

# Send MIDI Data via RS-232

## Overview

Most MIDI messages are sequences of 2-3 8-bit bytes. The largest hurdle when integrating the DecaBox with Crestron / AMX / Control4 equipment is properly formatting these messages. An excellent, detailed description of their syntax can be found here:

- <https://www.midi.org/specifications/item/table-1-summary-of-midi-message>
- <https://www.midi.org/specifications-old/item/table-3-control-change-messages-data-bytes-2>

In our documentation, we use this format to describe raw byte data: `$AA $BB $CC`. The \$ sign signifies hexadecimal values, which means that AA, BB, etc are in the range [00 FF] hex, which maps to [0 255] decimal. Spaces are inserted between bytes in this documentation merely for convenience in reading.

MIDI messages are zero based and *generally* bytes 2 and 3 have a maximum value of \$7F, or 127 decimal. A simple online decimal <-> hex converter can be found at

<https://www.binaryhexconverter.com/decimal-to-hex-converter>

Here are sample MIDI messages:

```
$90 $01 $7F    Note on, MIDI channel 1, note #2, full velocity $8F $07 $40    Note off, MIDI
channel 16, note #8, 50% velocity $B1 $03 $10    MIDI CC #4 (foot controller), ~30% intensity,
MIDI channel 2
$F0 $01 $02 $03 $04 $05 $06 $F7    A short MIDI sysex message. These are framed by [F0 F7] always.
```

(The MIDI channel is the lower nibble of the first byte. That is, \$BX means MIDI CC message and X can vary between [\$0 \$F]. Hex \$0 means MIDI channel 1, \$1 means MIDI channel 2, etc. \$F is channel 16.)

```
\xF0\x01\x02\x03\x04\x05\x06\xF7
```

# Sending MIDI to Data to the Decabox

Once the 2-3 byte MIDI messages have been correctly formatted, the next step is to send them to the DecaBox. That syntax looks like this:

```
M $AA $BB $CC...$FF[cr]
```

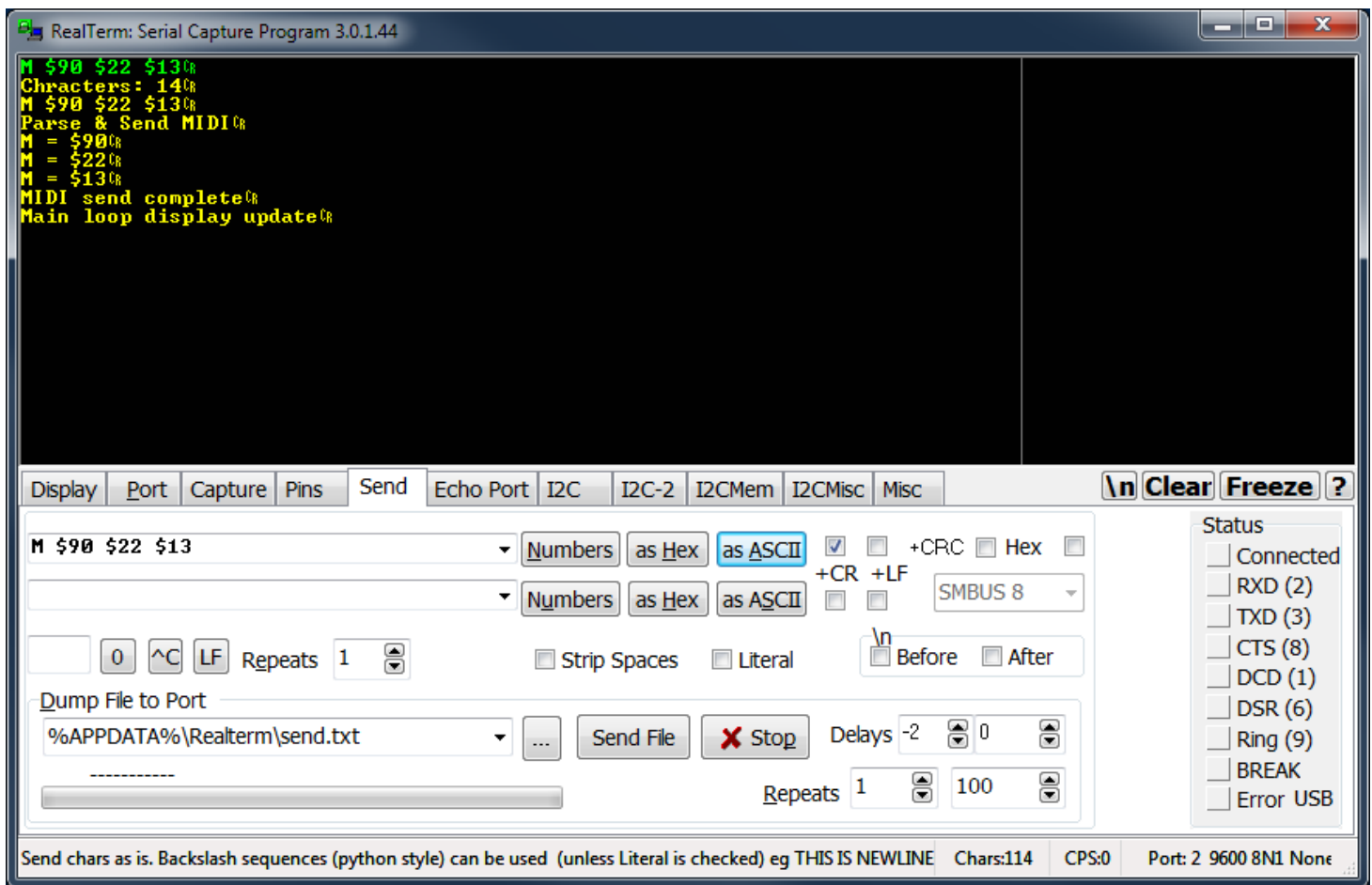
- The command starts with a capital M.
- It is followed by single space character ' '.- Then hex values written as strings in ASCII format.
- Command terminates with a carriage return.

Examples, using the same commands listed above:

```
M $90 $01 $7F[cr]    Note on, MIDI channel 1, note #2, full velocity M $8F $07 $40[cr]    Note off, MIDI channel 16, note #8, 50% velocityM $B1 $03 $10[cr]    MIDI CC #4 (foot controller), ~30% intensity, MIDI channel 2M $F0 $01 $02 $03 $04 $05 $06 $F7[cr]    A short MIDI sysex message. These are framed by [F0 F7] always.
```

Each of these commands are sent as ASCII STRINGS, whose length varies between 13 and ~30 characters.

Screenshot. Green is text sent to the box, yellow are replies.



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