MIDI Output in Dplug

State of the feature?
How it works?

Meeting
Feb 8th 2022

TL;DR New kinds of effects now possible in Dplug v12.4.1+

- Plug-ins that output MIDI from nothing (eg: arpeggiators)

- Plug-ins that filter MIDI messages (eg: note filter)

- Synthesizers/effects that can also output MIDI, either from UI or from audio thread.

CAUTION: This is a work in progress!

The features

- Send MIDI from UI or DSP

- MIDI 1.0 **Note On** and **Note Off** are the only messages supported for every format (no CC in AAX).

- AUv2 not done yet, macOS not tested yet, multiple channels not tested yet.

More details in Dplug Issue #577.

The API = send MIDI from UI or DSP

1. **Send a MIDI message from `processAudio`**

```
void sendMIDIMessage(MidiMessage message);
```

The message's `offset` field refers to the current sub-buffer (0 = first sample of sub-buffer) .

2. **Send MIDI messages from the UI**
(typically, on mouse events)

```
void sendMIDIMessagesFromUI(const(MidiMessage)[] messages);
```

- *guaranteed to preserve their relative offset*
- *but no guarantee of when exactly they will be sent ("ASAP")*

Making the MIDI out API nice

A. **Order of messages is irrelevant**
   - Messages are sorted by increasing `offset`
     - unless their offset is the same, in which case you need to order them.

B. **You can send messages arbitrarily in the future.**
   - with an `offset` that is larger than the current buffer
   - send whole patterns

C. **Works with buffer-splitting**

   If you want more precise MIDI handling, you can just lower your `maxFramesInProcess()`.

The Problem

MIDI effects aren't super compatible across hosts.

But... what exactly is a "MIDI effect" anyway?

Making the MIDI out API compatible

A. In `plugin.json` "`receivesMIDI`" MUST be `true`

- MUST call `getNextMidiMessages(int frames)`

B. In `plugin.json` "`sendsMIDI`" MUST be `true` (obviously)

C. MUST take audio input and output and bypass it.

D. (optional) can eventually produce sound to debug output MIDI.

- *Xfer Records's Chtulhu does this, best for the user.At this points, it is almost a normal synthesizer ^^*

  => **Let's just do like popular MIDI effects** that actually works in hosts in the wild.

Limitation because of that compatibility work

In Live and Studio One, must use a separate track for the MIDI effect, and send to another track.

(Thankfully many video tutorials exist for other MIDI effects + hosts that don't support that).

Some hosts support MIDI effects particularly well. (Bitwig, REAPER).

Demo time!

Meet Arpejoe, a Dplug example plugin that demonstrates MIDI output.

Thank you

Questions?