HITACHI

Hitachi Seiko, Ltd.

HICOMSCAN HDG-1111

DATA GRAPHIC SYSTEM

USER'S MANUAL

Hitachi Seiko, Ltd.

Kanagawa, Japan

Contents

1. General description

The HICOMSCAN HDG-1111 DATA GRAPHIC SYSTEM is a high per-
formance, high stable tablet digitizer designed to read
digital data from any kind of drawings. It is most suited
to an input device through which graphic data are input to
a computer, and is usable in many other application areas.

Features:

(1) High accuracy

A stylus pen or cursor has an accuracy of ± 0.01", and
thus ensures a highly accurate operation regardless of
the tablet dimensions.

(2) Lightweight

Compact structure with a built-in controller requires
a smaller space.

(3) Easy maintenance

A built-in microprocessor checks the hardware to permit
easy maintenance.

(4) Absolute digitisation

Origin remains held where it is even if a cursor or pen
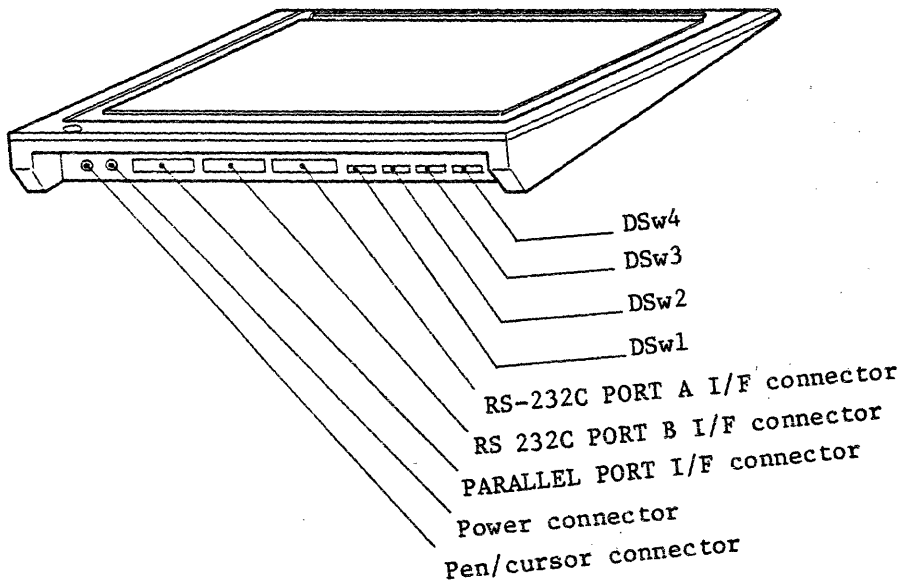is lifted off the tablet.

(5) High stability

Electromagnetic induction feature permits stable opera-
tion impervious to external factors such as wind, tem-
perature, humidity, noise or vibration.

(6) Noise resistance

Noise resisting characteristic enables the system to
be used as a computer terminal.

2. Components and connectors

Tablet

Pen tray

Digitizing surface

READY lamp

PROX (proximity) lamp

PDWN (pen-down) lamp

Pen holder

Pen connector

Stylus pen

DSw4

DSw3

DSw2

DSw1

RS-232C PORT A I/F connector

RS 232C PORT B I/F connector

PARALLEL PORT I/F connector

Power connector

Pen/cursor connector
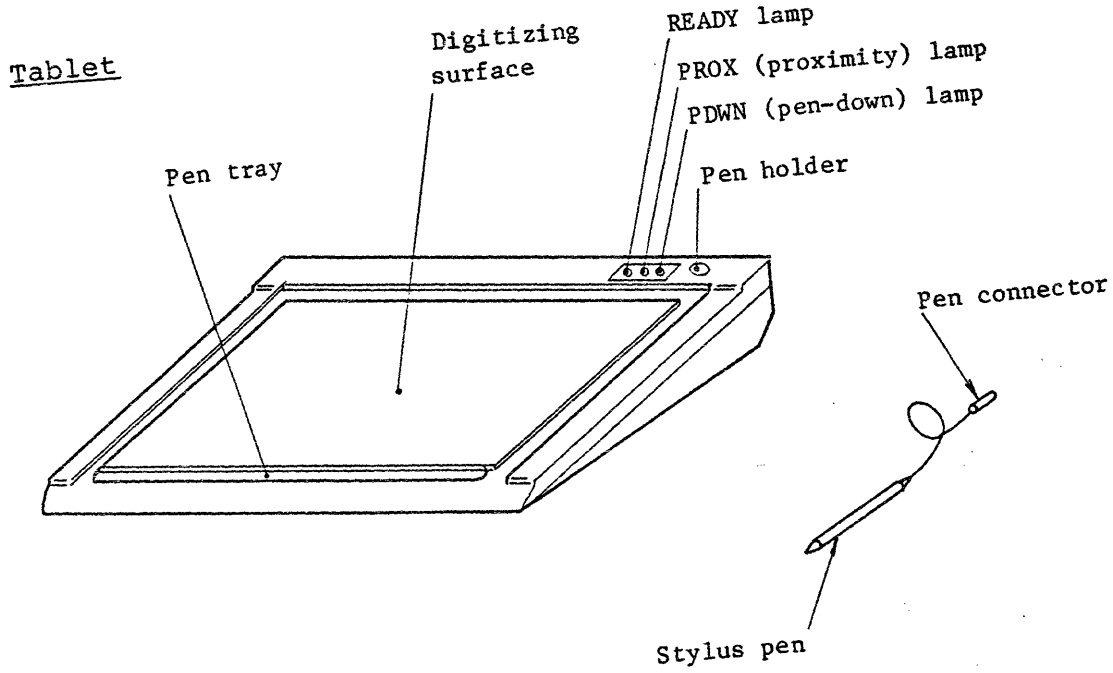
NOTE: Use a neutral cleaning agent for cleaning the tablet surface. Organic solvent may discolor or distort the tablet.

- 2 -
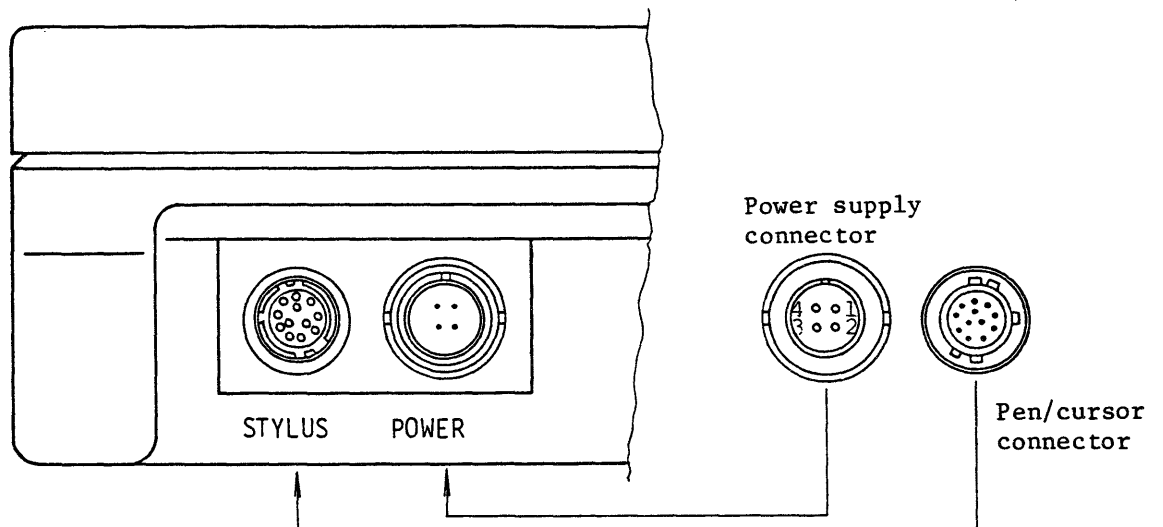
Pen/cursor connector

To plug in the connector, hold the connector shell by hand, turn the shell until it fits into the socket marked STYLUS on the tablet, and then push it straight into the socket. To disconnect, hold the shell by hand, and pull it straight toward you. Do not pull out the connector by pulling on the cable.

Power supply connector : HIROSE RM12BPG-4S (cable's side)

     PIN 1 : +5V 1A

        2 : +12V 0.2A

        3 : GROUND (common)

        4 : -12V 0.2A
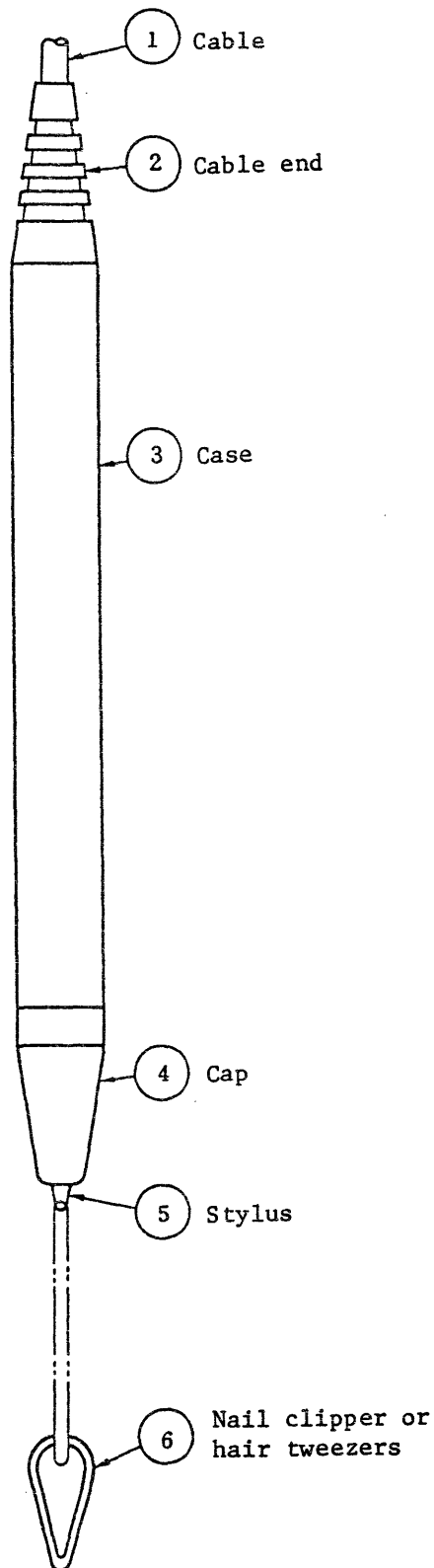
To plug in the connector, hold the connector shell by hand, turn it until it fits into the socket on the tablet, and then push it straight into the socket. Upon completion, be sure to turn the shell clockwise to lock it.

Stylus pen

- (1) Cable
- (2) Cable end
- (3) Case
- (4) Cap
- (5) Stylus
- (6) Nail clipper or hair tweezers

Stylus replacement procedure

(1) Pull out the existing stylus with a nail clipper or hair tweezers.

(2) Insert a new stylus properly into the cap.

(3) Make sure that the stylus is clamped tightly and will not drop.

CAUTION

(1) If the stylus is inserted improperly, digitizing operation cannot be made properly. Be sure to insert the stylus to the extreme end (or until it is pushed into the pen). If the stylus is pushed in too strongly, the pen may be broken.

(2) Do not pull on the cable, nor bend the cable end.

(3) Do not tap an object with the stylus pen.

3. I/O ports

3.1 RS-232C ports (serial port)

Two bi-directional half-duplex RS-232C ports are available. Pins are arranged so that Port A is configured as a modem, and Port B as a terminal. The difference between the modem and terminal configurations is that all lines on the same pin number have reversed roles as regards input/output, or, e.g., Pin No. 2 (Transmit Data) of Port A (modem) is for data input while the same number pins of Port B (terminal) is for data output. Table 3.1 shows the pin assignments.

<u>Connectors</u>

AMP206584-1 and DB-25P (cable side)

Before plugging in the connector, determine whether it is to be connected to Port A or B taking into account the following items.

(1) Type of external device port (modem configuration or terminal configuration)

(2) Type of connecting cable (direct type for modem-to-terminal connection or cross type for terminal-to-terminal connection)

For example, if the cross type cable is used for connecting a CRT display to the HDG-1111, the cable connector should be plugged into the Port B.

Table 3.1 RS-232C port pin assignments

Pin No.	Signal name	J1 port A	J2 port B
1	PG	GROUND	GROUND
2	TD	input	output
3	RD	output	input
4	RTS	input	output
5	CTS	output	input
6	DSR	output	input
7	SG	GROUND	GROUND
8	DCD	output	input
20	DTR	input	output
15	TSET*	NC	input
17	RSET**	NC	input
18	20mA out	output	NC
25	20mA return	GROUND	NC

NC : Not to be connected

* Transmitting clock pulse for synchronous mode

** Receiving clock pulse for synchronous mode

Single port operation mode

Data output/command input can be made through selected one
of the RS-232C ports. Any data input through the other
port will be ignored. Meaningless data or invalid commands
input to the selected port are also ignored.

Dual port operation mode

Both the RS-232C Ports A and B are effective in this mode. Either of these ports selected by the PORTA/PORT B selector switch (Port A when DSW2-2 is ON, Port B when DSW-2-2 is OFF) or main Port selection command is called main port, and the other is subport.

XY coordinate data is transmitted from the both ports if the subport is enabled by turning OFF the DSW2-1, and is output only from the main port if the subport is disabled. Commands are input to the HDG-1111 only from the main port.
Data transfer between PORT A-PORT B is a unique feature of the dual port operation mode. All data input to the subport will be transferred to the main port before being transmitted.

Among the data sent to the main port, those other than command data are transferred to the subport before being transmitted. The command data are 02 HEX for stop-data-output, 04 HEX for resume-data-output, and 01 HEX followed by two ASCII characters.

The data transfer between the input and output will results in a delay of approximately 0.1 ms.
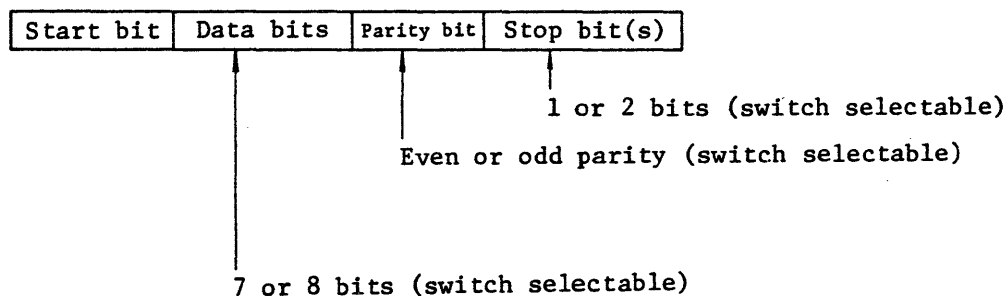
RS-232C character composition

Start bit	Data bits	Parity bit	Stop bit(s)

1 or 2 bits (switch selectable)

Even or odd parity (switch selectable)

7 or 8 bits (switch selectable)

Table 3.2

Data bit	Parity	Stop bit	DSW2-4	DSW2-5	DSW2-6
7	EVEN	2	OFF	OFF	OFF
7	ODD	2	OFF	OFF	ON
7	EVEN	1	OFF	ON	OFF
7	ODD	1	OFF	ON	ON
8	NONE	2	ON	OFF	OFF
8	NONE	1	ON	OFF	ON
8	EVEN	1	ON	ON	OFF
8	ODD	1	ON	ON	ON

Asynchronous mode (DSW1-2 must be OFF)

Table 3.3 Baud rate selection

Baud rate	DSW1-3	DSW1-4	DSW1-5	DSW1-6	DSW1-7	DSW1-8
19200	OFF	OFF	ON	OFF	OFF	OFF
9600	OFF	OFF	OFF	ON	OFF	OFF
4800	OFF	OFF	OFF	OFF	ON	OFF
2400	ON	OFF	ON	OFF	OFF	OFF
1200	ON	OFF	OFF	ON	OFF	OFF
600	ON	OFF	OFF	OFF	ON	OFF
300	ON	ON	ON	OFF	OFF	OFF
150	ON	ON	OFF	ON	OFF	OFF
75	ON	ON	OFF	OFF	ON	OFF
110	OFF	ON	OFF	OFF	OFF	ON

Synchronous mode (DSW1-2 must be ON)

Synchronizing clock pulse input pins are available on the Port B.

3.2 Current loop output

20 mA data output is available on the RS-232C Port A.
The data is output simultaneously with the output from the
RS-232C Port A (pin 3).

Pin 18 of Port A is current source, and Pin 25 is current
return (GROUND).   Logic 1 indicates 20 mA, and logic 0 is
0 mA.

   Load :   0 ∿ 350 ohms

3.3 Parallel port

8 bit wide TTL level parallel input/output port is available.

Connectors

AMP 306584-1 (25 pins) and DB-25P or equivalent (cable
side)

Table 3.4 shows the pin assignment.

Table 3.4 Pin assignment

Pin No.	Signal Name	I/O	Function
1	GROUND	—	INPUTDATA — STROBE
2	PDiSTRB	I	—
3	N.C.	—	—
4	+5V(strappable)	O	
5	N.C.	—	—
6	PDiACCEPTBL	O	
7	PDi0	I	INPUT DATA (LSB)
8	PDO0	O	OUTPUT DATA (LSB)
9	PDi1	I	INPUT DATA
10	PDO1	O	OUTUT DATA
11	PDi2	I	INPUT DATA
12	PDO2	O	OUTPUT DATA
13	PDi3	I	INPUT DATA
14	PDO3	O	OUTPUT DATA
15	PDi4	I	INPUT DATA
16	PDO4	O	OUTPUT DATA
17	PDi5	I	INPUT DATA
18	PDO5	O	OUTPUT DATA
19	PDi6	I	INPUT DATA
20	PDO6	O	OUTPUT DATA
21	PDi7	I	INPUT DATA(MSB)
22	PDO7	O	OUTPUT DATA (MSB)
23	GROUND	—	
24	N.C.	—	
25	PDO STRB	O	OUTPUT DATA STROBE

I: input pin
O: output pin

N.C. : No Connection

Parallel mode operation

When parallel mode is selected, input/output is made through the parallel port only. Any data input to the serial port will be ignored.

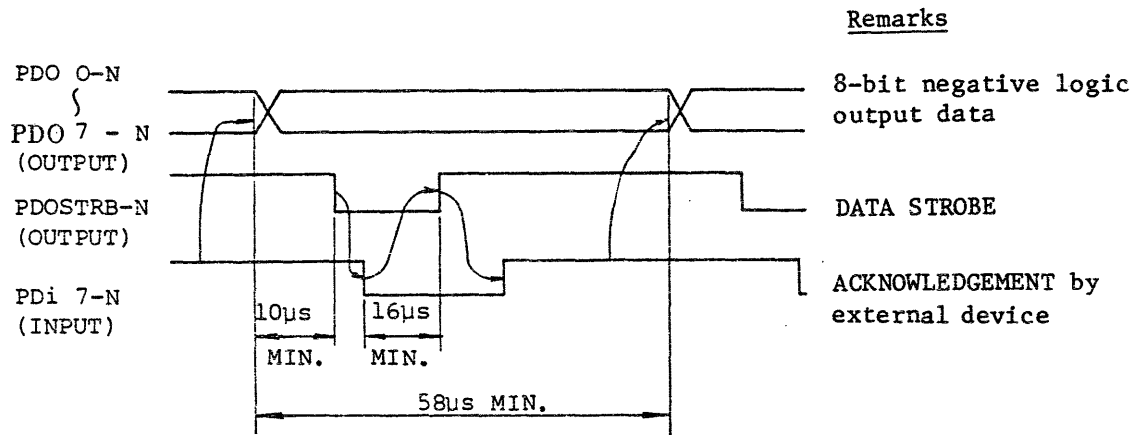(1) Data output (handshaking)

Fig. 3.3.1

NOTE: If handshaking is not used, PDOSTRB-N (pin 25) and PDi7-N (pin 21) should be shorted.
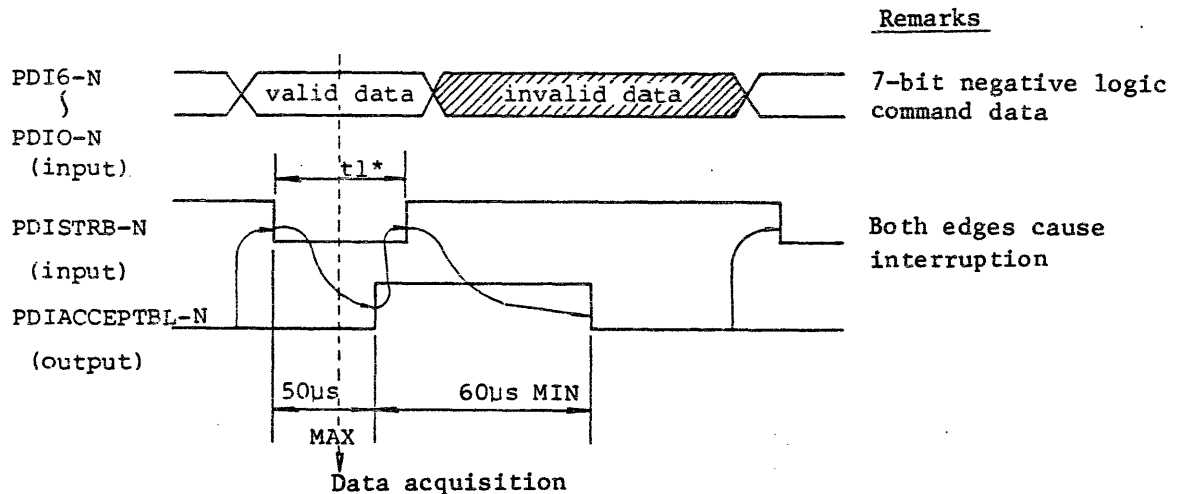
(2) Command input (handshaking)

Fig. 3.3.2

* If handshaking is not required, tl must be greater than 80 μs.

Serial mode operation

When serial mode is selected, XY coordinate data is also output through the parallel port. The output speed depends on the RS-232C baud rate.

Timing chart is shown in Fig. 3.3.3.

Remarks

PDO7-N
}
PDO 0-N
8-bit negative logic output data

PDOSTRB-N
STROBE data

*T

6 µs

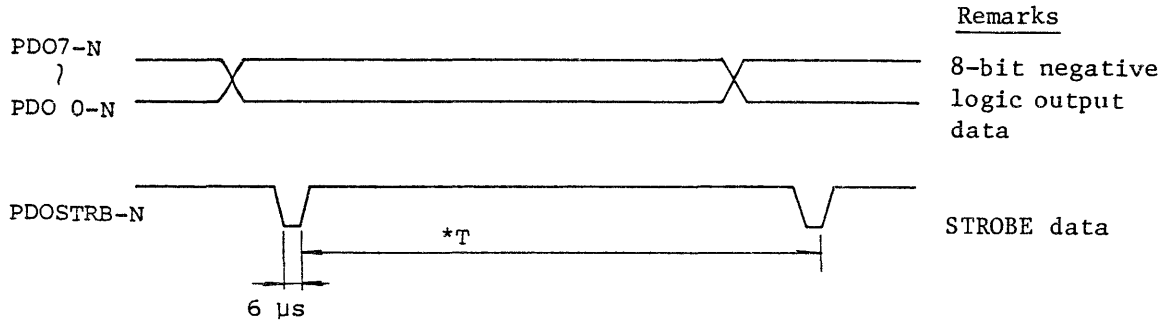Fig. 3.3.3

* Approximately

$$T = \frac{\text{Number of character bits (switch selectable)}}{\text{Baud rate (switch selectable)}}$$

3.4 I/O port selection

At power on, I/O port(s) should be selected by DIP switches. Thereafter, selection should be made in accordance with I/O port select command.

Tables 3.5 and 3.6 show the relation between switch setting or command and I/O port function.

Table 3.5

Selected Port Name				Port Function		
Serial/ Parallel	Single/ Dual	Port A/ Port B	Subport Enable/ Disable	XY Coordinate Data Output	Command Input	Data Transfer between Port A- Port B
① Parallel	–	–	–	P	P	No
② Serial	③ Single	⑤ Port A	–	A,P	A	No
		⑥ Port B	–	B,P	B	No
	④ Dual	⑤ Port A	⑦ Enable	A,B,P	A	Yes
			⑧ Disable	A,P	A	Yes
		⑥ Port B	⑦ Enable	A,B,P	B	Yes
			⑧ Disable	B,P	B	Yes

A : RS-232C Port A

B : RS-232C Port B

P : Parallel Port

Table 3.6

No.	DIP switch	Command	Function
①	DSW1-1 ON	PA	Parallel mode
②	DSW1-1 OFF	SR	Serial mode
③	DSW2-1 OFF	SN	Single port
④	DSW2-1 ON	DU	Dual port
⑤	DSW2-2 ON	QA	Port A
⑥	DSW2-2 OFF	QB	Port B
⑦	DSW2-3 OFF	SE	Subport enable
⑧	DSW2-3 ON	SK	Subport disable

4. XY Coordinate data formats

4.1 ASCII format

<u>S</u> <u>99999</u>,<u>S</u> <u>99999</u>, <u>F</u> <u>CR</u> <u>LF</u>
①   ②   ③④   ⑤   ⑥⑦   ⑧   ⑨

     ①   ④   Signs :   Plus (+) or minus (-). At power on, No sign is attached. Signs will be output after the Set Origin Command is executed. They will not be output after the Return Origin Command is executed.

     ②   X coordinate data

     ⑤   Y coordinate data

     5 digits when 0.025mm or 0.001" resolution is selected

     4 digits when 0.05mm, 0.1mm, 0.25mm, 0.0025", 0.005" or 0.01" resolution is selected.

     If Leading Zero Suppression is set, the data length may be shortened. (When shortened, then ③ , ⑥ , and ⑦ are output to distinguish ② and ⑤ from each other.)

     ③   ⑥   Delimiter

     ⑦   Pendown code (31 HEX) or cursor function code

     ⑧   Carriage return

     ⑨   Line feed

Table 4.1 shows how to select function with ASCII-formatted data.

Table 4.1 How to select function with ASCII-formatted data

Function name	Function	DIP switch		Command
Code Selection 　　　　Binary 　　　　ASCII	Binary format ASCII format	DSW3-1 　　　ON 　　　OFF		BI AS
Leading Zero Suppression 　　　　Yes 　　　　No	② and ⑤ are: 　Variable length 　Fixed length	DSW3-2 　　　ON 　　　OFF		LE LD
Function Code Output 　　　　Yes 　　　　No	③ , ⑥ , and ⑦ are: 　　Output 　　Not output	DSW3-3 　　　OFF 　　　ON		PE PI
CR Code Output 　　　　Yes 　　　　No	⑧ is: 　　Output 　　Not output	DSW3-4 　　　OFF 　　　ON		D1 D3
LF Code Output 　　　　Yes 　　　　No	⑨ is: 　　Output 　　Not output	DSW3-5 　　　OFF 　　　ON		D2 D4
Set origin 　　　　Set 　　　　Return	① and ④ are: 　　Output 　　Not output			FS FR
Resolution		DSW3-7	DSW3-8	
0.025mm or 0.001"	② and ⑤ are 5 digits each	OFF	OFF	L1
0.05mm or 0.0025"	② and ⑤ are 4 digits each	OFF	ON	L2
0.1 mm or 0.005"	② and ⑤ are 4 digits each	ON	OFF	L3
0.25 mm or 0.01"	② and ⑤ are 4 digits each	ON	ON	L4

4.2 Binary format

(1) High resolution packed binary format

(Applied to 0.025mm, 0.05mm, 0.001", or 0.0025" resolution)

BIT BYTE	7*	6	5	4	3	2	1	0
1	1	0	C3	C2	C1	C0	X15	X14
2	·	0	X13	X12	X11	X10	X9	X8	X7
3		0	X6	X5	X4	X3	X2	X1	X0
4		0	0	0	0	0	0	Y15	Y14
5		0	Y13	Y12	Y11	Y10	Y9	Y8	Y7
6		0	Y6	Y5	Y4	Y3	Y2	Y1	Y0

* RS-232C port(s) does not output BIT 7 when 7-data bits character is selected.

C3 ∿ C0   Pen-down code (0001 binary) or cursor function button code. 0000 binary means no actuation of the pen or cursor switch.

X15 ∿ X0 X coordinate data

Y15 ∿ Y0 Y coordinate data

(2) Low resolution packed binary format

(Applied to 0.1mm, 0.25mm, 0.005", or 0.01" resolution)

BIT BYTE	7	6	5	4	3	2	1	0
1	P	1	C3	C2	C1	C0	0	0
2	P	0	X5	X4	X3	X2	X1	X0
3	P	0	X11	X10	X9	X8	X7	X6
4	P	0	Y5	Y4	Y3	Y2	Y1	Y0
5	P	0	Y11	Y10	Y9	Y8	Y7	Y6

C3 ∿ C0   Pen-down code (0001 binary) or cursor
          function button code.

X11 ∿ X0   X coordinate data

Y11 ∿ Y15   Y coordinate data

P   Parity bit (even parity)
            RS-232C port(s) does not output this bit
            when 7-data bits character is selected.

Minus data of XY coordinate is expressed in terms of
two's complement when the "Set Origin" command has
been executed.

5. Operating modes

5.1 Resolution

Any of the following 8 resolutions is selectable.

0.025mm, 0.05mm, 0.1mm, 0.25mm

0.001", 0.0025", 0.005", 0.01"

Table 5.1 shows how to select a resolution.

Table 5.1 Selection of resolution

DIP switch setting				
DSW3 -7	DSW3 -8	DSW4-1		
		OFF	ON	
OFF	OFF	0.025mm	0.001"	L1
	ON	0.05m	0.0025"	L2
ON	OFF	0.1mm	0.005"	L3
	ON	0.25mm	0.01"	L4
		MT	IN	
		Command		

NOTE: At power ON, select a resolution by using a DIP switch.
Thereafter, select it with command.

5.2 Output mode

The following 4 modes are provided.

POINT ----- Data for one point only will be output when the pen or cursor switch is actuated.

TRACK ----- Data will be output continuously while the pen or cursor switch is actuated.

RUN ------- Data will be output continuously while the pen or cursor is on the approach to the tablet.

INCREMENTAL ----- Data will be output when the movement of
the pen or cursor in the X/Y direction
is above 10 times greater than the set
resolution. The INCREMENTAL mode is
invalid in the POINT mode.

5.3 Output speed (RATE)

Any of the following ourput speeds is selectable
1 (fastest), 1/2, 1/4, 1/10, 1/20, 1/40, 1/100, 1/200
(Switch or command selectable)

RATE controls the minimum output period of XY coordinate
data in the TRACK or RUN mode. In the INCREMENTAL mode,
XY coordinate data will be output only when the following
two conditions are met; (1) incremented data has been
detected, and (2) the period set by RATE selection has
elapsed.

RS-232C dual port data transfer requires to extend the
period.

RS-232C baud rate may limit the output speed regardless
of whether the speed has been selected by RATE.

Table 5.2 shows how to set a RATE.

Table 5.2 How to set rate

Setting RATE	DIP switch			Command
	DSW4-5	DSW4-6	DSW4-7	
1	OFF	OFF	OFF	R1
1/2	OFF	OFF	ON	R2
1/4	OFF	ON	OFF	R3
1/10	OFF	ON	ON	R4
1/20	ON	OFF	OFF	R5
1/40	ON	OFF	ON	R6
1/100	ON	ON	OFF	R7
1/200	ON	ON	ON	R8

The maximum speed is 200 XY points/second.*

* When Parallel port, Binary format, 0.025mm
  resolution and RATE 1 are selected and J3
  21 pin and 25 pin is shorted (i.e. hand-
  shaking is killed).

6. Lamps and buzzer

Lamps

Three status indicator LED's are mounted on the tablet.

READY -------- Indicates that power is ON and the initial
self-diagnosis has been successfully
completed.

PROX --------- Indicates that either the pen or cursor
(PROXIMITY)   has detected coordinates in the active
area of the tablet.

PDWN --------- Indicates that the pen or cursor switch
(PEN DOWN)   has been actuated. This lamp is effective
only when the PROX lamp is ON.

Buzzer

Table 6.1   Buzzer functions

No.	Buzzer function	Buzzer sounds when/at:	Duration of buzzing	Description
1	Pen-down Detection	Pen-down or cursor button has been depressed	200 ms × 1 time	
2	Command Receiving	Command has been received	50 ms × 1 time	
3	Bell Command Receiving	Command T1 has been received T2 has been received T3 has been received T4 has been received	200 ms × 1 time × 2 times × 3 times × 4 times	

No.	Buzzer function	Buzzer sounds when/at:	Duration of buzzing	Description
4	RS-232C Port Alarm	1. Power ON 2. Command RS 3. Start of digitizing mode* *(DSW2-8 turned OFF from ON)	400 ms × 5 times	Main port connector has not been plugged in, or external device has not been energized.
			400 ms ×10 times	Subport connector has not been plugged in, or external device has not been energized (in dual mode).
			400 ms × 15 times	Main port and subport connectors have not been plugged in, or external devices have not been energized (in dual mode).
5	Input Buffer Overflow	Data transfer between RS-232C ports	Intermittent buzzing at interval of 200 ms until power is turned OFF	Data being transferred between ports have overflown
6	Switch-set Self Test	Several seconds after setting T/M mode (DSW2-8 turned ON from OFF)	200 ms × 1 time 400 ms × 1 time	ROM NG ROM OK
			200 ms × 4 times 400 ms × 2 times	RAM NG RAM OK

The buzzer is enabled/disabled by switch or command.

Table 6.2

	DIP switch	Command
Buzzer enable	DSW3-6 OFF	AE
* Buzzer disable	DSW3-6 ON	AD

* The buzzer can be disabled only for Pen-down, command receiving, and bell command receiving (commands T1 through T4 receiving).

7. Command input

On-line command input

On-line command data is input through a selected port to change the existing operation mode.

(1) One character commands

    Stop Data Output -------- 02 HEX

    Resume Data Output ------ 04 HEX

Note that data will be continuously transferred between the RS-232C ports, and commands are also received while the "Stop Data Output" command is running.

(2) Three-character commands

Header 01HEX is followed by two ASCII characters.

Table 7.1 shows all three-character commands, but headers are omitted in it. Some of these commands will be briefed below. Most of them are described in other sections.

Set origin (or Floating Zero) : 01HEX FS

Upon receipt of this command (01HEX FS), the origin of the next XY coordinate can be set at any point on the active area of the tablet by touching the desired point with the pen or cursor and then actuating the pen or cursor switch. Thereafter, plus (+) or minus (-) sign is added when it is output in ASCII format, or 2's complement binary data is output as a minus data in case of binary format.

<u>Return Origin</u> : 01HEX FR

Upon receipt of this command, the origin set by the "Set Origin" command is canceled, and it returns to the initial position (left bottom corner of the active area on the tablet) which has been set at power ON. Thereafter, all XY coordinate data are set positive with no sign bit character.

<u>Self Test</u> : 01HEX DT

ROM and RAM are tested, and the results are answered back through the main port.

ASCII "0" is output when both ROM and RAM are OK.

ASCII "N" is output when ROM and/or RAM are NG.

"Stop Data Output" command should be input before starting the self test.

The HDG-1111 repeatedly performs self test and outputs the respective results until it receives "End of Self-Test" command (01HEX DR).

Table 7.1 Commands (without header)

	Command	Code	Remarks
1	Reset	RS	Settings are made by DIP switches.
2	Stop Data Output	SD	Commands are received, and data are transferred between ports even after this command is set.
3	Resume Data Output	RD	
4			
5	Select Point Mode	PT	
	Select Track Mode	LN	
	Select Run Mode	CN	
6	Select Incremental Data Output	IC	
	Reset Incremental Data Output	IR	
7	Select Inch Data Output	IN	
	Select Metric Data Output	MT	
8	0.025mm/0.001" Resolution	L1	
	0.05mm/0.0025" Resolution	L2	
	0.1mm/0.005" Resolution	L3	
	0.25mm/0.01" Resolution	L4	
9	Select Data Rate: 1	R1	(Fastest rate)
	1/2	R2	
	1/4	R3	
	1/10	R4	
	1/20	R5	
	1/40	R6	
	1/100	R7	
	1/200	R8	(slowest rate)

	Command	Code	Remarks
10	Set Origin	FS	
	Return Origin	FR	Origin returns to the initial position.
11	Self-Test	DT	ASCII "O" is output when ROM/RAM is OK. ASCII "N" is output when ROM/RAM is NG.
	End of Self-Test	DR	
12	Enable Buzzing	AE	Buzzer will sound.
	Disable Buzzing	AD	Buzzer will not sound (alarm will sound).
13	Buzz Once	T1	200 ms × 1 time
	Buzz Twice	T2	200 ms × 2 times
	Buzz 3 Times	T3	200 ms × 3 times
	Buzz 4 Times	T4	200 ms × 4 times
14	Select ASCII Format Output	AS	
	Select Packed Binary Output	BI	
15	Include Function Code	PE	Pen-down code/cursor function button code
	Exclude Function Code	PI	
16	Include Carriage-Return Code	D1	When ASCII format is selected.
	Include Line-Feed Code	D2	When ASCII format is selected.
	Exclude Carriage-Return Code	D3	When ASCII format is selected.
	Exclude Line-Feed Code	D4	When ASCII format is selected.
17	Suppress Leading Zero	LE	Leading zero(s) is not output when ASCII format is selected. (Data is of variable length.)
	Include Leading zero	LD	Leading zero(s) is output when ASCII format is selected. (Data is of fixed length.)

	Command	Code	Remarks
18	Select Parallel Port	PA	
	Select RS-232C (Serial) Port(s)	SR	
	Select Single-Port-Mode	SN	When serial mode is selected.
	Select Dual-Port Mode	DU	When serial mode is selected.
	Select Port A as Main Port	QA	When serial mode is selected.
	Select Port B as Main Port	QB	When serial mode is selected.
	Enable Subport	SE	When dual mode is selected.
	Disable Subport	SK	When dual mode is selected.

8. DIP Switch setting

All mode selections should be made by DIP switches at power ON or immediately after "Reset" (RS) command has been executed. Once a command other than the RS is input, then a mode is selected by the command.

Baud-rate will be changed as soon as the DIP switches for setting baud-rate are altered because the switches directly control circuits, but the alternation of other switches becomes available by turning off and then on the power or turning on and then off DSW2-8.

Dip switches functions are summarized in next page.

ON
OFF

Table 8.1 DIP switch functions
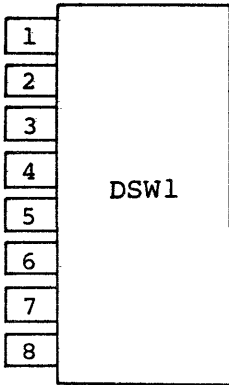
DSW1

1	..... SERIAL/PARALLEL OFF: Serial ON: Parallel
2	..... ASYNC/SYNC OFF: Asynchronous ON: Synchronous

BAUD RATE

DSW1										
③	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	OFF
④	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON
⑤	ON	OFF	OFF	ON	OFF	OFF	ON	OFF	OFF	OFF
⑥	OFF	ON	OFF	OFF	ON	OFF	OFF	ON	OFF	OFF
⑦	OFF	OFF	ON	OFF	OFF	ON	OFF	OFF	ON	OFF
⑧	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON
BAUD	19200	9600	4800	2400	1200	600	300	150	75	110
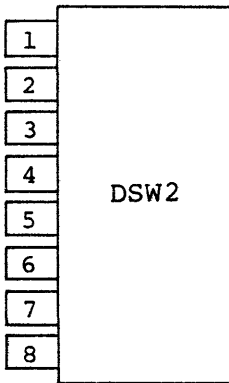
DSW2

1	..... SINGLE/DUAL OFF: Single ON: Dual
2	..... PORT B/PORT A OFF: Port B ON: Port A
3	..... SUBPORT ENABLE/DISABLE OFF: Enable ON: Disable

RS-232C WORD COMPOSITION

DSW-2 ④⑤⑥	OFF OFF OFF	OFF OFF ON	OFF ON OFF	OFF ON ON	ON OFF OFF	ON OFF ON	ON ON OFF	ON ON ON
BIT	7	7	7	7	8	8	8	8
PARITY	Even	Odd	Even	Odd	None	None	Even	Odd
STOP BIT	2	2	1	1	2	1	1	1

7	..... OFF (must-be)
8	..... DIGITIZE/TEST OFF: Digitize ON: T & M

DSW3
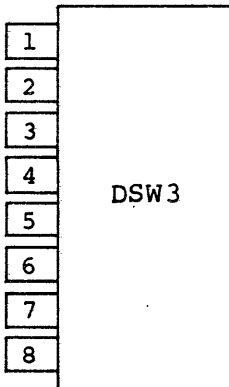
1	..... ASCII/BINARY OFF: ASCII ON: Binary
2	..... LEADING ZERO SUPPRESSION OFF: No ON: Yes
3	..... FUNCTION CODE OUTPUT OFF: Yes ON: No
4	..... C/R CODE OUTPUT OFF: Yes ON: No
5	..... L/F CODE OUTPUT OFF: Yes ON: No
6	..... BUZZER OFF: Enable (sounding) ON: Disable (not sounding)

RESOLUTION:

	OFF/OFF	OFF/ON	ON/OFF	ON/ON
	0.025mm or 0.001"	0.05mm or 0.0025"	0.1mm or 0.005"	0.25mm or 0.01"
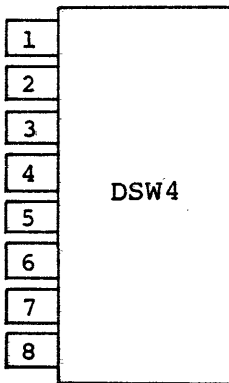
DSW4

1	..... UNIT SELECTION OFF: METRIC ON: ENGLISH (INCH)
2, 3	MODE SELECTION OFF/OFF RUN OFF/ON TRACK ON/OFF POINT ON/ON -
4	..... INCREMENTAL MODE OFF: NORMAL ON: INCREMENTAL

RATE SELECTION

RATE SW		1	1/2	1/4	1/10	1/20	1/40	1/100	1/200
DSW4	⑤	OFF	OFF	OFF	OFF	ON	ON	ON	ON
	⑥	OFF	OFF	ON	ON	OFF	OFF	ON	ON
	⑦	OFF	ON	OFF	ON	OFF	ON	OFF	ON

8 ..... MENU ENABLE
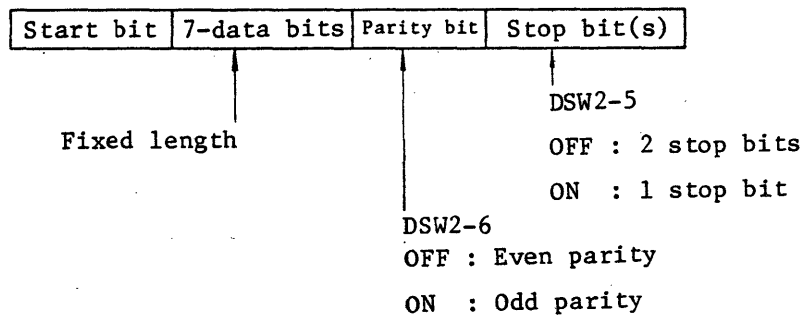
OFF: NORMAL
ON : MENU

9. B format

Data will be output in B format if the DSW2-7 is set to
ON at power ON. The output and command formats of the
HDG-1111 are compatible with those of the BIT PAD ONE
manufactured by Summagraphics Corp. in the U.S.A. The
functions of DIP switches (in B format) are shown in
Table 9.1 (page 32).

Port selection

One of the parallel ports RS-232C port A or port B can
be selected by the DSW1-1 and DSW2-2, and data-output/
command-input is made through the selected port only.
When serial I/F is selected, for example, then XY
coordinate data are output in the single mode, and
input data are not transferred between the ports.

RS-232C Word Composition

Start bit	7-data bits	Parity bit	Stop bit(s)

Fixed length

DSW2-5
OFF : 2 stop bits
ON : 1 stop bit

DSW2-6
OFF : Even parity
ON : Odd parity

Command input

Commands can be input only when REMOTE mode is set by the
turning ON the DSW4-2 and DSW4-3.

Mode selection

Table 9.2 shows the terms used with the HDG-1111 and BIT PAD ONE.

Table 9.2   Terms Used with HDG-1111 and BIT PAD ONE

BIT PAD ONE	HDG—1111
POINT MODE	POINT
STREAM MODE	RUN
SWITCH STREAM MODE	TRACK
Remote Control	REMOTE

Remote control

If REMOTE mode is set by turning ON the DSW4-2 and DSW4-3, the HDG-1111 stops outputting data at power ON, and a command, if input, causes only the XY coordinate data to be output.

Resolution Selection

To make the output and command formats compatible with those of the BIT PAD ONE, a resolution of 0.1 mm or 0.005" should be selected by turning ON the DSW3-7 and turning OFF the DSW3-8.
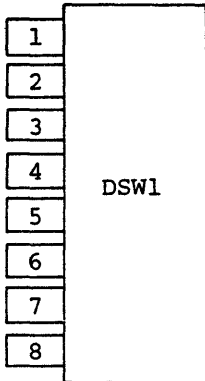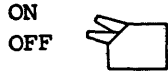
Cursor Button Code Selection   (when using a cursor)

The DSW2-1 is used to output a code equivalent to the 4-button/13-button of the BIT PAD ONE.

Data Strobe Signal on Parallel Port

The DSW3-3 enables you to select a positive logic/negative logic.

Table 9.1 DIP switch functions (when data are output in B format) [DSW2-7 : ON]

ON
OFF

DSW1

1 ..... SERIAL I/F/PARALLEL I/F   OFF: Serial   ON: Parallel

2 ..... ASYNC/SYNC   OFF: Asynchronous ON: Synchronous

DSW1		19,200	9,600	4,800	2,400	1,200	600	300	150	75	110
	3				ON	ON	ON	ON	ON	ON	
	4							ON	ON	ON	ON
	5	ON			ON			ON			
	6		ON			ON			ON		
	7			ON			ON			ON	
	8										ON
Baud		19,200	9,600	4,800	2,400	1,200	600	300	150	75	110

DSW2

1 ..... CURSOR BUTTON CODE
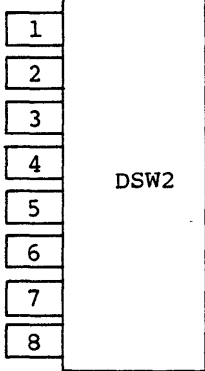
2 ..... SERIAL I/F PORT SELECTION

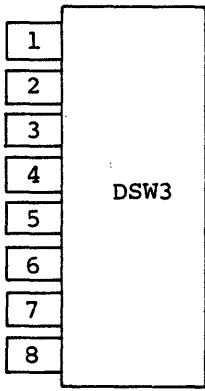| OFF: 4-button code	ON: 13-button code

OFF: Port B   ON: Port A

3 ..... (invalid)

4 ..... (invalid)

5 ..... ⎧ SERIAL DATA TRANSFER ⎫ ... ⎰ OFF: 2 stop bits ON: 1 stop bit

6 ..... ⎩ WORD COMPOSITION ⎭ ... ⎱ OFF: Even parity ON: Odd parity

7 ..... | ON: BIT PAD COMPATIBLE MODE |

8 ..... T/M MODE SETTING   OFF: Normal (digitizing) ON: T/M

DSW3

1 ..... OUTPUT FORMAT   OFF: ASCII   ON: Binary

2 ..... (invalid)

3 ..... DATA STROBE IN CASE OF   OFF: Positive   ON: Negative
        PARALLEL MODE   logic   logic

4 ..... (invalid)

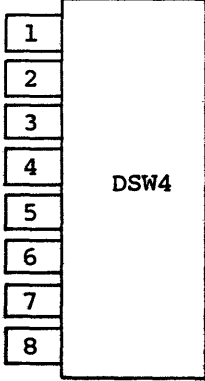5 ..... WHEN ASCII FORMAT IS   OFF: L/F code   ON: L/F code
        SELECTED   attached   not attached

6 ..... BUZZER   OFF: ENABLE (sounding)   ON: Disable (not sounding)

7 ..... ⎡ RESOLUTION ⎤ ... OFF⎧0.025mm OFF⎧0.05mm ON⎧0.1mm   ON⎧0.25mm
8 ..... ⎣   ⎦ ... OFF⎩0.001"   ON ⎩0.0025" OFF⎩0.005" ON⎩0.01"

DSW4

1 ..... OUTPUT UNIT SELECTION   OFF: [mm]   ON: [inch]

2 ..... ⎡MODE SELECTION⎤ ... OFF⎫   OFF⎫   ON ⎫   ON ⎫
3 ..... ⎣   ⎦ ... OFF⎭RUN ON ⎭TRACK OFF⎭POINT ON ⎭REMOTE

4 ..... (invalid)

5 ..... ⎫
6 ..... ⎬ OUTPUT RATE SELECTION
7 ..... ⎭

8 ..... (invalid)

DSW4		1	1/2	1/4	1/10	1/20	1/40	1/100	1/200
	5					ON	ON	ON	ON
	6			ON	ON			ON	ON
	7		ON		ON		ON		ON
RATE		1	1/2	1/4	1/10	1/20	1/40	1/100	1/200

10. Cursor (option)

Set the cursor on the tablet so that the intersection of
cursor lens cross-line is aligned with coordinate, and
then depress the cursor buttons. These procedures enable
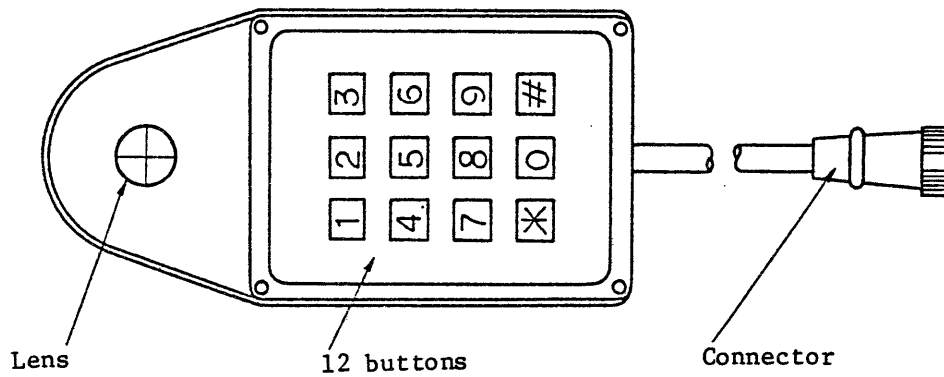the controller to issue PDWN signal.

10.1 12-button cursor

Lens   12 buttons   Connector

Table 10.1 Cursor button function codes

Button identifier	ASCII output	BINARY output			
		C_3	C_2	C_1	C_0
1	1 (31HEX)	0	0	0	1
2	2 (32HEX)	0	0	1	0
3	3 (33HEX)	0	0	1	1
4	4 (34HEX)	0	1	0	0
5	5 (35HEX)	0	1	0	1
6	6 (36HEX)	0	1	1	0
7	7 (37HEX)	0	1	1	1
8	8 (38HEX)	1	0	0	0
9	9 (39HEX)	1	0	0	1
*	* (2AHEX)	1	0	1	0
0	0 (30HEX)	1	0	1	1
#	# (23HEX)	1	1	0	0

11. Menu and T/M

11.1 Menu

If the POWER switch is turned ON with the DSW4-8 ON, the HDG-1111 is put in menu mode. As shown in Fig. 11.1, the active area of the tablet has dimensions of 10" (254mm) on the X axis × 11" (279.4mm) on the Y axis, and menu area is assigned at the leading portion of the tablet as wide as 1" on the X axis. Menu sheet is shown on the right side of this page.
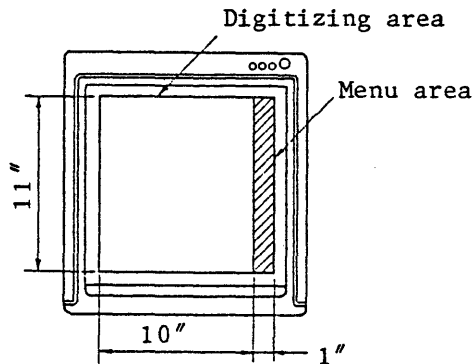

Fig. 11.1

Menu sheet setting procedure

(1) Put the HDG-1111 in RUN mode.

(2) Draw a line on the left edge of menu area on the tablet. When a pen or cursor is moved into the menu area, then the RUN mode automatically changes to POINT mode.

(3) Place the menu sheet on the menu area so that the left edge of the sheet is aligned with the drawn line, and then fix the sheet with tapes.

The menu is usable in the following two modes.

1. COMMAND mode

Setting procedure:

Put down the pen to the CANCEL and then COMMAND MODE on the menu sheet. Once the COMMAND mode is set, as many commands as you want can be input.

Command: 2 characters (see Table 7.1)

Put down the pen to the respective characters. If the first character is erroneously specified, put down the pen to the CANCEL and then COMMAND MODE to reset the COMMAND mode.

2. TYPE mode

In this mode, the characters specified by the pen will be output in ASCII format through the port set for XY coordinate data.

Setting procedure:

Put down the pen to the CANCEL and then TYPE MODE on the menu sheet.

Notes 1: Normal digitizing will be performed when the pen is put down to the digitizing area.

2: Menu sheet cannot be used when data are to be output in B format (DSW2-7 being ON).

3: The CANCEL on the menu sheet works to clear the COMMAND mode or TYPE mode when the pen is put down to it. If none of these modes has been set, no data will be output although the pen is put down to the menu sheet.

11.2 T/M (Test and Maintenance)

The HDG-1111 is put in TEST mode by turning ON the DSW2-8 to check the ROM and RAM. The test results are indicated by the buzzer. (Table 6.1)

NOTE: Be sure to set the DSW3-1 to OFF position before
        turning ON the DSW2-8.

The TEST mode automatically changes to DIGITIZE mode
by turning OFF the DSW2-8. Once the DIGITIZE mode is
set, the commands input previously will be all canceled,
and thus settings should be made by the DIP switches.

12. Specifications

12.1 Performance

Resolution : 0.025, 0.05, 0.1, and 0.25 millimeter
           0.001, 0.0025, 0.005, and 0.01 inch

Accuracy : ± 0.01"

Effective
Readout area: 11 × 11 inches (279.4 mm × 279.4 mm)
(Active area)

Readout
speed : 200 points/sec (maximum)

Origin : Fixed at the bottom left corner of the active area. It can be reset at any desired position of the active area by "Set Origin" command.

12.2 Operating mode

POINT, TRACK, RUN, and INCREMENTAL modes are settable

Self diagnosis : Set for testing ROM and RAM.

12.3 Environmental conditions

Item	During operation	During standby	Remarks
Temperature	0 ∿ 45°C	0 ∿ 60°C	
Humidity	10 ∿ 90% R.H	10 ∿ 95% R.H	No condensation allowed
Vibration	0.25G or less	2.5G or less	
Impact	2G or less	5G or less (during transportation)	
Dust	$1mg/m^3$ or less	$1mg/m^3$ or less	

12.4 Power supply

+5V ± 5% 1A (pin 1)

+12V ± 5% 0.2A (pin 2)

-12V ± 5% 0.2A (pin 4)

Common Ground (pin 3)

Connector: HIROSE RM12BPG-4S ----- cable side