

BATTERY DRIVE, 2" HIGH SPEED THERMAL PRINTER

FTP-628 Series

■ OVERVIEW

The FTP-628 MCL Series is ultra compact high speed, battery driven thermal printer, printing on 2-inch wide paper (58mm). Paper can be easily set by an original platen release mechanism.

The FTP-628 MCL series can be used for a variety of applications, such as portable terminals, POS, ticket issuing terminals, label printers, banking terminals, and measurement and medical equipment.



■ HIGHLIGHTS

- **Ultra compact**
Height 15.5 mm, width 69.9 mm, depth 35.7 mm
- **High speed printing**
It can print at 60 mm/s (480 dotlines/s) maximum by using Fujitsu's unique head drive control.
- **High resolution printing / Kanji supported**
8 dots/mm of resolution printing is possible.
- **Easy paper setting**
Our unique platen release mechanism allows a wide paper route even if the printer is ultra-compact, so paper can be easily inserted. Auto loading is also available on the MCL001 and MCL003 models.
- **Two types of paper routes**
Front and bottom paper feed.
- **Easy mounting**
Head, motor, sensor and other component wiring are unified to one flexible cable, and the mechanism can be secured by one hook and two screws at two locations, making mounting easy.

FTP-628MCL Series

■ PART NUMBERS

Item		Part Number
Printer mechanism		FTP-628MCL001 (front paper insertion without head open detection switch) FTP-628MCL002 (bottom paper insertion without head open detection switch) FTP-628MCL003 (front paper insertion with head open detection switch and knob) FTP-628MCL004 (bottom paper insertion with head open detection switch)
LSI for driving		FTP-628CU101
Interface Board	ANK only	FTP-628DSL001 (not yet available)
	Kanji supported	FTP-628DSL102 Universal serial / Centronics with flash memory and Kanji

■ SPECIFICATIONS

Item	Specifications
Part number	FTP-628MCL001/002/003/004
Printing method	Thermal-line dot method
Dot structure	384 dots/line
Dot pitch (Horizontal)	0.125 mm (8 dots/mm)—Dot density
Dot pitch (Vertical)	0.125 mm (8 dots/mm)—Line feed pitch
Effective printing area	48 mm
Number of columns	ANK 32 columns/line (maximum 12x 24 dot font)
Paper width	58 mm ^{±0.5}
Paper thickness	60 to 80 μ m (some paper in this range may not be used because of paper characteristics)
Printing Speed	Maximum 60mm/sec. (480 dot line/sec.)
Character types	Alphanumeric, katakana: 159 types International and special characters: 195 types JIS Kanji level 1, level 2, non-Kanji (supported only by FTP-628DSL102): about 6800 types
Character, dimensions (H×W), number of columns	12 × 24 dots, (1.5 × 3.0 mm), 32 columns: alphanumeric, katakana 24 × 24 dots, (3.0 × 3.0 mm), 16 columns: alphanumeric, katakana, Kanji 8 × 16 dots, (1.0 × 2.0 mm), 48 columns: alphanumeric, katakana 16 × 16 dots, (2.0 × 2.0 mm), 24 columns: alphanumeric, katakana, Kanji

■ SPECIFICATIONS

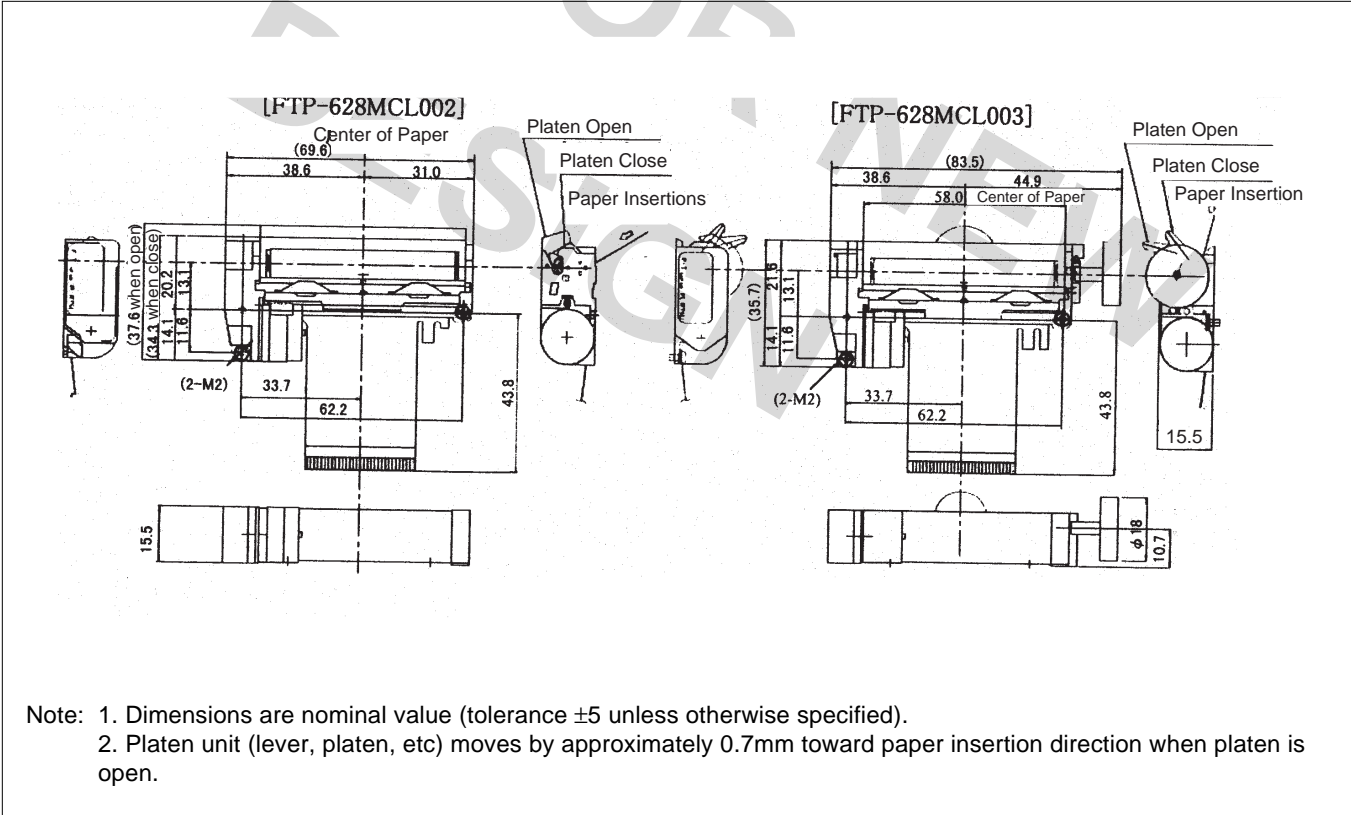
Item		Specification
Interface		Conforms to RS232C / Centronics
Power supply	For print head	4.2 - 8.5 VDC average current, 0.79 (1.3) A (print ratio: 12.5%, print speed: 60mm/sec.) () is the peak value
	For printer and cutter motor	4.2 - 8.5 VDC, 1A maximum
	For logic	5 VDC \pm 5%, 0.5 A maximum
Dimensions	Printer mechanism	69.6 x 34.3 x 15.5 mm (WxDxH) head down
	Interface board	131 x 99 x 24 mm
Weight (Mechanism)		Approximately 53g (without knob)
Head life		Pulse resistance: 100 million pulses/dot (under our standard conditions) Abrasion resistance: paper traveling distance 50km (print ratio: 25% or less)
Operating environment	Operating temperature	+5° C to +40° C (printing density assurance range, operation is possible at 0° C to +40° C)
	Operating humidity	20 to 85% RH (no condensation)
	Storage temperature	-20° C to +60° C (paper not included)
	Storage humidity	5-95% RH (no condensation)
Detection function	Head temperature detection	Detected by thermistor
	Paper out/mark detection	Detected by photo-interrupter (all models)
	Head up detection	Detected by micro-switch (003, 004 only)
Recommended thermal sensitive paper		<p>High sensitive paper: TF50KS-E4 (Nippon Paper) Standard paper: TF60KS-E (Nippon Paper) - FTP-020PU001/ FTP-020P0104 PD150R (Oji Paper) - FTP-020P0701</p> <p>Medium life storage paper: TF60KS-F1 (Nippon Paper) - FTP-020P0102 PD170R (Oji Paper) P220VBB-1 (Mitsubishi Paper) PH65BC-3H (Oji Paper)</p> <p>Long life storage paper: PD160R-N (Oji Paper) AFP-235 (Mitsubishi Paper)</p>

FUNCTION

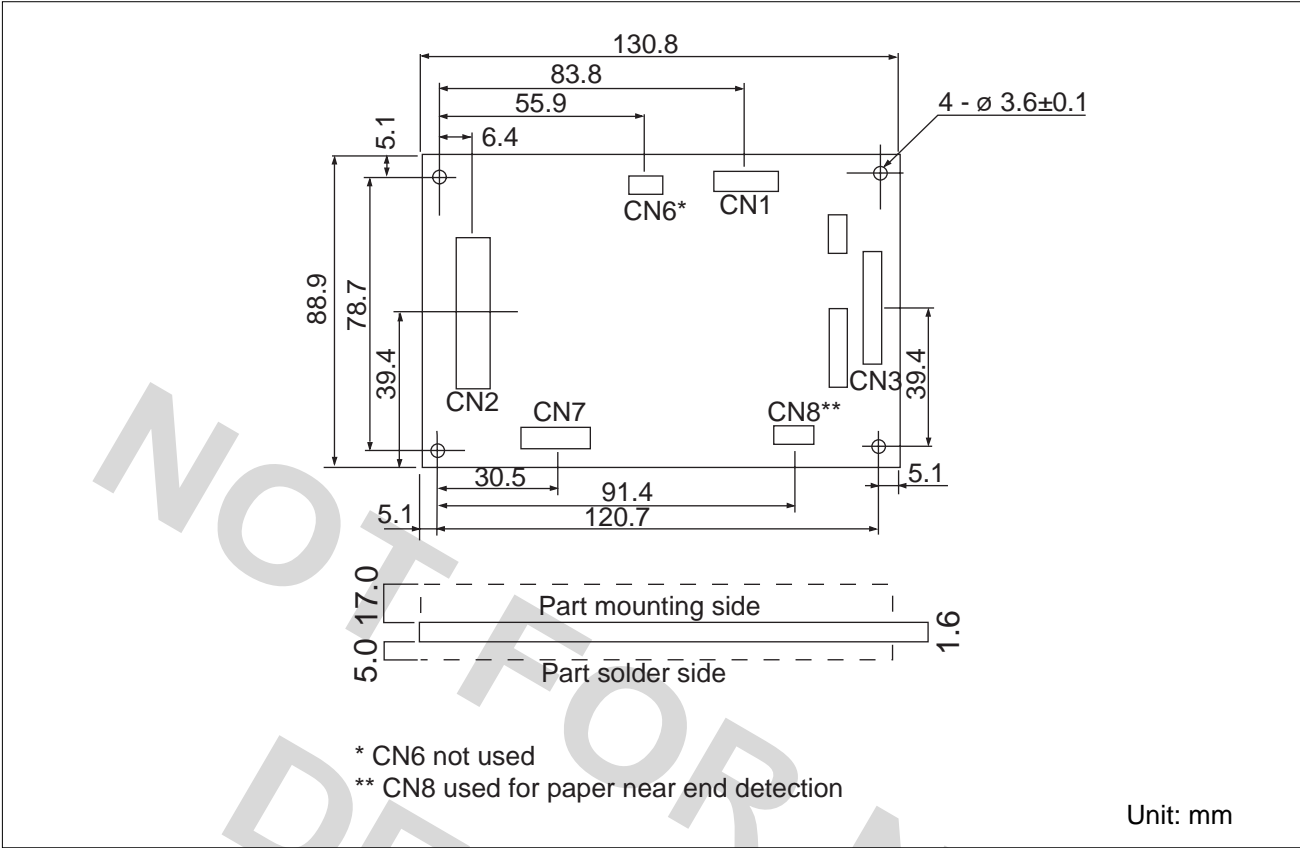
Item	Item
1. Test print function	8. Cutter abnormality detection
2. Paper out detection	9. Motor power saving function
3. Paper near end detection	10. Mark detection function
4. Head up detection	11. MCU operation abnormality detection
5. Thermal head temperature abnormality detection	12. Power ON/OFF sequence protection
6. Blow-out fuse detection	13. Motor over-current protection
7. Head voltage abnormality detection	14. Hardware timer

DIMENSIONS

1. Printer mechanism



2. Interface board



NOT FOR DESIGN NEW

■ PRINTER CONNECTOR (FLEXIBLE PT BOARD) PIN ARRAYS

Control circuit side connector: 52030-3010 Molex or equivalent product (Reference CN3)

No.	Signal	I/O	Contents	No.	Signal	I/O	Contents
1	PHK	—	Photo interrupter (cathode)	2	$\overline{\text{VSEN}}$	I	Power supply for paper sensor
3	PHE	O	Photo interrupter (emitter)	4	VH	I	Head driving power supply
5	VH	I	Head driving power supply	6	GNC	—	Ground for head
7	GND	—	Ground for head	8	DIN	I	Data input
9	$\overline{\text{LAT}}$	I	Data latch	10	CLK	I	Clock
11	$\overline{\text{STB6}}$	I	Enable 6	12	$\overline{\text{STB5}}$	I	Enable 5
13	$\overline{\text{STB4}}$	I	Enable 4	14	VDD	I	Logic Power supply
15	$\overline{\text{STB3}}$	I	Enable 3	16	$\overline{\text{STB2}}$	I	Enable 2
17	$\overline{\text{STB1}}$	I	Enable 1	18	TH	O	Thermistor
19	TH	O	Thermistor	20	GND	—	Ground for head
21	GND	—	Ground for head	22	VH	I	Head driving power supply
23	VH	I	Head driving power supply	24	N.C.	—	Open terminal
25	SW1	I	Head open switch*	26	SW2	O	Head open switch*
27	$\overline{\text{MT/B}}$	I	Stepping motor coil excitation signal B	28	MT/B	I	Stepping motor coil excitation signal B
29	$\overline{\text{MT/A}}$	I	Stepping motor coil excitation signal A	30	MT/A	I	Stepping motor coil excitation signal A

* on MCL003 and MCL004 models

■ INTERFACE

1. Centronics interface

(1) Connector (CN2)

Connector part number : FCN-605Q030-G/M (Fujitsu Components) or equivalent

Mating connector part number : FCN-607B030-G/B (Fujitsu Components) or equivalent

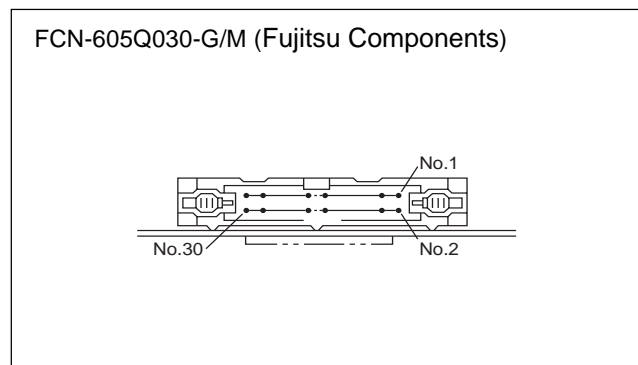
(2) Connector pin assignment

No.	Signal	I/O	Contents	No.	Signal	I/O	Contents
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 2	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 1	28	RINF3	O	Printer status 3
29	$\overline{\text{ATF}}$	I	Paper feed request	30	GND	—	Logic GND

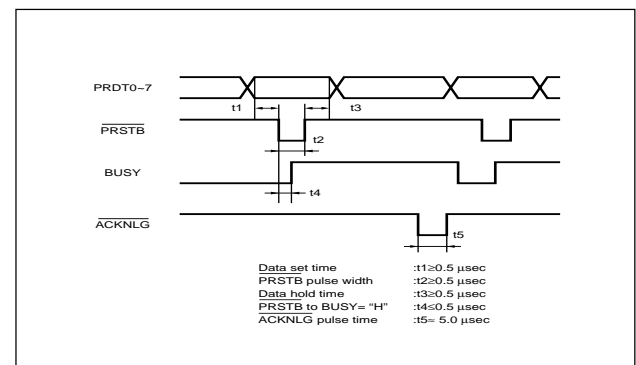
Notes:

- 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 interface board side.

(3) Connector pin number



(4) Data input signal timing



(5) Printer status signals

	Error status	RINF1	RINF2	RINF3
1.	Paper out	Low	High	Low
2.	Paper near end	High	High	Low
3.	Head up	High	Low	Low
4.	Head temperature abnormality	High	Low	High
5.	Head voltage abnormality	Low	High	High
6.	Hardware abnormality	High	High	High
7.	Mark detection abnormality	Low	Low	Low
8.	Normal	Low	Low	High

2. RS-232C

(1) Connector (CN7)

Connector part number : B10B-PH-K-S (J.S.T.) or equivalent

Mating connector part number : PHR-10 (J.S.T.) or equivalent

(2) Connector pin assignment

No.	Signal	I/O	Contents No.	No.	Signal	I/O	Contents No.
1	FG	-	Frame ground	2	RD	I	Receive data
3	TD	O	Transmission data	4	DTR	O	Data terminal ready
5	GND	-	Signal ground	6	DSR	I	Data set ready
7	$\overline{\text{SLCTIN}}$	I	Printer select	8	$\overline{\text{INPRM}}$	I	Reset
9	$\overline{\text{ATF}}$	I	Paper feed request	10	PWD	I	Power down cancellation signal

Notes:

- Symbol “ $\overline{\quad}$ ” means a negative logic signal.
- “I” or “O” means a signal direction from the interface board side.

■ CONNECTOR PIN ASSIGNMENT

1. Connector for power supply (CN1)

Part number : B6P-VH (J.S.T) or equivalent (board side)
 Mating Connector : VHR-6N

No.	Signal	I/O	Contents No.	No.	Signal	I/O	Contents No.
1	+V5	-	Power supply for logic	2	GND	-	Ground
3	GND	-	Ground	4	GND	-	Ground
5	+VH	-	Power supply for head motor	6	+VH	-	Power supply for head motor

2. Connector for printer mechanism connection (CN3)

Part number : 52030-3010 (made by Molex) or equivalent (board side)

No.	Signal	I/O	Contents	No.	Signal	I/O	Contents
1	PHK	—	Photo interrupter (cathode)	2	VSEN	O	Power supply for paper sensor
3	PHE	I	Photo interrupter (emitter)	4	VH	O	Head driving power supply
5	VH	O	Head driving power supply	6	GNC	—	Ground for head
7	GND	—	Ground for head	8	DIN	O	Data input
9	LAT	O	Data latch	10	CLK	O	Clock
11	STB6	O	Enable 6	12	STB5	O	Enable 5
13	STB4	O	Enable 4	14	VDD	O	Logic Power supply
15	STB3	O	Enable 3	16	STB 2	O	Enable 2
17	STB1	O	Enable 1	18	TH	I	Thermistor
19	TH	I	Thermistor	20	GND	—	Ground for head
21	GND	—	Ground for head	22	VH	O	Head driving power supply
23	VH	O	Head driving power supply	24	N.C.	—	Open terminal
25	SW1	O	Head open switch*	26	SW2	I	Head open switch*
27	MT/B	O	Stepping motor coil excitation signal B	28	MT/B	O	Stepping motor coil excitation signal B
29	MT/A	O	Stepping motor coil excitation signal A	30	MT/A	O	Stepping motor coil excitation signal A

* on MCL003 and MCL004 models

■ OPTIONS

Name		Part Number	Length (mm)
Interface Cable (between board and equipment)	For Centronics (CN2)	FTP-441Y201	500
	For RS232C (CN7)	FTP-628Y301	500
Power supply cable (CN1)		FTP-622Y401	300
Near end paper sensor (CN8) if required			

NOT FOR NEW DESIGN

■ COMMANDS

Command	Contents
HT	Moves print position to the next tab.
LF	Line feed.
FF	Feeds forms (new page).
DC 2	Power down.
ECS RS	Sets reverse printing.
ESC US	Resets reverse printing.
ESC ! + n	Sets print mode.
ESC %+n	Download character set specification//cancellation.
ESC &+y+c ₁ +c ₂ +x+d ₁ ~d _N	Download character definition.
ESC *+m+n ₁ +n ₂ +d ₁ ~d _N	Sets bit image mode.
ESC ?+n	External registration character deletion.
ESC 2	Sets 1/6 inch line feed length.
ESC 3+n	Sets the line feed length.
ESC @	Printer initialization.
ESC A+n	Sets the space between the line.
ESC C+n	Sets the page length by character line.
ESC D+d ₁ ~d _N +NUL	Sets the tab position.
ESC J+n	Feeds paper in forward direction and prints.
ESC K+n	Reverse paper feed.
ESC R+n	Selects international character.
ESC c+1+n	Sets internal processing (including auto paper loading).
ESC d+n	Printing and n-line feeding.
ESC e+n	Prints and reverse feeds n-lines.
ECS s+n	Sets printing speed.
ECS t+n	Character code table selection.
ESC {+n	Sets/resets upside down printing.
FS !+n	Kanji printing mode collective specification.
FS &	Kanji printing mode specification.
FS .	Kanji printing mode cancellation.
FS 9+n	Sets the detection functions.

Commands continued

Command	Contents
FS C+n	Kanji code system selection.
FS W+n	Kanji double height and width mode specification/cancellation.
GS <	Line feeds to the next mark.
GS A+m+n	Sets the line feed length after mark detection.
GS E+n	Sets print quality.
GS V+n+m	Paper cutting (for pending cutter models only).
GS e+n+m	Sets bar code width.
GS h+n	Sets bar code height.
GS k+m+n+d ₁ ~d _N	Selects bar code type and prints.
GS w+n	Sets bar code width magnification.
FS *+m+n ₁ +n ₂ +d ₁ ~d _N	High speed collective image printing specified.
GS &+m+x+y ₁ +y ₂ +d ₁ ~d _N	Registration of image data.
GS '+m+n	Prints registered image data.
FS E+n	Correction of impressed energy.
ESC V+n	Right Rotation 90° specification / cancellation.
GS a+n	Sets and cancels status transmission. (Serial Mode)
FS r+n	Parameter transmission. (Serial Mode)
ESC EM+n	Setting the amount of the feeding at automatic paper load.
ECS X+n+m	Setting the turning time of the motor excitation.
ESC DEL+n	Deletes recorded contents in flash memory.

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