# DREAM DSP Designer – MIDI messages

## 7bit Control NRPN Message (Host -> SAM5000)

NRPN sending method:
CTRL#99=NRPN high byte, CTRL#98=NRPN low byte, CTRL#6=NRPN value

*Example:*
*In order to send NRPN 3707h with 7bit value 64 (40h), send*
- ➢ *CTRL#99=56 (37h)  (MIDI code: B0h 63h 37h)*
- ➢ *CTRL#98=07 (07h)  (MIDI code: B0h 62h 07h)*
- ➢ *CTRL#6 =64  (40h)  (MIDI code: B0h 06h 40h)*

## 14bit Control NRPN Message (Host -> SAM5000)

Additionally to described 7bit Control NRPN Message the CTRL#38 is used to send the low significant value byte.
The 14bit NRPN value is subdivided to the NRPN MSB/LSB bytes (7 bit MIDI data bytes) as follows:

14bit data value = (NRPN MSB << 7) + NRPN LSB

*Example:*
*In order to send NRPN 0567h with value 1234h, send*
- ➢ *CTRL#99=05h  (MIDI code: B0h 63h 05h)*
- ➢ *CTRL#98=67h  (MIDI code: B0h 62h 67h)*
- ➢ *CTRL#38=34h  (MIDI code: B0h 26h 34h)*
- ➢ *CTRL#6 = 24h  (MIDI code: B0h 06h 24h)*

Be aware that the LSB (CTRL#38) should be sent first, the parameter change will be processed on MSB (CTRL#6).
Also be aware that the 14bit NRPN value is shifted 1bit left for building the 15bit parameter value going to the DSP:
➔ The 14bit NRPN value 0x1234 will be transferred as 15bit parameter value 0x2468 to the DSP

## 28bit Control Sys-Ex Message (Host -> SAM5000)

| Values | Size in bytes | Description |
|---|---|---|
| F0h | 1 | SysEx Start |
| 00h 20h 00h | 3 | DREAM S.A.S Manufacturer ID |
| 3Dh | 1 | Command ID |
| MIDI CHN | 1 | MIDI channel |
| NRPN Hi | 1 | NRPN Hi |
| NRPN Lo | 1 | NRPN Lo |
| DataCount | 1 | Number of data byte count (e.g. =4 -> 4x 7bit = 28bit data precision) |
| Data | DataCount | data value, data send in big endian format (MSB first) |
| F7h | 1 | SysEx End |

The 28bit value in the SysEx message is subdivided in 4 bytes (7 bit MIDI data bytes) as follows:

AA [00..7Fh], BB [00..7Fh], CC [0..7Fh], DD [0..7Fh]
28bit data value = (AA << 21) + (BB << 14) + (CC << 7) + DD

## Peak-Level Reply Sys-Ex Message (SAM5000 -> Host)

| Values | Size in bytes | Description |
|---|---|---|
| F0h | 1 | SysEx Start |
| 00h 20h 00h | 3 | DREAM S.A.S Manufacturer ID |
| ID | 1 | Command ID: copy of NRPN Peak Request value |
| Peak value | 1 | 0=-infinite, 1=-63dB, 2=-62dB … 3Fh=-1dB, 40h=0dB … 46h=+6dB (1dB steps) |
| F7h | 1 | SysEx End |