

FTP-631MCL/DCL

24V DRIVE, ULTRA HIGH SPEED LINE THERMAL PRINTER 3" TYPE, MECHANISM / INTERFACE BOARD

DESCRIPTION

This thermal printer provides ultra-high speed printing for 3 inches width paper (85mm), driven by 24V. This printer has small size, light weight, and low power consumption. And it has a print head open construction for easy maintenance. In addition to interface board, driving LSI (MCU + Gate Array) is also available.

FEATURES

- **ULTRA HIGH SPEED PRINTING**
It can print at 100 mm/s max. (800 dot lines/s) by using Fujitsu's unique head drive control system.
- **COMPACT AND LIGHTWEIGHT**
It is low profile as only 1 inch, and is light weight as approx. 260g.
- **LOW POWER CONSUMPTION**
The average current for head driving is approx. 0.5A (at 50 mm/s printing speed, 25% printing ratio).
- **EASY HEAD ACCESS**
Head-open construction makes head maintenance easy, especially for head cleaning.
- **HIGH RESOLUTION**
8 dot/mm head makes clear printings.
- **TWO PAPER PATHS**
Front or rear paper insertion types are available.
- **UL RECOGNIZED**
UL File No.E142123 Vol. 3 Sec.1



FTP-631MCL001 / FTP-631MCL002



FTP-621CU101, FTP-633GA101

FTP-631MCL001 / FTP-621DCL001

DESIGNATION

Item		Part number
Printer mechanism	Front paper insertion type	FTP-631MCL001
	Rear paper insertion type	FTP-631MCL 002
Interface board		FTP-621DCL001
LSI	Micro Controller Unit	FTP-621CU101
	Gate Array	FTP-633GA101

GENERAL SPECIFICATIONS

Item		Specifications
Printing Method		Thermally-Sensitive Line Dot Method
Dot Structure		640 dots / line
Dot Pitch (Horizontal)		0.125 mm (8 dot/mm) — Dot Density
Dot Pitch (Vertical)		0.125 mm (8 dot/mm) — Line Feed Pitch
Effective Printing Area		80 mm
No. of Columns		53 columns/line (max.) — Alpha Numeric Kana
Maximum Printing Speed		800 dot lines/s (100mm/s)
Character Types		JIS ANK : 128 International characters : 130 Semi-graphic : 63 ASCII : 31 Download : 384
Character Composition, Dimensions, (H × W) No. of Columns [Standard]		24 × 12 dots (3.0 × 1.5mm), 53 columns 32 × 16 dots (4.0 × 2.0mm), 40 columns 24 × 24 dots (3.0 × 3.0mm), 26 columns 32 × 32 dots (4.0 × 4.0mm), 20 columns
Interface		(1)Centronics standard (2) Bus interface* ¹
Power Supply	For Head	24VDC ± 5% Ave. current* ² 0.24A (2.09A) [25mm/sec., 25% Printing ratio] (Peak current) 0.53A (3.13A) [50mm/sec., 25% Printing ratio] 2.31A (5.17A) [100mm/sec., 25% Printing ratio]
	For Motor	24VDC ± 5%, 1.0A max.
	For Logic	5VDC ± 5%, 0.5A max.

*1 The data to be printed is automatically read out by the printer driver equipment memory (host system frame memory).
The communication is parameter transfer.

*2 When maximum applied voltage and minimum head resistance, specified paper, 25°C.

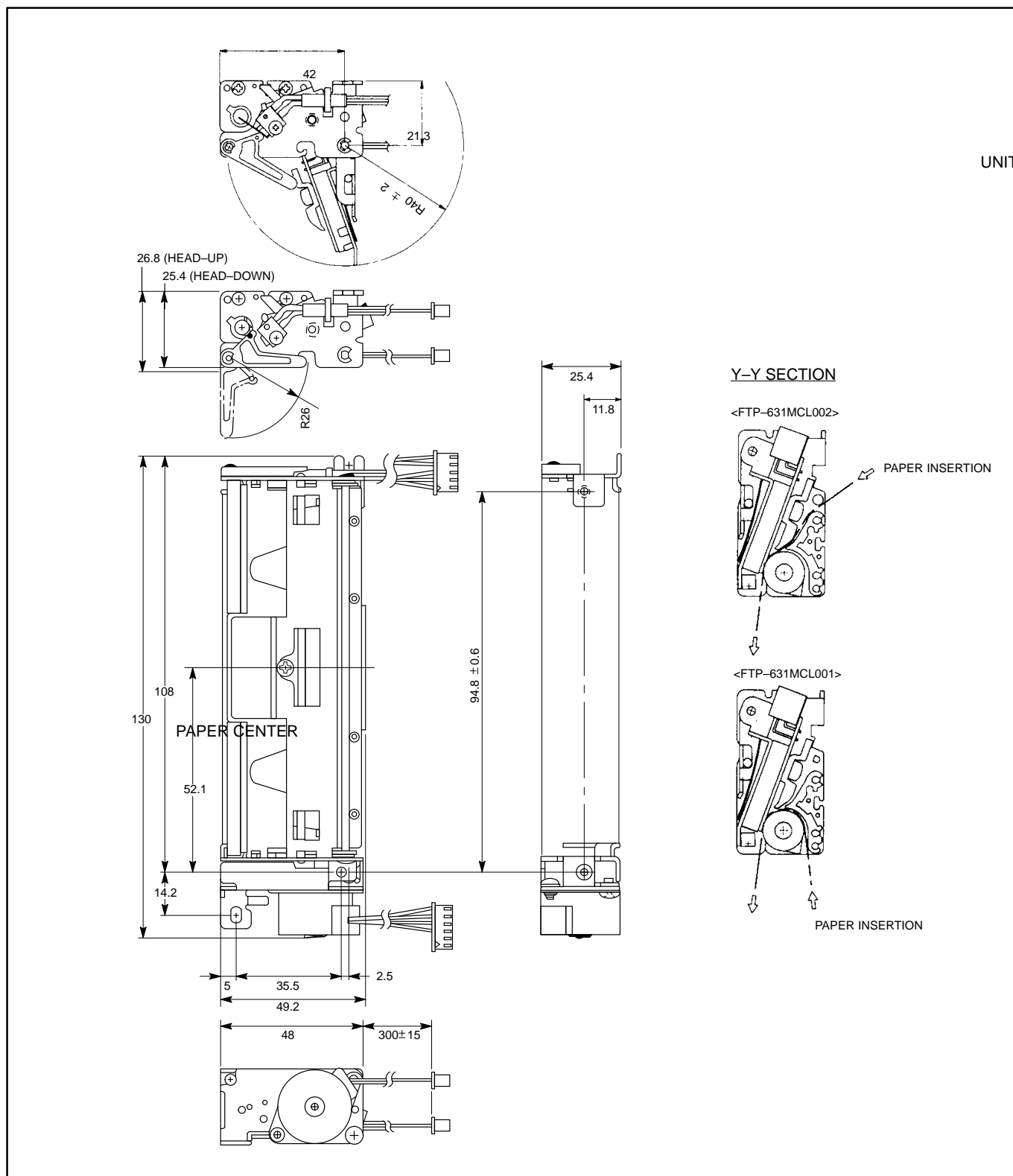
■ GENERAL SPECIFICATIONS

Item		Specifications
Weight	Mechanism	Approx. 260g
	Interface Board	Approx. 100g
Dimension	Mechanism	130 (W) × 48 (D) × 25.4 (H) mm (Excluding connector)
	Interface Board	140 (W) × 89 (D) × 23.0 (H) mm
Thermal Head Life		Pulse life : 50×10^6 pulse/dot Wear resistance : 50km (12.5% printing ratio)
Environmental Characteristics	Operating Temperature	+5 to +40°C*3
	Operating Humidity	20 to 85 % RH (No condensation)
	Storage Temperature	-20 to +60°C (Paper excluded)
	Storage Humidity	5 to 95% RH (No condensation)
Detection	Head Temperature	By Thermistor (applied energy control, abnormal temperature detection)
	Paper Out	By Photointerrupter (Command set)
	Head Up	By Microswitch
Paper Width		85 $^{+0}_{-1}$ mm
Specified Sensitive Paper		1 ply paper in roll : FTP-030P0020

*3 Temperature range for guaranteed printing density. It can operate at 0 to +40°C

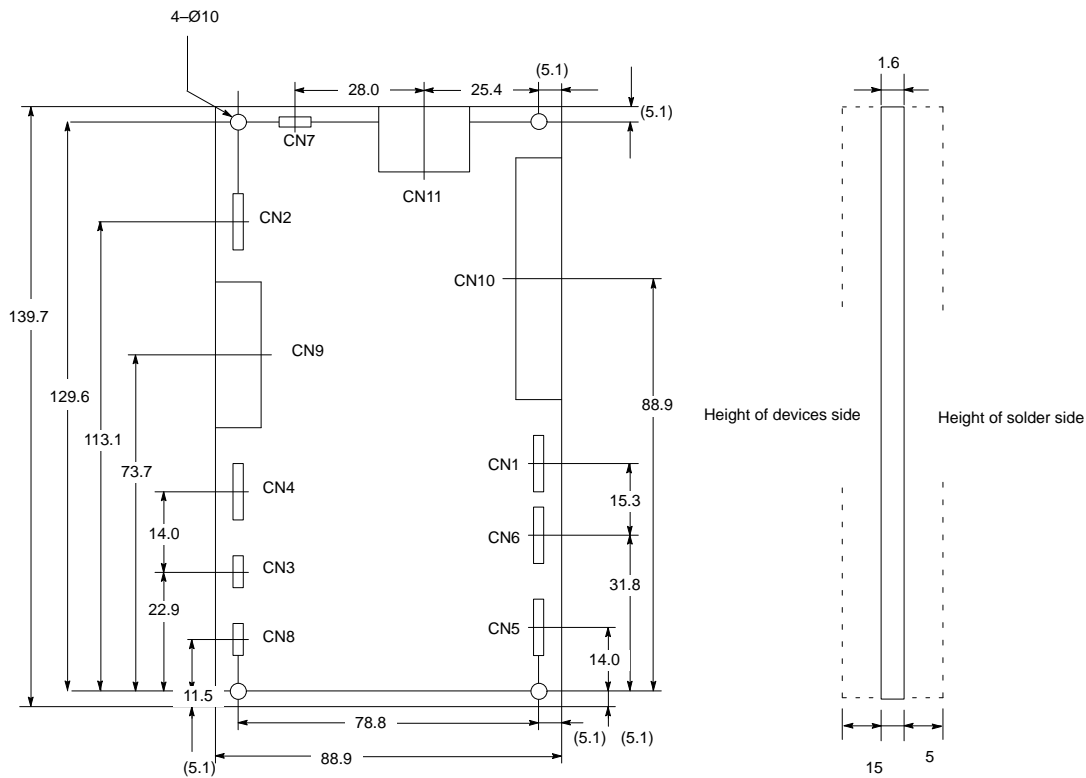
DIMENSION

Printer Mechanism



Interface Board

UNIT : mm



INTERFACE

1. Centronics Standard

(1) Connector (CN10)

Connector Part Number : FCN-605Q030-G/M (Fujitsu) or equivalent
 Mating Connector Part Number : FCN-607B030-G/B (Fujitsu) or equivalent

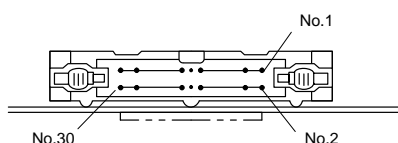
(2) Connector Pin Assignment

No	Code	I/O	Signal	No	Code	I/O	Signal
1	$\overline{\text{PRSTB}}$	I	Data strobe	2	$\overline{\text{PRSTB}} - \text{RET}$	—	Connected to logic GND
3	PRDT0	I	Data 0	4	PRDT0 -RET	—	Connected to logic GND
5	PRDT1	I	Data 1	6	PRDT1 -RET	—	Connected to logic GND
7	PRDT2	I	Data 2	8	PRDT2 -RET	—	Connected to logic GND
9	PRDT3	I	Data 3	10	PRDT3 -RET	—	Connected to logic GND
11	PRDT4	I	Data 4	12	PRDT4 -RET	—	Connected to logic GND
13	PRDT5	I	Data 5	14	PRDT5 -RET	—	Connected to logic GND
15	PRDT6	I	Data 6	16	PRDT6 -RET	—	Connected to logic GND
17	PRDT7	I	Data 7	18	PRDT7 -RET	—	Connected to logic GND
19	$\overline{\text{ACKNLG}}$	O	Data input acknowledge	20	$\overline{\text{ACKNLG}} - \text{RET}$	—	Connected to logic GND
21	BUSY	O	Busy	22	BUSY -RET	—	Connected to logic GND
23	RINF2	O	Printer status	24	$\overline{\text{INPRM}} - \text{RET}$	—	Connected to logic GND
25	$\overline{\text{SLCTIN}}$	I	Printer select	26	$\overline{\text{INPRM}}$	I	Reset
27	RINF1	O	Printer status	28	RINF3	O	Printer status
29	$\overline{\text{ATF}}$	I	Paper feed request	30	GND	—	Logic GND

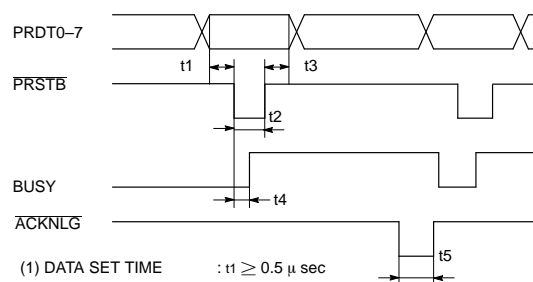
- Notes)
- Symbol “—” means a negative logic signal.
 - “-RET” signal is a return signal of the twisted pair cable.
 - “I” or “O” means a signal direction from the printer side.

(3) Connector Pin Number

FCN-605Q030-G/M (Fujitsu) or equivalent



(4) Data Input Signal Timing



- (1) DATA SET TIME : $t_1 \geq 0.5 \mu \text{ sec}$
 (2) PRSTB PULSE WIDTH : $t_2 \geq 0.5 \mu \text{ sec}$
 (3) DATA HOLD TIME : $t_3 \geq 0.5 \mu \text{ sec}$
 (4) PRSTB to BUSY = "H" : $t_4 \leq 0.5 \mu \text{ sec}$
 (5) ACKNLG PULSE TIME : $t_5 = 1.0 \sim 1.5 \mu \text{ sec}$

2. Bus Interface

(1) Connector (CN11)

Connector Part Number : FCN-215Q040-G/0 (Fujitsu) or equivalent
Mating Connector Part Number : FCN-217J040-G/0 (Fujitsu) or equivalent
FCN-214J040-G/0 (Fujitsu) or equivalent
FCN-215J040-G/0 (Fujitsu) or equivalent

(2) Connector Pin Assignment

No	Code	I/O	Signal	No	Code	I/O	Signal
1	ALE	O	Address latch	2	$\overline{\text{BRD}}$	—	Data read
3	$\overline{\text{BWR}}$	—	Data write	4	READY	—	Data access ready
5	HACK	—	Hold acknowledge	6	HRQ	—	User hold request input
7	MCRC	—	Power-down (Not used)	8	CLK	O	System clock
9	PCPAK1	O	Common RAM reading completion	10	$\overline{\text{ATF}}$	I	Automatic paper loading
11	PCPSD1	I	Common RAM reading request	12	PRON	O	Printer operation
13	$\overline{\text{RST}}$	I	Hard reset	14	GND	—	Ground
15	DB00	I/O	External address/Data bus 0	16	DB01	I/O	External address/Data bus 1
17	DB02	I/O	External address/Data bus 2	18	DB03	I/O	External address/Data bus 3
19	DB04	I/O	External address/Data bus 4	20	DB05	I/O	External address/Data bus 5
21	DB06	I/O	External address/Data bus 6	22	DB07	I/O	External address/Data bus 7
23	AB08	O	External address bus 08	24	DB09	O	External address bus 09
25	AB10	O	External address bus 10	26	AB11	O	External address bus 11
27	AB12	O	External address bus 12	28	AB13	O	External address bus 13
29	AB14	O	External address bus 14	30	AB15	O	External address bus 15
31	AB16	O	External address bus 16	32	AB17	O	External address bus 17
33	AB18	O	External address bus 18	34	AB19	O	External address bus 19
35	AB20	O	External address bus 20	36	AB21	O	External address bus 21
37	AB22	O	External address bus 22	38	AB23	O	External address bus 23
39	$\overline{\text{RAM2}}$	O	Common Ram access	40	$\overline{\text{INPRM}}$	I	Reset

Notes) • Symbol “—” means a negative logic signal.
• “I” or “O” means a signal direction from the printer side.

■ CONNECTORS (Interface Board)

1. Connector for Logic Power (CN1)

Part Number : B4B-XH-A-WHITE (J.S.T.) or equivalent (P.C.B.side)
Mating Connector Part Number : XHP-4 (J.S.T.) or equivalent (Cable side)

No	Code	I/O	Signal
1	Vcc	—	Power for logic (+5V)
2	GND	—	Logic ground
3	GND	—	Logic ground
4	VDD	—	Power supply for head/motor (+24V)

2. Connector for Thermal Head and Motor Power (CN2)

Part Number : B8B-XH-A-WHITE (J.S.T.) or equivalent (P.C.B.side)
Mating Connector Part Number : XHP-8 (J.S.T.) or equivalent (Cable side)

No	Code	I/O	Signal
1	VDD	—	Power for head/motor (+24V)
2	VDD	—	Power for head/motor (+24V)
3	VDD	—	Power for head/motor (+24V)
4	VDD	—	Power for head/motor (+24V)
5	GND	—	Head/motor ground
6	GND	—	Head/motor ground
7	GND	—	Head/motor ground
8	GND	—	Head/motor ground

3. Connector for Thermal Head Drive (CN9)

Part Number : FCN-605Q026-G/M (Fujitsu) or equivalent (P.C.B.side)

No	Code	I/O	Signal	No	Code	I/O	Signal
1	V _{DD}	—	Power for head (+24V)	2	GND	—	Head ground
3	V _{DD}	—	Power for head (+24V)	4	GND	—	Head ground
5	V _{DD}	—	Power for head (+24V)	6	GND	—	Head ground
7	LAT	O	Printing data latch	8	HD	O	Printing data output
9	ENB5 *	O	Printing enable 5 (not used)	10	ENB4 *	O	Printing enable 4
11	ENB3 *	O	Printing enable 3 (not used)	12	ENB2	O	Printing enable 2
13	ENB1	O	Printing enable 1	14	ENB0	O	Printing enable 0
15	V _{REF}	O	Standard voltage	16	TMP	I	Temperature detection
17	N.C.	—	Not connected	18	V _{CC}	—	Power for logic (+5V)
19	HCLK	O	Data transmission clock	20	HSEN	I	Printer distinction
21	V _{DD}	—	Power for head (+24V)	22	GND	—	Head ground
23	V _{DD}	—	Power for head (+24V)	24	GND	—	Head ground
25	V _{DD}	—	Power for head (+24V)	26	GND	—	Head ground

- Notes)
- * : Not used at mechanism side.
 - Symbol “—” means a negative logic signal.
 - “I” or “O” means a signal direction from the printer side.
 - Connector on printer mechanism Part Number : HIF3FC-26PA-2.54DS (Hirose) or equivalent.

4. Connector for Head-up / Paper-out Detection (CN4)

Part Number : B5B-XH-A-WHITE (J.S.T.) or equivalent (P.C.B.side)

Mating Connector Part Number : XHP-5 (J.S.T.) or equivalent (Cable side)

No	Code	I/O	Signal
1	SDV	—	Power for paper-out detection
2	PES	I	Paper-out detection
3	PDK	—	Light-emitting diode, cathode
4	V _{CC}	—	Power for head-up detection
5	HUP	I	Head-up detection

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5. Connector for Near-End Detection (CN3)

Part Number : B2B-XH-A-WHITE (J.S.T.) or equivalent (P.C.B.side)
Mating Connector Part Number : XHP-2 (J.S.T.) or equivalent (Cable side)

No	Code	I/O	Signal
1	Vcc	—	Power for logic (+5V)
2	$\overline{\text{NES}}$	I	Near-End detection

6. Connector for Stepping Motor Drive (CN5)

Part Number : B6B-XH-A-WHITE (J.S.T.) or equivalent (P.C.B.side)
Mating Connector Part Number : XHP-6 (J.S.T.) or equivalent (Cable side)

No	Code	I/O	Signal
1	N.C.	—	Not connected
2	N.C.	—	Not connected
3	MT/A	0	Motor coil excitation
4	MT/ $\overline{\text{A}}$	0	Motor coil excitation
5	MT/B	0	Motor coil excitation
6	MT/ $\overline{\text{B}}$	0	Motor coil excitation

7. Connector for Wrong Temperature of Head signal (CN7)

Part Number : B3B-XH-A-WHITE (J.S.T.) or equivalent (P.C.B.side)
Mating Connector Part Number : XHP-3 (J.S.T.) or equivalent (Cable side)

No	Code	I/O	Signal
1	TMPER	0	Wrong temperature of head
2	N.C.	—	Not connected
3	GND	—	Logic ground

■ PRINTING COMMANDS (CENTRONICS STANDARD INTERFACE)

Command	Code	Action
Line feed	LF	Prints buffer data and return the line to left end of next line.
Form Feed	FF	Prints buffer data and return the line to left side of next form.
Carriage return	CR	Prints buffer data and return the line to left end of next line.
Double width print set	SO	Sets the double width character.
Double width print reset	SI	Resets the double width character.
Black-white negative print set	RS	Sets the black-white negative printing.
Black-white negative print reset	US	Resets the black-white negative printing.
Double width print set	ESC SO	Sets the double width character.
Double width print reset	ESC SI	Resets the double width character.
Page length set in character line	ESC C + n	Sets the page length by character line.
Reverse print set	ESC R	Sets the reverse printing.
Reverse print reset	ESC S	Resets the reverse printing.
Bit image print set *	ESC V + n ₁ + n ₂ + d ₁ ~d _N	Sets the bit image printing.
Double width print set & reset	ESC W + n	Sets and resets the double width character.
Printing speed set	ESC s + n	Sets the printing speed.
Line feed length set in n/203 in.	ESC 3 + n	Sets the line feed length in n/203 in.
Character set 2 select	ESC 6	Selects the character set 2.
Character set 1 select	ESC 7	Selects the character set 1.
Download character register	ESC & +s +n ₁ +n ₂ +d ₁ ~d _N	Registers the download characters.
Registered download character select	ESC % + n + m	Selects the registered download characters.
Character set copy	ESC : + 0 + n + m	Copies the character set.
Bit image print set in high speed *	ESC* +a +n ₁ +n ₂ +d ₁ ~d _N	Sets the bit image printing in high speed.
International character set	ESC ^ + n	Selects the international characters.
Printer reset	ESC @	Initializes the printer.
Line feed length set after mark detection	ESC w + n	Sets the line feed length after mark detection.
Mark detection	ESC FF	Feeds the paper to the marking position.

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Command	Code	Action
Paper feed set in forward direction	ESC J + n	Sets the paper feed in forward direction. (Feeding range : 1 to 255 dot lines)
Paper feed set in reverse direction	ESC j + n	Sets the paper feed in reverse direction. (Feeding range : 1 to 255 dot lines)
Kanji mode set	FS &	Sets the Kanji mode.
Kanji mode reset	FS .	Resets the Kanji mode.
4 times enlarged character set & reset	FS W + n	Sets and resets the 4 times enlarged characters.
Double height print set & reset	FS ! + n	Sets and resets the double height character.
Detecting function set	FS 9 + n	Sets the detecting functions.
TOF mark detection	FS FF	Feeds the paper to the TOF mark position.
Printing quality set	FS x + n	Sets the printing quality conforming to type of paper.

Notes) • * : Sets the bit image print of 640 dots/line.
• Bus interface uses different commands.

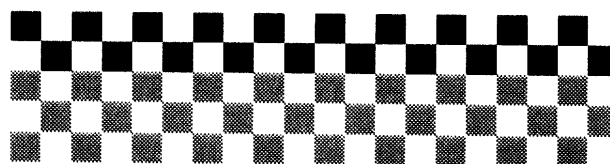
■ OPTIONS

1. Cable

Name	Part Number	Cable Length
Thermal head connection cable	FTP-441Y001	150mm
Interface cable	FTP-441Y201	500mm
Power supply cable (A) : for logic / motor	FTP-441Y401	300mm
Power supply cable (B) : for thermal head	FTP-441Y601	300mm

1. Paper Holder

Name	Part Number
Flange	FTP-040HF
Stand	FTP-040HS

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