

# "Maple Bus 1.0" Peripheral Hard Ware Specifications

## Twinstick

Revision 1.00

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Revision:

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1.00	1999/06/16	<ul style="list-style-type: none"><li>• Fixed Device Status – Product name changed.</li><li>• Fixed Device Status – Standby current consumption changed.</li><li>• Fixed Device Status – Maximum current consumption changed.</li><li>• Free Device Status – Changed.</li></ul>

\* For items affected by the latest revisions and previous revisions, added items are set off by , and deleted items are set off by .

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## 1. Twinstick FUNCTION CONDITIONS

### 1.1 Twinstick function definitions

The Twinstick indicates the input form fo the man-machine interface.

The Twinstick conforms with the Maple Bus 1.0 Standard Specifications. The device itself belongs to function type "FT<sub>0</sub>: Controller."

### 1.2 Function elements

Twinstick consists of the following elements among those defined in the FT<sub>0</sub>: Controller function.

- Digital direction keys A : Ra,La,Da,Ua
- Digital direction keys B : Rb,Lb,Db,Ub
- Digital buttons : A,B,C,D,X,Y,Z,Start

### 1.3 Detailed description of constituent elements

Each of the Twinstick function elements is describe in detail in the following.

(1) Digital direction keys A : Ra,La,Da,Ua

These are 2-value press/release (= ON/OFF) digital type keys (buttons).

Ra and La, Da and Ua form counterparts. The straight line (X-axis) on which Ra and La are placed at the respective endpoints intersects with the other straight line (Y-axis) on which the Da and Ua are placed at the respective endpoints. The keys (buttons) are arranged on the X-Y surface composed by these straight lines. The way the keys (buttons) are arranged and the directions of movement are as follows: Ra is on the right side, right direction, La is on the left side, left direction, Da is at the bottom, downward direction and toward the viewer, Ua is at the top, upward direction and away from the viewer.

The values are press= '0', release= '1'.

The Twinstick must not generate the key data of more than 3 keys (buttons) at the same time.

These direction keys are primarily for left-hand operation.

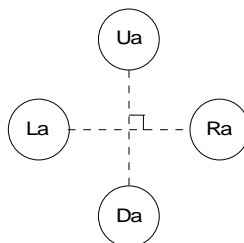


Fig. 1.1 Button layout of digital direction keys A

## (2) Digital direction keys B : Rb,Lb,Db,Ub

These are 2-value press/release (= ON/OFF) digital type keys (buttons).

Rb and Lb, Db and Ub form counterparts. The straight line (X-axis) on which Rb and Lb are placed at the respective endpoints intersects with the other straight line (Y-axis) on which the Db and Ub are placed at the respective endpoints. The keys (buttons) are arranged on the X-Y surface composed by these straight lines.

The way the keys (buttons) are arranged and the directions of movement are as follows: Rb is on the right side, right direction, Lb is on the left side, left direction, Db is at the bottom, downward direction and toward the viewer, Ub is at the top, upward direction and away from the viewer.

These direction keys are primarily for right-hand operation.

The values are: press = '0', release = '1'.

The Twinstick must not generate the key data of more than 3 keys (buttons) at the same time.

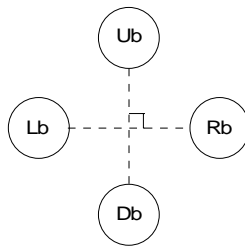


Fig. 1.2 Button layout of digital direction keys B

## (3) Digital button : A,B,C,D,X,Y,Z,Start

These are 2-value press/release (= ON/OFF) digital type keys (buttons).

The button arrangement is optional.

The Twinstick must be able to detect whether multiple keys (buttons) are ON at the same time.

The values are: press = '0', release = '1'.

## 2. Twinstick FUNCTION OPERATION

The Twinstick should be manufactured in accordance with the operation of " FT<sub>0</sub> : Contoroller" functions.

### (1) Key scan

It is a requirement that the data (key data) of the digital keys (buttons) and analog keys are always being updated.

There can always be a good response to data requests from the host.

Since there is no order of priority for key scan, all the keys (buttons) should be concurrently readable.

### (2) Optimization, conditions

- a) For the cross keys, no more than 3 keys (buttons) must be ON at the same time (key data must not be generated).
- b) The cross keys U and D, R and L must not be On at the same time (key data must not be generated).
- c) The simultaneous ON statuses of multiple digital buttons must detectable.
- d) When two or more keys (buttons) are simultaneously pressed, keys (buttons) that are not pressed must not come ON (key data must not be generated).
- e) Also includes a chattering and cancel function.

### (3) Expansion socket

The Twinstick have an expansion socket.

### 3. Device ID

In accordance with the device ID definition in the “Maple Bus 1.0” Standard Specifications.

The notation is that of the host’s memory image.

#### 3.1 Configuration of the Twinstick device ID

The device ID consists of 16 bytes (128 bits).

Bit	7	6	5	4	3	2	1	0
1st Data	0	0	0	0	0	0	0	0
2nd Data	0	0	0	0	0	0	0	0
3rd Data	0	0	0	0	0	0	0	0
4th Data	0	0	0	0	0	0	0	1
5th Data	0	0	0	0	0	0	0	0
6th Data	0	0	0	0	0	0	0	0
7th Data	1	1	1	1	1	1	1	0
8th Data	1	1	1	1	1	1	1	0
9th Data	0	0	0	0	0	0	0	0
10 <sup>th</sup> Data	0	0	0	0	0	0	0	0
11th Data	0	0	0	0	0	0	0	0
12th Data	0	0	0	0	0	0	0	0
13th Data	0	0	0	0	0	0	0	0
14th Data	0	0	0	0	0	0	0	0
15th Data	0	0	0	0	0	0	0	0
16th Data	0	0	0	0	0	0	0	0

Fig. 3.1 Configuration of device ID

FT : Designates type of function that the peripheral is equipped with. (Data 1<sup>st</sup> ~ 4<sup>th</sup>)

FD1 : Designates the function definition block of the first function. (Data 5<sup>th</sup> ~ 8<sup>th</sup>)

FD2 : Designates the function definition block of the second function. (Data 9<sup>th</sup> ~ 12<sup>th</sup>)

FD3 : Designates the function definition block of the third function. (Data 13<sup>th</sup> ~ 16<sup>th</sup>)

(1) FT<sub>0</sub>-FT<sub>31</sub> : Function type

Designates the function that the peripheral is equipped with.

There are 32 function types altogether.

(2) FD<sub>31</sub>-FD<sub>0</sub> : Function definition block

This is for the block defining the individual elements making up the function.

## 4. DATA FORMATS

The Twinstick function data formats are explained in the following.

The notation is that of the host's memory image.

### 4.1 Read format

This is the key data format when the Twinstick function data are read.

The data format size is 8 bytes.

Bit	7	6	5	4	3	2	1	0
1st Data	Ra	La	Da	Ua	Start	A	B	1
2nd Data	Rb	Lb	Db	Ub	D	X	Y	1
3rd Data	0	0	0	0	0	0	0	0
4th Data	0	0	0	0	0	0	0	0
5th Data	1	0	0	0	0	0	0	0
6th Data	1	0	0	0	0	0	0	0
7th Data	1	0	0	0	0	0	0	0
8th Data	1	0	0	0	0	0	0	0

Fig. 4.1 Read format

#### Key data explanation

1st : Digital button data. (ON = '0', OFF = '1')

2nd : Digital button data. (ON = '0', OFF = '1')

3rd : Analog axis 1 (A1) data.

Since there are no analog axes, "00h" is assumed for this value.

4th : Analog axis 2 (A2) data.

Since there are no analog axes, "00h" is assumed for this value.

5th : Analog axis 3 (A3) data.

Since there are no analog axes, the midpoint "80h" is assumed for this value.

6th : Analog axis 4 (A4) data.

Since there are no analog axes, the midpoint "80h" is assumed for this value.

7th : Analog axis 5 (A5) data.

Since there are no analog axes, the midpoint "80h" is assumed for this value.

8th : Analog axis 6 (A6) data.

Since there are no analog axes, the midpoint "80h" is assumed for this value.

### 4.2 Write format

There is no write format for writing data to the Twinstick functions.

Twinstick functions are read only.



## 5. Twinstick FUNCTION INFORMATION

This chapter explains information about specific devices (device statuses).

To prevent device statuses from being rewritten or erased, the data is recorded as is.

### 5.1 Types

#### Fixed Device Status

This is a set form of device status, consisting of 112 bytes in all, that must be designated.

Unless all items are designated, operation and connection are not guaranteed.

#### Free Device Status

The individual devices can use this status freely. It consists of 908 bytes.

### 5.2 Fixed Device Status

The Fixed Device Status has the following items, all of which must be designated.

#### (1) Device ID

Capacity	: 16Byte (0000000010000FEFE0000000000000000)
Description	: Indicates the Twinstick function's device ID.

#### (2) Destination

Capacity	: 1Byte(FFh)
Description	: Worldwide

#### (3) Connection direction

Capacity	: 1Byte(00h)	Upward
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#### (4) Product name

Size	: 30Byte
Description	: "Twin Stick" in hankaku characters. A space code (20h) is inserted for unused space.

#### (5) License

Size	: 60Byte
Description	: "Produced By or Under License From SEGA ENTERPRISES,LTD." in hankaku characters. A space code (20h) is inserted for unused space.

(6) Standby current consumption

Size : 2Byte

Description : Standby current consumption for temporary stop, in units of 0.1 mA, is designated in hexadecimal notation.

Since the Twinstick draws 22 mA, enter 00-DC h.

(7) Maximum current consumption

Size : 2Byte

Description : Maximum current consumption, in units of 0.1 mA, is designated in hexadecimal notation.

Since the Twinstick draws 30 mA, enter 01-2C h.

### 5.3 Free Device Status

The Free Device Status area is available for product planners, developers, designers and programmers to enter any information they wish. The host obtains this status by the All Device Request.

Provision for data arrays, etc., must be made in the application programs that make use of the Free Device Status.

Enter as follows in half-width characters:

"Version!1.000,1999/05/21,315-6211-AF!!!,Ra,La,Da,Ua,Rb,Lb,Db,Ub,A,B,X,Y,D,S!key"

In the above, "!" indicates a single half-width space.

## **6. AFTERWORD**