Crumar Bit One CC information   R. Grieb  May 8, 2020  (numbers are decimal, except where noted)

Note: CC's are only accepted when the Bit One is in Lower, Edit (Address) mode.


| Function | CC #<br>Dec/Hex | Parm # | Value Interpretation (range used is always 0-127) |
|---|---|---|---|
| DCO1 Octave | 14/0E | 23-26 | 0-31: 32', 32-63: 16', 64-95: 8', 96-127: 4' |
| DCO1 Freq offset | 15/0F | 31 | 0-127: Maps to 0-11 |
| DCO1 Tri Wave | 16/10 | 27 | 0-63: Disable, 64-127 Enable |
| DCO1 Saw Wave | 17/11 | 28 | 0-63: Disable, 64-127 Enable |
| DCO1 Pulse Wave | 18/12 | 29 | 0-63: Disable, 64-127 Enable |
| DCO1 Pulse Width | 19/13 | 32 | 0-127: Maps to 0-30 |
| DCO1 Dyn PW | 20/14 | 33 | 0-127 |
| | | | |
| DCO2 Octave | 21/15 | 34-37 | 0-31: 32', 32-63: 16', 64-95: 8', 96-127: 4' |
| DCO2 Freq offset | 22/16 | 42 | 0-127: Maps to 0-11 |
| DCO2 Tri Wave | 23/17 | 38 | 0-63: Disable, 64-127 Enable |
| DCO2 Saw Wave | 24/18 | 39 | 0-63: Disable, 64-127 Enable |
| DCO2 Pulse Wave | 25/19 | 40 | 0-63: Disable, 64-127 Enable |
| DCO2 Pulse Width | 26/1A | 43 | 0-127: Maps to 0-30 |
| DCO2 Dyn PW | 27/1B | 44 | 0-127 |
| | | | |
| DCO1 ADSR | 28/1C | 30 | 0-63: Off, 64-127 On |
| DCO2 ADSR | 29/1D | 41 | 0-63: Off, 64-127 On |
| | | | |
| VCF Attack | 30/1E | 12 | 0-127 |
| VCF Dyn Attack | 31/1F | 17 | 0-127 |
| VCF Decay | 32/20 | 13 | 0-127 |
| VCF Sustain | 33/21 | 14 | 0-127 |
| VCF Release | 34/22 | 15 | 0-127 |
| VCF Env Amt | 35/23 | 20 | 0-127 |
| VCF Dyn Env Amt | 36/24 | 21 | 0-127 |
| VCF Env Polarity | 37/25 | 22 | 0-63: Positive, 64-127: Negative |
| VCF Key tracking | 38/26 | 16 | 0-127 |
| | | | |
| VCA Dyn Attack | 39/27 | 45 | 0-127 |
| VCA Decay | 40/28 | 48 | 0-127 |
| VCA Sustain | 41/29 | 49 | 0-127 |
| VCA Dyn Env Amt | 42/2A | 46 | 0-127 |
| | | | |
| LFO1 mods DCO1 | 43/2B | 4 | 0-63: Off, 64-127 On |
| LFO1 mods DCO2 | 44/2C | 5 | 0-63: Off, 64-127 On |
| LFO1 mods VCF | 45/2D | 6 | 0-63: Off, 64-127 On |
| LFO1 mods VCA | 46/2E | 7 | 0-63: Off, 64-127 On |
| LFO1 waveform | 47/2F | 1-3 | 0-31: Off ,32-63:Tri,64-95:UpSaw,96-127:Square<br>Note: Turning waveform off also clears destinations<br>Clearing all of the dest bits will also disable it. |
| LFO1 rate | 48/30 | 10 | 0-127 |
| LFO1 dynamic rate | 49/31 | 11 | 0-127 |
| LFO1 delay | 50/32 | 9 | 0-127 |
| LFO1 depth | 51/33 | 8 | 0-127 |
| | | | |
| LFO2 mods DCO1 | 52/34 | 54 | 0-63: Off, 64-127 On |

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LFO2 mods DCO2        53/35      55            0-63: Off, 64-127 On
LFO2 mods VCF         54/36      56            0-63: Off, 64-127 On
LFO2 mods VCA         55/37      57            0-63: Off, 64-127 On
LFO2 waveform         56/38      51-53         0-31: Off ,32-63:Tri,64-95:DnSaw,96-127:Square
                                               Note: Turning waveform off also clears destinations
                                               Clearing all of the dest bits will also disable it.
LFO2 rate             57/39      60            0-127
LFO2 dynamic rate     58/3A      61            0-127
LFO2 delay            59/3B      59            0-127
LFO2 depth            60/3C      58            0-127


Sustain               64/40                    0-127 Sustain pedal, handled by original Bit01 code


VCF Resonance         71/47      19            0-127
VCA Release           72/48      50            0-127
VCA Attack            73/49      47            0-127
VCF Cutoff            74/4A      18            0-127


All notes off         123/7B                   Value not used, handled by original Bit01 code


Decimal      Hex Equivalent
00                00
32                20
64                40
96                60
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CC's are only enabled in Lower, Address (Edit) mode.

Note: To edit a parameter with the +/- buttons, you must first select the
parameter with the buttons on the Bit.  When a CC is handled, the display is
updated to show the parameter number and the new value.   This is not the same
as selecting that parameter with the Bit front panel.  The Crumar Bit firmware
does not know about the CC code at all, so it doesn't think any parameter has
been selected, and the +/- buttons are disabled.

When configuring a controller to use the CC's , assign parameters that map
to just a few values to switches, NOT to sliders.  Using a slider for
something like the LFO waveform will send many identical requests to the
synth as it it moved in-between the threshold values.  The synth doesn't detect
that the same option is being selected each time, so a lot of time may be wasted
processing CC's that don't change anything.   Also, in the case of something like
the LFO waveform, the firmware may also reset certain LFO variables each time
the waveform is selected, even if it was the same one that was already
selected.  This is because with the original controls there was no way to select
the same option over and over again, so the firmware was not designed to handle this.

When sending CC's to any synthesizer based on a 1980's CPU, it will always be
possible to send CC's faster than the synth can handle them.  It takes about 1 mSec
to send a three-byte CC message over legacy MIDI.  So with a computer it is possible
to send roughly 1000 CC's per second.  If it takes the synth more than 1 mSec to
process that CC, it will quickly fall behind.  Even using a stand-alone controller,
if you move a slider quickly, you can send hundreds of CC's at a very fast rate.
Some CC's can be processed very quickly.   Others require more code to execute for
each change.

If your unit has been modified to change MIDI thru to a second MIDI out, you can
save your patches as sysex now.

To save all patches as 60 separate MIDI sysex packets, Press Tape, then Upper.
The Bit One will reboot after sending the MIDI data, as it would after finishing a tape
operation.  The sysex file should be 3600 bytes in length.   To re-load the patches,
with memory un-protected, simply send the MIDI sysex packets to the Bit One.  The patches
are saved as 60 individual sysex program packets, not all in one packet.   The format
is the same as is documented in the Bit One owner's manual.  Note that the Bit One patch
sysex header contains a MIDI channel in it, which must match the current setting in
order for the patch to be loaded.  The new firmware uses the current MIDI channel in
the sysex packet header.   So to load dumped sysex patches, the MIDI channel must be set
to what it was at the time they were dumped.   The Bit One actually only has 60 user
patches, despite what the manual says.

The following other changes have been made in the new firmware:

1) OMNI MIDI mode is disabled at power up. (was enabled)
2) MIDI program changes are enabled at power up. (was disabled)
3) Previous MIDI receive channel setting now retained when power is off. (was set to 1)

Enabling MIDI sustain CC's disables the pedal input jack, so I left it disabled
at boot.

The new firmwware is based on the A3 Crumar firmware which added
these parameters, which can be selected using the front panel:

Parameter 62 MIDI sustain pedal CC enable/disable (enabling it disables the pedal input jack)
Parameter 63 MIDI program change message enable/disable
Parameter 64 MIDI Omni mode enable/disable
Parameter 65 MIDI receive channel set