

Recommended Practice (RP-036)

Default Pan Formula

Over the course of the development of MIDI, different manufacturers have implemented their own responses to CC#10. In addition, various AMEI/MMA Specification (such as GM2 and DLS2) have recommended response curves that are not all the same. The different pan curves produce an equal power distribution between the left and right channels, but in some cases, a true center could not be achieved by following the recommended equation directly.

The formula in this RP does achieve a true center and uses an equal power distribution, which is desirable.

Details:

The default desired synthesizer response to CC#10 – Pan for AMEI/MMA specifications shall be as follows, and shall override all previous recommended practices, including, but not limited to, GM1, GM2, DLS1, and DLS2.

[CC#10: Pan]

Default Value: 64 (40H)

[Note] 64 (40H) is Center.

Sets the stereo position for notes of the specified channel. This message causes subsequent notes on that channel to be positioned anywhere in the stereo field from hard left (value 0,1) to hard right (value 127). It is not necessary to pan a note that is currently sounding. However, if a currently sounding note is panned, the panning shall be done without audible artifacts, clicks or "zipper" noise.

[Note] Since MIDI controller values range from 0 to 127, the exact center of the range, 63.5, cannot be represented. Therefore, the effective range for CC#10 is modified to be 1 to 127, and values 0 and 1 both pan hard left. The recommended method is to subtract 1 from the value of CC#10, and saturate the result to be non-negative.

The following formulas are recommended:

Left Channel Gain [dB] = $20 \cdot \log (\cos (\pi / 2 \cdot \max (0, \text{CC\#10} - 1) / 126))$

Right Channel Gain [dB] = $20 \cdot \log (\sin (\pi / 2 \cdot \max (0, \text{CC\#10} - 1) / 126))$

The General MIDI 2 Specification (RP-024) is amended by this RP.

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