

Fourm MIDI Implementation

Fourm receives MIDI data according to the settings you have chosen in GLOBALS. In addition, there is interaction between some of the program parameters that determine the overall response of Fourm to MIDI data. These are the GLOBALS parameters that affect response to MIDI:

MIDI Channel: All, 1...16—Selects which MIDI channel to send and receive data, 1 to 16. All receives on all 16 channels.

Clock Mode: Sets Fourm's ability to send and receive MIDI clock messages:

- Off: MIDI Clock is neither sent nor received
- Out: MIDI Clock + Start and Stop are sent
- In: MIDI Clock is received
- In/Thru: MIDI Clock is received and routed to Thru jack

When set to IN or IN/THRU, if no MIDI clock is present at the selected input, the arpeggiator and sequencer will not function.

Clock Input: MIDI, USB—Sets the port, MIDI or USB, by which MIDI clock signals are received.

Clock Output: None, MIDI, USB, All—Sets the port, MIDI, USB, or both, by which MIDI clock signals are sent.

MIDI Param Out: Off, CC, NRPN—Changes to the values of front panel controls are transmitted via MIDI as Continuous Controllers (CC) or Non-Registered Parameter Number (NRPN). Transmission of parameters can also be turned off.

MIDI Param In: Off, CC, NRPN—Sets the method by which parameter changes are received via MIDI. As with transmission, NRPNs are the preferred method.

MIDI Control: Off, On—When set to On, the synth will respond to MIDI controllers, including pitch wheel, mod wheel, pedal, and volume.

MIDI SysX: Off, On—When set to On, the synth will respond to MIDI controllers, including pitch wheel, mod wheel, pedal, and volume.

MIDI SysX Port: MIDI, USB—When set to MIDI it will receive and transmit MIDI SysEx messages using the MIDI ports/cables When set to USB it will receive and transmit MIDI SysEx messages using the USB port/cable. MIDI SysEx messages are used when sending and receiving a variety of data including, programs, alternative tunings, system updates, and more.

MIDI Out Port: Off, MIDI, USB, All—Sets the port by which MIDI data will be transmitted.

MIDI Prog Send: Off, On—When set to On, the synth will send MIDI Program Change messages.

MIDI Prog Rcv: Off, On—When set to On, the synth will respond to MIDI Program Change messages.

MIDI Messages

System Real-Time Messages

Status	Description
1111 1000	MIDI Timing Clock

Received Channel Messages

Status	Second	Third	Description
1000 nnnn	0kkkkkkk	0vvvvvvv	Note Off. Velocity is ignored
1001 nnnn	0kkkkkkk	0vvvvvvv	Note On. Note off if vvvvvv = 0
1010 nnnn	0kkkkkkk	0vvvvvvv	Polyphonic Key Pressure
1011 nnnn	0vvvvvvv	0vvvvvvv	Control Change; see "Received Controller Messages"
1100 nnnn	0ppppppp		Program change, 0-127 for Programs 1-127 within current Bank
1101 nnnn	0vvvvvvv		Channel Pressure
1110 nnnn	0vvvvvvv	0vvvvvvv	Pitch Bend LS Byte then MS Byte

Notes: 0kkkkkkk
nnnn
0vvvvvvv

Note number 0-127
Channel number 0 to 15 (MIDI channel 1-16).
Ignored if MIDI channel set to ALL
Value

Received Controller Messages

Status	Second	Third	Description
1011 nnnn	0000 0001	0vvvvvvv	Mod Wheel: directly assignable controller
1011 nnnn	0000 0100	0vvvvvvv	Foot Controller: directly assignable controller
1011 nnnn	0000 0111	0vvvvvvv	Volume: Combined with Master Volume and Program Volume
1011 nnnn	0100 1010	0vvvvvvv	Brightness: Offset added to filter cutoff frequency
1011 nnnn	0010 0000	0vvvvvvv	Bank Select: 1 - 2 select user banks 1 - 2; 3 - 4 select factory banks 1 - 2
1011 nnnn	0100 0000	0vvvvvvv	Damper pedal: Holds envelopes in Sustain if 0100 0000 or higher
1011 nnnn	0111 1011	0vvvvvvv	All Notes Off: Clear all MIDI notes
1011 nnnn	0111 1001	0vvvvvvv	Reset All Controllers: Clears all MIDI controllers to 0, MIDI volume to maximum

See subsequent sections for additional Continuous Controller (CC) and Non-Registered Parameter Number (NRPN) messages received.

Transmitted Channel Messages

Status	Second	Third	Description
1000 nnnn	0kkkkkkk	0000000	Note Off.
1001 nnnn	0kkkkkkk	0vvvvvvv	Note On.
1011 nnnn	0vvvvvvv	0vvvvvvv	Control Change; see "Transmitted Controller Messages"
1100 nnnn	0ppppppp		Program change, 0-127 for Programs 00-128 within current Bank
1101 nnnn	0vvvvvvv		Channel Pressure
1110 nnnn	0vvvvvvv	0vvvvvvv	Pitch Bend LS Byte then MS Byte

Notes: 0kkkkkkk
nnnn

0vvvvvvv

Note number 0 — 127
Channel number 0 to 15 (MIDI channel 1-16).
Ignored if MIDI channel set to ALL
Value

Transmitted Controller Messages

Status	Second	Third	Description
1011 nnnn	0000 0001	0vvvvvvv	Mod Wheel
1011 nnnn	0000 0010	0vvvvvvv	Breath Controller: When assigned to Pedal/CV
1011 nnnn	0000 0100	0vvvvvvv	Foot Controller: When assigned to Pedal/CV
1011 nnnn	0000 1101	0vvvvvvv	Expression: When assigned to Pedal/CV
1011 nnnn	0000 0111	0vvvvvvv	Volume: When assigned to Pedal/CV
1011 nnnn	0100 1010	0vvvvvvv	Brightness: Assigned to Pedal/CV
1011 nnnn	0010 0000	0vvvvvvv	Bank Select: 0 - 9
1011 nnnn	0100 0000	0vvvvvvv	Damper pedal: Sends 0 if off, 0111 1111 when on
1011 nnnn	0000 0111	0vvvvvvv	Volume knob

See sections that follow for additional Continuous Controller (CC) and Non-Registered Parameter Number (NRPN) messages transmitted.

Additional Continuous Controllers Transmitted/Received

The following table details how MIDI Continuous Controllers (CCs) are mapped to Fourm controls. They are transmitted when MIDI Param Send is set to CC, and recognized/received when MIDI Param Receive is set to CC.

CC#	Param	Range	CC#	Param	Range
0	Bank Select MSB	0-3	32	Bank Select LSB	0-3
1	Mod Wheel	0-127	33	Glide_On	0-1
2	Breath Controller	0-127	34	Glide_Rate	0-127
3	Pitch Bend_Range	0-12	35	Glide Mode	0-3
4	Foot Controller	0-127	36	KeyMode	0-2
5	---	---	37	Env Retrig	0-1
6	Data Entry MSB	0-127	38	Data Entry LSB	0-127
7	Master Volume	0-127	39	Filter_Cutoff	0-127
8	---	---	40	Filter_Res	0-127
9	---	---	41	Filter_KeyTrack	0-1
10	---	---	42	Filter_KeyAmt	0-2
11	Expression Pedal	0-127	43	FiltEnv_Attack	0-127
12	Osc1_Octave	0-4	44	FiltEnv_Decay	0-127
13	Osc1_Freq	0-127	45	FiltEnv_Sustain	0-127
14	Osc1_Sync	0-1	46	FiltEnv_Release	0-127
15	Osc1_Saw	0-1	47	FiltEnv_VelOn	0-1
16	Osc1_Pulse	0-1	48	FiltEnv_VelAmt	0-127
17	Osc1_PW	0-127	49	FiltEnv_Amt	0-127
18	Osc1_Level	0-127	50	AmpEnv_Attack	0-127
19	Osc2_Octave	0-6	51	AmpEnv_Decy	0-127
20	Osc2_Freq	0-127	52	AmpEnv_Sustain	0-127
21	Osc2_Tri	0-1	53	AmpEnv_Release	0-127
22	Osc2_Saw	0-1	54	AmpEnv_VelOn	0-1
23	Osc2_Pulse	0-1	55	AmpEnv_VelAmt	0-127
24	Osc2_PW	0-127	56	LFO_Sync	0-1
25	Osc2_Level	0-127	57	LFO_Freq	0-127
26	Noise_On	0-1	58	LFO_FreqSync	0-15
27	Noise_Level	0-127	59	LFO_Shapes	0-15
28	Noise_Type	0-2	60	LFO_RevSaw	0-1
29	Unison_On	0-1	61	LFO_SHType	0-5
30	Unison_Voices	0-4	62	---	---
31	Unison_Detune	0-127	63	---	---

CC#	Param	Range
64	---	---
65	Arp_On	0-1
66	Arp_Mode	0-7
67	Arp_Range	0-2
68	Arp_Repeat	0-3
69	Arp_Relatch	0-1
70	Arp_Beatsync	0-1
71	Seq_Reset	1-64
72	Seq_PlayMode	0-2
73	Seq_ModDest	0-10
74	Brightness	0-127
75	ModSrc_FilterEnvRoute	0-2
76	ModSrc_OscBRoute	0-2
77	ModSrc_LFORoute	0-2
78	ModSrc_FilterEnvAmt	0-127
79	ModSrc_OscBAmt	0-127
80	ModSrc_LFOAmt	0-127
81	ModDst_FreqASrcRoute	0-3
82	ModDst_FreqBSrcRoute	0-3
83	ModDst_PWASrcRoute	0-3
84	ModDst_PWBSrcRoute	0-3
85	ModDst_CutoffSrcRoute	0-3
86	ModDst_AmpSrcRoute	0-3
87	ModDst_LFOFreqSrcRoute	0-3
88	ModDst_LFOAmtSrcRoute	0-3
89	ModSrc_AftertouchAmt	0-127
90	---	---
91	---	---
92	ModDst_ATDest1	0-3
93	ModDst_ATDest2	0-3
94	ModDst_ATDest3	0-3
95	Voice_Volume	0-127

CC#	Param	Range
96	---	---
97	---	---
98	---	---
99	---	---
100	---	---
101	---	---
102	Clock_BPM	15-127
103	Clock_Div	0-10
104	Scale	0-65
105	Transpose	0-4
106	Category	0-16
107	---	---
108	---	---
109	---	---
110	---	---
111	---	---
112	Editor_Byte	---
113	---	---
114	---	---
115	---	---
116	---	---
117	---	---
118	---	---
119	---	---
120	All Sound Off	
121	Reset Controllers	
122	Local Control On/Off	
123	All Notes Off	
124	Omni Mode Off	
125	Omni Mode On	
126	Mono Mode On	
127	Poly Mode On	

NRPN Messages

The Non-Registered Parameter Number (NRPN) MIDI messages are used to transmit and receive both global and program parameters. They are transmitted when MIDI Parameter Send is set to NRPN in GLOBALS, and received when MIDI Parameter Receive is set to NRPN in GLOBALS.

The messages are handled in standard MIDI format using the NRPN CC commands in running status byte format. Below is the format used for transmitting a NRPN parameter.

Transmitted NRPN Messages

Status	Description
1011 nnnn	Control Change
0110 0011	NRPN parameter number MSB CC
0vvv vvvv	Parameter Number MSB
0110 0010	NRPN parameter number LSB CC
0vvv vvvv	Parameter Number LSB
0000 0110	NRPN parameter value MSB CC
0vvv vvvv	Parameter value MSB
0010 0110	NRPN parameter value LSB CC
0vvv vvvv	Parameter value LSB

The parameter number can be found in the two tables below, one for global parameters, and the other for program parameters. The parameter numbers and the parameter values are broken into two 7-bit bytes for MIDI transmission; the LSB has the seven least-significant bits, and the MSB has the seven most-significant bits, though in most cases the MSB will be zero or one, and never more than two.

When receiving an NRPN, all messages do not necessarily need to be transmitted, since the synth will track the most recent NRPN number, though it is usually good practice to send the entire message above.

Once an NRPN is selected, the synth will also respond to NRPN Data Increment and Decrement commands, which some controllers utilize. Finally, it responds to one RPN (Registered Parameter Number) command, the RPN/NRPN Reset command, which can be handy for resetting the currently selected parameter to a known state.

Received NRPN Messages

Status	Second	Third	Description
1011 nnnn	0110 0011	0vvvvvvv	NRPN parameter number MSB CC
1011 nnnn	0110 0010	0vvvvvvv	NRPN parameter number LSB CC
1011 nnnn	0000 0110	0vvvvvvv	NRPN parameter value MSB CC
1011 nnnn	0010 0110	0vvvvvvv	NRPN parameter value LSB CC
1011 nnnn	0110 0000	0xxxxxxx	NRPN parameter value Increment
1011 nnnn	0110 0001	0xxxxxxx	NRPN parameter value Decrement
1011 nnnn	0010 0101	0111111	RPN parameter number MSB CC - Reset NRPN parameter number (when both MSB and LSB received)
1011 nnnn	0010 0100	0111111	RPN parameter number LSB CC - Reset NRPN parameter number (when both MSB and LSB received)

Program Parameter Data

The following table lists Fourm program parameters 0-352.

NRPN#	Param	Range
1	Osc 1 Octave	0-4
2	Osc 2 Octave	0-6
3	Osc 1 Freq	0-1400
4	Osc 1 Freq MSB	
5	Osc 2 Freq	0-1400
6	Osc 2 Freq MSB	
7	Osc 1 Sync	0-1
8	Osc 2 Tri	0-1
9	Osc 1 Saw	0-1
10	Osc 2 Saw	0-1
11	Osc 1 Pulse	0-1
12	Osc 2 Pulse	0-1
13	Osc 1 PW	0-127
14	Osc 2 PW	0-127
15	Osc 1 Level	0-127
16	Osc 2 Level	0-127
17	Feedback On	0-1
18	Feedback Level	0-127
19	Noise On	0-1
20	Noise Level	0-127

NRPN#	Param	Range
21	Noise Type	0-3
22	---	---
23	Glide On	0-1
24	Glide Mode	0-3
25	Glide Rate	0-127
26	Pitch Bend Range	0-12
27	Filter Cutoff	0-1023
28	Filter Cutoff MSB	
29	Filter Resonance	0-255
30	Filter KeyTrack	0-1
31	Filter Key Amount	0-127
32	---	---
33	LFO Sync	0-1
34	LFO Freq	0-255
35	LFO Freq Sync	0-15
36	LFO Shape	0-15
37	LFO Reverse Saw	0-1
38	LFO S/H Type	0-5
39	---	---
40	Filt Env Attack	0-255

NRPN#	Param	Range
41	Amp Env Attack	0-255
42	Filt Env Decay	0-255
43	Amp Env Decay	0-255
44	Filt Env Sustain	0-127
45	Amp Env Sustain	0-127
46	Filt Env Release	0-255
47	Amp Env Release	0-255
48	Filt Env Vel On	0-1
49	Amp Env Vel On	0-1
50	Filt Env Vel Amt	0-127
51	Amp Env Vel Amt	0-127
52	Env Retrigger	0-1
53	Filt Env Amt	0-255
54	Amp Env Amt	0-255
55	---	---
56	Voice Volume	0-127
57	Vintage	0-127
58	Unison On	0-1
59	Unison Voices	0-4
60	Unison Detune	0-127
61	Unison Note 1	0-60
62	Unison Note 2	0-60
63	Unison Note 3	0-60
64	Unison Note 4	0-60
65	ModSrc_FilterEnvRoute	0-2
66	ModSrc_OscBRoute	0-2
67	ModSrc_LFORoute	0-2
68	ModSrc_FilterEnvAmt	0-254
69	ModSrc_OscBAmt	0-254
70	ModSrc_LFOAmt	0-254
71	ModSrc_AftertouchAmt	0-254
72	ModDst_FreqASrcRoute	0-3
73	ModDst_FreqBSrcRoute	0-3
74	ModDst_PWASrcRoute	0-3

NRPN#	Param	Range
75	ModDst_PWBSrcRoute	0-3
76	ModDst_CutoffSrcRoute	0-3
77	ModDst_AmpSrcRoute	0-3
78	ModDst_LFOFrqSrcRoute	0-3
79	ModDst_LFOAmtSrcRte	0-3
80	ModDst_ATDest1	0-3
81	ModDst_ATDest2	0-3
82	ModDst_ATDest3	0-3
83	Key Mode	0-2
84	Scale	0-65
85	Transpose	0-4
86	Category	0-16
87	Clock BPM	30-250
88	Clock Div	0-10
89	Name 1	
90	Name 2	
91	Name 3	
92	Name 4	
93	Name 5	
94	Name 6	
95	Name 7	
96	Name 8	
97	Name 9	
98	Name 10	
99	Name 11	
100	Name 12	
101	Name 13	
102	Name 14	
103	Name 15	
104	Name 16	
105	Name 17	
106	Name 18	
107	Name 19	
108	Name 20	

NRPN#	Param	Range
109	Editor Byte	
110	Arp On	0-1
111	Arp Mode	0-7
112	Arp Range	0-2
113	Arp Repeat	0-3
114	Arp Relatch	0-1
115	Arp Beat Sync	0-1
116	Seq Reset	0-1
117	Seq Play Mode	0-3
118	Seq Mod Dest	0-6
119-126	Seq1_RestFlags1-8	
127-134	Seq2_RestFlags1-8	
135-142	Seq3_RestFlags1-8	
143-150	Seq4_RestFlags1-8	
151-158	Seq1_TieFlags1-8	
159-166	Seq2_TieFlags1-8	
167-174	Seq3_TieFlags1-8	
175-182	Seq4_TieFlags1-8	
183-246	Seq1_Note1-64	
247-310	Seq2_Note1-64	
311-374	Seq3_Note1-64	
375-438	Seq4_Note1-64	
439-502	Seq1_Vel1-64	
503-566	Seq2_Vel1-64	
567-630	Seq3_Vel1-64	
631-694	Seq4_Vel1-64	
695-702	Seq1_GlideFlags1-8	
703-710	Seq2_GlideFlags1-8	
711-718	Seq3_GlideFlags1-8	
719-726	Seq4_GlideFlags1-8	

Global Parameter Data

The table shows the global data sent and received on global parameter dumps, and corresponding NRPN number when sent/received individually.

NRPN	Range	Description
4096	0-100	Master Coarse Tune
4097	0-24	Master Fine Tune
4098	0-16	MIDI Channel 0 = All
4099	0-3	MIDI Clock Mode 0 = Off 1 = Out 2 = In 3 = In Thru
4100	0-1	MIDI Clock Cable In 0 = MIDI Port 1 = USB
4101	0-3	MIDI Clock Cable Out 0 = None 1 = MIDI 2 = USB 3 = All
4102	0-2	MIDI Param Send* 0 = NRPN 1 = CC 2 = Off
4103	0-2	MIDI Param Receive† 0 = NRPN 1 = CC 2 = Off
4104	0-1	MIDI Control Enable 0 = Off 1 = On
4105	0-1	MIDI SysEx Enable 0 = Off 1 = On
4106	0-1	MIDI SysEx Cable 0 = MIDI 1 = USB
4107	0-2	MIDI Cable Out 0 = MIDI 1 = USB 2 = All
4108	0-1	MIDI Program Send 0 = Off 1 = On
4109	0-1	MIDI Program Recv 0 = Off 1 = On

NRPN	Range	Description
4110	0-1	MIDI Arp Notes 0 = Off 1 = On
4111	0-2	Local Control 0 = All Off 1 = Key/Wheels Off 2 = On
4112	0-1	Mono/Stereo 0 = Mono 1 = Stereo
4113	0-2	Pot Mode 0 = Relative 1 = Passthru 2 = Jump
4114	0-4	Foot Pedal Assign 0 = Breath CC2 1 = Foot CC4 2 = Exp CC11 3 = LPF Full 4 = LPF Half
4115	0-1	Sustain Pedal Polarity 0 = Normal 1 = Reversed
4116	0-3	Sustain Mode 0 = Sustain 1 = Arp Hold 2 = Apr Hold Moment. 3 = Seq Start/Stop
4117	0-64	Global Scale
4118	0-1	Pressure Enable 0 = Off 1 = On
4119	0-7	Pressure Curve
4120	0-7	Velocity Curve
4121	0-1	OLED Screen-saver 0 = Off 1 = On
4122	0-1	Arp Beat Sync 0 = Off 1 = Quantize

Control NRPN Data

The following table lists the Fourm's control NRPN data. It is received and transmitted but not saved as part of a program.

NRPN	Value	Description
4188	0-1	Seq Play/Stop

SysEx Messages

Universal System Exclusive Message (Device Inquiry)

Status	Description
1111 0000	System Exclusive (SysEx)
0111 1110	Non-realtime message
0vvv vvvv	If MIDI channel is set to 1 - 16, 0vvvvvvv must match (unless MIDI Channel = ALL); always responds if 0vvvvvvv = 0111 1111.
0000 0110	Inquiry Message
0000 0001	Inquiry Request
1111 0111	End of Exclusive (EOX)

The Fourm responds with:

Status	Description
1111 0000	System Exclusive (SysEx)
0111 1110	Non-realtime message
0vvv vvvv	If MIDI Channel = ALL, 0vvvvvvv = 0111 1111. Otherwise 0vvvvvvv = Channel Number 0 - 15.
0000 0110	Inquiry Message
0000 0010	Inquiry Reply
0000 0001	Sequential ID
0011 1011	Fourm ID (Family LS)
0000 0001	Family MS
0000 0000	Family Member LS
0000 0000	Family Member MS
0000 nnnn	Main OS Version High Byte
0000 nnnn	Main OS Version Middle Byte
0000 nnnn	Main OS Version Low Byte
1111 0111	End of Exclusive (EOX)

Request Program Dump

Status	Description
1111 0000	System Exclusive (SysEx)
0000 0001	Sequential ID
0011 1011	Fourm ID
0000 0101	Request Program Transmit
0000 00vv	Bank Number, 0 - 3
0vvv vvvv	Program Number, 0 - 127
1111 0111	End of Exclusive (EOX)

The Fourm will respond by sending out the program data in the format described below in *Program Data Dump*.

Request Program Edit Buffer Dump

Status	Description
1111 0000	System Exclusive (SysEx)
0000 0001	Sequential ID
0011 1011	Fourm ID
0000 0110	Request Program Edit Buffer Transmit
1111 0111	End of Exclusive (EOX)

The Fourm will respond by sending out the current program edit buffer in the format described below in *Program Edit Buffer Data Dump*.

Request Global Parameter Dump

Status	Description
1111 0000	System Exclusive (SysEx)
0000 0001	Sequential ID
0011 1011	Fourm ID
0000 1110	Request Global Parameter Transmit
1111 0111	End of Exclusive (EOX)

The Fourm will respond by sending out the current values of the global parameters in the format described in *Global Parameters Data Dump*.

Program Data Dump

Status	Description
1111 0000	System Exclusive (SysEx)
0000 0001	Sequential ID
0011 1011	Fourm ID
0000 0010	Program Data
0000 00vv	Bank Number: 0 - 3
0vvv vvvv	Program Number: 0 - 127
0vvv vvvv	4096 bytes expanded to 4690 MIDI bytes in "packed MS bit" format
1111 0111	End of Exclusive (EOX)

Program Edit Buffer Data Dump

Status	Description
1111 0000	System Exclusive (SysEx)
0000 0001	Sequential ID
0011 1011	Fourm ID
0000 0011	Edit Buffer Data
0vvv vvvv	4096 bytes expanded to 4690 MIDI bytes in "packed MS bit" format
1111 0111	End of Exclusive (EOX)

Global Parameters Data Dump

Value	Description
1111 0000	System Exclusive (SysEx)
0000 0001	Sequential ID
0011 1011	Fourm ID
0000 1111	Main Parameter Data
0vvv vvvv	50 nibbles (LS then MS) for 25 Global parameters
1111 0111	End of Exclusive (EOX)

The Global Parameters Data Dump is not recognized when received. It is only transmitted when requested. NRPN messages are used to change Globals.

Packed Data Format

Data is packed in 8 byte “packets”, with the MS bit stripped from 7 parameter bytes, and packed into an eighth byte, which is sent at the start of the 8 byte packet.

Example:

Input Data

```
1 A7 A6 A5 A4 A3 A2 A1 A0
2 B7 B6 B5 B4 B3 B2 B1 B0
3 C7 C6 C5 C4 C3 C2 C1 C0
4 D7 D6 D5 D4 D3 D2 D1 D0
5 E7 E6 E5 E4 E3 E2 E1 E0
6 F7 F6 F5 F4 F3 F2 F1 F0
7 G7 G6 G5 G4 G3 G2 G1 G0
```

Packed MIDI data

```
1 00 G7 F7 E7 D7 C7 B7 A7
2 00 A6 A5 A4 A3 A2 A1 A0
3 00 B6 B5 B4 B3 B2 B1 B0
4 00 C6 C5 C4 C3 C2 C1 C0
5 00 D6 D5 D4 D3 D2 D1 D0
6 00 E6 E5 E4 E3 E2 E1 E0
7 00 F6 F5 F4 F3 F2 F1 F0
8 00 G6 G5 G4 G3 G2 G1 G0
```