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## SPECIFICATION FOR APPROVAL

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**Customer:**

**Product P/N: PDM-series**

**Approval sheet No.:**

**Approval Date:**

**Description: PDM-Series VFD Pole Display Module**

**F/W Version: V1.00H**

**APPROVAL BY:**

# **PDM-Series**

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# **Pole Display Module**

## **User's Manual**

Version 1.00

Issued: AUG 2018

## **Federal Communications Commission (FCC)**

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna.

Increase the separation between the equipment and receiver.

Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

## **Declaration of Conformity**

These devices comply with part 15 of the FCC Rules. Operation is subject to the following two conditions:

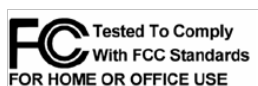
1. These devices may not cause harmful interference.
2. These devices must accept any interference received, including interference that may cause undesired operation.

## **Lithium Battery Replacement**

To avoid possible danger of explosion, ensure correct polarity when changing the lithium battery. Replace only with the same or equivalent type recommended by the manufacturer.

## **WEEE (Waste from Electrical and Electronic Equipment)**

The WEEE wheeled bin symbol on the product or on its packaging indicates that the product must not be disposed of with other waste. It should be the user's responsibility to dispose of their waste equipment by handing it over to an approved location for the recycling of waste electrical and electronic equipment. For more information about where to send your waste equipment for recycling, please contact your local city office, your household waste disposal service or where you purchased the product.



## **Disclaimer**

The material in this document is for information purpose and is subject to change without prior notice. PDM has made every effort to ensure that this user's manual is accurate and complete. However, no liability is assumed for any errors and omissions that may have occurred. Nor are any liability assumed for any damages resulting from the use of this product and the information contained in this document. PDM reserves the right to make improvements to this publication from time to time in the contents hereof without obligation of the manufacturer to notify any person of such revision or changes.

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## Important Safety Instructions

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Failure to observe these safety instructions may cause bodily injury, or damage to the product. Read these instructions carefully and keep this user's manual in an accessible location for future reference.

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**The product may cause a fire or electric shock when it is used improperly. Observe the above safety measures at all times.**



**If the product is damaged, immediately turn off the power and disconnect the power cord. Contact your dealer for assistance.**

1. Do not plug in or unplug the power cord with wet hands.
2. Do not plug the product into an AC outlet with the incorrect voltage. (Be sure to use a voltage that is between AC 100V~240V)
3. Do not plug several products into one multi-outlet.
4. Do not apply pressure to the power cord or place heavy objects on it.
5. Immediately stop using the product if it emits strange noise, odor, or smoke.
6. Do not use aerosol sprayers containing flammable gas inside or around the product.
7. Do not allow foreign objects or liquids to enter the product, or serious damage may result.
8. Do not place the product on an unstable surface. The product may cause a fire if it is dropped, damaged, or broken.

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The following instructions will help you to make better use of this product.

1. Keep the machine away from locations subject to high humidity, dust, or temperatures that exceed the specification.
2. Clean the product only by using a dry cloth or a cloth soaked with detergent. Never use thinner or other volatile solvents for cleaning.
3. At the end of the day, clean and inspect the exterior of the machine after the machine is powered off.
4. Use only specified accessories.
5. Do not expose the accessories directly to sunlight, high temperatures, humidity, dust, or gas.
6. Do not place heavy objects on top of the product or lean them against the product. These items may fall down and cause injury.

Do not block the air vent of the product as this can cause heat accumulation inside the box machine and may cause a fire.



**Abmtek Co., Ltd.**  
**富亦科技有限公司**

## RoHS DECLARATION

To Whom It May Concern:

We declare that all the products comply with The European RoHS Directive 2011/65/EU and Directive (EU) 2015/863.

All the parts used by ABMtek Co., LTD are RoHS compliant and do not exceed the maximum limit for following 10 designated substances.

No.	Substance Name	Maximum Permitted
1	Cadmium (Cd)	100 ppm
2	Lead (Pb)	1000 ppm
3	Mercury (Hg)	1000 ppm
4	Hexavalent chromium (Cr6+)	1000 ppm
5	Polybrominated biphenyls (PBB)	1000 ppm
6	Polybrominated diphenylethers (PBDE)	1000 ppm
7	Bis(2-ethylhexyl)phthalate (DEHP)	1000 ppm
8	Benzy1 butyl phthalate (BBP)	1000 ppm
9	Dibutyl phthalate (DBP)	1000 ppm
10	Diisobutyl phthalate (DIBP)	1000 ppm

Note:

1. The products which used High melting temperature solder which lead over 1000 ppm are exemptions from the substitution requirement should be permitted.

Reference for: Lead in high melting temperature type solders (i.e. lead- based alloys containing 85 % by weight or more lead). (2011/65/EU, Annex III, 7a)

2. GPP series products which lead over 1000ppm are exemptions from the substitution requirement should be permitted.

Reference for: Electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors, e.g. piezoelectric devices, or in a glass or ceramic matrix compound.( 2011/65/EU, Annex III, 7c-1)

ABMtek Co., LTD.

*Kevin Tai*

Vice President  
2018-08-01

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# CHAPTER 1

## INTRODUCTION

### Welcome

Thank you for choosing the PDM series Customer Pole Display Module. The PDM is a 20 columns x 2 lines customer display with Vacuum Fluorescent Display panel. VFD emits a very bright light with high contrast. Based on VFD display method, the PDM gives a better view of message in bright blue- green display fonts.

### 1.1 Features

1. Vacuum Fluorescent Display
2. Eye-catching bright blue-green display font
3. Unique panel design to vitalize your retail interior.
4. Supports 15 language characters, including those from the USA, France, Germany, UK, Sweden, Denmark I and II, Italy, Spain, Norway, Greek, Slavonic, Russian, Katakana and Portuguese.
5. Provides 9 command modes: EPSON ESC/POS, ADM787, ADM788, UTC/S, UTC/P, AEDEX, CD5220, ICD-2002 and DSP-800.
6. Low power consumption achieves optimal energy use and reliability.
7. Innovative hinge design for quick panel adjustment.
8. User-programmable for all fonts and customer messages.
9. Hardware Interface:

Standard:

RS-232C Interface with baud rates selectable from 4800 to 115200 bps.

Option:

Full speed data transfer using the USB 2.0 protocol.



## 1.2 Specification

Model	PDM-3500	PDM-3300
Display Method	Vacuum fluorescent Display text mode display panel	
Number of Characters	40 characters (20 columns x 2 lines)	
Display Color	Blue-green	
Brightness	700 cd/m <sup>2</sup>	
Font	I. 96 alphanumeric characters II. 15 sets of international characters: USA, France, Germany, UK, Sweden, Denmark I and II, Italy, Spain, Norway, Greek, Slavonic, Katakana, Russian and Portuguese III. One set of user downloadable characters	
Character Size	5x7 Dot Matrix 9.03 mm x 5.25 mm	5x7 Dot Matrix 6.75 mm x 3.75 mm
Command Set	1. EPSON ESC/POS      7. DSP800 2. ADM788              8. ICD2002 3. ADM787              9. CD5220 4. AEDEX 5. UTC/S 6. UTC/P	
Interface	RS-232C 4800/9600/19200/38400/115200 bps	
Power Supply	Power input DC 5V	
Power Consumption	2.5W	
MTBF	30,000 hrs	
Certification	CE/FCC Class A	
Rotation Angle	Vertically: 0-36 degrees Horizontal: 0-270 degrees	
<b>Physical Dimension</b>		
(W x D x H)	220 x 50 x 20 mm	145 x 45 x 20 mm
<b>Environment</b>		
Operation Temperature	-10~70°C	
Storage Temperature	-20~85°C	
Operation Humidity	15%~80% RH	
Storage Humidity	10%~90% RH	

# CHAPTER 2 INTERFACE

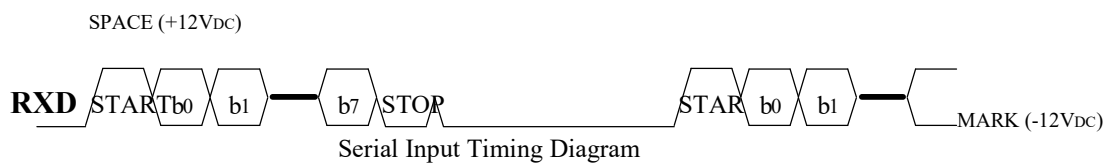
## 2.1 Communication Specification

### RS232C Type

Data transmission	Serial
Synchronization	Asynchronous
Handshaking	None
Signal level	MARK = -3 to -15V (logical "1" OFF) SPACE = +3 to +15V (logical "0" ON)
Baud rate	4800, 9600, 19200, 38400, 115200 bps
Parity	None, Even
Bit length (Data word length)	7 or 8 bits
Stop bits	1 bit

### Serial Data Input Stream

(Example of non parity, 8-bit data, 1 stop bit)



## 2.2 Standard Interface

### Serial RS232 connector to PC/HOST

Connector Type: 5267-08A (by Molex, 8-Pin Header) or equivalent

→ Recommended Mate Socket (Female): 5264-08 (by Molex) or equivalent

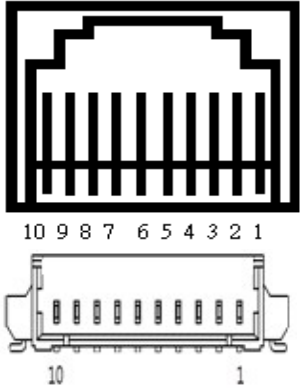
Pin assignment

Pin No.	Signal	I/O	Function	Illustration	To PC host DB9(male)
1	N/A	-	No connection		
2	RXD	Input	Receive Data		Pin 3 : TXD
3	TXD	Output	Transmit Data		Pin 2: RXD
4	N/A	-	No connection		
5	N/A	-	No connection		
6	GND	Power	Ground		Pin 5: GND
7	N/A	-	No connection		
8	DC in	Power	DC 5V~18V		

INTERFACE

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Connector Type: 10Pin 10P10C Phone Jack or pitch:1.25mm ACES PS-50271 series  
Pin assignment

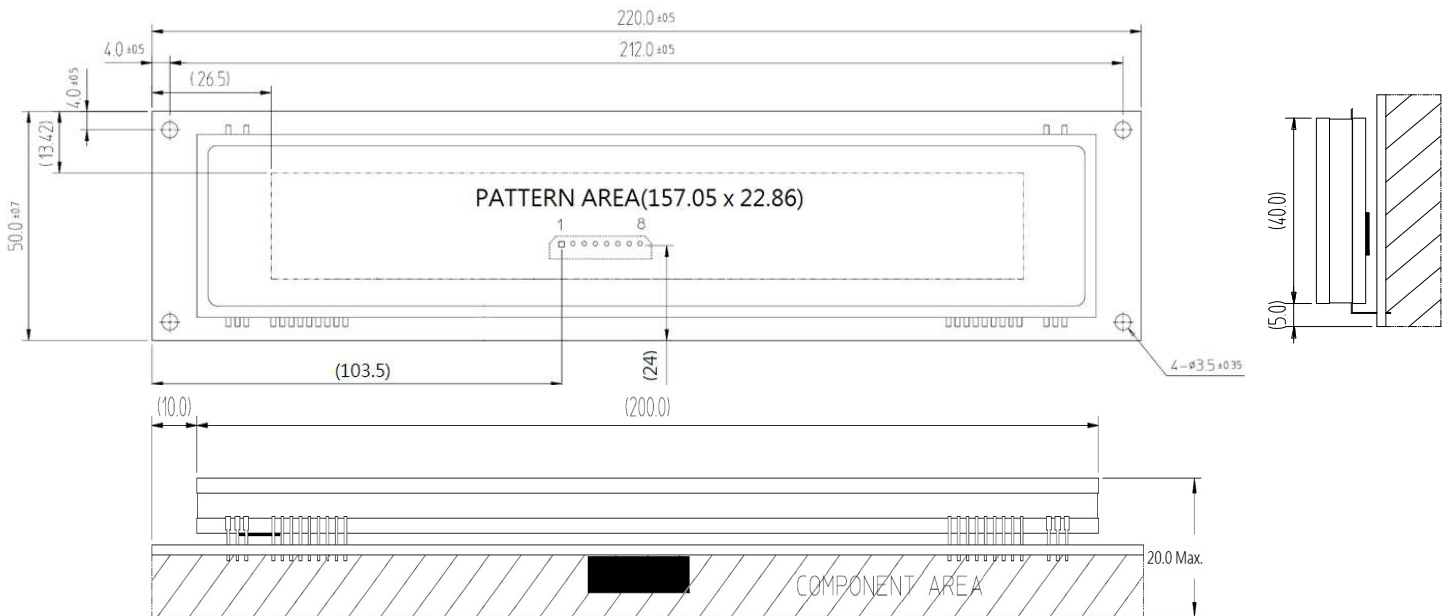
Pin No.	Signal	I/O	Function	Illustration
1	GND	-	Ground	
2	USB		Data -	
3	USB		Data+	
4	USB		VBUS	
5	TXD	Output	Transmit Data	
6	DTR/RTS	Output	Data Terminal Ready	
7	RXD	Input	Receive Data	
8	DSR/CTS	Input	Data Set Ready	
9	VIN	-	+5V	
10	GND	-	Ground	

## CHAPTER 3 INSTALLATION

The PDM Customer Pole Display Module is easy to install by following the instructions in this chapter. No special training or tools are necessary. As this manual contains required information on the installation and programming of PDM Customer Pole Display, it is recommended that you read the entire manual carefully prior to initiating installations.

### 3.1 Physical Function

#### 3.1.1 PDM-3500S Module Outline Dimension



Parameter	Symbols	Specification	Unit
Outer Dimensions	W * H * t	220.0 * 50.0 * 23.4	mm
Glass Size	W * H	200.0 * 40.0	mm
Display Area	W * H	167.4 * 23.2	mm
Character Pitch	CP(x) * CP(y)	8.45 * 11.05	mm
Character Size	CW * CH	5.45 * 9.15	mm
Weight	-	approx. 150	g

### 3.1.2 Environment Conditions

Parameter	Symbol	Min.	Max.	Unit
Operating Temperature	T <sub>OPR</sub>	-10	+70	°C
Storage Temperature	T <sub>STG</sub>	-20	+85	°C
Humidity (Operating)	T <sub>OPR</sub>	15	80	%
Humidity (Non-operating)	T <sub>STG</sub>	10	90	%
Vibration	-	4G (Amplitude=1mm, Freq.=10~50Hz)		-
Mechanical Shock	-	40G (Duration=10ms)		-

### 3.1.3 Absolute Maximum Rating

Parameter	Symbol	Min.	Max.	Unit
Power Supply Voltage	V <sub>CC</sub>	-0.3	20.0	V <sub>DC</sub>
Signal Input Voltage	V <sub>IN</sub>	-25.0	25.0	V <sub>DC</sub>

### 3.1.4 Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit
Power Supply Voltage	V <sub>CC</sub>	4.75	-	18.0	V <sub>DC</sub>
Signal Input Voltage	SPACE	-	3.0	12.0	V <sub>DC</sub>
	MARK	-	-15.0	-12.0	V <sub>DC</sub>

### 3.1.4 Electrical DC Characteristics

Parameter	Test Condition	Min.	Typ.	Max.	Unit
Supply Power	All dots are on	-	2.5	3	W
	All dots are off	-	0.5	1	W
Signal Output Voltage	SPACE	+3.0	+8.0	+15	V <sub>DC</sub>
	MARK	-15	-8.0	-3.0	V <sub>DC</sub>
Luminance	V <sub>CC</sub> = +12.0 V <sub>DC</sub>	350 (102)	700 (204)	- -	cd/m <sup>2</sup> (ft-L)
Display Color		Blue green			-

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## CHAPTER 4

### CONFIGURE YOUR DEVICE

The system parameters of PDM can be set by using VFD Utility software tool. You can find the tool in the companion disk. In addition to setting system parameters, you can configure welcome message and user font with the software tool. The system parameters include the following items.

- Language Character Set
- Command Type
- Baud rate
- Parity Check

#### 4.1.1 Command Type

The PDM supports up to 8 command sets. They are listed on the following table. Please select one from the pull-down list.

Command Type	Default
EPSON ESC/POS	
DSP-800	
ADM787/788	
AEDEX	
UTC/S	
UTC/P	
CD5220	*
ICD2002	

#### 4.1.2 Language Character Set Selection

The PDM supports the following language character set. Please refer to following table for character code page.

Character Set(20h-7Fh)	Code Table (80H-FFH)	Default
U.S.A	PC-437 (USA, Standard Europe)	*
France	PC-858	
Germany		
U.K.		
Denmark I		
Sweden		
Italy		
Spain		
Russia	WPC1251	
Norway	PC-858	
Denmark II		
Slavonic	Slavonic	
Russia	Russia	

Japan	Katakana	
User Font		

### 4.1.3 Baud Rate Selection

Baud Rate (bps)	Default
4800	
9600	*
19200	
38400	
115200	

### 4.1.4 Parity Check Selectio

Parity Check	Default
None-parity	*
Even-parity	

## CHAPTER 5

# SOFTWARE SETTING COMMAND

User can re-set the default configuration by using the following software commands:

### 5.1 Baud Rate Setting Command

**STX 05 B n ETX** Change the baud rate  
 ASCII Format STX 05 B n ETX  
 Dec. Format [02][05][66] n [03]  $49 \leq n \leq 56$   
 Hex. Format [02h][05h][42h] n [03h]  $30h \leq n \leq 38h$   
 Description Change the display communication baud rate. The baud rate setting can be selected from 4800~115200 bps.

N	Baud rate	N	Baud rate
30h	9600 bps	37h	19200 bps
31h	4800 bps	38h	115200 bps
32h~35h	Reserved		
36h	38400 bps		

### 5.2 Parity Check Setting Command

**STX 05 P n ETX** Change the parity check  
 ASCII Format STX 05 P n ETX  
 Dec. Format [02][05][80] n [03]  $49 \leq n \leq 54$   
 Hex. Format [02h][05h][50h] n [03h]  $31h \leq n \leq 36h$   
 Description

n	Parity	n	Parity	n	Parity
31h	N-8-1	33h	E-8-1	35h	O-8-1
32h	N-7-1	34h	E-7-1	36h	O-7-1



### 5.3 Command Type Setting Command

STX 05 C n ETX	Change the command type
ASCII Format	STX 05 C n ETX
Dec. Format	[02][05][67] n [03] $49 \leq n \leq 56$
Hex. Format	[02h][05h][43h] n [03h] $30h \leq n \leq 38h$
Description	Change the command type and initialize the display

n	Command type	n	Command type
30h	DSP-800	35h	UTC/S
31h	ESC/POS	36h	UTC/P
32h	ADM788	37h	CD5220
33h	ADM787	38h	ICD2002
34h	AEDEX		

### 5.4 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] $48 \leq n \leq 63$
Hex. Format	[02h][05h][53h] n [03h] $30h \leq n \leq 3Fh$
Description	Change the display International character set

n	Character Set (20h–7Fh)	Code Table (80H–FFH)
30h	U.S.A.	PC-437 (USA, Standard Europe)
31h	France	PC-858
32h	Germany	
33h	U.K.	
34h	Denmark I	
35h	Sweden	
36h	Italy	
37h	Spain	
38h	Russia	WPC1251
39h	Norway	PC-858
3Ah	Denmark II	
3Bh	Slavonic	Slavonic
3Ch	Russia	Russia
3Dh	Japan	Katakana
3Eh	U.K.	Greek
3Fh	User Font	

## 5.5 Save Display Demo Data

ASCII Format	<STX> <ENQ> L <i>n</i> <i>d1...dm</i> <ETX>
Dec. Format	2, 5, 76, <i>n</i> , <i>d1.....dm</i> , 3 ( <i>n</i> =49 or 50, <i>d1...dm</i> : message data, maximum character is under 92)
Hex. Format	[02h][05h][4Ch] <i>n</i> <i>d1.....dm</i> [03h] ( <i>n</i> =31h or 32h)
Description	Save demo message for upper line and bottom line. <i>n</i> =31h : save data message for upper line, <i>n</i> =32h : save data message for lower line

## 5.6 Run Demo Data

ASCII Format	<STX> <ENQ> D <MD8> <ETX>
Dec. Format	2, 5, 68, 8, 3
Hex. Format	[02h][05h][44h][08][03h]
Description	Run the demo messages which were saved by <STX> <ENQ> L command for the display.

## 5.7 Reset EE-PROM Data

ASCII Format	<STX> <ENQ> <MD7> <i>n</i> <ETX>
Dec. Format	2, 5, 7, <i>n</i> , 3 <i>n</i> =49,50,51
Hex. Format	[02h][05h][07h] <i>n</i> [03h] <i>n</i> =31h,32h,33h
Description	This command will reset the content of EEP-ROM. <i>n</i> =31h, clear all EEP-ROM contents including default setting value <i>n</i> =32h, clear upper line data message <i>n</i> =33h, clear lower line data message

## CHAPTER 6

### COMMAND SET

#### 6.1 ESC/POS Mode Command Set

Command	Code (hex)	Function description
HT	09	Move cursor right.
BS	08	Move cursor left.
US LF	1F 0A	Move cursor up.
LF	0A	Move cursor down.
US CR	1F 0D	Move cursor to right-most position.
CR	0D	Move cursor to left-most position.
HOM	0B	Move cursor to home position.
US B	1F 42	Move cursor to bottom position.
US \$ x y	1F 24 x y 01h ≤ x ≤ 14h, y = 01h, 02h	Move cursor to specified position.
CAN	18	Clear cursor line.
CLR	0C	Clear display screen.
US X n	1F 58 n 01h ≤ n ≤ 04h (=brightest)	Brightness adjustment.
US E n	1F 45 n 00h ≤ n ≤ FFh	Blink display screen.
ESC @	1B 40	Initialize display.
ESC R n	1B 52 n 00h ≤ n ≤ 0Ch	Select international character set. <b>(see Table 5-A)</b>
ESC t n	1B 74 n n = 00h, 01h..07h, 10h, 13h	Select character code table. <b>(see Table 5-B)</b>
US r n	1F 72 n n = 00h, 01h	Select/Cancel reverse character. n = 01 select, n = 00 cancel
US # n m	1F 23 n m n = 00h, 01h, 01h < m ≤ 14h	Turn annunciate on/off n = 01 on, n = 00 off
US C n	1F 43 n n = 00h, 01h	Set cursor on/off n = 01 on, n = 00 off
US MD1	1F 01	Specify overwrite mode.
US MD2	1F 02	Specify vertical scroll mode.
US MD3	1F 03	Specify horizontal scroll mode.
US @	1F 40	Execute self-test.

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)
ESC & s n m [a(p1..pa)]x m- n+1	1B 26 1 n m [a(p1..pa)]x m-n+1 21h ≤ n ≤ m ≤ FFh; 1 ≤ a ≤ 5 p1..p5=row1...row5	Define download characters.
ESC ? n	1B 3F n 21h ≤ n ≤ FFh	Delete download characters.
ESC % n	1B 25 n n=00h, 01h	Select/cancel download character set. n=01 select, n=00 cancel
ESC W n s x1 y1 x2 y2	1B 57 n s x1 y1 x2 y2 1 ≤ n ≤ 4, s=00h,01h 01h ≤ x1 ≤ x2 ≤ 14h 01h ≤ y1 ≤ y2 ≤ 02h	Specify/cancel the window range. s=01 specify, 00 cancel n=select the window x= column position y= row position
ESC = n	1B 3D n n=01h, 02h, 03h	Select peripheral device. n=01h, select printer n=02h, select display n=03h, select printer + display
US :	1F 3A	Set starting/ending position of macro definition.
US ^ n m	1F 5E n m 00h ≤ n ≤ FFh 00h ≤ m ≤ FFh	Execute and quit macro. n=word time m=show string time
US T h m	1F 54 h m 00h ≤ h ≤ 17h 00h ≤ m ≤ 3bh	Display time
US U	1F 55	Display time continuously
<ESC>_n	1B 5F n	Set Cursor On/Off n=00h cursor off, n=01h cursor on
<ESC> Q A d1 d2 d3 ..... dn <CR>	1Bh 51h 41h d1 d2 d3 d4 ..... dn 0Dh	Write String Character to Upper Line

<ESC> Q B d1 d2 d3 ..... dn <CR>	1Bh 51h 42h d1 d2 d3 d4 ..... dn 0Dh	Write String Character to Lower Line
<ESC> Q D d1 d2 d3 ..... dn <CR>	1Bh 51h 44h d1 d2 d3 d4 ..... dn 0Dh	Upper Line Message Scroll Continuously

n	International Font
00h	U.S.A.
01h	France
02h	Germany
03h	U.K.
04h	Denmark I
05h	Sweden
06h	Italy
07h	Spain
08h	Japan
09h	Norway
0Ah	Denmark II
0Bh	Slavonic
0Ch	Russia

Table 5-A Select International font

n	Code Table (80H-FFH)
00h	Page 0, (PC437, USA standard Euro)
01h	Page 1, (Katakana)
02h	Page 2, (PC850, Multilingual)
03h	Page 3, (PC860, Portuguese)
04h	Page 4, (PC863, Canadian-French)
05h	Page 5, (PC865, Nordic)
06h	Page 6, (Slavonic)
07h	Page 7, (Russian)
08h	Page 8, (Greek)
10h	Page 16, (WPC1252)
13h	Page 19, (PC858, +Euro symbol)

Table 5-B Select code table

## 6.2 ADM787/788 Mode Command Set

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 31H ≤ n ≤ 37H	Set the period to the upper line last n position
DC1	11 n n=31h, 32h	Set line blinking, n=31h upper line; n=32h bottom line
DC2	12 n n=31h, 32h	Clear line blinking, n=31h upper line; n=32h bottom 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

### 6.3 EMAX (AEDEX) Mode Command Set

Command	Code (hex)	Function Description
! # 1 ... CR	21 23 31 [d1, d2...dn] 0D 1 ≤ n ≤ 20	Upper line display
! # 2 ... CR	21 23 32 [d1, d2...dn] 0D 1 ≤ n ≤ 20	Bottom line display
! # 4 ... CR	21 23 34 [d1, d2...dn] 0D 1 ≤ n ≤ 40	Upper line message scroll continuously
! # 5 ... CR	21 23 35 h1h2 ":" m1m2 0D ":"=3A 30h ≤ h1 ≤ 32h; 30h ≤ m1 ≤ 35h 30h ≤ h2, m2 ≤ 39h	Display time h=hour m=minute
! # 6 ... CR	21 23 36 [d1, d2...dn] 0D 1 ≤ n ≤ 64	Upper line message scroll once pass
! # 8 ... CR	21 23 38 n m 0D 20h ≤ n, m	Change attention code
! # 9 ... CR	21 23 39 [d1, d2...dn] 0D 1 ≤ n ≤ 40	Two line display

### 6.4 UTC Mode Command Set

#### UTC/S (STANDARD)

Command	Code (hex)	Function Description
BS	08	Back space
HT	09	Horizontal tab
LF	0A	Line feed
CR	0D	Carriage return
DLE	10 n 00h ≤ n ≤ 27h	Display cursor 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

COMMAND SET

**UTC/P (ENHANCED)**

Command	Code (hex)	Function Description
ESC u A ....CR	1B 75 41 [d1, d2...dn] 0D 1≤n≤20	Upper line display
ESC u B ....CR	1B 75 42 [d1, d2...dn] 0D 1≤n≤20	Bottom line display
ESC u D ....CR	1B 75 44 [d1, d2...dn] 0D 1≤n≤40	Upper line message scroll continuously
ESC u E ....CR	1B 75 45 h1h2 ":" m1m2 0D ":"=3A 30h≤h1≤32h; 30h≤m1≤35h 30h≤h2, m2≤39h	Display time hh= hour mm= minute
ESC u F ....CR	1B 75 46 [d1, d2...dn] 0D 1≤n≤40	Upper line message scroll once pass
ESC u H ....CR	1B 75 48 n m 0D 20h≤n, m	Change attention code
ESC u I ....CR	1B 75 49 [d1, d2...dn] 0D 1≤n≤40	Two line display
ESC RS ....CR	1B 0F 0D	Change to UTC standard mode

**6.5 CD5220 Mode Command Set**

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 QA ....CR	1B 51 41 [d1, d2...dn] 0D 1≤n≤20	Set the string display mode, write string to upper line <b>(see Note 1)</b>
ESC QB ....CR	1B 51 42 [d1, d2...dn] 0D 1≤n≤20	Set the string display mode, write string to bottom line <b>(see Note 1)</b>
ESC QD ....CR	1B 51 44 [d1, d2...dn]xm 0D m≤40	Upper line message scroll continuously <b>(see Note 2)</b>
ESC [ D	1B 5B 44	Move cursor left
BS	08	Move cursor left
ESC [ C	1B 5B 43	Move cursor right
HT	09	Move cursor right
ESC [ A	1B 5B 41	Move cursor up



## COMMAND SET

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 top-left position
CR	0D	Move cursor to top-left position
ESC [ R	1B 5B 52	Move cursor to top-right position
US CR	1F 0D	Move cursor to top-right position
ESC [ K	1B 5B 4B	Move cursor to bottom position
US B	1F 42	Move cursor to bottom position
US @	1F 40	Execute self test
US E n	1F 45 n n=00h~FFh	Blink display screen n=00h for no blink
ESC I x y	1B 6C x y $1 \leq x \leq 14h$ y=01h, 02h	Move cursor to specified position x= column position y= row position
US \$ x y	1F 24 x y $01h \leq x \leq 14h$ ; y=01h, 02h	Move cursor to specified position
ESC @	1B 40	Initialize display
ESC W s x1 x2 y	1B 57 s x1 x2 y $01h \leq x1 \leq x2 \leq 13h$ y=01h, 02h, s=00h, 01h	Set/Cancel the window range at horizontal scroll mode x= column position y= row position
CLR	0C	Clear display screen and clear string mode
CAN	18	Clear cursor line and clear string mode
ESC * n	1B 2A n $01h \leq n \leq 04h$ (=brightest)	Brightness adjustment
US X n	1F 58 n $01h \leq n \leq 04h$ (=brightest)	Brightness adjustment
ESC & s n m [a(p1..pa)]x (m-n+1)	1B 26 1 n m [a (p1..pa)] x (m-n+1) $20h \leq n \leq m \leq FFh$ $1 \leq a \leq 5$ p1...p5=row1...row5	Define download characters
ESC ? n	1B 3F	Delete download characters

COMMAND SET

ESC % n	1B 25 n n=00h, 01h	Select/Cancel download character set n=01 select, n=00 cancel
ESC _ n	1B 5F n n=00h, 01h	Set cursor on/off n=01 cursor on, n=00 cursor off
ESC f n	1B 66 n	Select international font set <b>(see Note 3)</b>
ESC c n	1B 63 n	Select code <b>(see Note 4)</b>
ESC = n	1B 3D n n=01, 02h, 03h	Select peripheral device n=01h, select printer n=02h, select display n=03h, select printer + display
ESC s 1	1B 73 01	Store the user defined character into EEPROM.
ESC d 1	1B 64 01	Download the user defined character from EEPROM.

**NOTE:**

1. While using the command "ESC Q A" or "ESC Q B", other commands cannot be used except for "CLR" or "CAN" to change the operating mode.
2. When using the 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 parameters of the international font set control 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 parameters of the code table control command "ESC c n".

Parameter "n"		International Font Set
'A'	41h	Compliance with ASCII code

'L'	4Ch	Compliance with SLOVONIC code
'R'	52h	Compliance with RUSSIA code

## 6.6 ICD-2002 Mode Command Set

Command	Code(hex)	Function Description			
<HT>	09h	Move cursor right (only valid in overwrite mode)			
<BS>	08h	Move cursor left (only valid in overwrite mode)			
<CR>	0Dh	Move cursor to left-end position (only valid in overwrite mode)			
<ESC> @	1Bh 40h	Initialize customer display to initial state			
<ESC> U	1Bh 55h	Select upper row as current row (initial default)			
<ESC> D	1Bh 44h	Select lower row as current row			
<ESC> C r c	1Bh 43h r c	Move cursor to specified position (only valid in overwrite mode) (r=55h: upper line, r=44h: lower line, 1≤c≤20 : column number)			
<ESC> E r n	1Bh 45h r n	Set special effect or display mode of specified row.			
		r	Select Row	n	Select Function
		58h	All rows	30h	shift mode (default display mode)
		55h	upper row	31h	rotation mode
		44h	lower row	32h	blink mode
		33h	clear this row and switch to shift mode		
		34h	overwrite mode		
		35h	vertical mode		
<ESC> R n	1Bh 52h n	Set international code set sets (n=30h:USA, n=31h:Germany, n=32h:France, n=33h:Japan)			
<ESC> % n	1Bh 25h n	Select/cancel character user defined character (n=0: canceled, n=1: selected)			
<ESC> = n	1Bh 3Dh n	Select Peripheral (n=1: printer, n=2: display)			
<ESC> & n s [p <sub>i</sub> ]*5	1Bh 26h n s data	Define user font pattern n=code for first character, s=code for last character 21h≤n≤s≤FFh, data=5 bytes required for each character			

## 6.7 DSP-800 Mode Command Set

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 ( <b>see Table 5-C</b> )
EOT SOH P n ETB	04 01 50 n 17 31h≤n≤58h	Move cursor to specified position
EOT SOH C n m ETB	04 01 43 n m 17 31h≤n≤m≤58h	Clear display range from n to m position and move cursor to n position
EOT SOH S n ETB	04 01 53 n 17 31h≤n≤35h	Save the current view data to n layer for demo display
EOT SOH D n m ETB	04 01 44 n m 17 31h≤n≤4Fh 31h≤m≤33h	Display the saved demo message ( <b>see Table 5-D</b> )
EOT SOH A n ETB	04 01 41 n 17 31h≤n≤34h	Brightness adjustment
EOT SOH F n ETB	04 01 46 n 17 00h≤n≤FFh	Blink display screen n=00h for no blink
EOT SOH & n [px5] ETB	04 01 26 n p1...p5 17 20h≤n≤FFh	Define download characters
EOT SOH ? n ETB	04 01 3F n 17 20h≤n≤FFh	Delete download characters
EOT SOH = n ETB	04 01 3D n 17 n=31h, 32h, 33h	Select peripheral device. n=31h, select printer n=32h, select display n=33h, select printer + display
EOT SOH % ETB	04 01 25 17	Initialize display
EOT SOH @ ETB	04 01 40 17	Execute self-test

COMMAND SET

n	International Font
30h	USA
31h	France
32h	Germany
33h	UK
34h	Denmark I
35h	Sweden
36h	Italy
37h	Spain
38h	Japan
39h	Norway
3Ah	Denmark II

Table 5-C International Font Set

n	Layer Select
bit 0=1	Layer 1
bit 1=1	Layer 2
bit 2=1	Layer 3
bit 3=1	Layer 4
bit 4=0	Layer 5

m	Show mode
bit 0=1	Show mode 1
bit 1=1	Show mode 2

Table 5-D Layer table for saving data

# CHAPTER 7

## CHARACTER SET

### 7.1 Character Code (20h-7Eh)

#### 7.1.1 USA Standard Character Set

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
20h		!	“	#	\$	%	&	'	(	)	*	+	,	-	.	/
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	{		}	~	

#### 7.1.2 International Character Set

Country	Hex Dec	Character Code Number											
		23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E
U.S.A		#	\$	@	[	\	]	^	`	{		}	~
France		#	\$	à	°	ç	§	^	`	é	ù	è	¨
Germany		#	\$	§	Ä	Ö	Ü	^	`	ä	ö	ü	β
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	\$	@	i	Ñ	¿	^	`	¨	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		#	\$	@	[	\	]	^	`	{		}	~
Portuguese		#	\$	@	[	\	]	^	`	{		}	~

## 7.2 Character Code Page (80h-FFh)

### 7.2.1 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	à	á	¿	¬	½	¼	ì	«	»	
B0H	☼	☽	☼		†	‡	†	‡	†	‡	†	‡	†	‡	†	‡
C0H	⊥	⊥	⊥	⊥	—	+	†	‡	⊥	⊥	⊥	⊥	⊥	—	+	⊥
D0H	⊥	⊥	⊥	⊥	⊥	⊥	⊥	+	+	⊥	⊥	■	■	■	■	■
E0H	α	β	Γ	π	Σ	σ	μ	τ	Φ	θ	Ω	δ	∞	ø	ε	∩
F0H	≡	±	≥	≤		J	÷	≈	°	•	·	√	ⁿ	²	■	SP

### 7.2.2 Page 1 PC737: 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	Τ	Υ	Φ	Χ	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									£					-		

### 7.2.3 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	ì	«	»
B0H	☼	☽	■		†	Á	Â	À	©	†	‡	†	‡	¢	¥	†
C0H	⊥	⊥	⊥	⊥	—	+	ã	Ã	⊥	⊥	⊥	⊥	⊥	—	+	×
D0H	ð	Ð	Ê	Ë	È	I	Í	Î	Ï	⊥	⊥	■	■	ì	ì	■
E0H	Ó	β	Ô	Ò	õ	Õ	μ	þ	þ	Ú	Û	Ù	ý	Ý	—	'
F0H	—	±	=	¾	¶	§	÷	,	°	¨	·	1	3	2	■	SP

### 7.2.4 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	ä	à	Á	ç	ê	Ê	è	ï	ô	ì	Ä	Å
90H	É	À	È	ô	ö	ò	ú	ù	ì	Ö	Ü	ø	£	ù	Pt	Ó
A0H	á	í	ó	ú	ñ	Ñ										
B0H																
C0H	L															
D0H																
E0H	α	β	Γ	π	Σ	σ	μ	τ	Φ	Θ	Ω	δ	∞	ø	ε	∩
F0H	≡	±	≥	≤			÷	≈	°	•	·	√	n	²	■	

### 7.2.5 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	Â	à		ç	ê	ë	è	ï	î	=	À	§
90H	É	È	Ê	ô	Ë	Ï	û	ù		Ô	Ü		£	Ù	Û	f
A0H		í		ó	ú											
B0H																
C0H	L															
D0H																
E0H	α	β	Γ	π	Σ	σ	μ	τ	Φ	Θ	Ω	δ	∞	ø	ε	∩
F0H	≡	±	≥	≤			÷	≈	°	•	·	√	n	²	■	

### 7.2.6 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		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										
B0H																
C0H	L															
D0H																
E0H	α	β	Γ	π	Σ	σ	μ	τ	Φ	Θ	Ω	δ	∞	ø	ε	∩
F0H	≡	±	≥	≤			÷	≈	°	•	·	√	n	²	■	



### 7.2.7 Page 6 Slavonic

	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	ı	ë	Õ	õ	î	ž	ä	Ć
90H	é	Ł	í	ô	ö	ł	ł	ś	ś	Ö	Ü	ł	ł	ł	x	č
A0H	á	í	ó	ú	ą	ą	ż	ż	ę	ę		ż	č	ş	«	»
B0H	☒	☒	☒		†	á	â	ě	Ş					z	z	
C0H					—	+	ă	ă						—		⌘
D0H	đ	Đ	Đ	Ě	ď	Ň	í	î	ě		■	■		ţ	Ů	■
E0H	Ó	β	Ô	ń	ń	ň	š	š	ř	Ú	ř	Ú	ý	Ý	ţ	
F0H	-	”	˘	ˇ	ˇ	ş	÷		°	˙	˙	ú	ř	ř	■	

### 7.2.8 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	Ё	ё	К	Н	θ	¥	Υ	h	ð	ƒ	k	H	θ	¥	Υ	

### 7.2.9 Page 19 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	ä	à	â	ç	ê	ë	è	ï	î	ì	Ä	Å
90H	É	æ	Æ	ô	ö	ò	û	ù	ÿ	Ö	Ü	ø	£	∅	×	f
A0H	á	í	ó	ú	ñ	Ñ	à	ó	ı	Ŕ	¬	½	¼	ı	«	»
B0H	☒	☒	☒		†	Á	Â	À	c	†		¬	┘	¢	¥	¬
C0H	┘	┘	┘	┘	—	+	ã	Ã	┘	┘	┘	┘	┘	┘	┘	⌘
D0H	ð	Đ	Ê	Ë	È	€	Í	Î	Ï	┘	┘	■	■	ı	ı	■
E0H	Ó	β	Ô	Ò	õ	Õ	μ	ρ	ρ	Ú	Û	Ù	ý	Ý	—	'
F0H	—	±	=	¾	¶	§	÷	,	°	˙	˙	1	3	2	■	NBSP

**7.2.10 Page 16 WPC1252: West European Latin**

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
80H	€	”	,	f	„	...	†	‡	^	‰	Š	‹	Œ		Ž	
90H		’	’	“	”	•	–	—	~	™	š	›	œ		ž	ÿ
A0H		ı	ç	£	¤	¥	¦	§	¨	©	ª	«	¬	-	®	-
B0H	°	±	²	³	´	µ	¶	·	¸	¹	º	»	¼	½	¾	¿
C0H	À	Á	Â	Ã	Ä	Å	Æ	Ç	È	É	Ê	Ë	Ì	Í	Î	Ï
D0H	Ð	Ñ	Ò	Ó	Ô	Õ	Ö	×	Ø	Ù	Ú	Û	Ü	Ý	Þ	ß
E0H	à	á	â	ã	ä	å	æ	ç	è	é	ê	ë	ì	í	î	ï
F0H	ð	ñ	ò	ó	ô	õ	ö	÷	ø	ù	ú	û	ü	ý	þ	ÿ

**7.2.11 Page 17 PC852: Latin2**

	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	Ő	ó	î	Ž	Ä	Ć
90H	É	Í	í	ô	ö	Ĺ	Ĳ	Ś	ś	Ö	Ü	Ť	ť	Ł	×	č
A0H	á	í	ó	ú	Ą	ą	Ż	ż	Ę	ę	¬	ž	Č	ş	«	»
B0H	⋮	⋱	⋲		†	Á	Â	Ë	Ş	‡	‖	⌈	⌋	Ž	ž	⌞
C0H	L	⊥	⊤	†	-	†	Ă	ă	Ł	⌈	⌋	⌈	⌋	=	‡	¤
D0H	đ	Đ	Ď	Ě	ď	Ň	í	î	ě	Ј	Г	■	■	Т	Ў	■
E0H	Ó	ß	Ô	Ń	ń	ñ	Š	š	Ř	Ú	ř	Ů	ý	Ý	‡	´
F0H	-	”	„	˘	˘	§	÷	¸	°	¨	·	ú	Ř	ř	■	

**7.2.12 Page 28: KATAKANA : JAPANESE**

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
80H	α	β	γ	Δ	Ε	η	θ	λ	μ	π	ρ	σ	τ	Φ	Ω	Σ
90H	£	§	IE	IR	∫	□	□	¹	²	³	×	½	1/	√	±	■
A0H		。	「	」	、	・	ヲ	ア	イ	ウ	エ	オ	ヤ	ユ	ヨ	ツ
B0H	一	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	□	□	≠	≡	∥		⊥	□	□	~	~	≡	〒	□	⊕	⊖

**7.2.13 WPC1251: Cyrillic (Slavic)**

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
80H	Ъ	Ѓ	,	ѓ	„	...	†	‡	€	‰	Љ	‹	Њ	Ќ	Ѕ	Ї
90H	ђ	‘	’	“	”	•	–	—		™	љ	›	њ	ќ	ѕ	ї
A0H		Ў	ў	Ј	Ѡ	Ґ	Ҁ	§	Ё	©	Є	«	¬	-	®	ї
B0H	°	±	І	і	Ҁ	μ	¶	·	ё	№	є	»	ј	Ѕ	ѕ	ї
C0H	А	Б	В	Г	Д	Е	Ж	З	И	Й	К	Л	М	Н	О	П
D0H	Р	С	Т	У	Ф	Х	Ц	Ч	Ш	Щ	Ъ	Ы	Ь	Э	Ю	Я
E0H	а	б	в	г	д	е	ж	з	и	й	к	л	м	н	о	п
F0H	р	с	т	у	ф	х	ц	ч	ш	щ	ъ	ы	ь	э	ю	я

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## CHAPTER 8

### Packing List

Item	P/N	Description	Qty	Dimension	KG
1	PDM-3500	VFD Pole Display Module	12/tray 48/carton	470*400*415 mm	9KG

### Carton side

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