



String Fingering Diagrams

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Abstract

This document contains a set of string instrument fingering diagrams that may be used for checking multiple stops and combinations with natural harmonics. Diagrams (fitting on a A4 size page) are provided for violin, viola, cello double bass and guitars.

1 Guidelines for the use of the fingering diagrams

The diagrams in the following sections show the *fingerboards* of the most frequently used *string instruments*: violin, viola, cello, double bass and guitar. The positions on the string for each note in the *chromatic scale* are shown, starting from the open string at the top to the 2nd octave (24 chromatic steps) above the open string at the bottom. Positions are shown to scale and have been calculated using *equal temperament tuning*.

Note numbers have been indicated on the left at the positions of the *natural harmonics*. Note names are shown at these positions on each string. Use Table 1 to find out the equivalent sounding note at each harmonic.

Table 1: String instruments: natural harmonics.

Position number on the string	Interval above open string	Harmonic number	Will sound as interval above fundamental
4	major 3rd	5	2 octaves plus major 3rd
5	perfect 4th	4	2 octaves
7	perfect 5th	3	1 octave plus perfect 5th
9	major 6th	5	2 octaves plus major 3rd
12	1 octave	2	1 octave
16	1 octave plus major 3rd	5	2 octaves plus major 3rd
19	1 octave plus perfect 5th	3	1 octave plus perfect 5th
24	2 octaves	4	2 octaves

I use the diagrams at the end of this document when writing *double stops*, *multiple stops* or combinations of these with *natural harmonics* for string instruments. Textbooks will give tables with multiple stops for strings or show them as musical notation (on the staff); however, these mostly show only a subset and they obviously do not consider the ease of playing when they occur in the middle of a phrase. In the case of the guitar, there are many fretboard diagram books on the market, but they all use the assumption that the chord structures are based on the basic interval of the third (the triad is a combination



of two 3rds, the 7th chord a combination of three 3rds, etc.); for other multiple stops (such as chords in 4ths or tone sets in atonal music) these fretboard diagrams become almost useless.

Therefore, I like to get a feel for the complexity of my writing by checking the physical position of the fingers on the fingerboard. I put a hardcopy of the diagrams on my desk and take a set of game tokens (board game pawns will do perfectly), one for each finger. I will move these tokens along the diagrams as I check the score or part. Of course, consulting a string specialist on your fingering is better, but this is a great first order check. Feel free to use these tools, if you agree with me!

2 The String Quartet

Figure 1 shows the fingerboard of the individual instruments from the String Quartet: Violin 1, Violin 2, Viola and Cello. Finger positions are shown as black circles, positions of the natural harmonics as open circles. The wide gray bar indicates the normal hand span, the narrow gray bar shows the extended hand span.

3 The Double Bass

Figure 2.a shows the fingerboard of the double bass. This becomes relevant when writing for string orchestra or for the full string section of a (symphony) orchestra. Although double stops are most infrequent for this instrument, you may use this diagram to check a complex sequence (alternate normal tones with harmonics) in your music.

4 The Guitar

Figure 2.b shows the fingerboard of the six string fretted guitar in standard tuning. Fret positions are indicated.

5 Further reading

In the reference list you will find a number of textbooks for further reading about string playing and fingering problems: [1, 2, 5, 6] present a general introduction into orchestral strings, [4, 8] contain instrument playing method and [3, 7] are great for guitar lookup material. Modern string playing aspects are discussed extensively in [9].

References

- [1] Samuel Adler, *The Study of Orchestration, 2nd Edition*, W.W. Norton and Company, New York, ISBN 0-393-95807-8, 1989.
- [2] Alfred Blatter, *Instrumentation and Orchestration, 2nd Edition*, Wadsworth/Thomson Learning, Schirmer, Belmont CA, ISBN 0-00-02-82-864570-70-7, 1997.
- [3] Ralph Denyer, *The Guitar Handbook*, Dorling Kindersley Ltd./Pan Books, London, 1982.
- [4] Carl Flesch, *Die Kunst des Violinspiels, 1. band: Allgemeine und angewandte Technik*, Ries & erler, Berlin, ISMN M-013-0006-7, 1978.



- [5] Cecil Forsyth, *Orchestration*, Dover Publications, Inc., New York, ISBN 0-486-24383-4, 1982.
- [6] Kent Kennan, Donald Grantham, *The Technique of Orchestration, 5th Edition*, Prentice-Hall Inc., Upper Saddle River, NJ, ISBN 0-13-466327-6, 1997.
- [7] Jürgen Kumlehn, *Die AMA Gitarrengriffabelle*, AMA GmbH Verlag, Brühl, ISBN 3-927190-06-3, 1995.
- [8] F.A. Kummer, *Violoncello-Schule*, Ed. Hugo Becker, Edition Peters Nr. 3247, Edition Peters, Frankfurt.
- [9] Patricia Strange and Allen Strange, *The Contemporary Violin, Extended Performance Techniques*, University of California Press, Ltd., Berkeley, CA, ISBN 0-520-22409-4, 2001.

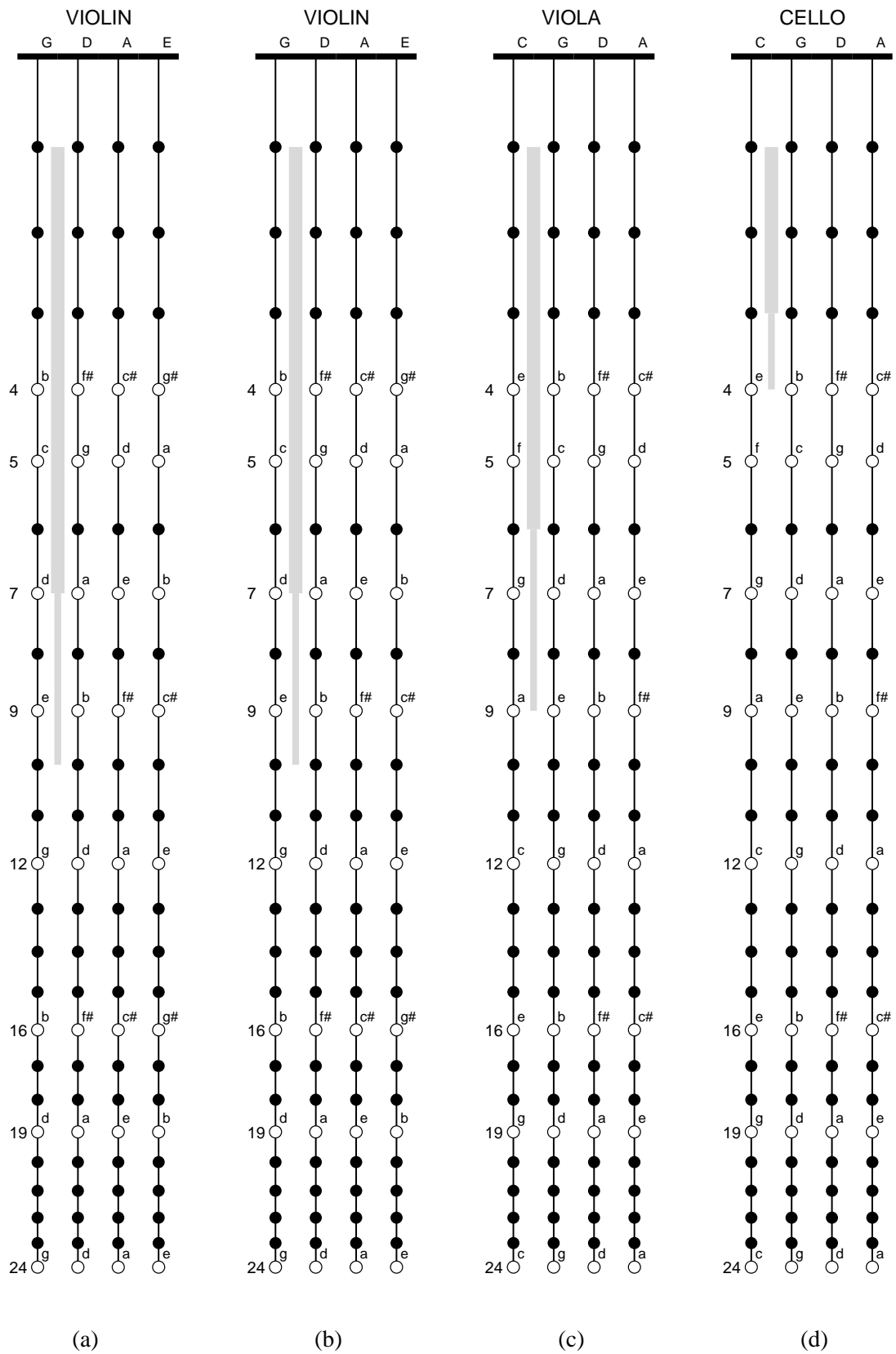


Figure 1: String Quartet fingerboard diagrams. (a): Violin 1, (b): Violin 2, (c): Viola, (d): Cello.

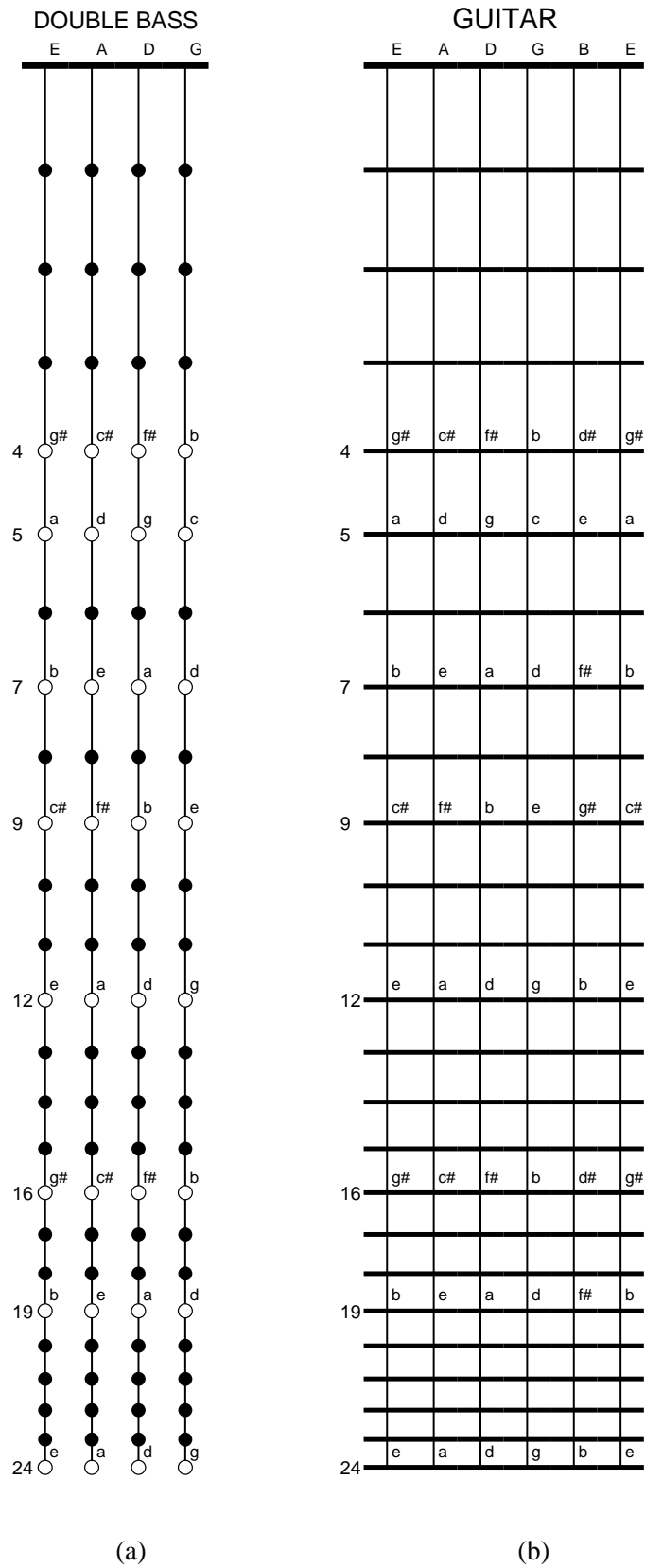


Figure 2: String instruments fingerboard diagrams. (a): Double Bass, (b): Guitar.