# Table of Contents

# Chapter 1 Introduction

## 1.1 Features

The TD777 is TFT LCD Displays which display 20 columns and 2 lines, / 4 lines / 9 lines each columns is 24x24 pixel., also 480*234 pixel picture.

256 color is variable for customer.

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

The customer display have different height by adjusting the support.

The interface of customer display is RS-232C or USB, with baud rates from 9600 up to 19200 bps for TD777.

**Attention**

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

## 1.2 Outline

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

The standard customer display should include following accessories:

| *Item* | *Description* | *Dimension (mm)* | *Q'ty* |
|---|---|---|---|
| **1** | Panel of TD777 | 185*115*24 | 1 |
| **2** | Pole | 130 | 2 |
| **3** | D-SUB 9PIN RS-232 Cable | 1600 | 1 |
| **4** | **<TD777>**<br>+5V or +12V PC 4P Plug Power Kit ***or***<br>PS/2 Power Kit ***or***<br>USB Power Kit ***or***<br>100V~240V Universal Adapter (5V/2A) ***or***<br>110V US / 230V Europe 2P Adapter (5V/1A) | <br><br><br><br><br>46(W) x 85(D) x 31(H)<br>54(W) x 83(D) x 48(H) | 1 |

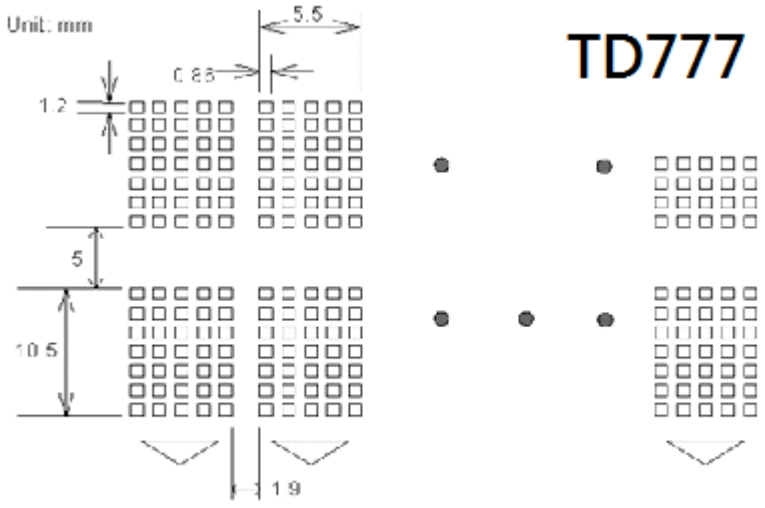
***※ Above accessories may be different due to customers' requirement when delivery.***

# Chapter 2 General Specification

## 2.1 Tube Display

### ( I ) TD777

| | |
|---|---|
| **Customer Display** | TFT LCD Color Display |
| **Display Pattern** | 24x24 pixel for character, 480x234 full picture |
| **Brightness** | 400 cd/m² |
| **Character Type** | 95 Alphanumeric & 32 International Characters |
| **Character Size** | 5.0 mm (W) x 7.0 mm (H) |
| **Character Number** | 20 x 2 / 20 x 4 / 20 x 9 |
| **Character Pitch** | Refer the figure 2.1 |



## 2.2 Electricity

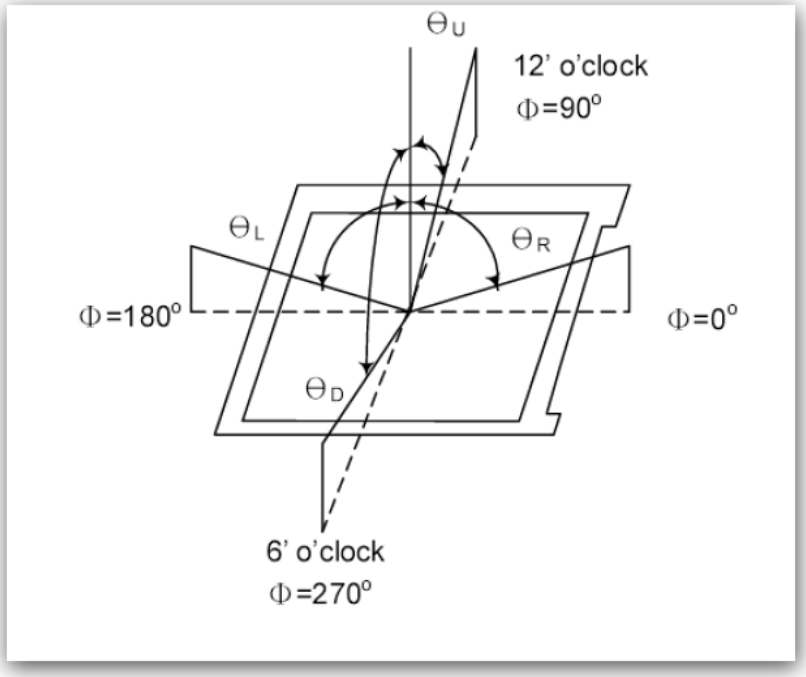
### ( I ) TD777

| | |
|---|---|
| **Central Control Unit** | CPU : STM32F101C8T6<br>ROM : 4 MB ROM<br>RAM : 1MB SRAM |
| **Speed** | CPU : 50 MHz |
| **Connector** | 9 PIN D-SUB Connector<br>6 PIN USB Connector |
| **Power Source** | DC +5V or +12V |
| **Power Consumption** | 3 Watts Average (Maximum 15 Watts) |

## 2.3 Overall Dimensions

| | |
|---|---|
| **Dimension of Panel LD220 :** | 165(H) x 100 (W) x 5.7 (D) |
| **Dimension of Base** | 160 x 100 x 35 |
| **Display Area** | 154.08 (H) x 86.58 (W) |
| **Horizontal Rotation** | 180° |
| **Weight** | 450g |

## 2.4 Viewing angel



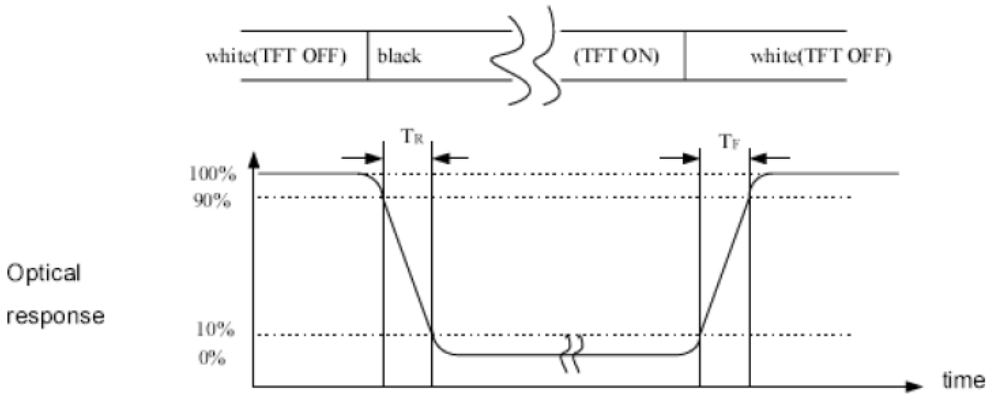
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Viewing angle | Hor. | $\theta_L$ | CR>10 | 50 | 60 | — | | |
| | | $\theta_R$ | | 50 | 60 | — | | |
| | Ver. | $\theta_U$ | | 30 | 40 | — | | |
| | | $\theta_D$ | | 50 | 60 | — | | |

Note:

1. Definition of Contrast Ratio (CR):
   Measured at the center point of panel

$$CR = \frac{\text{Luminace with all pixels white}}{\text{Luminance with all pixels black}}$$

2. Definaion of Response Time : Sum of $T_R$ and $T_F$




## 2.5 Environment

| | |
|---|---|
| **Operating Temperature** | -10℃ to +60℃ |
| **Storage Temperature** | -20℃ to +70℃ |

## 2.6 Driver Interface

| | |
|---|---|
| **Driver Interface** | RS232 |

## 2.7 User Setting

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

### 2.7.1 Function Setting

**No switch, all user setting is set up by Application Program (AP).**

**( I ) Baud Rate Select**

| Function Description Baud Rate (bps) |
|---|
| 9600 |
| 19200 |

**( II ) Command Type Select**

| Function Description | Software Defined |
|---|---|
| **Command Type** | **Hex Code** |
| ULTIMATE | 0A |
| LD540(LABAU) | 00 |
| EPSON | 01 |
| UTC Standard | 02 |
| UTC Enhance | 03 |
| AEDEX | 04 |
| ADM788 | 05 |
| DSP800 | 06 |
| CD5220 | 07 |
| EMAX | 08 |
| LOGIC CONTEOL | 09 |

## ( III ) International Character Set

| Function Description | |
|---|---|
| **International Character Set (Code 20H-7FH)** | **Code Table (Code 80H-FFH)** |
| U.S.A. | PC-437 (USA) (Standard European) |
| FRANCE | PC-850 (Multilingual) |
| GERMANY | PC-850 (Multilingual) |
| U.K. | PC-850 (Multilingual) |
| DENMARK I | PC-850 (Multilingual) |
| SWEDEN | PC-850 (Multilingual) |
| ITALY | PC-850 (Multilingual) |
| SPAIN | PC-850 (Multilingual) |
| JAPAN | Katakana |
| NORWAY | PC-865 (Nordic) |
| DENMARK II | PC-850 (Multilingual) |
| SLAVONIC/RUSSIAN | PC-437 (USA) (Standard European) |
| Factory Define | |
| Factory Define | |
| Factory Define | |
| Factory Define | |

# Chapter 3 Interface

## 3.1 Interface

### Specifications

Data Transmission Method : Asynchronous Serial.
Handshaking : DTR/DSR Control
Default Protocol : 9600/19200 bps, non-parity, 8 data bits, 1 stop bit.

### Communication Protocol

**1. Receive Data.**

The DTR signal is as follows:
[HIGH] This indicates that the display isn't ready to receive data.
It depend on the following conditions:

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

[LOW] This indicates that the display is ready to receive data.
It depend on the following conditions:

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

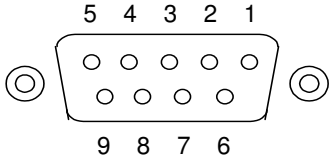
**2. Transmit Data.**

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

## 3.2 Interface Conversion Adapter

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

**( II ) Connector for Host Computer**




PIN Assignment

| Pin No. | Signal | I/O | Description |
|---|---|---|---|
| 1 | NC | | No Connection |
| 2 | TXD- | OUTPUT | Transmit Data |
| 3 | RXD | INPUT | Receive Data |
| 4 | DSR | INPUT | Data Set Ready |
| 5 | GND | | Power GND |
| 6 | DTR | OUTPUT | Data Terminal Ready |
| 7 | CTS | | Clear To Send |
| 8 | RTS | | Request to Send |
| 9 | By Selection | | N.C. or +5V ~ +12V |

# Chapter 4 Command Description

## 4.1 LD540 Command Set

### 4.1.1 LD540 Command Mode

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

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

r 58h=all rows
55h=upper row
44h=lower row

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

*** International Font Set Table**

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

### 4.1.2 EPSON Command Mode

| Command | Hex | Function Description |
|---|---|---|
| HT | 09 | Move cursor right |
| BS | 08 | Move cursor left |
| US LF | 1F 0A | Move cursor up |
| LF | 0A | Move cursor down |
| US CR | 1F 0D | Move cursor to right-most position |
| CR | 0D | Move cursor to left-most position |
| HOM | 0B | Move cursor to home position |
| US B | 1F 42 | Move cursor to bottom position |
| US $ x y | 1F 24 x y | Move cursor to specified position<br>1≦x(column)≦20 ; 1≦y(row)≦2 |
| US C n | 1F 43 n | Select/cancel cursor display<br>n=0, canceled ; n=1, selected |
| CLR | 0C | Clear display screen |
| CAN | 18 | Clear cursor line |
| US X n | 1F 58 n | Brightness adjustment<br>1≦n≦4 |
| US E n | 1F 45 n | Blink display screen<br>0≦n≦255 (n*50msec) ON / (n*50msec) OFF<br>n= 0, blinking is canceled<br>n=255, display is turned off |
| ESC @ | 1B 40 | Initialize display |
| ESC t n | 1B 74 n | Select character code table<br>0≦n≦5 ( Please refer ***"Chapter 5"*** ) |
| ESC R n | 1B 52 n | Select international character set<br>( Please refer ***International Font Set Table*** ) |
| US r n | 1F 72 n | Select/cancel reverse character<br>n=0, canceled ; n=1, selected |
| US MD1 | 1F 01 | Specify overwrite mode |
| US MD2 | 1F 02 | Specify vertical scroll mode |
| US MD3 | 1F 03 | Specify horizontal scroll mode |
| US . n | 1F 2E n | Specify period display<br>n= display character code |
| US , n | 1F 2C n | Specify comma display<br>n= display character code |
| US ; n | 1F 3B n | Specify semicolon (period+comma) display<br>n= display character code |
| US # n m | 1F 23 n m | Specify display annunciator,, turn the annunciator at "m" column on or off<br>n=0,1 (Off, On) ; 0≦m≦20 |

| | | |
|---|---|---|
| ESC & s n m [a(pl..p5)] (m-n+1) | 1B 26 s n m [a(pl..p5)](m -n+1) | Define download characters<br>s=1 ; 32≦n≦m≦126 ; a=5<br>( p1..p5 = pattern1..pattern5 ) |
| ESC ? n | 1B 3F n | Cancel user-defined characters<br>32≦n≦126 (n=character code) |
| ESC % n | 1B 25 n | Select/cancel download character set<br>n=0, canceled ; n=1, selected |
| ESC W n s (x1 y1 x2 y2) | 1B 57 n s (x1 y1 x2 y2) | Specify/cancel the window range<br>n=1,2,3,4 (four windows) ; s=0,1 (disable, enable)<br>1≦x1≦x2≦20 (column) ; 1≦y1≦y2≦2 (row) |
| ESC = n | 1B 3D n | Select peripheral device<br>n=1, printer ; n=2, display ; n=3, printer & display |
| US : | 1F 3A | Set starting/ending position of macro definition |
| US ^ n m | 1F 5E n m | Execute and quit macro<br>0≦(n,m)≦255<br>n: specifies the time interval for display of characters in units of [n* 50msec]<br>m: specifies the interval of macro execution every [m*50msec] |
| US @ | 1F 40 | Execute self-test |
| US T h m | 1F 54 h m | Display time<br>0≦h≦23 ; 0≦m≦59 |
| US U | 1F 55 | Display of time counter |

## * International Font Set Table

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

### ※ Specify decimal point, comma, semicolon, annunciator*

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

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

(2) **US # n m (annunciator):**

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

[ notes ] When n= 0, the annunciator at column m is turned off.
When n= 1, the annunciator at column m is turned on.
"m" specify column number (the most left column is column 1) at which annunciator to be turned on/off is placed.
When m = 0, all annunciators are turned on or off.

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

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

[n = 01h ], [ m = 03h ]
To turn off all the annunciators:
[n = 00h ], [ m = 00h ]

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

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

*** International Font Set Table**

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

**※ Specify decimal point, comma, semicolon, annunciator***

(3) **US . n (Decimal Point) / US , n (Comma) / US ; n (Semicolon):**
The displayed character codes are form 32(20h) to 127(7Eh), and 128(80h) to 255(FFh) in the character code table. The period/comma/semicolon displayed only for n. The period is not displayed for the subsequent display characters.

(4) **US # n m (annunciator):**
[ range ] n = 0(00h) or 1(01h) / m = 0(00h)~20(14h)
[ notes ] When n= 0, the annunciator at column m is turned off.
When n= 1, the annunciator at column m is turned on.
”m” specify column number (the most left column is column 1) at which annunciator to be turned on/off is placed.
When m = 0, all annunciators are turned on or off.
Once an annuciator(s) is turned on, it remains on until turned off by this command, the ESC@ or US@ command is executed, or the power is turned off.

[example]: To turn on the annunciator at the third column:
[n = 01h ], [ m = 03h ]
To turn off all the annunciators:
[n = 00h ], [ m = 00h ]

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

## 4.1.3 UTC Standard Command Mode

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

**Row Character Position Chart (Decimal)**

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

**Row Character Position Chart (Hex)**

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

## 4.1.4 UTC Enhance Command Mode

| Command | Hex | Function Description |
|---|---|---|
| ESC u A..CR | 1B 75 41 [data x 20] 0D | Upper line display |
| ESC u B..CR | 1B 75 42 [data x 20] 0D | Bottom line display |
| ESC u D..CR | 1B 75 44 [data x 45] 0D | Upper line message scroll continuously |
| ESC u E..CR | 1B 75 45 hh ':' mm 0D | Set and display 24 hour time<br>0≦h ,m≦9 |
| ESC u F..CR | 1B 75 46 [data x 45] 0D | Upper line message scroll once pass |
| ESC u H..CR | 1B 75 48 n m 0D | Change attention code<br>32≦n ,m<br>( Default attention code n=1Bh, m=75h ) |

| | | |
|---|---|---|
| ESC u 1..CR | 1B 75 49 [data x 40] 0D | Two line display |
| ESC RS..CR | 1B 0F 0D | Change to UTC standard mode |

### 4.1.5 AEDEX Command Mode

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

### 4.1.6 ADM788 Command Mode

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

### 4.1.7 DSP800 Command Mode

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

*** International Font Set Table**

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

### 4.1.8 CD5220 Command Mode

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

**(REMARK)**

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

*** International Font Set Table**

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

*** Select Code Table**

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

### 4.1.9 Ultimate Command Mode

Ultimate Command Mode means that it can recognize all the command in the customer display.
Like, you choose Ultimate Command set , but you use Epson or UTC etc., It can also use with the command.

### 4.2.0 Ultimate Command Mode

| Command | Hex | Function Description |
|---|---|---|
| FS 6 n | 1C36 n | Call n. Picture |
| FS 8 n | 1C38 n | Call n. Picutre 224640 byte |

# Chapter 5 Character Set

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

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20h | | ! | " | # | $ | % | & | ' | ( | ) | * | + | , | - | . | / |
| 30h | 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 | { | \| | } | ~ | |

## 5.2 International Character Selection

| No. | International | 23 | 24 | 40 | 5B | 5C | 5D | 5E | 60 | 7B | 7C | 7D | 7E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | U.S.A. | # | $ | @ | [ | \ | ] | ^ | ` | { | \| | } | ~ |
| 1 | FRANCE | # | $ | à | ° | Ç | § | ^ | ` | é | ù | è | ¨ |
| 2 | GERMANY | # | $ | § | Ä | Ö | Ü | ^ | ` | ä | ö | ü | β |
| 3 | U.K. | £ | $ | @ | [ | \ | ] | ^ | ` | { | \| | } | ~ |
| 4 | DENMARK I | # | $ | @ | Æ | Φ | Â | ^ | ` | æ | ø | â | ~ |
| 5 | SWEDEN | # | ¤ | É | Ä | Ö | Å | Ü | é | ä | ö | å | ü |
| 6 | ITALY | # | $ | @ | ° | \ | é | ^ | ù | à | ò | è | ì |
| 7 | SPAIN | ₧ | $ | @ | ¡ | Ñ | ¿ | ^ | ` | ¨ | ñ | } | ~ |
| 8 | JAPAN | # | $ | @ | [ | ¥ | ] | ^ | ` | { | \| | } | ~ |
| 9 | NORWAY | # | ¤ | É | Æ | Ø | Å | Ü | é | æ | ø | å | ü |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | DENMARK II | # | $ | É | Æ | Ø | Å | Ü | é | æ | ø | å | ü |
| 11 | SLAVONIC | # | $ | @ | [ | \ | ] | ^ | ` | { | \| | } | ~ |
| 12 | RUSSIA | # | $ | @ | [ | \ | ] | ^ | ` | { | \| | } | ~ |

## 5.3 Character Code Table

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

**00h – 7Fh**

| | 00h | 10h | 20h | 30h | 40h | 50h | 60h | 70h |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | 0 | @ | P | ` | p |
| 1 | | | ! | 1 | A | Q | a | q |
| 2 | | | " | 2 | B | R | b | r |
| 3 | | | # | 3 | C | S | c | s |
| 4 | | | $ | 4 | D | T | d | t |
| 5 | | | % | 5 | E | U | e | u |
| 6 | | | & | 6 | F | V | f | v |
| 7 | | | ' | 7 | G | W | g | w |
| 8 | | | ( | 8 | H | X | h | x |
| 9 | | | ) | 9 | I | Y | i | y |
| A | | | * | : | @ | Z | j | z |
| B | | | + | ; | A | [ | k | { |
| C | | | , | < | B | \ | l | \| |
| D | | | - | = | C | ] | m | } |
| E | | | . | > | D | ^ | n | ~ |
| F | | | / | ? | E | _ | o | |

*To be continued on next page…*

**80h – FFh**

| | 80h | 90h | A0h | B0h | C0h | D0h | E0h | F0h |
|---|---|---|---|---|---|---|---|---|
| 0 | Ç | É | á | ▒ | └ | ╨ | α | ≡ |
| 1 | ü | æ | í | ▒ | ┴ | ╤ | ß | ± |
| 2 | é | Æ | ó | ▒ | ┬ | ╥ | Γ | ≥ |
| 3 | â | ô | ú | ▒ | ├ | ╙ | π | ≤ |
| 4 | ä | ö | ñ | ▒ | ─ | ╘ | Σ | ⌠ |
| 5 | à | ò | Ñ | ▒ | ┼ | ╒ | σ | ⌡ |
| 6 | å | û | ª | ▒ | ╞ | ╓ | µ | ÷ |
| 7 | ç | ù | º | ▒ | ╟ | ╫ | τ | ≈ |
| 8 | ê | ÿ | ¿ | ▒ | ╚ | ╪ | Φ | ° |
| 9 | ë | Ö | ⌐ | ▒ | ╔ | ┘ | Θ | ∙ |
| A | è | Ü | ¬ | ▒ | ╩ | ┌ | Ω | · |
| B | ï | ¢ | ½ | ▒ | ╦ | ▒ | δ | √ |
| C | î | £ | ¼ | ▒ | ╠ | ▬ | ∞ | n |
| D | ì | ¥ | ¡ | ▒ | ═ | ▮ | φ | 2 |
| E | Ä | ₱ | « | ▒ | ╬ | ▐ | ε | ■ |
| F | Å | ƒ | » | ▒ | ╧ | ▪ | ∩ | |

### 5.3.2 Page 1 (PC863: Canadian-French)

| | 80h | 90h | A0h | B0h | C0h | D0h | E0h | F0h |
|---|---|---|---|---|---|---|---|---|
| 0 | Ç | É | ¦ | ▒ | └ | ╨ | α | ≡ |
| 1 | ü | È | ´ | ▒ | ┴ | ╤ | ß | ± |
| 2 | é | Ê | ó | ▒ | ┬ | ╥ | Γ | ≥ |
| 3 | â | ô | ú | │ | ├ | ╙ | π | ≤ |
| 4 | Â | Ë | ¨ | ┤ | ─ | ╘ | Σ | ⌠ |
| 5 | à | Ï | ¸ | ╡ | ┼ | ╒ | σ | ⌡ |
| 6 | ¶ | û | ³ | ╢ | ╞ | ╓ | µ | ÷ |
| 7 | ç | ù | ¯ | ╖ | ╟ | ╫ | τ | ≈ |
| 8 | ê | ¤ | Î | ╕ | ╚ | ╪ | Φ | ° |
| 9 | ë | Ô | ⌐ | ╣ | ╔ | ┘ | Θ | ∙ |
| A | è | Ü | ¬ | ║ | ╩ | ┌ | Ω | · |
| B | ï | ¢ | ½ | ╗ | ╦ | ▒ | δ | √ |
| C | î | £ | ¼ | ╝ | ╠ | ▬ | ∞ | n |
| D | ‗ | Ù | ¾ | ╜ | ═ | ▐ | φ | 2 |
| E | À | Û | « | ╛ | ╬ | ▌ | ε | ■ |
| F | § | ƒ | » | ┐ | ╧ | ▀ | ∩ | |

### 5.3.3 Page 2 (Japanese Katakana)

| | 80h | 90h | A0h | B0h | C0h | D0h | E0h | F0h |
|---|---|---|---|---|---|---|---|---|
| 0 | ▬ | ▌ | | ▬ | タ | ミ | □ | 日 |
| 1 | ▬ | ▌ | ・ | ア | チ | ム | ■ | 月 |
| 2 | ▬ | ▌ | 「 | イ | ツ | メ | ■ | 火 |
| 3 | ▬ | ▌ | 」 | ウ | テ | モ | ○ | 水 |
| 4 | ▬ | ▌ | 、 | エ | ト | ヤ | ● | 木 |
| 5 | ▬ | ▒ | ・ | オ | ナ | ユ | ◇ | 金 |
| 6 | ▬ | ▒ | ヲ | カ | ニ | ヨ | ◆ | 土 |
| 7 | ▬ | → | フ | キ | ヌ | ラ | ◆ | 年 |
| 8 | ▬ | ← | ィ | ク | ネ | リ | ▶ | 円 |
| 9 | ▬ | ↑ | ゥ | ケ | ノ | ル | ◀ | 分 |
| A | ▬ | ↓ | ェ | コ | ハ | レ | ▲ | 人 |
| B | ▬ | × | ォ | サ | ヒ | ロ | ▼ | 大 |
| C | ▌ | ÷ | ャ | ッ | フ | ワ | 《 | 中 |
| D | ▌ | ± | ュ | ス | ヘ | ン | 》 | 小 |
| E | ▌ | ≦ | ▬ | セ | ホ | “ | ½ | 〒 |
| F | ▬ | ≧ | ッ | ソ | マ | ° | ¼ | ℃ |