

Technical
documentation
of the

KIMOJO

interface
for use with an
UART
link

Version 1.0

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Presentation

The KIMOJO interface is an interface that allow the use, on old computers, of keyboards, mice and more modern joysticks than those of origin. It is able to simultaneously manage a keyboard and mouse that belong to the PS/2 or USB standard, as well as two USB joysticks, preferably the Sony “Dualshock 3” joystick. In addition, it can handle a joystick of this type via a wireless link with a Bluetooth dongle.

Originally developed on Amiga computers, it can now work with the Atari computers since its 1.3 version. On this computer, communication with the card is carried out through an asynchronous link and the data that transits there respond to a well-defined protocol. This asynchronous link can operate in two modes: the first, compatible with Atari computers and the second, more general, compatible with any host with a link to this standard. The purpose of this document is to describe the characteristics of this connection, and the protocol used to exchange data.

Serial link specifications

The KIMOJO interface communicates with its host via an asynchronous serial link that can operate in two modes. The first, compatible with Atari computers:

- The transmission speed is 7812.5 bits/s.
- The data format is: one start bit, 8 data bits and one stop bit.
- The least significant bit is sent first.
- The idle state is the high level.

The second, faster and more widespread:

- The transmission speed is 9600 bits/s.
- The data format is: one start bit, 8 data bits and one stop bit.
- The least significant bit is sent first.
- The idle state is the low level.

The choice of the link mode is determined by the position of the configuration switches present on the interface. See the documentation on the functioning of Amiga computers for details.

This link is Full Duplex, ie the card can issue data and receive it simultaneously.

Format of data packets

The exchange of data on this transmission line is governed by a well-defined protocol. Each data packet begins with a header byte that defines the nature and number of data it contains. When the host is the transmitter of this packet, this header corresponds to a command that the interface should execute. When the card is the transmitter of this packet, this header identifies the type of data sent that correspond either to the response to a received command or a report concerning an action on one of the managed devices, the movement of the mouse or pressing a keyboard key for example. When it comes to the action on the keyboard, it is this header itself that determines which key has been operated.

Because the KIMOJO interface can process multiple protocols at the same time (PS/2, USB and Bluetooth), it may not be able to execute the received commands immediately. It can indeed have a shift of a few milliseconds between the receiving of a command and its execution. Thus, if the host sends too many commands that the interface can not run, it has a 32-byte buffer for queuing commands to execute.

Overview of commands

This section lists all the commands managed by the KIMOJO interface. These commands are an implementation of those defined by Atari for their computers. Any data packet, of one or more bytes, sent by the host is obligatorily a command identified by its first byte. If this first byte does not match a known command identifier, it is ignored. Unexpected results may appear if this unknown byte is followed by data that could be interpreted as the package of a valid command. These commands are organized in 4 categories.

Changing Device Management

The commands in this category allow you to change how the KIMOJO interface returns to the host the state of the mouse and joysticks. There is no specific command for the keyboard.

Header	Length	Command name
0x07	2	« SET MOUSE BUTTON ACTION »
0x08	2	« SET RELATIVE MOUSE POSITION REPORTING »
0x09	2	« SET ABSOLUTE MOUSE POSITIONING »
0x0A	2	« SET MOUSE KEYCODE MODE »
0x0B	2	« SET MOUSE THRESHOLD »
0x0C	2	« SET MOUSE SCALE »
0x0E	6	« LOAD MOUSE POSITION »
0x0F	1	« SET Y=0 AT BOTTOM »
0x10	1	« SET Y=0 AT TOP »
0x12	1	« DISABLE MOUSE »
0x14	1	« SET JOYSTICK EVENT REPORTING »
0x15	1	« SET JOYSTICK INTERROGATION MODE »
0x17	2	« SET JOYSTICK MONITORING »
0x19	7	« SET JOYSTICK KEYCODE MODE »
0x1A	1	« DISABLE JOYSTICKS »

Querying the state of the devices

The commands in this category provide informations about the state of the mice and joysticks when the interface is configured to not sending event report on the activity of these devices. Here again, no control exists for the keyboard.

Header	Length	Command name
0x0D	1	« INTERROGATE MOUSE POSITION »
0x16	1	« JOYSTICK INTERROGATE »

Miscellaneous commands

This category includes non-peripheral commands.

Header	Length	Command name
0x1B	7	« TIME-OF-DAY CLOCK SET »
0x1C	1	« INTERROGATE TIME-OF-DAY CLOCK »
0x80	2	« RESET »

Reading devices configuration

The commands in this category make it possible to know the configuration of the mouse and the joysticks. No command exists for the keyboard. The response produced by the KIMOJO interface is thus made when it returns, it is possible to restore the parameter concerned: the answer contains indeed the complete command necessary to restore the parameter concerned.

Header	Length	Command name
0x87	1	« INQUERY MOUSE BUTTON ACTION »
0x88	1	« INQUERY MOUSE MODE »
0x89	1	« INQUERY MOUSE MODE »
0x8A	1	« INQUERY MOUSE MODE »
0x8B	1	« INQUERY MOUSE THRESHOLD »
0x8C	1	« INQUERY MOUSE SCALE »
0x8F	1	« INQUERY MOUSE VERTICAL CORDINATES »
0x90	1	« INQUERY MOUSE VERTICAL CORDINATES »
0x92	1	« INQUERY MOUSE STATE »
0x94	1	« INQUERY JOYSTICK MODE »
0x95	1	« INQUERY JOYSTICK MODE »
0x97	1	« INQUERY JOYSTICK MODE »
0x99	1	« INQUERY JOYSTICK MODE »
0x9A	1	« INQUERY JOYSTICK STATE »

Detailed description of commands

Changing Device Management

Command « SET MOUSE BUTTON ACTION »

Format of the data packet to send:

Header	Data
0x07	%00000MPR

This command determines the behavior of the mouse buttons.

When the mouse is in keyboard mode or when the mouse is in relative report mode while “m” is 1, a change of state of one of its buttons generates a key code:

- If the left button is pressed when “P” is set to 1, then the interface sends the code “0x74” to the host.
- If the right button is pressed when “P” is set to 1, then the interface sends the code “0x75” to the host.
- If the left button is released when “R” is set to 1, then the card sends the code “0xF4” to the host.
- If the right button is released and "R" is set to 1, then the card sends the code "0xF5" to the host.

In addition, when the mouse is in absolute mode, and whatever the value of “M”, if “P” is fixed to 1, then pressing on one of its buttons generates an absolute position report. Similarly, if “R” is 1, releasing one of its buttons also generates an absolute position report.

Command « SET RELATIVE MOUSE POSITION REPORTING »

Format of the data packet to send:

Header	Data
0x08	None

This command activates the relative report mode of the mouse.

In this mode, a report is sent to the host whenever the mouse moved or a change of state of one of his buttons took place. This is the default mouse management mode after power-up or resetting the KIMOJO interface. The report sent has the following structure:

Header	Data	
%111110AB	DX	DY

Field	Description
A	Left button state
B	Right button state
DX	Delta X
DY	Delta Y

“DX” and “DY” represent the amounts of mouse movements relative to its previous position. If “DX” is positive, it means that the mouse has been moved to the right, and to the left when it is negative. When the ordinate axis is placed at the top, "DY" is positive when the mouse is moved to the user, and negative when the mouse goes away. When the ordinate axis is placed at the bottom, the sign of "DY" is reversed.

The « [SET MOUSE THRESHOLD](#) » command sets the minimum amount of movement for a report to be sent to the host.

The « [SET Y=0 AT BOTTOM](#) » and « [SET Y=0 AT TOP](#) » commands define the position of the ordinate axis and have an impact on the execution of this command.

Command « SET ABSOLUTE MOUSE POSITIONING »

Format of the data packet to send:

Header	Data			
0x09	XMSB	XLSB	YMSB	YLSB

This command activates the absolute mode positioning of the mouse.

In this mode, the KIMOJO interface does not send any report as soon as the mouse moved or one of its buttons has been operated. It internally manages the position of the mouse and ensures that it remains well within the limits provided in parameters of the command. When the command is executed while the absolute positioning mode of the mouse is not activated, this internal position is initialized. If the absolute mode is already activated, then the internal coordinates of the mouse are analyzed against the new limits, but are not initialized: they remain unchanged if they are within the limits provided.

The « [INTERROGATE MOUSE POSITION](#) » command allows you to know the position of the mouse.

The « [LOAD MOUSE POSITION](#) » command allows you to define this position.

The « [SET MOUSE SCALE](#) » command defines the amount of mouse move for the value of the internal coordinates to increases or decreases by 1. It allows to define a move scale somehow.

The « [SET MOUSE BUTTON ACTION](#) » command enables sending an absolute position report when an action on one of the mouse buttons occurs.

The « [SET Y=0 AT BOTTOM](#) » and « [SET Y=0 AT TOP](#) » commands define the position of the ordinate axis and have an impact on the execution of this command.

Command « SET MOUSE KEYCODE MODE »

Format of the data packet to send:

Header	Data	
0x0A	DX	DY

This command enable the keyboard mode of the mouse.

In this mode, when the mouse moved from at least “DX” or “DY”, key codes are sent. These codes match the arrow keys. Each key code pressed is followed by the released code corresponding to this same key. Thus, the “0x4b 0xcb” sequence is sent when the mouse is moved to the left, “0x4d 0xcd” to the right, “0x48 0xc8” up and “0x50 0xd0” down.

This command is not impacted by the « [SET Y=0 AT BOTTOM](#) » and « [SET Y=0 AT TOP](#) » commands.

Command « SET MOUSE THRESHOLD »

Format of the data packet to send:

Header	Data	
0x0B	DX	DY

This command modifies the movement threshold that the mouse should reach to generate a relative position report. It affects the « [SET RELATIVE MOUSE POSITION REPORTING](#) » command. This threshold is set at 1 after power up or resetting the interface.

Command « SET MOUSE SCALE »

Format of the data packet to send:

Header	Data	
0x0C	EX	EY

This command sets the amount of mouse movement required to increase or decrease its internal position by 1. It only makes sense if the absolute position mode of the mouse is enable. It impacts the « [SET ABSOLUTE MOUSE POSITIONING](#) » command.

Command « LOAD MOUSE POSITION »

Format of the data packet to send:

Header	Data				
0x0E	0x00	XMSB	XLSB	YMSB	YLSB

This command sets the internal coordinates of the mouse.

It is usable only when the absolute position mode of the mouse is active. Once the command is executed, its internal coordinates are checked in order to always be within the limits set by the « [SET ABSOLUTE MOUSE POSITIONING](#) » command.

Command « SET Y=0 AT BOTTOM »

Format of the data packet to send:

Header	Data
0x0F	None

This command sets the position of the ordinate axis at the bottom of the mouse plane, ie close to the user. It affects reports sent in relative and absolute mode of the mouse. In keyboard mode, this command has no effect.

Command « SET Y=0 AT TOP »

Format of the data packet to send:

Header	Data
0x10	None

This command sets the position of the ordinate axis at the top of the mouse plane, ie away from the user. It affects reports sent in relative and absolute mode of the mouse. In keyboard mode, this command has no effect.

Command « DISABLE MOUSE »

Format of the data packet to send:

Header	Data
0x12	None

This command disables the mouse.

Any event related to the mouse is ignored and not reported to the host, but the management of this device by the KIMOJO interface continues. Only « [SET RELATIVE MOUSE POSITION REPORTING](#) », « [SET ABSOLUTE MOUSE POSITIONING](#) » and « [SET MOUSE KEYCODE MODE](#) » commands can enable it again.

Command « SET JOYSTICK EVENT REPORTING »

Format of the data packet to send:

Header	Data
0x14	None

This command enables the report mode for joysticks.

Like the mouse, every action on the joysticks or one of their buttons causes the KIMOJO interface to send a report whose format is as follow:

Header	Data
%11111111J	%B000RLDU

Bit	Description
J	Joystick identifier (0 = first joystick, 1 = second joystick)
B	State of the joystick button
R	The stick is tilted to the right
L	The stick is tilted to the left
D	The stick is tilted to the bottom
U	The stick is tilted to the top

Command « SET JOYSTICK INTERROGATION MODE »

Format of the data packet to send:

Header	Data
0x15	None

This command enable the joystick interrogation mode.

This is the same mode as the absolute report mode for the mouse. No more reports are sent to the host. The « [JOYSTICK INTERROGATE](#) » command must be used to know the current state of the two joysticks.

Command « SET JOYSTICK MONITORING »

Format of the data packet to send:

Header	data
0x17	Rate

This command enable the monitoring mode of the joysticks.

When this mode is enabled, the KIMOJO interface sends to the rate of “rate” hundredths of a second a report on the state of the joysticks whose structure is as follow:

Data	
%000000bB	%rlduRLDU

Bit	Description
b	State button of the first joystick
B	State button of the second joystick
r	The stick of the first joystick is tilted to the right
l	The stick of the first joystick is tilted to the left
d	The stick of the first joystick is tilted to the bottom
u	The stick of the first joystick is tilted to the top
R	The stick of the second joystick is tilted to the right
L	The stick of the second joystick is tilted to the left
D	The stick of the second joystick is tilted to the bottom
U	The stick of the second joystick is tilted to the top

In addition, in this mode, the management of the mouse and keyboard is disabled, which explains why there is no header in this package, since the data sent by the KIMOJO interface can only come from joysticks. To enable the keyboard and the mouse again, this joystick mode must be disabled with the « [SET JOYSTICK INTERROGATION MODE](#) » or « [SET JOYSTICK KEYCODE MODE](#) » command.

Command « SET JOYSTICK KEYCODE MODE »

Format of the data packet to send:

Header	Data					
0x19	RX	RY	TX	TY	VX	VY

This command enable the keyboard mode for the first joystick.

In this mode, each action on the stick of the first joystick causes the KIMOJO interface to send to the host a pair of codes. These codes match the arrow keys. Thus, the “0x4b 0xcb” sequence is sent when the stick is directed to the left, “0x4d 0xcd” to the right, “0x48 0xc8” up and “0x50 0xd0” down. In addition, the “Fire” button of the joystick has no action and the second joystick is disabled.

The rate at which these code sequences are sent depend on parameters supplied to the command and are expressed in tenths of seconds. Thus, when an action takes place on the stick of the joystick, a sequence of codes is sent to the rhythm of “TX” / ”TY” during “RX” / ”RY”, then all the “VX” / “VY” up to that the stick regains its rest position. The “RX” / “RY” parameters can be zero in which case only the “VX” / “VY” parameters are used.

Command « DISABLE JOYSTICKS »

Format of the data packet to send:

Header	Data
0x1A	None

This command disable the joysticks.

Only the « [SET JOYSTICK EVENT REPORTING](#) », « [SET JOYSTICK INTERROGATION MODE](#) », « [SET JOYSTICK MONITORING](#) » and « [SET JOYSTICK KEYCODE MODE](#) » commands can enable the joysticks again.

Querying the state of the devices

command « INTERROGATE MOUSE POSITION »

Format of the data packet to send:

Header	Data
0x0D	None

This command allows you to know the position of the mouse.

This command is usable only when the absolute position mode of the mouse is enabled. In response, the KIMOJO interface sends the host a data packet containing the absolute position of the mouse as well as the state of its two buttons. This data packet is as follow:

Header	Data				
0xF7	%0000DCBA	XMSB	XLBS	YMSB	YLSB

Bit/field	Description
A	Indicates that the right button was pressed since the last querying
B	Indicates that the right button was released since the last querying
C	Indicates that the left button was pressed since the last querying
D	Indicates that the left button was released since the last querying
XMSB:XLBS	Horizontal position of the mouse
YMSB:YLSB	Vertical position of the mouse

This command is treated differently from the others: as soon as it is received by the interface and no command is in the queue, then it is executed immediately.

The « [SET ABSOLUTE MOUSE POSITIONING](#) » command enable the absolute mouse position.

Command « JOYSTICK INTERROGATE »

Format of the data packet to send:

Header	Data
0x16	None

This command allows to know the current status of the two joysticks.

This command can only be used when the joystick interrogation mode is activated (see « [SET JOYSTICK INTERROGATION MODE](#) » command). Upon receipt of this command, the KIMOJO interface sends the host a data packet whose format is as follows:

Header	Data	
0xFD	%b000rldu	%B000RLDU

Bit	Description
b	State button of the first joystick
r	The stick of the first joystick is tilted to the right
l	The stick of the first joystick is tilted to the left
d	The stick of the first joystick is tilted to the bottom
u	The stick of the first joystick is tilted to the top
B	State button of the second joystick
R	The stick of the second joystick is tilted to the right
L	The stick of the second joystick is tilted to the left
D	The stick of the second joystick is tilted to the bottom
U	The stick of the second joystick is tilted to the top

Miscellaneous commands

Command « TIME-OF-DAY CLOCK SET »

Format of the data packet to send:

Header	Data					
0x1B	YY	MM	DD	hh	mm	ss

Byte	Description
YY	Year
MM	Month
DD	Day
hh	Hours
mm	Minutes
ss	Seconds

This command set the date.

The parameters of the command are in the “BCD” format and must specify a valid date and time in “H24” format, otherwise unexpected result may occurs.

The KIMOJO interface embed a clock, so the date and time are retained after the power off if a battery backup is connected to its dedicated connector. Otherwise, they are initialized to the 00/01/01 00:00:00 values after each power on and the clock is halted until this command is executed.

Command « INTERROGATE TIME-OF-DAY CLOCK »

Format of the data packet to send:

Header	Data
0x1C	None

This command allows you to know the date and time.

Once executed, the KIMOJO interface sends the host a data packet whose format is the following:

Header	Data					
0xFC	YY	MM	DD	hh	mm	ss

Data are the same as for the « [TIME-OF-DAY CLOCK SET](#) » command.

Command « RESET »

Format of the data packet to send:

Header	Data
0x80	0x01

This command performs a reset.

Only the part dedicated to the host management is reset, not the KIMOJO itself. The queue commands to run and the data to send to the host are not impacted. After the execution of this command, the interface sends “0xf0” to the host:

- All devices are enabled.
- The mouse report mode is enabled (« [SET RELATIVE MOUSE POSITION REPORTING](#) »).
- The joysticks event report mode is enabled (« [SET JOYSTICK EVENT REPORTING](#) »)
- The ordinate axis of the mouse is set to top (« [SET Y=0 AT TOP](#) »).
- The scale mouse factor is set to one (« [SET MOUSE SCALE](#) »).
- The threshold mouse is set to one (« [SET MOUSE THRESHOLD](#) »).

Reading device configuration

Command « INQUERY MOUSE BUTTON ACTION »

Format of the data packet to send:

Header	Data
0x87	None

This command allows to know the configuration of mouse buttons.

After the execution of this command, the KIMOJO interface sends the host a data packet whose format is the following:

Header	Data							
0xF6	0x07	P1	0x00	0x00	0x00	0x00	0x00	0x00

See the « [SET MOUSE BUTTON ACTION](#) » command for details about the “P1” parameter.

Command « INQUERY MOUSE MODE »

Format of the data packet to send:

Header	Data
0x88	None
0x89	
0x8A	

This command allows to know the mouse management mode.

After the execution of this command defined by three possible headers, the KIMOJO interface sends the host a data packet whose format is different depending of the mouse management mode currently activated:

When the mouse is in the relative position reporting mode:

Header	Data							
0xF6	0x08	0x00	0x00	0x00	0x00	0x00	0x00	0x00

When the mouse is in the absolute positioning mode:

Header	Data							
0xF6	0x09	XMAX MSB	XMAX LSB	YMAX MSB	YMAX LSB	0x00	0x00	0x00

When the mouse is in the keyboard mode:

Header	Data							
0xF6	0x0A	DX	DY	0x00	0x00	0x00	0x00	0x00

Command « INQUERY MOUSE THRESHOLD »

Format of the data packet to send:

Header	Data
0x8B	None

This command allows to know the mouse movement threshold.

After the execution of this command, the KIMOJO interface sends the host a data packet whose format is the following:

Header	Data							
0xF6	0x0B	DX	DY	0x00	0x00	0x00	0x00	0x00

See the « [SET MOUSE THRESHOLD](#) » command for details about the “DX” and “DY” parameters.

Command « INQUERY MOUSE SCALE »

Format of the data packet to send:

Header	Data
0x8C	None

This command allows to know the scale factor of the mouse.

After the execution of this command, the KIMOJO interface sends the host a data packet whose format is the following:

Header	Data							
0xF6	0x0C	EX	EY	0x00	0x00	0x00	0x00	0x00

See the « [SET MOUSE SCALE](#) » command for details about the “EX” and “EY” parameters.

Command « INQUERY MOUSE VERTICAL CORDINATES »

Format of the data packet to send:

Header	Data
0x8F 0x90	None

This command allows to know the position of the ordinate axis of the mouse.

After the execution of this command defined by two possible headers, the KIMOJO interface sends the host a data packet whose format is the following:

Header	Data							
0xF6	ID	0x00	0x00	0x00	0x00	0x00	0x00	0x00

When the ordinate axis is fixed at the bottom, “ID” equal “0x0f”, “0x10” in the opposite case. See the « [SET Y=0 AT BOTTOM](#) » and « [SET Y=0 AT TOP](#) » command for more details.

Command « INQUERY MOUSE STATE »

Format of the data packet to send:

Header	Data
0x92	None

This command allows to know the state of the mouse.

After the execution of this command, the KIMOJO interface sends the host a data packet whose format is the following:

Header	Data							
0xF6	ID	0x00	0x00	0x00	0x00	0x00	0x00	0x00

When the mouse is enabled, “ID” equal “0x00”, “0x12” otherwise. See the « [DISABLE MOUSE](#) » command for more details.

Command « INQUERY JOYSTICK MODE »

Format of the data packet to send:

Header	Data
0x94	None
0x95	
0x97	
0x99	

This command allows to know the joysticks management mode.

After the execution of this command defined by four possible headers, the KIMOJO interface sends the host a data packet whose format is the following:

When the joysticks event reporting mode is enabled:

Header	Data							
0xF6	0x14	0x00	0x00	0x00	0x00	0x00	0x00	0x00

When the joysticks interrogation mode is enabled:

Header	Data							
0xF6	0x15	0x00	0x00	0x00	0x00	0x00	0x00	0x00

When the joystick monitoring mode is enabled:

Header	Data							
0xF6	0x17	Rate	0x00	0x00	0x00	0x00	0x00	0x00

When the joystick keyboard mode is enabled:

Header	Data							
0xF6	0x19	RX	RY	TX	TY	VX	VY	0x00

See the « [SET JOYSTICK EVENT REPORTING](#) », « [SET JOYSTICK INTERROGATION MODE](#) », « [SET JOYSTICK MONITORING](#) » and « [SET JOYSTICK KEYCODE MODE](#) » for more details.

Command INQUERY JOYSTICK STATE

Format of the data packet to send:

Header	Data
0x9A	None

This command allows to know the state of joysticks.

After the execution of this command, the KIMOJO interface sends the host a data packet whose format is the following:

Header	Data							
0xF6	ID	0x00	0x00	0x00	0x00	0x00	0x00	0x00

When the joysticks are enabled, “ID” equal “0x00”, “0x1A” otherwise. See the « [DISABLE JOYSTICKS](#) » command for more details.

Data packets sent by the KIMOJO interface

Any data packet sent by the interface starts with a byte that identifies the data that follows it. This identifier also determines the size of the data packet and may be followed by no data associated with it: it is the case of keyboard key codes or the answer to the « [RESET](#) » command.

Data packets related to the keyboard

Header	Length	Description
0x01	1	« ESC » key pressed
0x02	1	« 1 » key pressed
0x03	1	« 2 » key pressed
0x04	1	« 3 » key pressed
0x05	1	« 4 » key pressed
0x06	1	« 5 » key pressed
0x07	1	« 6 » key pressed
0x08	1	« 7 » key pressed
0x09	1	« 8 » key pressed
0x0A	1	« 9 » key pressed
0x0B	1	« 0 » key pressed
0x0C	1	« - » key pressed
0x0D	1	« = » key pressed
0x0E	1	« BS » key pressed
0x0F	1	« TAB » key pressed
0x10	1	« Q » key pressed
0x11	1	« W » key pressed
0x12	1	« E » key pressed
0x13	1	« R » key pressed
0x14	1	« T » key pressed
0x15	1	« Y » key pressed
0x16	1	« U » key pressed
0x17	1	« I » key pressed
0x18	1	« O » key pressed

Header	Length	Description
0x19	1	« P » key pressed
0x1A	1	« [» key pressed
0x1B	1	«] » key pressed
0x1C	1	« RET » key pressed
0x1D	1	« CTRL » key pressed
0x1E	1	« A » key pressed
0x1F	1	« S » key pressed
0x20	1	« D » key pressed
0x21	1	« F » key pressed
0x22	1	« G » key pressed
0x23	1	« H » key pressed
0x24	1	« J » key pressed
0x25	1	« K » key pressed
0x26	1	« L » key pressed
0x27	1	« ; » key pressed
0x28	1	« ‘ » key pressed
0x29	1	« ` » key pressed
0x2A	1	« LEFT SHIFT » key pressed
0x2B	1	« \ » key pressed
0x2C	1	« Z » key pressed
0x2D	1	« X » key pressed
0x2E	1	« C » key pressed
0x2F	1	« V » key pressed
0x30	1	« B » key pressed
0x31	1	« N » key pressed
0x32	1	« M » key pressed
0x33	1	« , » key pressed
0x34	1	« . » key pressed
0x35	1	« / » key pressed
0x36	1	« RIGHT SHIFT » key pressed
0x38	1	« ALT » key pressed
0x39	1	« SPACE BAR » key pressed
0x3A	1	« CAPS LOCK » key pressed

Header	Length	Description
0x3B	1	« F1 » key pressed
0x3C	1	« F2 » key pressed
0x3D	1	« F3 » key pressed
0x3E	1	« F4 » key pressed
0x3F	1	« F5 » key pressed
0x40	1	« F6 » key pressed
0x41	1	« F7 » key pressed
0x42	1	« F8 » key pressed
0x43	1	« F9 » key pressed
0x44	1	« F10 » key pressed
0x47	1	« HOME » key pressed
0x48	1	« UP ARROW » key pressed
0x4A	1	« - » key of numeric keypad pressed
0x4B	1	« LEFT ARROW » key pressed
0x4D	1	« RIGHT ARROW » key pressed
0x4E	1	« + » key of numeric keypad pressed
0x50	1	« DOWN ARROW » key pressed
0x52	1	« INSERT » key pressed
0x53	1	« DEL » key pressed
0x60	1	« ISO » key pressed
0x61	1	« UNDO » key pressed
0x62	1	« HELP » key pressed
0x63	1	« (» key of numeric keypad pressed
0x64	1	« / » key of numeric keypad pressed
0x65	1	« * » key of numeric keypad pressed
0x66	1	« * » key of numeric keypad pressed
0x67	1	« 7 » key of numeric keypad pressed
0x68	1	« 8 » key of numeric keypad pressed
0x69	1	« 9 » key of numeric keypad pressed
0x6A	1	« 4 » key of numeric keypad pressed
0x6B	1	« 5 » key of numeric keypad pressed
0x6C	1	« 6 » key of numeric keypad pressed
0x6D	1	« 1 » key of numeric keypad pressed

Header	Length	Description
0x6E	1	« 2 » key of numeric keypad pressed
0x6F	1	« 3 » key of numeric keypad pressed
0x70	1	« 0 » key of numeric keypad pressed
0x71	1	« . » key of numeric keypad pressed
0x72	1	« ENTER » key of numeric keypad pressed
0x81	1	« ESC » key released
0x82	1	« 1 » key released
0x83	1	« 2 » key released
0x84	1	« 3 » key released
0x85	1	« 4 » key released
0x86	1	« 5 » key released
0x87	1	« 6 » key released
0x88	1	« 7 » key released
0x89	1	« 8 » key released
0x8A	1	« 9 » key released
0x8B	1	« 0 » key released
0x8C	1	« - » key released
0x8D	1	« = » key released
0x8E	1	« BS » key released
0x8F	1	« TAB » key released
0x90	1	« Q » key released
0x91	1	« W » key released
0x92	1	« E » key released
0x93	1	« R » key released
0x94	1	« T » key released
0x95	1	« Y » key released
0x96	1	« U » key released
0x97	1	« I » key released
0x98	1	« O » key released
0x99	1	« P » key released
0x9A	1	« [» key released
0x9B	1	«] » key released
0x9C	1	« RET » key released

Header	Length	Description
0x9D	1	« CTRL » key released
0x9E	1	« A » key released
0x9F	1	« S » key released
0xA0	1	« D » key released
0xA1	1	« F » key released
0xA2	1	« G » key released
0xA3	1	« H » key released
0xA4	1	« J » key released
0xA5	1	« K » key released
0xA6	1	« L » key released
0xA7	1	« ; » key released
0xA8	1	« ‘ » key released
0xA9	1	« ` » key released
0xAA	1	« LEFT SHIFT » key released
0xAB	1	« \ » key released
0xAC	1	« Z » key released
0xAD	1	« X » key released
0xAE	1	« C » key released
0xAF	1	« V » key released
0xB0	1	« B » key released
0xB1	1	« N » key released
0xB2	1	« M » key released
0xB3	1	« , » key released
0xB4	1	« . » key released
0xB5	1	« / » key released
0xB6	1	« RIGHT SHIFT » key released
0xB8	1	« ALT » key released
0xB9	1	« SPACE BAR » key released
0xBA	1	« CAPS LOCK » key released
0xBB	1	« F1 » key released
0xBC	1	« F2 » key released
0xBD	1	« F3 » key released
0xBE	1	« F4 » key released

Header	Length	Description
0xBF	1	« F5 » key released
0xC0	1	« F6 » key released
0xC1	1	« F7 » key released
0xC2	1	« F8 » key released
0xC3	1	« F9 » key released
0xC4	1	« F10 » key released
0xC7	1	« HOME » key released
0xC8	1	« UP ARROW » key released
0xCA	1	« - » key of numeric keypad released
0xCB	1	« LEFT ARROW » key released
0xCD	1	« RIGHT ARROW » key released
0xCE	1	« + » key of numeric keypad released
0xD0	1	« DOWN ARROW » key released
0xD2	1	« INSERT » key released
0xD3	1	« DEL » key released
0xE0	1	« ISO » key released
0xE1	1	« UNDO » key released
0xE2	1	« HELP » key released
0xE3	1	« (» key of numeric keypad released
0xE4	1	« / » key of numeric keypad released
0xE5	1	« * » key of numeric keypad released
0xE6	1	« * » key of numeric keypad released
0xE7	1	« 7 » key of numeric keypad released
0xE8	1	« 8 » key of numeric keypad released
0xE9	1	« 9 » key of numeric keypad released
0xEA	1	« 4 » key of numeric keypad released
0xEB	1	« 5 » key of numeric keypad released
0xEC	1	« 6 » key of numeric keypad released
0xED	1	« 1 » key of numeric keypad released
0xEE	1	« 2 » key of numeric keypad released
0xEF	1	« 3 » key of numeric keypad released
0xF0	1	« 0 » key of numeric keypad released
0xF1	1	« . » key of numeric keypad released
0xF2	1	« ENTER » key of numeric keypad released

Command response packets

Header	Length	Description
0xF0	1	Response to the « RESET » command
0xF6	8	Response to the « STATUS INQUIRIES » command
0xF7	6	Response to the « INTERROGATE MOUSE POSITION » command
0xFC	7	Response to the « INTERROGATE TIME OF DAY CLOCK » command
0xFD	3	Response to the « JOYSTICK INTERROGATE » command

Event report data packets

Header	Length	Description
0xF8	3	Mouse event Report
0xF9	3	Mouse event Report
0xFA	3	Mouse event Report
0xFB	3	Mouse event Report
0xFE	2	First joystick event report
0xFF	2	Second joystick event report