

*C>PIF LST:=S7MIDI.DDC17B3
MIDI SYSTEM EXCLUSIVE DATA FORMAT FOR S700
30 JUN 86. Copyright Akai Ltd. Gallus faciebat.

RECOGNISED BY S700:

EXCLUSIVE AKAI:

Request for overall settings.
Overall settings.
Request for sample parameters.
Sample parameters.
System exclusive common reception enable.
System exclusive common reception disable.

MNEMONIC
ROVS
QVS
RSPRM
BPRM
SECRE
SECRD

SYSTEM EXCLUSIVE COMMON:

Request sample dump
Abort sample dump.
Not acknowledge sample block. (Request retransmission)
Acknowledge sample block. (or sample header)
Sample dump.

MNEMONIC
RSD
ASD
NAKS
ACKS
SD

TRANSMITTED BY S700:

Akai exclusive.

Overall settings.
Sample parameters

MNEMONIC
DOVS
DSP

Exclusive common:

Sample dump.
Abort sample dump.
Not ack sample block.
Ack sample block.

SD
ASD
NAKS
ACKS

GENERAL NOTES

The purpose of the interface is to allow a computer to control all S700 functions, to process and synthesize samples, and to allow the S700 to replay samples developed for other machines, e.g. Prophet 2000.

S700 is always a slave. It will never send unless it is told to. This means all data transfers out of S700 must use two way communication. S700 can however receive with an incoming connection only. Reception of sample dump is speeded up with a two way connection.

Samples are requested by NUMBER. This number is 0 to 5 and corresponds to the displayed number -1.

Sample transfer is according to the standard described in the Prophet 2000 manual. This uses 'System exclusive common' which does not include a manufacturers prefix code. As it does not include a MIDI channel code, any samples sent, or requests for samples would be responded to by all samplers on the same MIDI line. The 'System exclusive common reception enable' and '...disable' messages, which do include a MIDI channel number, can be used to select one of several S700s on the same line.

A further enhancement of the standard sample dump protocol is that when closed loop transmission is used, gaps between blocks may be as long as 10 seconds rather than the 20 ms specified. This allows the computer to use its disk in the middle of a long file. This variation maintains full compatibility with the standard.

There are several parameters associated with a S700 sample that are not included in the Prophet 2000 sample dump. These may be sent with the Akai exclusive 'Sample parameters' messages.

The use of the above enhancements will not prevent the S700 from being completely compatible with the Prophet 2000 sample dump format.

START POINT

When S700 sends a sample it sends only that part of the waveform between the start and end points. When it sends the AKAI exclusive sample parameters it sends the start and end points as shown on the S700 display.

DETAILED SPECIFICATION OF MESSAGES.

SAMPLE DUMP FORMAT (as recognised and transmitted by S700)

BYTE#	RANGE	TYPE*	DESCRIPTION
0	0F0H	B	System exclusive code.
1	07EH	B	Common non-realtime identifier.
2	1	B	60 Sample dump code.
3	N	B	Sample number, LE. The incoming sample will replace the S700's sample numbered N+1 where N is 0 to 5 (or 15). If N is greater than 5 (or 15), then the sample being edited will be replaced.
4	0	B	Reserved. Must be 0.
5	0-16	B	Bits per word. S700 transmits 12, but can accept 8 to 14.
6,7,8	0-127	TB	SAMPLING PERIOD IN ns. S700 accepts 15257 to 500000. S700 assumes that the nominal pitch of samples is C3 (MIDI 60) unless a subsequent set of AKAI exclusive parameters specifies it otherwise.
9,10,11	0-127	TB	TOTAL WORDS IN SAMPLE. S700 accepts 280 to 32752. If more than 32752 points are sent only the first 32752 will be stored.
12,13,14	0-127	TB	LOOP START POINT. If >= total-5, assume non looping.
15,16,17	0-127	TB	LOOP END. S700 takes this as end point. It takes the start point as 0 unless AKAI exclusive sample parameters subsequently raise it.
18	0-1	B	0=looping 1=alternating. (One shot if loop length<5).
Next follows a variable number of sample blocks. Each has the same format:			
0	0-127	B	Block number LSbyte. (Block number HSbyte is not sent.
1,2	0-4095	SW	
3-120	as 1,2 above.		
121	0-127	B	Checksum, being the exclusive OR of the previous 120 bytes.

A final byte follows the last block:

77 0F7H B End of exclusive code.

SYSTEM COMMON HANDSHAKES (recognised and transmitted by S700).

BYTE#	RANGE	TYPE	DESCRIPTION
0	0F0H	B	System exclusive code.
1	7EH	B	Common non-realtime code.
2	ff	B	Function codes: ACK=7FH Acknowledge sample block or header. ASD=7DH Abort sample dump. NAK=7EH Not acknowledge. (Request retransmission of block).
3	0F7H	B	End of exclusive.

SYSTEM COMMON REQUEST SAMPLE DUMP (recognized by 8700)

BYTE#	RANGE	TYPE	DESCRIPTION
0	0F0H	B	System exclusive code
1	7FH	B	Common non-realtime code.
2	0	B	RSD Request Sample Dump code.
3	0-5(15)	B	Sample #, =8700 displayed number - 1
4	0	B	
5	0F7H	B	EOX

AKAI EXCLUSIVE MESSAGES. (Recognised by 8700)

BYTE	RANGE	TYPE	DESCRIPTION
0	0F0H	B	System exclusive code
1	47H	B	Akai identifier
2	0-15	B	MIDI channel #
3	1,4,5,6	B	Function code: RQVS = 1 Request for overall settings. RSPRM = 4 request for sample parameters. REQRE = 5 System exclusive common reception enable. SECRD = 6 Ditto disable.
4	65	B	8700 identifier.
5	0-5(15)	B	Sample number where applicable. Otherwise 0
6	0	B	Reserved. (must be 0).
7	0F7H	B	EOX

AKAI EXCLUSIVE Overall settings. (Recognized and transmitted by 8700)

BYTE	RANGE	TYPE	DESCRIPTION
0	0F0H	B	System exclusive code
1	47H	B	Akai identifier
2	0-15	B	MIDI channel #
3	0	B	OVS Function code for overall settings
4	65	B	8700 identifier
5	0	B	Reserved. (must be 0)
6	0	B	Reserved. (must be 0)
7,8	0,15	DB	Overall settings data: MDCH0 8700 basic MIDI reception channel, coded 0-15.
9,10	5,8	DB	MDMPM 8700 MIDI mode. 3=Poly, 8=Mono, 14=Special mod
11,12	0,15	DB	MDXTCH MIDI channel to be used by 8700 when 8700 is sending AKAI exclusive messages.
13,14	0,64,128	DB	OMNION 8700 Omni on=128, Omni off=0, Multi-program=
15,16	0-12	DB	PWRNGE. Pitch wheel range (+- semitones). eg 12 means range of octave down to octave up.
17,18	0,255	DB	PRCHOF. MIDI program change reception. 0 to allow, 255 to inhibit.
19,22	0	DW	Reserved
23,26	0	DW	Reserved
27,30	0	DW	Reserved
31	0-127	B	CHECKSUM. exclusive OR of bytes 7-30
32	0F0H	B	EOX

AKAI EXCLUSIVE Sample parameters. (Recognised and transmitted by S700)

BYTE	RANGE	TYPE	DESCRIPTION
0	0F0H	B	System exclusive code
1	47H	B	Akai Identifier
2	0-15	B	MIDI channel #
3	10	B	SPRM Function code for sample parameters.
4	45	B	S700 Identifier
5	0-5(15)	B	Sample number
6	0	B	Reserved. (must be 0).

First are 32 sets of sample parameters, one for each program. Each consists of 4 data elements:

7,8	0-99	DB	KEYL	Lowest key in keyrange for this sample in first program.
9,10	0-99	DB	KEYH	Highest key in keyrange.
11,12	0-255	DB	TRANSP	7 LSBs are signed key transposition. +-60. MSB is set for constant pitch.
13,14	0-255	DB	ATPYCH	Audio trigger. MSB set to disable. 7 LSBs give MIDI note.

15-262 31 further blocks of four elements for 2nd to 32nd programs. Each block is coded as bytes 7-14 above.

263,264	X	DB		Undefined.
265,266	1-4	DB	APMODE	1-one shot, 2-looping, 4=alternating, 9=Drum triggered one shot.
267-270	0-32768	DW	SSTAT	Start point.
271-274	X	DW		Undefined.
275-278	200-32768	DW	SEND	End point+1. Must be >=SSTAT+200
279-282	0-32768	DW	SLOOP	Loop point. Must be < SEND
283-286	X	DW		Undefined.
287,288	0-99	DB	LFSP	LFO speed. 0=2 Hz, 99=8 Hz.
289,290	0-99	DB	LFDP	LFO depth. 99=+- semitone.
291,292	0-99	DB	LFDL	LFO delay. 99 means slow buildup.
293,294	0-99	DB	FLTRFQ	Filter frequency. 99 means maximum.
295,296	0-99	DB	RELEASE	Release time. 99 means slowest.
297,298	0-99	DB	LONSS	Loudness. 99=max. LSB is -0.375 dB.
299,300	1-16	DB	SPNTUN	Pitch tuning. Signed. LSB is 1/16 semitone
301,302	24-96	DB	RECNP	Nominal recording pitch. Coding as for MIDI key in semitones. (69 = A440).
303,304	36-77	DB	RECBW	Recording bandwidth. Defines original sample rate. 69 means bandwidth of 10.86 KHz which corresponds to sample rate of 26400 Hz. Other rates are computed according to: Rate= 26400*2^((RECBW-69)/12). If RECNP=RECBW and SPNTUN=0 and TRANSP=0 then samples made with 60 points per cycle will come out at concert pitch.
305,306	0-255	DB	RVRSE	0=Forward, 255=Reversed. Used only for display
307,308	0-99	DB	VELFIL	Velocity/filter interaction.
309,310	0-99	DB	VELLON	Velocity/loudness interaction.
311,312	0-99	DB	VELRLS	Velocity/release interaction. 99 gives slow release for low velocity.
313,314	X	DB		Undefined.
315,316	X	DB		Undefined.
317	0-127	B		Checksum. Exclusive OR of bytes 7-317
318	0F0H	B		End of sample parameters.

* CODING OF B TB DB DW
B represents a byte transmitted as a single MIDI byte.

DB represents an 8bit parameter in S700's memory. It is sent as two MIDI bytes: first byte 0 d6 d5 d4 d3 d2 d1 d0
second byte 0 0 0 0 0 0 0 d7

where d0 is the parameter's least significant bit.
If the second byte is 2 or higher the value will not be copied into S700's memory and the previous value will remain.
It is thus possible to change only selected parameters.

TB represents a 21 bit value transmitted as three MIDI bytes:
first byte: 0 d6 d5 d4 d3 d2 d1 d0
second byte: 0 d13 d12 d11 d10 d9 d8 d7
third byte: 0 d20 d19 d18 d17 d16 d15 d14

DB represents a 12 bit value transmitted as two MIDI bytes:
first byte: 0 d11 d10 d9 d8 d7 d6 d5
second byte: 0 d4 d3 d2 d1 d0 0 0
Coding is offset binary, zero is sent as 40h 0

DW represents a 16 bit quantity. It is sent as four MIDI bytes:
first byte 0 d6 d5 d4 d3 d2 d1 d0
second byte 0 0 0 0 0 0 0 d7
third byte 0 d14 d13 d12 d11 d10 d9 d8
fourth byte 0 0 0 0 0 0 0 d15
If both the second and third bytes are 4 or more, the value will not be copied into S700's memory and the previous value will remain.

Signed and unsigned.
Parameters described as signed are represented in two complement form. e.g. 00 value of -1 = 0FFH

UNDEFINED and RESERVED
Reserved values are for possible future enhancements and must be transmitted as shown. Undefined values have no operational effect and might as well be filled with 0s.

EXAMPLE OF DIALOG WHERE COMPUTER RECEIVES SAMPLE FROM S700

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COMPUTER:    RED
              (0F0H, 7EH, 0, 0, 0, 0F7H)
              Computer requests S700 to send its first sample.

S700:        BD
              10F0H, 7EH, 1, 0, 0, 0CH,
              77H, 27H, 2,
              7EH, 7FH, 1,
              34H, 7FH, 1,
              77H, 27H, 2,
              01
              Sample period = 1019 / 26400.
              Words in sample = 32768.
              Loop start point = 32692.
              Loop end point = last sample point +1
              Modem looping.

COMPUTER:    ACKB
              (0F0H, 7EH, 7FH, 0F7H) Computer acknowledges sample header.

S700:        (0, 40H,0, 40H,0, 40H,0, 40H,0, ..... 0)
              This is a block of 60 sample points.

COMPUTER:    ACKS
              (0F0H, 7EH, 7FH, 0F7H) Computer acknowledges sample block.

              The above two lines are repeated while S700 sends a total of 546 blocks.
              :
              :
              :
S700:        (26H, 40H,0, 40H,0, 40H,0 40H,0, .....0,0 0,0 0)
              This is the 546th block. Note that the last bytes are padded
              with 0s to keep the block the same length as the others.

COMPUTER:    ACKB
              (0F0H, 7EH, 7FH, 0F7H) Computer acknowledges last block.

S700:        EOX
              (0F7H) Marks end of message.

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*C>PIF LBT:=FF

TIMEOUT.

When receiving Akai exclusive data, after the first six bytes have been received, the remaining bytes must be separated by no more than 2 seconds. This provision protects the S700 from hanging in the event of incomplete messages.



To : Akai Professional Distributors
 From : K. Urata / Hakkyo Akai Tokyo SMI Dept. cc: Service department

Subject : X7000/S700 MIDI System Exclusive's Bug

Jan 7' 1987

Dear Sirs,

Unfortunately we have found a bug in X7000/S700 MIDI System Exclusive and this has been fixed, an improved ROM version will be installed by our production line starting at beginning of Feb '87.

Bug : When X7000/S700 is received " Request for Sample Parameter " (RSPSM=4), X7000/S700 should be sending 319 byte of data to the computer once, but keep sending these data repeatedly (endless)

Countermeasure : ROM address / 30C4 = F4
 ↓
 30C4 = F8 To change

Current	23	0D	20	F4	19	10	F3
Improved	23	0D	20	F8	19	10	F3

X7000/S700 serial number : 2D2XX - XXXXX

S62(Japanese) = '1987' February

Serial number (2D2XX - XXXXX) all after will be having improved ROM version.

Please note that this bug is in MIDI System Exclusive, so this could be only concerned with the customer who want to develop or to buy computer software, and if there's any inquiry from your dealer or customer concerning this problem, please contact to Akai Tokyo / Service department.

We will be able to provide you improved ROM version with free of charge.
 (Available by the end of January '87)

Apart from above change, there were mistakes in MIDI System Exclusive Format, so please find enclosed reissued MIDI System Exclusive (changes underlined)

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