B diminished 7th chord : B D F G# ((root B - minor 3rd - flat fifth - major6th))

D diminished 7th chord : D F G# B ((root D - minor 3rd - flat fifth - major6th))

F diminished 7th chord : F G# B D (root F - minor 3rd - flat fifth - major6th)

Diminished 7th chord as entry to 4 different roots

Since any diminished 7th chord's notes form 4 different diminished 7th chords when starting from each of the 4 notes as root, this makes the diminished 7th chord useful as a chord that opens harmonic possibilities to 4 different roots.

For example, let us find each of the diminished 7th chords when we take a root, each of the notes of the **G# diminished 7th chord : G# B D F**

Below table shows the 4 diminished 7th chords associated with G# diminished 7th chord. Along with each dim7th chord is written the 7th chord that sounds similar to it.

1 G# B D F

E7 : G# B D E

2 B D F G#

G7 : B D F G

3 D F G# B

A#7 : D F G# A#

4 F G# B D

C#7 : F G# B C#

Diminished 7th chord, similar 7th chord and use of tension

We see that each of the note grouping or rearranging of diminished 7th chord has 3 notes in common with a 7th chord.

Those three notes in the seventh chord gives it the tension to be used as a V7 chord before a I chord.

In fact just the third and seventh notes of a 7th chord are enough to create the tension. The 3rd and 7th notes of a dominant 7th chord form a tritone interval which is the reason for the unsettled feeling which asks for resolution.

Since the diminished 7th chord has the tension interval (tritone), similar to a 7th chord, we can use the diminished 7th chord as the V7 chord in a V7 to I motion. This V7 motion to the root is called the perfect cadence, the ultimate resolution in any kind of music.

Each of the four dim7 chords derived from the same diminished chord, can act as a V7 chord in 4 different V7 to I motions. Each of the V7 can resolve to 4 different chords hence acting as a door to 4 different roots.

Example: Here are the **4 different paths that G#dim7** can be an opening to, considering each of the 4 different dim7th and associated 7th chord that its notes can form:

1. E7 resolves to A minor or A major related chords. E is the fifth of A. G#dim7, which has 3 notes in common to E7, also resolves to Am or Amajor related chords and scales.
2. G7 resolves to chords based on the note C. G is the fifth of C. Bdim7 also resolves to C major and C minor related chords and scales.
3. A#7 resolves to D# based chords. A# is the fifth D#. Ddim7 resolves to D#major or Dminor chords and scales.
4. C#7 resolves to F# minor or F# major related chords. Fdim7 resolves to F#major and F# minor chords and scales.

The half diminished seventh

the **half-diminished seventh chord**, also known as a half-diminished chord or a **minor seventh flat five** ($m7b5$), is created by taking the root, minor third, diminished fifth and minor seventh (1, $b3$, $b5$ and $b7$).

Naming convention

Dominant seventh, minor 7th etc imply the addition of a minor 7th interval to a triad. (when a major 7th interval is added, it will be mentioned as major 7th in the chord name. e.g. minor major 7th chord, major 7th chord, major 7th flat five chord).

But in the case of diminished 7th chord, the interval added is a diminished seventh, a major 6th interval. This is not expected terminology.

Diminished triad + minor 7th gives us the half diminished seventh chord, not the diminished seventh chord.

The chord name **minor 7th flat five** is in fact the most accurate, clearly telling us what the elements of the chord are:

1. minor 7th chord: minor triad + minor 7th interval: root - minor 3rd - fifth - minor 7th
2. flatten the fifth of the minor 7th chord to get minor 7th flat five chord: root - minor 3rd - flat five - minor 7

So, remember that diminished seventh is actually

1. a diminished triad + major 6th note. (major 6th is also called diminished seventh, hence we can reason out the name of the chord.)
2. Another way of looking at diminished seventh chord: minor 6th chord with a flattened fifth.

Symbols

C half diminished 7th is usually written as: C° , $Cm7b5$, $C-7b5$, $Cm7(b5)$

\circ makes its appearance to represent the half diminished seventh chord. It looks similar to the greek character ϕ or Φ

Remember that C° represents the diminished seventh chord and a cut (slash) through the 'o' gives the half diminished seventh chord C°

Example: D half diminished 7th

Below table shows the sequence of notes starting from D and the corresponding interval names.

root	m2	M2	m3	M3	4	#4 / b5	5	m 6	M 6	m 7	M 7	root
D	D#	E	F	F#	G	G# / Ab	A	A#	B	C	C#	D

D half diminished seventh = D diminished triad + minor 7th

= (root - minor 3rd - flat fifth) + minor 7th note

= **D F Ab C**

OR

Minor 7th chord to half diminished 7th

Easiest way to remember or play the half diminished chord would be to remember it as a minor 7th chord with a flattened fifth.

Minor 7th chords are used much, maybe more than diminished triads. So, when you have to play or find the notes of a half diminished seventh chord:

1. find the minor 7th chord
2. find the fifth note
3. flatten the fifth note.

e.g. D half diminished seventh is same as D minor 7th flat five, which is a **D minor 7th chord with a flattened fifth note.**

D minor 7th = D minor triad + minor 7th note
= (D F A) + C

Flatten the fifth note (A) of the D minor 7th to get:

Dm7b5 = D F Ab C

Half diminished seventh and diminished seventh comparison

Diminished chord to minor 6th chord

Diminished seventh: root - minor third - flat fifth - major 6th

If we change the flat fifth to a fifth: root- minor third - fifth - major 6th.

This is a minor 6th chord. Minor chord + the major 6th note.

Diminished 7th chord can be remembered as the minor 6th chord with a flat fifth. And minor 6th as a diminished 7th chord with a fifth instead of a flat fifth

Half diminished to minor 7th

Half diminished seventh: root - minor third - flat fifth - minor 7th

Change the flat fifth to a fifth to get: root- minor third - fifth - minor seventh.

This is a minor 7th chord: Minor chord (root - minor 3rd - fifth) + minor 7th note

Half diminished is a minor 7th chord with the fifth flattened, as its accurate name

Minor 7th flat five says. To get a minor 7th chord from half diminished seventh, just make the flat fifth note a fifth.

Repetition, perspective, relations

Repeating the relations between chords, from different possible angles lets us remember the chords in context and in relation with each other. Underneath the chord names, the elements which they are made of all come from the same family of intervals.