The Nashville Number System is a way to write chord charts using numbers instead of chord letters. The chart can be played in any key without having to rewrite the chart because the numbers remain the same regardless of the key you're playing in. It's a real time saver. Say for instance you wrote a song in the key of G, and the chord progressions goes something like this:

G B C G

Here's the Nashville Number System version:

1 3 4 1

Let's say the song is too high for the singer. Just lower the song to the key of E. Instead of having to rewrite the entire chart from scratch, you use the same exact chart. In whatever key you play it in, the chart is still: 1341. Pretty cool, hey?

It's all based on the major scale, you know, DO-RE-MI-FA-SO-LA-TE-DO. In the key of C, which has no sharps or flats, the letters would be: C-D-E-F-G-A-B-C. Again, in the key of C, it would be written in numbers, 1-2-3-4-5-6-7-1. Notice that it doesn't keep going up to 8, but back to 1. That's because even though the note sounds higher, it's still a C note, just a higher version of it. It's an octave of the lower C on number 1. So, if you can count to seven, and memorize the major scale in every key, you can do the Nashville Number System.

The number system is a great means of communication in the studio. It allows everyone to stay pretty much on the same page, as it were. The charts can be as simple or as complex as you like. Obviously the simpler and clearer the chart is, the easier it will be to read and follow along.

Although there's no one single way to write a numbers chart, the ultimate goal is clarity.
You wouldn't want to write a chart with so much information that it's difficult to read.
In fact, good musicians can usually figure out where the song is going. Just make it a good road map. You can add arrangement information and basic chord definitions, such as the following, where it's designated who takes the "fills":

1 3 4 1 : fiddle

1 3 4 5 : fiddle

4 3- 2- 1 : steel

4 5 1 1 : piano

In the previous example, the fiddle takes the fills on the first eight bars, then the next four are taken by the steel guitar, then the last four are taken by the piano. It's important to know who's playing the fills, so that you don't have everyone playing over each other. Of course, you can add codas, double bar repeats, diamonds, retards, signals for louder or softer sections, etc. Use any of the traditional tools of written music, but instead of having to read "fly paper" (or full) charts, you have a simple easy map to follow.