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Chapter 1 Introduction

1.1 Features

The ICD-2002 and ICD-2002L are Vacuum Fluorescent Displays which display 20 columns and 2 lines, and the ICD-1201 is a Vacuum Fluorescent Graphic Display which displays 192x16 dots.

Blue-green fluorescent color is easy on the eyes.

The display panel is movable so that it can be adjusted for the best viewing angle.

The customer display have different height by adjusting the support.

The interface of customer display is RS-232C, with baud rates from 1200 up to 9600bps for ICD-1201 and from 4800 up to 9600bps for ICD-2002/L.

The customer display have provided the pass through function to reduce the cable connection.

The self-test function check the circuit board and performs each function for diagnostic purpose. (ICD-1201)

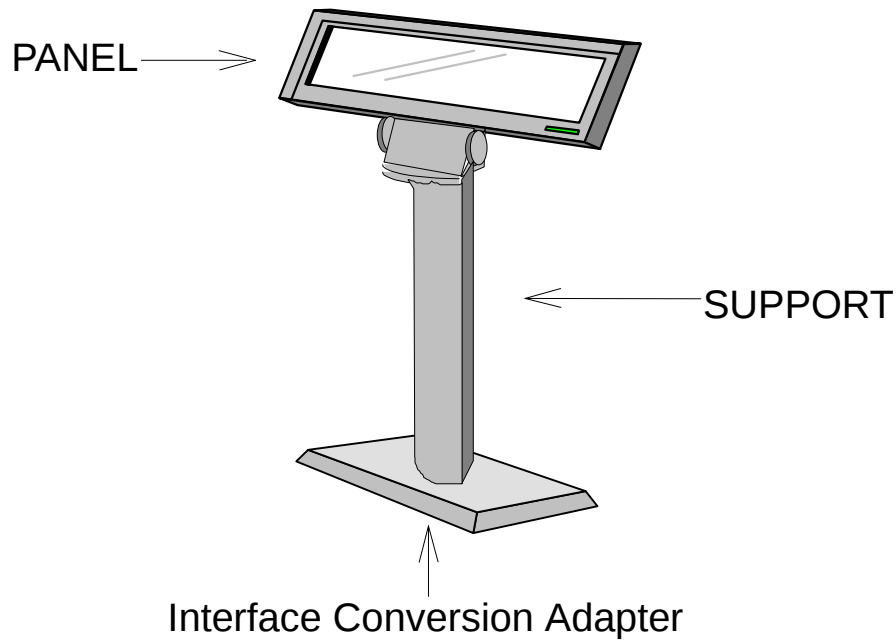
The user defined and international character sets are the standard of customer display.

Attention

1. This specification shall apply only to the product(s) coming along with this manual inside.
2. This manual may not apply to the previous or later product(s).
3. This specification may be modified without any notice. If it is necessary for “customers” to have a latest manual about specification, please inquire your suppliers.

1.2 Outline

The customer display outline has included of three parts: the panel, the support, and the interface adapter



The standard VFD customer display should include following accessories:

Item	Description	Dimension (mm)	Q'ty
1	(1) Panel of ICD-2002 or ICD-1201 (2) Panel of ICD-2002L	225(W) x 50(D) x 92(H) 280(W) x 65(D) x 95(H)	1
2	Support (Short)	88 (H), 33 (Diameter)	1
3	Support (Long)	220 (H), 33 (Diameter)	1
4	Interface Conversion Adapter	190(W) x 95(D) x 50(H)	1
5	Metal Parts	182(W) x 86(D) x 3(H)	1
6	Manual Diskette (1.44MB)	90(W) x 93(D) x 3(H)	1
7	D-SUB 9PIN RS-232 Cable		1
8	Screw P3x8 for Interface Conversion Adapter		4
9	Screw P3.1x15 for Interface Conversion Adapter		4
10	<ICD-2002/L> +5V PC 4P Plug Power Kit or PS/2 Power Kit or USB Power Kit or 100V~240V Universal Adapter (5V/2A) or 110V US or 230V Europe 2P Adapter (5V/1A) <ICD-1201> 100V~240V Universal Adapter (5V/1A)	46(W) x 85(D) x 31(H) 54(W) x 83(D) x 48(H) 47(W) x 107(D) x 40(H)	1

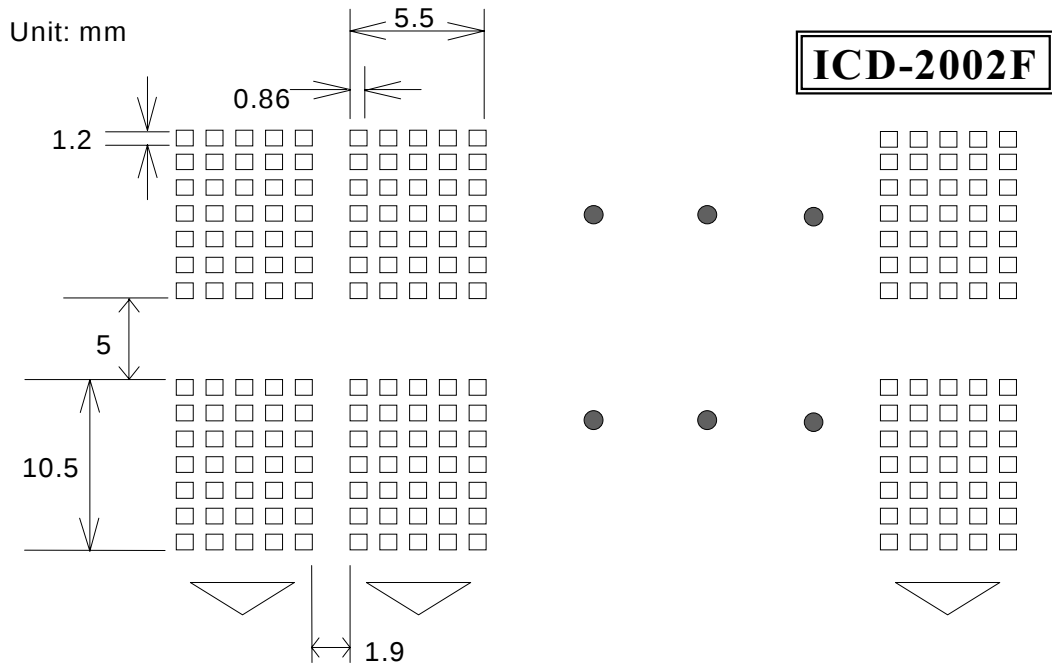
✱ Above accessories may be different due to customers' requirement when delivery.

Chapter 2 General Specification

2.1 Tube Display

(I) ICD-2002/L

Customer Display	Vacuum Fluorescent Display Blue Green
Display Pattern	5 x 7 Dot Matrix
Brightness	350~700 cd/m ²
Character Type	95 Alphanumeric & 32 International Characters
Character Size	5.5 mm (W) x 10.5 mm (H) (ICD-2002F) 7.2 mm (W) x 11.25 mm (H) (ICD-2002L)
Character Number	20 x 2
Character Pitch	Refer the figure 2.1



(II) ICD-1201

Customer Display	Vacuum Fluorescent Graphic Display Blue Green
Display Pattern	8x8 or 16x16 Dot Matrix
Display Area (X x Y)	140.6 x 35.0 mm
Number of Dots (X x Y)	192x16
Dot Size (X x Y)	0.4 x 0.4 mm
Luminance	515 cd /m ² (Ave.)
Character Type	95 Alphanumeric & 32 International Characters (For 8x8 font)

2.2 Electricity

(I) ICD-2002/L

Central Control Unit	CPU : 8031 BH ROM : 64K EPROM RAM : 32K SRAM
Speed	CPU : 11.0592 MHz
Connector	10 PIN Phone Jack Connector 9 PIN D-SUB Connector 25 PIN (Female) D-SUB Connector
Power Source	DC +5V
Power Consumption	3 Watts Average (Maximum 15 Watts)

(II) ICD-1201

Central Control Unit	CPU : 8031 BH ROM : 32K EPROM RAM : 32K SRAM
Speed	CPU : 11.0592 MHz
Connector	8 PIN Phone Jack Connector 9 PIN D-SUB Connector 25 PIN (Female) D-SUB Connector
Power Source	DC +5V
Power Consumption	3 Watts Average (Maximum 15Watts)

2.3 Overall Dimensions

Dimension of Panel (1) ICD-1201 / 2002 : (2) ICD-2002L :	225 mm (W) x 50 mm (D) x 92 mm (H) 280 mm (W) x 65 mm (D) x 95 mm (H)
Dimension of Support Long Support Short Support	220 mm (H) x 33 mm (Diameter) 88 mm (H) x 33 mm (Diameter)
Dimension of Base	190 mm (W) x 95 mm (D) x 55 mm (H)
Viewing Angle	Max. 45°
Horizontal Rotation	Max. 340°
Weight	About 0.8 Kg

2.4 Environment

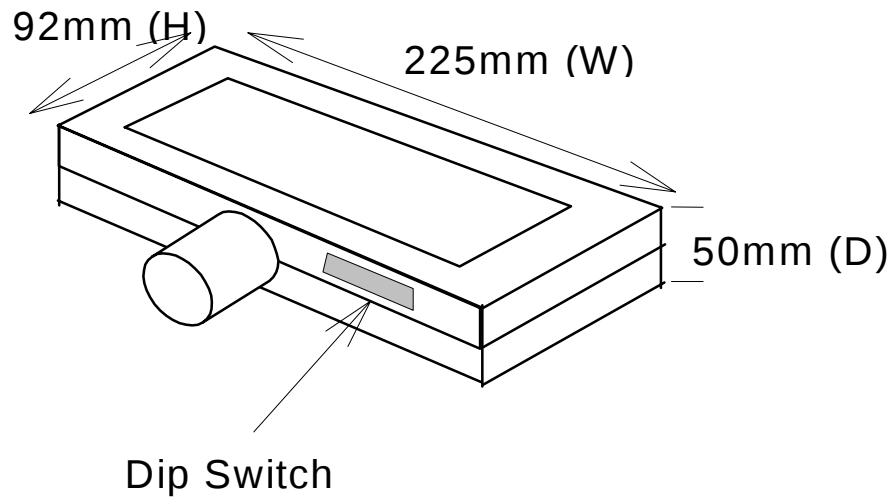
Operating Temperature	+10°C to +40°C
Storage Temperature	-10°C to +50°C
Relative Humidity	0% to 90% RH

2.5 Driver Interface

Driver Interface	RS232
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2.6 DIP Switch Settings

The default protocol is 9600 bps, non-parity, 8 data bits, 1 stop bit and with DTR/DSR control.



2.6.1 ICD-2002 Dip Switch Setting

(I) Baud Rate Select

SW Number - SW1	Function Description Baud Rate (bps)
OFF	9600
ON	4800

(II) Command Type Select

SW Number			Function Description	Software Defined
SW4	SW3	SW2	Command Type	Hex Code
OFF	OFF	OFF	ICD2002	00
OFF	OFF	ON	EPSON POS D101	01
OFF	ON	OFF	UTC Standard	02
OFF	ON	ON	UTC Enhance	03
ON	OFF	OFF	AEDEX	04
ON	OFF	ON	ADM788	05
ON	ON	OFF	DSP800	06
ON	ON	ON	CD5220	07

(III) International Character Set

SW Number				Function Description	
SW8	SW7	SW6	SW5	International Character Set (Code 20H-7FH)	Code Table (Code 80H-FFH)
OFF	OFF	OFF	OFF	U.S.A.	PC-437 (USA) (Standard European)
OFF	OFF	OFF	ON	FRANCE	PC-850 (Multilingual)
OFF	OFF	ON	OFF	GERMANY	PC-850 (Multilingual)
OFF	OFF	ON	ON	U.K.	PC-850 (Multilingual)
OFF	ON	OFF	OFF	DENMARK I	PC-850 (Multilingual)
OFF	ON	OFF	ON	SWEDEN	PC-850 (Multilingual)
OFF	ON	ON	OFF	ITALY	PC-850 (Multilingual)
OFF	ON	ON	ON	SPAIN	PC-850 (Multilingual)
ON	OFF	OFF	OFF	JAPAN	Katakana
ON	OFF	OFF	ON	NORWAY	PC-850 (Multilingual)
ON	OFF	ON	OFF	DENMARK II	PC-850 (Multilingual)
ON	OFF	ON	ON	SLAVONIC/RUSSIAN	
ON	ON	OFF	OFF	Factory Define	
ON	ON	OFF	ON	Factory Define	
ON	ON	ON	OFF	Factory Define	
ON	ON	ON	ON	Factory Define	

2.6.2 ICD-1201 Dip Switch Setting

(I) Baud Rate Setting:

SW8	SW7	Baud Rate (bps)
OFF	OFF	9600
OFF	ON	4800
ON	OFF	2400
ON	ON	1200

(II) Power on String Function Enable/Disable:

SW2	Function Description
OFF	Enable
ON	Disable

(III) Selftest Function:

SW1	Function Description
OFF	Disable
ON	Enable

Chapter 3 Interface

3.1 Interface

Specifications

Data Transmission Method : Asynchronous Serial.

Handshaking : DTR/DSR Control

Default Protocol : 9600bps, non-parity, 8 data bits, 1 stop bit.

Communication Protocol

1. Receive Data.

The DTR signal is as follows:

[HIGH] This indicates that the display isn't ready to receive data.

It depend on the following conditions:

- ☐ The period from when the power is turned on to when the printer first becomes ready to receive data.
- ☐ When the remaining space in the receiving buffer becomes 128 bytes or less.
- ☐ When the DTR signal of the printer is HIGH when the printer is selected using the command.

[LOW] This indicates that the display is ready to receive data.

It depend on the following conditions:

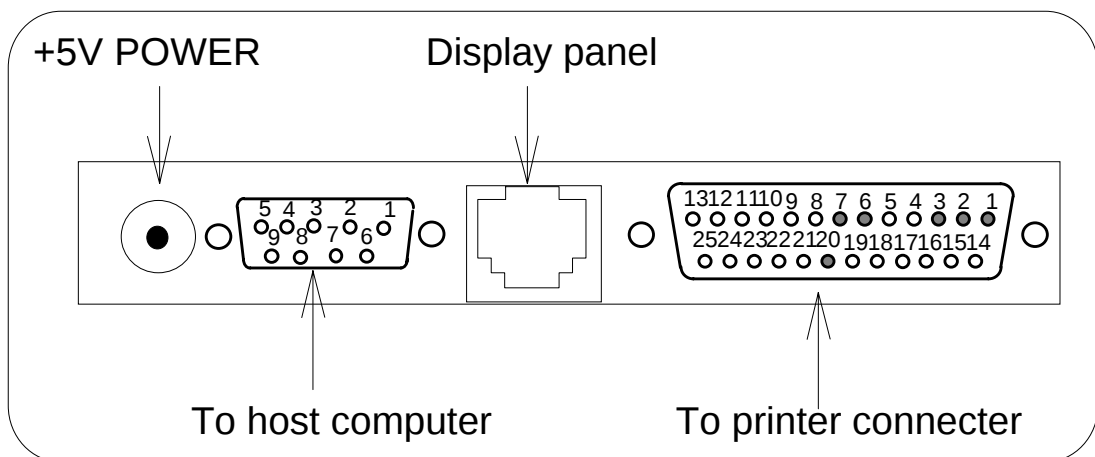
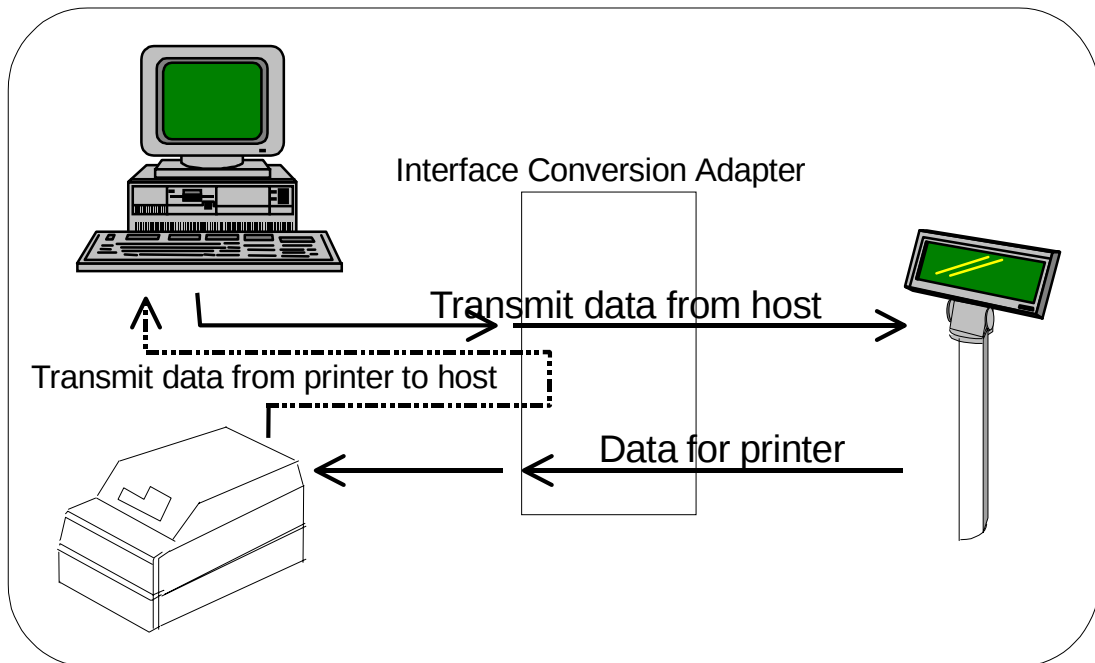
- ☐ When the printer first becomes ready to receive data after power-on.
- ☐ When the remaining space in the receiving buffer becomes 128 bytes or more.
- ☐ When the DTR signal of the printer is LOW when the printer is selected using the command.

2. Transmit Data.

After confirming the DSR is LOW, data is transmitted to printer.

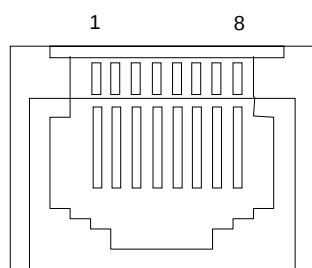
3.2 Interface Conversion Adapter

The interface adapter section has connectors for the display panel, the printer, the power supply, and host computer. All the data transmitted from the host computer will be received by the display. If this data is for the display, the data will be processed, and if it is for the printer, it will be transmitted to the printer. Whether the data is for the display or the printer can be switched using the peripheral device selection command.

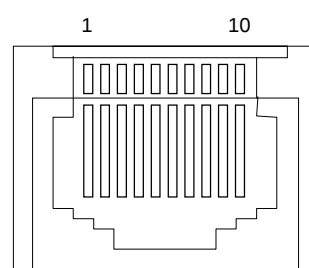


3.3 Connector

(I) Connector for Display Panel



8PIN Modular
(ICD-1201)

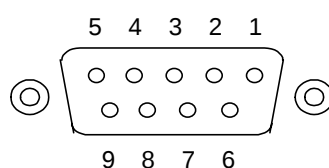


10PIN Modular Jack
(ICD-2002/L)

Connector Signal Assignment

Pin No. (8 PIN)	Pin No. (10 PIN)	Signal	I/O	Description
	1	NC		No Connection
1	2	NC		No Connection
2	3	TXD	OUTPUT	Transmit Data
3	4	RXD	INPUT	Receive Data
4	5	DSR	INPUT	Data Set Ready (From Printer)
5	6	GND		Ground
6	7	DTR	OUTPUT	Data Terminal Ready (From Display)
7	8	Vcc		Power Supply (+5V)
8	9	Vgnd		Power Supply (Ground)
	10	NC		No Connection

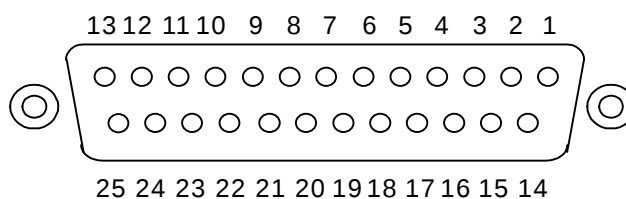
(II) Connector for Host Computer



PIN Assignment

Pin No.	Signal	I/O	Description
1	NC		No Connection
2	By Pass		Connect with DB-25 Pin#3
3	RXD	INPUT	Receive Data
4	By Pass		Connect with DB-25 Pin#20
5	GND		Power GND
6	DTR	OUTPUT	Data Terminal Ready
7	By Selection		N.C. or +5V
8	GND		Power GND
9	By Selection		N.C. or +5V

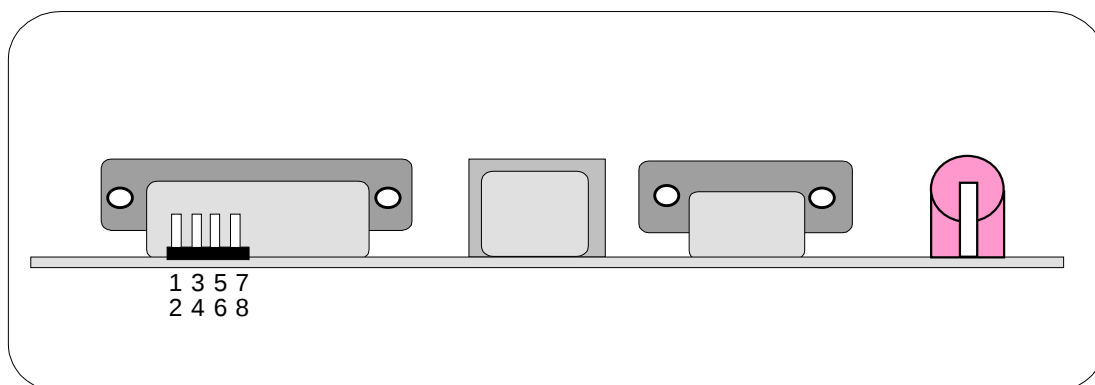
(III) Connector for Printer



PIN Assignment

Pin No.	Signal	I/O	Description
1	N.C.		No Connection
2	TXD	OUTPUT	Transmit Data
3	RXD	INPUT	Receive Data from DB-9 Pin#2
4	By Selection		N.C. or +5V
5	GND		Power GND
6	DSR	INPUT	Data Set Ready
7	GND		Power GND
20	DTR	OUTPUT	Data Terminal Ready from DB-9 Pin#4
22	By Selection		N.C. or +5V

(IV) Power Source Supply Via D-SUB 9PIN or 25PIN



Jumper Setting				The PIN No. for Power Source Signal
1-2	3-4	5-6	7-8	
OFF	OFF	OFF	OFF	NULL (Default Setting)
ON	OFF	OFF	OFF	No. 9 of 9 pin D-sub
OFF	ON	OFF	OFF	No. 7 of 9 pin D-sub
OFF	OFF	ON	OFF	No. 22 of 25 pin D-sub
OFF	OFF	OFF	ON	No. 4 of 25 pin D-sub

- ✱ If the host can supply power source by D-SUB 9PIN or 25PIN, you can use this function to reduce unnecessary +5V DC power adapter or power kits.
- ✱ The factory setting for this jumper is NULL that means this customer display must have a +5V DC power adapter or a power kit to supply power source.

Chapter 4 Command Description

4.1 ICD-2002 Command Set

4.1.1 ICD2002 Command Mode

Command	Hex	Function Description
HT	09	Move cursor right (Only valid in overwrite mode)
BS	08	Move cursor left (Only valid in overwrite mode)
CR	0D	Move cursor to left-most position (Only valid in overwrite mode)
ESC @	1B 40	Initialize customer display to initial state, clears display buffer, set display mode to shift and sets current display row to upper row
ESC U	1B 55	Select upper row as current row (Initial default)
ESC D	1B 44	Select lower row as current row
ESC A n	1B 41 n	Sets customer display disable or enable n=D, Disable ; n=E, Enable
ESC C r c	1B 43 r c	Move cursor to specified position (Only valid in overwrite mode) r=U, upper row ; r=D, lower row $1 \leq c \leq 20$ (column number)
ESC E r n	1B 45 r n	Set special effect or display mode of specified row
ESC R n	1B 52 n	Set international font sets (Please refer <i>International Font Set Table</i>)
ESC = n	1B 3D n	Select peripheral n=1, printer ; n=2, display ; n=3, printer & display
ESC % n	1B 25 n	Set font pattern n=0, selected ; n=1, canceled
ESC & n s [p]	1B 26 n s data	Define user font pattern n=code for first character s=code for last character data=5 bytes required for each character

(REMARK)*Using commands “ESC E r n”, the value (Hex) of parameter

r	58h=all rows 55h=upper row 44h=lower row	n	special function, the value is one of 30h=shift mode (Default display mode) 31h=rotation mode 32h=blink mode 33h=clear this row and switch to shift mode 34h=overwrite mode 35h=vertical mode
---	--	---	---

* International Font Set Table

n (Hex)	International Font Set	n (Hex)	International Font Set
30h	U.S.A	32h	FRANCE
31h	GERMANY	33h	JAPAN

4.1.2 EPSON Command Mode

Command	Hex	Function Description
HT	09	Move cursor right
BS	08	Move cursor left
US LF	1F 0A	Move cursor up
LF	0A	Move cursor down
US CR	1F 0D	Move cursor to right-most position
CR	0D	Move cursor to left-most position
HOM	0B	Move cursor to home position
US B	1F 42	Move cursor to bottom position
US \$ x y	1F 24 x y	Move cursor to specified position $1 \leq x(\text{column}) \leq 20 ; 1 \leq y(\text{row}) \leq 2$
US C n	1F 43 n	Select/cancel cursor display n=0, canceled ; n=1, selected
CLR	0C	Clear display screen
CAN	18	Clear cursor line
US X n	1F 58 n	Brightness adjustment $1 \leq n \leq 4$
US E n	1F 45 n	Blink display screen $0 \leq n \leq 255$ (n*50msec) ON / (n*50msec) OFF n= 0, blinking is canceled n=255, display is turned off
ESC @	1B 40	Initialize display
ESC t n	1B 74 n	Select character code table $0 \leq n \leq 5$ (Please refer “ Chapter 5 ”)
ESC R n	1B 52 n	Select international character set (Please refer International Font Set Table)
US r n	1F 72 n	Select/cancel reverse character n=0, canceled ; n=1, selected
US MD1	1F 01	Specify overwrite mode
US MD2	1F 02	Specify vertical scroll mode
US MD3	1F 03	Specify horizontal scroll mode
US . n	1F 2E n	Specify period display n= display character code
US , n	1F 2C n	Specify comma display n= display character code
US ; n	1F 3B n	Specify semicolon (period+comma) display n= display character code
US # n m	1F 23 n m	Specify display annunciator,, turn the annunciator at “m” column on or off n=0,1 (Off, On) ; $0 \leq m \leq 20$
ESC & s n m [a(pl..p5)] (m- n+1)	1B 26 s n m [a(pl..p5)](m-n+1)	Define download characters s=1 ; $32 \leq n \leq m \leq 126$; a=5 (p1..p5 = pattern1..pattern5)
ESC ? n	1B 3F n	Cancel user-defined characters $32 \leq n \leq 126$ (n=character code)

ESC % n	1B 25 n	Select/cancel download character set n=0, canceled ; n=1, selected
ESC W n s (x1 y1 x2 y2)	1B 57 n s (x1 y1 x2 y2)	Specify/cancel the window range n=1,2,3,4 (four windows) ; s=0,1 (disable, enable) $1 \leq x1 \leq x2 \leq 20$ (column) ; $1 \leq y1 \leq y2 \leq 2$ (row)
ESC = n	1B 3D n	Select peripheral device n=1, printer ; n=2, display ; n=3, printer & display
US :	1F 3A	Set starting/ending position of macro definition
US ^ n m	1F 5E n m	Execute and quit macro $0 \leq (n,m) \leq 255$ n: specifies the time interval for display of characters in units of [n* 50msec] m: specifies the interval of macro execution every [m*50msec]
US @	1F 40	Execute self-test
US T h m	1F 54 h m	Display time $0 \leq h \leq 23$; $0 \leq m \leq 59$
US U	1F 55	Display of time counter

*** International Font Set Table**

n (Hex)	International Font Set	n (Hex)	International Font Set
00h	U.S.A.	06h	ITALY
01h	FRANCE	07h	SPAIN
02h	GERMANY	08h	JAPAN
03h	U.K.	09h	NORWAY
04h	DENMARK I	0Ah	DENMARK II
05h	SWEDEN		

※ Specify decimal point, comma, semicolon, annunciator*

(1) US . n (Decimal Point) / US , n (Comma) / US ; n (Semicolon):

The displayed character codes are from 32(20h) to 127(7Eh), and 128(80h) to 255(FFh) in the character code table. The period/comma/semicolon displayed only for n. The period is not displayed for the subsequent display characters.

(2) US # n m (annunciator):

[range] n = 0(00h) or 1(01h) / m = 0(00h)~20(14h)

[notes] When n= 0, the annunciator at column m is turned off.

When n= 1, the annunciator at column m is turned on.

”m” specify column number (the most left column is column 1) at which annunciator to be turned on/off is placed.

When m = 0, all annunciators are turned on or off.

Once an annunciator(s) is turned on, it remains on until turned off by this command, the ESC@ or US@ command is executed, or the power is turned off.

[example]: To turn on the annunciator at the third column:

[n = 01h], [m = 03h]

To turn off all the annunciators:

[n = 00h], [m = 00h]

※ Above commands relating decimal point, comma, semicolon, and annunciator may not be available due to hardware limit of display tube.

4.1.3 UTC Standard Command Mode

Command	Hex	Function Description
BS	08	Back space
HT	09	Horizontal tab
LF	0A	Line feed
CR	0D	Carriage return
DC0 p	10 p	Move cursor to specified position, $0 \leq p \leq 39$ (Please refer Row Character Position Chart)
DC1	11	Over write display mode
DC2	12	Vertical scroll mode
DC3	13	Cursor on
DC4	14	Cursor off
ESC d	1B 64	Change to UTC enhanced mode
US	1F	Clear display

Row Character Position Chart (Decimal)

Row1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Row2	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39

Row Character Position Chart (Hex)

Row1	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F	10	11	12	13
Row2	14	15	16	17	18	19	1A	1B	1C	1D	1E	1F	20	21	22	23	24	25	26	27

4.1.4 UTC Enhance Command Mode

Command	Hex	Function Description
ESC u A..CR	1B 75 41 [data x 20] 0D	Upper line display
ESC u B..CR	1B 75 42 [data x 20] 0D	Bottom line display
ESC u D..CR	1B 75 44 [data x 45] 0D	Upper line message scroll continuously
ESC u E..CR	1B 75 45 hh ':' mm 0D	Set and display 24 hour time $0 \leq h, m \leq 9$
ESC u F..CR	1B 75 46 [data x 45] 0D	Upper line message scroll once pass
ESC u H..CR	1B 75 48 n m 0D	Change attention code $32 \leq n, m$ (Default attention code n=1Bh, m=75h)
ESC u I..CR	1B 75 49 [data x 40] 0D	Two line display
ESC RS..CR	1B 0F 0D	Change to UTC standard mode

4.1.5 AEDEX Command Mode

Command	Hex	Function Description
! # 1..CR	21 23 31 [data x 20] 0D	Upper line display
! # 2..CR	21 23 32 [data x 20] 0D	Bottom line display
! # 4..CR	21 23 34 [data x 45] 0D	Upper line message scroll continuously
! # 5..CR	21 23 35 hh ':' mm 0D	Set and display 24 hour time $0 \leq h, m \leq 9$
! # 5 CR	21 23 35 0D	Display 24 hour time
! # 6..CR	21 23 36 [data x 45] 0D	Upper line message scroll once pass
! # 8..CR	21 23 38 n m 0D	Change attention code $32 \leq n, m$ (Default attention code n="!", m="#")
! # 9..CR	21 23 39 [data x 40] 0D	Two line display

4.1.6 ADM788 Command Mode

Command	Hex	Function Description
CLR	0C	Clear display
CR	0D	Carriage return
SLE1	0E	Clear up line and move cursor to upper line left most end
SLE2	0F	Clear low line and move cursor to lower line left most end
DC0	10 n	Set period to upper line last n position $1 \leq n \leq 7$
DC1	11 n	Set line blinking n=1, upper line n=2, lower line
DC2	12 n	Clear line blinking n=1, upper line n=2, lower line
SF1	1E	Clear field 1 and move cursor to field 1 fast position
SF2	1F	Clear field 2 and move cursor to field 2 fast position

4.1.7 DSP800 Command Mode

Command	Hex	Function Description
EOT SOH I n ETB	04 01 49 n 17	Select international character set (Please refer <i>International Font Set Table</i>)
EOT SOH P n ETB	04 01 50 n 17	Move cursor to specified position $49 \leq n \leq 88$
EOT SOH C n m ETB	04 01 43 n m 17	Clear display range from <u>n</u> position to <u>m</u> position and move cursor to <u>n</u> position $49 \leq n \leq m \leq 88$
EOT SOH S n ETB	04 01 53 n 17	Save the current displaying data (40 characters) to n'th layer for demo display $1 \leq n \leq 3$ (n specify the layer 1, 2, or 3)
EOT SOH D n m ETB	04 01 44 n m 17	Display the saved data $1 \leq n \leq 3$ (n specify the layer 1, 2, or 3) “m” can be ignored
EOT SOH A n ETB	04 01 41 n 17	Brightness adjustment $1 \leq n \leq 4$
EOT SOH = n ETB	04 01 3D n 17	Select peripheral device n=1, printer ; n=2, display
EOT SOH % ETB	04 01 25 17	Initialize display

* International Font Set Table

n (Hex)	International Font Set
30h	U.S.A.
31h	FRANCE
32h	GERMANY
33h	U.K.
34h	DENMARK I
35h	SWEDEN
36h	ITALY
37h	SPAIN
38h	JAPAN
39h	NORWAY
3Ah	DENMARK II

4.1.8 CD5220 Command Mode

Command	Hex	Function Description
ESC DC1	1B 11	Overwrite mode
ESC DC2	1B 12	Vertical scroll mode
ESC DC3	1B 13	Horizontal scroll mode
ESC Q A CR	1B 51 41 [N]20 0D	Set string display mode, write string to upper line
ESC Q B CR	1B 51 42 [N]20 0D	Set string display mode, write string to lower line
ESC Q D CR	1B 51 44 [N]m20 0D	Upper line message scroll continuously m<40
ESC [D	1B 5B 44	Move cursor left
BS	08	Move cursor left
ESC [C	1B 5B 43	Move cursor right
HT	09	Move cursor right
ESC [A	1B 5B 41	Move cursor up
ESC [B	1B 5B 42	Move cursor down
LF	0A	Move cursor down
ESD [H	1B 5B 48	Move cursor to home position
HOM	0B	Move cursor to home position
ESC [L	1B 5B 4C	Move cursor to left-most position
CR	0D	Move cursor to left-most position
ESC [R	1B 5B 52	Move cursor to right-most position
ESC [K	1B 5B 4B	Move cursor to bottom position
ESC l x y	1B 6C x y	Move cursor to specified position $1 \leq x \leq 20$ (column) ; $y=1,2$ (row)
ESC @	1B 40	Initialize display
ESC W s x1 x2 y	1B 57 s x1 x2 y	Enable or disable the window range at horizontal scroll mode s=0,1 (disable, enable) $1 \leq x1 \leq x2 \leq 20$ (column) ; $y=1,2$ (row)
CLR	0C	Clear display screen, and clear string mode
CAN	18	Clear cursor line, and clear string mode
ESC * n	1B 2A n	Brightness adjustment $1 \leq n \leq 4$
ESC & s n m [a(pl..p5)] (m-n+1)	1B 26 s n m [a(pl..p5)] (m-n+1)	Define download characters s=1 ; $32 \leq n \leq m \leq 126$; a=5 (p1..p5 = pattern1..pattern5)
ESC ? n	1B 3F n	Delete download characters $32 \leq n \leq 126$ (n=character code)
ESC % n	1B 25 n	Select / cancel download character set. n=0, canceled ; n=1, selected
ESC _ n	1B 5F n	Set cursor ON/OFF n=0,1 (Off,On)
ESC f n	1B 66 n	Select international fonts set
ESC c n	1B 63 n	Select fonts, ASCII code or JIS code
ESC = n	1B 3D n	Select peripheral device n=1, printer ; n=2, display ; n=3, printer & display

(REMARK)

- * While using command “ESC Q A” or “ESC Q B”, these two commands could be used combining with terminal printer - TP 2688 or TP3688
- * If using command “ESC Q A” or “ESC Q B”, others commands can’t be used except using command “CLR” or “CAN” to change operating mode.
- * If using command “ESC Q D”, message on upper line will move continuously till receiving a new command, clearing upper line, and moving cursor to most left position on upper line.

*** International Font Set Table**

n (Decimal)	International Font Set
A	U.S.A
G	GERMANY
I	ITALY
J	JAPAN
U	U.K.
F	FRANCE
S	SPAIN
N	NORWAY
W	SWEDEN
D	DENMARK I
E	DENMARK II
L	SLAVONIC
R	RUSSIA
	Reserved

*** Select Code Table**

n (Decimal)	International Code
A	compliance with ASCII code
J	compliance with JIS code
R	compliance with RUSSIA code
L	compliance with SLAVONIC code

4.2 ICD-1201 Command Set

Command	Hex	Function Description
HT	09	Move cursor right (Only valid in overwrite mode)
BS	08	Move cursor left (Only valid in overwrite mode)
CR	0D	Move cursor to left-most position (Only valid in overwrite mode)
ESC @	1B 40	Initialize customer display to initial state, clears display buffer, sets display mode to shift, and sets current display row to upper row
ESC U	1B 55	Select upper row as current row (Initial default)
ESC D	1B 44	Select lower row as current row
ESC A n	1B 41 n	Set customer display disable or enable n='D', disable ; n='E', enable
ESC C r c	1B 43 r c	Move cursor to specified position (Only valid in overwrite mode) r="U", upper row ; r="D", lower row $1 \leq c \leq 20$ (column number)
ESC E r n	1B 45 r n	Set special effect or display mode of specified row (Please refer (Remark) section)
ESC R n	1B 52 n	Set international font sets (Please refer International Font Set Table)
ESC = n	1B 3D n	Select peripheral n=1, printer ; n=2, display ; n=3, printer & display
ESC % n	1B 25 n	Set font pattern n=0, normal font set n=1, user font set n=2, Chinese character font set
ESC & n s [p]	1B 26 n s data	Define user font pattern n=code for first character s=code for last character data=5 bytes required for each character
ESC * x y w h [b]	1B 2A x y w h [b]	$0 \leq x \leq 191$ (Initial upper left "x" position) $0 \leq y \leq 1$ (Initial upper left "y" position) $1 \leq w \leq 192$ (Bit image width) $1 \leq h \leq 2$ (Bit image height) [b] = bit image string

(REMARK)*Using commands "ESC E r n", the value (Hex) of parameter

r	58h=all rows	n	special function, the value is one of
	55h=upper row		30h=shift mode (Default display mode)
	44h=lower row		31h=rotation mode
			32h=blink mode
			33h=clear this row and switch to shift mode
			34h=overwrite mode
			35h=vertical mode

* International Font Set Table

n (Hex)	International Font Set	n (Hex)	International Font Set
30h	U.S.A	32h	FRANCE
31h	GERMANY	33h	JAPAN

Chapter 5 Character Set

5.1 U.S.A. / Standard Character Set (20h - 7Eh)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
20h																
30h																
40h																
50h																
60h																
70h																

5.2 International Character Selection

ASCII CODE

No.	International	23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E
0	USA												
1	FRANCE												
2	GERMANY												
3	U.K.												
4	DENMARK I												
5	SWEDEN												
6	ITALY												
7	SPAIN												
8	JAPAN												
9	NORWAY												
10	DENMARK II												
11	SLAVONIC												
12	RUSSIA												

5.3 Character Code Table

5.3.1 Page 0 (PC437: U.S.A., Standard Europe)

00h – 7Fh

	HEX	0	1	2	3	4	5	6	7
HEX	BIN	0000	0001	0010	0011	0100	0101	0110	0111
0	0000	NUL		SP	0	@	P	-	p
		00	16	32	48	64	80	96	112
1	0001	MD1		I	1	A	Q	a	q
		01	17	33	49	65	81	97	113
2	0010	MD2		"	2	B	R	b	r
		02	18	34	50	66	82	98	114
3	0011	MD3		#	3	C	S	c	s
		03	19	35	51	67	83	99	115
4	0100			\$	4	D	T	d	t
		04	20	36	52	68	84	100	116
5	0101			%	5	E	U	e	u
		05	21	37	53	69	85	101	117
6	0110			&	6	F	V	f	v
		06	22	38	54	70	86	102	118
7	0111			'	7	G	W	g	w
		07	23	39	55	71	87	103	119
8	1000	BS	CAN	(	8	H	X	h	x
		08	24	40	56	72	88	104	120
9	1001	HT		)	9	I	Y	i	y
		09	25	41	57	73	89	105	121
A	1010	LF		*	:	G	Z	j	z
		10	26	42	58	74	90	106	122
B	1011	HOM	ESC	+	:	K	[	k	(
		11	27	43	59	75	91	107	123
C	1100	CLR		,	<	L	\	l	
		12	28	44	60	76	92	108	124
D	1101	CR		-	=	M	]	m	}
		13	29	45	61	77	93	109	125
E	1110			.	>	N	^	n	~
		14	30	46	62	78	94	110	126
F	1111		US	/	?	O	_	o	SP
		15	31	47	63	79	95	111	127

To be continued on next page...

80h – FFh

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	À 128	Á 144	Â 160	Ã 176	Ä 192	Å 208	Æ 224	Ç 240
1	0001	à 129	á 145	â 161	ã 177	ä 193	å 209	æ 225	ç 241
2	0010	â 130	ã 146	ä 162	å 178	æ 194	ç 210	È 226	É 242
3	0011	â 131	ã 147	ä 163	å 179	æ 195	ç 211	è 227	é 243
4	0100	ä 138	å 148	æ 164	ç 180	È 196	É 212	Ê 228	Ë 244
5	0101	ä 133	å 149	æ 165	ç 181	È 197	É 213	ê 229	ë 245
6	0110	ä 134	å 150	æ 166	ç 182	È 198	É 214	ë 230	÷ 246
7	0111	ä 135	å 151	æ 167	ç 183	È 199	É 215	ë 231	∞ 247
8	1000	ä 136	å 152	æ 168	ç 184	È 200	É 216	÷ 232	° 248
9	1001	ä 137	å 153	æ 169	ç 185	È 201	É 217	° 233	° 249
A	1010	ä 138	å 154	æ 170	ç 186	È 202	É 218	° 234	° 250
B	1011	ä 139	å 155	æ 171	ç 187	È 203	É 219	° 235	√ 251
C	1100	ä 140	å 156	æ 172	ç 188	È 204	É 220	∞ 236	η 252
D	1101	ä 141	å 157	æ 173	ç 189	È 205	É 221	∞ 237	° 253
E	1110	ä 142	å 158	æ 174	ç 190	È 206	É 222	∞ 238	° 254
F	1111	ä 143	å 159	æ 175	ç 191	È 207	É 223	∞ 239	° 255

5.3.2 Page 1 (Japanese Katakana)

	HEX	B	B	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	ー	丨	ㇿ	ー	夕	ㇿ	□	日
		128	144	160	176	192	208	224	240
1	0001	ー	丨	・	ア	チ	△	■	月
		129	145	161	177	193	209	225	241
2	0010	■	丨	「	イ	ウ	メ	■	火
		130	146	162	178	194	210	226	242
3	0011	■	丨	」	ウ	テ	モ	○	水
		131	147	163	179	195	211	227	243
4	0100	■	■	、	エ	ト	ヤ	●	木
		132	148	164	180	196	212	228	244
5	0101	■	■	・	オ	ナ	ユ	◇	金
		133	149	165	181	197	213	229	245
6	0110	ー	■	ヲ	カ	ニ	ヨ	◆	土
		134	150	166	182	198	214	230	246
7	0111	ー	→	ア	キ	ヌ	ラ	♦	年
		135	151	167	183	199	215	231	247
8	1000	ー	←	イ	ク	ネ	リ	▶	円
		136	152	168	184	200	216	232	248
9	1001	■	↑	ロ	ケ	ノ	ル	◀	分
		137	153	169	185	201	217	233	249
A	1010	■	↓	エ	コ	ハ	レ	▲	人
		138	154	170	186	202	218	234	250
B	1011	■	×	オ	サ	ヒ	ロ	▼	大
		139	155	171	187	203	219	235	251
C	1100	丨	÷	ヤ	シ	フ	ワ	◀	中
		140	156	172	188	204	220	236	252
D	1101	■	±	ユ	ス	ヘ	ン	➤	小
		141	157	173	189	205	221	237	253
E	1110	■	≤	■	セ	ホ	・	±	〒
		142	158	174	190	206	222	238	254
F	1111	■	≥	ソ	ソ	マ	・	±	℃
		143	159	175	191	207	223	239	255

5.3.3 Page 2 (PC850: Multilingual)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	À 128	Á 144	Â 160	Ã 176	Ä 192	Å 208	Æ 224	Ç 240
1	0001	È 129	É 145	Ê 161	Ë 177	Ì 193	Í 209	Î 225	Ï 241
2	0010	Ò 130	Ó 146	Ô 162	Õ 178	Ö 194	× 210	Ø 226	Ù 242
3	0011	Š 131	Ṧ 147	Ú 163	Û 179	Ü 195	Ý 211	Þ 227	ß 243
4	0100	Ÿ 132	ä 148	ñ 164	ı 180	— 196	Ê 212	Σ 228	ı 244
5	0101	İ 133	ò 149	Ñ 165	ı 181	÷ 197	ı 213	Œ 229	ı 245
6	0110	À 134	û 160	Ä 186	Å 182	İ 198	ı 214	ı 230	÷ 246
7	0111	Ş 135	ù 161	Å 187	Ä 183	İ 199	ı 215	ı 231	÷ 247
8	1000	Ê 136	ÿ 162	Ł 188	© 184	ı 200	ı 216	ı 232	÷ 248
9	1001	Ş 137	Ö 163	® 189	ı 185	ı 201	ı 217	ı 233	÷ 249
A	1010	İ 138	Û 164	ı 170	ı 186	ı 202	ı 218	ı 234	÷ 260
B	1011	ı 139	ı 165	ı 171	ı 187	ı 203	ı 219	ı 235	ı 261
C	1100	ı 140	ı 166	ı 172	ı 188	ı 204	ı 220	ı 236	ı 262
D	1101	ı 141	ı 167	ı 173	ı 189	ı 205	ı 221	ı 237	ı 263
E	1110	ı 142	ı 168	ı 174	ı 190	ı 206	ı 222	ı 238	ı 264
F	1111	ı 143	ı 169	ı 175	ı 191	ı 207	ı 223	ı 239	ı 265

5.3.4 Page 3 (PC860: Portuguese)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	Ç 128	Ê 144	Í 160	Ï 176	Ì 192	Ú 208	Ô 224	÷ 240
1	0001	Ù 129	Ã 145	Î 161	Ð 177	Í 193	Û 209	ß 225	± 241
2	0010	é 130	È 146	ó 162	Ñ 178	Ô 194	Û 210	Ï 226	≥ 242
3	0011	ê 131	â 147	ô 163	í 179	í 195	Ì 211	κ 227	≤ 243
4	0100	ë 132	õ 148	ñ 164	í 180	— 196	Ì 212	Σ 228	∫ 244
5	0101	è 133	ò 149	Ñ 165	í 181	÷ 197	Í 213	Ø 229	∫ 245
6	0110	Á 134	Ú 150	â 166	í 182	í 198	Í 214	μ 230	+ 246
7	0111	ç 135	û 151	ç 167	í 183	í 199	÷ 215	τ 231	≈ 247
8	1000	ê 136	í 152	ç 168	í 184	Ì 200	÷ 216	ø 232	' 248
9	1001	Ê 137	õ 153	ó 169	í 185	Í 201	í 217	ø 233	' 249
A	1010	ë 138	Û 154	— 170	í 186	Ì 202	Í 218	Ω 234	- 250
B	1011	í 139	ê 155	í 171	í 187	Ô 203	Ï 219	δ 235	√ 251
C	1100	Ô 140	ê 156	í 172	Í 188	í 204	— 220	∞ 236	n 252
D	1101	ì 141	Û 157	í 173	Í 189	— 205	Ï 221	φ 237	² 253
E	1110	Ä 142	π 158	≤ 174	Í 190	÷ 206	í 222	€ 238	' 254
F	1111	Å 143	σ 159	≥ 175	í 191	Ì 207	— 223	∩ 239	sp 255

5.3.5 Page 4 (PC863: Canadian-French)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	À 128	É 144	Ì 160	Ñ 176	Ò 192	Ó 208	Ô 224	Õ 240
1	0001	Ù 129	Ê 145	Í 161	Î 177	Ô 193	Õ 209	Ö 225	× 241
2	0010	Ê 130	Ë 146	Î 162	Ï 178	Ô 194	Õ 210	Ö 226	÷ 242
3	0011	Ë 131	Ï 147	Ï 163	Ï 179	Õ 195	Ö 211	× 227	≤ 243
4	0100	Ä 132	È 148	Î 164	Ï 180	Ö 196	× 212	Û 228	Ü 244
5	0101	Å 133	É 149	Ï 165	Ï 181	× 197	Û 213	Ü 229	Ý 245
6	0110	Æ 134	Ê 150	Ï 166	Ï 182	× 198	Ü 214	Ý 230	þ 246
7	0111	Ç 135	Ë 151	Ï 167	Ï 183	× 199	Ý 215	þ 231	ß 247
8	1000	È 136	Ï 152	Ï 168	Ï 184	× 200	þ 216	ß 232	° 248
9	1001	É 137	Ï 153	Ï 169	Ï 185	× 201	ß 217	° 233	± 249
A	1010	Ê 138	Ï 154	Ï 170	Ï 186	× 202	° 218	± 234	² 250
B	1011	Ë 139	Ï 155	Ï 171	Ï 187	× 203	± 219	² 235	³ 251
C	1100	Ì 140	Ï 156	Ï 172	Ï 188	× 204	² 220	³ 236	´ 252
D	1101	Í 141	Ï 157	Ï 173	Ï 189	× 205	³ 221	´ 237	µ 253
E	1110	Î 142	Ï 158	Ï 174	Ï 190	× 206	´ 222	µ 238	¶ 254
F	1111	Ï 143	Ï 159	Ï 175	Ï 191	× 207	µ 223	¶ 239	· 255

5.3.6 Page 5 (PC865: Nordic)

	HEX	B	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	Ċ 128	É 144	á 160	Ė 176	Ł 192	Ł 208	α 224	≡ 240
1	0001	Ħ 129	Ė 145	â 161	Ė 177	Ł 193	Ł 209	β 225	± 241
2	0010	Ħ 130	Æ 146	ô 162	Ł 178	Ł 194	Ł 210	Γ 226	≥ 242
3	0011	Ħ 131	ô 147	ú 163	Ł 179	Ł 195	Ł 211	κ 227	≤ 243
4	0100	Ħ 132	ä 148	ñ 164	Ł 180	Ł 196	Ł 212	Σ 228	ƒ 244
5	0101	Ħ 133	ä 149	Ñ 165	Ł 181	Ł 197	Ł 213	σ 229	ƒ 245
6	0110	Ħ 134	û 150	ē 166	Ł 182	Ł 198	Ł 214	μ 230	÷ 246
7	0111	Ħ 135	û 151	ē 167	Ł 183	Ł 199	Ł 215	τ 231	∞ 247
8	1000	Ħ 136	ÿ 152	ł 168	Ł 184	Ł 200	Ł 216	φ 232	ˆ 248
9	1001	Ħ 137	Ö 153	Ł 169	Ł 185	Ł 201	Ł 217	θ 233	ˆ 249
A	1010	Ħ 138	Û 154	Ł 170	Ł 186	Ł 202	Ł 218	Ω 234	ˆ 250
B	1011	Ħ 139	φ 155	Ł 171	Ł 187	Ł 203	Ł 219	δ 235	√ 251
C	1100	Ħ 140	ē 156	Ł 172	Ł 188	Ł 204	Ł 220	∞ 236	η 252
D	1101	Ħ 141	φ 157	Ł 173	Ł 189	Ł 205	Ł 221	φ 237	ˆ 253
E	1110	Ħ 142	Å 158	Ł 174	Ł 190	Ł 206	Ł 222	Ε 238	ˆ 254
F	1111	Ħ 143	ƒ 159	Ł 175	Ł 191	Ł 207	Ł 223	Π 239	φ 255

Chapter 6 Installation Guide

