

『Maple Bus 1.0』 Peripheral Hardware Specifications



105 Key Keyboard for Germany

Revision 1.10

Issued by
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Revision :

0.50	1999/05/17	First release
1.00	1999/06/07	Added Key scan code
1.10	1999/06/21	Changed the specifications for the device ID keyboard language from UK to Germany Corrected transposition of [Z] and [Y] in Fig. 4.3, and corrected keycode "63h" from [.] [.]  indicates a location changed, and  indicates a deletion

Note:

Windows 95 does not support the new EU currency unit in Euro font.

In Windows 95, characters are displayed differently. (This has been confirmed for versions A, B, and C of Windows 95. Later versions are unverified.)

Windows NT 4.0 Workstation SP4 and Windows 98 are supported.

An update program must be downloaded from the Microsoft site in order for this software to display normally in Windows 95.

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1 The Keyboard

1.1 Keyboard Functions

The Keyboard function is an input type man/machine interface serving for input and editing of characters and numerals, and for control of screen operations. This peripheral conforms to the "Maple Bus" Standard Specifications, belonging to function type "FT₆".

1.2 Outline of Operation

(1) Key scan

Keys are scanned constantly and data on key status is kept up to date in order to enable good response to requests from the host on the status of keys.

(2) Optimization and conditions

- a) When no keys are pressed, simultaneous depression of up to three keys can be detected.
- b) If three or more keys are being pressed, up to three additional keys can be detected provided that they are combinations that do not result in sneak current. However, if sneak current is produced, an error code results for that key and all subsequent keys pressed.
- c) If a seventh key is pressed while six keys are already being pressed under the conditions given in b) above, an error code results for all further keyboard functions.
- d) If sneak current results when more than three keys are pressed simultaneously, an error code is sent for all further keyboard functions.
- e) If two or more keys are pressed simultaneously while two or more other keys are already being pressed, an error code is sent for all further keyboard functions, even if the combination of keys pressed does not produce a sneak current.

(3) Restrictions

Key repeat (intermittent output of a key scan code when a key is held down) cannot be set by keyboard function.

When key repeat is required, the repeat rate and initial repeat delay must be set by the host in software.

1.3 Keyboard Language, Keyboard Type

The keyboard applicable to these specifications is "Germany AT 105 Key Keyboard."

1.4 Function Outline

See Fig. 4-1, Keyboard layout.

2 Device ID

The device ID corresponds to the Maple Bus 1.0 Standard Specifications. The table below shows the memory image on the host.

2.1 Germany AT 105 Key Keyboard Device ID Configuration

The configuration uses 16 bytes (128 bit).

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	1	0	0	0	0	0	0
5th Data	0	0	0	0	0	1	0	0
6th Data	0	0	0	0	0	1	1	0
7th Data	0	0	0	0	0	0	0	0
8th Data	1	0	0	0	0	0	0	0
9th Data	0	0	0	0	0	0	0	0
10th 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 2-1 Device ID

- FT : Peripheral function type
 FD1 : Function definition block for 1st function
 FD2 : Function definition block for 2nd function
 FD3 : Function definition block for 3rd function

(1) FT₀ - FT₃₁: Function type

Indicates the function type implemented by the peripheral. There are a total of 32 function types.

(2) FD₃₁ - FD₀: Function definition block

These blocks define the various elements that make up a function.

~~Keyboard function types FD₃₁ to FD₂₄ (5th data) are defined as KL₇ to KL₀ (the keyboard language). Please note that with the 105 key keyboard for Germany, this is set to 03h: England (UK).~~

3 Data Format

This section describes the Keyboard function data format.

The notation uses the memory image on the host.

3.1 Write Format

The format for writing Keyboard function data is shown below. When the host sends write data with "Set Condition", the keyboard returns a "Device Reply" for normal end or an error code for abnormal end.

bit	7	6	5	4	3	2	1	0
1st Data	LD ₇	LD ₆	LD ₅	LD ₄	LD ₃	LD ₂	LD ₁	LD 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	0

Fig. 3-1 Write format

Write format description

1st : LD LED setting

2nd : W1 Reserved = 00h

3rd : W2 Reserved = 00h

4th : W3 Reserved = 00h

LED setting

LD	Mapping	Lit	Out
0	Num Lock	1	0
1	Caps Lock	1	0
2	Scroll Lock	1	0
3	Reserved	1	0
4	Reserved	1	0
5	Kana	1	0
6	Power	1	0
7	Shift	1	0

Fig. 3-2 LED information bit

When set to ON (lit), the state is maintained until set to OFF (out).

With keyboard specifications, LD₇-LD₀ is normally "00h" because all LEDs are unavailable.

3.2 Read Format

The format for reading data from the Keyboard function is shown below. When the host sends a "Get Condition", the keyboard returns the "Data Transfer".

The data format size is 8 bytes.

bit	7	6	5	4	3	2	1	0
1st Data	M ₇	M ₆	M ₅	M ₄	M ₃	M ₂	M ₁	M ₀
2nd Data	LD ₇	LD ₆	LD ₅	LD ₄	LD ₃	LD ₂	LD ₁	LD ₀
3rd Data	KC1 ₇	KC1 ₆	KC1 ₅	KC1 ₄	KC1 ₃	KC1 ₂	KC1 ₁	KC1 ₀
4th Data	KC2 ₇	KC2 ₆	KC2 ₅	KC2 ₄	KC2 ₃	KC2 ₂	KC2 ₁	KC2 ₀
5th Data	KC3 ₇	KC3 ₆	KC3 ₅	KC3 ₄	KC3 ₃	KC3 ₂	KC3 ₁	KC3 ₀
6th Data	KC4 ₇	KC4 ₆	KC4 ₅	KC4 ₄	KC4 ₃	KC4 ₂	KC4 ₁	KC4 ₀
7th Data	KC5 ₇	KC5 ₆	KC5 ₅	KC5 ₄	KC5 ₃	KC5 ₂	KC5 ₁	KC5 ₀
8th Data	KC6 ₇	KC6 ₆	KC6 ₅	KC6 ₄	KC6 ₃	KC6 ₂	KC6 ₁	KC6 ₀

Fig. 3-3 Read format

Read format description

- 1st : Change key bit
- 2nd : LED information
- 3rd : Key scan code array #1
- 4th : Key scan code array #2
- 5th : Key scan code array #3
- 6th : Key scan code array #4
- 7th : Key scan code array #5
- 8th : Key scan code array #6

Change key bit

M	Mapping	Down	Up
0	Left Control	1	0
1	Left Shift	1	0
2	Left Alt	1	0
3	S1	1	0
4	Right Control	1	0
5	Right Shift	1	0
6	Right Alt	1	0
7	S2	1	0

Fig. 3-4 Change key bit

Example: [Control] + [Alt]

Normal	'00000000' (00h)
Left 「Alt」 Down	'00000100' (04h)
Right 「Control」 Down	'00010100' (14h)

LED information

LD	Mapping	Lit	Out	Default
0	Num Lock	1	0	0
1	Caps Lock	1	0	0
2	Scroll Lock	1	0	0
3	Reserved	1	0	0
4	Reserved	1	0	0
5	Kana	1	0	0
6	Power	1	0	0
7	Shift	1	0	0

Fig 3-5 LED information bit

Key scan code array for simultaneous key depression

When a key on the keyboard is pressed, the key scan code (see "5. Key code") is placed in the array. The array holds up to six key scan codes. When seven or more keys are pressed, a rollover error is generated.

Key input	Change key	Array #1	Array #2	Array #3	Array #4	Array #5	Array #6	Description
No input	00h	00h	00h	00h	00h	00h	00h	
Changed key input Right [Alt] "down"	40h	00h	00h	00h	00h	00h	00h	Changed key only is updated
First key input [A] "down"	40h	04h	00h	00h	00h	00h	00h	Array is left-aligned
Second key input [H] "down"	40h	04h	0Bh	00h	00h	00h	00h	
Third key input [I] "down"	40h	04h	0Bh	0Ch	00h	00h	00h	
Fourth key input [M] "down"	40h	04h	0Bh	0Ch	10h	00h	00h	
Change key input Left [Shift] "down"	42h	04h	0Bh	0Ch	10h	00h	00h	Changed key only is updated
Fifth key input [O] "down"	42h	04h	0Bh	0Ch	10h	12h	00h	
Sixth key input [T] "down"	42h	04h	0Bh	0Ch	10h	12h	17h	
Seventh key input [Q] "down"	42h	01h	01h	01h	01h	01h	01h	Seventh key was pressed. Rollover error generated.
First key input released [A] "up"	42h	0Bh	0Ch	10h	12h	17h	00h	Array is left-aligned
Second key input released [H] + [M] "up"	42h	0Ch	12h	17h	00h	00h	00h	
Changed key input released Right [Alt] "up"	02h	0Ch	12h	17h	00h	00h	00h	Changed key only is updated
First key input released [I] "up"	02h	12h	17h	00h	00h	00h	00h	
First key input released Second key input [O] "up" + [Y] "down"	02h	17h	1Ch	00h	00h	00h	00h	Array is aligned with priority to "up"
First key input released [T] "up"	02h	1Ch	00h	00h	00h	00h	00h	
Changed key input released Left [Shift] "up"	00h	1Ch	00h	00h	00h	00h	00h	Changed key only is updated
First key input released [Y] "up"	00h	00h	00h	00h	00h	00h	00h	No key pressed

Fig. 3-6 Operation example (no sneak current is produced)

Sneak current phenomenon

Depending on the key position and timing, pressing three or more keys can lead to a condition where the keyboard circuitry cannot respond accurately, producing a false key scan code output. This is called sneak current. When it occurs, the keyboard produces a rollover error.

Key status	Change key	Array #1	Array #2	Array #3	Array #4	Array #5	Array #6	Description
Normal	00h	00h	00h	00h	00h	00h	00h	
Right [Alt] down	40h	00h	00h	00h	00h	00h	00h	Changed key only is updated
[A] down	40h	04h	00h	00h	00h	00h	00h	Array is left-aligned
[Z] down	40h	04h	1Dh	00h	00h	00h	00h	
[P] down	40h	04h	1Dh	01h	01h	01h	01h	Sneak current occurs. Rollover error is generated.

Fig 3-7 Sneak current condition

4 Key Scan Codes

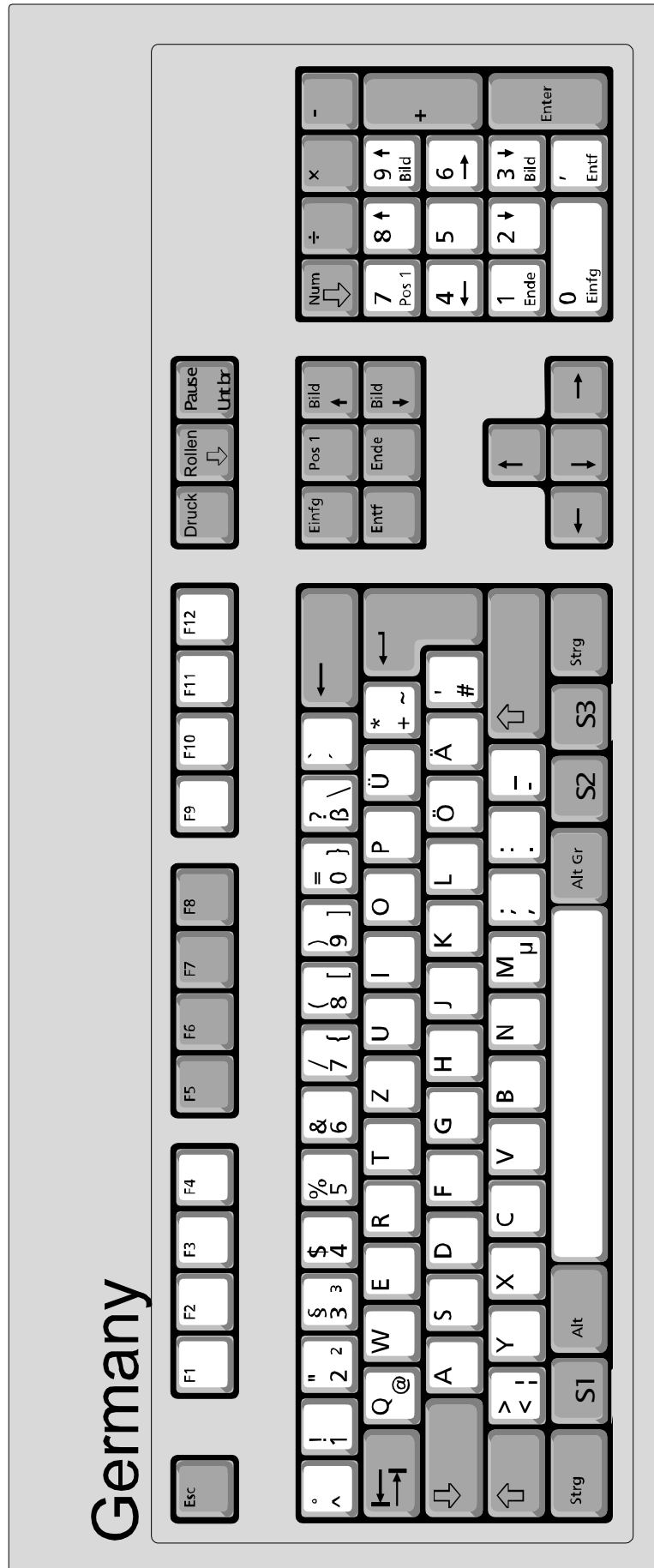


Fig. 4-1 Keyboard layout

29h	3Ah	3Bh	3Ch	3Dh	3Eh	3Fh	40h	41h	42h	43h	44h	45h
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

35h	1Eh	1Fh	20h	21h	22h	23h	24h	25h	26h	27h	2Dh	2Eh	2Ah
2Bh	14h	1Ah	08h	15h	17h	1Ch	18h	0Ch	12h	13h	2Fh	30h	28h
39h	04h	16h	07h	09h	0Ah	0Bh	0Dh	0Eh	0Fh	33h	34h	32h	
※2	64h	1Dh	1Bh	06h	19h	05h	11h	10h	36h	37h	38h	※6	
※1	※4	※3	2Ch						※7	※8	65h	※5	

46h	47h	48h
-----	-----	-----

49h	4Ah	4Bh
4Ch	4Dh	4Eh

50h	51h	52h	4Fh
-----	-----	-----	-----

53h	54h	55h	56h
5Fh	60h	61h	57h
5Ch	5Dh	5Eh	58h
59h	5Ah	5Bh	
62h		63h	

Fig. 4-2 Key scan code

code DEC	code HEX	Keyboard type German 105K	code DEC	code HEX	Keyboard type German 105K
0	00h	No Event Indicated	56	38h	Keyboard [-], [_]
1	01h	Error Roll Over	57	39h	Keyboard [Caps Lock]
4	04h	Keyboard [a], [A]	58	3Ah	Keyboard [F1]
5	05h	Keyboard [b], [B]	59	3Bh	Keyboard [F2]
6	06h	Keyboard [c], [C]	60	3Ch	Keyboard [F3]
7	07h	Keyboard [d], [D]	61	3Dh	Keyboard [F4]
8	08h	Keyboard [e], [E], [€](Euro)	62	3Eh	Keyboard [F5]
9	09h	Keyboard [f], [F]	63	3Fh	Keyboard [F6]
10	0Ah	Keyboard [g], [G]	64	40h	Keyboard [F7]
11	0Bh	Keyboard [h], [H]	65	41h	Keyboard [F8]
12	0Ch	Keyboard [i], [I]	66	42h	Keyboard [F9]
13	0Dh	Keyboard [j], [J]	67	43h	Keyboard [F10]
14	0Eh	Keyboard [k], [K]	68	44h	Keyboard [F11]
15	0Fh	Keyboard [l], [L]	69	45h	Keyboard [F12]
16	10h	Keyboard [m], [M], [µ]	70	46h	Keyboard [Druck]
17	11h	Keyboard [n], [N]	71	47h	Keyboard [Rollen]
18	12h	Keyboard [o], [O]	72	48h	Keyboard [Pause]
19	13h	Keyboard [p], [P]	73	49h	Keyboard [Einfg]
20	14h	Keyboard [q], [Q], [@]	74	4Ah	Keyboard [Pos1]
21	15h	Keyboard [r], [R]	75	4Bh	Keyboard [Bild↑]
22	16h	Keyboard [s], [S]	76	4Ch	Keyboard [Entf]
23	17h	Keyboard [t], [T]	77	4Dh	Keyboard [Ende]
24	18h	Keyboard [u], [U]	78	4Eh	Keyboard [Bild↓]
25	19h	Keyboard [v], [V]	79	4Fh	Keyboard [→]
26	1Ah	Keyboard [w], [W]	80	50h	Keyboard [←]
27	1Bh	Keyboard [x], [X]	81	51h	Keyboard [↓]
28	1Ch	Keyboard [y], [Y], [z], [Z]	82	52h	Keyboard [↑]
29	1Dh	Keyboard [z], [Z], [y], [Y]	83	53h	Keypad [Num Lock]
30	1Eh	Keyboard [1], [!]	84	54h	Keypad [/]
31	1Fh	Keyboard [2], ["], [²]	85	55h	Keypad [*]
32	20h	Keyboard [3], [\$], [³]	86	56h	Keypad [-]
33	21h	Keyboard [4], [\$]	87	57h	Keypad [+]
34	22h	Keyboard [5], [%]	88	58h	Keypad [Enter]
35	23h	Keyboard [6], [&]	89	59h	Keypad [1], [Ende]
36	24h	Keyboard [7], [/], [÷]	90	5Ah	Keypad [2], [↓]
37	25h	Keyboard [8], [(], [{}]	91	5Bh	Keypad [3], [Bild↓]
38	26h	Keyboard [9], [)], [}]	92	5Ch	Keypad [4], [←]
39	27h	Keyboard [0], [=], [~]	93	5Dh	Keypad [5]
40	28h	Keyboard [Return](Enter)	94	5Eh	Keypad [6], [→]
41	29h	Keyboard [ESC]	95	5Fh	Keypad [7], [Pos1]
42	2Ah	Keyboard [Delete](BS)	96	60h	Keypad [8], [↑]
43	2Bh	Keyboard [Tab]	97	61h	Keypad [9], [Bild↑]
44	2Ch	Keyboard [Spacebar]	98	62h	Keypad [0], [Einfg]
45	2Dh	Keyboard [ß], [?], [N]	99	63h	Keypad [Entf]
46	2Eh	Keyboard ['] , [']	100	64h	keyboard [<], [>], []
47	2Fh	Keyboard [ü], [Ü]	101	65h	keyboard [S3]
48	30h	Keyboard [+], [*, [~]	*224	E0h	Keyboard L[Strg]
49	31h	Not Use	*225	E1h	Keyboard L[Shift]
50	32h	keyboard [#], [']	*226	E2h	Keyboard L[Alt]
51	33h	Keyboard [ö], [Ö]	*227	E3h	Keyboard [S1]
52	34h	Keyboard [ä], [Ä]	*228	E4h	Keyboard R[Strg]
53	35h	Keyboard [^], [°]	*229	E5h	Keyboard R[Shift]
54	36h	Keyboard [,], [;]	*230	E6h	Keyboard R[Alt]
55	37h	Keyboard [., [']	*231	E7h	Keyboard [S2]

Fig. 4-3 Keyboard List

The following key codes exist in addition to those shown in Fig. 4-2.

00h: No operation
01h: Rollover error

The 2nd data of the keys marked *1 (Left Control), *2 (Left Shift), *3 (Left Alt), *4 (S1), *5 (Right Control), *6 (Right Shift), *7 (Right Alt), and *8 (S2) is handled as the change key bit, so no key codes are returned for the 3rd to 8th data.

For a detailed explanation of character input methods, please refer to the software (IME) specifications.

5 Keyboard Function Information

This section describes device-specific information (device status). The device status must be stored in such a way that device status data cannot be changed or erased.

5.1 Type

Fixed Device Status

This refers to 112 bytes of device status information data with a fixed format, comprising required information. Correct connection and operation are only assured if all items are properly recorded.

Free Device Status

This refers to a maximum of 908 bytes of device-specific status information that can be allocated freely.

5.2 Fixed Device Status

The Fixed Device Status area must include all the items listed below.

(1) Device ID

Size	: 16 bytes (00000040-03060080-00000000-00000000)
Description	: Specify peripheral device ID.

(2) Country specification

Size	: 1 byte (08h)
Description	: Only available in the Europe region.

(3) Connection method

Size	: 1 byte (00h)
Description	: Connects to the expansion device and records the direction of the expansion socket. Becomes "00h" when the expansion device is not connected to the keyboard.

(4) Model name

Size	: 30 bytes
Description	: "Keyboard" in hankaku characters. Remaining slots to be padded with spaces (20h).

(5) License

Size	: 60 bytes
Description	: "Produced By or Under License From SEGA ENTERPRISES,LTD." in hankaku characters. Remaining slots to be padded with spaces (20h).

(6) Standby current consumption

Size : 2 bytes

Description : Indicates the current consumption of the unit in paused condition (During minimum power consumption), in 0.1 mA units (hexadecimal notation).

Contains 01-2Ch since power consumption for the 105 Key Keyboard for Germany w is 30 mA.

(7) Maximum current consumption

Size : 2 bytes

Description : Indicates the maximum current consumption of the unit, in 0.1 mA units (hexadecimal notation).

Contains 01-90h since power consumption for the 105 Key Keyboard for Germany w is 40 mA

5.3 Free Device Status

The Free Device Status area can include information about developers, designers, and programmers or any other information. The host can obtain this information by issuing the "All Device Request" command. If it is to be used by an application, the data ordering sequence must be taken into consideration.

"Version 1.010,1999/04/27,315-6211-AM", in hankaku characters.

6 Remarks

Contents subject to major or minor changes until release of final (distribution) version (Rev. 1.0).
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