

DSP-850 Series Customer Display

User Manual

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Manual Version 1.6

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Safety

IMPORTANT SAFETY INSTRUCTIONS

1. To disconnect the machine from the electrical power supply, turn off the power switch and remove the power cord plug from the wall socket. The wall socket must be easily accessible and in close proximity to the machine.
2. Read these instructions carefully. Save these instructions for future reference.
3. Follow all warnings and instructions marked on the product.
4. Do not use this product near water.
5. Do not place this product on an unstable cart, stand, or table. The product may fall, causing serious damage to the product.
6. Slots and openings in the cabinet and the back or bottom are provided for ventilation; to ensure reliable operation of the product and to protect it from overheating. These openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, sofa, rug, or other similar surface. This product should never be placed near or over a radiator or heat register, or in a built-in installation unless proper ventilation is provided.
7. This product should be operated from the type of power indicated on the marking label. If you are not sure of the type of power available, consult your dealer or local power company.
8. Do not allow anything to rest on the power cord. Do not locate this product where persons will walk on the cord.
9. Never push objects of any kind into this product through cabinet slots as they may touch dangerous voltage points or short out parts that could result in a fire or electric shock. Never spill liquid of any kind on the product.

FCC

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference
- (2) This device must accept any interference received, including interference that may cause undesired operation.

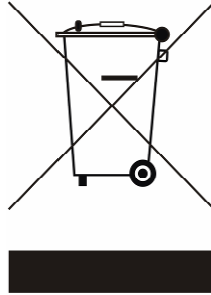
CE Mark



This device complies with the requirements of the EEC directive 89/336/EEC with regard to "Electromagnetic compatibility" and 73/23/EEC "Low Voltage Directive".

LEGISLATION AND WEEE SYMBOL

2002/96/EC Waste Electrical and Electronic Equipment Directive on the treatment, collection, recycling and disposal of electric and electronic devices and their components.



The crossed dustbin symbol on the device means that it should not be disposed of with other household wastes at the end of its working life. Instead, the device should be taken to the waste collection centers for activation of the treatment, collection, recycling and disposal procedure.

To prevent possible harm to the environment or human health from uncontrolled waste disposal, please separate this from other types of wastes and recycle it responsibly to promote the sustainable reuse of material resources.

Household users should contact either the retailer where they purchased this product, or their local government office, for details of where and how they can take this item for environmentally safe recycling.

Business users should contact their supplier and check the terms and conditions of the purchase contract.

This product should not be mixed with other commercial wastes for disposal.

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B. 1 X 12 CUSTOMER DISPLAY

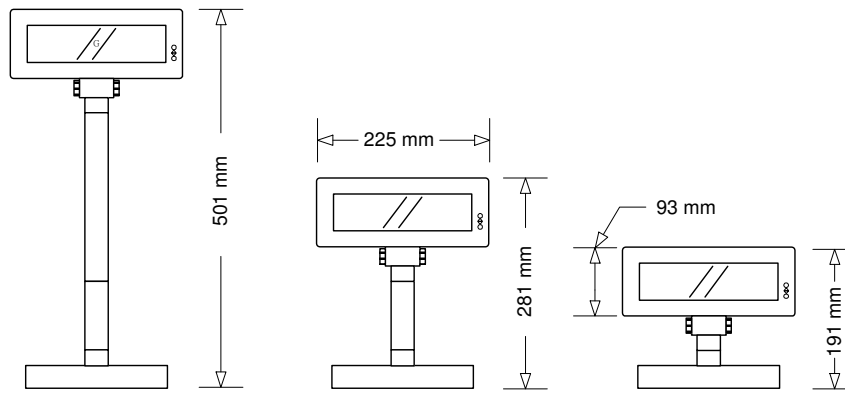
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(2 X 20 CUSTOMER DISPLAY AND 1 X 12 CUSTOMER DISPLAY)

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A. 2 x 20 Customer Display

1. Checklist



☐ Pole Display Module

☐ Flat Cable (DB-9P to DB-9P)
Flat Cable Connector

☐ Base Unit

☐ Two Pieces of Pole Support
(1x22cm, 1x9cm)

☐ Installation Guide

☐ Power Adapter

2. Features

1. Data can be display on 20 columns x 2 lines.
2. Blue—green color and large character are easy to see.
3. The DIP switches setting emulate commands mode, baud rate and international character.
4. Command emulation modes include: POS7300, EPSON ESC/POS, ADM787/ ADM788, DSP800, AEDEX/ EMAX, UTC, and CD5220.
5. Display area can be controlled by window function.
6. Provides an interface based in RS-232C, and RS232C baud rate from 4800 to 38400 bps.
7. Reverse characters can be specified using the Epson command set.

3. Specification

NO	Item	Description
1	Display method	Vacuum fluorescent display
2	Number of character	40 characters (20 columns x 2 lines)
3	Character font	5 x 7 Dot matrix
4	Display color	Blue green
5	Brightness	700 cd /m ²
6	Character type	96 alphanumeric 13 kinds of international character set
7	Character size	9.0mm x 5.25mm
8	Power supply	11-19VDC Manufacture offer +12V power adapter
9	Power consumption	3 - 6 W
10	MTBF	25000 hours (power on time)
11	Panel dimensions	224 (W) x 93 (H) x 50(D) mm
12	Support dimensions	Long support : 22 cm Short support : 9 cm
13	Base dimensions	190(w)x55(h)x96(d)mm
14	Viewing angle	-5 - 60 degrees
15	Rotation angle	Maximum 270 degrees
16	Weight	1.25 Kg
17	Operating temperature	5 - 45°C
18	Operating Humidity	30%-85%
19	Storage Temperature	-10 - 55°C
20	Storage Humidity	10%-85%

4. Interface

4.1. Specification

Data transmission	Serial
Synchronization	Asynchronous
Handshaking	DTR / DSR
Signal level	MARK = -3 to -15 V (logic "1") SPACE = +3 to +15 V (logic "0")
Baud rates	4800,9600,19200,38400 bps
Parity	None, even
Bit length	8 bits
Stop bits	1 bit

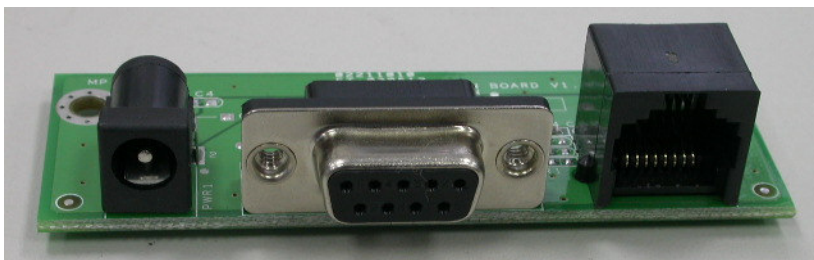
4.2. Display Base

The picture below shows the configuration of the stand alone VFD Pole Display base.



Figure of VFD Pole Display Base

4.3. Connector



PWR

COM

RJ45

PWR: Power input connector from adapter

- Connector type: DC jack (5.5/2.1)

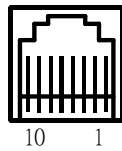


- Pin assignment

No	Signal
+	Vin
-	GND

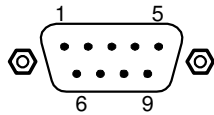
RJ45: Connect to display panel

- Connector type: Phone-jack 10P/8C



COM: RS232C link to PC/HOST connector (9-pin)

- Connector type: D-sub 9 pin female



5. Dip Switch and Software Setting

5.1. Command Type Selection

SW1	SW2	SW3	Command Type	Demo Mode Support	Default
ON	ON	ON	DSP-850	No	*
OFF	ON	ON	EPSON ESC/POS	Yes	
ON	OFF	ON	ADM 787/ ADM 788	No	
OFF	OFF	ON	DSP800	Yes	
ON	ON	OFF	AEDEX/ EMAX	No	
OFF	ON	OFF	UTC/P	No	
ON	OFF	OFF	UTC/S	No	
OFF	OFF	OFF	CD5220	Yes	

5.2. Baud Rate Selection

SW8	SW9	Baud Rate (bps)	Default
ON	ON	4800	
OFF	ON	9600	*
ON	OFF	19200	
OFF	OFF	38400	

5.3. Parity Check Selection

SW10	Parity Check	Default
ON	None-parity	*
OFF	Even-parity	

5.4. Demo Mode Selection

SW11	Show Demo String	Default
ON	Enable	
OFF	Disable	*

5.5. International Character Set

SW4	SW5	SW6	SW7	Character Set (20h – 7Fh)	Code Table (80H-FFH)	Default	Note
ON	ON	ON	ON	U.S.A.	PC-437 (USA, Standard Europe)	*	
OFF	ON	ON	ON	FRANCE	PC-850(Multilingual) or PC-858 (Multilingual + Euro Symbol)		1
ON	OFF	ON	ON	GERMANY			1
OFF	OFF	ON	ON	U.K.			1
ON	ON	OFF	ON	DENMARK I			1
OFF	ON	OFF	ON	SWEDEN			1
ON	OFF	OFF	ON	ITALY			1
OFF	OFF	OFF	ON	SPAIN			1
ON	ON	ON	OFF	JAPAN	Katakana		
OFF	ON	ON	OFF	NORWAY	PC-850(Multilingual) or PC-858		1
ON	OFF	ON	OFF	DENMARK II	(Multilingual+ Euro Symbol)		1
OFF	OFF	ON	OFF	Slawie			
ON	ON	OFF	OFF	RUSSIA			
OFF	ON	OFF	OFF	U.S.A	PC860(Portuguese)		
ON	OFF	OFF	OFF	Not used			2
				U.K.	Greek		2
OFF	OFF	OFF	OFF	Not used			3
				U.S.A	PC-852(Hungary)		3

Note:

1. PC-850 or PC-858 support need special request. The PC-858 specifically providing the Euro Dollar Symbol on Char D5h.
2. U.K. + Greek character support need special request.
3. U.S.A + PC-852 character support need special request.

5.6. Command Control

SW12	Function
ON	Depend on SW1~SW11 setting
OFF	By pass SW1~SW11 setting, fixed at: 1. Command type: POS7300, 2. Baud rate: 9600 3. Parity check: None-parity 4. Demo mode: Disable 5. International char set: USA, standard Europe

6. Software Status Setting Commands

When the system is POWER ON, it will read the DIP switch to set the **Command Type, Baud Rate, Parity, Demo Mode** and **International Character**. User can re-set the Software Status Setting Commands as following:

6.1. Baud Rate Setting Command

STX 05 B n ETX /Change the baud rate setting/
ASCII Format STX 05 B n ETX
Dec. Format [02][05][66] n [03]
Hex. Format [02h][05h][42h] n [03h] $30h \leq n \leq 34h$
Description Change the display communication baud rate. The baud rate setting can be selected from 4800 to 38400.

n	Baud rate
30h	4800
31h	9600
32h	19200
33h	38400

6.2. Parity Check Setting Command

STX 05 P n ETX /Change the Parity check setting/
ASCII Format STX 05 P n ETX
Dec. Format [02][05][80] n [03]
Hex. Format [02h][05h][50h] n [03h] $n=30h, 31h$
Description Change the display communication parity. Set 8 data bit and the parity set for even or non-parity.

n	Parity check
30h	None-parity
31h	Even-parity

6.3. International Character Set Setting Command

STX 05 S n ETX /Change the international character set/
 ASCII Format STX 05 S N ETX
 Dec. Format [02][05][83] n [03]
 Hex. Format [02h][05h][53h] n [03h] $30h \leq n \leq 3fh$
 Description Change the display international character font.

N	Character Set (20h – 7Fh)	Code Table (80H-FFH)	Default	Note
30h	U.S.A.	PC-437 (USA, standard Europe)	*	
31h	FRANCE	PC-850 (multilingual) or PC-858 (multilingual+Euro Symbol)		1
32h	GERMANY			1
33h	U.K.			1
34h	DENMARK I			1
35h	SWEDEN			1
36h	ITALY			1
37h	SPAIN			1
38h	JAPAN	Katakana		
39h	NORWAY	PC-850 (multilingual) or PC-858		1
3Ah	DENMARK II	(multilingual+ Euro Symbol)		1
3Bh	Slawie			
3Ch	RUSSIA			
3Dh	U.S.A	PC860 (Portuguese)		
3Eh	Not used			2
	U.K.	Greek		2
3Fh	Not used			3
	U.S.A	PC-852 (Hungary)		3

Note:

1. PC-850 or PC-858 support need special request. The PC-858 specifically providing the Euro Dollar Symbol on Char D5h.
2. U.K. + Greek character support need special request.
3. U.S.A + PC-852 character support need special request.

6.4. Command Type Setting Command

STX 05 C n ETX /Change the command type setting/
ASCII Format STX 05 C n ETX
Dec. Format [02][05][67] n [03]
Hex. Format [02h][05h][43h] n [03h] $30h \leq n \leq 37h$
Description This command will change the command type and initialize the display.
The display emulation mode is based on DSP800/ ESC/ ADM 787/ POS7301/ AEDEX/ UTC/ CD5220 mode.

n	Command Type	N	Command Type
30h	DSP-850	34h	AEDEX
31h	ESC/POS	35h	UTC/P
32h	ADM 787	36h	UTC/S
33h	DSP800	37h	CD5220

6.5. Show Firmware Version

STX 05 V 01 ETX /Show Firmware Version/
ASCII Format STX 05 V 01 ETX
Dec. Format [02][05][86][01][03]
Hex. Format [02h][05h][56h][01h][03h]
Description Show firmware version.

7. Command List Table

Command List Table – 1

	DSP-850	CD5220	EPSON D101	UTC/S	UTC/P	AEDEX	ADM788	DSP800
Move cursor right	○	○	○					
Move cursor left	○	○	○					
Move cursor up	○	○	○					
Move cursor down	○	○	○					
Move cursor to right-most position	○	○	○					
Move cursor to left-most position	○	○	○					
Move cursor to home position	○	○	○					
Move cursor to bottom position		○	○					
Move cursor to specified position	○	○	○					○
Clear display screen	○	○	○	○			○	
Clear cursor line	○	○	○					
Brightness adjustment		○	○					○
Blink display screen	○	○	○					○
Initialize display	○	○	○					○
Select character code table		○	○					
Select international character set		○	○					○
Select/cancel reverse character			○					
Overwrite mode	○	○	○	○				
Vertical scroll mode	○	○	○	○				
Horizontal scroll mode	○	○	○					
Set/cancel the window range		○	○					
Select peripheral device		○	○					○
Set starting/ending position of macro definition			○					
Execute and quit macro			○					
Execute self-test		○	○					○
Display time			○		○	○		
Display time continuously			○					
Display position				○				
Cursor on/off	○	○	○	○				
Change to UTC enhanced mode				○				
Change to UTC standard mode					○			
Write string to upper line	○	○			○	○		

Command List Table – 2

	DSP-850	CD5220	EPSON D101	UTC/S	UTC/P	AEDEX	ADM788	DSP800
Upper line message continuous scroll	○	○			○	○		
Bottom line message scroll continuously	○							
Message vertical down scroll continuously	○							
Message vertical upper scroll continuously	○							
Carriage return	○			○			○	
Line feed	○			○				
Back space	○			○				
Horizontal tab	○			○				
Command type select		○	○					○
Upper line message scroll once pass					○	○		
Change attention code					○	○		
Two line display					○	○		
Clear upper line and move cursor to upper left-end position							○	
Clear bottom line and move cursor to bottom left-end position							○	
Set period to upper line, last n position							○	
Set line blinking, upper line	○						○	
Clear line blinking, upper line	○						○	
Clear field 1 and move cursor to field 1, first position							○	
Clear field 2 and move cursor to field 2, first position							○	
Clear display range from n position to m position and move cursor to n position								○
Save the current displaying data to n layer for demo display								○
Turn annunciator on/off			○					
Specify period			○					
Specify comma			○					
Specify semicolon (period + comma)			○					

8. Command Details

8.1. POS7300 Series Command List

Command	Code (hex)	Function Description
ESC F A .. CR	1B 46 41 [DATA X 40] 0D	Write string to upper line
ESC F B .. CR	1B 46 42 [DATA X 40] 0D	Write string to lower line
ESC F D .. CR	1B 46 44 [DATA X 40] 0D	Upper line message scroll continuously
ESC F O .. CR	1B 46 4F [DATA X 40] 0D	Bottom line message scroll continuously
ESC P x y	1B 50 x y $1 \leq x \leq 14h, y=1,2$	Move cursor to specified position
ESC _ n	1B 5F n n=00,01	Set cursor on/off
ESC DC1	1B 11	Overwrite mode
ESC DC2	1B 12	Vertical scroll mode
ESC DC3	1B 13	Horizontal scroll mode
ESC @	1B 40	Initialize display
US MD2 n	1F 02 n n=01~0Ch	Message vertical down scroll continuously
US MD1 n	1F 01 n n=01~0Ch	Message vertical upper scroll continuously
US DC1 n	1F 11 n n='1','2'	Set line blinking N='1' up line, n='2' low line
US DC2 n	1F 12 n n='1','2'	Clear line blinking N='1' up line, n='2' low line
US E n	1F 45 n n=0~FFh	Blink display screen n=00h~FFh, n=0 for no blink
NULL H	0 48	Move cursor up
NULL K	0 4B	Move cursor left
NULL M	0 4D	Move cursor right
NULL P	0 50	Move cursor down
NULL G	0 47	Move cursor to left-most position
NULL O	0 4F	Move cursor to right-most position
BS	08	Back space
HT	09	Horizontal tab
LF	0A	Line feed
HOM	0B	Move cursor to home position
CLR	0C	Clear display screen
CR	0D	Carriage return
CAN	18	Clear cursor line, and clear string mode

8.2. CD5220 Standard Mode Command List

CD5220 Standard Mode Command List-1

Command	Code (hex)	Function Description
ESC DC1	1B 11	Overwrite mode
US SOH	1F 01	Overwrite mode
ESC DC2	1B 12	Vertical scroll mode
US STX	1F 02	Vertical scroll mode
ESC DC3	1B 13	Horizontal scroll mode
US ETX	1F 03	Horizontal scroll mode
ESC Q A .. CR	1B 51 41 [n]x20 0D	Set the string display mode, write string to upper line. * ¹
ESC Q B .. CR	1B 51 42 [n]x20 0D	Set the string display mode, write string to lower line. * ¹
ESC Q D .. CR	1B 51 44 [n]xm 0D m < 40	Upper line message scroll continuously. * ¹ * ²
ESD [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
US LF	1F 0A	Move cursor up
ESC [B	1B 5B 42	Move cursor down
LF	0A	Move cursor down
ESC [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
US CR	1F 0D	Move cursor to right-most position
ESC [K	1B 5B 4B	Move cursor to bottom position
US B	1F 42	Move cursor to bottom position
ESC # n	1B 23 n n=30h~37h	Command type select
US @	1F 40	Execute self test
US E n	1F 45 n n=0~FFh	Blink display screen n=00h~FFh, n=0 for no blink
ESC I x y	1B 6C x y / 1F 24 x y 1 ≤ x ≤ 14h, y=1,2	Move cursor to specified position
US \$ x y	1F 24 x y 1 ≤ x ≤ 14h, y=1,2	Move cursor to specified position
ESC @	1B 40	Initialize display
ESC W s x1 x2 y	1B 57 1 x1 x2 y 0 ≤ x1 ≤ x2 ≤ 13h y=1,2 S=0 cancel, 1 set	Set or cancel the window range at horizontal scroll mode

CD5220 Standard Mode Command List-2

Command	Code (hex)	Function Description
CLR	0C	Clear display screen, and clear string mode
CAN	18	Clear cursor line, and clear string mode
ESC * n	1B 2A n $1 \leq n \leq 4$	Brightness adjustment
US X n	1F 58 n $1 \leq n \leq 4$	Brightness adjustment
ESC _ n	1B 5F n n=00,01	Set cursor on/off
ESC f n	1B 66 n	Select international fonts, refer. ^{*3}
ESC c n	1B 63 n	Select fonts, ASCII code or JIS code, refer. ^{*4}
ESC = n	1B 3D n n=01,02,03	Select peripheral device, display or printer n=01,enable printer n=02,enable display n=03,enable printer, display

Note:

1. While using command “ESC Q A” or “ESC Q B”, other commands cannot be used except when using command “CLR” or “CAN” to change operating mode.
2. When using command “ESC Q D”, the upper line message will scroll continuously until a new command is received, it will then clear the upper line and move the cursor to the upper left-end position.
3. The parameter of international fonts set control by command “ESC f n”.

Parameter “n”		International Font Set
‘A’	41h	U.S.A.
‘G’	47h	Germany
‘I’	49h	Italy
‘J’	4Ah	Japan
‘U’	55h	U.K.
‘F’	46h	France
‘S’	53h	Spain
‘N’	4Eh	Norway
‘W’	57h	Sweden
‘D’	44h	Denmark I
‘E’	45h	Denmark II
‘L’	4Ch	Slavonic
‘R’	52h	Russia

4. The parameter of the code table control by command “ESC c n”.

Parameter “n”		International Font Set
‘A’	41h	Compliance with ASCII code
‘J’	4Ah	Compliance with JIS code
‘L’	4Ch	Compliance with SLOVONIC code
‘R’	52h	Compliance with RUSSIA code

8.3. UTC Standard Mode Command List

Command	Code (hex)	Function Description
BS	08	Back space
HT	09	Horizontal tab
LF	0A	Line feed
CR	0D	Carriage return
DLE	10 n $0 \leq n < 28h$	Display position
DC1	11	Over write display mode
DC2	12	Vertical scroll mode
DC3	13	Cursor on
DC4	14	Cursor off
US	1F	Clear display
ESC d	1B 64	Change to UTC enhanced mode

8.4. UTC Enhanced Mode Command List

Command	Code (hex)	Function Description
ESC u A .. CR	1B 75 41 [data x 40] 0D	Upper line display
ESC u B .. CR	1B 75 42 [data x 40] 0D	Bottom line display
ESC u D .. CR	1B 75 44 [data x 40] 0D	Upper line message scroll continuously
ESC u E .. CR	1B 75 45 h h ':' m m 0D h, m = '0' - '9'	Display time
ESC u F .. CR	1B 75 46 [data x 40] 0D	Upper line message scroll Once pass
ESC u H .. CR	1B 75 48 n m 0D $20h \leq n, m$	Change attention code
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

8.5. AEDEX/EMAX Mode Command List

Command	Code (hex)	Function Description
! # 4 ... CR	21 23 34 [data x 40] 0D	Upper line message scroll
! # 5 ... CR	21 23 35 h h ':' m m 0D h,m='0'-'9'	Display time
! # 8 ... CR	21 23 38 n m 0D $20h \leq n, m$	Change attention code
! # 9 ... CR	21 23 39 [data x 40] 0D	Two line display
! # 6 ... CR	21 23 36 [data x 40] 0D	Upper line message scroll once pass

8.6. ADM787/788 mode command list

Command	Code (hex)	Function Description
CLR	0C	Clear display
CR	0D	Carriage return
SLE1	0E	Clear upper line and move cursor to upper left-end position
SLE2	0F	Clear bottom line and move, Cursor to bottom left-end position
DC0	10 n	Set period to upper line last n position, $31H \leq n \leq 37H$
DC1	11 n	Set line blinking, upper line n='1' up line, n='2' low line
DC2	12 n	Clear line blinking, upper line n='1' up line, n='2' low line
SF1	1E	Clear field 1 and move cursor to field 1, first position
SF2	1F	Clear field 2 and move cursor to field 2, first position

8.7. DSP800 Mode Command List

Command	Code (hex)	Function Description
EOT SOH I n ETB	04 01 49 n 17 n=00~0Fh or 30~3Fh	Select international character set
EOT SOH P n ETB	04 01 50 n 17 n=31h-58h	Move cursor to specified position
EOT SOH C n m ETB	04 01 43 n m 17 $31h \leq n \leq m \leq 58h$	Clear display range from <u>n</u> position to <u>m</u> position and move cursor to <u>n</u> position
EOT SOH S n ETB	04 01 53 n 17 n=31h-35h	Save current view message to n layer for demo view data
EOT SOH D n m ETB	04 01 44 n m 17 n=31h-4Fh, m=31h-33h	Display the saved demo message
EOT SOH A n ETB	04 01 41 n 17 n=31h-34h	Brightness adjustment
EOT SOH F n ETB	04 01 46 n 17 $00h \leq n \leq FFh$	Blink display Screen n=00h~FFh, n=0 for no blink
EOT SOH = n ETB	04 01 3D n 17 n='1', '2', '3'	Select peripheral device. n='1', enable printer n='2', enable display n='3', enable printer display
EOT SOH % ETB	04 01 25 17	Initialize display
EOT SOH @ ETB	04 01 40 17	Execute self-test
EOT SOH # n ETB	04 01 23 n 17 n=30~37h	Command type select

8.8. EPSON ESC/POS Command List

EPSON ESC/POS Command List-1

Command	Code (hex)	Function Description
ESC t n	1B 74 n n=00-0Fh	Select character code table. See note * ²
ESC R n	1B 52 n n=00-0Fh	Select international character set. See note * ¹
US r n	1F 72 n n=00,01	Select/cancel reverse character.
US MD1	1F 01	Specify overwrite mode.
US MD2	1F 02	Specify vertical scroll mode.
US MD3	1F 03	Specify horizontal scroll mode.
CAN	18	Clear cursor line
ESC # n	1B 23 n 30h ≤ n ≤ 38h	Command type select
US # n m	1F 23 n m, n=0 or 1, 0 < m ≤ 14h	Turn annunciator on/off
US C n	1F 43 n n=00, 01	Set cursor on/off
BS	08	Move cursor left
HT	09	Move cursor right
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 1 ≤ x ≤ 14h, y=1 or 2	Move cursor to specified position
CLR	0C	Clear display screen
US E n	1F 45 n n=00h~FFh	Blink display screen n=00h~FFh, n=0 for no blink
ESC @	1B 40	Initialize display
US . n	1F 2E n n=a displayable character code	Specify period
US , n	1F 2C n n=a displayable character code	Specify comma
US ; n	1F 3B n n=a displayable character code	Specify semicolon (period + comma)

EPSON ESC/POS Command List-2

Command	Code (hex)	Function Description
ESC W n s x1 y1 x2 y2	1B 57 n s x1 y1 x2 y2 n=1,2,3,4 s=0,1	Specify/cancel the window range. 1<=x1<=x2<=20 1<=y1<=y2<=2
ESC = n	1B 3D n n=01, select printer n=02, select display n=03, select printer, display	Select peripheral device.
US :	1F 3A	Set starting/ending position of macro definition. Ex.: 1F 3A ... (macro string) ... 1F 3A
US ^ n m	1F 5E n m 00 ≤ (n, m) ≤ ff n=Word time m=show string time	Execute and quit macro. It's an interval of n between the two words. It's an interval of m between the two strings.
US @	1F 40	Execute self - test
US T h m	1F 54 h m 0<=h<=17h, 0<=m<=3bh	Display time
US U	1F 55	Display time continuously

Note:

1. Select international character set for ESC/POS

n	International Font Set	n	International Font Set
0h	U.S.A.	8h	JAPAN
1h	FRANCE	9h	NORWAY
2h	GERMANY	Ah	DENMARK II
3h	U.K.	Bh	SLAVONIC
4h	DENMARK I	Ch	RUSSIA
5h	SWEDEN	Dh	U.S.A.
6h	ITALY	Eh	No used/ U.K
7h	SPAIN	Fh	No used/ U.S.A

2. Select character code table for ESC/POS

n	International Font Set (80H~FFH)
0h	Page 0, (PC437: U.S.A., standard Europe)
1h	Page 1, (Katakana for Japan)
2h	Page 2, (PC858: multilingual+ Euro Symbol)
3h	Page 3, (PC860: Portuguese)
4h	Page 4, (PC863: Canadian-French)
5h	Page 5, (PC865: Nordic)
6h	Page 6, (Slavonic)
7h	Page 7, (Russia)
8h	Page 8, (Greek)
9h	Page 9, (PC852: Hungary)

9. Character Set

9.1. Character Code 20H – 7EH

9.1.1 International Character Sets

Character Code Number													
Country	Hex	23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E
	Dec	35	36	64	91	92	93	94	96	123	124	125	126
U.S.A	#	\$	@	[\]	^	`	{		}	~	
France	#	\$	à	°	ç	§	^	`	é	ù	è	ˆ	
Germany	#	\$	§	Ä	Ö	Ü	^	`	ä	ö	ü	ß	
U.K	£	\$	@	[\]	^	`	{		}	~	
Denmark I	#	\$	@	Æ	Ø	Å	^	`	æ	ø	å	~	
Sweden	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü	
Italy	#	\$	@	°	\	é	^	ù	à	ò	è	ì	
Spain	Pt	\$	@	ı	Ñ	¿	^	`	ˆ	ñ	}	~	
Japan	#	\$	@	[¥]	^	`	{		}	~	
Norway	#	¤	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü	
Denmark II	#	\$	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü	
Slavonic	#	\$	@	[\]	^	`	{		}	~	
Russia	#	\$	@	[\]	^	`	{		}	~	

9.1.2 USA, Standard Character Sets

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
20H	SP	!	“	#	\$	%	&	‘	()	*	+	,	-	.	/
30H	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40H	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50H	P	Q	R	S	T	U	V	W	X	Y	Z	[\]	^	_
60H	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70H	p	q	r	s	t	u	v	w	x	y	Z	{		}	~	SP

9.2. Character Code 80H – FFH

9.2.1 Page 0 (PC437: USA, Standard Europe)

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
80H	Ç	ü	é	â	ä	à	å	ç	ê	ë	è	ï	î	ì	Ä	Å
90H	É	æ	Æ	ô	ö	ò	û	ù	ÿ	ö	Ü	¢	£	¥	Pt	f
A0H	á	í	ó	ú	ñ	Ñ	ª	º	¿	¬	½	¼	¡	«	»	
B0H	⌘	⌚	⌛	⌜	⌝	⌞	⌟	⌠	⌡	⌢	⌣	⌤	⌥	⌦	⌧	⌨
C0H	Ⓕ	Ⓖ	Ⓗ	Ⓙ	Ⓚ	Ⓛ	Ⓜ	Ⓝ	Ⓞ	Ⓟ	Ⓠ	Ⓡ	Ⓢ	Ⓣ	Ⓤ	Ⓥ
D0H	Ⓦ	Ⓧ	Ⓨ	Ⓩ	ⓐ	ⓑ	ⓒ	ⓓ	ⓔ	ⓕ	ⓖ	ⓗ	ⓘ	ⓙ	ⓚ	ⓛ
E0H	α	β	Γ	Π	Σ	σ	μ	τ	Φ	θ	Ω	δ	∞	ø	ε	∩
F0H	≡	±	≥	≤	∫	∫	÷	≈	°	•	·	√	"	²	■	SP

9.2.2 Page 1 (Katakana for Japan)

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
80H	α	β	γ	△	ε	η	θ	λ	μ	π	ρ	σ	τ	Φ	Ω	Σ
90H	£	§	IE	IR	∫	¯x	Ä	⁻¹	²	³	×	½	¼	√	±	■
A0H	SP	。	「	」	、	・	ヲ	フ	イ	ウ	エ	オ	ヤ	ユ	ヨ	ツ
B0H	ー	ア	イ	ウ	エ	オ	カ	キ	ク	ケ	コ	サ	シ	ス	セ	ソ
C0H	タ	チ	ツ	テ	ト	ナ	ニ	ヌ	ネ	ノ	ハ	ヒ	フ	ヘ	ホ	マ
D0H	ミ	ム	メ	モ	ヤ	ユ	ヨ	ラ	リ	ル	レ	ロ	ワ	ン	"	°
E0H	↑	↓	←	→	↶	↷	↵	↶	↷	↶	↷	"	"	«	»	∴
F0H	≤	≥	≠	≡	∥		⊥	∞	α	~	~	≡	⊥	⊙	⊕	⊖

9.2.3 Page 2 (PC850: Multilingual)

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
80H	Ç	ü	é	â	ä	à	å	ç	ê	ë	è	ï	î	ì	Ä	Å
90H	É	æ	Æ	ô	ö	ò	û	ù	ÿ	ö	Ü	ø	£	Ø	×	f
A0H	á	í	ó	ú	ñ	Ñ	ª	º	¿	®	¬	½	¼	¡	«	»
B0H	⌘	⌚	⌛	⌜	⌝	Á	Â	À	©	⌢	⌣	⌤	⌥	¢	¥	⌧
C0H	Ⓕ	Ⓖ	Ⓗ	Ⓙ	Ⓚ	ã	Ã	ℓ	ℝ	ℙ	Ⓙ	Ⓚ	Ⓛ	Ⓜ	Ⓝ	Ⓞ
D0H	ð	Ð	Ê	Ë	È	€	Í	Î	Ï	Ⓙ	Ⓚ	■	■	Ⓛ	ì	■
E0H	ó	β	ô	ò	õ	Õ	μ	þ	Ɔ	Ú	Û	Ü	ý	Ý	-	'
F0H	-	±	=	¾	¶	§	÷	˘	°	˙	˙	1	3	2	■	SP

9.2.4 Page 2 (PC858: Multilingual + Euro Symbol)

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
80H	Ç	ü	é	â	ã	à	á	ç	ê	ë	è	ï	î	ì	Ä	Å
90H	É	æ	Æ	ô	ö	ò	û	ù	ÿ	ö	Ü	ø	£	Ø	×	f
A0H	á	í	ó	ú	ñ	Ñ	ä	ö	¿	®	¬	½	¼	¡	«	»
B0H	☼	☼	☼		└	Á	Â	À	©	¶		¶	¶	¢	¥	⌋
C0H	L	└	┐	└	—	└	ã	Ã	ℒ	℔	ℒ	℔	℔	=	℔	¤
D0H	ð	Ð	Ê	Ë	È	€	Í	Î	Ï	⌋	⌋	■	■	¡	ì	■
E0H	ó	β	ô	ò	õ	Õ	μ	þ	þ	Ú	Û	Ü	ý	Ý	-	'
F0H	-	±	=	¾	¶	§	÷	˘	°	˘	˘	1	3	2	■	SP

9.2.5 Page 3 (PC860: Portuguese)

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
80H	Ç	ü	é	â	ã	à	Á	ç	ê	Ê	è	Í	Ô	ì	Ã	Â
90H	É	À	È	ô	õ	ò	Ú	ù	ì	Õ	Ü	¢	£	Ù	Pt	Ó
A0H	á	í	ó	ú	ñ	Ñ	ä	ö	¿	®	¬	½	¼	¡	«	»
B0H	☼	☼	☼		└	¶	¶	¶	¶	¶		¶	¶	¶	¶	⌋
C0H	L	└	┐	└	—	└	¶		ℒ	℔	ℒ	℔	℔	=	℔	±
D0H	ℒ	℔	π	ℒ	ℒ	℔	π	¶	¶	⌋	L	■	■	■	■	■
E0H	α	β	Γ	π	Σ	σ	μ	τ	Φ	θ	Ω	δ	∞	ø	ε	∩
F0H	≡	±	≥	≤	¡	¡	÷	≈	°	•	•	√	n	2	■	SP

9.2.6 Page 4 (PC863: Canadian- French)

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
80H	Ç	ü	é	â	ã	à	á	ç	ê	ë	è	ï	î	ì	Ä	Å
90H	É	æ	Æ	ô	ö	ò	û	ù	ÿ	ö	Ü	ø	£	Ø	×	f
A0H	á	í	ó	ú	ñ	Ñ	ä	ö	¿	®	¬	½	¼	¡	«	»
B0H	☼	☼	☼		└	Á	Â	À	©	¶		¶	¶	¢	¥	⌋
C0H	L	└	┐	└	—	└	ã	Ã	ℒ	℔	ℒ	℔	℔	=	℔	¤
D0H	ð	Ð	Ê	Ë	È	€	Í	Î	Ï	⌋	⌋	■	■	¡	ì	■
E0H	ó	β	ô	ò	õ	Õ	μ	þ	þ	Ú	Û	Ü	ý	Ý	-	'
F0H	-	±	=	¾	¶	§	÷	˘	°	˘	˘	1	3	2	■	SP

9.2.7 Page 5 (PC865: Nordic)

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
80H	Ç	ü	é	â	ä	à	å	ç	ê	ë	è	ï	î	ì	Ä	Å
90H	É	æ	Æ	ô	ö	ò	û	ù	ÿ	Ö	Ü	ø	£	Ø	Pt	f
A0H	á	í	ó	ú	ñ	Ñ	ä	å	ç	®	¬	½	¼	ì	«	»
B0H	☐	☐	☐		└	Á	Á	Á	0	¶		¶	¶	¢	¥	└
C0H	L	└	└	└	—	└	ā	Ã	ℒ	ℒ	ℒ	ℒ	ℒ	=	ℒ	▣
D0H	ð	Ð	Ê	Ë	È	€	í	î	ï	└	└	■	■	ì	ì	■
E0H	ó	β	ô	ò	õ	Õ	μ	ρ	ρ	Ú	Û	Ù	ý	Ý	-	'
F0H	-	±	=	¾	¶	§	÷	˘	°	˘	˘	1	3	2	■	SP

9.2.8 Page 6 (Slawie)

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
80H	Ç	ü	é	â	ä	û	ć	ç	ł	ë	õ	õ	î	ż	ä	ć
90H	é	Ł	í	ô	ö	Ł	ĩ	ś	ś	Ö	Ü	ť	ť	ł	x	č
A0H	á	í	ó	ú	ą	ą	ż	ż	ę	ę		ż	č	ş	«	»
B0H	☐	☐	☐		└	á	â	ě	ş					ť	ť	
C0H					—	└	ă	ă						=		▣
D0H	đ	đ	đ	ë	đ	ň	í	î	ě			■	■	ť	û	■
E0H	ó	β	ô	ń	ń	ň	ś	ś	ř	ú	ř	ů	ý	ý	ť	'
F0H	—	˘		˘	˘	§	÷	˘	°	˘	˘	ů	ř	ř	■	SP

9.2.9 Page 7 (Russia)

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
80H	А	Б	В	Г	Д	Е	Ж	З	И	Й	К	Л	М	Н	О	П
90H	Р	С	Т	У	Ф	Х	Ц	Ч	Ш	Щ	Ъ	Ы	Ь	Э	Ю	Я
A0H	а	б	в	г	д	е	ж	з	и	й	к	л	м	н	о	п
B0H																
C0H																
D0H																
E0H	р	с	т	у	ф	х	ц	ч	ш	щ	ъ	ы	ь	э	ю	я
F0H	ø	ř	K	H	θ	Υ	Υ	h	ø	ř	k	H	θ	Υ	Υ	SP

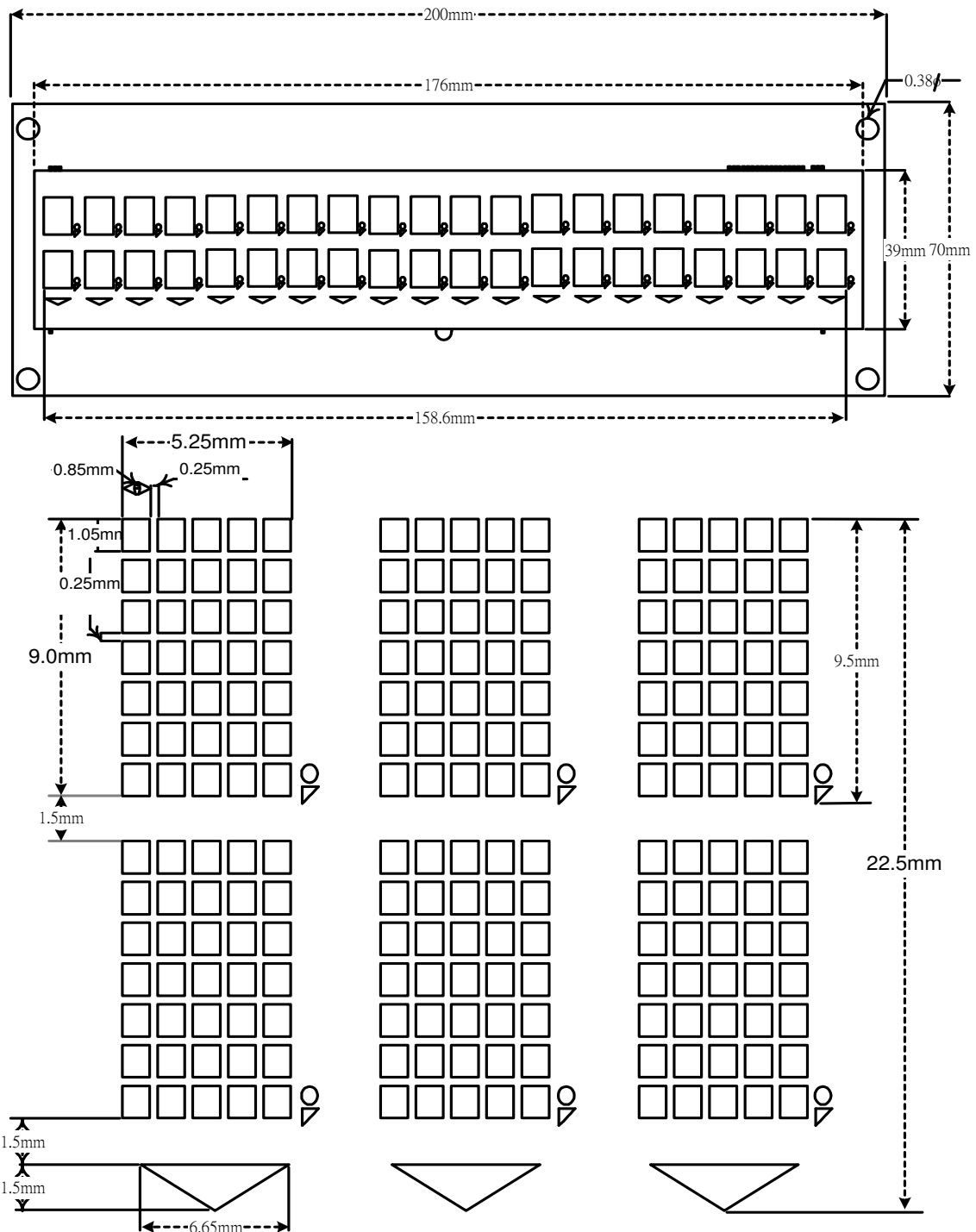
9.2.10 Page 8 (Greek)

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
80H	A	B	Γ	Δ	E	Z	H	Θ	I	K	Λ	M	N	Ξ	O	Π
90H	P	Σ	T	Υ	Φ	X	Ψ	Ω	α	β	γ	δ	ε	ζ	η	θ
A0H	ι	κ	λ	μ	ν	ξ	ο	π	ρ	σ	ς	τ	υ	φ	χ	ψ
B0H																
C0H																
D0H																
E0H	ω															
F0H										£				-		

9.2.11 Page 9 (PC852: Hungary)

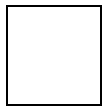
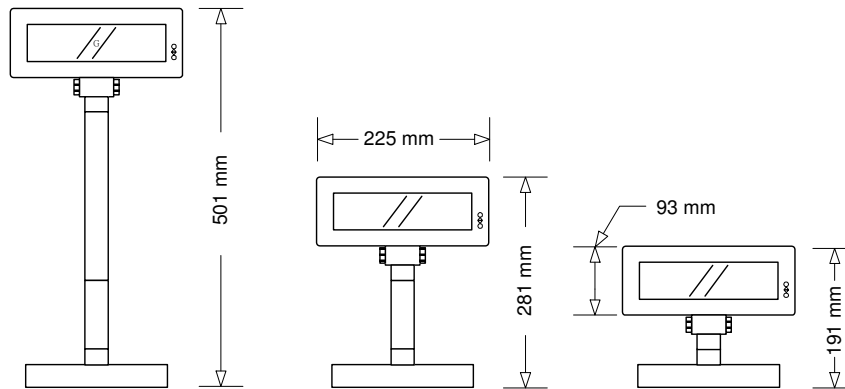
	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
80H	Ç	ű	é	â	ä	û	ć	ç	ı	ë	Ő	ő	î	Ž	Ä	Ć
90H	É	Í	Í	ô	ö	Ĺ	ĺ	Š	š	Ö	Ü	Ť	ť	Ł	x	Č
A0H	á	í	ó	ú	Ą	ą	Ž	ž	Ę	ę	¬	ż	Č	ș	«	»
B0H	▒	▒	▒		†	Á	Â	Ě	Ş	¶		¶	¶	ž	ž	ŕ
C0H	Ł	Ł	Ŧ	Ŧ	—	†	Ä	ä	Ł	Ł	Ł	Ł	Ł	=	Ł	▒
D0H	đ	Đ	Ď	Ě	ď	Ň	í	î	ě	Ј	г	■	■	Ť	Ů	■
E0H	Ó	β	Ô	Ń	ń	ň	Š	š	Ř	Ú	ř	Ů	ý	Ý	ť	´
F0H	—	~	,	˘	˘	§	÷	„	°	ˆ	ˆ	ű	ř	ř	■	SP

10. Display Module Dimension

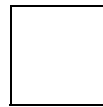


B. 1 x 12 Customer Display

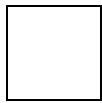
1. Checklist



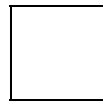
Pole Display Module



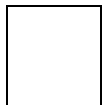
Flat Cable (DB-9P to DB-9P flat cable connector)



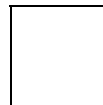
Base Unit



Two pieces of pole support (1x22cm, 1x9cm)



Installation guide



Power Adapter

2. Features

1. Data can be display on 12 columns x 1 line.
2. Blue-green color and large character are easy to see.
3. Command emulation modes include: POS7300, EPSON ESC/POS.
4. Provides an interface based in RS-232C, and RS232C baud rate 9600 bps.

3. Specification

NO	Item	Description
1	Display method	Vacuum fluorescent display
2	Number of character	40 characters (12 columns x 1 lines)
3	Character font	7 segment
4	Display color	Blue green
5	Brightness	700 cd /m ²
6	Character type	10 numeric
7	Character size	dot matrix 17.0 x 5.4 mm
8	Power supply	11-19VDC Manufacture offer +12V power adapter
9	Power consumption	3 - 6 W
10	MTBF	25000 hours (power on time)
11	Panel dimensions	224 (W) x 93 (H) x 50(D) mm
12	Support dimensions	Long support : 22 cm Short support : 9 cm
13	Base dimensions	19.7 x 10 cm (W x D)
14	Viewing angle	-5 - 60 degrees
15	Rotation angle	Maximum 270 degrees
16	Weight	1.25 Kg
17	Operating temperature	5 - 45°C
18	Operating Humidity	30%-85%
19	Storage Temperature	-10 - 55°C
20	Storage Humidity	10%-85%

4. Interface

4.1. Interface Specification

Data transmission	Serial
Synchronization	Asynchronous
Handshaking	DTR / DSR
Signal level	MARK = -3 to -15 V (logic "1") SPACE = +3 to +15 V (logic "0")
Baud rates	9600 bps
Parity	None
Bit length	8 bits
Stop bits	1 bit

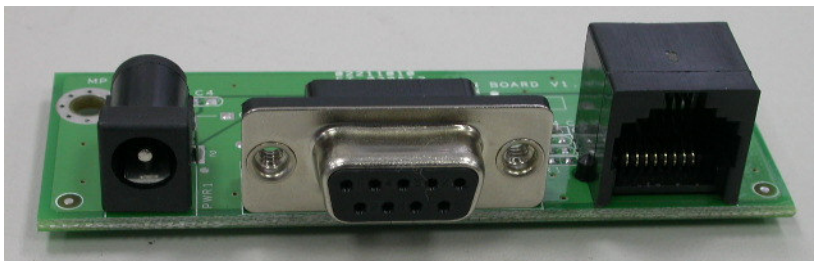
4.2. Display Base

Below illustrate the configuration of Stand alone VFD Pole Display base.



Figure of VFD Pole Display Base

4.3. Connector



PWR

COM

RJ45

PWR: Power input connector from adapter

- Connector type: DC jack (5.5/2.1)

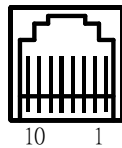


- Pin assignment

No	Signal
+	Vin
-	GND

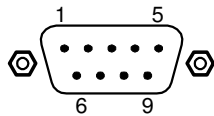
RJ45: Connect to display panel

- Connector type: Phone-jack 10P/8C



COM: RS232C link to PC/HOST connector (9-pin)

- Connector type: D-sub 9 pin female



5. Command List Table

Command List Table – 1

Command	Code (Hex)	Function Description
ESC @	1B 40	Initialize display
ESC D	1B 44	Enable the demo mode
ESC O m	1B 4F m (m= 1 or 2)	Display ON or OFF
ESC B m	1B 42 m (1 <= m <= 3)	Adjust the brightness level
ESC [D	1B 5B 44	Move cursor left
SO	0E	Move cursor left
ESC [C	1B 5B 43	Move cursor right
SI	0F	Move cursor right
ESC [H	1B 5B 48	Move cursor to home position
ESC [L	1B 5B 4C	Move cursor to left-most position
CR	0D	Move cursor to left-most position
LF	0A	Move cursor to left-most position
ESC [R	1B 5B 52	Move cursor to right-most position
HOM	0B	Move cursor to home position
ESC [K	1B 5B 4B	Move cursor to bottom position
ESC I x y	1B 6C x y (1 <= x <= 12, y=1)	Move cursor to specified position
ESC P x y	1B 50 x y (1 <= x <= 12, y=1)	Move cursor to specified position
CLR	0C	Clear display screen
CAN	12	Clear cursor line
.	2E	Set the pointer mark on the last show character location
ESC . x m	1B 2E x m (1 <= x <= 12, m= 0 or 1)	Set the pointer mark ON or OFF on specified position
,	27	Set the comma mark on the last show character location
ESC ' x m	1B 27 x m (1 <= x <= 12, m= 0 or 1)	Set the comma mark ON or OFF on specified position
ESC Q A ... CR	1B 51 41 D1D2...Dn 0D (0 <= n <= 12) (2Dh <= Dn <= 79h)	Set the string display
ESC F A ... CR	1B 51 41 D1D2...Dn 0D (0 <= n <= 12) (2Dh <= Dn <= 79h)	Set the string display
ESC - m	1B 2D m (m= 1 or 2)	Set left-most dash ON or OFF
ESC _ n	1B 5F n (n= 0 or 1)	Set cursor ON or OFF

Command List Table – 2

Command	Code (Hex)	Function Description
US E n	1F 45 n (n= 0 ~ FF)	Blink display screen n=00h~FFh, n=0 for disable blink
BS	08	Back space
NULL K	00 4B	Move cursor left
NULL M	00 4D	Move cursor right
NULL G	00 47	Move cursor to left-most position
NULL O	00 4F	Move cursor to right-most position

6. Command Details

Command Details – 1

■	ESC [C	/ Move cursor right /
	ASCII Format	: ESC [C
	Dec. Format	: [027] [091] [067]
	Hex. Format	: [1Bh] [5Bh] [43h]
	Description	: Move cursor one character to the right
■	SI	/ Move cursor right /
	ASCII Format	: SI
	Dec. Format	: [015]
	Hex. Format	: [0Fh]
	Description	: Move cursor one character to the right
■	ESC [H	/ Move cursor to home position /
	ASCII Format	: ESC [H
	Dec. Format	: [027] [091] [072]
	Hex. Format	: [1Bh] [5Bh] [48h]
	Description	: Move cursor to the left-most position
■	ESC [L	/ Move cursor to left-most position /
	ASCII Format	: ESC [L
	Dec. Format	: [027] [091] [076]
	Hex. Format	: [1Bh] [5Bh] [4Ch]
	Description	: Move cursor to the left-most position
■	CR	/ Move cursor to left-most position /
	ASCII Format	: CR
	Dec. Format	: [013]
	Hex. Format	: [0Dh]
	Description	: Move cursor to the left-most position
■	LF	/ Move cursor to left-most position /
	ASCII Format	: LF
	Dec. Format	: [010]
	Hex. Format	: [0Ah]
	Description	: Move cursor to the left-most position
■	ESC [R	/ Move cursor to right-most position /
	ASCII Format	: ESC [R
	Dec. Format	: [027] [091] [082]
	Hex. Format	: [1Bh] [5Bh] [52h]
	Description	: Move cursor to the right-most position
■	HOM	/ Move cursor to home position /
	ASCII Format	: HOM
	Dec. Format	: [011]
	Hex. Format	: [0Bh]
	Description	: Move cursor to the home position

Command Details – 2

■	ESC [K	/ Move cursor to bottom position /
	ASCII Format	: ESC [R
	Dec. Format	: [027] [091] [075]
	Hex. Format	: [1Bh] [5Bh] [4Bh]
	Description	: Move cursor to the right-most position
■	ESC I x y	/ Move cursor to specified position /
	ASCII Format	: ESC I x y
	Dec. Format	: [027] [108] [x] [y] (1 <= x <= 12)
	Hex. Format	: [1Bh] [6Ch] [x] [y] (y=1)
	Description	: Move cursor to the x'th column on the y'th line.
■	ESC P x y	/ Move cursor to specified position /
	ASCII Format	: ESC P x y
	Dec. Format	: [027] [80] [x] [y] (1 <= x <= 12)
	Hex. Format	: [1Bh] [50h] [x] [y] (y=1)
	Description	: Move cursor to the x'th column on the y'th line.
■	CLR	/ Clear display screen /
	ASCII Format	: CLR
	Dec. Format	: [012]
	Hex. Format	: [0Ch]
	Description	: Clear all of the displayed characters
■	CAN	/ Clear cursor line /
	ASCII Format	: CAN
	Dec. Format	: [018]
	Hex. Format	: [12h]
	Description	: Clear the line containing the display
■	.	/ Set the pointer mark on last show character location /
	ASCII Format	: .
	Dec. Format	: [046]
	Hex. Format	: [2Eh]
	Description	: Set the pointer mark on last show character location.
■	ESC @	/ Initialize display /
	ASCII Format	: ESC @
	Dec. Format	: [027] [064]
	Hex. Format	: [1Bh] [40h]
	Description	: Clear the data in the input buffer and setting.
■	ESC D	/ Enable the demo mode /
	ASCII Format	: ESC D
	Dec. Format	: [027] [068]
	Hex. Format	: [1Bh] [44h]
	Description	: Enable the demo mode. Send any word can exit the demo mode.

Command Details – 3

■	ESC O m	/ Display ON or OFF /	
	ASCII Format	:	ESC O m
	Dec. Format	:	[027] [079] [m] (m= 1 or 2)
	Hex. Format	:	[1Bh] [4Fh] [m]
	Description	:	Clear the data in the input buffer and setting. m=1: Display ON (Default) m=2: Display OFF
■	ESC B m	/ Adjust the brightness level /	
	ASCII Format	:	ESC B m
	Dec. Format	:	[027] [066] [m] (1 <= m <= 3)
	Hex. Format	:	[1Bh] [42h] [m]
	Description	:	Adjust the brightness level m=1: low level m=2: middle level m=3: high level (Default)
■	ESC [D	/ Move cursor left /	
	ASCII Format	:	ESC [D
	Dec. Format	:	[027] [091] [068]
	Hex. Format	:	[1Bh] [5Bh] [44h]
	Description	:	Move cursor one character to the left
■	SO	/ Move cursor left /	
	ASCII Format	:	SO
	Dec. Format	:	[014]
	Hex. Format	:	[0Eh]
	Description	:	Move cursor one character to the left
■	ESC . x m	/ Set the pointer mark ON or OFF on specified position /	
	ASCII Format	:	ESC . x m
	Dec. Format	:	[027] [046] [x] [m] (1 <= x <= 12)
	Hex. Format	:	[1Bh] [2Eh] [x] [m] (m= 0 or 1)
	Description	:	Set the pointer mark ON or OFF at x position. m=0: Clear the pointer mark at x position m=1: Set the pointer mark at x position
■	‘	/ Set the comma mark on last show character location /	
	ASCII Format	:	‘
	Dec. Format	:	[039]
	Hex. Format	:	[27h]
	Description	:	Set the comma mark on last show character location.

Command Details – 4

■	ESC ' x m	/ Set the comma mark ON or OFF on specified position /
	ASCII Format	: ESC ' x m
	Dec. Format	: [027] [039] [x] [m] (1 <= x <= 12)
	Hex. Format	: [1Bh] [27h] [x] [m] (m= 0 or 1)
	Description	: Set the pointer mark ON or OFF at x position. m=0: Clear the comma mark at x position m=1: Set the comma mark at x position
■	ESC Q A [D1 D2 .. Dn] CR	/ Set the string display /
	ASCII Format	: ESC Q A D1D2...Dn CR
	Dec. Format	: [027] [081] [065] (0 <= n <= 12) D1D2...Dn [013]
	Hex. Format	: [1Bh] [51h] [41h] (2Dh <= Dn <= 79h) D1D2...Dn [0Dh]
	Description	: Set the string display mode. The string display mode will be cancel with CLR or CAN.
■	ESC F A [D1 D2 .. Dn] CR	/ Set the string display /
	ASCII Format	: ESC F A D1D2...Dn CR
	Dec. Format	: [027] [070] [065] (0 <= n <= 12) D1D2...Dn [013]
	Hex. Format	: [1Bh] [46h] [41h] (2Dh <= Dn <= 79h) D1D2...Dn [0Dh]
	Description	: Set the string display mode. The string display mode will be cancel with CLR or CAN.
■	ESC - m	/ Set left-most dash ON or OFF /
	ASCII Format	: ESC - m
	Dec. Format	: [027] [045] [m] (m= 1 or 2)
	Hex. Format	: [1Bh] [2Dh] [m]
	Description	: Set left-most dash on/off. m=1: Display m=2: No display (Default)
■	ESC _ n	/ Set cursor ON or OFF /
	ASCII Format	: ESC _ n
	Dec. Format	: [027] [095] [n] (n= 0 or 1)
	Hex. Format	: [1Bh] [5Fh] [n]
	Description	: Set cursor on/off. n=0: Display n=1: No display (Default)
■	US E n	/ Blink display screen /
	ASCII Format	: US _ n
	Dec. Format	: [031] [069] [n] (n= 0 ~ 255)
	Hex. Format	: [1Fh] [45h] [n] (n= 0 ~ FFh)
	Description	: Blink display screen n=00h~FFh, n=0 for no blink

Command Details – 5

■	BS	/ Back space /
	ASCII Format	: BS
	Dec. Format	: [08]
	Hex. Format	: [08h]
	Description	: Move cursor left and clean the character.
■	NULL K	/ Move cursor left /
	ASCII Format	: NULL K
	Dec. Format	: [00] [075]
	Hex. Format	: [00h] [4Bh]
	Description	: Move cursor left
■	NULL M	/ Move cursor right /
	ASCII Format	: NULL M
	Dec. Format	: [00] [077]
	Hex. Format	: [00h] [4Dh]
	Description	: Move cursor right
■	NULL G	/ Move cursor to left-most position /
	ASCII Format	: NULL G
	Dec. Format	: [00] [071]
	Hex. Format	: [00h] [47h]
	Description	: Move cursor to left-most position
■	NULL O	/ Move cursor to right-most position /
	ASCII Format	: NULL O
	Dec. Format	: [00] [079]
	Hex. Format	: [00h] [4Fh]
	Description	: Move cursor to right-most position
■	STX 05 V 01	TEX / Show firmware version /
	ASCII Format	: NULL O
	Dec. Format	: [02] [05] [86] [01] [03]
	Hex. Format	: [02h] [05h] [56h] [01h] [03h]
	Description	: Show the firmware version on the screen

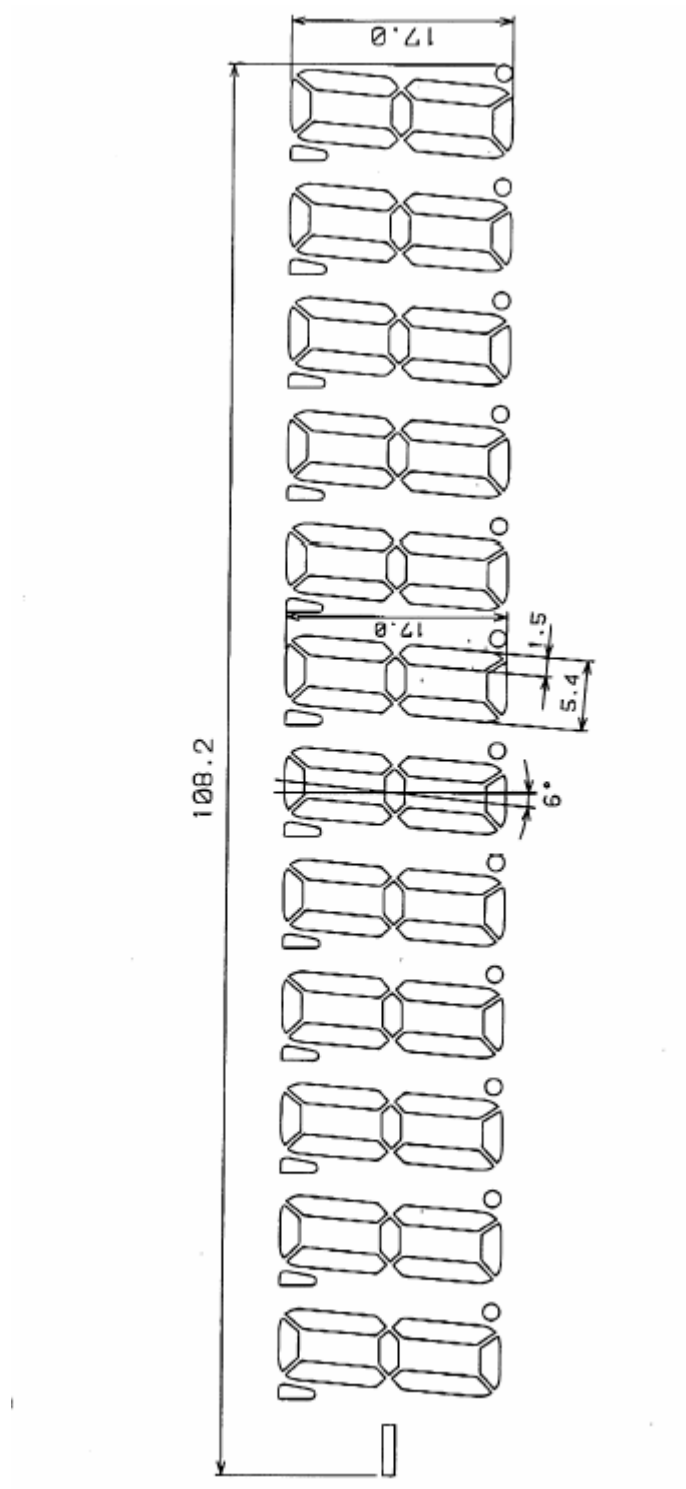
7. Character Set

0	1	2	3	4	5	6	7
8	9	A / a	B / b	C / c	D / d	E / e	F / f
G / g	H / h	I / i	J / j	K / k	L / l	M / m	N / n
O / o	P / p	Q / q	R / r	S / s	T / t	U / u	V / v
W / w	X / x	Y / y	Z / z	Space	-	=	/
[]	_					

Note:

- Undefined characters will be displayed as a space character.

8. Display Module Dimension



(2 x 20 Customer Display and 1 x 12 Customer Display)

Appendix A - Command Details

A.1. Overwrite mode

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

A.2. Vertical scroll mode

In this mode, the cursor will move rightward. The cursor will begin from the upper left-end position until it has reached the end of the upper line. The cursor will then move down to the bottom left-end position to continue until it has reached the end of the bottom line.

A.3. Horizontal scroll mode

In this mode, the extent of the cursor activity is bound by a predefined range, limited to the upper line. (Please refer to Set or cancel window command), where the default window is the whole upper line. The cursor will begin from the left-end of the range and move rightward until it reached the end of the range, to continue, the characters that comes thereafter will start pushing the previous characters leftward from the right-end, scrolling the characters to the left.

A.4. Set the string display mode and write string to display

Set the string display mode, write to upper or lower line $d1\ d2\ d3\ \dots\ dn$ $\{1 \leq n \leq 20\}$. 'A' stands for the upper line, 'B' stands for the lower line. The string display mode will be cancelled and the display will return to the previous mode after receiving CLR or CAN.

A.5. Upper line message continuous scroll

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

A.6. Move cursor left

When the current cursor is at the left-end position, this command operates differently depending on the display mode.

- **Overwrite mode:** When the cursor reached the left-end of the lower line, it will continue to the right-end of the upper line, overwrite previous characters. When it reached the left end of the upper line, it will continue to the right-end of the lower line.
- **Vertical scroll mode:** When the cursor reached the left-end of the lower line, the lower line will scroll up and replace the previous upper line, the lower line will be

cleared and the cursor will continue to the right end of the lower line.

- **Horizontal scroll mode:** The cursor will remain stationary.

A.7. Move cursor right

Move the cursor to the right. When the cursor has reached the right-end, this command operates differently depending on the display mode.

- **Overwrite mode:** When the cursor has reached the right-end of the lower line, it will continue to the left-end of the upper line and overwrite previous characters. When it has reached the right-end of the upper line, it will continue to the right-end of the lower line.
- **Vertical scroll mode:** When the cursor has reached the right-end of the lower line, the lower line will scroll up to replace the upper line, the lower line is cleared and ready to continue characters thereafter.
- **Horizontal scroll mode:** The cursor will remain stationary.

A.8. Move cursor up

Move the cursor up one line. When the cursor is on the upper line, this command operates differently depending on the display mode.

- **Overwrite mode:** The cursor is moved to the same column the lower line.
- **Vertical scroll mode:** The characters displayed on the upper line is scrolled to the lower line, and the upper line is cleared. The cursor will remain at the same position.
- **Horizontal scroll mode:** The cursor will remain stationary.

A.9. Move cursor down

Move the cursor down one line. When the cursor is on the lower line, this command operates differently depending on the display mode.

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

A.10. Move cursor to home position

The cursor will move to the left-end position of the upper line.

A.11. Move cursor to left-most position

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

A.12. Move cursor to right-most position

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

A.13. Move cursor to bottom position

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

A.14. Move cursor to specified position

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

A.15. Initialize display

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

A.16. Reset the window

Reset the window on the display.

When s=0, the window is cancelled (values: x1, x2, and y are not required.)

When s=1, the window will be reset (values: x1, x2, and y are required.)

The x1 and x2 set the position of the left column and right column, respectively, of the window.

The y sets the upper line or the lower line of the window.

This function is valid within the horizontal mode.

A.17. Clear display screen and clear string mode

All the display characters will be cleared, and the string mode will be cancelled.

A.18. Clear current line and cancel string mode

The current line is cleared, and the string mode is cancelled.

A.19. Brightness adjustment

Adjust the brightness of the vacuum fluorescent display.

When n=3, brightness=70%

When n=4, brightness=100%

A.20. Set cursor ON or OFF

When n=0, cursor is OFF

When n=1, cursor is ON

Appendix B - Control Code Set

HEX	CODE	HEX	CODE
00H	NULL	10H	DLE
01H	SOH, MD1	11H	DC1
02H	STX, MD2	12H	DC2
03H	ETX, MD3	13H	DC3
04H	EOT, MD4	14H	DC4
05H	ENQ, MD5	15H	NAK
06H	ACK, MD6	16H	SYN
07H	BEL, MD7	17H	ETB
08H	BS, MD8	18H	CAN
09H	HT	19H	EM
0AH	LF	1AH	SUB
0BH	VT, HOM	1BH	ESC
0CH	FF, CLR	1CH	FS
0DH	CR	1DH	GS
0EH	SO, SLE1	1EH	RS, SF1
0FH	SI, SLE2	1FH	US, SF2