FTP-644MCL001/002
PRODUCT SPECIFICATIONS

TITLE	FTP-644MCL001/002 PRODUCT SPECIFICATIONS		CUST
DRAW No.	A1NA02246-0001/6		

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1. Guideline for product recycling

- Fujitsu Takamizawa Component Co., Ltd. is making an effort to promote the environmental management per ISO 14001 with a policy "Better corporate activities while valuing the environment"
- The below lists the components and their materials used in this printer.   Refer this list when the printer is to be recycled.

FTP-644MCL001/002   List of materials

No.	Name of components	Material
1	Printer frame	PPO resin (with GF)
2	Gear cover	POM resin
3	Rubber roller	Silicone rubber + SUS
4	Platen gear, middle gears 1, 2	POM resin
5	Pulse motor	SPCC + iron + copper wire
6	Motor FG plate	SUS
7	Sensor fixture	ABS resin
8	Knob	ABS resin
9	FG plate	SUS
10	Head-up arm	Zinc alloy
11	Head-up lever	POM resin
12	Thermal head	Aluminum + ceramic substrate
13	Head pressurizing shaft	SUS
14	Head support board	SPCC
15	Head pressurizing spring	SUS
16	Arm spring	SUS
17	Spring (Only MCL001)	SUS
18	Pinch roller (Only MCL001)	POM resin
19	Bearing	Sintered alloy
20	FG coil spring	SUS
21	Guide film (Only MCL001)	PET resin

"Abbreviations for the materials used"

SUS:	Stainless steel
POM:	Polyacetal resin
PET:	Poly(ethylene terephthalate)
PPO:	Poly(phenylene oxid) resin
SPCC:	Rolled steel plate
PI:	Polyimide
GF:	Fiberglass resin

2. Scope

This specification applies to FTP-644MCL001/002.

The following standard interface board or drive LSI and reference circuits satisfy the specifications in this manual:

(1) Standard interface board: FTP-624DCL012
(2) Drive LSI: FTP-624CU112

3. Description

This printer is a compact and light high-speed printer equipped with a line dot thermal head with 8-dot/mm resolution.

4. Configuration

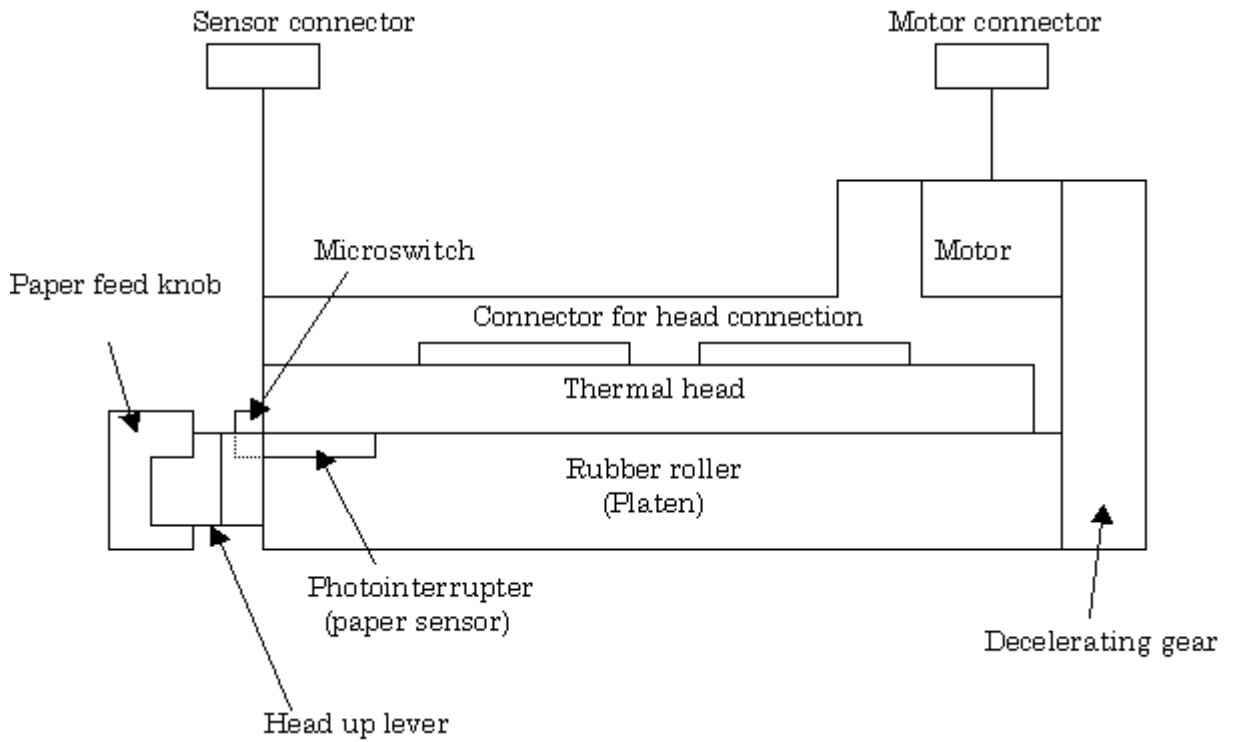The configuration of this printer (mechanical unit) is shown below.

Figure 1 Printer configuration

5. General Specifications

ITEM		SPESIFICATION
Printing specifications	Printing method	Thermal sensitive line dot method
	Effective printing width	104mm
	Head configuration	832 dots / line
	Dot pitch	0.125(vertical direction) x 0.125(horizontal direction)
	Print density	1-ply paper: The OD value must be 0.8 or more in high-resolution mode. *Measuring instrument : SAKURA densitometer PDA-65 from Konica Co.,Ltd.
	Printing speed	16 lines per second (320 dots per second max.) (1-ply, "H" x double-density 8 digits (8 x 16 fonts) , 25℃, 60% R.H. , battery voltage 7.2V, approx. 1/10-inch feed)
Specified paper(*1)	High-sensitivity paper	TF50KS-E4 NIPPON PAPER
	Standard paper	TF50KS-E NIPPON PAPER
		PD150R OJI PAPER
	Medium-term preservable paper	TF60KS-F1 NIPPON PAPER
		P220VBB-1 MITSUBISHI PAPER
		PD170R OJI PAPER
	Long-term preservable paper	TP50KJ-R NIPPON PAPER
		AFP-235 MITSUBISHI PAPER
		PD160R-N OJI PAPER
Paper width		MCL001 : 112^{+0}_{-1} (front insertion)
		MCL002 : 114^{+0}_{-1} (rear insertion)
Paper feed method		Friction feed (1 dot line / 4 pulse, bipolar 1-2 phase excitation)
Paper feed accuracy		±5% at fixed-speed feed with the back tension of approx.100g(0.98N) (±2% at 25℃ and 60%RH)
Line gap in one print line by enable drive		Gap between right and left print line in the same line dot line : 0.125mm
Detection function	Head temperature detection	Thermistor
	Paper detection	Photo interrupter
	Mark detection	
	Head up detection	Micro switch
External dimensions(W x D x H)		138mm x 46mm x 20mm (excluding the lever and knob)
Mass		Approx. 125g

*1 For using unspecified paper, both sides shall consult and evaluate and check it to determine whether to use it.

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ITEM			SPESIFICATION
Operating power	Head	For printing	4.2V to 8.5V DC (equivalent to 4 or 5 Ni-Cd or Ni-MH batteries, or 2 lithium-ion batteries, and constant-voltage power supply) Approx. 2.6A (Peak value for 7.2V applied and current conducted for 64 dots made simultaneously.)
		For logic	Voltage : 5 VDC ±5% Current : Maximum 0.2A
	Motor drive		4.2V to 8.5V DC (equivalent to 4 or 5 Ni-Cd or Ni-MH batteries, or 2 lithium-ion batteries, and constant-voltage power supply) Up to 0.8A (on F&T standard drive circuit)
Environmental characteristics	Operating temperature and humidity(*2)		5°C to 40°C, 20 to 85%RH No condensation
	Storage temperature and humidity		-20°C to 60°C, 5 to 95%RH No condensation paper is excluded
	Noise		60 dB or less at 1m from the surface of the printing mechanism
Reliability (*3)	Vibration (non-operation)		10 to 55 to 10 Hz, one-side amplitude 0.15mm,1 octave/minute, maximum 1G 20 cycles for each of X, Y, and Z directions
	Impact (non-operation)		50G, 11ms, half-sine wave, 5 times for each of the X, Y, and Z directions
	Pack drop		75cm drop for 6 surface, corner and ridges in pack
	Temperature and humidity cycle (non-operation)		Two successive cycles of -25°C (2 hours) to room temperature (2 hours) to 65°C and 85% RH (2hours) to room temperature (2hours)
Life	Head	Electrical life	1 hundred million pulses (at the F&T standard printing condition)
		Mechanical life	Paper length : 50 km (printing rate : 12.5%)
	Life of the head up lever		5000 or more times when one up and down are counted as one time
	Photointerrupter life		1.2×10^4 hours (time while the current is conducted) with the specified circuit
Printing start position at the left end			MCL001 : 4±1 mm , MCL002 : 5±1 mm from the paper edge to the print start position. This value is : 1. When the paper of 112mm (MCL001) and 114mm (MCL002) width is used 2. When 1-ply long-term perceivable paper is used 3. When no paper jam or collapse occurs
Paper positioning by mark detection			Approx. 7.5mm (MCL001) and 10.2mm (MCL002) from the mark end position to heating element. This value is when paper is inserted from front, fixed-speed feed is used, and paper feeding by marking detection is the default (2mm).

*2 The print density is guaranteed in this range. The printer can operate from 0°C to 50°C.
*3 After the test, the printing specifications shall be satisfied.

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6. External Dimensions and Mounting Positions

(1) External dimensions

Figure 2 shows the external dimensions.

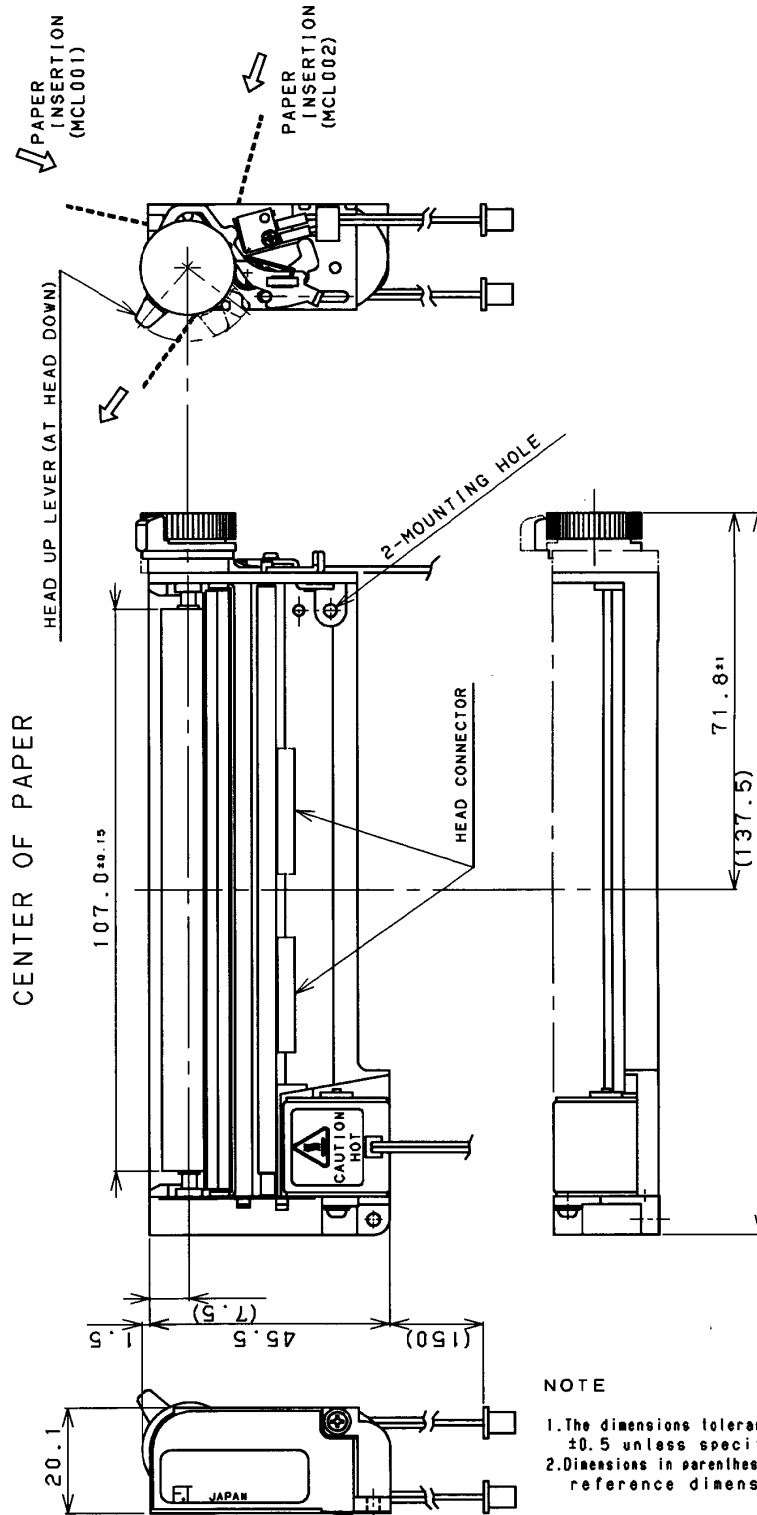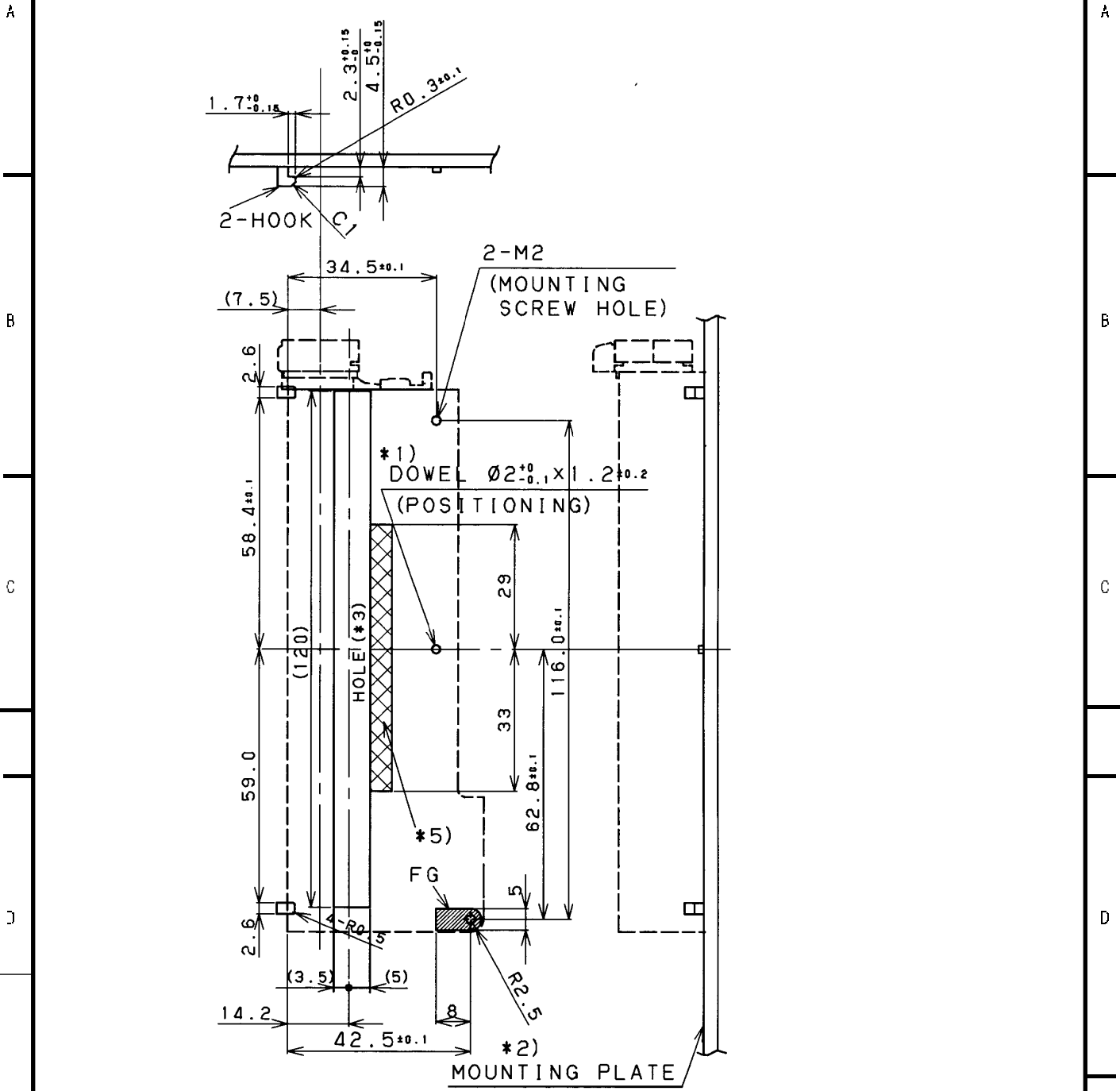**Figure 2   FTP-644MCL001/002 outerview dimensions**

(UNIT : mm)

NOTE

1. The dimensions tolerance is ±0.5 unless specified.
2. Dimensions in parentheses are reference dimensins.

(2) Mounting positions

Figure 3 shows the mounting dimensions of this printer.

(UNIT : mm)

Figure 3   FTP-644MCL001/002 mounting dimensions

NOTES)
1. We recommends dowel to be installed for positioning the printer.
2. The plane degree of the installation board of the printer is within 0.1.
3. *sign size is a center at the entrance of the form of the printer for MCL002.
   The size is assumed to be a reference value. (Please set the size that the form don't come in contact.
4. Please connect FG more than the range in the slash part.
5. Please install running away like part ▨ so that there is a possibility to come in contact with the installation board by the winding of FFC.
6. The printer must be secured by positioning the horizontal direction using the dowels, pressing the printer toward the hooks on both sides, then fixing the two M2 screws.

7. Connector Specifications

7.1 Thermal Head

(1)   Connectors used

Mechanical unit side   Connector 1: B11B-PH-K-S-2.2 (made by J.S.T) or equivalent
                            Connector 2: B10B-PH-K-S-2.2 (made by J.S.T) or equivalent

Remote (housing) side :   Connector 1: PHR-11 (made by J.S.T) or equivalent
                            Connector 2: PHR-12 (made by J.S.T) or equivalent
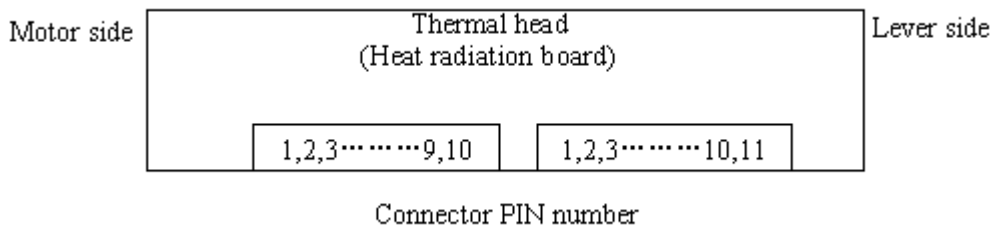
(2)   Pin assignment on the mechanical unit side

Connector 1:

Number	Symbol	Signal name
1	STB 5	Strobe 5
2	STB 6	Strobe 6
3	STB 7	Strobe 7
4	STB 8	Strobe 8
5	CLK	Clock
6	LAT	Data latch
7	DIN	Data in
8	GND	Ground
9	GND	Ground
10	VH	Head drive power
11	VH	Head drive power

Connector 2:

Number	Symbol	Signal name
1	VH	Head drive power
2	VH	Head drive power
3	GND	Ground
4	GND	Ground
5	TH*1	Thermistor
6	STB 1	Strobe 1
7	STB 2	Strobe 2
8	STB 3	Strobe 3
9	STB 4	Strobe 4
10	VDD	Logic power

*1) One end of the thermistor is connected to the ground.

Motor side   Thermal head
                  (Heat radiation board)   Lever side

          1,2,3·········9,10   1,2,3·········10,11

          Connector PIN number

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(3)   Notes

         1) Pull up the five strobe signals with about 22kΩ.
         2) Pull down the latch, data input, and clock signals with 22kΩ.
         3) Don't connect or disconnect a connector with the power turned on.
         4) Don't connect or disconnect a connector 10 or more times.
         5) Don't strain connector.

7.2   Paper Feed Motor

(1)   Connectors used

     Motor side(housing) :   PHR-4 (made by J.S.T) or equivalent

     Remote side: B4B-PH-PH-K-S (made by J.S.T) or equivalent

(2)   Pin assignment on the motor side

Number	Symbol	Signal name
1	B	Excitation signal B
2	B	Excitation signal B
3	A	Excitation signal A
4	A	Excitation signal A

7.3   Sensor Connector

(1)   Connectors used

     Sensor side(housing)   :   PHR-5 (made by J.S.T) or equivalent

     Remote side: B5B-PH-K-S (made by J.S.T) or equivalent

(2)   Pin assignment on the sensor side

Number	Symbol	Signal name
1	VSEN	Power for the paper sensor
2	PHE	Photo interrupter emitter
3	PHK	Photo interrupter cathode
4	SW1	Head up detection switch 1
5	SW2	Head up detection switch 2

8. Thermal Head Specifications

(1) General Characteristics

1. Method : Thermal line dot method
2. Total number of dots : 832 dots/line
3. Dot pitch : 0.125 mm
4. Dot dimensions : 0.110 x 0.110 mm
5. Average resistance : 280 $\Omega \pm 15$ %

(2) Maximum rating

1. Maximum voltage applied : 8.5V
2. Maximum energy applied : 0.456 mJ/dot
   (Vset=8.5V, Ton=1.9 ms, Tcy=2.5ms)
3. Maximum board temperature : 70°C (thermistor temperature)
4. Maximum number of concurrently energized dots : 128 dots

(3) Electrical characteristics

1. Electrical characterisitics : Table 1
2. Timing chart : Figure 5
3. Circuit block diagram : Figure 6
4. Equivalent circuit : Figure 7
5. Control timing : Figure 8
6. Driver formation : 64 bits x 13 drivers
7. Data transfer method : Single-input serial transfer
8. Data input frequency : 5.0 MHz or lower
9. Printing method : Independent 8-enable method

(4) Electrical operating conditions (Rating in common use: When temperature is 25°C, Rav is 280Ω, and current is conducted to make 128 dots simultaneously.)

1. Power applied (Po) : 0.818 W/dot
2. Width of pulse applied (Ton) : 1.9 msec
3. Energy applied (Eo) : 0.35 mJ / dot (25°C)
4. Printing cycle period : 2.5 msec (at 25°C, 6-part divided drive)
   This can be shorten by using self-hysteresis method.
5. Voltage applied (VH) : 7.2V
6. Current consumption : 3.2 A (peak value at 7.2 V)

Notes :
Energy calculation formula

Head average Resistance value (Rav)	Power applied (P)	Power loss (P_L)	Voltage drop (V_L)
280±15%	0.181 W / dot	0.004 W / dot	0.17 V

$$P = \frac{(VH - VL)^2}{Rav} + P_L$$

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(5) Thermistor characteristics

1) Thermistor constant (B)   :3950 k ± 2%
2) Resistance value R25   : 30 kΩ ± 5%
3) Operating temperature range   : -20 to 80°C
4) Heat time constant   : within 30 seconds (in air)
5) Temperature characteristics   : RX=R25 x EXP{ B x (1/TX-1/T25)}
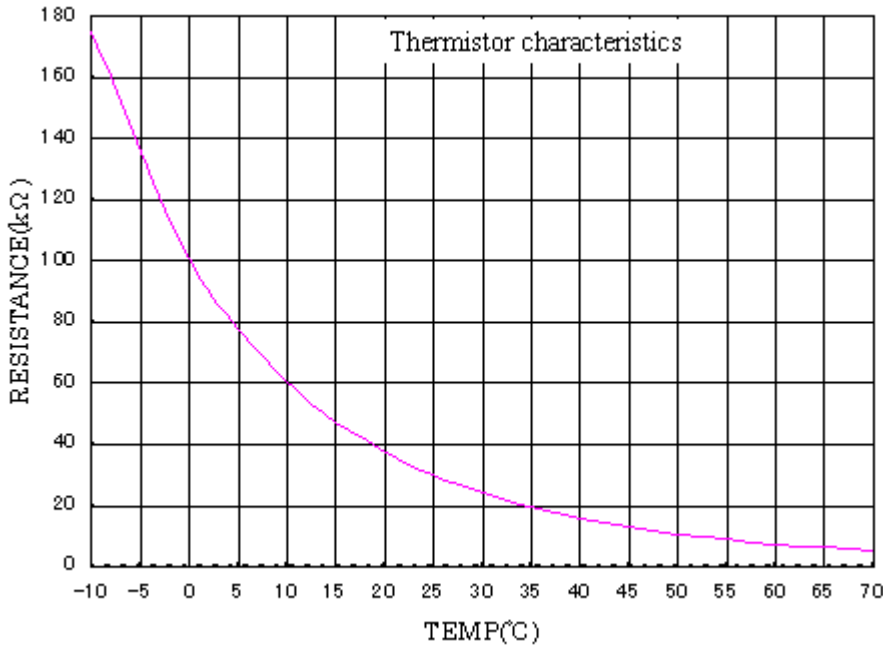(T = Absolute temperature)

Figure 4   Temperature characteristics of thermistor

(6) Notes on use

Thermistor characteristics

1) Control the head board (thermistor) temperature within the specified temperature if printing characters at a high printing rate.
2) It is recommended to turn VH off if the printer is in standby mode so that ions and noise does not damage the thermal head.
3) Control surge noise between VH and GND so that it does not exceed 32V.
4) Control the printer so that the thermal head does not overheat if a line to the thermistor is cut.
5) Do not apply pulse noise that is 2 V or greater and/or 20 ns or more to the signal pins.
6) It is recommended to route the lines from VH to the thermal head and GND to the thermal head using wires 300 mm or less and 15mΩ or less that are separated from the other signal lines.
7) Control the CLK, LAT, DIN, and STB signals using the C-MOS (74HC240 or similar).
8) Install an aluminum electrolytic capacitor with approximately 15 V withstand voltage and 33 μF between VDD and GND to prevent noise.
9) Turn on the VDD first, then the VH.   Turn off the VH first, then the VDD.

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Table 1　Electrical characteristics

Item	Symbol	Minimum	Typical	Maximum	Unit	Conditions
Average resistance Value	Rave	238	280	322	Ω	
Output supply Voltage	Vset	-	7.2	8.5	V	Standard printing conditions The maximum rating is 8.5 V.
Supply voltage	VDD	4.5	5.00	5.5	V	
High input voltage	Vih	0.8xVDD	-	VDD	V	ENB, DI, LAT, CLK
Low input voltage	Vil	0.0	-	0.2xVDD	V	Same as above
High input current	Iih	-	-	1.0	μA	DI
		-	-	13.0	μA	CLK, LAT
		-	-	52.0	μA	ENB
Low input current	Iil	-	-	-1.0	μA	DI
		-	-	-13.0	μA	CLK, LAT
		-	-	-949.0	μA	ENB
Driver leakage current	IL	-	-	10.0	μA/dot	VDD=5.0V, VH=27V
Driver saturation voltage	Voon	-	-	2.0	V	VDD=5.0V, VIo=60mA
Maximum transfer Frequency	fd	-	-	5.0	MHz	DUTY 50%(±5%)
Data setup time	T1	70.0	-	-	ns	See Figure 5, "Timing chart."
Data holding time	T2	30.0	-	-	ns	Same as above
Latch setup time	T3	300.0	-	-	ns	Same as above
Latch pulse width	T4	200.0	-	-	ns	Same as above
Strobe setup time	T5	1.5	-	-	μs	Same as above
Propagation delay Time	T6	-	-	3.0	μs	Same as above
Propagation delay Time	T7	-	-	3.0	μs	Same as above

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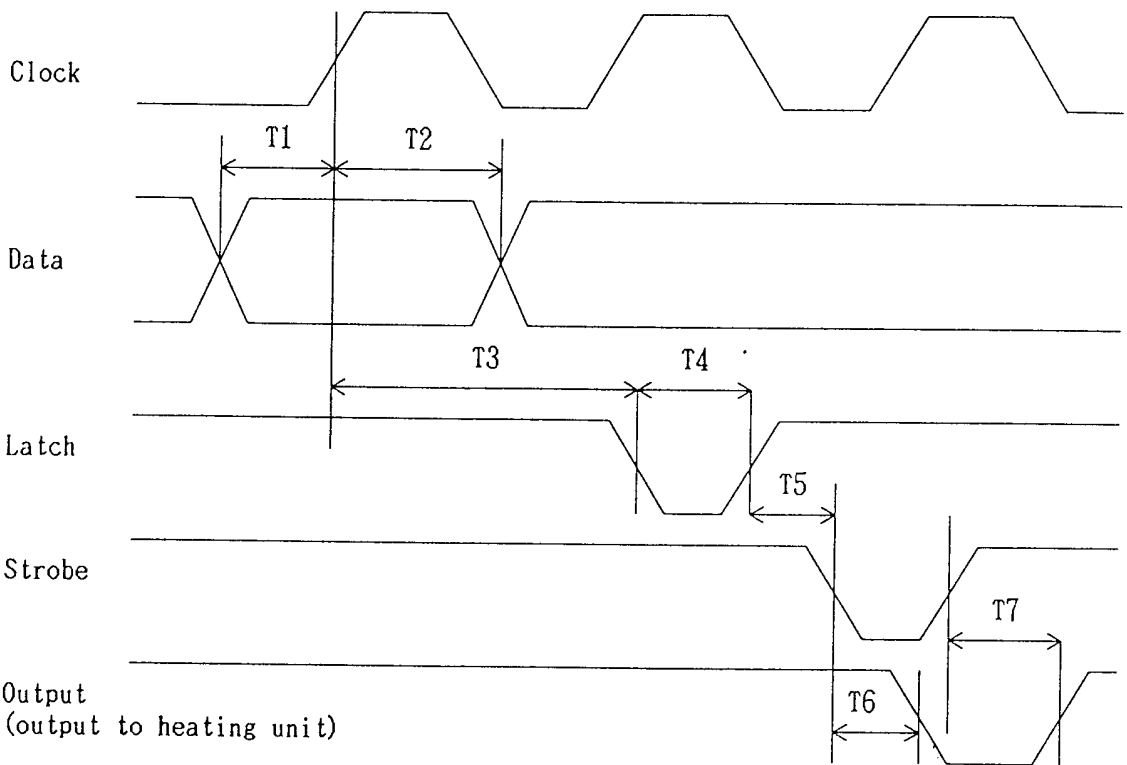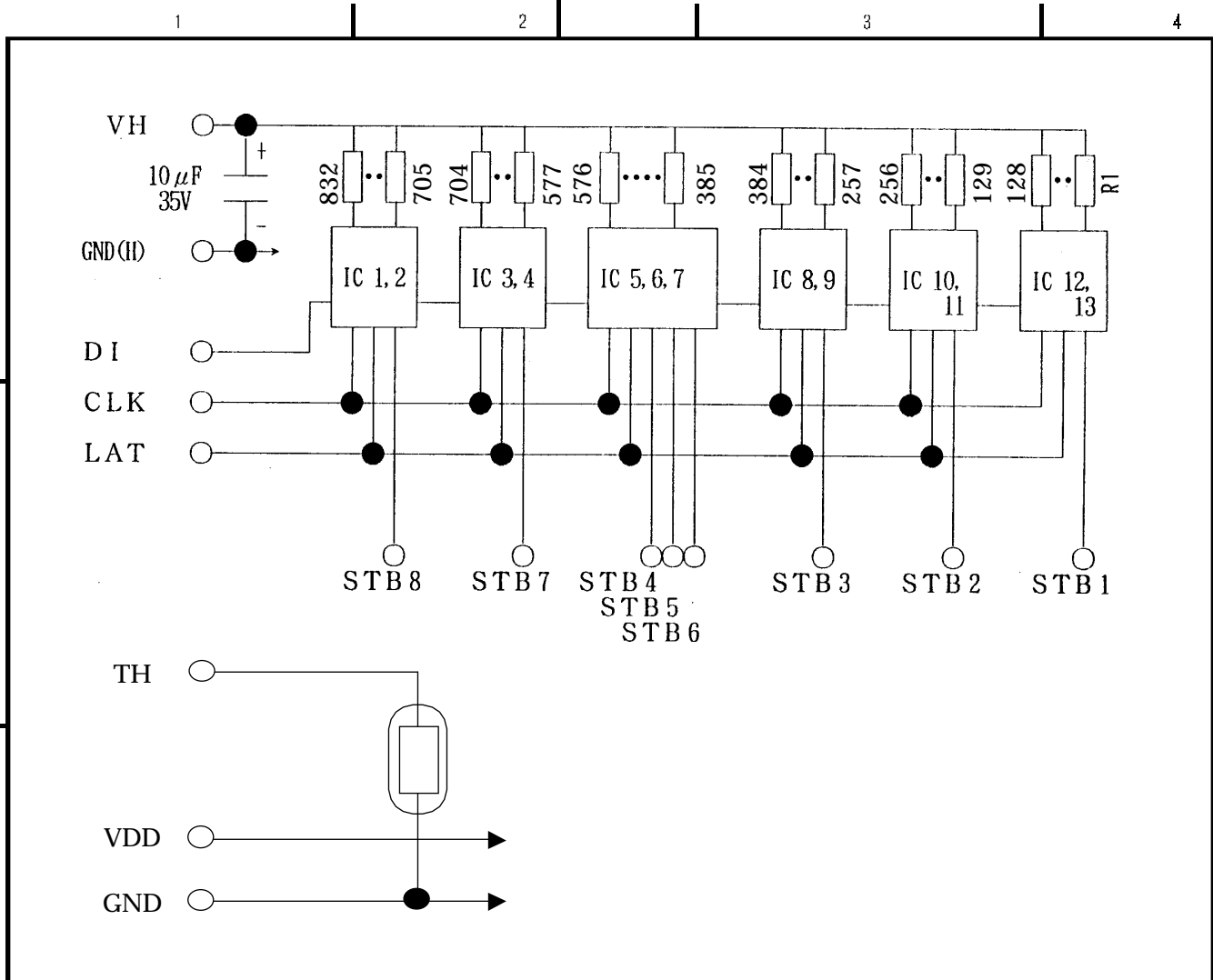97.01 FDNCA- 902-2

Clock

T1   T2

Data

T3   T4

Latch

T5

Strobe

T7

Output
(output to heating unit)

T6

Figure 5   Timing chart
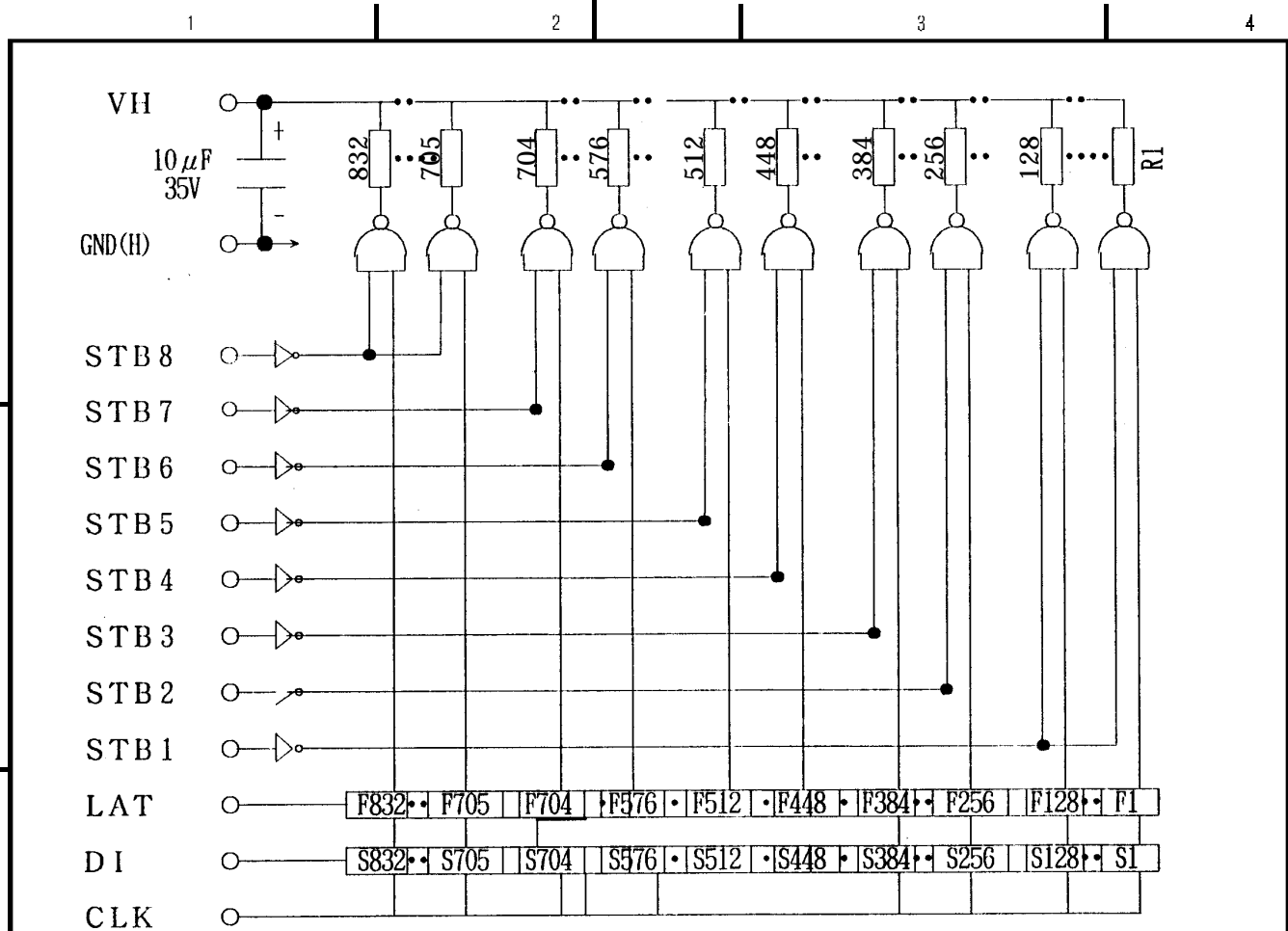
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Notes:

1. VH is the power for the head.
2. VDD is the power for the logic.
3. GND is the power ground.
4. R1 to R832 are heating resistance elements.

Figure 6 Circuit block diagram

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F : Flip flop
S : Shift register

Notes:
1. VH is the power for the head.
2. VDD is the power for the logic.
3. GND is the power ground.
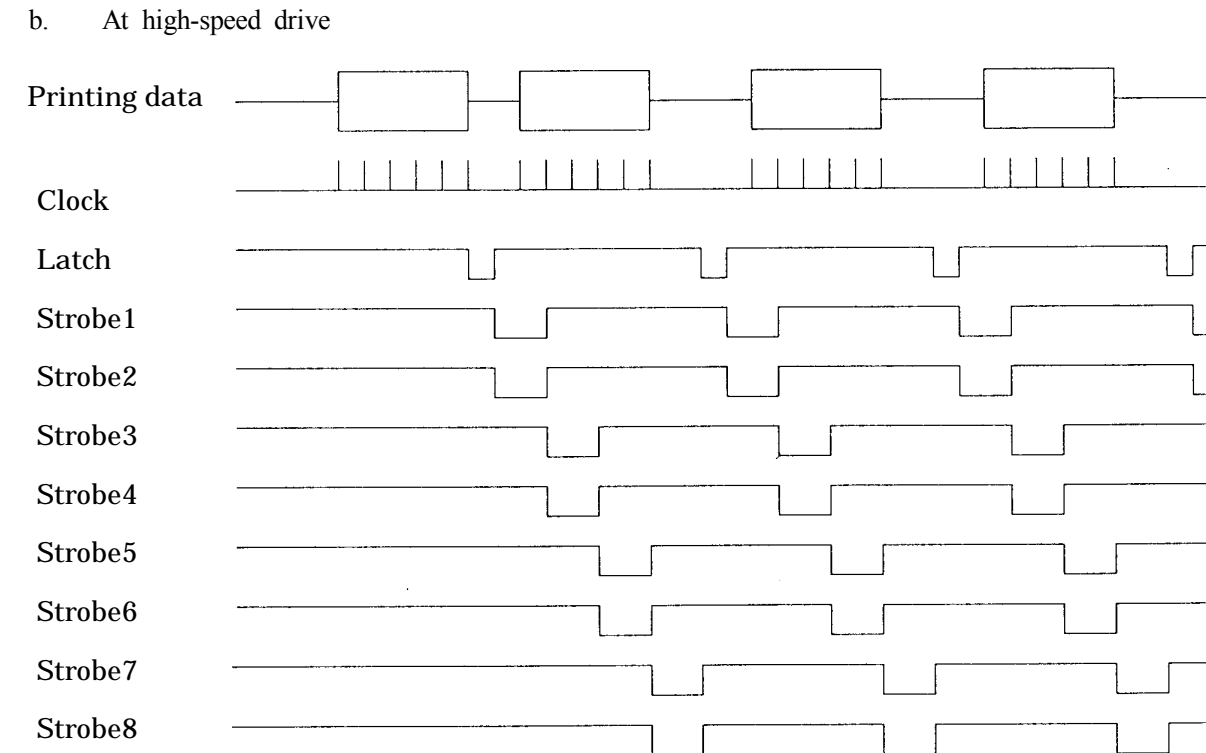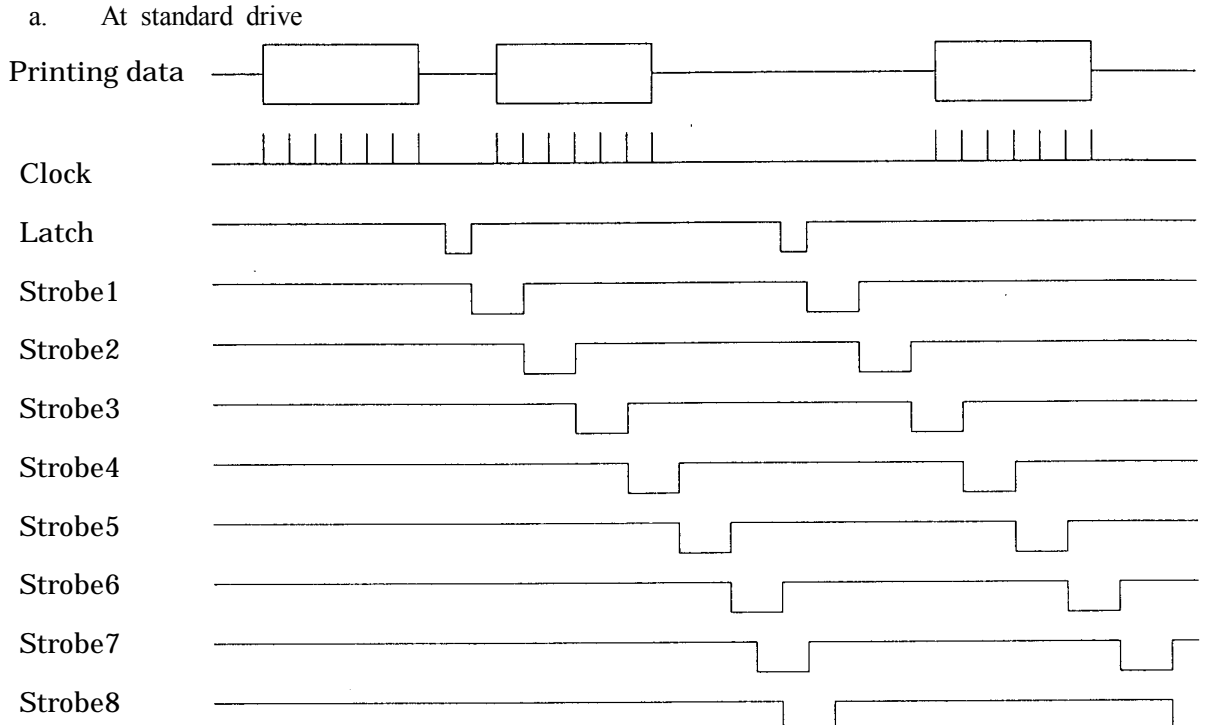4. R1 to R832 are heating resistance elements.

Figure 7　　Electric circuit block diagram

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a. At standard drive

Printing data

Clock

Latch

Strobe1

Strobe2

Strobe3

Strobe4

Strobe5

Strobe6

Strobe7

Strobe8

b. At high-speed drive

Printing data

Clock

Latch

Strobe1

Strobe2

Strobe3

Strobe4

Strobe5

Strobe6

Strobe7

Strobe8

Note:
The head current consumption increases at high-speed drive.

Figure 8   Control timing

9. Stepping Motor Specifications

(1) General specifications (motor as a single unit)
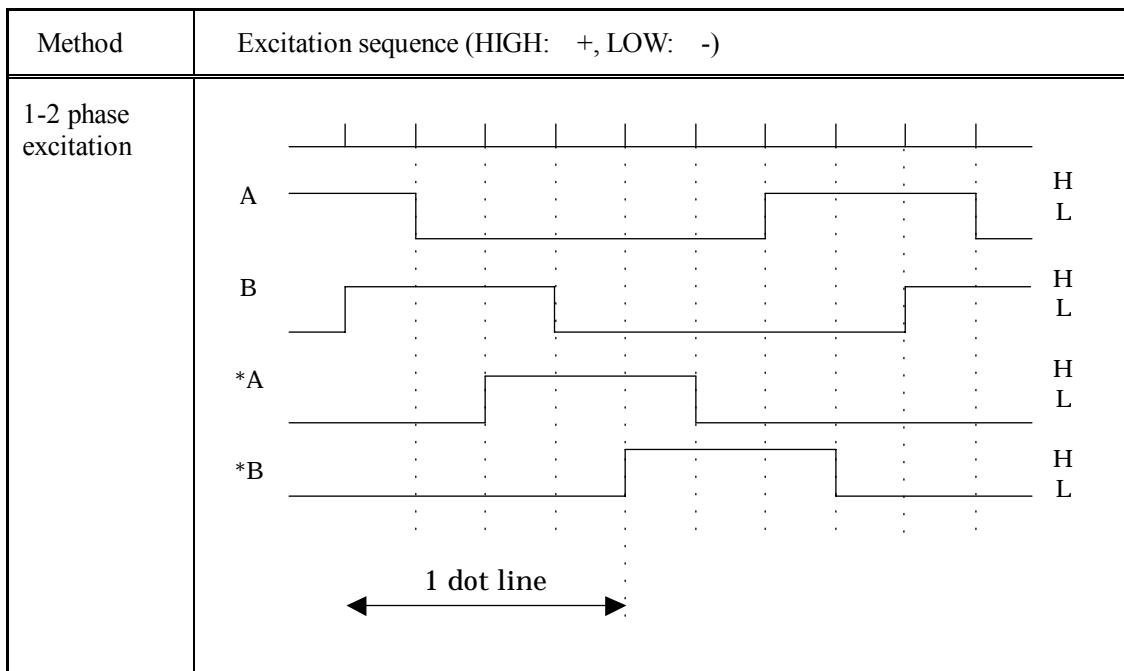
Item	Specification
Type	Permanent magnetic type
Number of phases	2 phases (bipolar specification)
Step angle	9 ° at 1-2 phase excitation
Coil resistance/phase	6.0Ω±10%
Rated voltage	DC4.2 – 8.5 V

(2) Stepping motor drive method

1) Drive the stepping motor by bipolar 1-2 phase excitation.

2) Number of steps per dot line printed

Excitation method	Number of steps	Rotation angle
1-2 phase excitation	4	9 degrees/step

3) The excitation method for reference is shown below.

Method	Excitation sequence (HIGH: +, LOW: -)
1-2 phase excitation	

(3) Motor drive condition

1) In high-speed mode, the rising edge of the waveform of the current becomes blunt due to the L element if the motor is driven by low voltage. To solve this problem, apply step-up power to improve the rising edge of the current. If the current waveform is blunt, fluctuation of the environment generates output torque variation which may cause the paper to be incorrectly fed.

2) Determine the conditions to drive the motor after checking the temperature humidity, paper type, and other factors that influence load variation. Note that if the motor is driven with excessive torque, gears may be damaged if the paper jams.

3) At low-speed drive (low drive frequency), abnormal noise or torque drop may occur because of motor resonance. Perform full evaluation and check to use a 250 pps or lower drive frequency.

4) If step-up power is applied, the reference exciting current is 375 mA. An excessive current generates excessive torque that may damage mechanical parts. Do not conduct an excessive current.

5) In the start sequence of high-speed printing or print start sequence after stopping the motor exciting current, perform acceleration control or an equivalent procedure.

(4) Notes

1) If the motor is stopped and motor excitation is discontinued during printing, the print may be separated because of the elasticity of the rubber roller when the motor is restarted. Print crush or white line insertion may occur. When print continuity is required, print all data at one time instead of stopping printing halfway. The above rubber roller deformation and other effect can also be reduced by feeding minute current in the standby state. In this case, the current as a guide is 150 mA

2) Turn off excitation to leave the printer unused for long time. The motor, drive element, or other may be heated.

3) Hold the motor side wall temperature 90°C or lower in use. Excess of 90°C may damage the coil in the motor.

4) When an abnormal condition occurs, stop printer drive as early as possible.

5) This printer feeds one dot line by four steps. Therefore, in motor drive by 1-2 phase excitation, control the motor so that stop occur in the 1-phase excitation state and start occurs in the 2-phase excitation state to save power and stabilize operation.

6) Printing operation with no paper and the head down may wear the rubber roller or damage the head. Don't perform printing in this condition.

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(6) Example of stepping motor drive circuit

Figure 8 shows an example of the bipolar constant-current drive circuit.

Figure 8 Motor drive circuit
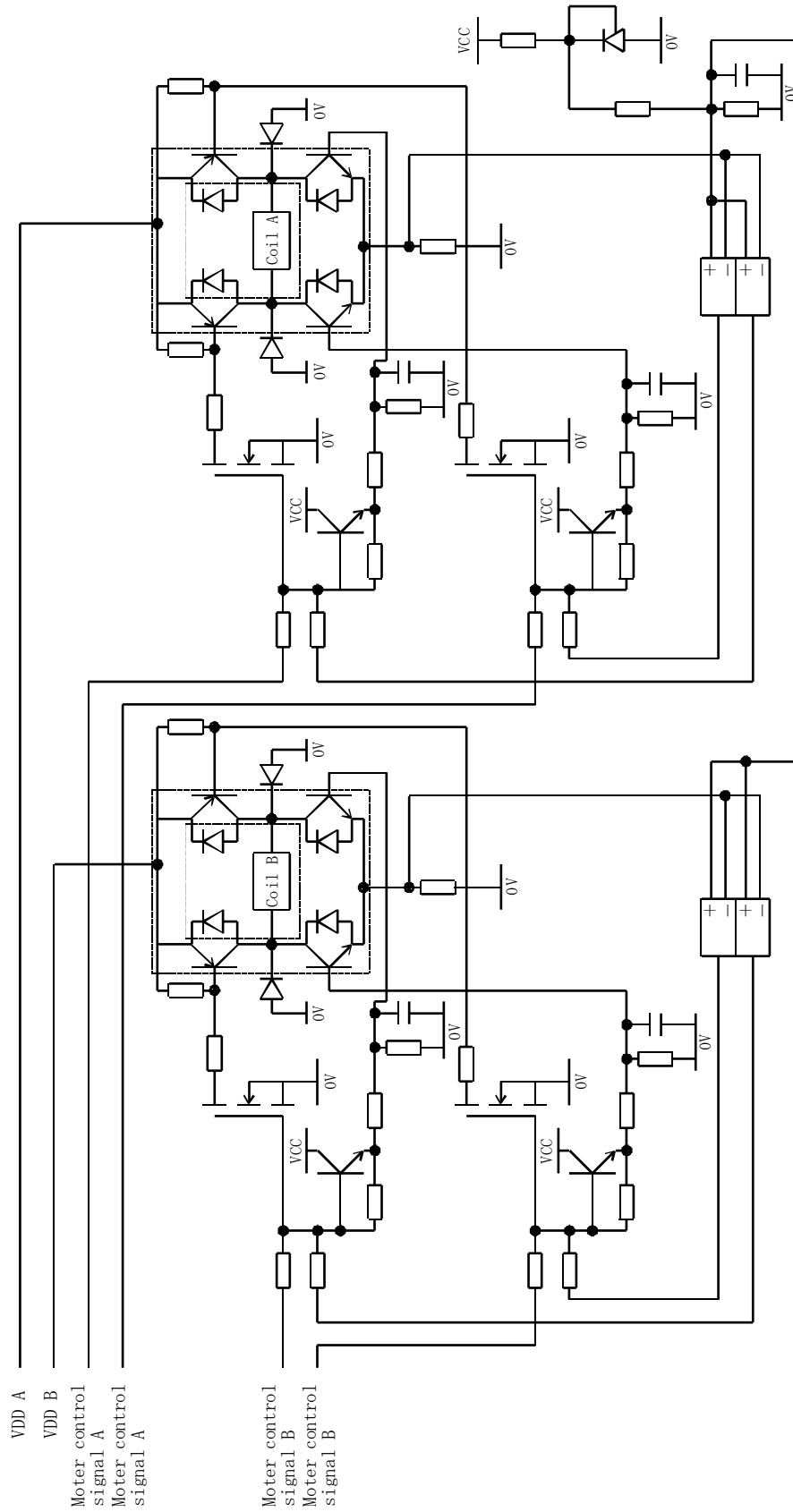
10. Photointerrupter Specifications

The main purpose of this photointerrupter is to position the paper by mark detection. This photointerrupter can also be used to detect no paper condition.

(1)　　Absolute maximum ratings

	Item	Symbol	Rated value	Unit
Input	Forward current	I_F	50	mA
	Reverse voltage	V_R	5	V
	Allowable loss	P	70	mW
Output	Voltage between collector and emitter	V_{CEO}	20	V
	Voltage between emitter and collector	V_{ECO}	5	V
	Collector current	I_C	20	mA
	Collector loss	P_C	70	mW

(2)　　Electrooptical characteristics

(25°C)

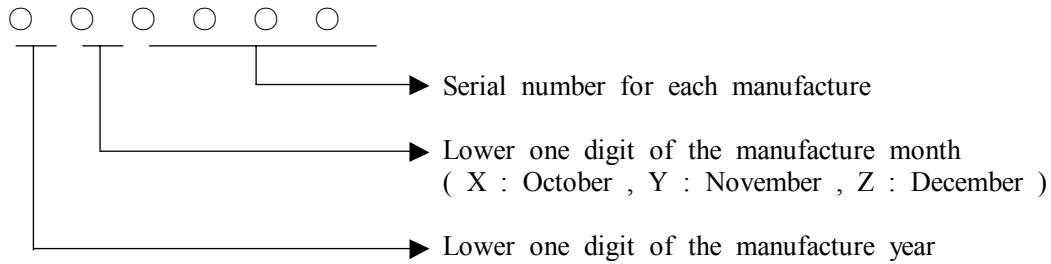|	Item	Symbol	Minimum value	Typical value	Maximum value	Unit	Conditions
Input	Forward voltage	V_F	1.0	1.2	1.4	V	I_F=20 mA
	Reverse current	I_R	-	-	10	µA	V_R=3 V
Output	Dark current	I_{CEO}	-	-	200	nA	V_{CE}=10 V
Transmission Characteri-Stics	Photoelectric current	I_C	260	-	1100	µA	V_{CE}=5 V, I_F=10 mA
	Leakage current	I_{LEAK}	-	-	1	µA	V_{CE}=5 V, I_F=20 mA
	Response time (rise)	tr	-	5	-	µs	V_{CE}=5 V, I_C=1 mA
	Response time (fall)	tf	-	5	-	µs	R_L=100Ω

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(3)   Example of external connection circuit
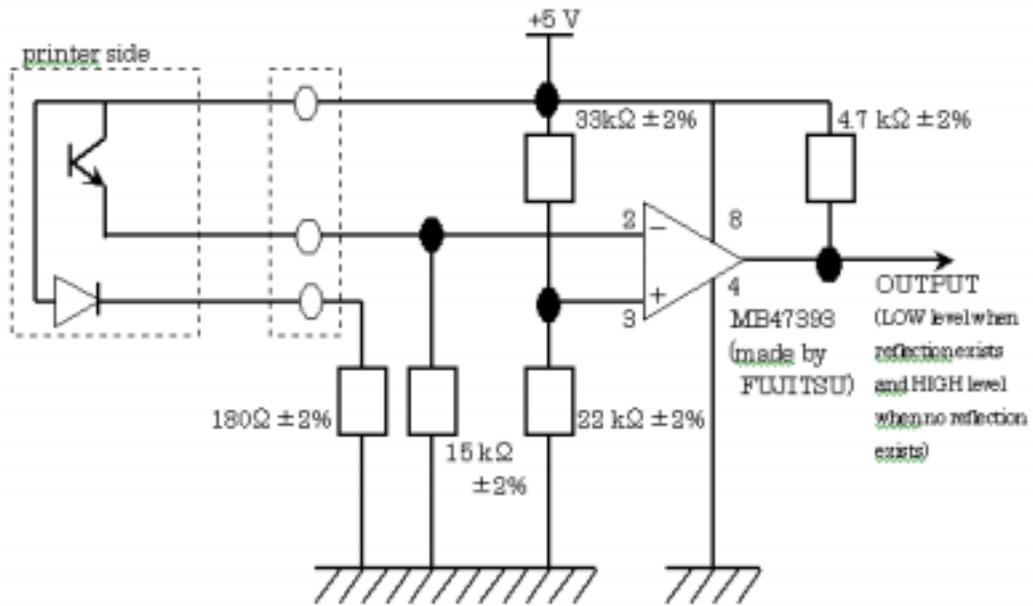
11.   Microswitch Specifications

Microswitches are built in to detect head up.

Item	Specification
Rated voltage	DC 30V
Rated current	0.1 A
Minute load capacity	DC5 V, 1 mA
Contact resistance	200 mΩ or less
Contact material	Gold

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12. Marking

11.1 Type and Serial Number Marking label

(1) Contents: The type, manufacture serial number, and revision number are marked.

(2) Application place: This label shall be applied on the side of the main body of the mechanical unit.

(3) Marking method: The type number, serial number, and revision number shall be marked by stamping.

(4) Serial number marking: 6-digits serial number shall be marked in the following format:

○ ○ ○ ○ ○ ○

→ Serial number for each manufacture

→ Lower one digit of the manufacture month
(X : October , Y : November , Z : December)

→ Lower one digit of the manufacture year

(5) Revision number marking: Mark the revision of the printer.

(6) Marking example: A marking example is shown below.

FTP-644MCL001 ← Type
No.0Z0001   01A ← Revision

(16)

F.T JAPAN

→ Manufacture serial number

(34)
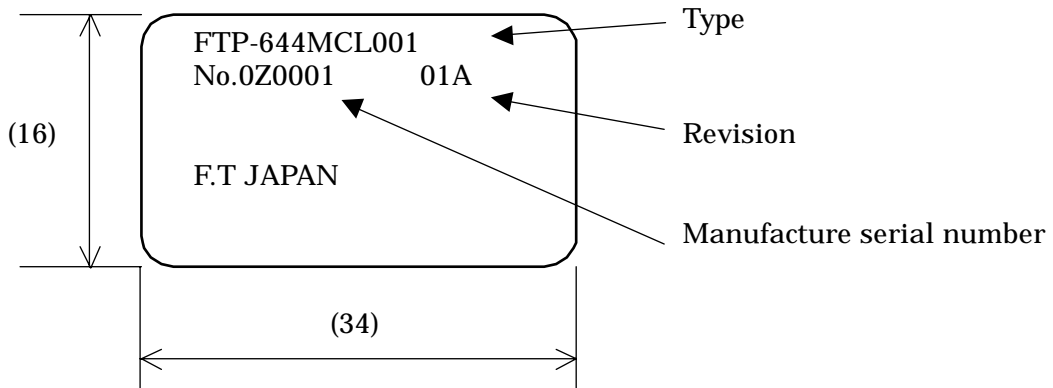
13. Packing

(1) Packing form: Put each unit in an antistatic bag and pack it in the dedicated packing box.

(2) Dimensions: Conform to the F&T standard.

(3) Number of units piled: Up to three units can be piled up in horizontal position.

(4) Marking: Mark the type and quantity on the surface of the packing box.

14. Notes for Handling

(1) Notes for paper loading and unloading

Load the paper so that its shaft is as parallel with the printer as possible.
(See the figure below)

Adjust paper ejection so that it is ejected smoothly without hitting the cover or other.

Without these treatments, trouble such as paper snaking, printing position misalignment, and paper jam may occur in printing.

0.5mm or less

0.5° or less

(2) Notes for storage

For long-time storage (half year or longer in room temperature), load paper and establish head up condition.

If the rubber roller remain in direct contact with the head and pinch roller for long time, the rubber roller may be partially deformed to cause uneven print darkness.

Do not place the printer in an environment in which condensation may occur with the

power on for long time to prevent galvanic corrosion.

(3) Notes for mounting and setting

When installing the printer, fix the edge part with hooks at two places and fix the rear part with screws of M2 at two places.
At this time, support the printer by the same plate (flatness : 0.1 or less).

Connect the mounting section on the motor side to the frame ground of the main body.

In securing, take care not to strain or deform the printer body.

A violation of these notes may cause trouble such as blurred printing,
wavy paper, paper jam, and noise.

(4) Back tension of recording paper

When using this printer with the F&T standard circuit, adjust the back tension of the

paper at the printer paper entrance to approx.0.98N(100g).

Application of back tension that exceeds 0.98N(100g) may cause a paper jam or overload and damage the gear.

(5) Galvanic corrosion

If head voltage is applied with the paper wet, the head may be damaged because of

galvanic corrosion. Do not place the printer in anenvironment in which condensation

may occur with the power on for long time.

(6) Dust and drip

The structure of this printer is neither dust-proof nor drip-proof. Give a treatment against dust and drips to the mainframe side beforehand.

(7) Other

Lift the head up lever when paper is not loaded on the printer.

If the paper runs out during printing, stop printer operation to prevent printing with no paper. This causes printer failures.

15. Other

(1) Both sides shall consult to solve occurred problems based on this specification.

(2) Both sides shall consult to make changes and additions incompatible with this specification.

In the range of compatibility, this printer may be changed without prior notice because

this type is a standard type.

(3) Preprinting

Consult on preprinting (printing on the paper) according to Appendix 1 beforehand. The ink used, printing method, and drying method of preprinting may affect the print quality of the thermal printer largely.

(4) Label feed

Do not feed labels backward by turning the knob in reverse direction or other because it

may cause the label to adhere to the inside of printer.

(5) Paper rolling direction

Roll the paper with the heat-sensitive side on the outside to make paper insertion easy

and reduce the transport load at drive.

(6) Paper perforation

Perforate paper from the heat-sensitive side to prevent printing failure or head life shortening because of a perforation burr or paper residues.

(7) Head cleaning

Paper residues or foreign matter may shorten the life of the head or platen.
Clean the printer periodically.

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DATE

EDIT	DATE	DESIGN	CHECK	DESCRIPTION
DESIGN			CHECK		APPLY

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Appendix 1

Preprinting

1.Detecion mark position

Print the detection mark in a 5±1 mm x 10 mm (MCL001) and 15 mm (MCL002) or wider band as shown in the figure below.

```
        ┌──── top ────
        │
                Mark
        (Heat-sensitive side)

        On the Heat-sensitive side
                (MCL001)
        On the Non-heat-sensitive side
                (MCL002)
```

insertion direction of a paper

5±1mm

Preprinting inhibited

10 mm or more (MCL001)
15 mm or more (MCL002)

2. Positioning mark preprinting

The mark color shall be black and the density shall be 7% or lower reflection factor and PCS0.9 or higher. Use oil ink and remove unevenness. Multiple coating is recommended to raise the PCS value.
The density measuring instrument and value are as follows:

PCS measuring instrument : Macbeth reflection-type densitometer PCM-II
(used filter : D range 900 nm)

3. Preprinting inhibition

Preprinting on the mark detection area (10 mm from the right edge) is inhibited. If this preprinting is required, select ink in the range of the wavelength (700 to 1000 nm) used by the photointerrupter and so that the reflection factor is 80% or higher.
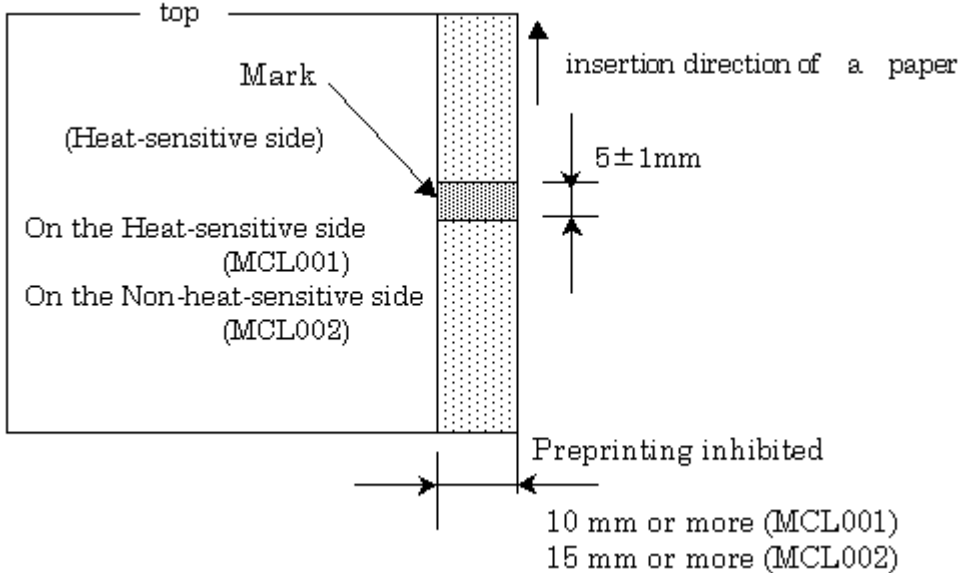
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CUST

EDIT | DATE | DESIGN | CHECK | DESCRIPTION

DESIGN | | CHECK | | APPLY

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4. Notes for preprinting

The characteristics of heat-sensitive paper differ those of general printing paper and no-carbon paper. Note the following in print processing :

A. Printing method

Use the UV printing method because heat-sensitive paper has poor ink dryability.

B. Ink

(1)   Use ink that doesn't have bad effect such as residue adhesion, head wearing, and sticking on the thermal printer.

(2) Use ink that contains 100 ppm or less of CI ions.

Recommended ink: RNC type by F&K TOKA

(3) Take care of the ink tack because the surface strength of the heat-sensitive layer is lower than general printing paper. Use 6.0 as the ink tack for general heat-sensitive paper or the same level as no-carbon paper for high-storage heat-sensitive paper.

(4) Don't apply an excessive amount of ink. An excessive amount of ink causes printing or coloring failure or sticking.

(5) Use heat-resistant ink material that doesn't perform cooling. Also use such ink for the non-heat-sensitive side.

(6) After printing, check that the ink adheres to the paper. Manage wetting water carefully because in general, UV ink tends to yield to water.

(7) Avoid ink transfer and blocking.

(8) Ensure that the preprint isn't peeled by water or alcohol.

C. Wetting water

(1) Manage wetting water carefully because heat-sensitive paper tends to repel water.

(2) An excessive amount of IPA in the wetting water may cause color smudging to background. adjust the IPA amount to 5% or less for general heat-sensitive paper or 10% or less for high-strong heat-sensitive paper.

D. Other

(1) When using many UV lamps, take care of paper contraction (flow or width direction) or color smearing because of heat.

(2) Set the holding roller pressure of the drive roll high because the paper surface is slippery.

(3) Perform multiple printing to raise the PCS value of the positioning marker.

(4) Some preprinting causes sticking or the like. Be sure to perform evaluation and check on the actual machine.