

Streaming Mode Programming – Motivation and Intended Use

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This Proposal is a result of problems I encountered while working on the development of a new MERG mobile decoder (yet to be released). This decoder model has all the capabilities of older models, and the ability to play sound. Moreover, it supports recordable sound.

I was looking for a way to upload sound data via the rails, which would be completed in a reasonable time period. Current DCC protocol does not allow batching of data, has limitations on the packet size and a great deal of overhead, and involves programming a single byte of data (CV) per packet at a rate which is roughly equivalent to 5 KBPS. It is not practical when a large volume of data is involved.

From its initiation, the streaming protocol in this proposal was designed to closely follow widely available industry standards from related disciplines. I found publicly available samples of code for a bootloader which can be embedded in decoders for this purpose. RS-232 was chosen since many DCC decoders have built-in USART devices that can be easily programmed to work with that protocol.

Intel Hex format was chosen since it is widely used in programming memory devices, is ASCII compliant, portable and can be easily prepared and ported among environments and over the web. It eliminates the need for special packet headers and synchronization (a preamble in DCC case) which are required if using a pure binary protocol. In order to prevent problems during the streaming process, and establish constraints on the environment, this proposal specifies the use of a programming track, which is reasonable considering the time involved in large data uploads.

I have discovered many more potential uses for Streaming data into a decoder. One example is upgrades and software patches for the decoder firmware. Another is fast batch-programming of a large number of CVs (it typically takes one streaming packet to program an entire speed table, vs. as many packets as there are CVs if CV access instructions are used).

Following one of the principal drivers of the DCC initiative, that of interoperability of equipment, standardization of the download process would allow modelers to use any combination of command station/ decoder which are compliant with this proposal to perform an upload. The only requirement is that the data file which is being used is compatible with the specific decoder. This file is typically provided by the manufacturer or via the web.

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