

ALESIS

M20

System Exclusive

Fourth Revision
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ALESIS PDAT SYSTEM EXCLUSIVE

The PDAT responds to all Alesis system exclusive ADAT commands, as well as MIDI Machine Control (MMC) commands. In addition, the PDAT also responds to and sends out Alesis system exclusive PDAT commands to access functions that may or may not be addressed by PDAT or MMC commands.

Note: There may be some overlap in commands. For example, setting a locate address may be done using MMC, ADAT Sysex or PDAT Sysex commands.

The PDAT has the following MIDI System Exclusive format:

F0H	Start-of-Exclusive
00H 00H 0EH	Alesis manufacturer ID
16H	PDAT product ID
aaH	Device id# (0..7EH, 7FH=all)
bbH	Opcode (0..7FH)
data	Data
F7H	End-of-Exclusive

OPCODES

- Note: 1) Items in parentheses, {}, can be repeated multiple times
2) Items in square brackets, [], are optional, depending upon preceding info

01H - Write Parameter

F0H 00H 00H 0EH 16H <dev#> **01H** {<param#> [<sub-param>] <data>} F7H
<param#> - If = 0, then function bit to follow in sub-param position
- If <> 0, then this value is the user parameter number
<sub-param> - User bit parameter (range 0..13h)
<data> - For User Parameters, see Parameter Table
- For Sub-Parameters, 0=disabled and 7Fh=enabled

Parameters (general user parameters)

See Table 1

Sub-Parameters (user function bit parameters)

00 All Safe Enable
01 All Input Enable
02 Auto Input Enable
03 Auto Play Enable
04 Rehearse Enable
05 Online Enable
06 Auto AUX Routing Enable
07 Format Safe Enable
08 Format Enable
08 SMPTE Chase Enable
0A Internal Generator Enable
0B Tape Offset Enable
0C Track Delay Enable
0D Pre-Roll Enable
0E Post-Roll Enable
0F Auto Return Enable
10 Auto Record Enable
11 Fast Wind Mode Enable
12 Mute Audio Enable
13 CADI Connect Status (1=connected)

02H - Read Parameter

F0H 00H 00H 0EH 16H <dev#> **02H 06H** {<param#> [<sub-param>]} F7H
<param#> - 00 = bit parameter to follow in sub-param position

Response:

F0 00 00 0E 16 <dev#> **02H 07H** {<param#> [<sub-param>] <data>} F7

03H - Jog Command

F0H 00H 00H 0EH 16H <dev#> **03H** <data-1> <data-2> F7H
<data-1> - 000000ba a = jog speed<7>, b = direction (0=fwd, 1=rew)
<data-2> - jog speed<6..0>

04H - Control Pause Tension

F0H 00H 00H 0EH 16H <dev#> **04H** F7H

Data Transfer Commands

10H - MIDI Sysex Dump

F0H 00H 00H 0EH 16H <dev#> **10H 06H** <type> F7H

<type> - 0 = all

- Request dump of all user parameters

Response: F0 00 00 0E 16 <dev#> 10H 07H <type> <byte count> <data>F7

<type> - 0 (complete user parameter dump = 1964 data bytes)

<data> - 8 MIDI data bytes output for every 7 data bytes

<i>a7 a6 a5 a4 a3 a2 a1 a0 transfer as</i>	<i>00 a6 a5 a4 a3 a2 a1 a0</i>
<i>b7 b6 b5 b4 b3 b2 b1 b0</i>	<i>00 b5 b4 b3 b2 b1 b0 a7</i>
<i>c7 c6 c5 c4 c3 c2 c1 c0</i>	<i>00 c4 c3 c2 c1 c0 b7 b6</i>
<i>d7 d6 d5 d4 d3 d2 d1 d0</i>	<i>00 d3 d2 d1 d0 c7 c6 c5</i>
<i>e7 e6 e5 e4 e3 e2 e1 e0</i>	<i>0 e2 e1 e0 d7 d6 d5 d4</i>
<i>f7 f6 f5 f4 f3 f2 f1 f0</i>	<i>0 f1 f0 e7 e6 e5 e4 e3</i>
<i>g7 g6 g5 g4 g3 g2 g1 g0</i>	<i>0 g0 f7 f6 f5 f4 f3 f2</i>
	<i>0 g7 g6 g5 g4 g3 g2 g1</i>

11H - MIDI Software Dump

F0H 00H 00H 0EH 16H <dev#> **11H** <type> [data] F7H

<dev#> always = 7FH

<type> can be:

- | | |
|----------|---|
| 0 | 4 Meg Flash Boot segment data without interleaved checksum |
| 1 | 4 Meg Flash Code segment data without interleaved checksum |
| 2 | 4 Meg Flash Boot segment data with interleaved checksum |
| 3 | 4 Meg Flash Code segment data with interleaved checksum |
| 4 | 8 Meg Flash Boot segment data without interleaved checksum |
| 5 | 8 Meg Flash Code segment data without interleaved checksum |
| 6 | 8 Meg Flash Boot segment data with interleaved checksum |
| 7 | 8 Meg Flash Code segment data with interleaved checksum |

If <type> is 0,1,4, or 5 (data without interleaved checksum) then [data] is:

<#data bytes> <24 Bit Address> <data byte 1> .. <data byte N>

..
<#data bytes = 2> <24 Bit Address = 0> <checksum word>

where:

<#data bytes> is sent as a single byte greater than 0 but less than 128.

<24 Bit Address> is sent as 6 nibble-ized data bytes. For example, address 123456H is sent as 01H 02H 03H 04H 05H 06H. MSB first.

<data byte> is sent as 2 nibble-ized data bytes. For example, data 98H is sent as 09H 08H. MSB first. <data byte> is repeated for <#data bytes>.

<checksum word> is sent as 4 nibble-ized total checksum bytes. Note <#data bytes> must equal

2. <24 Bit Address> must equal 0.

Repeat the <#data bytes> <24 Bit Address> <data byte 1> .. <data byte N> sequence for programming of additional flash locations. Note that the <24 Bit Address> specifies the start of programming location for the specified <data byte>'s. Always complete the end of the transmission with the checksum sequence above.

If <type> is 2,3,6, or 7 (data with interleaved checksum) then [data] is:

<#data bytes> <24 Bit Address> <data byte 1> .. <data byte N> <checksum>

..

<#data bytes> <24 Bit Address> <data byte 1> .. <data byte N> <checksum>

where:

<#data bytes> is sent as a single byte greater than 0 but less than 128.

<24 Bit Address> is sent as 6 nibble-ized data bytes. For example, address 123456H is sent as 01H 02H 03H 04H 05H 06H. MSB first.

<data byte> is sent as 2 nibble-ized data bytes. For example, data 98H is sent as 09H 08H. MSB first. <data byte> is repeated for <#data bytes>.

<checksum> is sent as 2 nibble-ized checksum bytes.

The checksum is the sum of the previous <data byte> sequence mod 256.

Repeat the <#data bytes> <24 Bit Address> <data byte 1> .. <data byte N> <checksum> sequence for programming of additional flash locations. Note that the <24 Bit Address> specifies the start of programming location for the specified <data byte>'s.

12H - Tape Data

F0H 00H 00H 0EH 16H <dev#> **12H** <type> F7H

<dev#> device

<type> can be:

0 Prepare data to save to tape

1 Initiate a save data to tape

Action Commands

16H - Locate

F0H 00H 00H 0EH 16H <dev#> **16H** <loc#> F7H

<loc#> - 0..99=locate 0.. locate 99

17H - Inject Tape

F0H 00H 00H 0EH 16H <dev#> **17H** F7H

18H - Enter Deck Standby

F0H 00H 00H 0EH 16H <dev#> **18H** F7H

Parameter Table

Parameter Name	<param>	<data>	Comments
VU Peak Hold Mode ¹	01h	0..2 0 = No Peak Hold 1 = Momentary 2 = Continuous	
VU Peak Hold Time ¹	02h	0 .. 99	Amount of time the peak pixel is held on
VU Decay Time ¹	03h	0 .. 99	Amount of time it takes each VU pixel to decay
VU Meter Scale ¹	04h	0..1 0 = Normal 1 = Fine dB	VU meter scale
VU Fine Headroom ¹	05h	2..22 dB	Amount of headroom for Fine dB scale
Digital Source ¹	06h	0..2 0 = ADAT Optical 1 = Track Copy 2 = I/O Card (only valid if I/O card detected)	
Input Select Bitmap ²	07h	bitmap (0=analog input, 1=digital input)	
Analog Routing ¹	08h	0..2 0 = one-to-one 1 = half and half 2 = odd-even	[1..8 → 1..8] [1..4 → 5..8] [chan 1 → 1,3,5,7 and chan 2 → 2,4,6,8]
ADAT Optical Source ²	09h	optical source bitmap (1=source channel)	
Track Copy Source ²	0Ah	track copy source bitmap (1=source channel)	
AES/EBU Source ²	0Bh	AES/EBU source bitmap (1=source channel)	
AUX Track Source ²	0Ch	AUX source bitmap (1=source channel)	
Pre-Roll Time ¹	0Dh	0..25	
Post-Roll Time ¹	0Eh	0..25	
Loop Start Point ¹	0Fh	0..99	Loop start locate number
Loop End Point ¹	10h	0..99	Loop end locate number
Auto Punch-In Point ¹	11h	0..99	Auto Punch-In locate number
Auto Punch-Out Point ¹	12h	0..99	Auto Punch-Out locate number
Locate Address	13h	<loc #> <32-bit timecode> <loc #> = 0..99 <32-bit timecode> = MIDI data format 5	
Locate Name	14h	<loc #> <8-character ASCII> <loc #> = 0..99 <8-character ASCII> = <left-most>..<rt-most>	
Format Type ¹	15h	0..1 0 = 16-bit 1 = 20-bit	
Track Delay Value ³	16h	[<track #> <value>] <track #> = 0..7 <value> = 0..8160 samples	
Tape Offset Value ⁵	17h	32-bit sample	

Parameter Name	<param>	<data>	Comments
SMPTE Offset Value ⁷	18h	Signed SMPTE format	
Chase Mode ¹	19h	0..1 0 = Continuous 1 = Once	
Flywheel Amount ²	1Ah	0..150 frames → <msb> <lsb> <msb> = 0aaa aaaa (bit 0..6) <lsb> = 0bbb bbbb (bit 7..13)	# of frames to flywheel when chasing SMPTE
Park Ahead ⁵	1Bh	32-bit timecode (samples)	Distance to stop ahead of last good SMPTE In
Internal Gen Mode ¹	1Ch	0..1 0 = Free-run 1 = Play/Rec	
Int Gen Start Reference ¹	1Dh	0..2 0 = ABS Time 1 = TC Track 2 = User Set	
Int Gen ABS Offset ⁶	1Eh	32-bit timecode	When Start Ref = ABS Time, current ABS Time plus this offset gives the starting timecode
Int Gen User Set Start ⁶	1Fh	SMPTE time format	
Int Gen User Bits ⁵	20h	8 hex characters	
Varispeed ⁴	21h	-300..200 cents (FED4 ..00C8)	
MIDI Device ID ²	22h	0..127 (127 = 7Fh = All Call)	
MMC Output ⁰	23h	0..1 0 = MMC output disabled 1 = MMC output enabled	
MTC Output ⁰	24h	0..1 0 = MTC output disabled 1 = MTC output enabled	
Dig Output Format ¹	25h	0..3 0 = 20-bit 1 = 16-bit 2 = 16-bit dithered 3 = Dig Thru mode (pass DigIn to DigOut)	
One-button Record ⁰	26h	0..1 0 = One-button record disabled 1 = One-button record enabled	
Direct Input Monitor ⁰	27h	0..1 0 = ADC/DAC 1 = Direct input	
TC Output Level ¹	28h	0..30 (divide by 10 to get volts)	
Fwd/Rew SMPTE Out ⁰	29h	0..1 0 = SMPTE output in fwd/rew disabled 1 = SMPTE output in fwd/rew enabled	
Search Enable Mode ⁰	2Ah	0..1 0 = Normal 1 = Button only	

Parameter Name	<param>	<data>	Comments
Locate Before Play ⁰	2Bh	0..1 0 = Disabled 1 = All slaves located to master before play	
Mute Until Locked ⁰	2Ch	0..1 0 = Each unit unmutes once it is in sync 1 = Units mute until master sees all locked	
Dynamic Punch ⁰	2Dh	0..1 0 = Punch using Play/Record buttons only 1 = Punch from track enable buttons allowed	
Track Group Enable ⁰	2Eh	0..1 0 = Track enable group buttons inactive 1 = Track enable group buttons active	Track Enable Group buttons are on the CADI
Unthread Timeout ¹	2Fh	1..20 minutes	
Crossfade Time ¹	30h	0..31	
Remote Source ¹	31h	0..2 0 = ADAT Sync 1 = MIDI 2 = RS-422 (Sony 9-pin protocol)	This allows the user to select which remote source is in control when Online is enabled.
Online Control Mode ¹	32h	0..1 0 = Remote Only 1 = Remote and Local	This allows the user to select whether front panel and LRC (both considered Local) are allowed when Online is enabled.
Tape Counter Mode ¹	33h	0..2 0 = SMPTE 1 = ABS Time 2 = RELATIVE	
Reference Counter Mode ¹	34h	0..4 0 = SMPTE IN 1 = LOC PT 2 = TAPE TC 3 = INT GEN 4 = OFFSET	Displays current SMPTE Input Displays current locate address Displays TC Track of loaded tape Displays the Internal Generator Displays the SMPTE or Tape Offset
Clock Source ¹	35h	0..6 0 = Internal 1 = Video 2 = ADAT 3 = I/O Card 4 = Word 5 = SMPTE 6 = Optical	
Sample Rate ¹	36h	<0..3> range 0..1 (0=48K, 1=44.1K) <4..7> range 0..2 (0=no pull-up/down, 1=pull-up, 2 = pull-down)	
SMPTE Rate ¹	37h	0..5 0 = 24 fps 1 = 25 fps 2 = 29.97 fps 3 = 29.97 DF 4 = 30 fps 5 = 30 DF	

Parameter Name	<param>	<data>	Comments
Timecode Source ¹	38h	0..1 0 = Internal 1 = External	
Chase Reference ¹	39h	0..1 0 = ABS Time 1 = Tape TC Track	
Pitch Mode ¹	3Ah	0..1 0 = Fixed 1 = Variable	
RMD Error Enable ⁰	3Ch	0..1 0 = RMD Error LEDs inactive 1 = RMD Error LEDs active	RMD = Remote Meter Bridge Yellow error LED indicates interpolation errors Red error LED indicate transport/system errors
Digital Scan Enable ⁰	3Dh	0..1 0 = Digital scan disabled 1 = Digital scan enabled	No audio while jog/shuttle Hear digital audio (scrub) while in jog/shuttle
Digital Scan Level ¹	3Eh	0..7 0= -42 dB, 1= -36 dB, 2= -30 dB, 3= -24dB 4= -18 dB, 5= -12 dB, 6= -6 dB, 7= 0 dB	
Pseudo Master ¹	3Fh	0..15 = device ID of the pseudo master	0 = ID1 = no pseudo master
RS-422 Trk Arm Enable ⁰	40h	0..1 0 = RS-422 track arming disabled 1 = RS-422 track arming enabled	Ignore RS-422 Edit Preset command
RS-422 Track Mapping ¹	41h	0..1 0=no mapping 1=odd/even	Mapping options for 2-track Edit Preset 1 → 1, 2 → 2 1 → 1,3,5,7 and 2 → 2,4,6,8

MIDI Data Format Types

- 0 **Bit Parameter**
 - Normal data format: 0 or 1
 - MIDI data format: 0 (disabled) or 7Fh (enabled)

- 1 **Byte Parameter with max value less than 80h**
 - Normal data format: 0 a₆ a₅ a₄ a₃ a₂ a₁ a₀
 - MIDI data format: <0 a₆ a₅ a₄ a₃ a₂ a₁ a₀>

- 2 **Byte Parameter with max value greater than or equal to 80h**
 - Normal data format: a₇ a₆ a₅ a₄ a₃ a₂ a₁ a₀
 - MIDI Data Format: <0 a₆ a₅ a₄ a₃ a₂ a₁ a₀> <0 0 0 0 0 0 0 a₇>

- 3 **Word Parameter with max value less than 4000h (2¹⁴)**
 - Normal data format: 0 0 b₅ b₄ b₃ b₂ b₁ b₀ a₇ a₆ a₅ a₄ a₃ a₂ a₁ a₀
 - MIDI Data Format: <0 a₆ a₅ a₄ a₃ a₂ a₁ a₀> <0 b₅ b₄ b₃ b₂ b₁ b₀ a₇>

- 4 **Word Parameter with max value greater than or equal to 4000h (2¹⁴)**
 - Normal data format: 0 0 b₅ b₄ b₃ b₂ b₁ b₀ a₇ a₆ a₅ a₄ a₃ a₂ a₁ a₀
 - MIDI Data Format: <0 a₆ a₅ a₄ a₃ a₂ a₁ a₀> <0 b₅ b₄ b₃ b₂ b₁ b₀ a₇>

- 5 **Long Parameter**
 - Normal data format: d₇ d₆ d₅ d₄ d₃ d₂ d₁ d₀ c₇ c₆ c₅ c₄ c₃ c₂ c₁ c₀ b₇ b₆ b₅ b₄ b₃ b₂ b₁ b₀ a₇ a₆ a₅ a₄ a₃ a₂ a₁ a₀
 - MIDI Data Format: <0 a₆ a₅ a₄ a₃ a₂ a₁ a₀><0 b₅ b₄ b₃ b₂ b₁ b₀ a₇><0 c₄ c₃ c₂ c₁ c₀ b₇ b₆><0 d₃ d₂ d₁ d₀ c₇ c₆ c₅><0 0 0 0 d₇ d₆ d₅ d₄>

- 6 **SMPTE Parameter**
 - Normal data format: hr:min:sec:frm
 - MIDI Data Format: <hour> <min> <sec> <frm>
 - <hour> = 000hhhhh range=0..23
 - <min> = 00mmmmmm range=0..59
 - <sec> = 00ssssss range=0..59
 - <frm> = 000fffff range=0..29

- 7 **SMPTE Parameter**
 - Normal data format: hr:min:sec:frm:sfrm:smp
 - MIDI Data Format: <sign/hour> <min> <sec> <frm> <sfrm> <smp>
 - <sign/hour> = 00shhhhh where s=0: positive, s=1:negative and hhhh range=0..23
 - <min> = 00mmmmmm range=0..59
 - <sec> = 00ssssss range=0..59
 - <frm> = 000fffff range=0..29
 - <sfrm> = 0xxxxxxx range=0..99
 - <smp> = 000yyyyy range=0..19