

# FTP-423MCL253/DCL102

## MICRO THERMAL PRINTER (2 INCH HIGH SPEED TYPE)

### OUTLINE

This micro thermal printer has a capability of high speed printing driven by 6 V power.

This printer is suitable for portable equipment (hand-held terminal etc.).

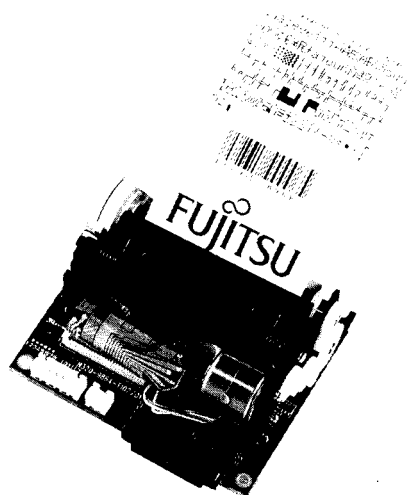
MCU and Gate array are also available instead of Interface board.

### FEATURES

- **6 V POWER DRIVING**  
Line dot thermal printer which can be driven by a 6 V power supply (4 or 5, Ni-Cd or Ni-MH batteries).
- **HIGHER SPEED PRINTING**  
It can print 12 characterlines/s. (240 dotline/s)
- **LOWER POWER CONSUMPTION**  
The power consumption is lower by 30% compared to conventional type.
- **VARIETY OF APPLIED PAPER**  
1 ply, 2 ply (TTC, TCC), label paper are available.

### DESIGNATION

Item	Part number
Mechanism	FTP-423MCL253
Interface board	FTP-423DCL102
MPU	FTP-423CU201
Gate array	FTP-423GA201



FTP-423MCL253, FTP-423DCL102



FTP-423CU201, FTP-423GA201

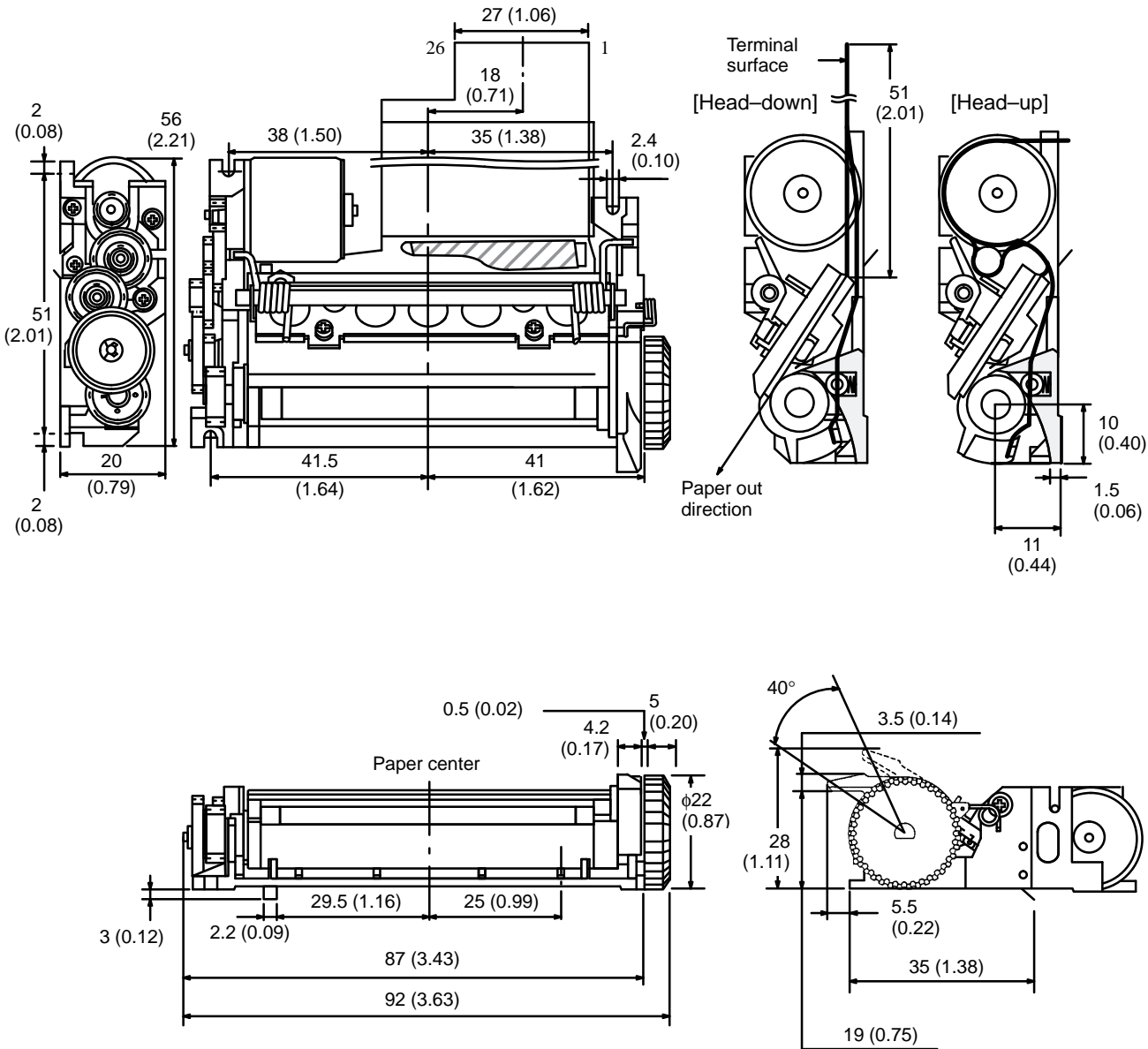
## GENERAL SPECIFICATIONS

Item			Specification
Printing method			Thermal sensitive line dot method
Dot structure			320 dot/line
Dot pitch (W)			0.165 mm (6 dot/mm)
Dot pitch (V)			0.165 mm (6 dot/mm)
Effective printing area			52.8 mm
No. of characters			53 characters (ANK character)/line (max.)
Printing speed			12 character lines/s. (at printing 8 columns of character “H”, 25°C, 6.0 V)
Characters			JIS : 128 kinds      International characters : 132 kinds ASCII small letters : 31 kinds      Down load characters : 20 kinds Semi-graphic : 36 kinds      Special characters : 30 kinds
Character structures (H x W)			Single density mode : 14 x 12 dots (24 columns), 32 x 16 dots (18 columns) Single density condensed : 14 x 12 dots (26 columns), 32 x 16 dots (20 columns) Double density mode : 7 x 6 dots (53 columns), 16 x 8 dots (40 columns)
Interface			8-bit parallel interface
Power supply	For head		4.5 to 7.5 V (equiv. to 5 Ni-Cd batteries, full charge up to 8.5 V) 4.5 A (peak current at 6.0 V, 100% duty)
	For motor		4.5 to 7.5 V (equiv. to 5 Ni-Cd batteries, full charge up to 8.5 V) Approx. 1.0 A (average current with recommended circuit, 1.8 A peak)
	For logic		5 V ±5%, 0.2 A (max.)
Character size (H x W)			7 x 6 dots : 1.2 x 1.0 mm, 14 x 12 dots : 2.3 x 2.0 mm 16 x 8 dots : 2.6 x 1.3 mm, 32 x 16 dots : 5.3 x 2.6 mm
Weight	Mechanism Interface board		Approx. 110 g Approx. 50 g
Dimension	Mechanism Interface board		92 x 56 x 20 mm (excluding knob, lever, flexible P.C.B.) 90 x 73 x 20 mm
Head life			Pulse durability : 1 x 10 <sup>7</sup> pulses or more Wear resistance : 10 km or more (duty 12.5%, 6 V, 25°C)
Environment	Operating	Temperature	+5 to +40°C
		Humidity	20 to 85%RH (no condensing)
	Storage	Temperature	−20 to +60°C
		Humidity	5 to 95%RH (no condensing)
Detector	Head temperature		Thermistor
	Paper out/Head up		Photo-sensor (Set by control command)
	Mark		Photo-sensor
	Voltage • Adjustment following to ambient temp.		Micro controller unit (MCU)
	Paper load		Micro controller unit (MCU)
Paper width			58 <sup>+0</sup> <sub>−1</sub> mm
Specified paper			1 ply (roll) : FTP-020PG021      2 ply (roll) : FTP-020P7121 Label (roll) : FTP-020PL021      2 ply (strip) : FTP-020P8821

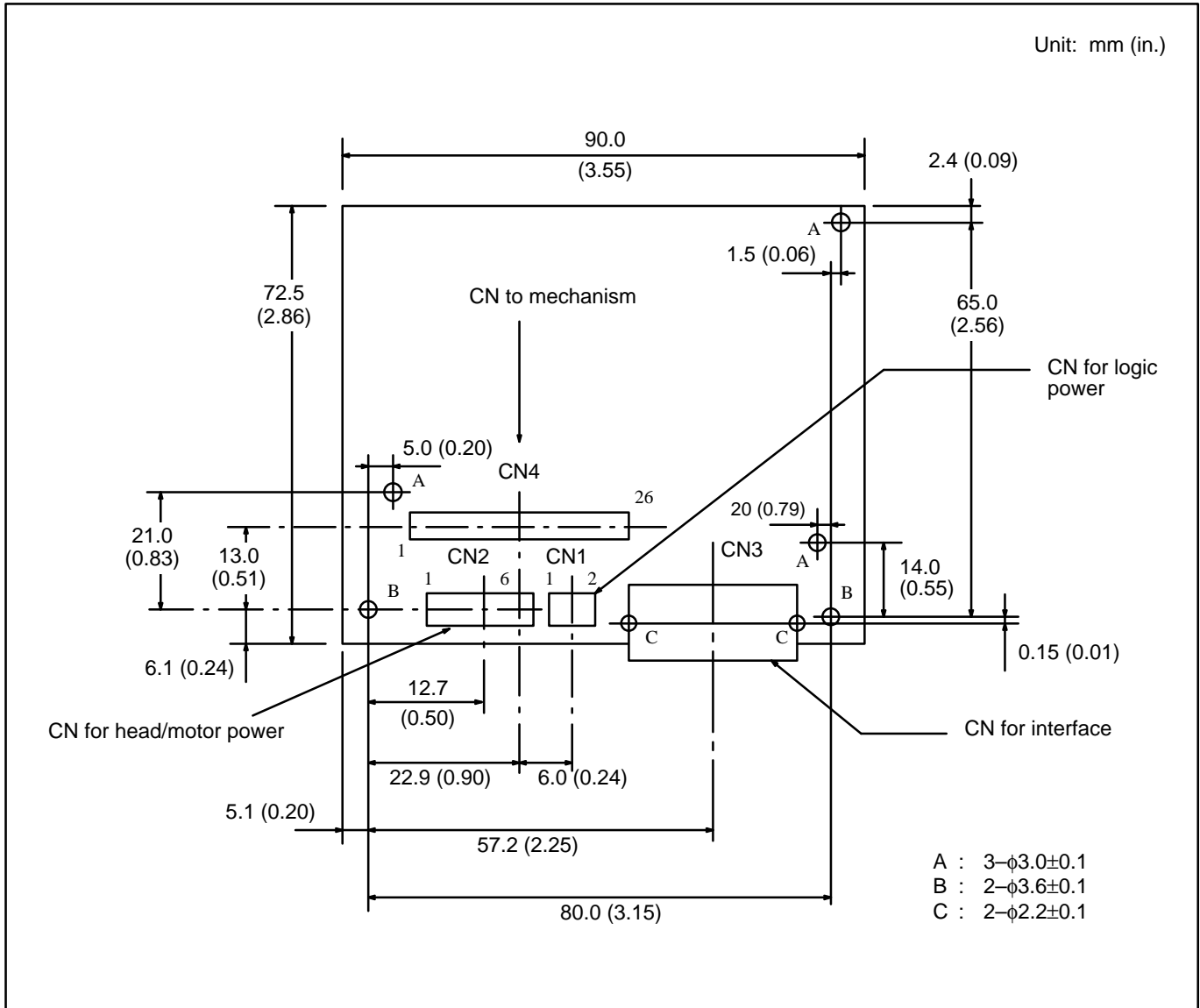
# DIMENSIONS

## 1. MECHANISM

Unit: mm (in.)



## 2. INTERFACE BOARD



# INTERFACE

## 1. CONNECTORS (CN3)

Part number : FCN-215Q034-G/0 (FUJITSU) or equivalent

Mating connector : FCN-217J034-G/0 (FUJITSU) or equivalent

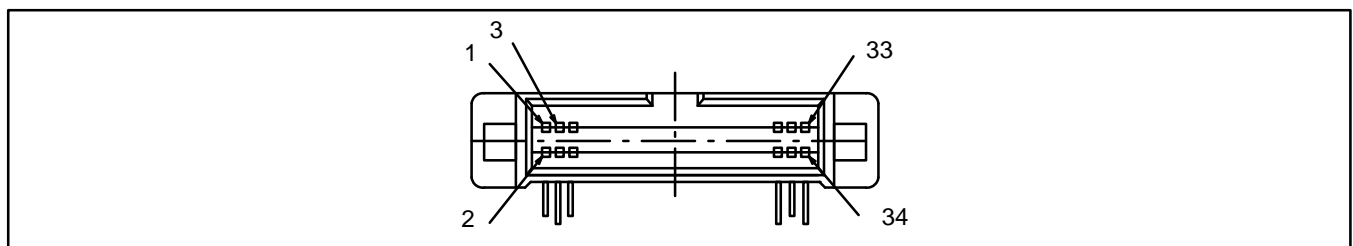
## 2. CONNECTOR PIN ASSIGNMENT

No.	Signal	I/O	Description	No.	Signal	I/O	Description
1	*PRSTB	I	Data strobe	2	$\overline{\text{PRSTB}}\text{-RET}$	—	To logic ground
3	PRDT0	I	Print data 0	4	PRDT0-RET	—	To logic ground
5	PRDT1	I	Print data 1	6	PRDT1-RET	—	To logic ground
7	PRDT2	I	Print data 2	8	PRDT2-RET	—	To logic ground
9	PRDT3	I	Print data 3	10	PRDT3-RET	—	To logic ground
11	PRDT4	I	Print data 4	12	PRDT4-RET	—	To logic ground
13	PRDT5	I	Print data 5	14	PRDT5-RET	—	To logic ground
15	PRDT6	I	Print data 6	16	PRDT6-RET	—	To logic ground
17	PRDT7	I	Print data 7	18	PRDT7-RET	—	To logic ground
19	$\overline{\text{ACKNLG}}$	O	Acknowledge	20	$\overline{\text{ACKNLG}}\text{-RET}$	—	To logic ground
21	PRIRQ	O	Data receive timing	22	PRIRQ-RET	—	To logic ground
23	PINF1	O	Printer status out 1	24	$\overline{\text{PRRST}}\text{-RET}$	—	To logic ground
25	VCC	O	+5 V	26	$\overline{\text{PRRST}}$	I	System reset
27	$\overline{\text{PRRDY}}$	O	Data receive timing	28	PINF2	O	Printer status out 2
29	$\overline{\text{PRPF}}$	I	Paper feed signal	30	GND	—	Logic ground
31	$\overline{\text{PRINT}}$	I	Power down cancel	32	$\overline{\text{PROFF}}$	I	Emergent stop
33	PRMD	I	Printer function mode	34	PRBSY	O	Busy

**Note:** — indicates negative logic signal.

## 3. CONNECTOR PIN NUMBER

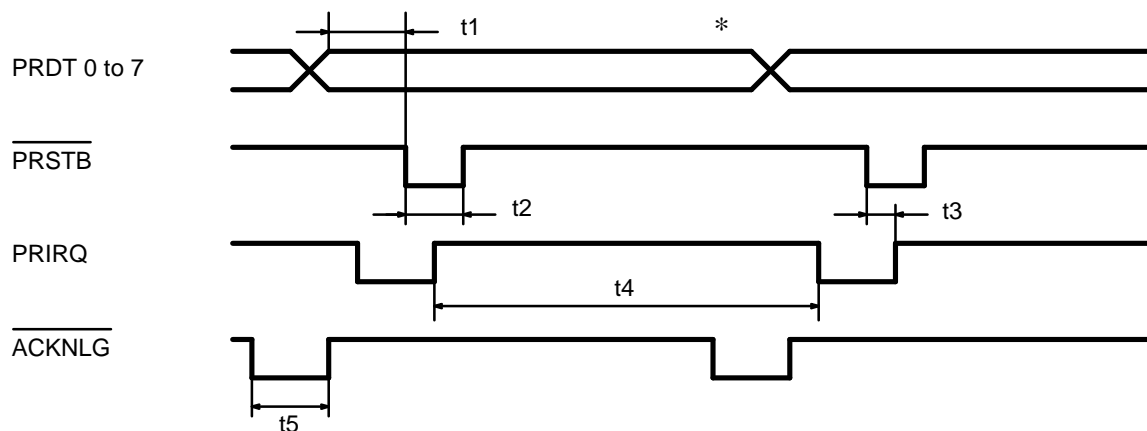
FCN-215Q034-G/0 (FUJITSU) or equivalent



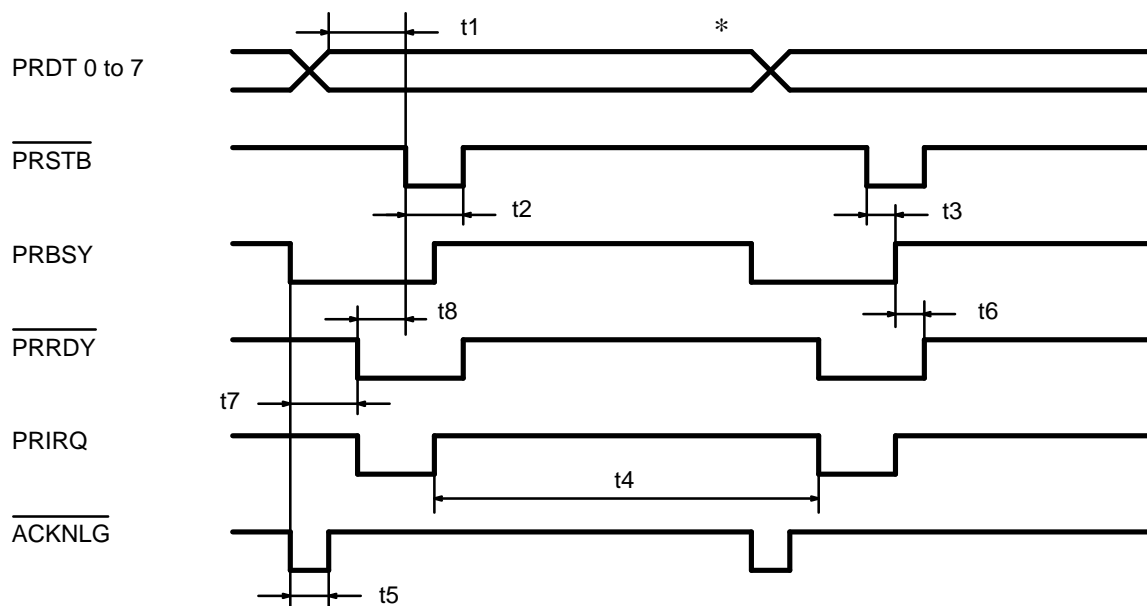
#### 4. DATA RECEIVE TIMING

This printer can be driven by 2 types of interface.

##### • CENTRONICS STANDARD



##### • 8-BIT PARALLEL INTERFACE



\*: Next data can be transmitted when  $\overline{\text{ACKNLG}}$  signal is low.

- |   |   |   |  |
|---|---|---|--|
| (1) Data set time                                 | : $t_1 \geq 0.5 \mu \text{ sec}$              | (2) $\overline{\text{PRSTB}}$ pulse width         | : $t_2 \geq 0.5 \mu \text{ sec}$             |
| (3) $\overline{\text{PRSTB}}$ in → PRBSY = "H"    | : $t_3 \leq 0.5 \mu \text{ sec}$              | (4) PRIRQ = "H"                                   | : $t_4 > \text{approx. } 30 \mu \text{ sec}$ |
| (5) $\overline{\text{ACKNLG}}$ pulse width        | : $t_5 = 2.5 \text{ to } 3.5 \mu \text{ sec}$ | (6) PRBSY = "H" → $\overline{\text{PRRDY}}$ = "H" | : $t_6$ not specified                        |
| (7) PRBSY = "L" → $\overline{\text{PRRDY}}$ = "L" | : $t_7$ not specified                         | (8) $\overline{\text{PRSTB}}$ set time            | : $t_8 \geq 0.5 \mu \text{ sec}$             |

## CONNECTOR PIN ASSIGNMENT

### 1. CONNECTOR FOR LOGIC POWER SUPPLY (CN1)

[B2B–XH–A–white (J.S.T.) or equivalent]

No.	Signal	Description
1	VCC	Power for logic
2	GND	Logic ground

### 2. CONNECTOR FOR HEAD/MOTOR POWER SUPPLY (CN2)

[B6B–XH–A–white (J.S.T.) or equivalent]

No.	Signal	Description
1	BAT	Power for head/motor
2	BAT	Power for head/motor
3	BAT	Power for head/motor
4	GND	Head/motor ground
5	GND	Head/motor ground
6	GND	Head/motor ground

### 3. CONNECTOR TO MECHANISM (CN4)

[52030–2610 (MOLEX) or equivalent]

No.	Signal	Description	No.	Signal	Description
1	$\overline{\text{PES}}$	Photo–sensor detection	2	N.C	LED, Cathode
3	PESC	Photo–sensor connection	4	VDD (S)	Power for photo–sensor
5	VDD (L)	IC power in thermal head	6	HCLK	Data transmission clock
7	STB0	Strobe signal	8	STB1	Strobe signal
9	STB2	Strobe signal	10	STB3	Strobe signal
11	STB4	Strobe signal	12	GND	Head and Logic ground
13	GND	Head and Logic ground	14	GND	Head and Logic ground
15	N.C	Not connected	16	HDATA	Data output signal
17	$\overline{\text{LAT}}$	Data latch signal	18	TH1	Temperature detection (1)
19	TH2	Temperature detection (2)	20	MT/A	Motor excitation (A)
21	$\text{MT}/\overline{\text{A}}$	Motor excitation ( $\overline{\text{A}}$ )	22	MT/B	Motor excitation (B)
23	$\text{MT}/\overline{\text{B}}$	Motor excitation ( $\overline{\text{B}}$ )	24	N.C	Not connected
25	VBAT	Power for head drive	26	BAT	Power for head drive

## CONTROL COMMAND

Control command name	Symbol	Function
Printing	LF, CR	Print buffer data and go to next line
Double-width print set	SO	Print data with double-width
Power down	DC2, DC3	Go to power down mode
Double-width print cancel	DC4	Cancel double-width print set
Escape sequence	ESC	This command forms extended commands with subsequent characters as shown below:
Space bet/n lines set	ESC A+n	Set space between lines per 2 x "n" dot lines
Paper feeding	ESC B+n	Feed paper per 2 x "n" dot lines
Counter paper feeding	ESC J+n	Counter-feed paper per 2 x "n" dot lines
Bit image printing	ESC K+n <sub>1</sub> +n <sub>2</sub> + n <sub>3</sub>	Print bit image
Int'l characters set	ESC R+n	Print national characters selected by "n"
Optional characters registration	ESC &+n <sub>1</sub> +n <sub>2</sub>	Register pattern data of 7 x 6, 16 x 8
Printing speed set	ESC Q+n+SP+~ *1	Set printing speed
Printing density set	ESC Q+n+!+A	Set printing density
Printing quality set	ESC x+n	Select standard or high quality printing mode
Special characters	ESC ¥ +n	Designate special characters.
Left end set	ESC l+n	Set left end when image printing
Paperout detection off	ESC 8	Paper-out detection off
Paperout detection on	ESC 9	Paper-out detection on
Mark detection *2	ESC F F	Feed paper to marked position
Paper feed lines set after mark detection	ESC w+n	Set paper feed lines after mark detection
Paper feed lines set at paper loading	ESC EM+n	Set paper feed lines at paper loading
Automatic printing speed set	ESC s+n	Set function mode when automatic printing speed set

\*1: SP means Space Code (=20H).

\*2: Mark is detected as a detection mark with the width of 2 mm min.



# PRINTING PATTERN SAMPLE

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0123456789101112131415161718192021222324252627282930313233343536373839404142434445464748495051525354555657585960616263646566676869707172737475767778798081828384858687888990919293949596979899100101102103104105106107108109110111112113114115116117118119120121122123124125126127128129130131132133134135136137138139140141142143144145146147148149150151152153154155156157158159160161162163164165166167168169170171172173174175176177178179180181182183184185186187188189190191192193194195196197198199200201202203204205206207208209210211212213214215216217218219220221222223224225226227228229230231232233234235236237238239240241242243244245246247248249250251252253254255256257258259260261262263264265266267268269270271272273274275276277278279280281282283284285286287288289290291292293294295296297298299300301302303304305306307308309310311312313314315316317318319320321322323324325326327328329330331332333334335336337338339340341342343344345346347348349350351352353354355356357358359360361362363364365366367368369370371372373374375376377378379380381382383384385386387388389390391392393394395396397398399400401402403404405406407408409410411412413414415416417418419420421422423424425426427428429430431432433434435436437438439440441442443444445446447448449450451452453454455456457458459460461462463464465466467468469470471472473474475476477478479480481482483484485486487488489490491492493494495496497498499500501502503504505506507508509510511512513514515516517518519520521522523524525526527528529530531532533534535536537538539540541542543544545546547548549550551552553554555556557558559560561562563564565566567568569570571572573574575576577578579580581582583584585586587588589590591592593594595596597598599600601602603604605606607608609610611612613614615616617618619620621622623624625626627628629630631632633634635636637638639640641642643644645646647648649650651652653654655656657658659660661662663664665666667668669670671672673674675676677678679680681682683684685686687688689690691692693694695696697698699700701702703704705706707708709710711712713714715716717718719720721722723724725726727728729730731732733734735736737738739740741742743744745746747748749750751752753754755756757758759760761762763764765766767768769770771772773774775776777778779780781782783784785786787788789790791792793794795796797798799800801802803804805806807808809810811812813814815816817818819820821822823824825826827828829830831832833834835836837838839840841842843844845846847848849850851852853854855856857858859860861862863864865866867868869870871872873874875876877878879880881882883884885886887888889890891892893894895896897898899900901902903904905906907908909910911912913914915916917918919920921922923924925926927928929930931932933934935936937938939940941942943944945946947948949950951952953954955956957958959960961962963964965966967968969970971972973974975976977978979980981982983984985986987988989990991992993994995996997998999100010011002100310041005100610071008100910101011101210131014101510161017101810191020102110221023102410251026102710281029103010311032103310341035103610371038103910401041104210431044104510461047104810491050105110521053105410551056105710581059106010611062106310641065106610671068106910701071107210731074107510761077107810791080108110821083108410851086108710881089109010911092109310941095109610971098109911001101110211031104110511061107110811091110111111121113111411151116111711181119112011211122112311241125112611271128112911301131113211331134113511361137113811391140114111421143114411451146114711481149115011511152115311541155115611571158115911601161116211631164116511661167116811691170117111721173117411751176117711781179118011811182118311841185118611871188118911901191119211931194119511961197119811991200120112021203120412051206120712081209121012111212121312141215121612171218121912201221122212231224122512261227122812291230123112321233123412351236123712381239124012411242124312441245124612471248124912501251125212531254125512561257125812591260126112621263126412651266126712681269127012711272127312741275127612771278127912801281128212831284128512861287128812891290129112921293129412951296129712981299130
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:;<=>?@ABCDEFGHIJKLMNOPQRS
TUVWXYZ[\]^_`abcdefg hijklm
nopqrstuvwxyz{|}~ ¨áâãäåæ
çèéëìíîïðññòóôõö÷øùúûüý
þÿÀÁÂÃÄÅÆÇÈÉÊËÌÍÎÏÐ
ÑÒÓÔÕÖ×ØÙÚÛÜÝÞßàáâã
äåæçèéêëìíîïðññòóôõö÷øùúûüýþÿ
```

!"#\$%&'()\*+,-./0123  
456789:;<=>?@ABCDEFGH  
IJKLMNOPQRSTUVWXYZ[  
\\]^\_`abcdefghijklmnopqrstuvwxyz  
{|}~Çüéâ  
äå&çèëìíîïÄÅæøöðù  
ÿÜÜ&£¥¦§¨ª«¬®¯°±²³  
¼½¾¿ÀÁÂÃÄÅÆÇÈÉÊË  
ÌÍÎÏÐÑÒÓÔÕÖ×ØÙÚÛÜ  
ÝÞßàáâãäåæçèéêëìí  
îïðññ²³´µ¶·¸¹º»¼½¾¿  
ÀÁÂÃÄÅÆÇÈÉÊËÌÍÎÏ  
ÐÑÒÓÔÕÖ×ØÙÚÛÜÝÞßà  
áâãäåæçèéêëìíîïðñ  
²³´µ¶·¸¹º»¼½¾¿  
n2



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