VIOTEH VD-220 VFD 2X20 CUSTOMER DISPLAY USER' S

Contents

Rev. Date 2050929 V1.3

1. FEATURES

- High brightness vacuum fluorescent display for excellent visibility over a wide viewing angle.
- Available in 9.0mm or higher characters.
- 40 characters in 20 columns by 2 lines format.
- 13 sets of international characters. More international font sets are available upon request.
- Standard RS-232C serial interface for data communication, with 9600 and other baud rate selection. USB interface (Virtual Com Mode) is available.
- Easy programming using Escape sequence commands.
- Emulation of CD5220, ESC/POS, Logic Control and UTC command sets. More command sets are available upon request.
- Display can swivel and tilt to a wide range of angles.
- Adjustable display height.
- Uses +5V or +12V regulated power. Wide range 9-24V DC unregulated supply is optional on request.
- Power can be sourced from USB port (+5V) or external adapter, with the bracket and cable kit supplied in typical configuration. Single cable is used for USB data interface and power supply.
- Optional AC adapters in various configurations for all AC voltages.

2. SPECIFICATIONS

2.1. Display Specifications

Display Type	Vacuum Fluorescent Display (VFD)
Display Color	Green
Display Format	40 Characters (20 columns x 2 lines)
Character Type	13 Sets of international characters
Character Font	5 x 7 Dot matrix
Character Size	9.03mm(H) x 5.25mm(W)
Character Pitch	8.0mm
MTBF	25,000 hours
Operating Temperature	5~45℃
Storage Humidity	10%~85%

2.2. RS-232C Interface Specifications

Data Transmission	Serial, asynchronous
Baud Rate	300, 600, 1200, 2400, 4800, 9600, 19200, 38400 and 57600
Data Bits	8 bits
Parity	None
Stop bit	Bits 1
Character Size	9.03mm(H) x 5.25mm(W)
Character Pitch	8.0mm

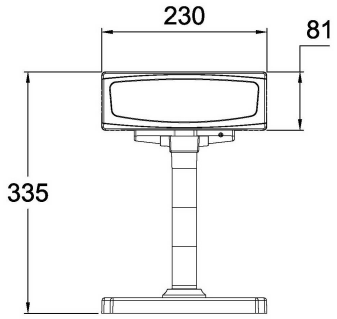
2.3. Power Supply Specifications

Supply Voltage	+5V by factory setting. +9V-36V optional
Consumption	3.0-6.0 Watts max
Power Connector	A. USB cable with +5V powered B. 2.5mm concentric power jack for external adapter C. 2.5mm DC jack to USB adapter
Supply Options	USB Port or DC5V/2.0A regulated AC adapter. 2.5 mm connector DC9.0V-36V/1.0A unregulated AC adaptor, 2.5mm connector

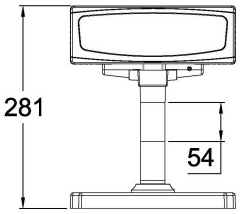
2.4. Physical Specifications

Height adjustment	Two removable tubes
Dimensions	
Total Height	208mm to 508mm
Panel	228mm (W) x 94mm (H) x 47.7mm (D)
Neck Height	54mm
Tube Height	150mm x 2
Base Section	228mm (W) x 60mm (H) x 114mm (D)
Weight	1.2kg
Tilt Angle	0 – 30° in continuous rotating
Swivel Angle	270°

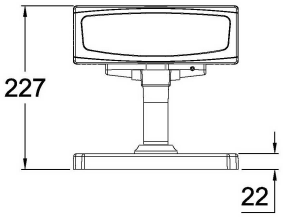
2.5. Physical Appearance



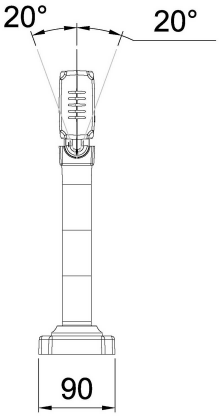
Front View-Full Height



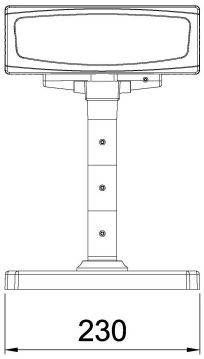
Front View-Mid Height



Front View-Min Height



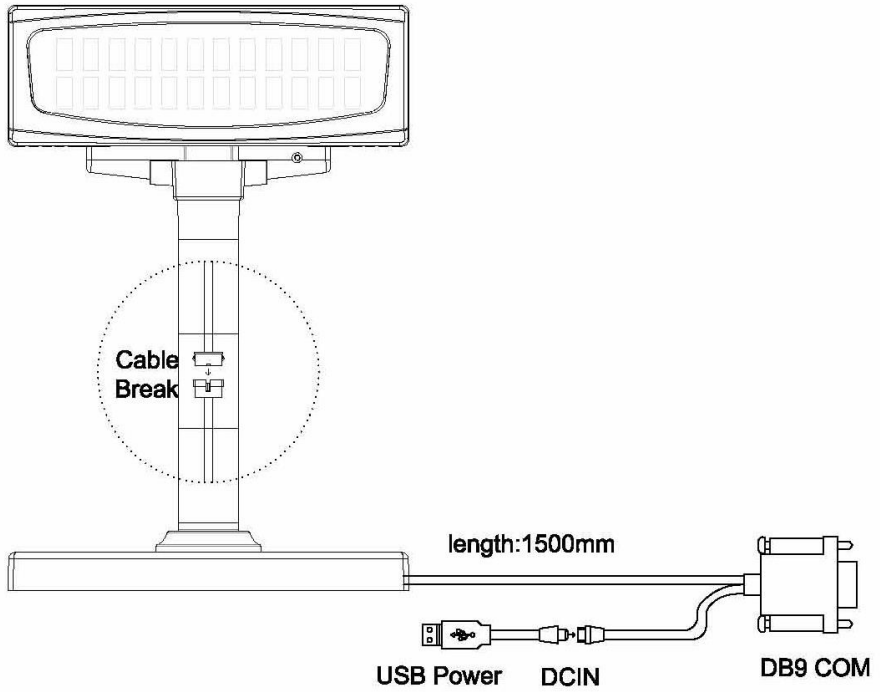
Rear View – Side



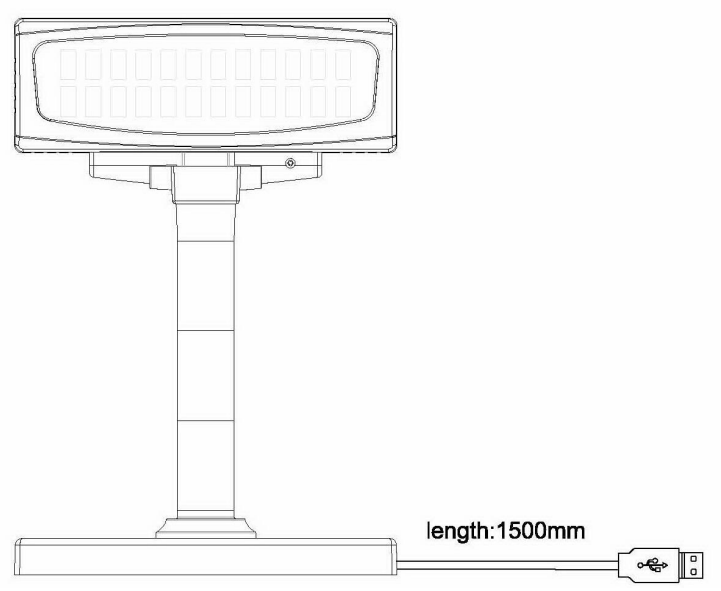
Rear View - Back

Units: mm

2.6. Cable for Data Interface and Power Configuration



PD-2100 RS232 Interface



PD-2100 USB

2.7. Interface Pin Assignment

2.7.1. Serial Port DB9 Female Connector

Pin Number	I/O	Signal Name
1	-	NC (no connection)
2	I	RXD
3	O	TXD
4	O	DTR
5	-	GND
6	I	DSR
7	O	RTS
8	I	CTS
9	-	V+ (optional)

Handshaking signal pairs DTR/DSR, RTS/CTS is available alternately, not present simultaneously.

2.7.2. Serial Port RJ45 Connector

This cable connector is applied to PD-2002V and some customized clients only.

Pin Number	I/O	Signal Name
1	-	Field Ground
2	O	TXD
3	I	RXD
4	I	DSR
5	O	DTR
6	-	PS (+12V) Ground
7	I	+V
8	-	NC

2.7.3. USB Type A Connector

Pin Number	I/O	Signal Name
1	I	VBus
2	I/O	D-
3	I/O	D+
4	-	GND

3. Usage Notes

3.1. Signal Naming

Please note that the signal naming of the pin assignment for the DB9 RS-232 connectors on the Customer Display follows the convention for DCE. The host is viewed as DTE. Thus, TxD would be an output for the host, the same name applies to an input of the DCE, such as the Customer Display, which would be wired to the host pin by the same name.

3.2. Handshaking

The handshake signals are another source of confusion. There are essentially two sets of control lines, DTR/DSR and RTS/CTS. Disregarding the original designation for teletype purpose, they serve essentially identical function. DTR and RTS are from host to device, logical high on both signals the host is ready, either one low indicates a not-ready status. DSR and CTS are from device to host, logical high on both signals the device is ready. Printer sometimes uses DCD as the ready signal to the host.

The Customer Display uses only TxD for receiving data from host, and DTR/ DSR for handshaking. All the other signals are routed to the following device in such a way as to ensure proper pass-through function. The use of a printer with Customer Display should always have the printer connected to the next device connector of the Customer Display and the Customer Display connected to the host. Paralleling the signal lines, as some times done to connect multiple devices to a RS-232 port, may lead to improper operation.

3.3. Power Supply and Pin 9

Pin 9 of DB9, originally designated as RI (ring indicator) input to host, is used as the power supply pin. Many systems has provision for supplying a +12V source on this pin to peripheral devices. The supply is then routed to the same pin on connector to the next device, a second Customer Display, for example. Printers usually have a separate power source, leaving pin 9 open. **Precaution is necessary not to connect any device with the RI line active, such as a modem, to the Customer Display, failure to observe may lead to permanent damage.** To find out if it is safe to connect a device, use a voltmeter to measure the RI pin of the device while it is powered on. If the reading is within 0+/- 3V, it is likely to be safe.

3.4. Power Bracket Kit

This kit is supplied in the typical configuration for Customer Display with 2.5mm DC jack. Using this feature eliminates the need for a AC adapter when power cannot be obtained from pin9 of RS-232 as described in previous note. A bracket with an RCA jack is included

that fits the rear standard PC expansion slot location, with a connector to source +5V from system`s peripheral power connector. A cable with a RCA plug on one end and a DC plug on the other end routes power to the Customer Display.

3.5. Power-on Moving Message

At Default Command Set mode, upon power-on a moving message is displayed after self-check. This message is stored in EEPROM and may be changed by following the steps below.

1. Send **0Ch** to Customer Display to clear display.
2. Send desired message to Customer Display.
3. Send **1Bh 53h 31h** to store the message in EEPROM.

4. DISPLAY MODES DESCRIPTION

There are basically four display modes for the Customer Display. The user may choose the mode that is most appropriate for the application.

4.1. Overwrite Mode

This is the default mode. ESC DC1 and ESC @ commands would also put the display into this mode. The cursor moves from left to right, if it is at the end of the line, it moves to the beginning of the other line. Characters are displayed at the current cursor position, overwriting what is originally there, the cursor is then moved to the next position.

4.2. Vertical Scroll Mode

If the cursor is at the upper line it behaves like the overwrite mode. When it is at the end of the lower line, the next character would scroll the content of the lower line to upper line, the lower line is cleared and the cursor is moved to the beginning of the lower line.

4.3. Horizontal Scroll Mode

In this mode the cursor stays in whatever line it is at, unless changed by cursor movement commands. When the cursor is not at the end of the line, the input character is displayed at current cursor position, the cursor is then moved right. Once at the end of the line, subsequent character input would scroll the current line left one position, and the new character is displayed at the end position.

There is also a command, **ESC W**, to set display window in this mode. The effective display line would be limited within the window as defined by the command.

4.4. String Mode

This mode is perhaps the simplest used. The two display lines are treated independently. Only two commands, **ESC QA** and **ESC QB**, are needed. **ESC QA** followed by a string of no more than twenty characters would display the string on the upper line, left aligned. **A CR** (0Dh) character terminates the command. If the string is less than twenty characters in length, the rest of the display line is padded with blank. **ESC QB** does the same for the lower display line. The only other commands active in this mode are CLR and **CAN**. **CLR** would clear the display and change the Customer Display into **overwrite mode**. **CAN** clears the last line that was changed and change the Customer Display into **overwrite mode**. The initialization command, **ESC @**, has no effect in this mode.

5. COMMAND SET TABLE

5.1. SYSTEM COMMAND

Command	Hex Code	Description
STX 2	02 32	Update Firmware
STX MD5	02 05	Select international character set
STX MD6	02 06	Select extend font
STX B n	02 42 n	Set baud rate
STX D n	02 44	Display demo massage
STX S 1	02 53 31	Save data for demo display
STX C n	02 43 n	Command type select
STX MD5 D 8 ETX	02 05 44 08 03	Run Scroll Demo message
STX MD5 L n m ETX	02 05 4C nn mm 03	Save data for scroll demo display
ESC S 1	1B 53 31	Save data for Power-on Moving Message

5.2. CD5220 Commands

Command	Hex Code	Description
ESC DC1	1B 11	overwrite mode
ESC DC2	1B 12	vertical scroll mode
ESC DC3	1B 13	horizontal scroll mode
ESC * n	1B 2A n	brightness adjustment
ESC _ n	1B 5F n	set cursor ON/OFF
ESC c	1B 63	Select extend fonts
ESC f	1B 66	select international fonts
ESC [A	1B 5B 41	move cursor up
ESC [B	1B 5B 42	move cursor down
LF	0A	move cursor down
BS	08	move cursor left
HT	09	move cursor right
ESC [D	1B 5B 44	move cursor left
ESC [C	1B 5B 43	move cursor right
HOM	0B	move cursor to home position
ESC [H	1B 5B 48	move cursor to home position
ESC [K	1B 5B 4B	move cursor to bottom position
CR	0D	move cursor to left-most position
ESC [L	1B 5B 4C	move cursor to left-most position
ESC [R	1B 5B 52	move cursor to right-most position
ESC l x y	1B 6C x y	move cursor to specified position
ESC @	1B 40	initialize display
CLR	0C	clear display screen
CAN	18	clear cursor line, and clear string mode
ESC Q A $d_1d_2d_3…d_n$ CR	1B 51 41 d1d2d3…dn0D	Upper line display
ESC Q B $d_1d_2d_3…d_n$ CR	1B 51 42 d1d2d3…dn0D	Lower line display
ESC Q D d1d2d3…dn CR	1B 51 44 d1d2d3…dn0D	upper line message scroll continuously
ESC Q C $d_1d_2d_3…d_n$ CR	1B 51 43 d1d2d3…dn0D	lower line message scroll continuously

5.3. ESC/POS Commands

Command	Hex Code	Description
US MD1	1F 01	overwrite mode
US MD2	1F 02	vertical scroll mode
US MD3	1F 03	horizontal scroll mode
US X n	1F 58 n	brightness adjustment
US C n	1F 43 n	Turn cursor display mode on/off
ESC R n	1B 52 n	select international character set
ESC t n	1B 74 n	select character code table
US LF	1F 0A	move cursor up
LF	0A	move cursor down
BS	08	move cursor left
HT	09	move cursor right
HOM	0B	move cursor to home position
US B	1F 42	move cursor to bottom position
CR	0D	move cursor to left-end position
US CR	1F 0D	move cursor to right-end position
US $ x y	1F 24 x y	move cursor to specified position
ESC @	1B 40	initialize display
CLR	0C	clear display screen
CAN	18	clear cursor line
US @	1F 40	execute self-test
US r n	1F 72 n	select/cancel reverse character
US,	1F 2C n	Display character n , and turn the comma of the character on
US.	1F 2E n	Display character n , and turn the point of the character on
US;	1F 3B n	Display character n , and turn the semicolon of the character on
US #	1F 23 n	turn annunciator ON/OFF
US T h m	1F 54 h m	set and display time
US U	1F 55	continue to display time
US E n	1F 45 n	Sets display screen blank interval
ESC W	1B 57 n m x1 y1 x2 y2	Set/cancel window rang

ESC = n	1B 3d n	Select other display
ESC & s n m	1B 26 01 n m a(p1…pa*s) x (m-n+1)	download user defines characters
ESC % n	1B 25 n	select/cancel download character set

5.4. LOGIC CONTROLS Commands

Command	Hex Code	Description
ESC u A d1...dn	01	Data to Peripheral
ESC u B d1...dn	21 23 02	Data to Display
EOT n	04 n	Brightness Control
BS	08	back space
HT	09	horizontal tab
LF	0A	Line Feed
CR	0D	Carriage Return
DLE	10 n	move cursor to specified position
DC1	11	Normal Display Mode
DC2	12	vertical scroll mode
DC3	13	Cursor On
DC4	14	Cursor Off
US	1F	Reset

5.5. UTC/standard mode

Command	Hex Code	Description
EOT n	04 n	Brightness Control
BS	08	back space
HT	09	horizontal tab
LF	0A	line feed
CR	0D	carriage return
DEL n	10 n	move cursor to specified position
DC1	11	over write display mode
DC2	12	vertical scroll mode
DC3	13	cursor on
DC4	14	cursor off
CAN	18	clear cursor line
ESC d	1B 64	change to UTC enhanced mode
US	1F	clear display

5.6. UTC/enhanced mode

Command	Hex Code	Description
ESC u A d1...dn	1B 75 41 d1...dn 0D	upper line display
ESC u B d1...dn	1B 75 42 d1...dn 0D	bottom line display
ESC u D d1...dn	1B 75 44 d1...dn 0D	upper line message scroll continuously
ESC u F d1...dn	1B 75 46 d1...dn 0D	upper line message scroll one pass
ESC u I d1...dn	1B 75 49 d1...dn 0D	two line display
ESC RS CR	1B 0F 0D	change to UTC standard mode

6. COMMAND SET DESCRIPTION

6.1. System command details

1) STX 2 / Update Firmware

ACSII Format: STX 2

Dec. Format: [002][050]

Hex. Format: [02H][32H]

Description: Update Firmware

2) STX B n / Set baud rate

ACSII Format: STX B n 0<=n<=7

Dec. Format: [002][066] n 48<=n<=55

Hex. Format: [02H][42H] n 30H<=n<=37H

Description: Change the system baud rate and save it into EEPROM.

(Default baud rate for the new models: 9600bit/s）

ASCII n	Dec. n	Hex. n	Baud rate
0	48	30H	9600
1	49	31H	4800
2	50	32H	2400
3	51	33H	1200
4	52	34H	600
5	53	35H	300
6	54	36H	57600
7	55	37H	19200

3) STX C n / Command type select

ACSII Format: STX C n 0<=n<=2

Dec. Format: [002][067]n 48<=n<=53

Hex. Format: [02H][43H] n 30H<=n<=35H

Description: This command will change the command type and initialize the display

(Command set after powering up: ALL (ESC/POS, CD5220)）

ASCII n	Dec. n	Hex. n	Command type
0	48	30H	CD5220
1	49	31H	ESC/POS
2	50	32H	ESC/POS, CD5220
3	51	33H	UTC-S
4	52	34H	UTC-E
5	53	35H	Logic Control

4) STX S / Save data for demo display

ACSII Format: STX S

Dec. Format: [002][083]

Hex. Format: [02H][53H]

Description: Save demo message to EEPROM. The command is only available for the static state display mode, not for the scroll mode.

5) STX D n / Display demo massage

ACSII Format: STX D n 0<=n<=1

Dec. Format: [002][068]n 48<=n<=49

Hex. Format: [02H][44H]n 30H<=n<=31H

Description: Display demo message which has been saved by command STX S to EEPROM

When n=0, the demo message will be displayed under overwrite mode;

When n=1, the demo message will be displayed under upper line scroll mode.

6) STX MD5 n / Select international character set

ACSII Format: STX MD5 n

Dec. Format: [002][005]n 48<=n<=60

Hex. Format: [02H][05H]n 30H<=n<=3CH

Description: Select the international character set. The setting function will be saved

to EEPROM.

ASCII n	Dec. n	Hex. n	International font set
0	48	30H	U.S.A
1	49	31H	FRANCE
2	50	32H	GERMANY
3	51	33H	U.K
4	52	34H	DENMARKI
5	53	35H	SWEDEN
6	54	36H	ITALY
7	55	37H	SPAIN
8	56	38H	JAPAN
9	57	39H	NORWAY
:	58	3AH	DENMARKII
;	59	3BH	SLAVONIC
<	60	3CH	RUSSIA

For more information, see Appendix

7) STX MD6 n / Select extend font

ACSII Format: STX MD6 n

Dec. Format: [002][006]n 00<=n<=0C

Hex. Format: [02H][06H]n 00H<=n<=0CH

Description: Select the extend character set. The setting function will be saved to EEPROM.

DEC n	HEX n	Table of External Font（80H…FFH）
0	00H	U.S.A. and Standard Europe(A)
1	01H	Katakana for Japan(K)
2	02H	Multilingual(M)
3	03H	Portuguese(P)
4	04H	Canadian French(C)
5	05H	Nordic(N)
6	06H	SLAVONIC(S)
7	07H	RUSSIA(R)

8	08H	Win1252
9	09H	PC866[Cyrillic #2]
10	0AH	PC852[Latin2]
11	0BH	PC858[Euro]
12	0CH	Win1251
13	0DH	PC864[Arabic](Arabic version only)
15	0FH	Chinese

For more information, see Appendix

8) STX MD5 L n m ETX / Save data for scroll demo display

ASCII Format: STX 05 L n m ETX

Dec. Format: [02][05][76] n m [03]

Hex. Format: [02h][05h][4Ch] n m [03h]

Description: Save demo message for upper line and bottom line

n = 31h save data message for upper line

n = 32h save data message for lower line

m = data message; the maximum data character is under **60**

9) STX MD5 D 8 ETX / Run Scroll Demo message

ASCII Format: STX 05 D 8 ETX

Dec. Format: [02][05][68][08][03]

Hex. Format: [02h][05h][44h][08][03h]

Description: Run Scroll demo message for the display

10) ESC S 1 / Save data for Power-on Moving Message

ACSII Format: ESC S 1

Dec. Format: [027][083][049]

Hex. Format: [1BH][53H][31H]

Description: upon power-on a moving message is displayed after self-check. This message is stored in EEPROM and may be changed by following the steps below.

1. Send 0Ch to Customer Display to clear display.

2. Send desired message to Customer Display.
3. Send 1Bh 53h 31h to store the message in EEPROM.

6.2. CD5220 command details

1) ESC DC1 / Overwrite mode

ACSII Format: ESC DC1

Dec. Format: [027][017]

Hex. Format: [1BH][11H]

Description: Change the display mode to overwrite mode. In the mode, the cursor moves from left-most to right-most position of upper line, the move to the left-most position of lower line. When cursor moves from the right-most of lower line to left-most position of upper line, the former characters will be overwrite.

2) ESC DC2 / Vertical scroll mode

ACSII Format: ESC DC2

Dec. Format: [027][018]

Hex. Format: [1BH][12H]

Description: Change the display mode to vertical scroll mode. In this mode, the cursor moves from left-most to right-most position of upper line, then move to the left-most position of lower line. When the cursor move to the right-most of lower line, the characters in the lower line will scroll up to replace the characters in the upper line.

3) ESC DC3 / Horizontal scroll mode

ACSII Format: ESC DC3

Dec. Format: [027][019]

Hex. Format: [1BH][13H]

Description: Change the display mode to the horizontal scroll mode. In this mode, the cursor is off, the characters will push displayed from the right-most position of upper line.

4) ESC Q A d1d2d3…dn CR / Upper line display

ACSII Format: ESC Q A d1d2d3…dn CR

Dec. Format: [027][081][065]d1d2d3…dn[013]

Hex. Format: [1BH][51H][41H]d1d2d3…dn[0DH]

Description: In this mode, cursor is off, characters display d1 d2 d3….dn (1<= n<=20) in the upper line.

5) ESC Q B d1d2d3…dn CR / Lower line display

ACSII Format: ESC Q B d1d2d3…dn CR

Dec. Format: [027][081][066]d1d2d3…dn[013]

Hex. Format: [1BH][51H][42H]d1d2d3…dn[0DH]

Description: In this mode, cursor is off, characters display d1 d2 d3….dn (1<= n<=20) in the lower line.

6) ESC Q D d1d2d3…dn CR / Upper line message scroll continuously

ACSII Format: ESC Q D d1 d2 d3….dn CR

Dec. Format: [027][081][068] d1d2d3…dn [013] 32<=dn<=255

Hex. Format: [1BH][51H][44H] d1d2d3…dn [0DH] 20H<=dn<=ffH

Description: Change the display mode to the horizontal scroll mode. In this mode, the cursor is off, the characters will push displayed from left-most position of upper line.

7) ESC Q C d1d2d3…dn CR / lower line message scroll continuously (only PD-50)

ACSII Format: ESC Q C d1 d2 d3….dn CR

Dec. Format: [027][081][067] d1d2d3…dn [013] 32<=dn<=255

Hex. Format: [1BH][51H][43H] d1d2d3…dn [0DH] 20H<=dn<=ffH

Description: Change the display mode to the horizontal scroll mode. In this mode, the cursor is off, the characters will push displayed from left-most position of lower line.

8) ESC [D / Move cursor left

ACSII Format: ESC [D

Dec. Format: [027][091][068]

Hex. Format: [1BH][5BH][44H]

Description: When the cursor reached the left-end, this command operates differently depending on the display mode.

a. Overwrite mode: When the cursor is at the left-end of lower line, it will continue to the right-end of upper line. When the cursor is at the left-end of upper line, it will continue to the right-end of lower line.

b. Vertical scroll mode: When the cursor is at the left-end of the lower line, it will continue to the right-end of the upper line. When the cursor is at the left-end of upper line, the characters display on the upper line scroll to the lower line, and the upper line is cleared. The cursor will move to the right-end of upper line.

c. Horizontal scroll mode: The cursor will remain stationary.

9) BS / Move cursor left

ACSII Format: BS

Dec. Format: [008]

Hex. Format: [08H]

Description: When the cursor reached the left-end, this command operates differently depending on the display mode.

a. Overwrite mode: When the cursor is at the left-end of lower line, it will continue to the right-end of upper line. When the cursor is at the left-end of upper line, it will continue to the right-end of lower line.

b. Vertical scroll mode: When the cursor is at the left-end of the lower line, it will continue to the right-end of the upper line. When the cursor is at the left-end of upper line, the characters display on the upper line scroll to the lower line, and the upper line is cleared. The cursor will move to the right-end of upper line.

c. Horizontal scroll mode: The cursor will remain stationary.

10) ESC [C / Move cursor right

ACSII Format: ESC [C

Dec. Format: [027][091][067]

Hex. Format: [1BH][5BH][43H]

Description: When the cursor reached the right-end, this command operates differently depending on the display mode.

a. Overwrite mode: When the cursor reached the right-end of the lower line, it will continue to the left-end of the upper line. When the cursor reached the right-end of the upper line, it will continue to the left-end of the lower line.

b. Vertical scroll mode: When the cursor reached the right-end of the upper line, it will continue to the left-end of the lower line, and the characters display on the lower line scroll to the upper line, and the lower line is cleared. The cursor will move to the left-end of lower line.

c. Horizontal scroll mode: The cursor will remain stationary.

11) HT / Move cursor right

ACSII Format: HT

Dec. Format: [009]

Hex. Format: [09H]

Description: When the cursor reached the right-end, this command operates differently depending on the display mode.

a. Overwrite mode: When the cursor reached the right-end of the lower line, it will continue to the left-end of the upper line. When the cursor reached the right-end of the upper line, it will continue to the left-end of the lower line.

b. Vertical scroll mode: When the cursor reached the right-end of the upper line, it will continue to the left-end of the lower line, and the characters display on the lower line are scroll to the upper line, and the lower line is cleared. The cursor will move to the left-end of lower line.

c. Horizontal scroll mode: The cursor will remain stationary.

12) ESC [A / Move cursor up

ACSII Format: ESC [A

Dec. Format: [027][091][065]

Hex. Format: [1BH][5BH][41H]

Description: When the cursor is on the top line, this command operates differently depending on the display mode.

a. Overwrite mode: The cursor is moved to the same column on the lower line.

b. Vertical scroll mode: The characters display on the upper line are scrolled to the lower line, and the upper line is cleared. The cursor will remain at the same position.

c. Horizontal scroll mode: The cursor will remain stationary.

13) ESC [B / Move cursor down

ACSII Format: ESC [B

Dec. Format: [027][091][066]

Hex. Format: [1BH][5BH][42H]

Description: When the cursor reached the lower line, the command operates differently depending on the display mode.

a. Overwrite mode: The cursor is moved to the same column on the upper line.

b. Vertical scroll mode: The characters display on the lower line are scrolled to the upper line, and the lower line is cleared. The cursor will remain at the same position.

c. Horizontal scroll mode: The cursor will remain stationary.

14) LF / Move cursor down

ACSII Format: LF

Dec. Format: [010]

Hex. Format: [0AH]

Description: When the cursor reached the lower line, the command operates differently depending on the display mode.

a. Overwrite mode: The cursor is moved to the same column on the upper line.
b. Vertical scroll mode: The characters display on the lower line are scrolled to the upper line, and the lower line is cleared. The cursor will remain at the same position.
c. Horizontal scroll mode: The cursor will remain stationary.

15) ESC [H / Move cursor to home position of the upper line

ACSII Format: ESC [H

Dec. Format: [027][091][072]

Hex. Format: [1BH][5BH][48H]

Description: The cursor will be moved to the left position of the upper line.

16) HOM / Move cursor to home position of the upper line

ACSII Format: HOM

Dec. Format: [011]

Hex. Format: [0BH]

Description: The cursor will be moved to the left position of the upper line.

17) ESC [K / Move cursor to bottom position of the lower line

ACSII Format: ESC [K

Dec. Format: [027][091][075]

Hex. Format: [1BH][5BH][4BH]

Description: The cursor will be moved to the right-end position on the lower line.

18) ESC [L / Move cursor to left-most position of the current line

ACSII Format: ESC [L

Dec. Format: [027][091][076]

Hex. Format: [1BH][5BH][4CH]

Description: The cursor will be moved to the left-end position of the current line.

19) CR / Move cursor to left-most position of the current line

ACSII Format: CR

Dec. Format: [013]

Hex. Format: [0DH]

Description: The cursor will be moved to the left-end position of the current line.

20) ESC [R / Move cursor to right-most position of the current line

ACSII Format: ESC [R

Dec. Format: [027][091][082]

Hex. Format: [1BH][5BH][52H]

Description: The cursor will be moved to the right-end position of the current line

21) ESC l x y / Move cursor to specified position

ACSII Format: ESC l x y

Dec. Format: [027][108] x y 1<=x<=20，1<=y<=2

Hex. Format: [1BH][6CH]x y 1H<=x<=14H，01H<=y<=02H

Description: The cursor will be moved to the X column on the y line.

22) ESC @ / Initialize display

ACSII Format: ESC @

Dec. Format: [027][064]

Hex. Format: [1BH][40H]

Description: The data in the input buffer will be cleared and reset from default.

Settings	**Values**
Display mode	Overwrite mode
Position	Home position (upper left corner of window)
Screen	Clear
Character code table	PC-850
International character set	U.S.A.
User-defined characters	Not defined(User-defined characters will be

	recalled when power on)
Reverse characters	Canceled
Display blinking	Canceled
Brightness adjustment	100%
Set-up time	00:00
Cursor display	Not Selected

23) CLR / Clear display screen

ACSII Format: CLR

Dec. Format: [012]

Hex. Format: [0CH]

Description: All the display characters will be cleared.

24) CAN / Clear current line, and cancel string mode

ACSII Format: CLR

Dec. Format: [024]

Hex. Format: [18H]

Description: The current line is cleared, and the string mode is canceled.

25) ESC * n / Brightness adjustment

ACSII Format: ESC * n 1<=n<=4

Dec. Format: [027][042]n 49<=n<=52

Hex Format: [1BH][2AH]n 31H<=n<=34H

Description: Adjust the brightness of the vacuum fluorescent display.

When n=1，brightness=40%。

When n=2，brightness=60%。

When n=3，brightness=80%。

When n=4，brightness=100%。

26) ESC _ n / Set cursor ON or OFF

ACSII Format: ESC _ n 0<=n<=1

Dec. Format: [027][095] n 48<=n<=49

Hex. Format: [1BH][5FH] n 30H<=n<=31H

Description: Set cursor On or OFF

When n=0，cursor is OFF.

When n=1，cursor is On.

27) ESC f n / Select international character set

ACSII Format: ESC f n

Dec. Format: [027][102]n

Hex. Format: [1BH][66H]n

ASCII n	Dec. n	Hex. n	International font set
A	65	41H	U.S.A
D	68	44H	DENMARKI
E	69	45H	DENMARKII
F	70	46H	FRANCE
G	71	47H	GERMANY
I	73	49H	ITALY
J	74	4AH	JAPAN.
L	76	4CH	SLAVONIC
N	78	4EH	NORMAY
R	82	52H	RUSSIA
S	83	53H	SPAIN
U	85	55H	U.K.
W	87	57H	SWEDEN

For more information, see Appendix

28) ESC c n / Select extend font

ACSII Format: ESC c n n=A、J、L、R

Dec. Format: [027][099] n n=65、74、76、82

Hex. Format: [1BH][63H] n n= 41H、4AH、4CH、52H

Description: The extend fonts are saved in 80H…FFH

ASCII n	Dec. n	Hex. n	Character code table（80H…FFH）
A	65	41H	U.S.A. and Standard Europe
J	74	4AH	Katakana for Japan
L	76	4CH	SLAVONIC
R	82	52H	RUSSIA

For more information, see Appendix

6.3. ESC/POS standard command details

1) US MD1 / Overwrite mode

ACSII Format: US MD1

Dec. Format: [031][001]

Hex. Format: [1FH][01H]

Description: Change the display mode to the overwrite mode. In this mode, the cursor will move rightward and begin from the upper left-end position. When the cursor reached the end of the upper line, the cursor will move down to the bottom left-end position to continue. When the cursor reached the end of the bottom line, it will move up to the upper left-end position and overwrite the previous characters.

2) US MD2 / Vertical scroll mode

ACSII Format: US MD2

Dec. Format: [031][002]

Hex. Format: [1FH][02H]

Description: Change the display mode to the vertical scroll mode. In this mode, the cursor will move rightward. The cursor will begin from the upper left-end position until it reached the end of the upper line. The data will scroll the bottom line up to replace the upper line, the cursor will then move down to the bottom left-end position to continue until it reached the end of the bottom line.

3) US MD3 / Horizontal scroll mode

ACSII Format: US MD3

Dec. Format: [031][003]

Hex. Format: [1FH][03H]

Description: Change the display mode to the horizontal scroll mode. In this mode, the characters will push displayed from the right-most position of the line where cursor is.

4) BS / Move cursor left

ACSII Format: BS

Dec. Format: [008]

Hex. Format: [08H]

Description: The cursor can be on or off by command: US C n.

When the cursor reached the left-end, this command operates differently depending on the display mode.

a. Overwrite mode: When the cursor is at the left-end of lower line, it will continue to the right-end of upper line. When the cursor is at the left-end of upper line, it will continue to the right-end of lower line.

b. Vertical scroll mode: When the cursor is at the left-end of the lower line, it will continue to the right-end of the upper line. When the cursor is at the left-end of upper line, the characters display on the upper line scroll to the lower line, and the upper line is cleared. The cursor will move to the right-end of upper line.

c. Horizontal scroll mode: The cursor will remain stationary.

5) HT / Move cursor right

ACSII Format: HT

Dec. Format: [009]

Hex. Format: [09H]

Description: When the cursor reached the right-end, this command operates differently depending on the display mode.

a. Overwrite mode: When the cursor reached the right-end of the lower line, it will continue to the left-end of the upper line. When the cursor reached the right-end of the upper line, it will continue to the left-end of the lower line.

b. Vertical scroll mode: When the cursor reached the right-end of the upper line, it will continue to the left-end of the lower line, and the characters display on the lower line scroll to the upper line, and the lower line is cleared. The cursor will move to the left-end of lower line.

6) US LF / Move cursor up

ACSII Format: US LF

Dec. Format: [031][010]

Hex. Format: [1FH][0AH]

Description: The cursor can be on or off by the command: US C n.

When the cursor is on the top line, this command operates differently depending on the display mode.

a. Overwrite mode: The cursor is moved to the same column on the lower line.

b. Vertical scroll mode: The characters display on the upper line are scrolled to the lower line, and the upper line is cleared. The cursor will remain at the same position.

c. Horizontal scroll mode: The cursor will remain stationary.

7) LF / Move cursor down

ACSII Format: LF

Dec. Format: [010]

Hex. Format: [0AH]

Description: The cursor can be on or off by the command: US C n.

When the cursor reached the lower line, the command operates differently depending on the display mode.

a. Overwrite mode: The cursor is moved to the same column on the upper line.

b. Vertical scroll mode: The characters display on the lower line are scrolled to the upper line, and the lower line is cleared. The cursor will remain at the same position.

c. Horizontal scroll mode: The cursor will remain stationary.

8) CR / Move cursor to left-most position of the current line

ACSII Format: CR

Dec. Format: [013]

Hex. Format: [0DH]

Description: The cursor will move to the left-end position of the current line.

The cursor can be on or off by the command: US C n.

9) US CR / Move cursor to right-most position of the current line

ACSII Format: US CR

Dec. Format: [031][013]

Hex. Format: [1FH][0DH]

Description: The cursor can be on or off by the command: US C n.

10) HOM / Move cursor to home position of the upper line

ACSII Format: HOM

Dec. Format: [011]

Hex. Format: [0BH]

Description: The cursor can be on or off by the command: US C n.

11) US B / Move cursor to the right-most position of the lower line

ACSII Format: US B

Dec. Format: [031][066]

Hex. Format: [1FH][42H]

Description: The cursor can be on or off by the command: US C n.

12) US $ x y / Move the cursor to the specified position

ACSII Format:	US $ x y	x is set by programme，1≤y≤2
Dec. Format:	[031][036] x y	1≤x≤20，1≤y≤2
Hex. Format:	[1FH][24H]x y	1H≤x≤14H，01H≤y≤02H

Description: The cursor can be on or off by the command: US C n.

The cursor will be moved to the x column on the y line.

13) ESC @ / Initialize display

ACSII Format: ESC @

Dec. Format: [027][064]

Hex. Format: [1BH][40H]

Description: Initialize display, set display mode as overwrite mode.

Cursor off, maximum brightness, clear screen and move cursor to left-end of upper line.

Settings	Values
Display mode	Overwrite mode
Position	Home position (upper left corner of window)
Screen	Clear
Character code table	PC-850
International character set	U.S.A.
User-defined characters	Not defined(User-defined characters will be recalled when power on)
Reverse characters	Canceled
Display blinking	Canceled
Brightness adjustment	100%
Set-up time	00:00
Cursor display	Not Selected

14) CLR / Clear display screen

ACSII Format:: CLR

Dec Format: [012]

Hex Format: [0CH]

Description: Cleared all characters, and moved cursor to the left-end of upper line , Different from initialization , this command won't reset display to default .

15) CAN / Clear current line, and cancel string mode

ACSII Format: CAN

DEC Format: [024]

Hex Format: [18H]

Description: Clear current line , and move the cursor to the left-end of upper lien . The cursor is default for invisible . Perform "US C n" command to turn it on/off.

16) US C n / Set cursor ON or OFF

ACSII Format: US C n 0<=n<=1

Dec Format: [031][067] n 48<=n<=49

Hex Format: [1FH][43H] n 30H<=n<=31H

Description: turn cursor on/off

n = 0, off

n = 1, on。

17) US @ / execute self-test

ACSII Format: US @

Dec. Format: [031][064]

Hex. Format: [1FH][40H]

Description: Display the process of test .

18) US T h m / set and display time

ACSII Format: US T h m

Dec. Format: [027][084]h m 0<=h<=24；0<=m<=60

Hex. Format: [1FH][54H]h m 00H<=h<=18H；00H<=m<=3CH

Description: Display preset time on lower line , and time automatically from a preset time . When an command use lower line , timing paused , perform command “US U” could continue to time.

19) US U / continue to display time

ACSII Format: US U

Dec. Format: [031][085]

Hex. Format: [1FH][55H]

Description: continue display the time which is set by command “US T h m”.

20) US n / Display character n , and turn the point of the character on

ACSII Format: US . n

Dec. Format: [031][046]n 32<=n<=255

Hex. Format: [1FH][2EH]n 20H<=n<=FF

Description: Display character n , and turn the point of the character on.

21) US n / Display character n , and turn the comma of the character on

ACSII Format: US , n

Dec. Format: [031][044]n 32<=n<=255

Hex. Format: [1FH][2CH]n 20H<=n<=FF

Description: Display character n , and turn the comma of the character on.

22) US ; n / Display character n , and turn the semicolon of the character on

ACSII Format: US ; n

Dec. Format: [031][059]n 32<=n<=255

Hex. Format: [1FH][3BH]n 20H<=n<=FF

Description: Display character n , and turn the semicolon of the character on.

23) US # n m / turn annunciator ON/OFF

ACSII Format: US # n m

Dec. Format: [031][035]n m n=0,1；1<=m<=20

Hex. Format: [1FH][23H]n m n=00H,01H；01H<=m<=14H

Description: Turn Triangle descriptor on lower line off.

24) US X n / Brightness adjustment

ACSII Format: US X n

Dec. Format: [027][042]n 1<=n<=4

Hex. Format: [1FH][58H]n 01H<=n<=04H

Description: Adjust brightness of screen.

n = 1，brightness = 40%

n = 2，brightness = 60%

n = 3，brightness = 80%

n = 4，brightness = 100%

25) US r / Select/cancel reverse characters

ASCII Format: US r n

Dec. Format: [031][114]n n = 0, 1, 48, 49

Hex. Format: [1FH][72H]n n = 0, 1, 30h, 31h

Description: Selects or cancels reverse display of the characters received after this command.

When n = 1 or 49, reverse characters are selected.

When n = 0 or 48, reverse chara

26) US E n / Sets display screen blank interval

ACSII Format: US E n

Dec. Format: [027][069]n 0<=n<=255

Hex. Format: [1FH][45H]n 00H<=n<=FFH

Description: Set flickering frequency of cursor. When execute this command, screen will flicker as the frequency of n, the greater , time slot of on/off is larger . If set to 0, stop flickering.

27) ESC R n / Select international character set

ACSII Format: ESC R n

Dec. Format: [027][082]n 0<=n<=12

Hex. Format: [1BH][52H]n 00H<=n<=0CH

Description:: Table International Font。

Dec n	Hex n	Table International Font
0	00H	U.S.A
1	01H	FRANCE
2	02H	GERMANY
3	03H	U.K.
4	04H	DENMARKI
5	05H	SWEDEN
6	06H	ITALY
7	07H	SPAIN
8	08H	JAPAN.

9	09H	NORMAY
10	0AH	DENMARKII
11	0BH	SLAVONIC
12	0CH	RUSSIA

For more information, see Appendix

28) ESC t n / Select external Font

ACSII Format: ESC t n

Dec. Format: [027][116] n 0<=n<=11

Hex. Format: [1BH][74H] n 00H<=n<=0BH

Description:: Select Table of External Font . Fonts are saved from 80H to FFH

DEC n	HEX n	Table of External Font（80H…FFH）
0	00H	U.S.A. and Standard Europe(A)
1	01H	Katakana for Japan(K)
2	02H	Multilingual(M)
3	03H	Portuguese(P)
4	04H	Canadian French(C)
5	05H	Nordic(N)
6	06H	SLAVONIC(S)
7	07H	RUSSIA(R)
8	08H	WIN1252
9	09H	PC866[Cyrillic #2]
10	0AH	PC852[Latin2]
11	0BH	PC858[Euro]
12	0CH	Win1251
13	0DH	PC864[Arabic](Arabic version only)

For more information, see Appendix

29) ESC & s n m / download user defines characters

ACSII Format: ESC & s n m [a(p1...pa*s)] x (m-n+1) s=1

Dec. Format: [027][038][001] n m [a(p1...pa*s)] x (m-n+1) 20h<n<m<FFh

Hex. Format: [1BH][26H][01H][n][m] [a(p1...pa*s)] x (m-n+1) 0<a<5

0<p1...pa*s<255

Define and download characters defined by user. Any invalid data will withdraw this command. Scope:

s = Longitudinal bitmap bytes, Scope for 1

n = 32-126，Start ASCII character

m = 32-126，end ASCII character

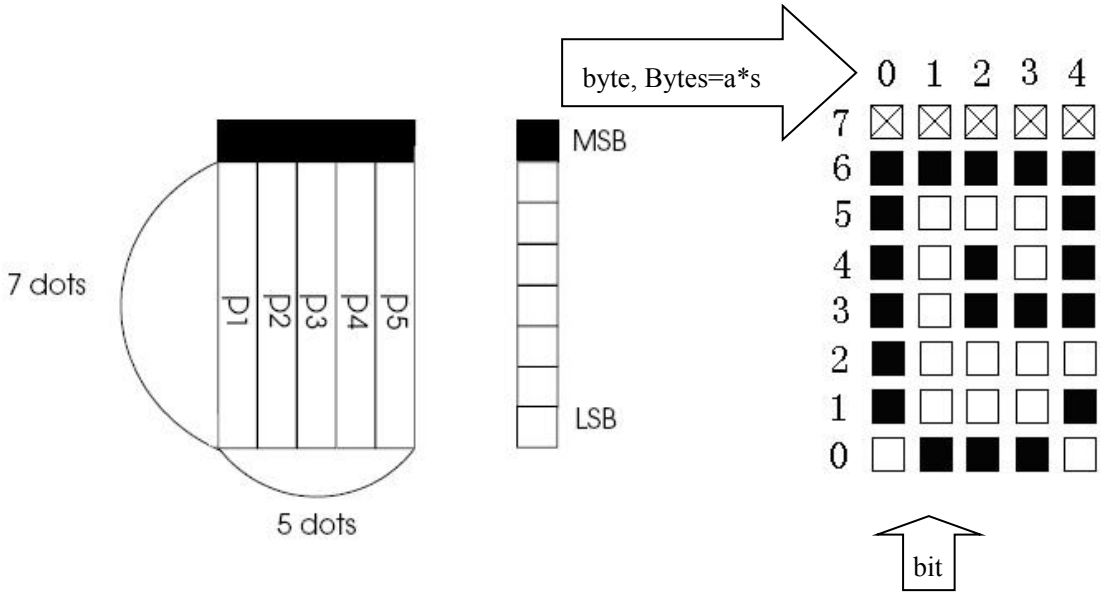
If define one character,c1 equals c2.

a = Character wide points, Scope for 5-8

p = Assign character matrix information. First, the longitudinal arrangement s bytes, then turn right arrangement, second column, ordinal analogy, finished the first row until [a] column.

Note: a character bitmap bytes for a * s.

Method of defining characters:



Dot matrix of defined characters is 7x5 dot matrix, bit7 not used but must be 0:

byte	binary	hex
0	01111110	0x7E
1	01000001	0x41
2	01011001	0x59
3	01001001	0x49
4	01111010	0x7A

Description: Guest show receives this command, it will directly store the lattice data in corresponding character n and m scope in guest show's EEPROM, and cover the old

user-defined character matrix. Therefore, if the user wants to use custom characters, please be sure to download all characters matrix in one command, not to download matrix more than once.

- PD-2002V/202S: s=1;(m-n+1)<=96;a<=5;Can user-defined 96 characters of dot matrix
- PD-50D4: s=3;(m-n+1)<=96;a<=8;Can user-defined 40 characters of dot matrix, one of the characters as 16 point(2 bytes)
- PD-50D2: s=3;(m-n+1)<=96;a<=12;Can user-defined 13 characters of dot matrix, one of the characters as 24 point(3 bytes)

30) ESC % n / Select User-defined characters

ACSII Format: ESC % n

Dec. Format: [027] [037] n

Hex. Format: [1BH] [25H] n

Choose user-defined characters to display. When the user custom characters are not defined, then use standard characters bitmap.

n value: lowest bit 0, cancel user-defined characters.

lowest bit 1, select user-defined characters.

Description: if n=1, and received display character is in scope of ESC & command's n and m, it will show dot matrix defined by ESC & command.

31) ESC = n / Select other display

ACSII Format: ESC = n

Dec. Format: [027] [061] n

Hex. Format: [1BH] [3DH] n

n : =2,Display messages on the two display;

=4,Display messages on the customer display only;

=5,Display messages on the operator display only.

Description: This command used for EC-2002 only;

32) ESC W / Set/cancel window range

ASCII Format: ESC W n m x1 y1 x2 y2

Dec. Format: [027] [087] n m x1 y1 x2 y2

Hex. Format: [1BH] [57H] n m x1 y1 x2 y2

n=1

M=0,1,48,49

1≤x1≤y2≤20

1≤y1≤y2≤2

Description: Select or cancel a single window on the display screen.

- n =1, Only one window can be selected or canceled.
- m specifies selection or cancellation.

  When m = 1 or 49, a window is selected.(Values x1,y1,x2,and y2 are required.)

  When m = 0 or 48, a window is canceled.(Values x1,y1,x2,and y2 are not required.)
- x1, y1 set the positions of the upper left column and line of the window, respectively.
- X2, y2 set the positions of the lower right column and line of the window, respectively.

Notes:

- Up to four windows can be selected simultaneously on the display screen; however, the window ranges cannot overlap.
- To cancel a window, send the command without arguments for x1,y1,x2, and y2.
- If a value is set outside the display screen or overlapping another window, this command is ignored.

6.4. LOGIC CONTROLS command details

All software commands of the non-pass-thru model are available with following additional commands for pass-thru control. When power is turned on or after a reset command has been initiated, all text is displayed on the display.

1) ! # ^B / Data to Display

ACSII Format: ! # ^B

Dec. Format: [033][035][002]

Hex. Format: [21H][23H][02H]

Description: All data following this command will be sent to the pole display until a “Data to Peripheral” command is received.

SOH / Data to Peripheral:

ACSII Format: SOH

Dec. Format: [001]

Hex. Format: [01H]

Description: All data following this command will be sent to the peripheral until a “Data to Display” command is received.

2) EOT n / Brightness Control

ACSII Format: EOT

Dec. Format: [004] n

Hex. Format: [04H] n

Description: The brightness of the display can be adjusted using this command followed by a data byte [FFH], [60H], [40H] or [20H].

Dimming Level	DEC	HEX
100%	255	FF
60%	96	60
40%	64	40
20%	32	20

3) BS / Back Space

ACSII Format: BS

Dec. Format: [008]

Hex. Format: [08H]

Description: The cursor position moves one digit to the left erasing the previous information.

4) HT / Horizontal Tab

ACSII Format: HT

Dec. Format: [009]

Hex. Format: [09H]

Description: The cursor position shifts one digit to the right without erasing character at original cursor position.

5) LF / Line Feed

ACSII Format: LF

Dec. Format: [010]

Hex. Format: [0AH]

Description: The cursor position moves to the same position in the other row. In vertical scroll mode, if cursor was in second row, the cursor will not move and display will scroll up.

6) CR / Carriage Return

ACSII Format: CR

Dec. Format: [013]

Hex. Format: [0DH]

Description: The cursor moves to the left most digit of the row it is in.

7) DLE n / move cursor to specified position

ACSII Format: DLE n

Dec. Format: [016] n

Hex. Format: [10H] n

Description: Moves the cursor to any position on the display with this command followed by a data byte of [00H] to [27H], or in decimal [000] to [039].

8) DC1 / Normal Display Mode

ACSII Format: DC1

Dec. Format: [017]

Hex. Format: [11H]

Description: Data can be written into either row. Move to the left most digit of the other row when line is full.

9) DC2 / Vertical Scroll Mode

ACSII Format: DC2

Dec. Format: [018]

Hex. Format: [12H]

Description: Data is written into the second row and transferred to the first row when carriage return is received, leaving the second row empty.

10) DC3 / Cursor On

ACSII Format: DC3

Dec. Format: [019]

Hex. Format: [13H]

Description: Turns on the cursor.

11) DC4 / Cursor Off

ACSII Format: DC4

Dec. Format: [020]

Hex. Format: [14H]

Description: Turns off the cursor.

12) US / Reset

ACSII Format: US

Dec. Format: [031]

Hex. Format: [1FH]

Description: All characters are erased and all settings are returned to the power-on reset conditions.

6.5. UTC/Standard command details

1) EOT n / Brightness adjustment

ACSII Format: EOT

Dec. Format: [004] n

Hex. Format: [04H] n

Description: The brightness of the display can be adjusted using this command followed by a data byte [FFH], [60H], [40H] or [20H].

Dimming Level	DEC	HEX
100%	255	FF
60%	96	60
40%	64	40
20%	32	20

2) BS / Back Space

ACSII Format: BS

Dec. Format: [008]

Hex. Format: [08H]

Description: The cursor position moves one digit to the left.

3) HT / Horizontal Tab

ACSII Format: HT

Dec. Format: [009]

Hex. Format: [09H]

Description: The cursor position shifts one digit to the right without erasing character at original cursor position.

4) LF / Line Feed

ACSII Format: LF

Dec. Format: [010]

Hex. Format: [0AH]

Description: The cursor position moves to the same position in the other row. In vertical scroll mode, if cursor was in second row, the cursor will not move and display will scroll up.

5) CR / Carriage Return

ACSII Format: CR

Dec. Format: [013]

Hex. Format: [0DH]

Description: The cursor moves to the left most digit of the row it is in.

6) DLE n / move cursor to specified position

ACSII Format: DLE n

Dec. Format: [016] n

Hex. Format: [10H] n

Description: Moves the cursor to any position on the display with this command followed by a data byte of [00H] to [27H], or in decimal [000] to [039].

7) DC1 / Normal Display Mode

ACSII Format: DC1

Dec. Format: [017]

Hex. Format: [11H]

Description: Data can be written into either row. Move to the left most digit of the other row when line is full.

8) DC2 / Vertical Scroll Mode

ACSII Format: DC2

Dec. Format: [018]

Hex. Format: [12H]

Description: Data is written into the second row and transferred to the first row when carriage return is received, leaving the second row empty.

9) DC3 / Cursor On

ACSII Format: DC3

Dec. Format: [019]

Hex. Format: [13H]

Description: Turns on the cursor.

10) DC4 / Cursor Off

ACSII Format: DC4

Dec. Format: [020]

Hex. Format: [14H]

Description: Turns off the cursor.

11) CAN / clear cursor line

ACSII Format: CAN

Dec. Format: [024]

Hex. Format: [18H]

Description: clear cursor line

12) US / Reset

ACSII Format: US

Dec. Format: [031]

Hex. Format: [1FH]

Description: All characters are erased and all settings are returned to the power-on reset conditions.

13) ESC d / Change to UTC enhanced mode

ACSII Format: ESC d

Dec. Format: [027][100]

Hex. Format: [1BH][64H]

Description: Change to UTC enhanced mode

6.6. UTC/Enhanced command details

1) ESC u A d1d2d3…dn CR / Upper Line display

ACSII Format: ESC u A d1d2d3…….dn CR

Dec. Format: [027][117][065] d1d2d3 …dn[013]

Hex. Format: [1BH][75H][41H]d1d2d3…dn[0DH]

Description: In this mode, cursor is off, characters display d1 d2 d3….dn (1<= n<=20) in the upper line.

2) ESC u B d1d2d3…dn CR / Bottom Line display

ACSII Format: ESC Q B d1d2d3 …dn CR

Dec. Format: [027][117][066] d1d2d3 …dn[013]

Hex. Format: [1BH][75H][42H]d1d2d3 …dn[0DH]

Description: In this mode, cursor is off, characters display d1 d2 d3….dn (1<= n<=20) in the lower line.

3) ESC u D d1d2d3…dn CR / Upper Line message scroll continuously

ACSII Format: ESC Q D d1d2d3 …dn CR

Dec. Format: [027][117][068]d1d2d3 …dn[013]

Hex. Format: [1BH][75H][44H]d1d2d3 …dn[0DH]

Description: The message (previously defined) will scroll continuously in the horizontal direction until a new command is received.

4) ESC u F d1d2d3…dn CR / Upper Line message scroll one time

ACSII Format: ESC Q F d1d2d3 …dn CR

Dec. Format: [027][117][070]d1d2d3 …dn[013]

Hex. Format: [1BH][75H][46H]d1d2d3 …dn[0DH]

Description: The message (previously defined) will scroll one time.

5) ESC u l d1d2d3…dn CR / Two line display

ACSII Format: ESC Q l d1d2d3…dn CR

Dec. Format: [027][117][073]d1d2d3 …dn[013]

Hex. Format: [1BH][75H][49H]d1d2d3 …dn[0DH]

Description: The message (previously defined) will be displayed from the top row of the left-most

6) ESC RS CR / change to UTC standard mode

ASCII Format: ESC RS CR

Dec. Format: [027][015][013]

Hex. Format: [1BH][0FH][0DH]

Description: change to UTC standard mode .

7. Appendix

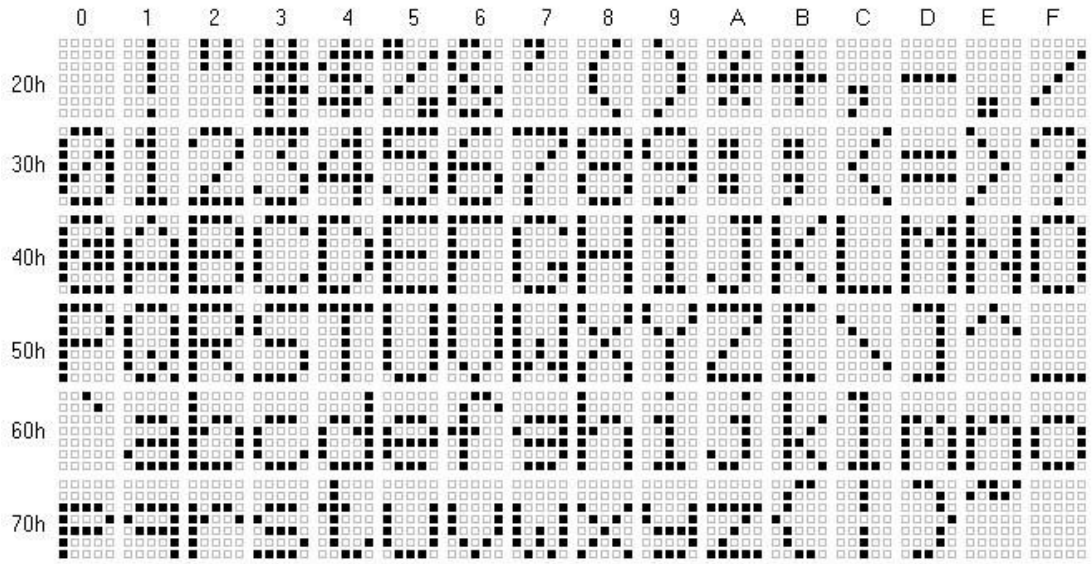
International Font Set (20h-7Fh)

n	International Font Set	n	International Font Set
0	U.S.A.	8	Japan
1	France	9	Norway
2	Germany	A	Denmark II
3	U.K.	B	Slavonic
4	Denmark I	C	Russia
5	Sweden	D	reserved
6	Italy	E	reserved
7	Spain	F	reserved

Code Page Table of Extended Characters

n	International Font Set (80h-FFh)
0	Page 0: PC437: U.S.A., standard Europe.
1	Page 1: Katakana for Japan.
2	Page 2: PC858: multilingual.
3	Page 3: PC860: Portuguese
4	Page 4: PC863: Canadian-French.
5	Page 5: PC865: Nordic.
6	Page 6: Slavonic.
7	Page 7: Russia.
8	Page 8: Win 1252
9	Page 9: PC866: Cyrillic #2
A	Page A: PC852: Latin2
B	Page B: PC858: Euro
C	Page C: Win 1251
D	Page D: PC864: Arabic(Arabic version only)

U.S.A. font set



Differences of International Font are described as below:

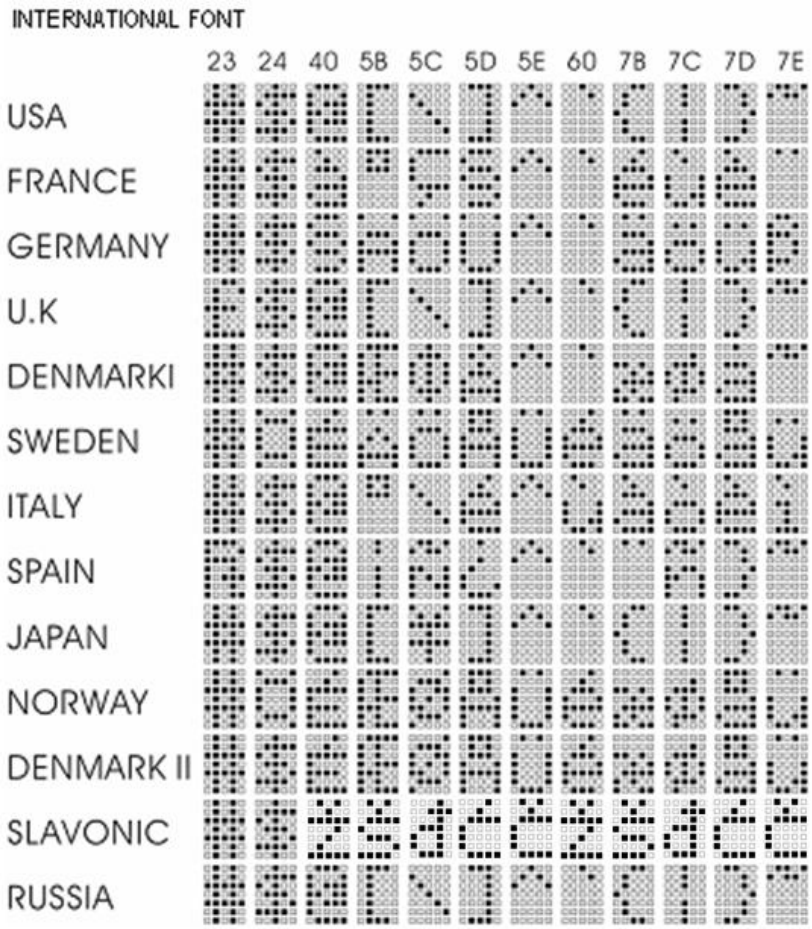
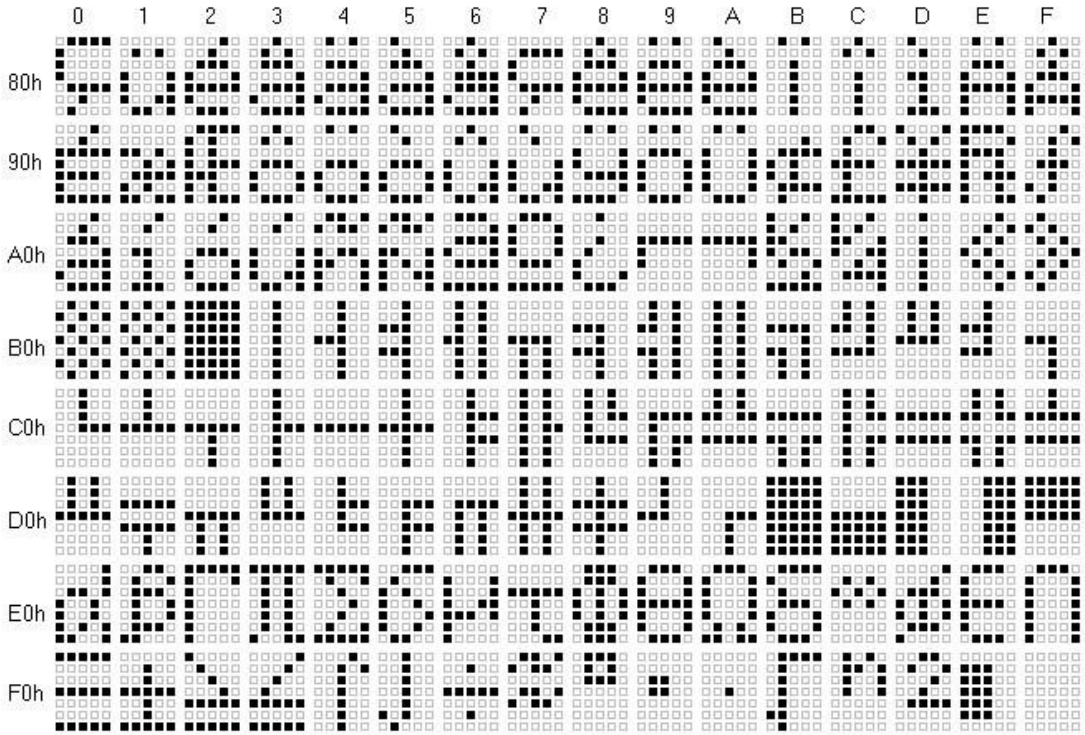
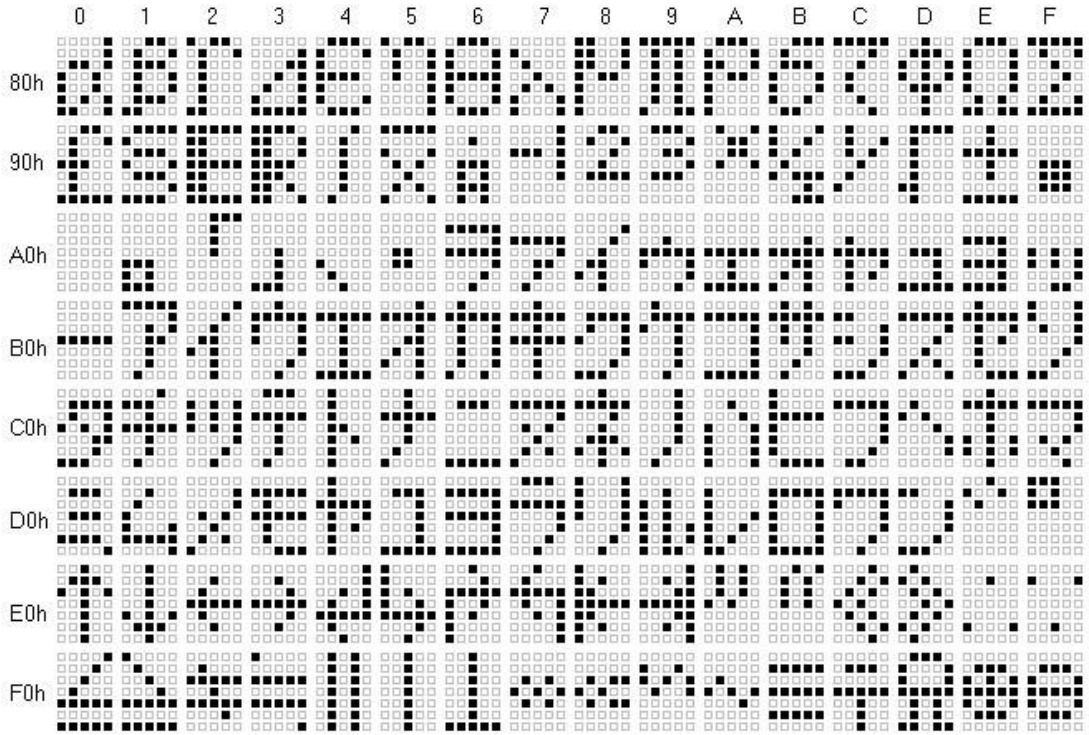


Table of Extended Fonts is described as below:

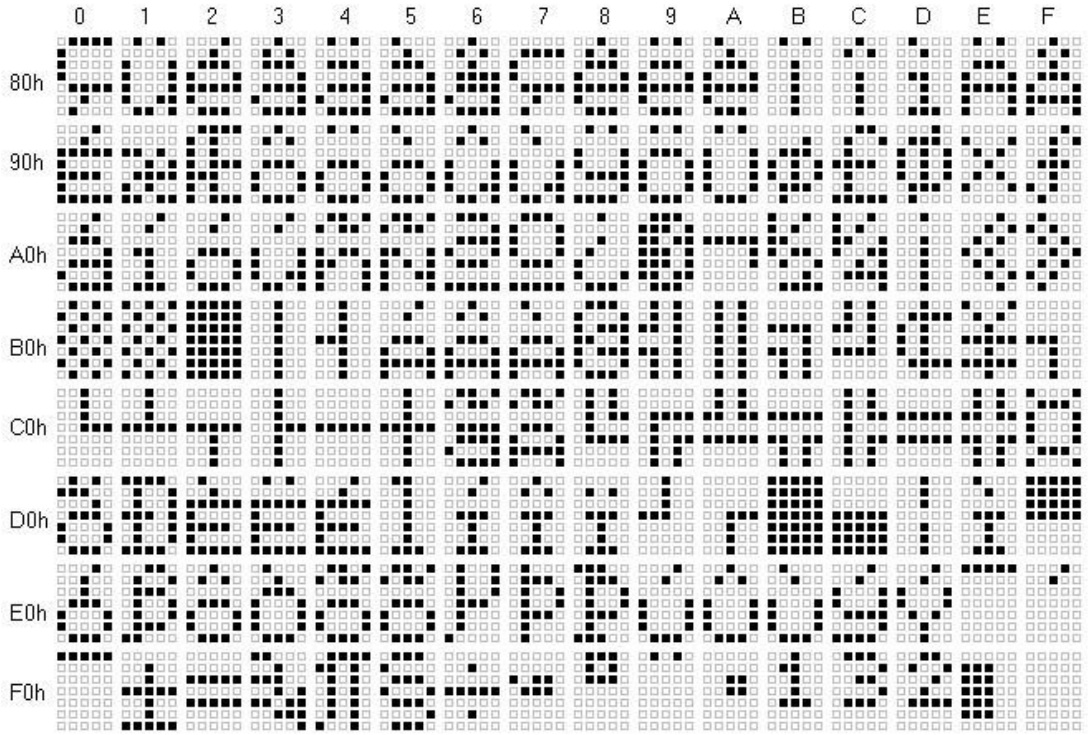
1. PC-437 Standard European international font set



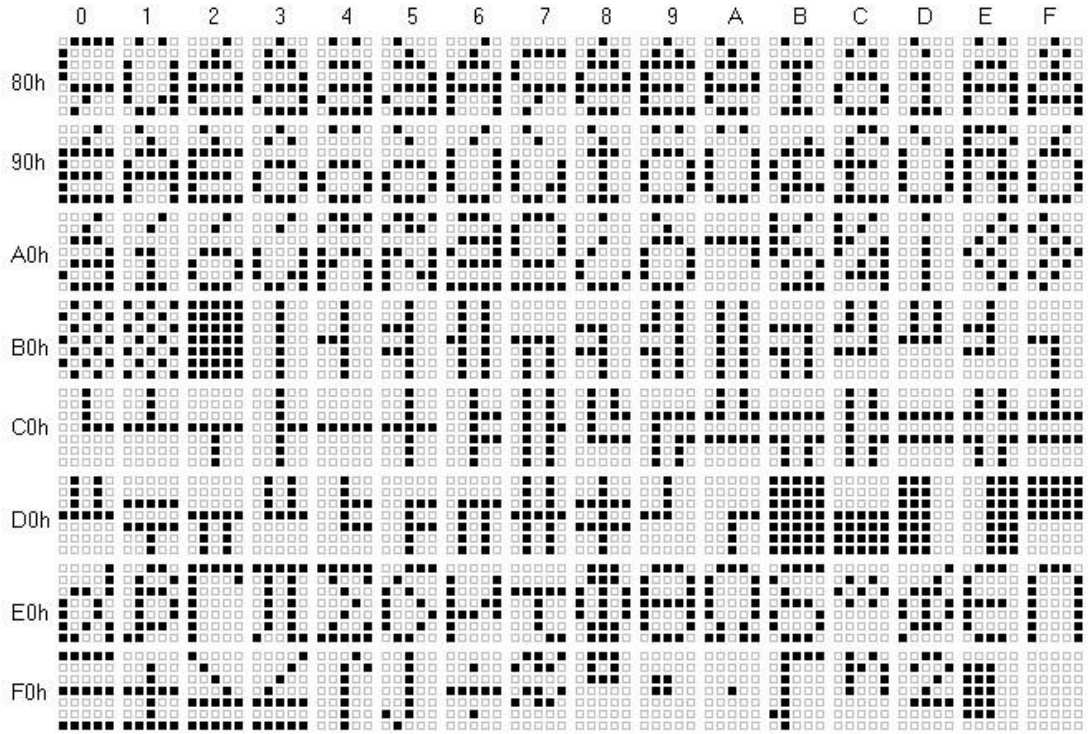
2. Katakana font set



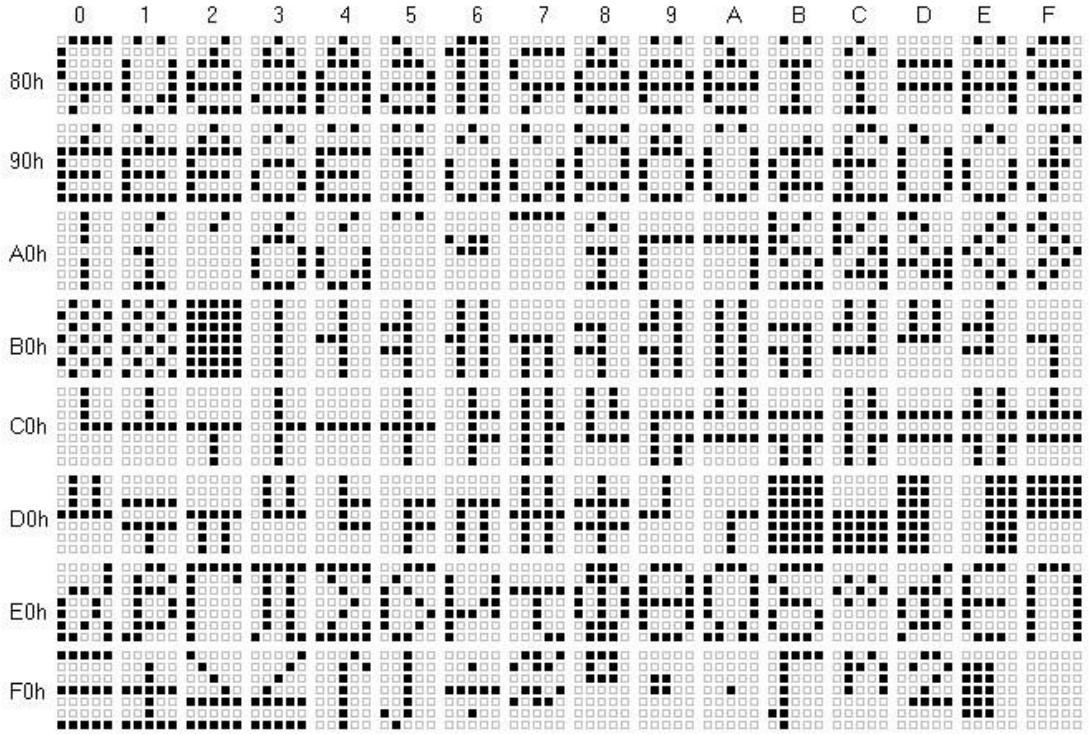
3. PC-858 (multilingual international font set)



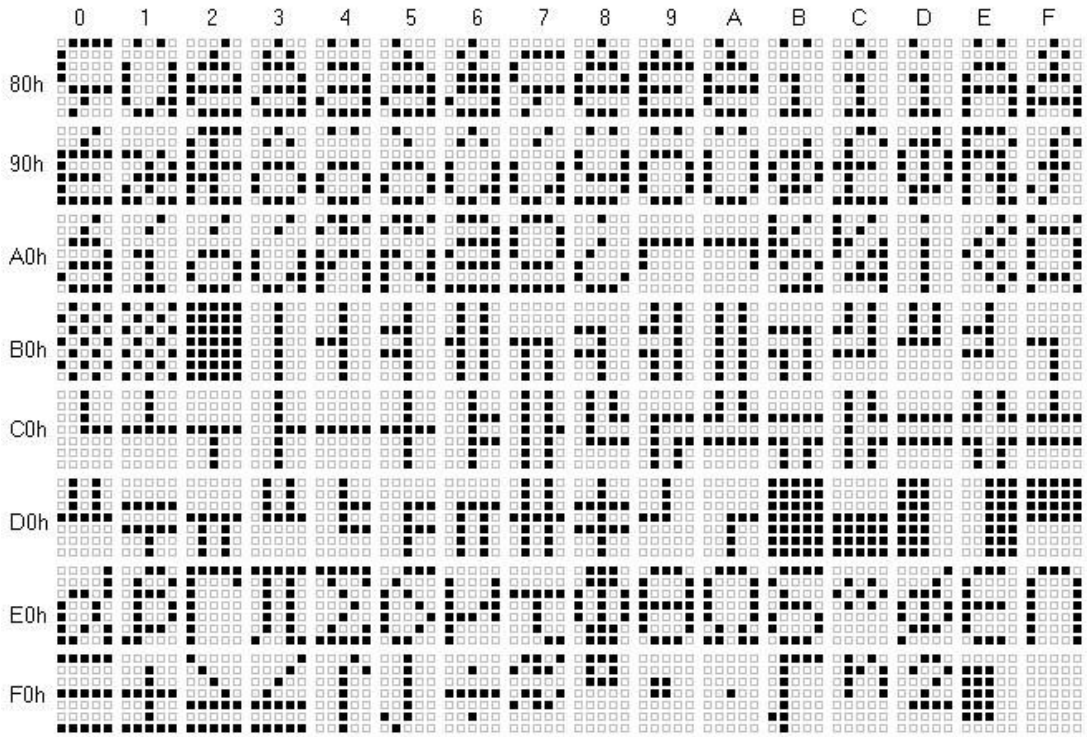
4. PC-860 Portuguese international font set



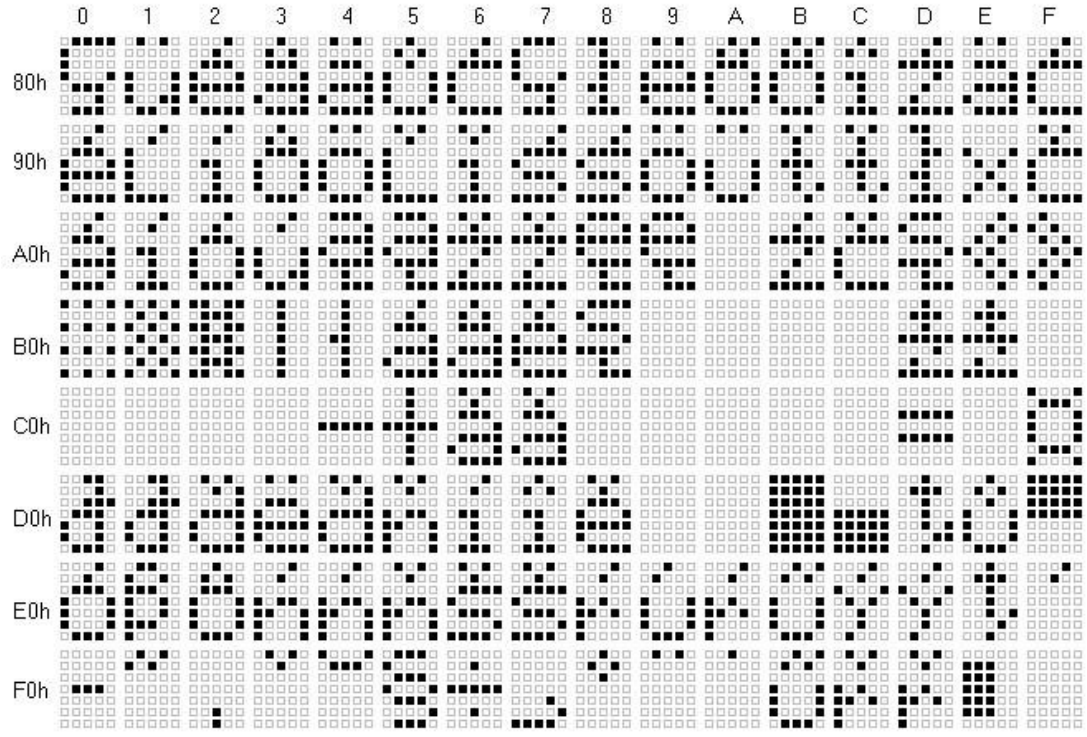
5 PC-863 Canadian French international font set



6. PC-865 Nordic international font set

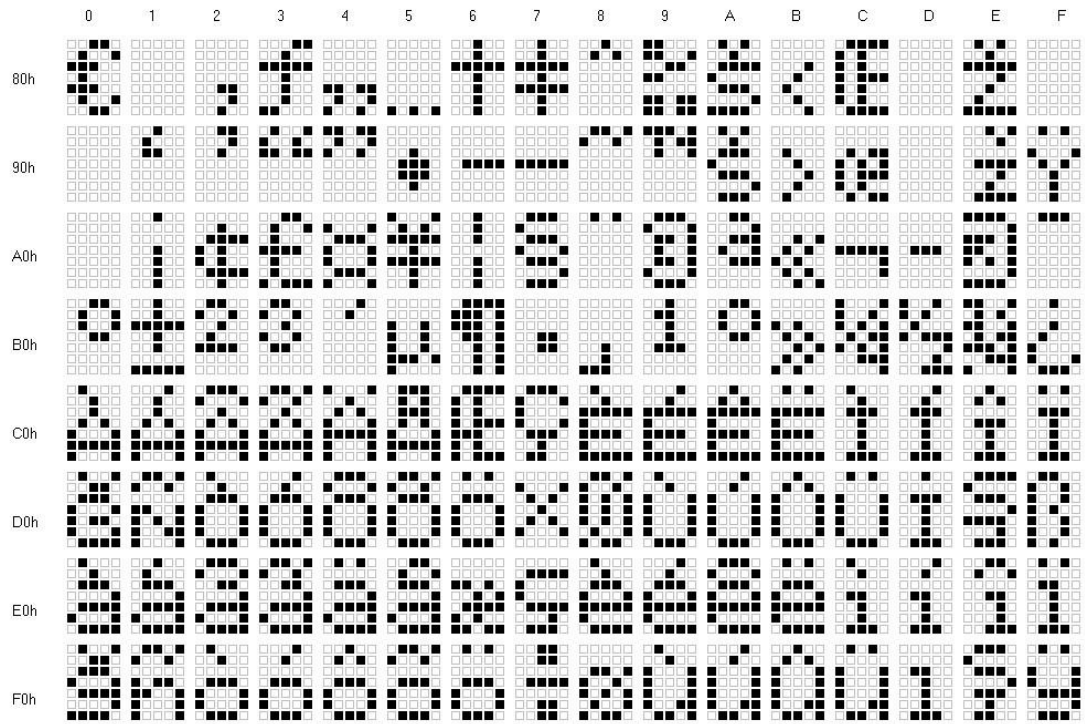


7. Slavonic font set



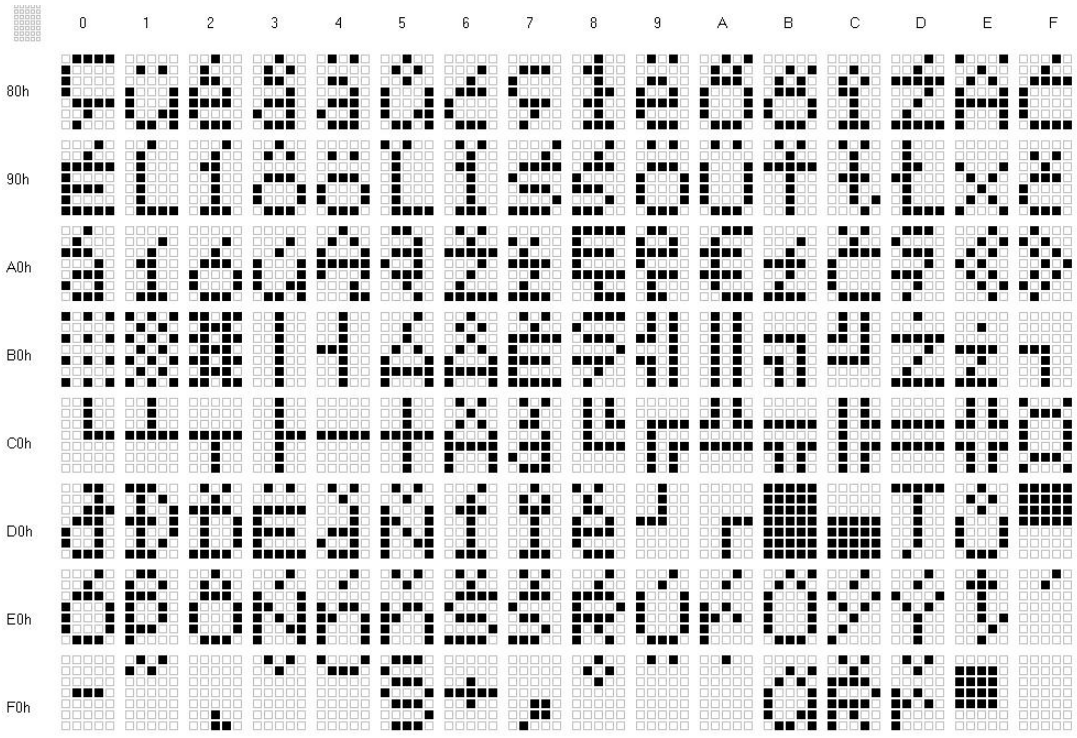
8. Russia font set

9. Win1252 font set

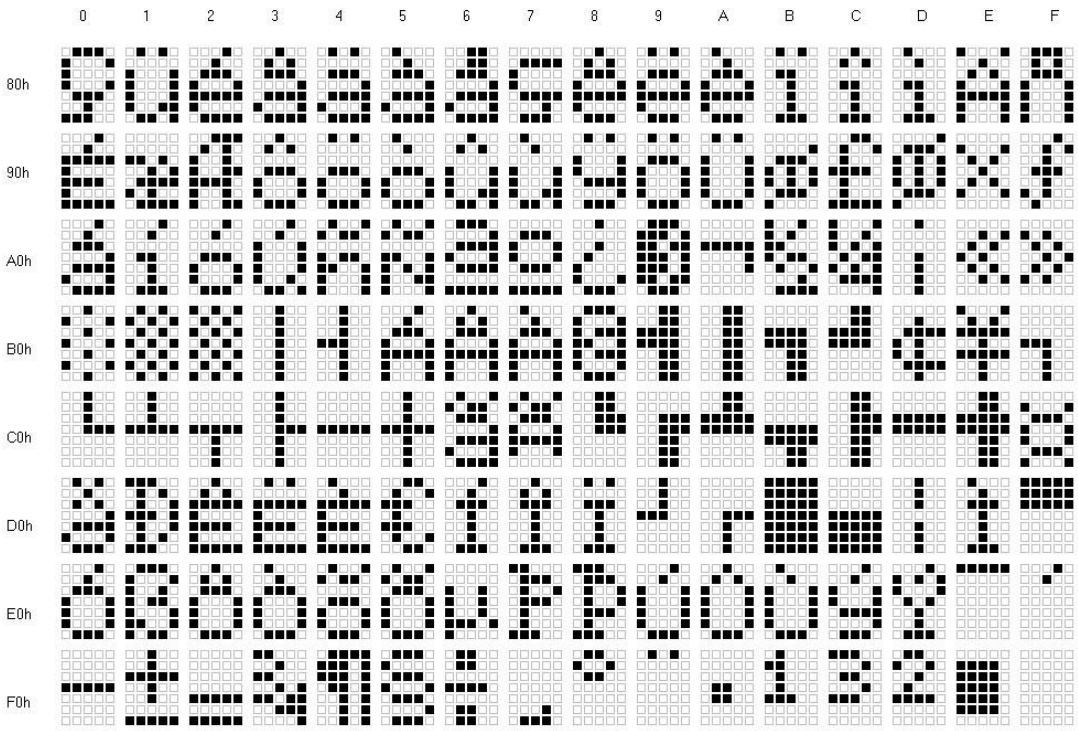


10. PC866 [Cyrillic #2] font set

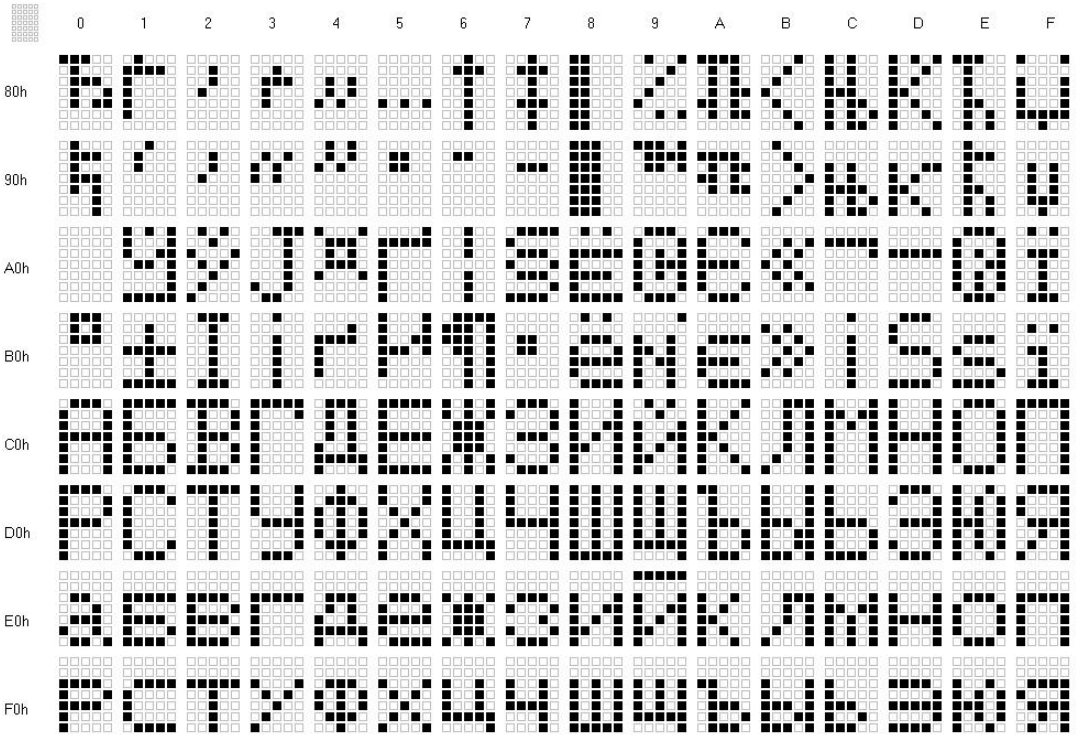
11. PC852 [Latin 2] font set



12. PC858 [Euro] font set



13. Win1251



14. PC864 [Arabic] font set (Arabic version only)