

Product Specification for Pen-Based Tablet Driver for MS-DOS

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02	000630	Kuribashi	Hayama	4, 5, 16 and page 17 were changed.	HIHasegawa	Tech Bes N-25246	
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DESIG.	000229	T.Miyazawa	CHECK		APPR. K.Nishimura		

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Product Specification for Pen-Based Tablet Driver for MS-DOS

1. Scope

This specification applies to the pen-based tablet driver, which is a standard multi-port MS-DOS device driver provided by Fujitsu Takamisawa Component Limited.

[Drawing number to be specified when procuring driver]

Name	Drawing number	Edition number
MS-DOS pen-based tablet driver	NS01B-0559-0505	1st edition

[File configuration]

File name	Function
Medvstd.com	Pen-based tablet driver
Caldstd.com	Correction program

[Type]

Item	Type
EEPROM	Used
Interface	Serial

2. Overview

This product is a pen-based tablet driver that is an MS-DOS (*1), (*2) mouse emulation driver that permits operations equivalent to those with a mouse (*3), and which is provided by Fujitsu Takamisawa Component Limited.

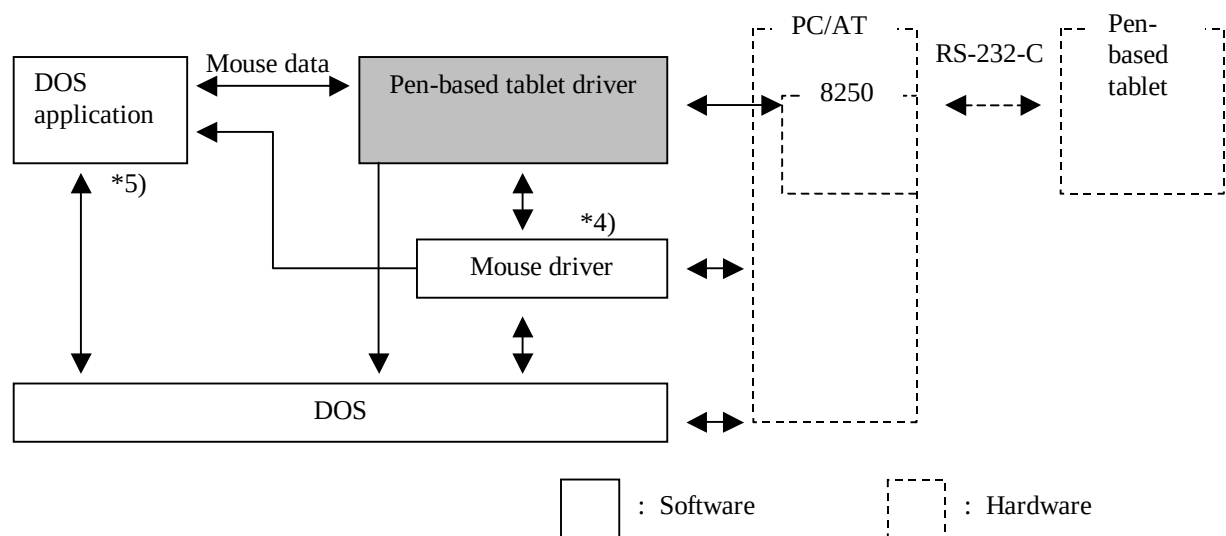
This product is a driver of the TSR (resident program) type which converts input coordinate data received via RS-232-C into mouse coordinate data.

This product can be used with an existing mouse driver. Using this product with a mouse driver enables input with both a pen-based tablet and a mouse.

The shaded area in the block drawing below indicates this product.

(Where a mouse driver is resident)

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Used in conjunction with a mouse driver.

Notes

- *1 Only IBM-PC/AT and compatible machines can be used as hardware.
- *2 Not compatible with Windows
- *3 Only the left button can be used. Pressing the panel is equivalent to clicking the left button.
- *4 To use this product with a mouse driver, first make the mouse driver resident. If the mouse driver is not resident, the mouse cursor is not displayed.
- *5 In case of used specific function not covered by this specification, Some application sometimes don't work.

3. Configuration

This product consists of the function calling section (int 33h) for calling the pen-based tablet driver function from the application, and an interrupt handler for receiving data sent from the pen-based controller and generating coordinate data and button data.

In addition, a correction program for correcting the pen-based tablet (utility) is added to this product.

4. Basic Specifications ②

- (1) RS-232-C Format: 8 bits plus 1 stop bit, without parity (fixed)
- (2) RS-232-C communication speed: 9600/4800/2400 bps (selected)
- (3) Software interrupt: mouse driver interrupt int 33h (fixed)
- (4) Hardware interrupt:

IRQ number	1~15 (optional)
8259 I/O base address	master 20h, slave 21h
8250 I/O base address	0~FFFFh

8250: Serial controller

8259: Interrupt controller

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5. Activating a Pen-based tablet driver

Driver name IRQ number, 8250 I/O base address, baud rate

<Parameters>

IRQ number

IRQ1	I1
⋮	⋮
IRQ15	I15

Default: I4 (IRQ4)

8250 I/O base address

0h	P0
⋮	⋮
FFFFh	PFFFF

Default: P3F8 (3F8h)

baud rate

9600bps	B96
4800bps	B48
2400bps	B24

Default: B96 (9600 bps)

<Example of activation>

medvstd I4,P3F8,B96

(When parameter designations are omitted, default values will be set.)

6. Messages ②

Messages is displayed

(1) When installation is performed normally

The Touch Panel driver V1.0 is installed

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(2) When the parameter setting is incorrect

Parameter Error

(3) When there is no response from the pen-based tablet

No Response from the Touch Panel

(4) When a driver has already been installed

The Touch Panel driver is already installed

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7. Specifications of Functions

7.1 Function Specifications List

No.	Function	Calling AX data (int 33h)	Limitation
1	Initialize a pen-based tablet and driver	0 h	
2	(Display a cursor)	1 h	*
3	(Delete a cursor)	2 h	*
4	Acquire the cursor position and information on a button	3 h	
5	Set the cursor position	4 h	
6	Acquire the position and button press frequency	5 h	
7	Acquire the position and button release frequency	6 h	
8	Set the range for the X-directional motions of a cursor	7 h	
9	Set the range for the Y-directional motions of a cursor	8 h	
0	(Set a shape of the graphic cursor)	9 h	*
q	(Set a shape of the text cursor)	A h	*
w	Acquire the distance traveled by the cursor	B h	
e	Set the interrupt sub-routine	C h	
r	(Enable write pen emulation)	D h	*
t	(Disable write pen emulation)	E h	*
y	Set the mouse movement ratio	F h	
u	(Set the range for deleting the cursor)	10 h	*
i	Exchange the interrupt sub-routine	14 h	
o	Acquire the memory capacity needed to retain the driver status	15 h	
p	Retain the driver status	16 h	
a	Return the driver status	17 h	
s	Set an alternate interrupt sub-routine	18 h	
d	Acquire the address of an alternate interrupt sub-routine	19 h	
f	(Set the mouse sensitivity)	1 A h	
g	(Acquire the mouse sensitivity)	1 B h	*
h	(Set the CRT page number)	1 D h	*
j	(Acquire the CRT page number)	1 E h	*
k	Disable the driver	1 F h	
l	Enable the driver	20 h	
;	Reset software	21 h	

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- Functions with an * in the Limitations column are not supported by the pen-based tablet driver. When an existing mouse driver is made resident, the mouse driver will support these functions. (However, if the existing mouse driver does not have this function, it will not be supported.)
- Standard mouse drivers are equipped with the functions in brackets (). For more details, see the specifications for resident mouse drivers.

To call a function of a pen-based tablet driver, set a parameter in a register (AX, BX, CX, DX, SI, DI, DS) and execute software interrupt (int 33h).

Parameter	AX = 0h
Burr value	AX = Status of pen-based tablet (0h: unavailable, FFFFh: available) BX = number of buttons (2h)

The pen-based tablet driver does not support cursor display.
This function is available when a standard mouse driver is resident.

Parameter	AX = 1h
Burr value	None

The pen-based tablet driver does not support deletion of a cursor.
This function is available when a standard mouse driver is resident.

Parameter	AX = 2h
Burr value	None

Parameter	AX = 3h
Burr value	BX = a status of a button Bit 0 = 1: The panel is pressed down. (Otherwise, the left button of the mouse is pressed down.) Bit 1 = 1: (The right button of the mouse is pressed down.) CX = X coordinate of cursor DX = Y coordinate of cursor

Parameter	AX = 4h CX = X coordinate of a cursor DX = Y coordinate of a cursor
Burr value	None

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6 Acquire position and button press frequency

Parameter	AX = 5h BX = a button designated (0h: panel/left button, 1h: right button)
Burr value	AX = status of a button Bit 0 = 1: The panel is pressed. (Otherwise, the left button of the mouse is pressed.) Bit 1 = 1: (The right button of the mouse is pressed.) BX = Button press frequency CX = The last X coordinate of a cursor with the designated button pressed DX = The last Y coordinate of a cursor with the designated button pressed

After executing the function, the button press frequency will be cleared.

7 Acquire position and button release frequency

Parameter	AX = 6h BX = a button designated (0h: panel/left button, 1h: right button)
Burr value	AX = Button status Bit 0 = 1: The panel is pressed. (Otherwise, the left button of the mouse is pressed.) Bit 1 = 1: (The right button of the mouse is pressed.) BX = Button release frequency CX = The last X coordinate of a cursor with the designated button released DX = The last Y coordinate of a cursor with the designated button released

After executing the function, button release frequency will be cleared.

8 Set the range of X-directional motions of a cursor

Parameter	AX = 7h CX = coordinate within the scope of cursor movement to the left end DX = coordinate within the scope of cursor movement to the right end
Burr value	None

9 Set the range of Y-directional motions of a cursor

Parameter	AX = 8h CX = coordinate within the scope of cursor movement to the top end DX = coordinate within the scope of cursor movement to the bottom end
Burr value	None

0 (Set the shape of a graphic cursor)

The pen-based tablet driver does not support the setting of a shape of a graphic cursor. This function is available when a standard mouse driver is resident.

Parameter	AX = 9h BX = X coordinate of the cursor display point CX = Y coordinate of the cursor display point ES: DX = head address of graphic cursor data
Burr value	None

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q (Set the shape of a text cursor)

The pen-based tablet driver does not support the setting of a shape of a graphic cursor. This function is available when a standard mouse driver is resident.

Parameter	AX = Ah BX = Selection of a cursor (0: software cursor, 1: hardware cursor) CX = AND mask data DX = XOR mask data
Burr value	None

w Acquire the distance traveled by a cursor

Parameter	AX = Bh
Burr value	CX = traveling distance in the X direction (mickey count) DX = traveling distance in the Y direction (mickey count)

e Set the interrupt sub-routine

Parameter	AX = Ch CX = interrupt mask ES: DX = interrupt address
Burr value	None

- Interrupt mask

Set the following interrupt masks for the BX register:

Bit 0 = 1: The cursor position has been changed.

Bit 1 = 1: The panel has been pressed (the left button has been pressed).

Bit 2 = 1: The panel has been released (the left button has been released).

Bit 3 = 1: (The right button has been pressed.)

Bit 4 = 1: (The right button has been released.)

When the operation set at "1" is performed, call the address set for ES: DX register.

At calling, a driver will set the data in the following table to the register.

Data to be set when a sub-routine is called	AX = a status of a pen-based tablet Bit 0 = 1: The cursor position has been changed. Bit 1 = 1: The panel has been pressed (the left button has been pressed). Bit 2 = 1: The panel has been released (the left button has been released). Bit 3 = 1: (The right button has been pressed.) Bit 4 = 1: (The right button has been released.) BX = a status of a button Bit 0 = 1: The panel is on (the left button is on). Bit 1 = 1: (The right button is on.) CX = X coordinate of a cursor DX = Y coordinate of a cursor SI = Distance traveled in X direction (mickey count) DI = Distance traveled in Y direction (mickey count)
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r (Enable write pen emulation)

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The pen-based tablet driver does not support setting of write pen emulation.

This function is available when a standard mouse driver is resident.

Parameter	AX = Dh
Burr value	None

t (Disable write pen emulation)

The pen-based tablet driver does not support the setting of write pen emulation.

This function is available when a standard mouse driver is resident.

Parameter	AX = Eh
Burr value	None

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y Set the mouse movement ratio

The pen-based tablet driver does not support the setting of mouse movement ratio.

This function is available when a standard mouse driver is resident.

Parameter	AX = Fh CX = X-directional movement ratio of a mouse (mickey/pixel) DX = Y-directional movement ratio of a mouse (mickey/pixel)
Burr value	None

u (Set the range for deleting a cursor)

The pen-based tablet driver does not support the setting of the range for deleting a cursor.

This function is available when a standard mouse driver is resident.

Parameter	AX = 10h CX = range for deletion top left of X coordinate DX = top left of Y coordinate SI = bottom right of X coordinate DI = bottom right of Y coordinate
Burr value	None

i Exchange the interrupt sub-routine

Parameter	AX = 14h CX = new interrupt mask ES: DX = new interrupt address
Burr value	CX = pervious interrupt mask ES: CX = previous interrupt address

o Acquire the memory capacity needed to retain the driver status

Parameter	AX = 15h
Burr value	BX = memory capacity needed to retain the driver status

p Retain driver status

Parameter	AX = 16h ES: DX = head address where a driver status is retained
Burr value	None

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a Return driver status

Parameter	AX = 17h ES: DX = head address where a driver status is retained
Burr value	None

s Set an alternate interrupt sub-routine

Parameter	AX = 18h CX = interrupt mask ES: DX = interrupt address
Burr value	None

- Interrupt mask

Set the following interrupt masks for BX register:

Bit 0 = 1: The cursor position has been changed.

Bit 1 = 1: The panel has been pressed (the left button has been pressed).

Bit 2 = 1: The panel has been release (the left button has been released).

Bit 3 = 1: (The right button has been pressed.)

Bit 4 = 1: (The right button has been released.)

Bit 5 = 1: A button has been operated while holding the Shift key down.

Bit 6 = 1: A button has been operated while holding the Ctrl key down.

Bit 7 = 1: A button has been operated while holding the Alt key down.

When the operation set at "1" is performed, call the address set for ES: DX register. Up to three addresses can be defined for each status of the Shift key.

At calling, a driver will set the data contained in the following table in the register.

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Data to be set when a sub-routine is called	AX = a status of a pen-based tablet Bit 0 = 1: The cursor position has been changed. Bit 1 = 1: The panel has been pressed (the left button has been pressed). Bit 2 = 1: The panel has been released (the left button has been released). Bit 3 = 1: (The right button has been pressed.) Bit 4 = 1: (The right button has been released.) BX = a status of a button Bit 0 = 1: The panel is on (the left button is on). Bit 1 = 1: (The right button is on.) CX = X coordinate of a cursor DX = Y coordinate of a cursor SI = Distance traveled in the X direction (mickey count) DI = Distance traveled in the Y direction (mickey count)
---	--

d Acquire the address of an alternate interrupt sub-routine

Parameter	AX = 19h CX = interrupt mask
Burr value	AX = Error status (FFFFh: error, an alternate interrupt sub-routine is not set) BX = Segment of interrupt address CX = Interrupt mask DX = Offset of interrupt address

f (Set the mouse sensitivity)

The pen-based tablet driver does not support the setting of the mouse sensitivity.

This function is available when a standard mouse driver is resident.

Parameter	AX = 1Ah BX = X-directional mouse sensitivity CX = Y-directional mouse sensitivity
Burr value	None

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g (Acquire the mouse sensitivity)

The pen-based tablet driver does not support the acquisition of mouse sensitivity.

This function is available when a standard mouse driver is resident.

Parameter	AX = 1Bh
Burr value	BX = X-directional mouse sensitivity CX = Y-directional mouse sensitivity

h (Set the CRT page number)

The pen-based tablet driver does not support the setting of the CRT page number.

This function is available when a standard mouse driver is resident.

Parameter	AX = 1Dh BX = CRT page number for displaying a cursor
Burr value	None

j (Acquire the CRT page number)

The pen-based tablet driver does not support the acquisition of the CRT page number.

This function is available when a standard mouse driver is resident.

Parameter	AX = 1Eh
Burr value	BX = CRT page number for displaying a cursor

k Disable a driver

Parameter	AX = 1Fh
Burr value	AX = when a driver cannot be disabled FFFFh BX = int 33h interrupt vector before a driver becomes resident

l Enable a driver

Parameter	AX = 20h
Burr value	None

; Reset software

Parameter	AX = 21h
Burr value	AX = whether a driver exists or not (FFFFh: already resident, 33h: not resident) BX = number of buttons (2h)

8. Video Modes Permitting Operation of a Pen-based tablet driver

The pen-based tablet driver can operate in the following video modes.

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Video mode number	Number of colors	Mode	Virtual screen	JP mode	US mode
0	16	Text	640 × 200		○
1	16	Text	640 × 200		○
2	16	Text	640 × 200		○
3	16	Text	640 × 200	○	○
4	4	Graphic	640 × 200		○
5	4	Graphic	640 × 200		○
6	2	Graphic	640 × 200		○
7	Monochrome	Text	640 × 200		○
D	16	Graphic	640 × 200		○
E	16	Graphic	640 × 200		○
F	Monochrome	Graphic	640 × 350		○
10	16	Graphic	640 × 350		○
11	2	Graphic	640 × 480	○	○
12	16	Graphic	640 × 480	○	○
13	256	Graphic	640 × 200		○
72	16	Graphic	640 × 480	○	
73	16	Text	640 × 200	○	

9. Correction Program (Utility)

Corrections are made so that the position in which a pen-based tablet is pressed can be in agreement with the display position. When a pen-based tablet driver is set up or exchanged, corrections should always be made.

The correction program can operate even if a pen-based tablet driver is not resident.

Instructions on the correction program are given in Japanese and English.

9.1 Configuration of a Correction Program

The correction program consists of a parameter input section for setting correction parameters, a correction screen for conducting operations for correction, a drawing test screen for visually inspecting agreement between the position in which a pen-based tablet is pressed and the display position after correction and a section for creating correction data in order to create a correction data file.

9.2 Specifications for Operating a Correction Program when EEPROM is Used

9.2.1 Activating a correction program ②

Enter the correction program name and parameters with keys and execute activation. The parameters for activation are the same as those of a pen-based tablet driver.

<Example activation>

CALDSTD I4,P3F8,B96

(When the parameter designations are omitted, default values will be set.)

9.2.2 Correction parameters input section ②

This correction program is keyboard-less-type so that there isn't Correction parameters input section.

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10.4-inch panel left drawer and date of nine-point correction will be input

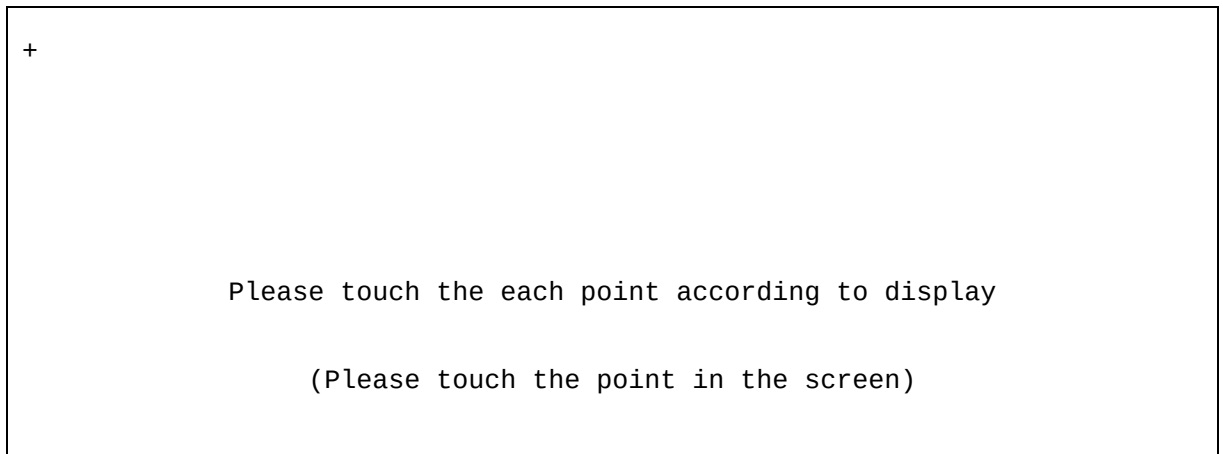
02 000630 Kiribayashi Correction Program is changed.

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9.2.3 Correction screen ②

Make corrections in accordance with the following procedure.

- 1 One+ marks indicating the correction input points are displayed.
- 2 Press down the correction point. The + marks will move.
- 3 After pressing nine + marks, then correction completed.



<Correction screen>

Key input of correction screen can't be done

Message after correction completed

Message	Correction result
The calibration ended normally.	Completed normally.

The correction data is stored in the EEPROM of the pen-based tablet circuit when the correction is completed normally.

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9.2.4 Drawing test screen

This correction program is keyboard-less-type so that there isn't drawing test screen.

10. Other

Any unclear points regarding matters not covered by this specification shall be resolved through mutual consultation.

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