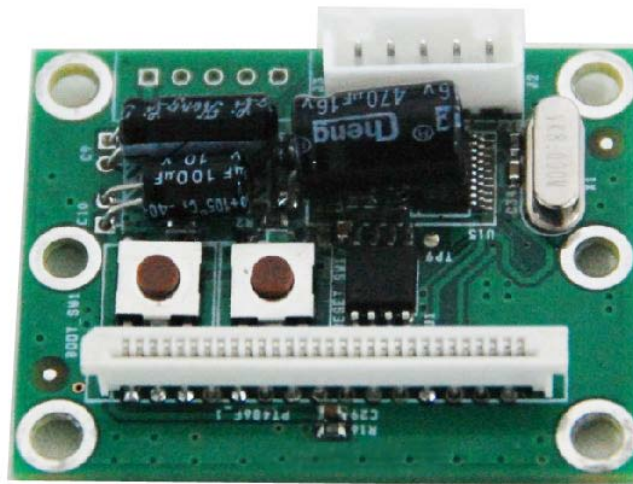


# PT486F

## Control board specifications



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## REVISION RECORDS

[illegible]

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### 1.Characters

TCB series Print control board is designed specifically for thermal printer control board.It has the following characteristics:

- 1.1 Print device built GBK Chinese character, completely remove the uncommon word distress.
- 1.2. High speed printing, low noise.
- 1.3. Power supply: 5V-9V.
- 1.4. Machine size is small, easy to install.

### 2. Operation precautions

- 2.1 When you install control board, please pay attention to static electricity control, do not touch parts and circuits, and take the edge of board by hand.



(√)



(×)

- 2.2 While plug and pull cable, please keep connecting finger of cable and socket are in a parallel position.



(√)



(×)

- 2.3 While plug and pull cable, please ensure the power is off.

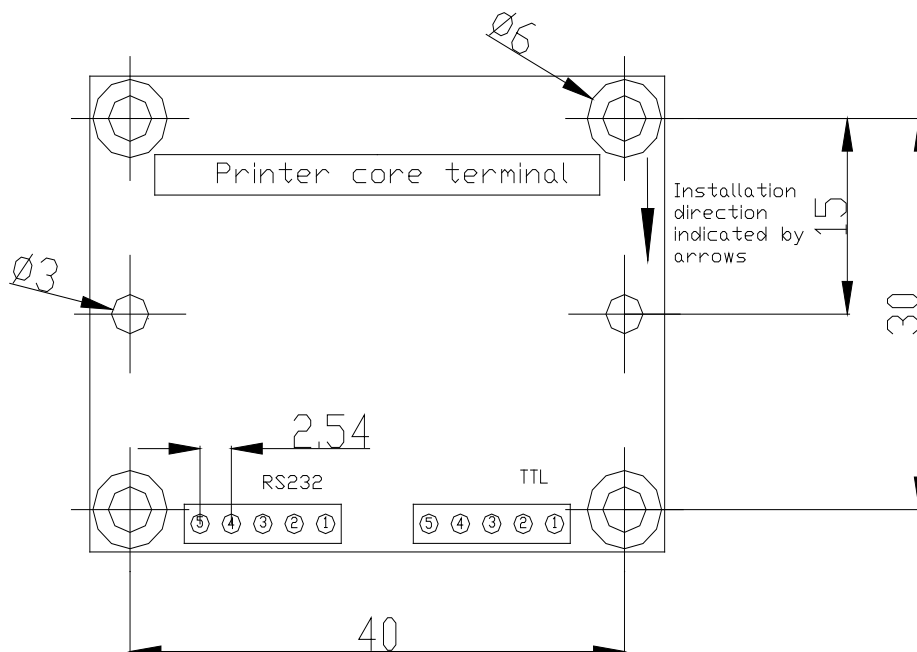
- 2.4 Please notice that no foreign matters close to PCB, in order to avoid short circuit.

### 3.How to use

After power up, hold down the BOOT\_SW1 for 2 seconds, one test page will be printed.

### 4. Dimension figure

[Unit: mm]



## 5. Pin assignments

### 5.1 Head connector pin assignment

No.	Signal Name	No.	Signal Name
1	PHK	16	TM
2	VSEN	17	TM
3	PHE	18	STB3
4	N.C(101)SW1(103)	19	STB2
5	N.C(101)SW2(103)	20	STB1
6	VH	21	GND
7	VH	22	GND
8	DI	23	$\overline{\text{LAT}}$
9	CLK	24	DO
10	GND	25	VH
11	GND	26	VH
12	STB6	27	MT/A
13	STB5	28	MT/ $\overline{\text{A}}$
14	STB4	29	MT/B
15	VDD	30	MT/ $\overline{\text{B}}$

### 5.2. Signal interface pin assignment

No.	Signal Name
1	VIN
2	$\overline{\text{RTS}}$
3	$\overline{\text{TXD}}$
4	$\overline{\text{RXD}}$
5	GND

**6. Electrical characteristics**

Parameter	Symbol	Test conditions	Recommendations			Unit
			Min.	Typ.	Max.	
Supply voltage	$V_{dd}$		2.7	3.3	5.25	V
	$V_H$		---	---	8.5	V
Input voltage for logic	$V_{IH}$		0.8*Vdd	---	Vdd	V
	$V_{IL}$		0	---	0.2*Vdd	V
Clock frequency	$f_{CLK}$	Duty 50%	---	---	10	MHz

**7 Printing command set****7.1 Command List**

Type	Command	Name
Print command	LF	Print and line feed
	HT	Horizontal tab
	FF	Print and feed marked paper to print starting position
	ESC J n	Print and feed paper
	ESC FF	Print and feed marked paper to print starting position
	ESC d n	Print and feed n lines
Line spacing Command	ESC 2	Select default line spacing
	ESC 3 n	Set line spacing
	ESC a n	Select align mode
	GS L nL nH	Set left margin
	ESC \$	Set absolute print position
	ESC \	Set relative print position
Character Command	ESC ! n	Select print mode(s)
	GS ! n	Select character size
	ESC E n	Turn emphasized mode on/off
	ESC SP n	Set right-side character spacing
	ESC SO	Turn double width on
	ESC R	Select and internation character set
	ESC t	Select character code table
	ESC DC4	Turn double width off
	ESC { n	Turn upside-down printing mode on/off
	GS B n	Turn white/black reverse printing mode on/off
	ESC V n	Turn clockwise rotation mode on/off
	ESC - n	Turn underline mode on/off

Bit Image Command	ESC *	Select bit-image mode
	GS /	Print downloaded bit image
	GS *	Define downloaded bit image
	GS v 0	Print raster bit image
	FS p n m	Print NV bit image
Init Command	ESC @	Initialize printer
Status Command	ESC v n	Transmit paper sensor status
Bar Code Command	GS H	Select printing position for HRI characters
	GS h	Set bar code height
	GS x	Set left margin of bar code printing
	GS w	Set bar code width
	GS k	Print bar code
Control board parameters command	DC2 C n	Set serial port baud rate
	DC2 F	Font Download
	DC2 # n	Set Print Density
	DC2 T	Print a test page

## 7.2 Command detail

TCB thermal printer control board use ESC/POS command set.

The printing command is described as followed format:

CMD	Function
Format	ASCII List by ASCII characters Decimal List by decimal characters Hexadecimal List by hexadecimal characters
Description	Command function description
Example	Command use example

### 7.2.1 Print Commands

LF	Print and line feed
Format	ASCII LF Decimal 10 Hex 0A
Description	LF prints the data in the print buffer and feeds one line. When the print buffer is empty, LF feeds one line.
HT	Horizontal tab
Format	ASCII HT Decimal 9 Hex 09
Description	Moves the print position to the next horizontal tab position. Horizontal tab position is 8 characters starting position.



FF			Print and feed marked paper to print starting position
Format	ASCII	HT	
	Decimal	12	
	Hex	0C	
Description	Prints the data in the print buffer and feeds marked paper to the print starting position.		

ESC J n			Print and feed paper
Format	ASCII	ESC J n	
	Decimal	27 74 n	
	Hex	1B 4A n	
Description	n = 0-255.		
	Prints the data in the print buffer and feeds n dots.		
	The command will not change the setting set by command ESC 2, ESC 3.		

ESC FF		Print and feed marked paper to print starting position
Format	ASCII	ESC FF
	Decimal	27 12
	Hex	1b 0C
Description	Prints the data in the print buffer and feeds marked paper to the print starting position.	

ESC d n			Print and feed n lines
Format	ASCII	ESC d n	
	Decimal	27 100 n	
	Hex	1B 64 n	
Description	n = 0-255.		
	Prints the data in the print buffer and feeds n characters.		

## **7.2.2 Line spacing setting command**

ESC 2		Select default line spacing
Format	ASCII	ESC 2
	Decimal	27 50
	Hex	1B 32
Description	Sets the line space to 4mm, 32dots.	

ESC 3 n			Set line spacing
Format	ASCII	ESC 3 n	
	Decimal	27 51 n	
	Hex	1B 33 n	
Description	n = 0-255		
	Sets the line spacing to n dots.		
	The default value is 32 dots.		

<b>ESC a n</b>		<b>Select align mode</b>
Format	ASCII	ESC a n
	Decimal	27 97 n
	Hex	1B 61 n

Description	Default is 0 $0 \leq n \leq 2$ or $48 \leq n \leq 50$ Align left: $n=0,48$ Align middle: $n=1,49$ Align right: $n=2,50$
-------------	---

<b>GS L nL nH</b>		<b>Set left margin</b>
Format	ASCII	GS L nL nH
	Decimal	29 76 nL nH
	Hex	1D 4C nL nH

Description	Sets the left margin using nL and nH. The left margin is set to $[(nL + nH \times 256) \times 0.125 \text{ mm}]$ .
-------------	---

<b>ESC \$ nL nH</b>		<b>Set absolute print position</b>
Format	ASCII	ESC \$ nL nH
	Decimal	27 36 nL nH
	Hex	1B 24 nL nH

Range	$\leq nL \leq 255$ ; $0 \leq nH \leq 255$
-------	---

Description	The distance from the beginning of the line to the print position is $[(nL + nH \times 256) \times 0.125 \text{ mm}]$
-------------	--

Notes	Settings outside the specified printable area are ignored.
-------	--

<b>ESC \ nL nH</b>		<b>Set relative print position</b>
Format	ASCII	ESC \ nL nH
	Decimal	27 92 nL nH
	Hex	1B 5C nL nH

Range	$\leq nL \leq 255$ ; $0 \leq nH \leq 255$
-------	---

Description	Sets the print starting position based on the current position using horizontal or vertical motion units. This command sets the distance from the current position to $[(nL + nH \times 256) \times 0.125 \text{ mm}]$
-------------	--

Notes	<ul style="list-style-type: none"> <li>Any setting that exceeds the printable area is ignored.</li> <li>When pitch N is specified to the right:  <math>nL + nH \times 256 = N</math>  When pitch N is specified to the left (the negative direction), use the complement of 65536.  When pitch N is specified to the left:  <math>nL + nH \times 256 = 65536 - N</math></li> <li>Print starting position from current position to <math>[N \times 0.125 \text{ mm}]</math>.</li> </ul>
-------	--

**7.2.3 Character command****ESC ! n** **Select print mode**

Format	ASCII	ESC ! n
	Decimal	27 33 n
	Hex	1B 21 n

Description      The default value is 0. This command is effective for all characters.

BIT0: Character font selected.

BIT1: Reserved.

BIT2: Reserved.

BIT3: 1:Emphasized mode selected

BIT4: 1:Double Height mode selected

BIT5: 1:Double Width mode selected

BIT6: 1:Deleteline mode selected

BIT7: 1:Underline mode selected

**ESC E n** **Turn emphasized mode on/off**

Format	ASCII	ESC ! n
	Decimal	27 69 n
	Hex	1B 45 n

Description      Only the least significant bit of n is enabled.  
                          When the LSB of n is 0, emphasized mode is turned off.  
                          When the LSB of n is 1, emphasized mode is turned on.

**ESC SP n** **Set right-side character spacing**

Format	ASCII	ESC SP n
	Decimal	27 32 n
	Hex	1B 20 n

Description      n is the spacing between two characters. The default value is 0.

**ESC SO** **Select Double Width mode**

Format	ASCII	ESC SO
	Decimal	27 14
	Hex	1B 0E

Description      Select Double Width mode  
                          To turn double width off, use LF or DC4 command.

**ESC R n** **Select an international character set**

Format	ASCII	ESC R n
	Decimal	27 82 n
	Hex	1B 52 n

Description Selects international character set n from the following table:

n	International
0	U.S.A.
1	France
2	Germany
3	U.K.
4	Denmark I
5	Sweden
6	Italy
7	Spain I
8	Japan
9	Norway
10	Denmark II
11	Spain II
12	Latin
13	Korea
14	Slovenia / Croatia
15	China

**ESC t n** **Select character code table**

Format	ASCII	ESC t n
	Decimal	27 116 n
	Hex	1B 74 n

Description The range is  $0 \leq n \leq 47$ .

When the n value is out of the specified range , the command is ignored.

Select character code table is n.

n	Code Page	n	Code Page
0	CP437 [U.S.A., Standard Europe]	24	CP737 [Greek]
1	Katakana	25	WCP1257 [Baltic]
2	CP850 [Multilingual]	26	Thai
3	CP860 [Portuguese]	27	CP720[Arabic]
4	CP863 [Canadian-French]	28	CP855
5	CP865 [Nordic]	29	CP857[Turkish]
6	WCP1251 [Cyrillic]	30	WCP1250[Central Eurpoe]
7	CP866 Cyrillic #2	31	CP775
8	MIK[Cyrillic /Bulgarian]	32	WCP1254[Turkish]

9	CP755 [East Europe, Latvian 2]	33	WCP1255[Hebrew]
10	Iran	34	WCP1256[Arabic]
11	reserve	35	WCP1258[Vietnam]
12	reserve	36	ISO-8859-2[Latin 2]
13	reserve	37	ISO-8859-3[Latin 3]
14	reserve	38	ISO-8859-4[Baltic]
15	CP862 [Hebrew]	39	ISO-8859-5[Cyrillic]
16	WCP1252 Latin I	40	ISO-8859-6[Arabic]
17	WCP1253 [Greek]	41	ISO-8859-7[Greek]
18	CP852 [Latina 2]	42	ISO-8859-8[Hebrew]
19	CP858 Multilingual Latin I +Euro)	43	ISO-8859-9[Turkish]
20	Iran II	44	ISO-8859-15 [Latin 3]
21	Latvian	45	Thai2
22	CP864 [Arabic]	46	CP856
23	ISO-8859-1 [West Europe]	47	Cp874

**ESC DC4****Disable Double Width mode**

Format	ASCII	ESC DC4
	Decimal	27 20
	Hex	1B 14

Description      Disable Double Width mode

**ESC { n****Set/Cancel Character Updown mode**

Format	ASCII	ESC {	n
	Decimal	27	123 n
	Hex	1B	7B n

Description      n=1:Enable Updown mode  
                       n=0:Disable Updown Mode  
                       Default value is 0

**GS B n****Turn white/black reverse printing mode on/off**

Format	ASCII	ESC B	n
	Decimal	29	66 n
	Hex	1D	42 n

Description      n=1:Enable white/black reverse mode  
                       n=0:Disable white/black reverse mode  
                       Default value is 0.

**ESC V n** **Turn clockwise rotation mode on/off**

Format	ASCII	ESC V n
	Decimal	27 86 n
	Hex	1B 56 n

Description Range is  $0 \leq n \leq 2$ .

n is used as follows:

n	Function
0	Turns off clockwise rotation mode
1	Turns on 90°clockwise rotation mode
2	Turns on 180°clockwise rotation mode

**ESC – n** **Turn underline mode on/off**

Format	ASCII	ESC - n
	Decimal	27 45 n
	Hex	1B 2D n

Description Range is  $0 \leq n \leq 2$ ,  $48 \leq n \leq 50$

n	Function
0,48	Turns off underline mode.
1,49	Turns on underline mode (1 dot thick)
2,50	Turns on underline mode (2 dots thick)

**7.2.4 Bit Image Command****ESC \* m n1 n2 d1 d2...dk** **Select bit-image mode**

Format	ASCII	ESC * m n1 n2 d1 d2 ... dk
	Decimal	27 42 m n1 n2 d1 d2 ... dk
	Hex	1B 2A m n1 n2 d1 d2 ... dk

Description

This command selects a bit image mode using m for the number of dots specified by  $(nL+nH*256)$

$m=0,1,32,33$ .

$n1=0-255$

$n2=0-3$

$dx=0-255$

$k = n1+256*n2$  ( $m=0,1$ )

$k = (n1+256*n2)*3$  ( $m=32,33$ )

The modes selected by m are as follows:

0: 8dots single density

1: 8dots double density

32:24 dots single density

33:24 dots double density

<b>GS / n</b>		<b>Print downloaded bit image</b>
Format	ASCII	GS / n
	Decimal	29 47 n
	Hex	1D 2F n

**Description**

This command prints a downloaded bit image using the mode specified by n as specified in the chart. In standard mode, this command is effective only when there is data in the print buffer. This command is ignored if a downloaded bit image has not been defined.

n=0-3、48-51: Specify bit image mode

n	Pattern Mode	Vertical DPI	Horizontal DPI
0,48	Normal	203DPI	203DPI
1,49	Double width	203DPI	101DPI
2,50	Double height	101DPI	203DPI
3,51	Quadruple	101DPI	101DPI

<b>GS * n1 n2 d1...dk</b>		<b>Define downloaded bit image</b>
Format	ASCII	GS * n1 n2 d1 ... dk
	Decimal	29 42 n1 n2 d1 ... dk
	Hex	1D 2A n1 n2 d1 ... dk

**Description**

When this command is executed, all user-defined characters are deleted.

Defines the downloaded bit image in the downloaded graphic area.

n1 =1~48(width), n2=1~8(height), k=n1×n2×8

The downloaded bit image is effective Until restart or re-defined.

The sequence of bit image is Longitudinal modulus. High byte in the first .

<b>GS v 0 p wL wH hL hH</b>		<b>Print raster bit image</b>
Format	ASCII	GS v 0 p wL wH hL hH d1 ... dk
	Decimal	29 118 48 p wL wH hL hH d1 ... dk
	Hex	1D 76 30 p wL wH hL hH d1 ... dk

**Description**

p: Print bit image format

Bit 0=1, double width

Bit 0=0, single width

Bit 1=1, double width

Bit 1=0, single width

wL, wH, select the number of data bytes (wL+wH×256) in the horizontal direction for the bit image.

hL, hH, select the number of data bits (hL+hH×256) in the vertical direction for the bit image.

The bit image Uses MSB format. The top bits in the left side of

the print position. The data sent in the first in the left side of the print position.

FS p n m			Print NV bit image
Format	ASCII	FS p n m	
	Decimal	1C 70 n m	
	Hex	28 112 n m	
Description	<ul style="list-style-type: none"> <li>• n is the number of the NV bit image</li> <li>• m specifies the bit image mode.</li> </ul>		

m	Mode	Vertical Dot Density	Horizontal Dot Density
0,48	Normal	203.2 dpi	203.2 dpi
1,49	Double-width	203.2 dpi	101.6 dpi
2,50	Double-height	101.6 dpi	203.2 dpi
3,51	Quadruple	101.6 dpi	101.6 dpi

- NV bit image is a bit image defined in non-volatile memory by **FS q** and printed by **FS p**.
- This command is not effective when the specified NV bit image has not been defined.
- In standard mode, this command is effective only when there is no data in the print buffer.
- This command is not affected by print modes (emphasized, double-strike, underline, character size, white/black reverse printing, or 90° rotated characters, etc.), except upside-down printing mode.
- If the downloaded bit-image to be printed exceeds one line, the excess data is not printed.
- If the printing area width set by **GS L** and **GS W** for the NV bit image is less than one vertical line, the following processing is performed only on the line in question.
  - ① The printing area width is extended to the right in NV bit image mode up to one line vertically. In this case, printing does not exceed the printable area.
  - ② If the printing area width cannot be extended by one line vertically, the left margin is reduced to accommodate one line vertically.

FS q n [xL xH yL yH d1...dk]1...[xL xH yL yH d1...dk]		Define NV bit image
Format	ASCII	FS q n n [xL xH yL yH d1...dk]...[ xL xH yL yH d1...dk]
	Decimal	28 113 n [xL xH yL yH d1...dk]...[ xL xH yL yH d1...dk]
	Hex	1C 71 n [xL xH yL yH d1...dk]...[ xL xH yL yH d1...dk]
Description	$1 \leq (xL + xH \times 256) \leq 1023$ $1 \leq (yL + yH \times 256) \leq 800$ $0 \leq d \leq 255$ $k = (xL + xH \times 256) \times (yL + yH \times 256) \times 8$ The entire capacity size = 64 KB, Single up to 40K. Defines the NV bit image in the NV graphics area: <ul style="list-style-type: none"><li>• n specifies the number of defined NV bit images.</li><li>• xL, xH specify the number of bytes in the horizontal direction as <math>(xL + xH \times 256) \times 8</math>.</li></ul>	



	<ul style="list-style-type: none"> <li>• yL, yH specify the number of bytes in the vertical direction as ( yL + yH × 256) × 8.</li> </ul>
--	---

<b>ESC @</b>	<b>Initialize printer</b>
--------------	---------------------------

Format	ASCII    ESC @ Decimal   27 64 Hex        1B 40
Description	Initializes the printer. ➤ The print buffer is cleared. ➤ Reset the param to default value. ➤ return to standard mode ➤ Delete user-defined characters

**7.2.5 Status Command**

<b>ESC v</b>	<b>Transmit paper sensor status</b>
--------------	-------------------------------------

Format	ASCII    ESC v n Decimal   27 118 n Hex        1B 76 n
Description	Transmits the status of the paper sensor as 1 byte of data. The status byte definition: Return P stands for paper status For example: Send hexadecimal : 1B 76 50, return to 00 stands for paper is ready, return to 01 stands for the lack of paper.

**7.2.6 Bar Code Command**

<b>GS H n</b>	<b>Select printing position for HRI characters</b>
---------------	--

Format	ASCII    GS H n Decimal   29 72 n Hex        1D 48 n
Description	0 ≤ n ≤ 255 n selects the printing position as follows: 0: Not printed 1: Above the barcode 2: Below the barcode 3: Both above and below the barcode

### GS h n Set bar code height

Format	ASCII	GS h n
	Decimal	29 104 n
	Hex	1D 68 n

Description Sets the height of the bar code.  
 $1 \leq n \leq 255$   
 n specifies the number of dots in the vertical direction.  
 The default value is 50 .

### GS x n Set left margin of bar code printing

Format	ASCII	GS x n
	Decimal	29 120 n
	Hex	1D 78 n

Description Print bar code starting position from 0 to 255

### GS w n Set bar code width

Format	ASCII	GS w n
	Decimal	29 119 n
	Hex	1D 77 n

Description Sets the horizontal size of the bar code.  
 $n = 2, 3, 4$   
 The default value is 2

### GS k m d1 d2 ... dk NUL Print barcode symbology

GS k m n d1 d2 ... dn				
Format	ASCII	GS k m	d1 d2 ... dk NUL	
1	Decimal	29 107 m	d1 d2 ... dk 0	
	Hex	1D 6B m	d1 d2 ... dk 00	
Format	ASCII	GS k m n	d1 d2 ... dn	
2	Decimal	29 107 m n	d1 d2 ... dn	
	Hex	1D 6B m n	d1 d2 ... dn	

Description m: bar code type  
 Format 1:  $0 \leq m \leq 10$   
 Format 2:  $65 \leq m \leq 75$   
 n: bar code length

m	Bar code system	Number of characters	Remarks
0,65	UPC-A	11,12	48-57
1,66	UPC-E	11,12	48-57
2,67	EAN13	12,13	48-57
3,68	EAN8	7,8	48-57

4,69	CODE39	>1	32,36,37,43,45-57,65-90
5,70	I25	>1 even number	48-57
6,71	CODEBAR	>1	36,43,45-58,65-68
7,72	CODE93	>1	0-127
8,73	CODE128	>1	0-127
9,74	CODE11	>1	48-57
10,75	MSI	>1	48-57

**7.2.7 Control board parameters command****DC2 C n****Set serial port baud rate**

Format	ASCII	DC2 C n
	Decimal	18 67 n
	Hex	12 43 n
Description	0≤n≤4	

n	Baud rate
0	9600
1	19200
2	38400
3	57600
4	115200

This command is effective after Re-power.

**DC2 F d1 d2.....dn****Font Download**

Format	ASCII	DC2 F d1 d2.....dn
	Decimal	18 70 d1 d2.....dn
	Hex	12 46 d1 d2.....dn
Description	d1 d2 ... .. dn is the font data.	

**DC2 # n****Set Print Density**

Format	ASCII	DC2 # n
	Decimal	18 35 n
	Hex	12 23 n
Description	n is the print density code :0-F	

**DC2 T****Print a test page**

Format	ASCII	DC2 T
	Decimal	18 84
	Hex	12 54
Description	Print a test page.	

