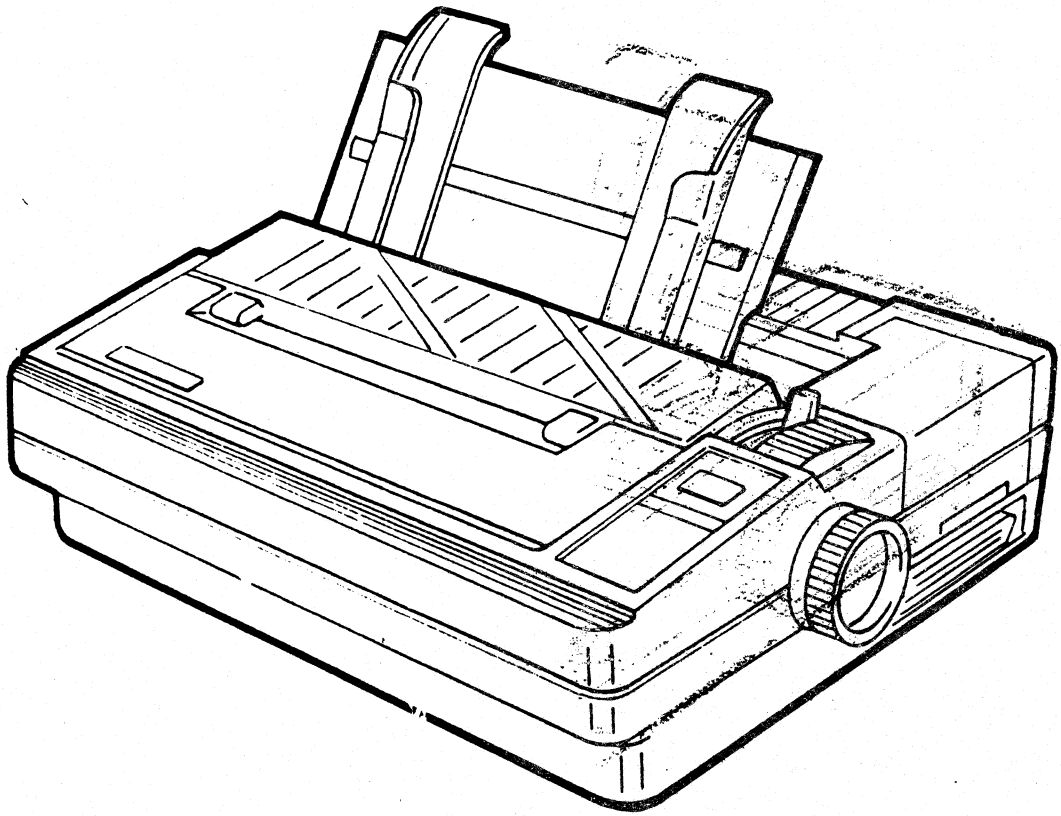
GSX 140
Technical Manual

CITIZEN



CHAPTER 1
SPECIFICATIONS

CHAPTER 1 SPECIFICATION
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1-1 SPECIFICATIONS

(1) Printing Method

24wires dot matrix impact printer

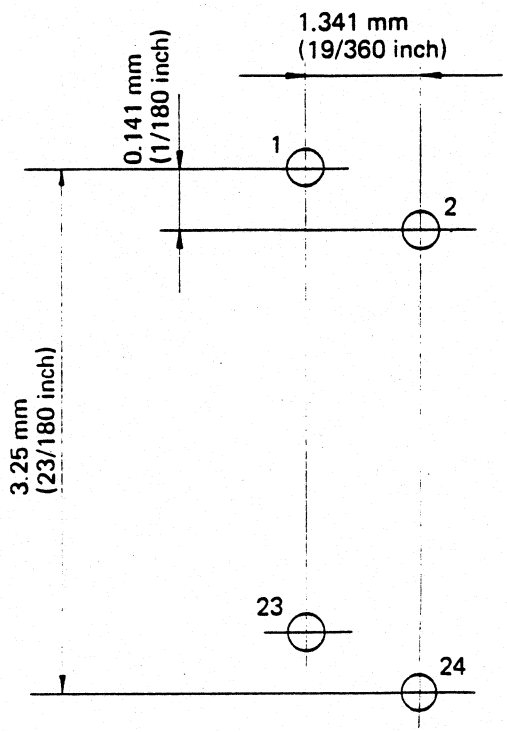
(2) Printing System

Bidirectional logic seeking for DP, LQ and Graphics.

LQ and Graphics : Bi -or Unidirectional (selectable by operation panel)

(3) Print Head

Number of print head wire	:	24 wires
Wire arrangement	:	12×2 stagger
Diameter of wire	:	0.2mm
Life	:	200million dots / wire
Driving voltage	:	+27 V (DC)



(4) Printing Speed

	10 cpi	12cpi Hi Speed mode	12cpi Normal speed (Hi density)
Draft	160 cps/120 dpi	192 cps/120 dpi	160 cps/144 dpi
LQ	53 cps/360 dpi	64 cps/360 dpi	53 cps/432 dpi

(5) Number of Column

CPI	10	12	15	17.1	20
Columns	80	96	120	137	160

(6) Character Sets

ASCII 96 normal characters

International 32 normal characters, 13 languages (include Scandinavia)

IBM characters graphics

IBM code page, 437, 850, 860, 863, 865

(7) Character Matrix

Character Pitch	Draft	Letter quality
10 cpi	24(V)×12(H)	24(V)×36(H)
12 cpi	24(V)×10(H)	24(V)×30(H)
15 cpi	24(V)×8(H)	
17.1 cpi	24(V)×12(H)	
Proportional Spacing		24(V)×N(H)

Note : V : Vertical
H : Horizontal

(8) Line Feed Space

1/6 , 1/8, n/60, 7/72, n/120

or n/180 inch. (programmable)

(9) Form Length

6, 8, 11, 11 2/3, 12, 14, 15 inch

(10) Buffer Memory

Input Buffers

8K bytes (standard)

40K bytes (Option)

Down load

Max. 96 characters (IBM) (Need option RAM)

Max. 128 characters (Epson)

Note : The option RAM can be used for either IBM download or input buffer.

(11) Paper Feed Speed

Through Speed (Continuous feed)	with ASF	: 2.5" /sec.
	without ASF	: 3.25" /sec.

(12) Paper Handling

Paper course (Insertion)

	Push tractor	Pull tractor	Cut sheet
Rear	YES	YES (*1)	YES (*2)
Bottom	NO	YES	NO

*1 The copy paper is recommended for the bottom feeding with the pull tractor.
*2 Use insertion plate unit.

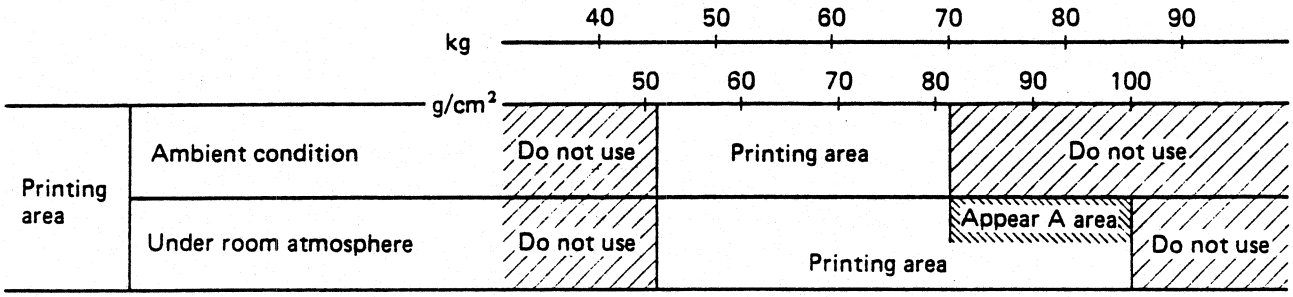
Paper specification

	Cut sheet	Fanfold form
Width	7.2"~10" (182.9mm~254mm)	4"~10" (101.6mm~254mm)
Length	4.5"~14.3" (114.3mm~364mm)	———
Thickness	0.0026" to 0.004" (0.065mm~0.1mm)	0.0026" to 0.009" (0.065mm~0.22mm)
Weight	45~70kg 80~100g / m^2 (Under room atmosphere)	45~70kg 80~100g / m^2 (Under room atmosphere)
Copies	Not available	Original + 2 sheets (Rear) Original + 3 sheets (Bottom paper feeding with clear copy mode)
Notes	1.Please set the Paper Select Lever at FRIC position. (▱) 2.Please use the highest quality paper	1.Please set the Paper Select Lever at PIN position. (▱) 2.Please use the highest quality paper.

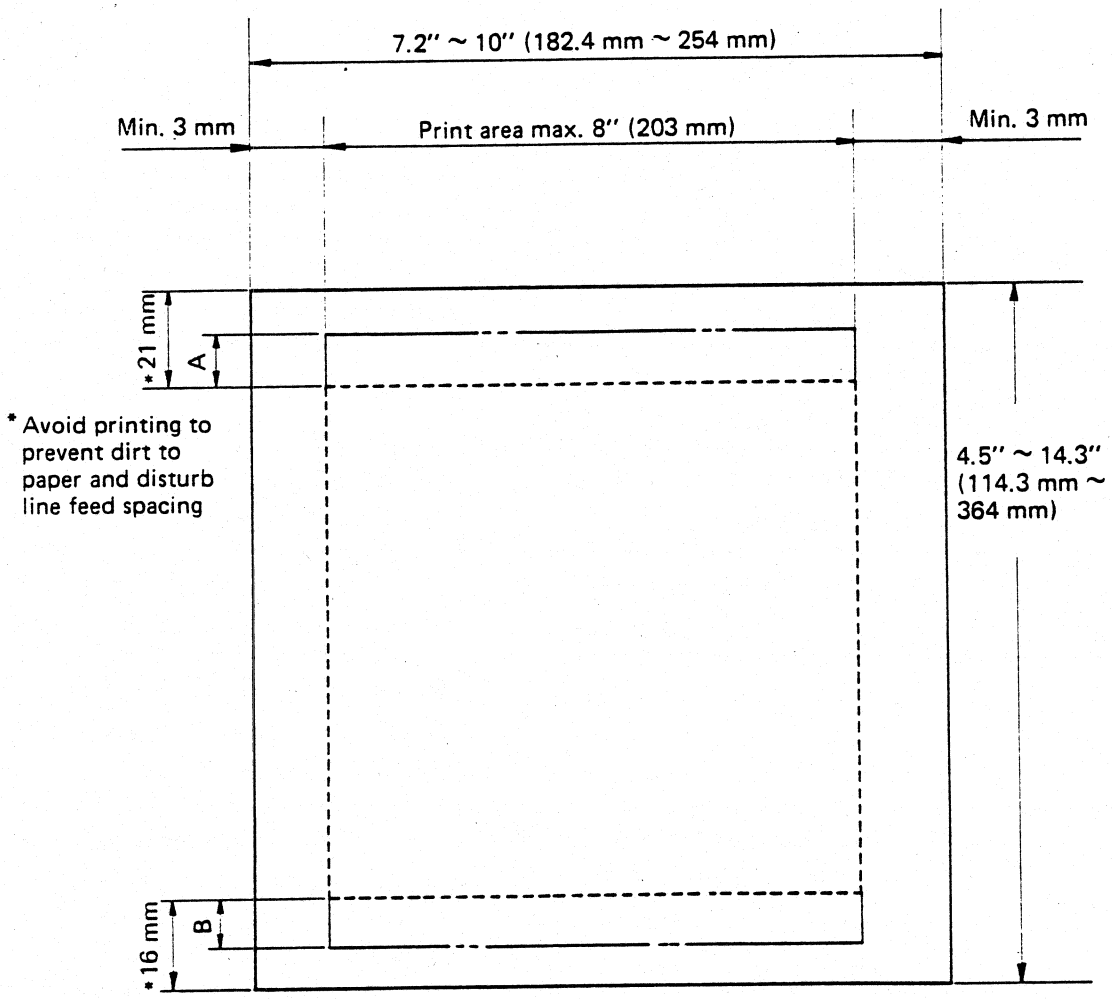
(13) Paper Standard and Printing Area

(A) Cut sheet (with using insertion plate unit)

① Paper weight



② Printing area

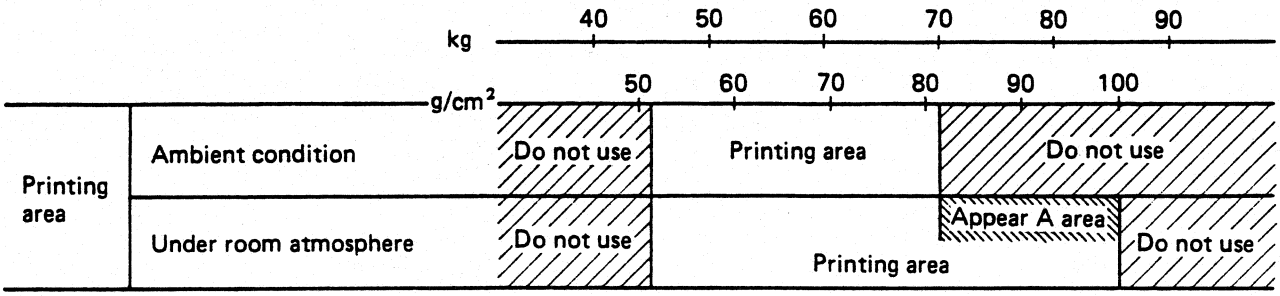


A: Incomplete print area according to paper thickness.
A=12.7 mm

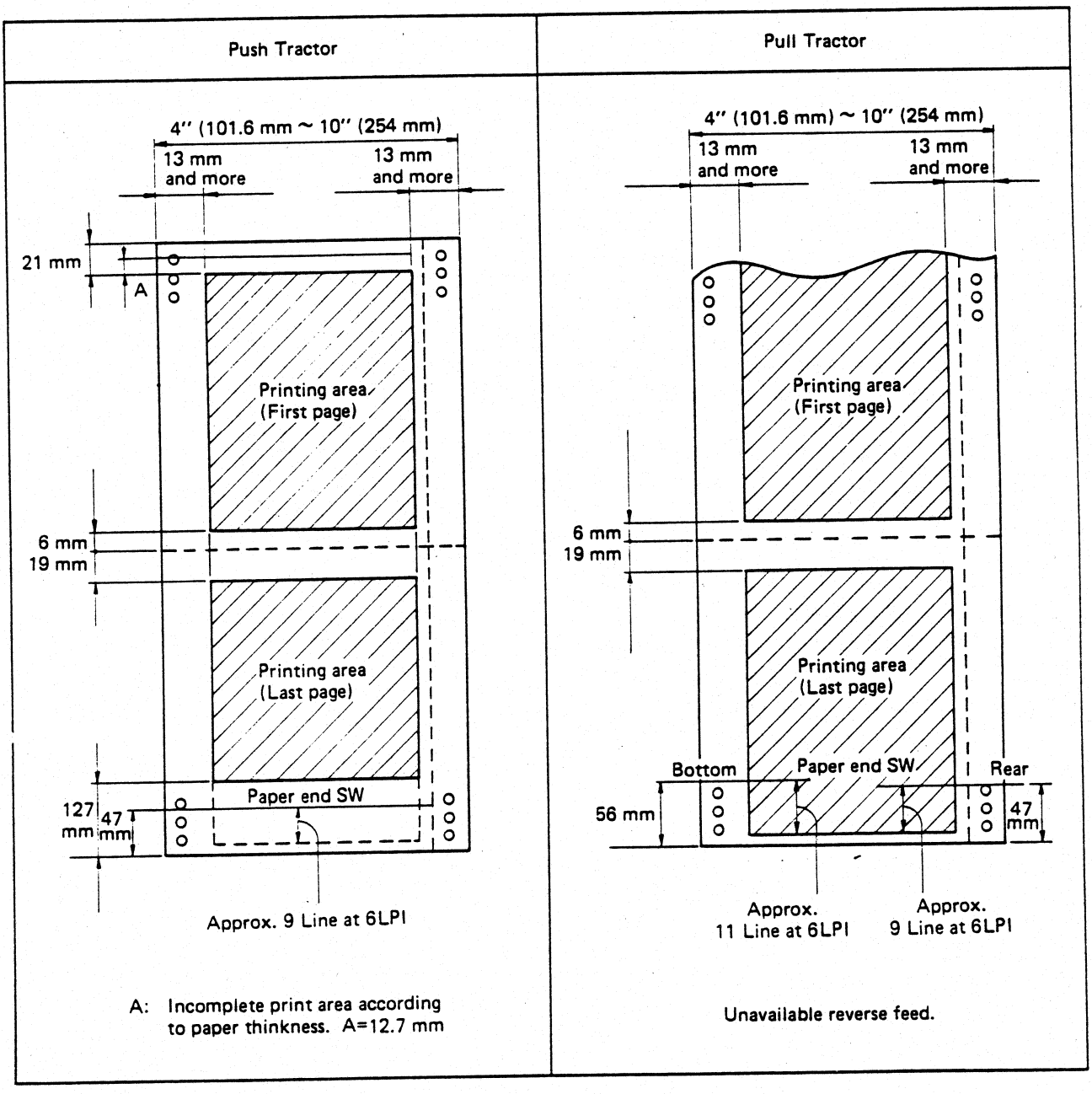
B: Incomplete print area.
B=10 mm.

(B) Continuous form (with using tractor)

① Paper weight



② Printing area



(14) Ribbon Cartridge

Use of genuine citizen ribbons is recommended.

● Specification

	Black ink Ribbon	Color ink Ribbon
Color	Black	Black Blue Magenta Yellow
Width	8±0.2mm	25.4±0.3mm
Length	13± 0.3m 0	12± 0.3m 0
Thickness	0.128±0.008mm	←
Material	66 Nylon	←
Denier	40×40 Denier	←
Ink volume	21±1%	18±1% 20±1% (Only yellow)
Life	2 million characters	----------

(15) Emulation

Selectable by operation panel

IBM Proprinter X24

EPSON LQ500/850

(16) Interface

- Specifications

	Parallel I/F	Serial I/F (RS-232C)
Transfer system	8 bit	DTR protocol XON/XOFF Protocol
Hand shake	ACK(Acknowledge) or BUSY	
Synchronizing system	STROBE pulse	Synchronous
Baud rate		110, 300, 600, 1200, 2400, 4800, 9600
Logic Level	TTL-compatible	±5~±12 V
Word length		7 or 8bit selectable
Start bit		1 bit fixed
Stop bit		1 or 2 bit selectable
Connector	Printer/cable side; 36pin connector	25pin connector

(17) Electrical Specifications

Power requirement	:	95 to 132 VAC
Power source frequency	:	47 to 400 Hz
Power consumption	:	Stand by 12W
	:	Operation 35W (under slide pattern)

(18) Reliability

MTBF : 4,000 hours, excepting the print head (by calculation)

MTTR : 20 minutes or less

Life of printing head	:	200 million dots/wire
Life of ribbon	:	2 million characters

(19) Environmental Requirements

Temperature	:	In operation	5°C to 35°C
	:	In storage	−30°C to +65°C
Humidity	:	In operation	10% to 80% RH (Non condensing)
	:	In storage	5% to 85% RH (Non condensing)

(20) Physical Dimensions

height	Width		depth	Weight
	Include knob	Not Include knob		
5.1" (130mm)	16.9" (429mm)	15.8" (402mm)	12.6" (320mm)	11.5 lb (5.2kg)

(21) Features

- IBM Code Page
- Paper Parking
- Clear Copy mode
- Quiet mode
- Push or Pull tractor
  (selectable by changing mount position)
- Print styles and modes selectable on Operation Panel
- Parallel (standard) and Serial Interfaces (option)
- Automatic paper loading with ASF
- High quality print ribbon

Chapter 2
Operating Principles

CHAPTER 2 OPERATING PRINCIPLES
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2-1 Operation of each Mechanism

This printer is a serial impact dot matrix printer comprised of several mechanisms such as the print head, carriage feed, ribbon feed and paper feed parts.
This section describes the operation of each of these mechanism.

2-1-1 Print head mechanism (see Fig.1)

The print head is a clapper type which utilizes the attractive force of an electromagnet. It is designed to be easily mounted on and detached from the carriage assembly which moves in parallel with the platen.
The print head is electrically connected to the control circuit via a connecting cable.
The print head consists of the following components :

(a) Nose assembly.
(b) Electromagnetic solenoid assembly.
(c) Armature assembly.

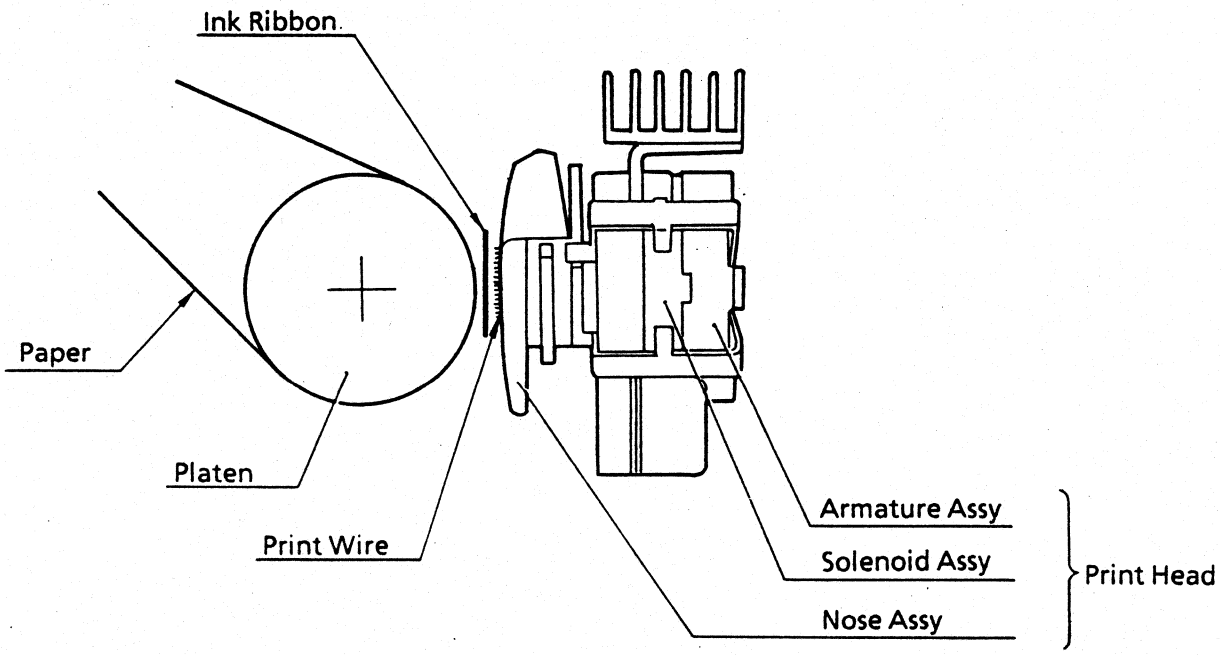


Fig. 1

(1) Operation of print head (See Fig.2)

The armature is usually held in the armature stopper position by the armature spring and the print wire spring. When the appropriate drive signal for each character received is detected by the control circuit, the drive current is applied to the print coil corresponding to that signal. When the coil conducts, the attractive force is generated between the armature and core to drive the armature toward the platen, allowing the print wire attached to the armature to strike the ink ribbon and platen. As a result, dots are printed on the form paper. When the printing stroke is completed, the armature is retracted to the armature stopper position by the armature spring. The print wire is also reset to the rest position by way of the wire spring.

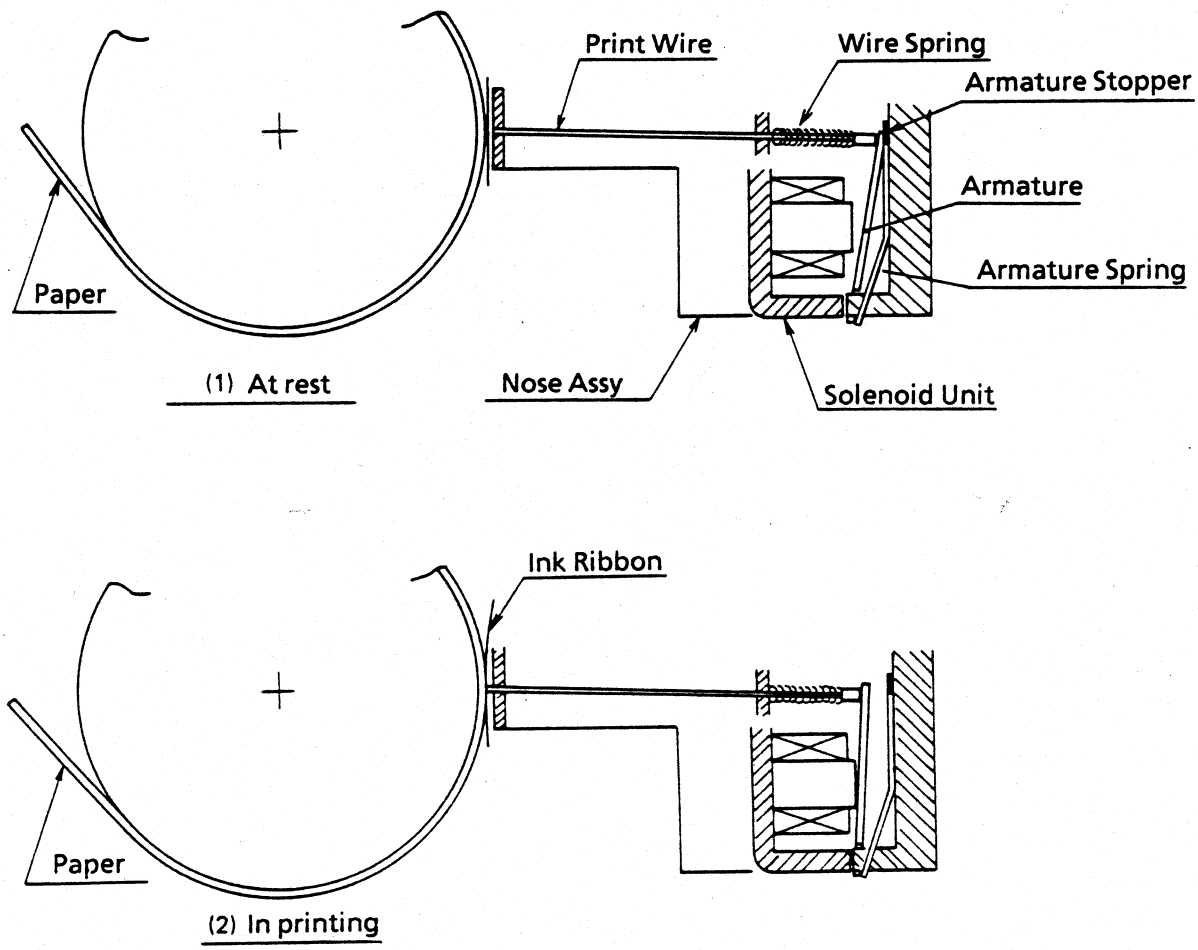


Fig. 2

2-1-2 Carriage feed mechanism

The carriage SA2 assembly is guided by the carriage shaft SA1 and carriage guide frame mounted parallel with the platen and is driven by the carriage motor SA.

The major components of this mechanism are :

(a) Carriage motor SA
(b) Timing belt
(c) Pulley R and pulley R holder
(d) Pulley L SA
(e) Carriage shaft SA1
(f) Carriage SA2
(g) Home position switch (HP switch)
(h) Carriage guide frame

(1) Mechanism and operation (See Fig.3)

The carriage SA2 is equipped with the print head and is designed to move parallel with the platen along the carriage shaft SA1 and carriage guide frame. On the carriage SA2, the timing belt is fixed at its both ends. Constant tension is maintained on this belt by the pulley R holder.

The carriage SA2 is driven by the carriage motor SA via the timing belt. Clockwise (counter-clockwise) rotation of the motor provides the right to left (left to right) movement of the carriage SA2. When the carriage motor rotates 450 degrees, the carriage assembly moves by 25.4 mm (1 inch).

(2) Carriage return operation (See Fig.3)

When the CR code is received, a signal from the control circuit actuates the counter-clockwise rotation of the carriage motor SA.

As the result, the carriage SA2 moves form right to left.

The home position switch located at the base of the carriage SA2 passes through on the home position switch.

By its signal from the switch, the carriage SA2 stops at the home position.

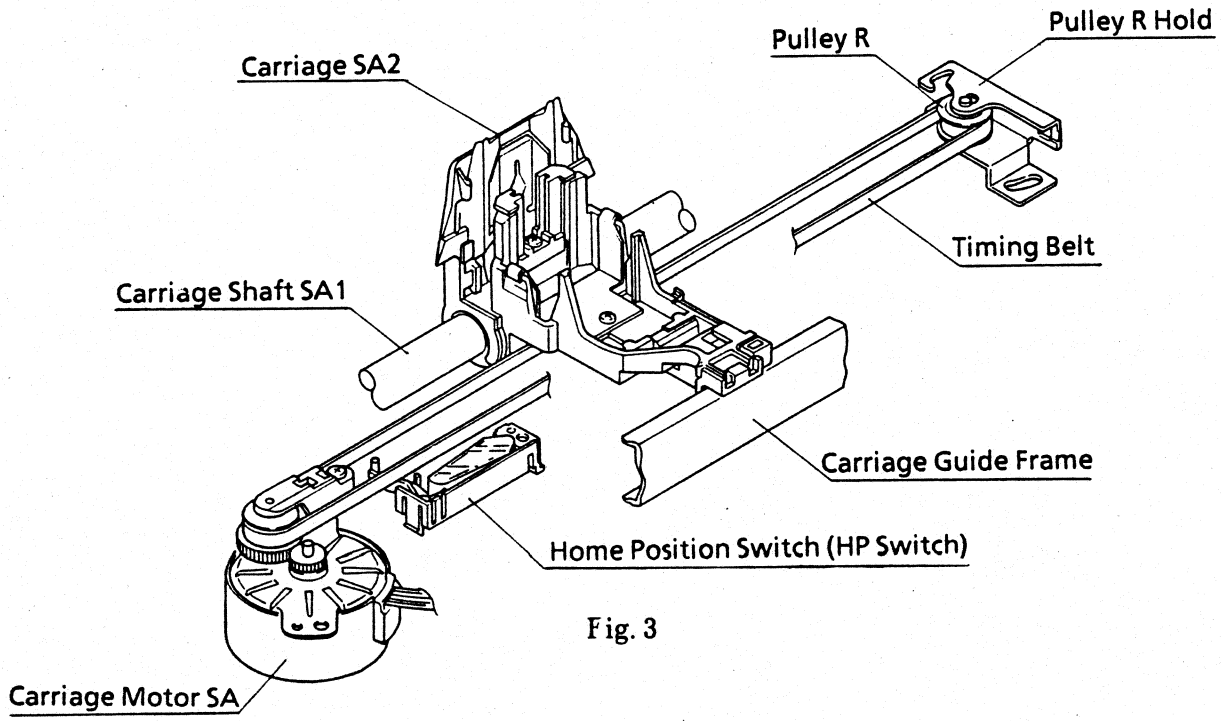


Fig. 3

2-1-3 Ribbon feed mechanism

The driving power for the ribbon feed system is derived from the carriage motor SA via gears.
The major components of the ribbon feed mechanism are :

(a) Carriage motor SA
(b) Ribbon gear SA
- 1st gear, 2nd gear, 3rd gear and ribbon gear.

(c) Cassette feed gear and idle gear.

(1) Ribbon feed operation (See Fig. 4)

While the carriage is sliding in the arrow direction the ribbon gear rotates in the same direction through 1st gear, 2nd gear and 3rd gear. Then, while the carriage is moving reversely, the 1st gear rotates counterclockwise and the ribbon gear rotates in the arrow direction through 2nd and 3rd gear.
That is, no matter which direction the carriage slides in, the ribbon gear rotates clockwise.

(2) Ribbon cassette mechanism (See Fig. 4)

The ink ribbon is formed in the Möbius endless loop, and is always fed between idle gear and feed gear in the uni-direction.
Rotation of the feed gear which is coaxially coupled with the cassette idle gear allows the ribbon to be folded and pushed into the cassette. The ribbon is arranged in a straight line by the slit provided at the feed outlet on the other side. The ink ribbon is inverted between the slit and back tension leaf spring, and it is fed toward the print head with appropriate back tension applied by the back tension leaf spring.

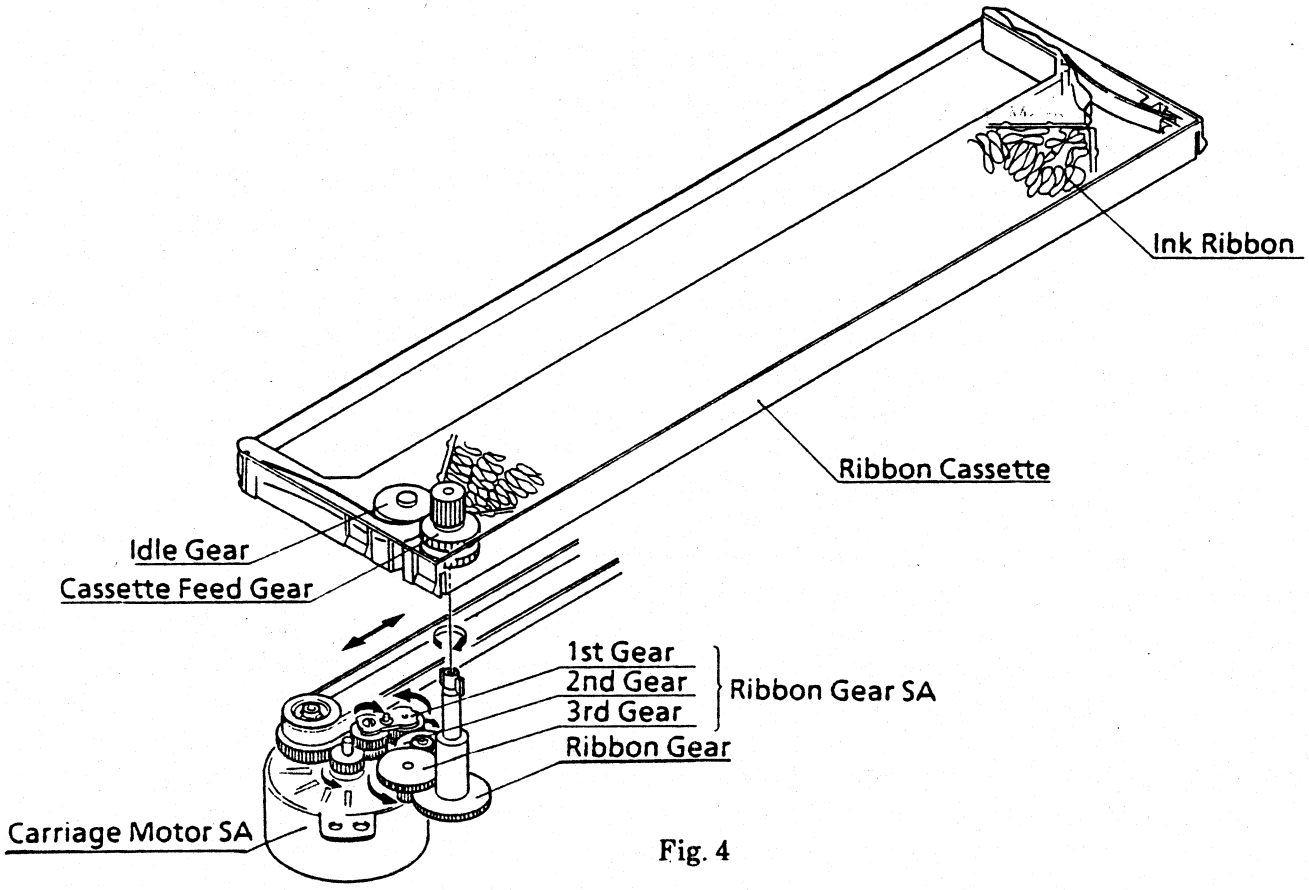


Fig. 4

2-1-4 Paper feed mechanism

The paper is advanced by three types of feeding methods : Friction feed method, tractor feed (Pull) method and tractor feed (Push) method. Individual operational principles are described below. The major components of the paper feed mechanism are :

(a) Paper feed motor SA
(b) Gear train
(c) Platen SA
(d) Roller holder SA
(e) Tractor unit

(1) Friction feed mechanism (See Fig. 5)

When the select lever is set "FRIC" position (▱), the roller holder SA is pressed and connected to the platen SA. At the same time, the idle gear 2 disengages from the tractor gear and the power to the tractor is cut off.

Consequently, power of the PF motor SA is transmitted to the idle gear 1 and the platen gear, causing the platen to be driven.

The select SW is changed to OFF-line, and the friction feed operation is detected by the control circuit.

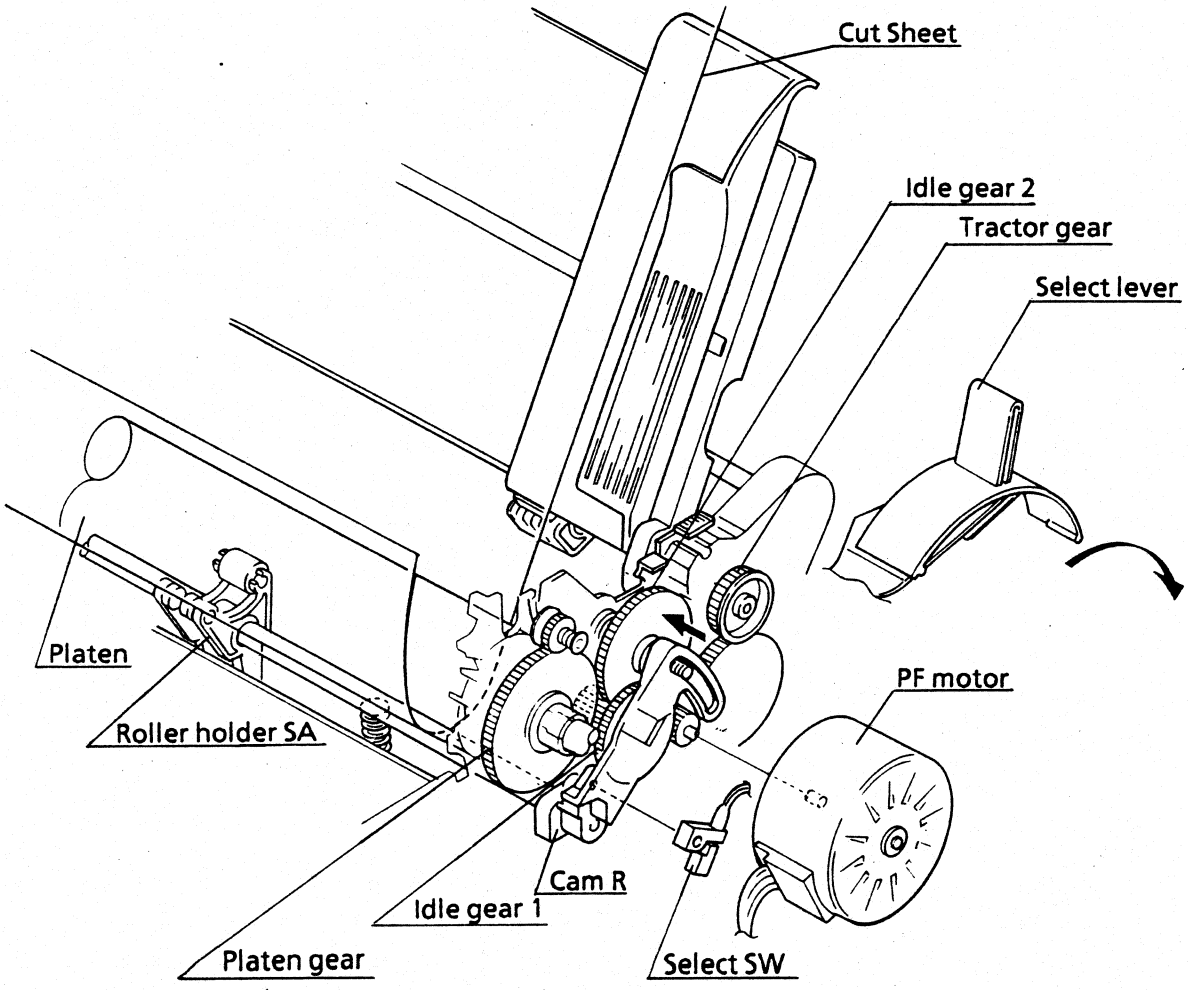


Fig. 5

(2) Tractor feed mechanism (Push) (See Fig. 6)

When the select lever is set to "PIN" position ( ), the friction rollers are released from platen and at the same time the idle gear 2 slides to engage the tractor gear.

Therefore, the PF motor power drives the platen and is also transmitted through the tractor gear to the tractor, and feeding continuous paper. (Fig.●)

Also at the same time, the select SW is changed to ON-line, and the tractor feed operation (push) is detected by the control circuit.

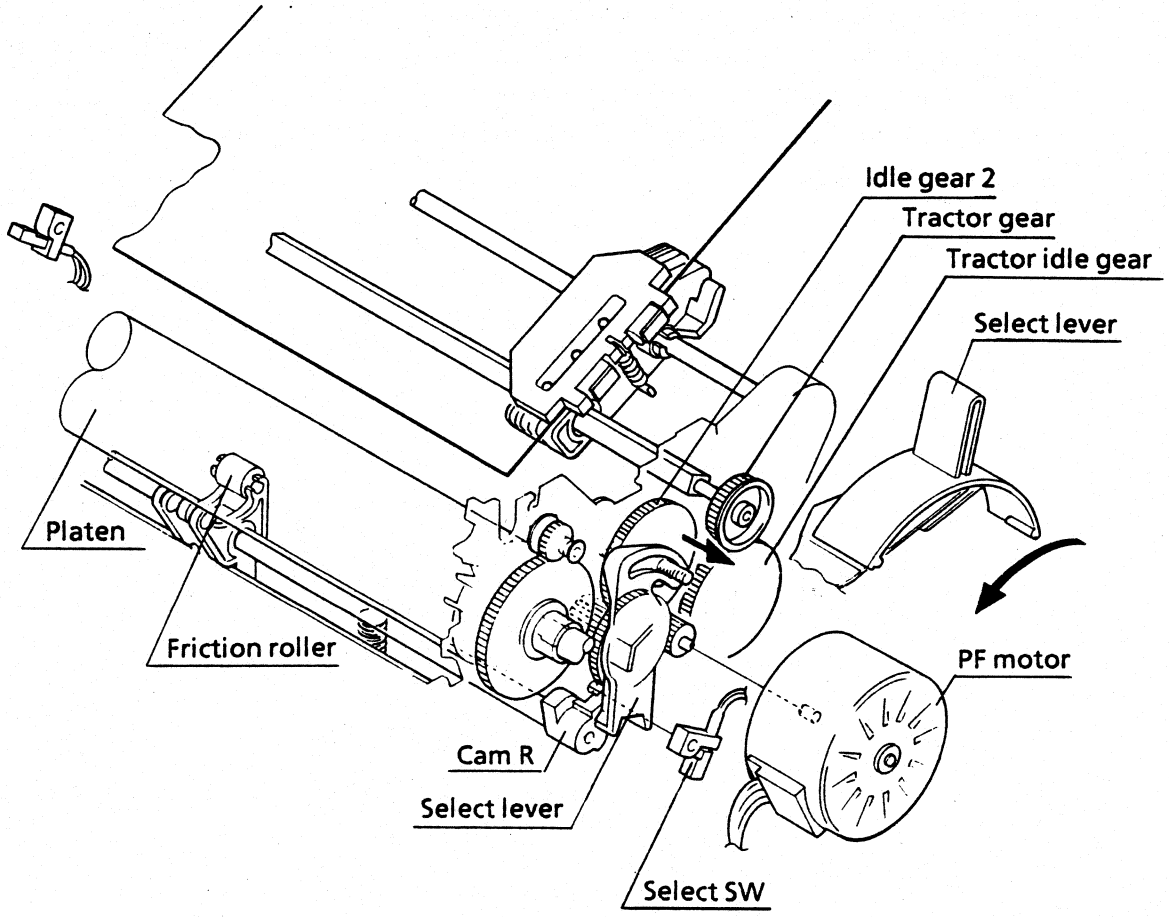


Fig. 6

(3) Tractor feed mechanism (Pull) (See Fig. 7)

The tractor unit is mounted on the top of the printer (Refer to the illustration on the upper case.), and at the same time the pull position is detected by the pull tractor SW, and is transmitted to the control circuit.

When the select lever is set to "PIN" position, the friction rollers are released from platen by the cam R, and becomes continuous paper feeding state.

In case of the pull tractor position, with "PIN" or "FRIC" position of the select lever, the tractor idle gear are always engaged with the idle gear 2. But cut sheet paper can not use at "FRIC" side.

This is inhibited by the control circuit.

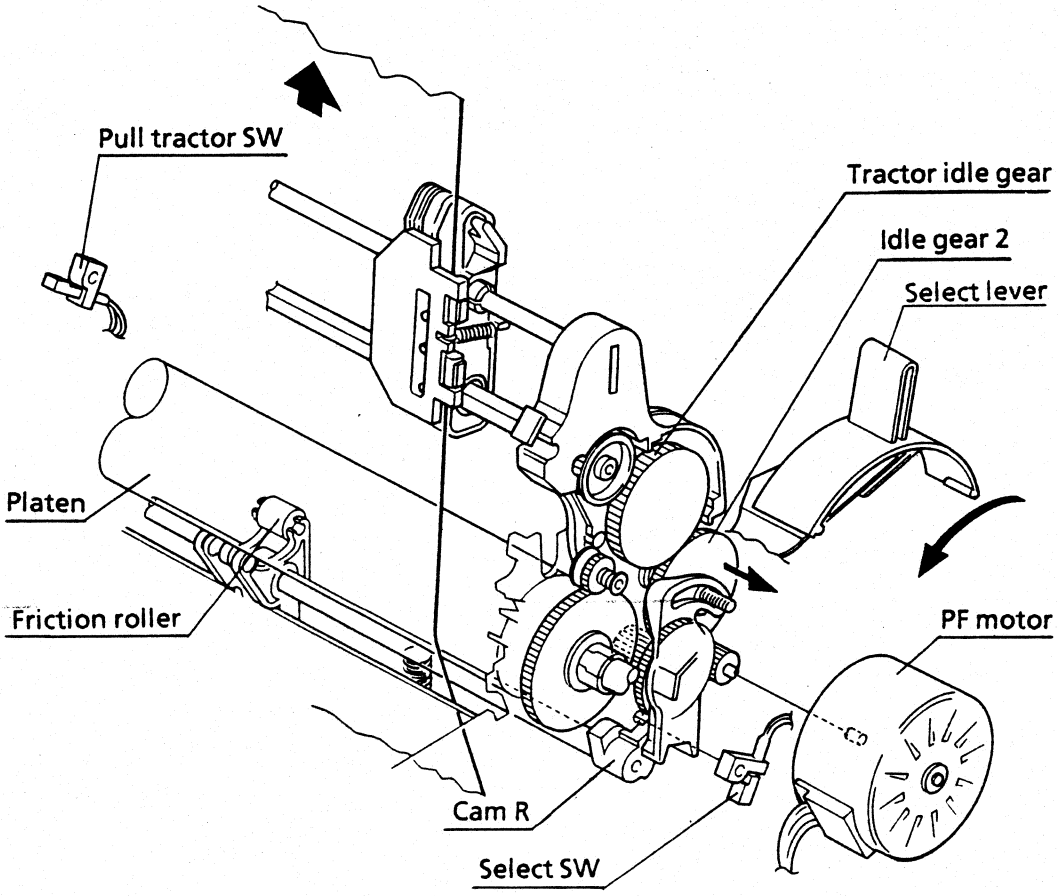


Fig. 7

(4) Paper Parking Operation (See Fig. 8)

This paper parking is a mechanism by which printing can be done on the cut sheet while parking without removing the continuous form from the tractor when changing from continuous form printing to cut sheet printing.

Operation Procedure

A. Printing cut sheet after printing continuous from.

1. Set the LCD panel display on the operation panel to OFF LINE mode. If the printer is ON LINE mode, press the [ON LINE] key to change to OFF LINE.
2. Press the [PARK LOAD] key.

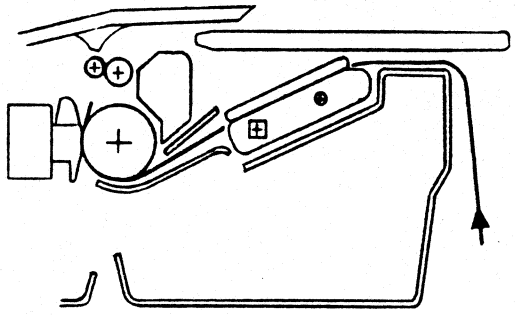
   Each time this operation did, the continuous form is fed backward by max. 15 inches.

   After detected by the P. E. switch, the paper stops on the tractor.
3. Set the select lever to FRIC side ( ).

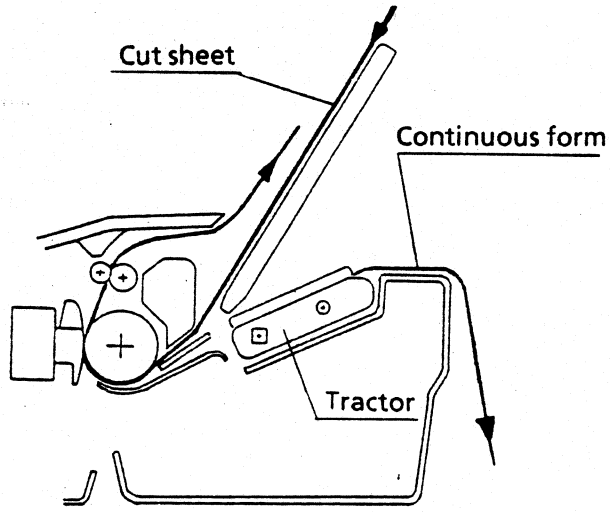
   After that, when the cut sheet is inserted, printing starts by auto sheet loading function.

B. Printing continuous form after printing cut sheet.

1. Set the select lever to TRACTOR side ( ).
2. When the [PARK LOAD] key is pressed, the continuous form is fed up to the position of the print head allowing printing from the top of the paper.



[Tractor Feed]



[Paper Parking Operation]

Fig. 8

2-1-5 Paper end detection mechanism (See Fig. 9)

The paper end detection mechanism consists a switch for detecting the rear feed and another switch for detecting the bottom feed.

The paper end SW1 (rear side) for the rear feed detects both the paper running out from the rear, and paper pork position of the continuous paper.

In case of the bottom feed, the paper end SW2 (bottom side) is used the detection of paper running out, and paper control that the printer inhibits the back-feeding.

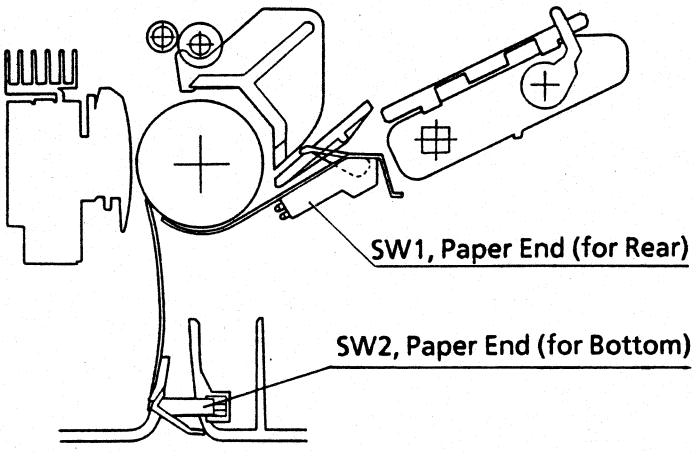


Fig. 9

2-1-6 Print head gap adjust mechanism (See Fig. 10)

The print head gap adjust mechanism moves the carriage BK forward or backward by rotating an eccentric-shaped carriage rail bushing to properly adjust the gap between the print head and platen.

The gap adjusting lever is located to the left side as viewed from the operator. The gap can be varied by tilting the lever.

Tilting the gap adjusting lever toward the platen narrows the gap between the platen and print head, while tilting it in the opposite direction widens the gap. The gap adjusting lever is so designed that it can be adjusted in fixed increments with click touch maintained when it is tilted on its own shape. One click of the gap adjusting lever changes the gap between the platen and print head at increments of 0.05 mm.

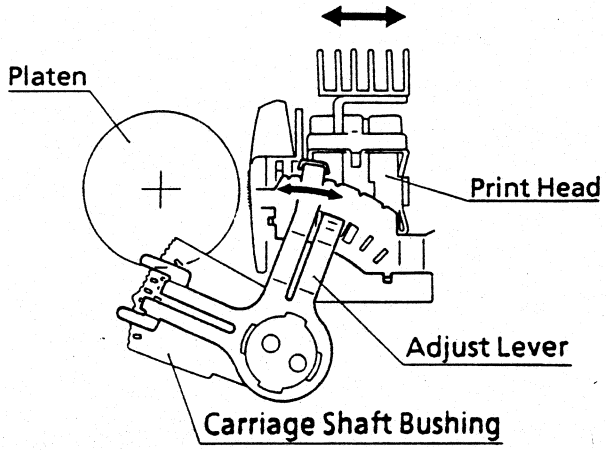
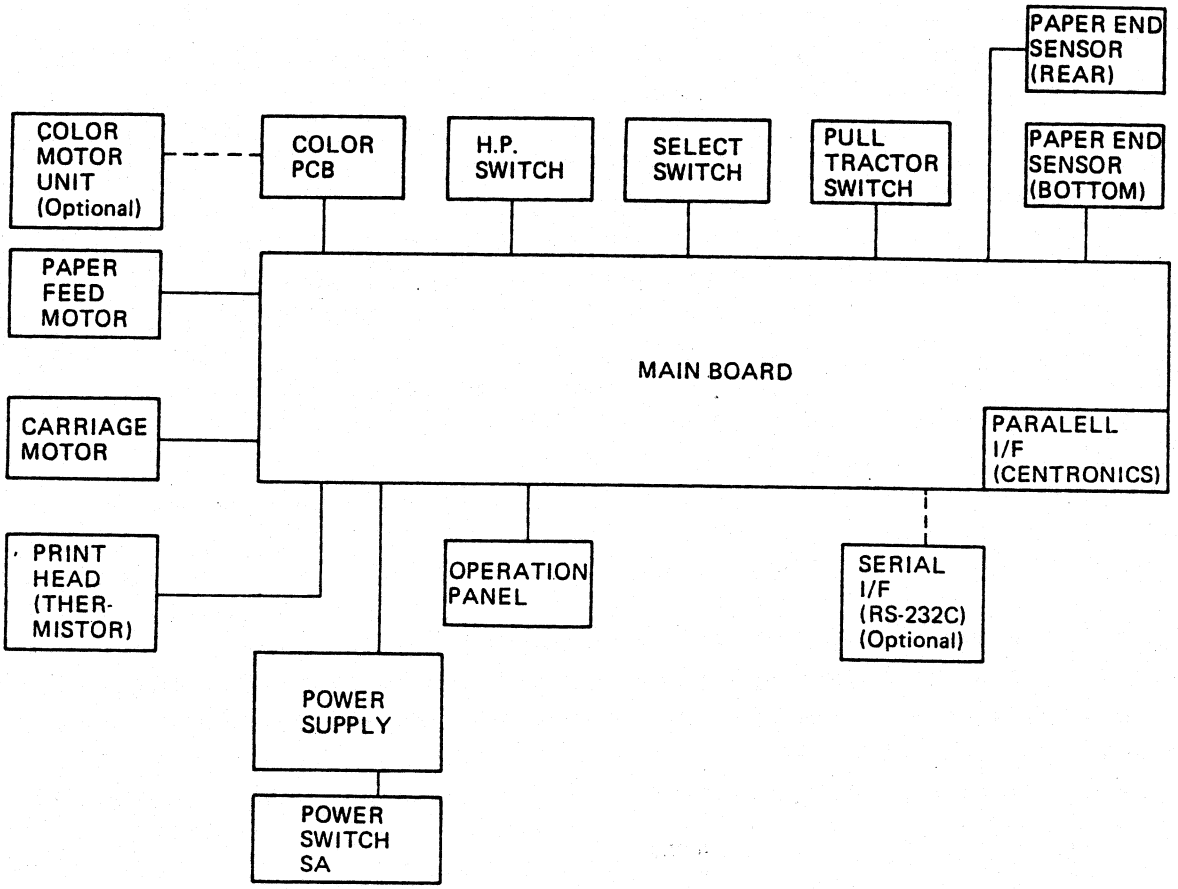


Fig. 10

2-2 Operation of control parts

2-2-1 Configuration of printer

The following shows major configuration blocks.



Major functions of individual components are described below :

(1) Power switch SA

Consists of a main switch and a filter circuit to eliminate external noise.

(2) Power supply

Transforms AC input to +5V or +27V DC output required to drive the printer.
The power supply is controlled with a switching type regulator.

(3) Main board

Controls entire operations of the printer.
It consists of CPU, ROM, RAM, Custom IC and driver circuit, etc.

(4) Operation panel

A panel used to display the operating status of the printer and to set specifications.
It consists of 6 switches, an LCD panel with 8 digits×2 lines and 3 LEDs.

(5) Print head

The print head has 12 pieces of the print wire of 0.2 mm dia. each arranged in 2 rows (parallel arrangement of 24 pieces in total). When the solenoid is turned on, the print head absorbs the armature to hit the platen with a print wire.

(6) Motors

There are the carriage motor, the paper feed motor and the color motor (optional) and they are all stepping type motors.

(7) Sensors

There are five sensors; the H. P.switch, the select switch, the pull tractor switch, the paper end sensor and the temperature sensor.

There are two paper end sensors; one for REAR and the other for BOTTOM.

The temperature sensor is located inside the print head and thermistor is used.

Except for the temperature sensor, all the sensors are mechanical sensors.

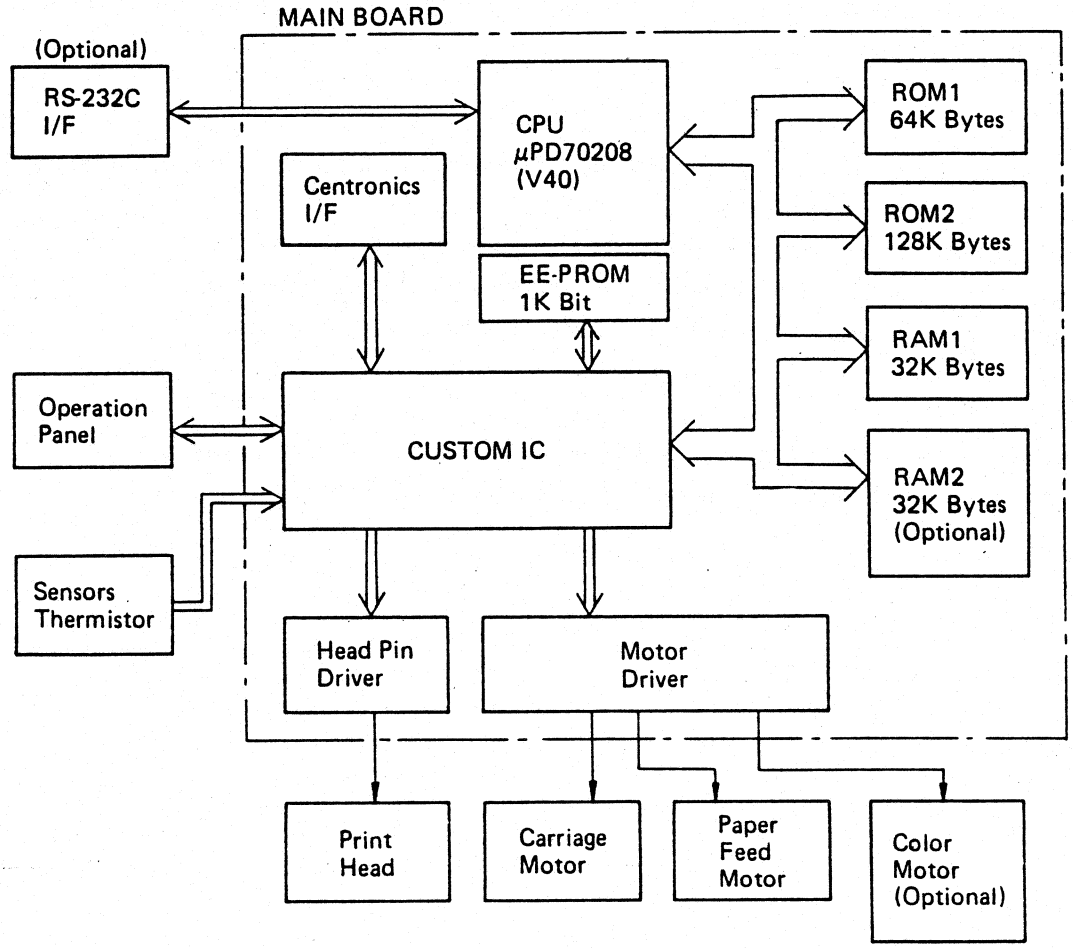
(8) Interfaces (I/F)

This is a circuit to transmit and receive data between the host and the printer.

Two types, Centronics parallel I/F and RS-232C I/F (optional), can be used.

2-2-2 Operation of control unit

(1) Block diagram



The following descriptions are for major functions of the components.

① CPU

The CPU used is μPD70208 (NEC V40) and it is a CMOS microprocessor with 16-bit architectures. The basic clock is 7.37MHz.

② ROM1

It is for control program by using a ROM of 64KBytes.

③ ROM2

It is for C. G. (Character Generator) by using a ROM of 128KBytes.

④ RAM1

It is used as working area, input buffer and download buffer by using a RAM of 32KBytes.

⑤ RAM2 (Optional)

It is RAM 32KBytes for expansion.

It expands the input buffer or the download buffer areas.

⑥ EE-PROM

It is an EE-PROM of 1KBit.

It is used for storage of setting on the operation panel, etc.

The stored data are retained even if the power is OFF.

⑦ Custom IC

It is a CMOS custom IC incorporating a control circuit for I/O port of the I/F, current flow time of each motor and head pins, address decoder, etc.

⑧ Head Pin Driver

It is a driving circuit for flowing current to the head pins.

It consists of the transistor array for driving, the transistor array for surge control, etc.

⑨ Motor Driver

It is a circuit to drive the carriage motor, the paper feed motor, the color motor (optional).

The carriage motor is driven by the constant current driving system.

The paper feed motor and the color motor are driven by the constant voltage driving system.

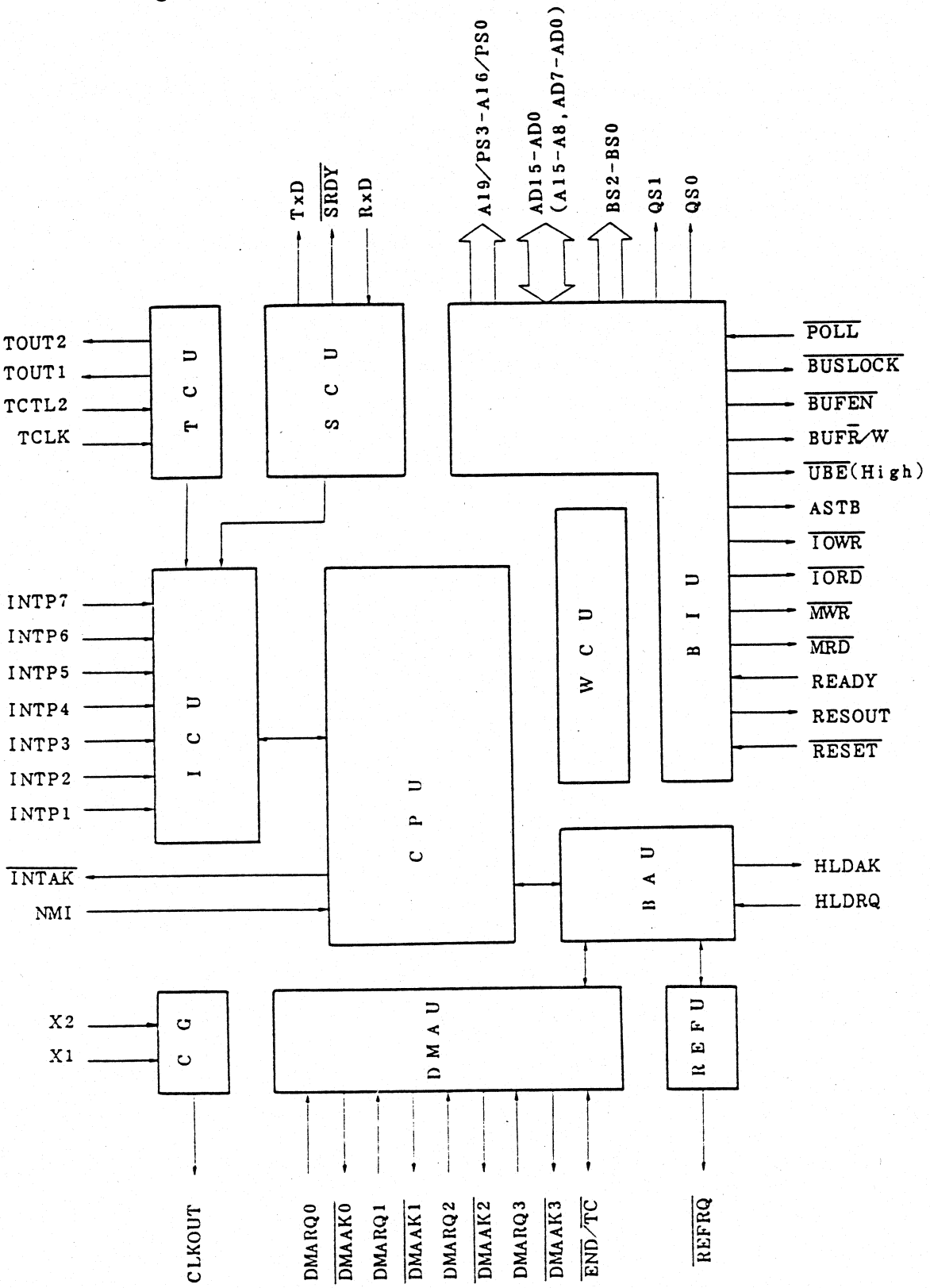
(2) CPU

① Outline of the function

The microprocessor used in this device is μPD70208 equipped with 16-bit architecture CPU and an 8-bit data bus.

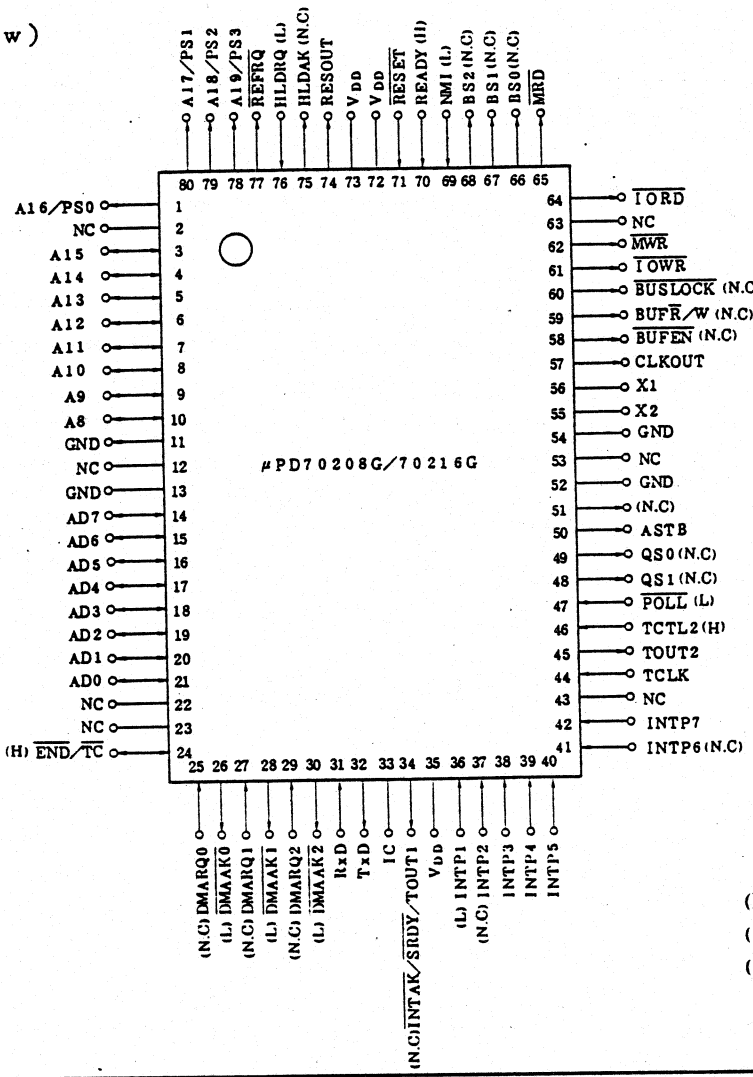
It has serial interface, a timer, an interrupt controller, etc.

② Block diagram



③ Descriptions on the function of terminals

(Top View)



(N.C) : No Connection
(L) : "Low" Level
(H) : "High" Level

Terminal No.	Terminal name	IN/OUT	Controlling function
14~21	AD7~AD0	IN/OUT*	Address/Data Bus. It is used for both address and data bus. The lower 8 bits of 20 bits are for the address.
3~10	A15~A8	OUT*	Address Bus. The middle 8 bits of 20 bits are for the address.
78~80, 1	A19/PS3~ A16/PS0	OUT*	Address Bus/Processor Status. A bus used exclusively for the address. The higher 3 bits of 20 bits are for the address.
77	$\overline{\text{REFRQ}}$	OUT	Refresh Request.

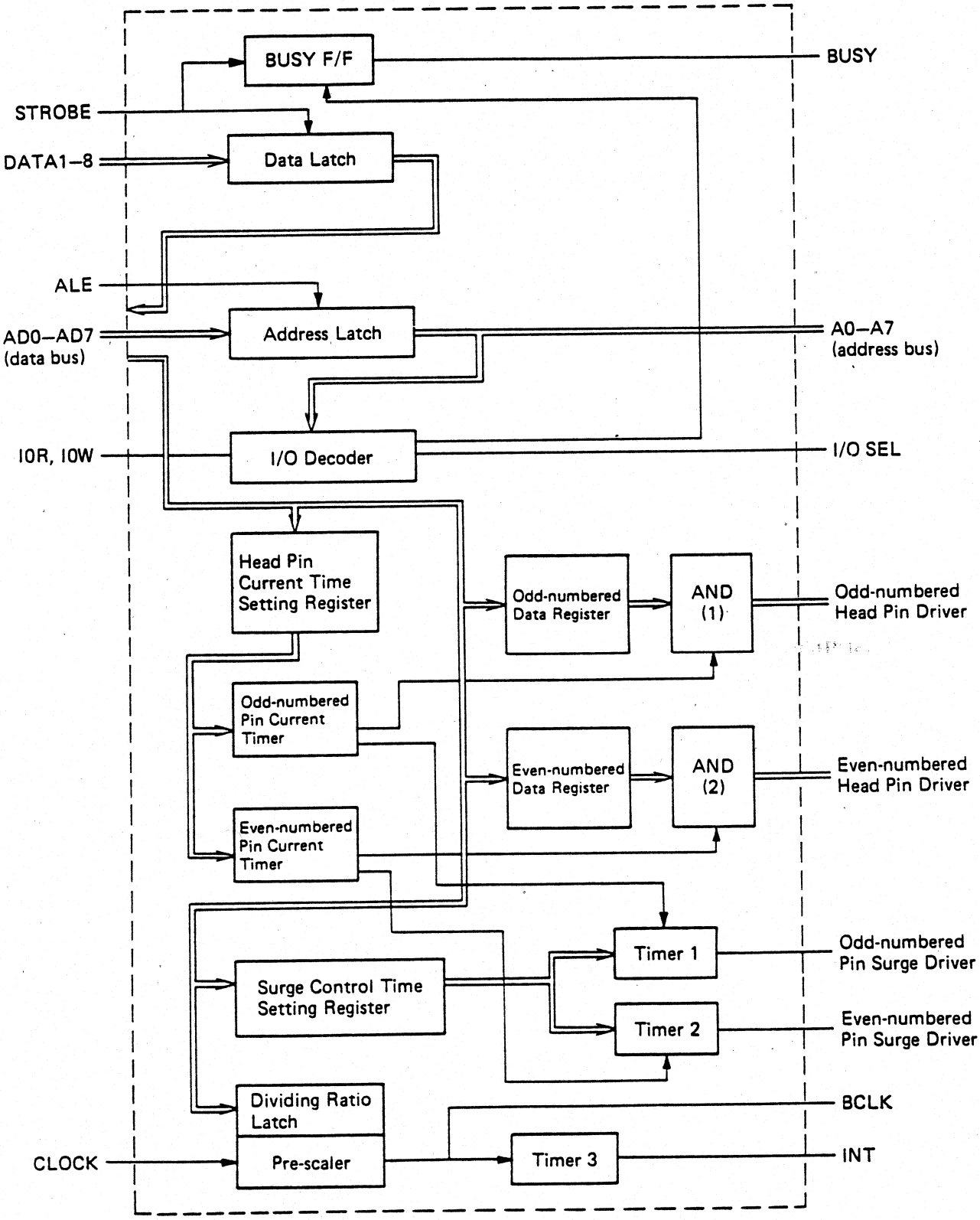
Terminal No.	Terminal name	IN/OUT	Controlling function
71	$\overline{\text{RESET}}$	IN	Reset input signal for CPU.
65	$\overline{\text{MRD}}$	OUT*	Memory Read signal. Data read synchronizing signal from the memory.
62	$\overline{\text{MWR}}$	OUT*	Memory Write signal. Data write synchronizing signal to the memory.
64	$\overline{\text{IORD}}$	OUT*	I/O Read signal. Data read synchronizing signal from the I/O port. Connected to Custom IC.
61	$\overline{\text{IOWR}}$	OUT*	I/O Write signal. Data write synchronizing signal to the I/O port. Connected to Custom IC.
50	ASTB	OUT	Address Strobe signal. Synchronizing signal to latch address information to external.
57	CLKOUT	OUT	Clock Output. The clock of 7.37MHz is output.
45	TOUT2	OUT	Timer Output. An output terminal of the internal timer/counter. Connected to INT5.
44	TCLK	IN	Timer Clock. This is a base clock.
38	INTP3	IN	Interrupt request.
39	INTP4	IN	Interrupt request.
40	INTP5	IN	Interrupt request.
42	INTP7	IN	Interrupt request.
55, 56	X2, X1	IN	A terminal to connect an oscillator for Generating system clock. A ceramic oscillator of 14.74MHz is connected.
32	TXD	OUT	Transmit Data. The data transmitting line for the serial I/F.
31	RXD	IN	Receive Data. The data receiving line for the serial I/F.

* : Tri-state output

(3) Custom IC

The I/O port consists mainly of a custom I/C.

① Block diagram



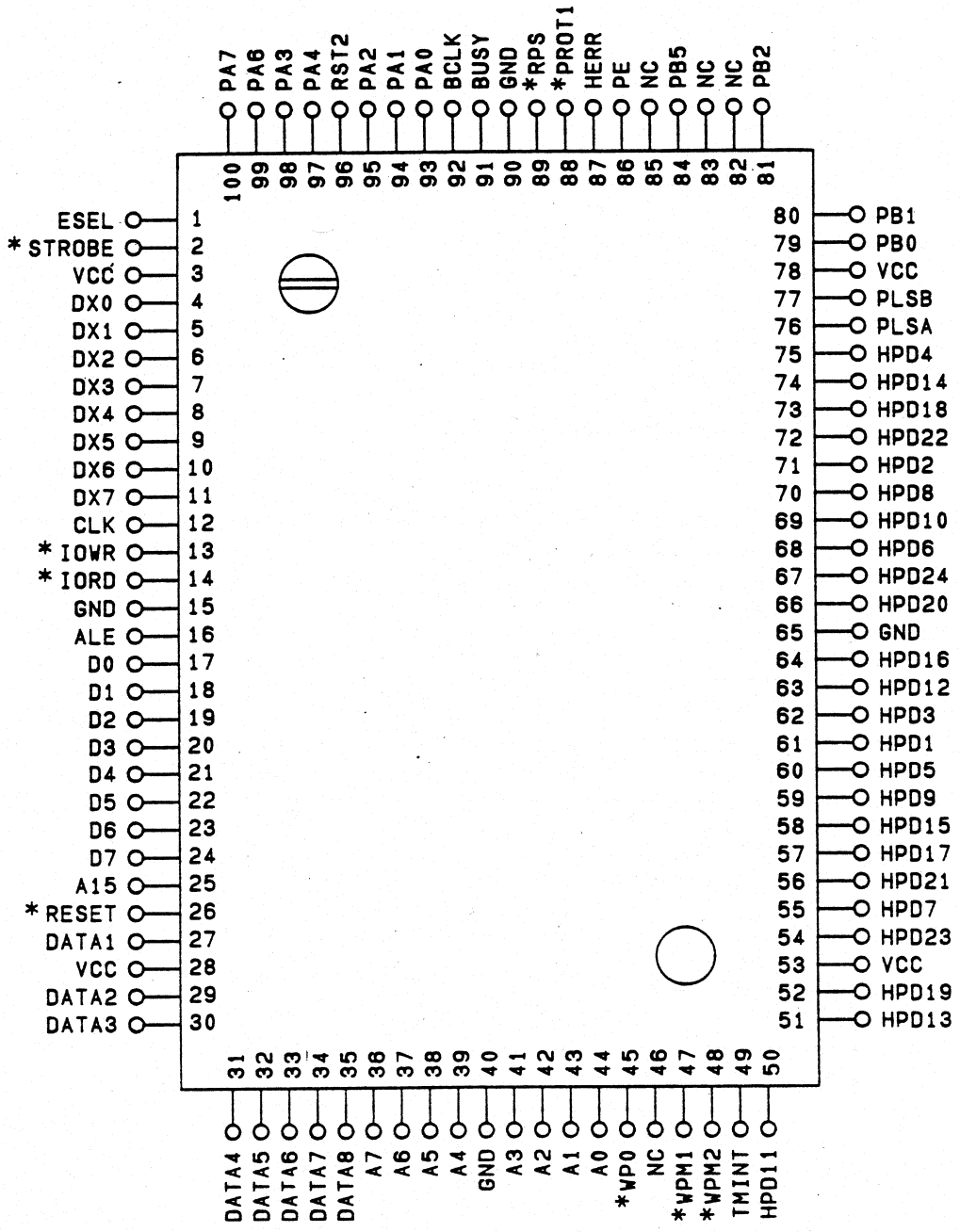
② Pin arrangement and signal names

- Pin arrangement

NC : No Connection

* : Negative logic

Vcc: +5V



Pin No.	Signal name	IN/OUT	Input voltage level	Function
1	ESEL	IN	CMOS	Selection of edge of STROBE signal of Centronics I/F. (The rising edge is selected as factory setting).
2	*STROBE	IN	TTL	Latching of DATA1 to DATA8 of Centronics I/F. This signal is input from Pin1 of CN4.
3	VCC			+5V (power supply)
4	DX0	IN	CMOS	Goes to "LOW" level when friction feed mode is selected. This signal is input from CN8.
5	DX1	IN	CMOS	Goes to "LOW" level when pull mode tractor is selected. This signal is input from CN9.
6	DX2	IN	CMOS	Goes to "LOW" level when LF/FF switch on the operation panel is pressed.
7	DX3	IN	CMOS	Goes to "LOW" level when SELECT switch on the operation panel is pressed.
8	DX4	IN	CMOS	Goes to "LOW" level when SAVE switch on the operation panel is pressed.
9	DX5	IN	CMOS	Goes to "LOW" level when MENU switch on the operation panel is pressed.
10	DX6	IN	CMOS	Goes to "LOW" level when PARK LOAD switch on the operation panel is pressed.
11	DX7	IN	CMOS	Goes to "LOW" level when ONLINE switch on the operation panel is pressed.
12	CLK	IN	CMOS	Clock of 7.37MHz to operate the internal counter is input.
13	*IOWR	IN	TTL	I/O WRITE signal sent from CPU (output from Pin 61 of CPU).
14	*IORD	IN	TTL	I/O READ signal sent from CPU (output from Pin 64 of CPU).
15	GND			0V (power supply).

Pin No.	Signal name	IN/OUT	Input voltage level	Function
16	ALE	IN	TTL	Latching and output of address to Pins A0 to A7.
17	D0	IN/OUT	TTL	Data bus (LSB).
18	D1	IN/OUT	TTL	Data bus
19	D2	IN/OUT	TTL	Data bus
20	D3	IN/OUT	TTL	Data bus
21	D4	IN/OUT	TTL	Data bus
22	D5	IN/OUT	TTL	Data bus
23	D6	IN/OUT	TTL	Data bus
24	D7	IN/OUT	TTL	Data bus (MSB).
25	A15	IN	TTL	Address A15 (Normally, this goes to "LOW " level with JP5).
26	*RESET	IN	CMOS	Resetting of internal registers.
27	DATA1	IN	TTL	LSB data of Centronics I/F. This signal is input from Pin 2 of CN4.
28	VCC			+5V (power supply).
29	DATA2	IN	TTL	Data of Centronics I/F. This signal is input from Pin 3 of CN4.
30	DATA3	IN	TTL	Data of Centronics I/F. This signal is input from Pin 4 of CN4.
31	DATA4	IN	TTL	Data of Centronics I/F. This signal is input from Pin 5 of CN4.
32	DATA5	IN	TTL	Data of Centronics I/F. This signal is input from Pin 6 of CN4.
33	DATA6	IN	TTL	Data of Centronics I/F. This signal is input from Pin 7 of CN4.
34	DATA7	IN	TTL	Data of Centronics I/F. This signal is input from Pin 8 of CN4.

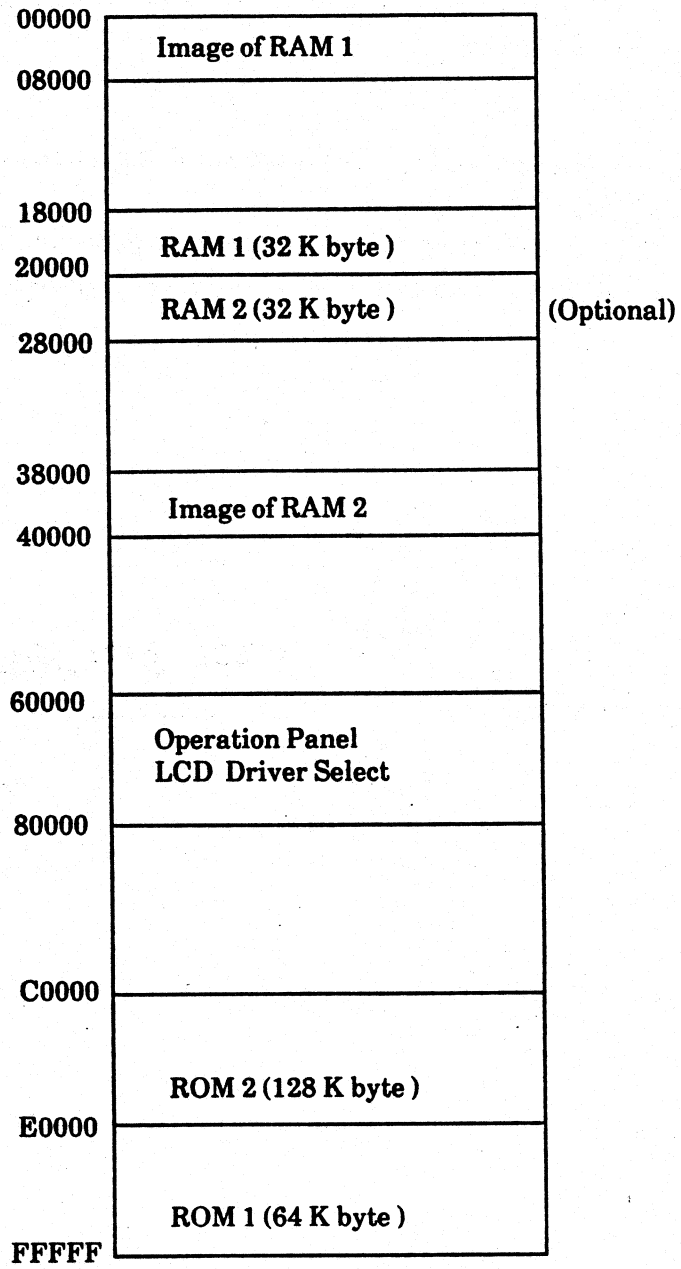
Pin No.	Signal name	IN/OUT	Input voltage level	Function
35	DATA8	IN	TTL	MSB data of Centronics I/F. This signal is input from Pin 9 of CN4.
36	A7	OUT		Address signal A7.
37	A6	OUT		Address signal A6.
38	A5	OUT		Address signal A5.
39	A4	OUT		Address signal A4.
40	GND			0V (power supply).
41	A3	OUT		Address signal A3.
42	A2	OUT		Address signal A2.
43	A1	OUT		Address signal A1.
44	A0	OUT		Address signal A0.
45	*WP0	OUT		Clock signal for outputting of exciting pulse to the color motor. (input to Pin9 of IC17)
46	NC	OUT		Unused.
47	*WPM1	OUT		Clock signal for outputting of exciting pulse to the paper feed motor. (input to Pin 9 of IC16)
48	*WPM2	OUT		Clock signal for outputting of exciting pulse to the carriage motor. (input to Pin 9 of IC18)
49	TMINT	OUT		Signal of timer interrupt (input to Pin 39 of INT4 terminal of CPU).
50	HPD11	OUT		Head pin No. 11 drive data.
51	HPD13	OUT		Head pin No. 13 drive data.
52	HPD19	OUT		Head pin No. 19 drive data.
53	VCC			+5V (power supply).
54	HPD23	OUT		Head pin No. 23 drive data.

PIN No.	Signal name	IN/OUT	Input voltage level	Function
55	HPD7	OUT		Head pin No. 7 drive data.
56	HPD21	OUT		Head pin No. 21 drive data.
57	HPD17	OUT		Head pin No. 17 drive data.
58	HPD15	OUT		Head pin No. 15 drive data.
59	HPD9	OUT		Head pin No. 9 drive data.
60	HPD5	OUT		Head pin No. 5 drive data.
61	HPD1	OUT		Head pin No. 1 drive data.
62	HPD3	OUT		Head pin No. 3 drive data.
63	HPD12	OUT		Head pin No. 12 drive data.
64	HPD16	OUT		Head pin No. 16 drive data.
65	GND			0V (power supply).
66	HPD20	OUT		Head pin No. 20 drive data.
67	HPD24	OUT		Head pin No. 24 drive data.
68	HPD6	OUT		Head pin No. 6 drive data.
69	HPD10	OUT		Head pin No. 10 drive data.
70	HPD8	OUT		Head pin No. 8 drive data.
71	HPD2	OUT		Head pin No. 2 drive data.
72	HPD22	OUT		Head pin No. 22 drive data.
73	HPD18	OUT		Head pin No. 18 drive data.
74	HPD14	OUT		Head pin No. 14 drive data.
75	HPD4	OUT		Head pin No. 4 drive data.
76	PLSA	OUT		Surge control of even-number pin (surge control at "HIGH" level).

Pin No.	Signal name	IN/OUT	Input voltage level	Function
77	PLSB	OUT		Surge control of odd-number pin (surge control at " HIGH" level).
78	VCC			+5V (power supply).
79	PB0	OUT		Lighting of Alarm LED on the operation panel. When this signal is at "HIGH" level, Pin 20 of CN1 goes to "LOW" level and LED lights up.
80	PB1	OUT		RS signal of operation panel display.
81	PB2	OUT		R/W signal of operation panel display.
82	NC			Unused
83	NC			Unused
84	PB5	OUT		Outputting of a pulse of approx. 50μs every 50ms. If no pulse is output for about a few hundred milliseconds during this cycle, the unit judges as crash of program and a reset signal is output.
85	NC			Unused
86	P. E	OUT		PE signal of Centronics I/F (When this signal is at "Low" level, Pin 12 of CN4 goes to "HIGH" level and the device become PE state).
87	HERR	OUT		Head pin current flow error signal (input to Pin 38 of INT3 terminal of CPU).
88	*PROT1	OUT		Input port read signal (input to Pins 1 and 19 of IC11).
89	*RPS	OUT		Input port read signal (input to Pins 1 and 15 of IC12).
90	GND			0V (power supply).
91	BUSY	OUT		BUSY signal of Centronics I/F (When this signal is at "HIGH" level, Pin 11 of CN4 goes to "HIGH" level and the device becomes BUSY state).

Pin No.	Signal name	IN/OUT	Input voltage level	Function
92	BCLK	OUT		Base clock of CPU and outputting of 87.8KHz (This signal is input to Pin 44 of CPU).
93	PA0	OUT		FAULT signal of Centronics I/F (When this signal is at "HIGH" level, Pin 32 of CN4 goes to "LOW" level and the printer becomes FAULT state).
94	PA1	OUT		ACK signal of Centronics I/F (When this signal is at "LOW" level, Pin 10 of CN4 goes to "HIGH" level).
95	PA2	OUT		DTR signal of serial I/F (When this signal is at "LOW" level, DTR signal goes to "HIGH" level).
96	RST2	OUT		RTS signal of serial I/F (When this signal is at "LOW" level, RTS signal goes to "HIGH" level).
97	PA4	OUT		Serial input signal of EE-PROM (input to Pin 3 of IC15).
98	PA3	OUT		Chip select signal of EE-PROM (input to Pin 1 of IC15).
99	PA6	OUT		Clock signal (250KHz) of EE-PROM (input to Pin 2 of IC15).
100	PA7	OUT		Lighting of ONLINE LED on the operation panel. When this signal is at "HIGH" level, Pin 19 of CN1 goes to "LOW" level and LED lights up.

(4) Memory map


00000
Image of RAM 1
08000
18000
RAM 1 (32 K byte)
20000
RAM 2 (32 K byte)
(Optional)
28000
38000
Image of RAM 2
40000
60000
Operation Panel
LCD Driver Select
80000
C0000
ROM 2 (128 K byte)
E0000
ROM 1 (64 K byte)
FFFFF

(5) Sensors

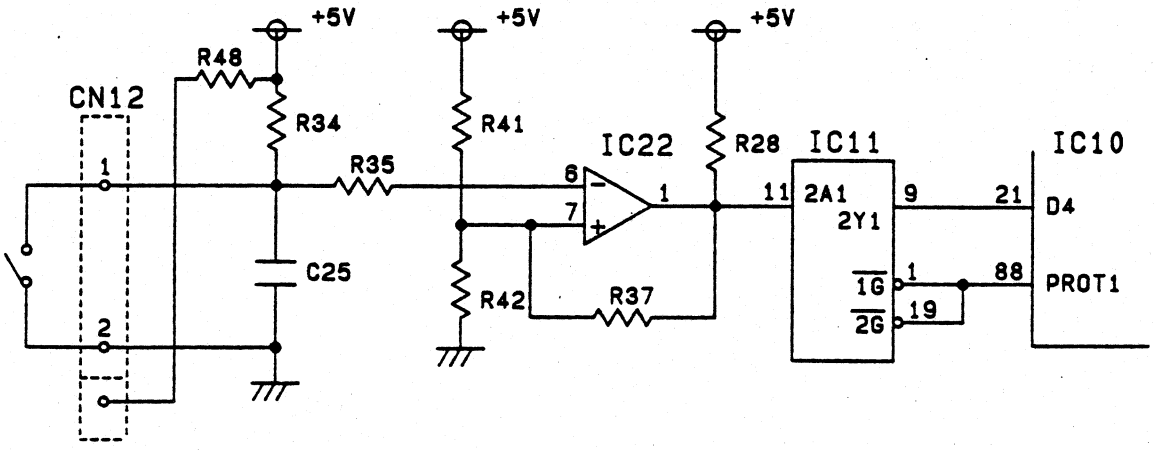
① Home position sensor

A home position sensor is used to detect the position of the print head after power on. This sensor uses a single-circuit mechanical contact switch.

The sensor sets the home position where it is turned ON when the print head moves to the left end.

When the print head is not at the home position at power on, the head moves slowly to the left and stops after detecting the home position.

On the other hand, when the head is at the home position at power on, the head moves slowly to the right once and it gets out of the home position and the operation above is performed.



When the print head is at the home position, the switch is turned on and pin 1 of CN12 goes to "LOW" level.

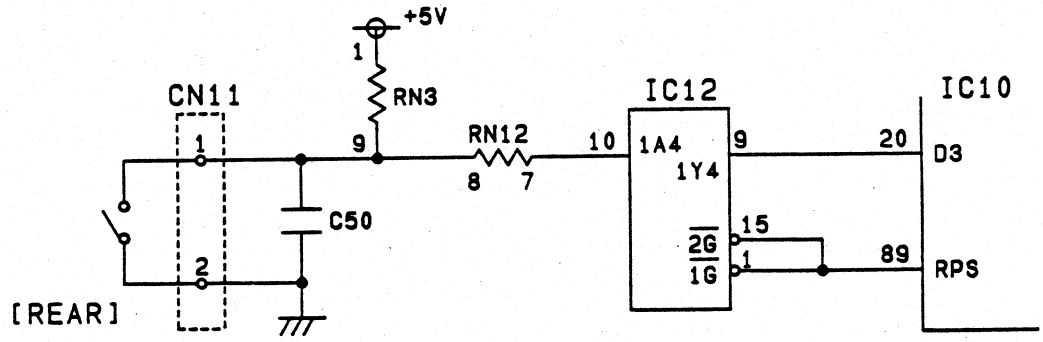
Consequently, pin 11 of IC11 turns from "LOW" level to "HIGH" level.

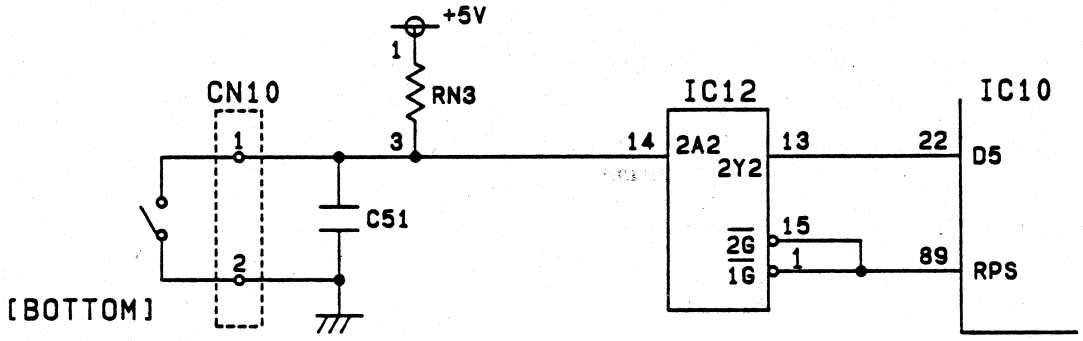
② Paper end sensor

There are two types for the paper end sensor ; one for REAR insertion and the other for BOTTOM insertion. This sensors detects the presence of printing paper.

Both sensors use a single-circuit mechanical contact switch.

The senor for REAR insertion also detects the position of the paper at the auto sheet loading function, the auto sheet feeding function and the paper parking function as well as normal detection of presence of paper.





When the paper is present, both sensors are turned off ; thus, pins 10 and 14 of IC12 become "HIGH" level.

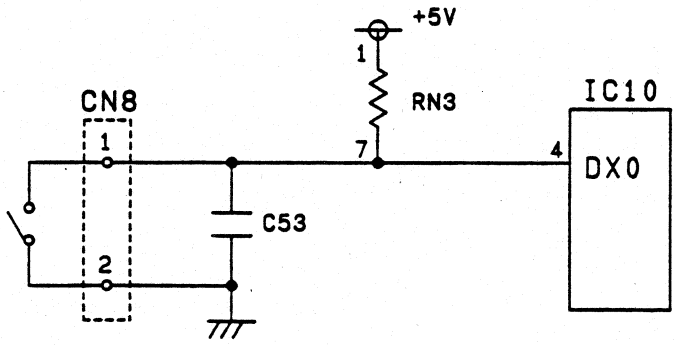
(Note) When both sensors detect presence of paper, alarm is indicated.

③ Select lever sensor

This sensor detects change of friction feeding and tractor feeding. This sensor uses a single-circuit mechanical contact switch.

This sensor also detects the selection of the paper at the auto sheet loading function, the auto sheet feeding function and the paper parking function.

(Note) When the paper set and the paper select condition are not matched, alarm is indicated.



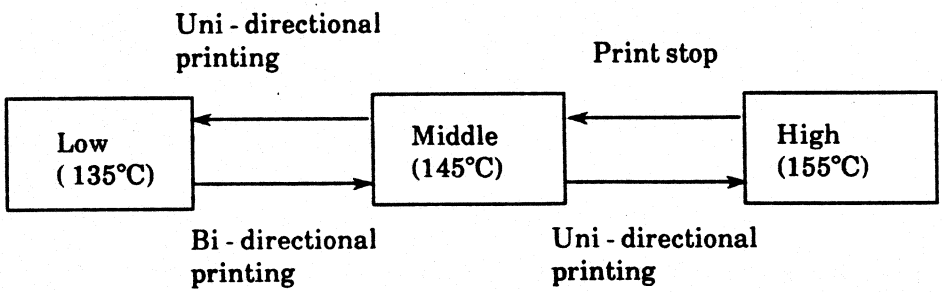
When the select lever is at the friction side, this sensor is turned on and pin 1 of CN8 becomes "LOW" level. Consequently, pin 4 of IC10 turns from "HIGH" level to "LOW" level.

④ Print head thermo sensor

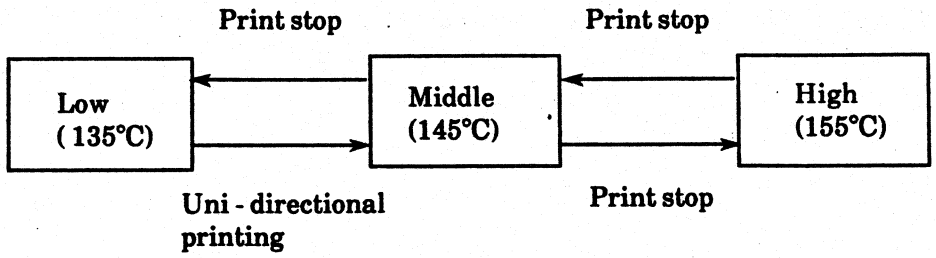
This sensor detects temperature inside the print head.

The sensor measures resistance of the thermistor incorporated into the print head to control the printing according to temperature of the print head.

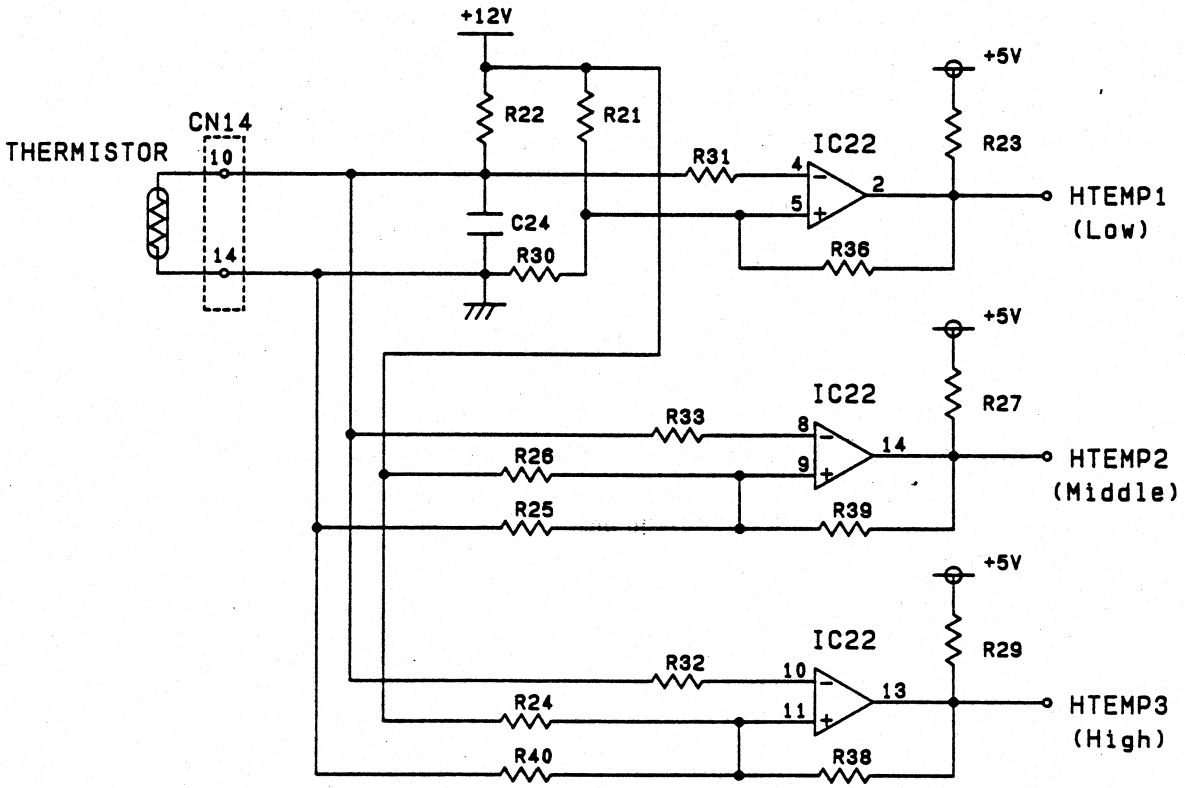
(a) In bi-directional printing



(b) In uni-directional printing



(Note) When printing stops in both (i) and (ii), only the reciprocating movement of the carriage is continued.

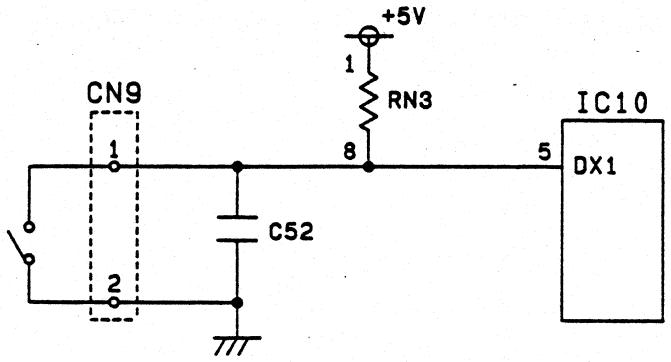


The higher the temperature, the less the resistance of the thermistor. The output of each comparator in IC22 turns from "LOW" level to "HIGH" depending on the resistance.

⑤ Pull tractor sensor

This sensor detects whether the pull tractor is used or not.

This sensor uses a single-circuit mechanical contact switch.



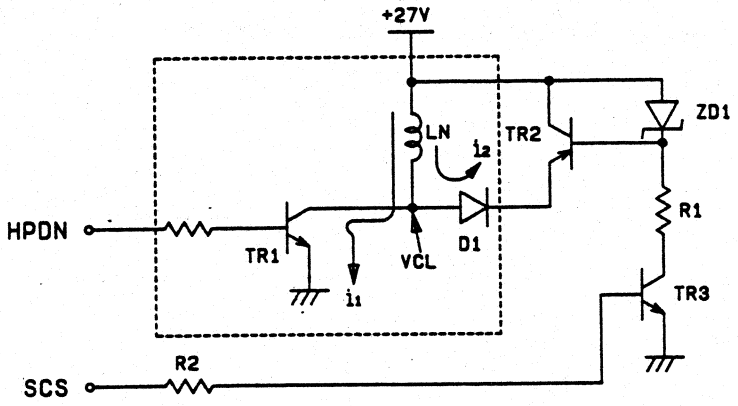
When the pull tractor is used, the switch is on and pin 5 of IC10 becomes "LOW" level.

(6) Drivers

① Head pin driver

This driver circuit drives the head pins.

Six transistor arrays (SMA4031), each of which has four circuits, are used to drive 24 head pins. The following shows one of the circuits.



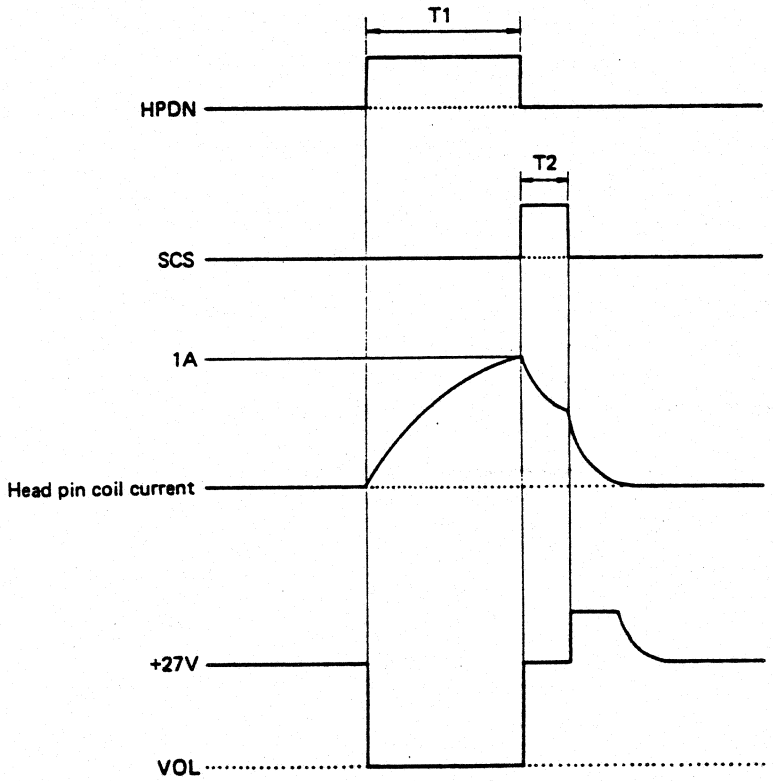
The above figure shows a circuit to drive a head pin N.

When the signal HPDN turns "HIGH" during printing, the transistor TR1 is turned ON, causing the current i1 to flow into the head pin coil LN. After elapse of the time T1, the signal HPDN turns "LOW" and the transistor TR1 is turned OFF.

Simultaneously, the signal SCS turns "HIGH" and the transistor TR3 is turned ON.

Then, the transistor TR2 is turned ON and the current i2 flows by the counter electromotive voltage produced in the head pin coil Ln. After elapse of the time T2, the transistor TR3 is turned OFF, causing the counter electromotive voltage of the coil to apply voltage corresponding to the Zener diode ZD1 between the emitter and the collector of TR2, which provides a braking effect to attenuate the current i2 sharply.

The figure given below shows the waveforms for the above sequence.



Current flowing time T1 : 387μs

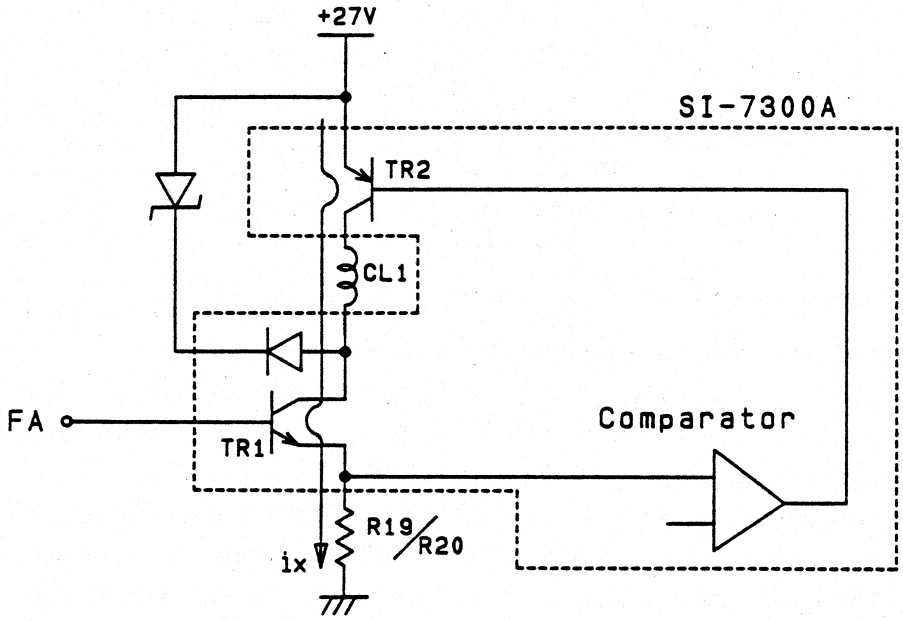
Surge control time T2 : 68μs

② Carriage motor driver

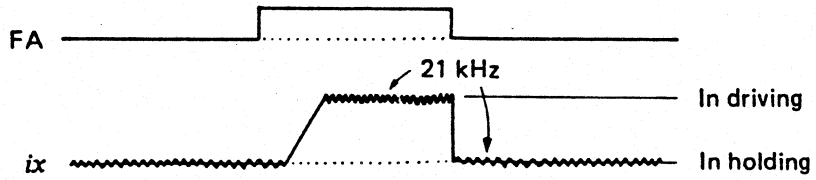
This is a driving circuit to drive the carriage motor.

Hybrid IC (SI-7300A) is used for the carriage motor and the motor is driven by the unipolar chopper method.

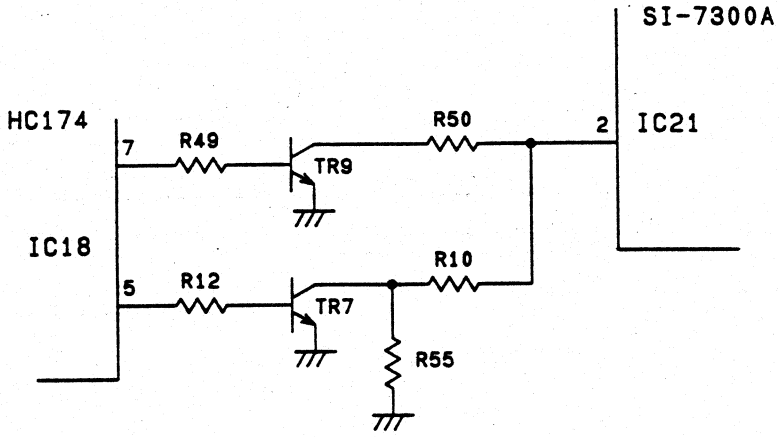
The inside of the IC consists of the trigger pulse generating circuit, the reference voltage generating unit, the comparing amplifying unit, the current control unit, the exciting signal amplifying unit and the reversal exciting canceling unit.



When a phase signal FA is turned ON, the transistor TR1 is turned ON and the current ix starts to flow through the motor coil CL1. Then, voltage is generated at the detecting resistor R19/R20. This voltage and the reference voltage inside the IC are compared by a comparator and when the former reaches the set value, the transistor TR2 is turned OFF. Then, the current flowing in Rx also is turned OFF. This ON/OFF operation of TR2 controls the current to the motor coil. This chopping frequency is determined by the characteristics inside the IC and it is operating at about 21KHz. The figure below shows the current waveforms for the 2-phase exciting method.



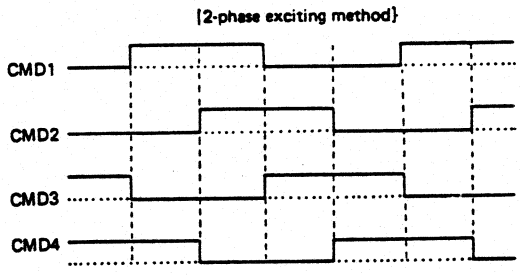
SI-7300A can control the output current by changing the reference voltage inside the IC. This device uses two outputs of IC18 to set the current flowing in the carriage motor to the following three stages.

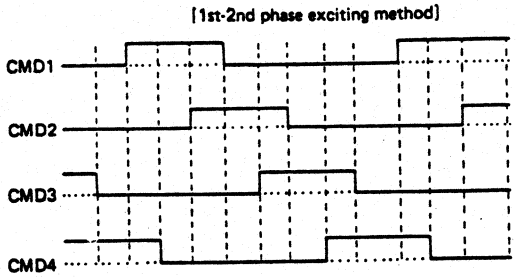


	Pin 5 of IC18	Pin 7 of IC18	Current value of CR motor
In holding	High	Low	Approx. 0.2 A
At setting of standard black ribbon from the operation panel	Low	High	Approx. 0.4 A
At setting of color ribbon from the operation panel	Low	Low	Approx. 0.5 A

As to the exciting method of the motor, the 2-phase exciting method is applied to control in DP mode. For another printing mode, it is controlled by the 1st-2nd phase exciting method.

The figure given below shows the waveforms for each exciting method.

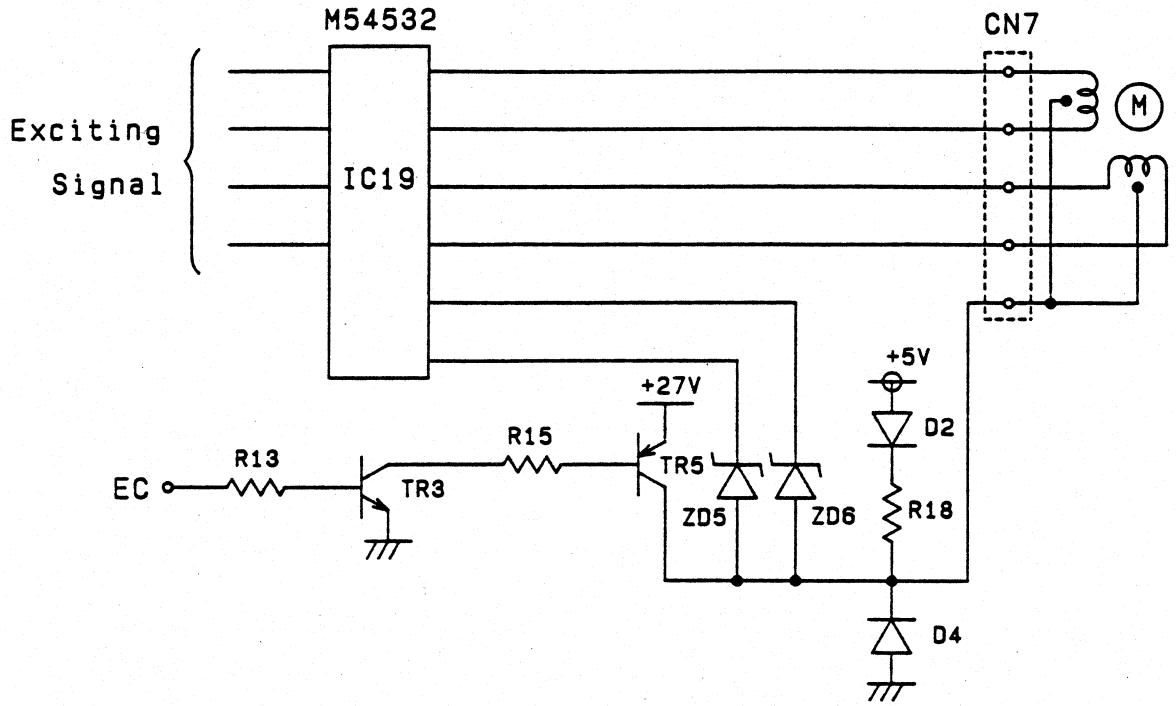




❸ Paper feed motor driver

This driver circuit drives the paper feed motor.

A transistor array (M54532), which has four circuits, is used to drive the paper feed motor.



The exciting method for the motor is the 1st-2nd phase method.

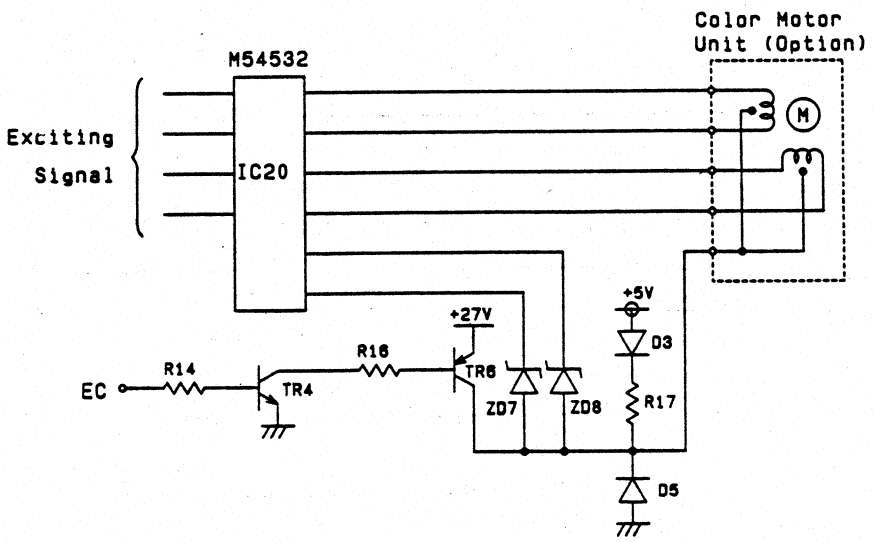
In driving, the exciting control signal EC becomes "HIGH" level and the transistors TR3 and TR5 are turned ON. At this time, the voltage applied to the motor becomes +27V.

In holding, the signal EC becomes "LOW" and the transistors TR3 and TR5 are turned OFF. Then, the voltage applied to the motor becomes +5V.

④ Color motor driver

This driver circuit drivers the color motor.

A transistor array (M54532), which has four circuits, is used to drive the color motor.



The exciting method for the motor is the 1st-2nd phase method.

In driving, the exciting control signal EC becomes "HIGH" level and the transistors TR4 and TR6 are turned ON. At this time, the voltage applied to the motor becomes +27V.

In holding, the signal EC becomes "LOW" and the transistors TR4 and TR6 are turned OFF. Then, the voltage applied to the motor becomes +5V.

Next, the following describes the ribbon controlling method.

Two types of ribbons can be used ; a standard black ribbon and a color ribbon.

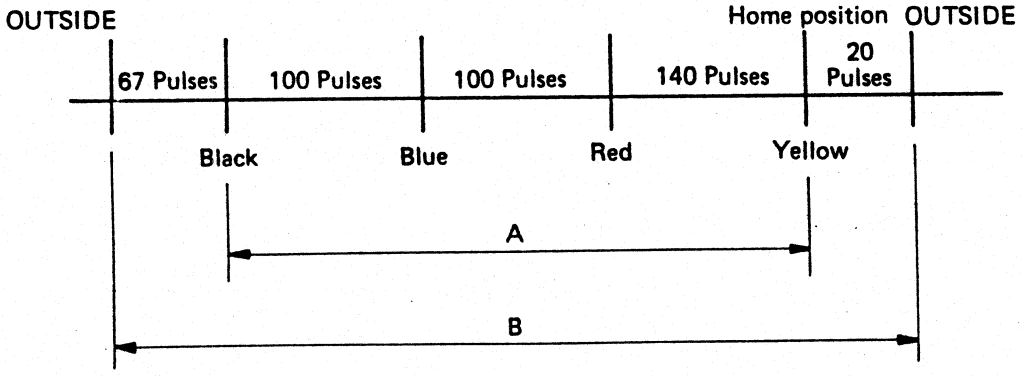
After attaching the color motor unit, the ribbon is set on the operation panel depending on the ribbon type attached.

When the standard black ribbon is set on the operation panel, the color motor is not driven. When the color ribbon is set on the operation panel, the color motor is driven at power on for approx. 450 pulses as the initialization and raise the ribbon cassette.

Then, from this stop position, the cassette is moved downward for 20 pulses.

This position becomes the home position for the color motor.

Thereafter, this home position is used as a reference and the distance from each color is managed in the number of pulses.

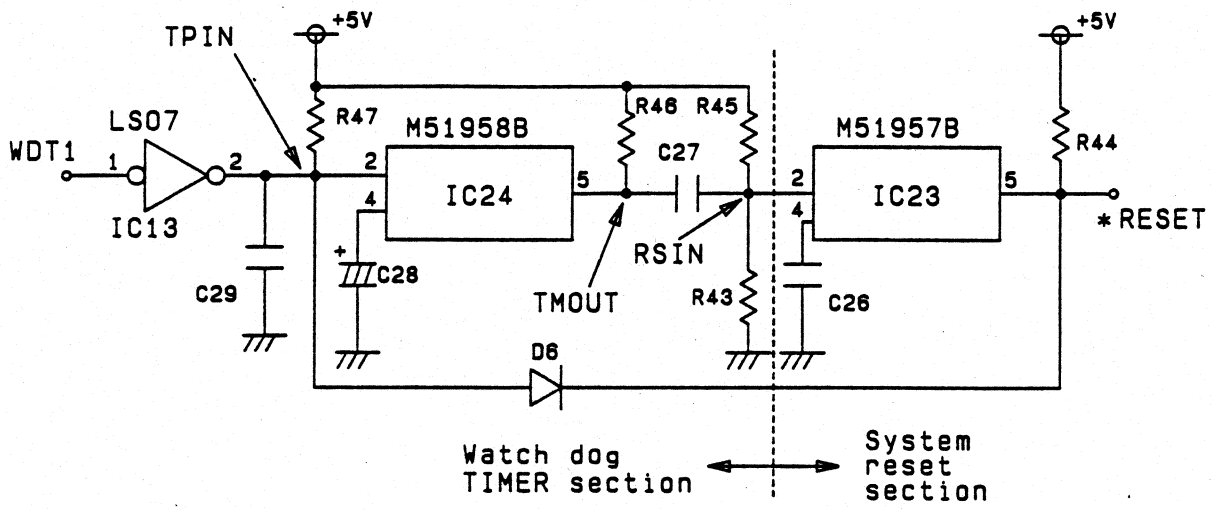


A: Driving range in use

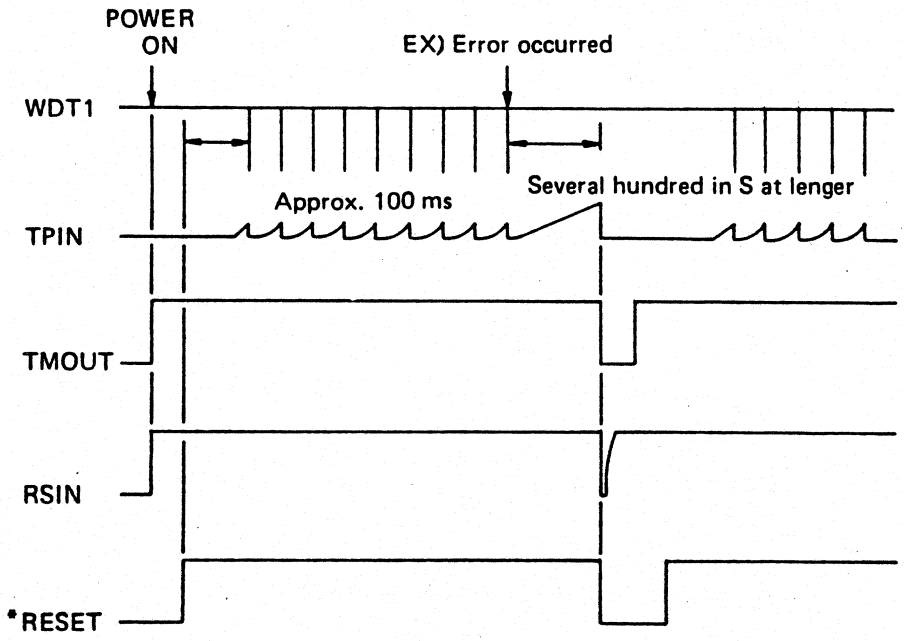
B: Driving range in initiral reset

⑤ Reset circuit

This circuit performs the system reset.



The reset circuit consists of the watchdog timer section and the system reset section. When this circuit is powered up, TMOUT (pin 5 of IC24) and RSIN (pin 2 of IC23) are set to "HIGH" level. The reset signal RESET is set to "HIGH" by the time constant C26, and the reset is released. After the release, the program starts and WDT1 is input after approx. 100mS. Then, WDT1 is periodically input and the capacitor C28 charges and discharges repeatedly. At the same time, TMOUT is held at "HIGH" level. If the program crashes, input of WDT1 becomes unperiodical and it is not input for several hundred ms or longer. Then, the potential of TPIN rises and TMOUT turns to "LOW" level when the interval becomes longer than the set value. At the same time, RESET (pin 5 of IC23) become " LOW " to be in a RESET state. Simultaneously, the RESET is fed back to return the TPIN to "HIGH" level ; thus, the reset is released.

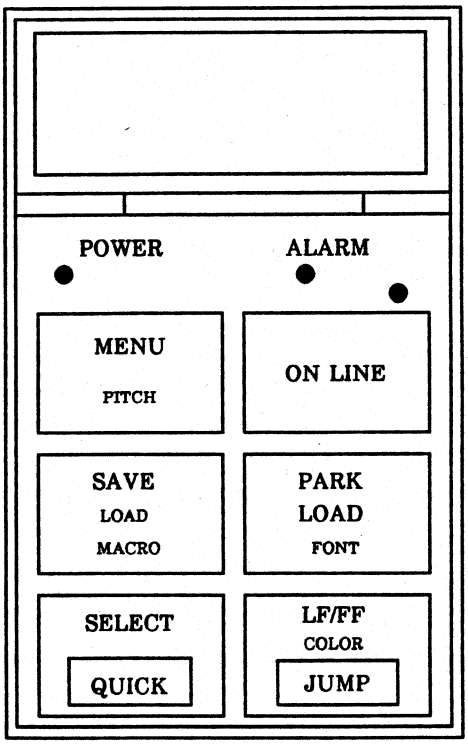


(7) Operation panel

(7-1) Overview

The operation panel is used to set printing modes and display the operation status. It consists of a display block and an display block.

①External View



②Display block

(a) LED indicators

The display block has three LED indicators.

<POWER>

- Goes on when the printer is turned on.
- The LED color green.

<ON LINE>

- Goes on when the printer is set on-line and goes off when an alarm is detected on the printer
  or the printer is set off-line.
- The LED color is green.

<ALARM>

- Goes on or flashes if an alarm is detected.
- The LED color is red.

(b) LCD window

The display block also has an liquid crystal display (LCD) window consisting of two lines by eight digits.

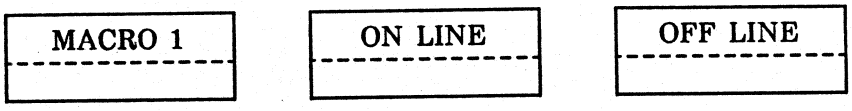
The LCD window displays data depending on the printer operating mode.

Three operating modes are available : normal, setting, and error.

(b-1) Normal mode : The current printer status is displayed.

Immediately after the printer is turned on, <<MACRO 1>> flashes unconditionally in the window of upper line for three seconds at 0.5 intervals.

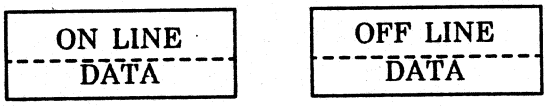
After this, <<ON LINE>> or <<OFF LINE>> is displayed in the upper column.



<<DATA>> appears on the left side of the lower column while the printer is receiving data or data still remains in the receive buffer.

On the right side, a graphic is displayed to show the amount of data remaining in the buffer.

When the option buffer is set, the buffer capacity is changed 8K bytes to 40K bytes automatically.



Note) This function is not installed yet.

(b-2) Setting mode : A menu is displayed in the upper lines and a select item in the lower line.

The printer enters setting mode when the [MENU] key is pressed in off-line state.

(b-3) Error mode : If an error from alarm level 1 to alarm level 3 explained in Section 4-4 "ALARMS" occurs, an error message is displayed in both lines (16 digits).

③ Operation block

The operation block has six keys explained below.

Key function

Pushed Key	In ON-LINE states	In OFF-LINE states
[ON-LINE]	<<OFF-LINE>> is displayed	<<ON-LINE>> is displayed
[LF/FF, JUMP]	Reverse micro line feed function. Quick Setting.	Feed paper one line. Feed paper to next page if this key press for a second or more. Jump operation.
[MENU]	Quick setting.	Menu selection.
[SELECT, QUICK]	Quick setting.	Select item selection.
[SAVE]	Quick setting.	Write items in EE-PROM
[PARK LOAD]	Forward micro line feed function. Quick setting.	Park Loading.

Note. Regarding to each switch function, refer to the User's Manual.

(7-2) Special Printing function

The special printing function supports printing modes used to make sure the current setting status of the ROM version and printer.

① Operations

No.	Function	Operation	Description
(1)	Self Test	Turns on the printer while [LF/FF] is held down.	The printer prints title (printer model name) then ASCII sliding pattern continuously within one page.
(2)	Maintenance Mode	Turns on the printer while [LF/FF] and [ON-LINE] are hold down.	The printer prints title (printer model name), ROM version, CG version, the operation panel setting, and then prints character "H" continuously within one page.
(3)	Hex Dump Mode	Turn on the printer while [SELECT QUICK] is held down	The printer prints data sent form the host CPU in hex codes. One line contains 16 hex data. If the final line has data of less then 16, it prints it if next data is not sent within a second.

<Test print example>

(a) Self test pattern

```
***** <CITIZEN> GSX-140 Printer *****

 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmno
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnop
"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopq
#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqr
$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrs
%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrst
```

(b) Maintenance print pattern

```
***** <CITIZEN> GSX-140 Printer *****

 ROM VERSION  : T000-000M1 MAY-20-1989
 CG  VERSION  : T100-000G MAY-19-1989
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
```

(c) HEX Dump print pattern

```
***** <CITIZEN> GSX-140 Printer *****

0000  1B 46 1B 2D 00 1B 54 0D 0A 0D 0A 0D 0A 41 42 43   .F.-..T......ABC
0010  44 45 46 47 48 49 4A 4B 4C 4D 4E 4F 50 51 52 53   DEFGHIJKLMNOPQRS
0020  54 55 56 57 58 59 5A 41 42 43 44 45 46 47 48 49   TUVWXYZABCDEFGHI
0030  4A 4B 4C 4D 4E 4F 50 51 52 53 54 55 56 57 58 59   JKLMNOPQRSTUVWXY
0040  5A 41 42 43 44 45 46 47 48 49 4A 4B 4C 4D 4E 4F   ZABCDEFGHIJKLMNO
0050  50 51 52 53 54 55 56 57 58 59 5A 41 42 43 44 45   PQRSTUVWXYZABCDE
```

*The printer prints according to the values set in the EE-PROM. To interrupt printing then resume it, press the [ON LINE] Key. To escape from each mode, turn off the power

(7-3)ALARMS

Alarms are divided into three levels.

① Alarm Level 1

[Features]

- Alarms at alarm level 1 are automatically released when its error is recovered.
- If an alarm occurs, the printer is set to off-line state and interrupts printing.

[Indication]

The ALARM LED indicator goes on and alarm message is displayed in the LCD window.

No.	LCD window	Cause	Action to be taken
01	PAPER JAM	Paper was not fed properly when ASF is used.	After removing the jammed paper, press the [ON-LINE] Key.
02	PAPER OUT	Paper is out.	Set paper.
03	PAPERSEN ERROR	Paper was inserted from both bottom and rear. PIN-FRICTION lever is moved after paper set.	Set paper correctly. Set PIN-FRICTION lever correctly.
04	DATA IN BUFFER	Data remain in the input buffer. User can not set setting mode by operation panel.	After clearing input buffer, set operation panel again.

LCD window

PAPER JAM	OFF LINE P.OUT	PAPERSEN ERROR	DATA IN BUFFER

② Alarm Level 2

[Feature]

•Alarms at alarm level 2 are automatically released by the printer.

[Indication]

The ALARM LED indicator flashes and an alarm message is displayed in the LCD window.

No.	LCD window	Cause
01	HEAD HOT	The head is heated over a specific temperature. (When the temperature lowers, the alarm is automatically release.) The message disappears when the temperature lowers then <<ON LINE>> appears. If the [ON LINE] key is pressed while the message is displayed, the printer is set to off-line.
02	PULL TRACTOR	A command to feed paper in reverse was received while the tractor is mounted at the "PULL" position. When Reveres Line Feed is "disable", the message is displayed for 3 seconds then the printer goes on printing. The command is ignored.

LCD Window

HEAD
HOT

PULL
TRACTOR

③ Alarm Level 3

[Features]

- Alarms may be caused by hardware errors or temporary malfunctions.
- Alarms are not released automatically.

The user must turn off the printer once then on again.

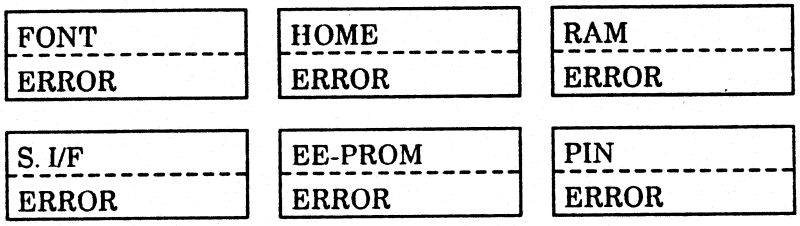
- If an alarm occurs, the printer is set to off-line and stops printing.

[Indication]

The Alarm LED indicator goes on and an alarm message is displayed in the LCD window.

No.	LCD window	Cause
01	FONT ERROR	Not correct font card was set.
02	HOME ERROR	The head was not positioned properly.
03	RAM ERROR	The RAM was damaged.
04	S. I/F ERROR	Setting of serial I/F was not correctly.
05	EE-PROM ERROR	EE-PROM write error
06	PIN ERROR	The head pin response (energized) time was not set into the RAM property.

LCD Window



④Alarm level 4

[Features]

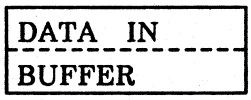
- No setting can be made until the cause of the alarm is removed.
- The printer returns to the previous mode after an alarm message is displayed on the LCD window for about 2 second.

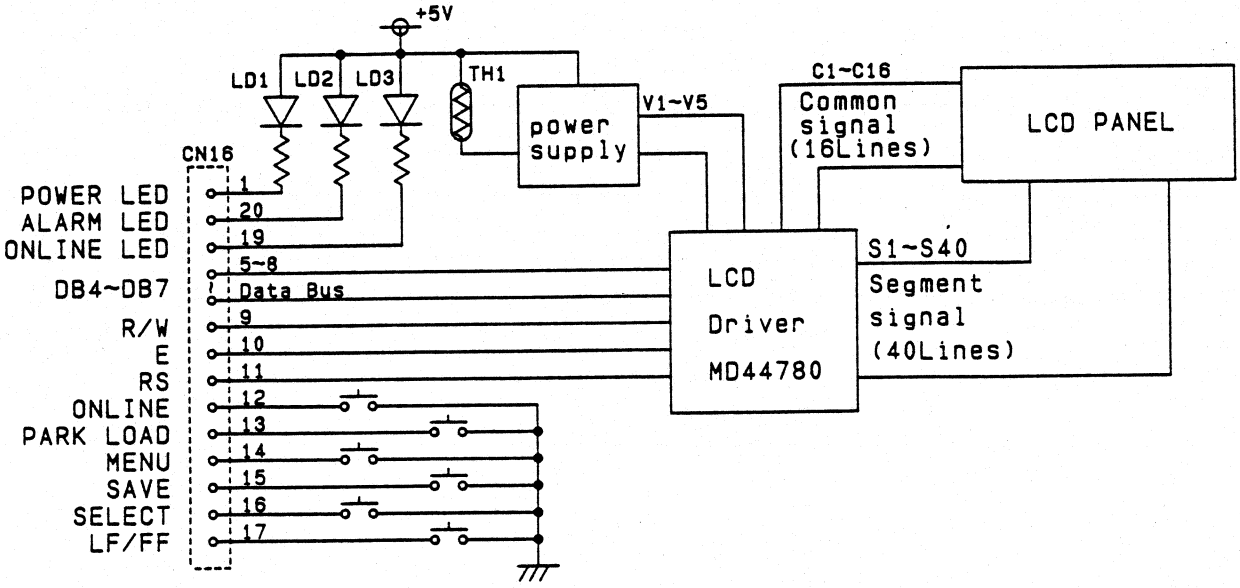
[Indication]

- The ALARM LED indicator goes on and an alarm message is displayed on the LCD window.

No.	LCD window	Cause	Action to be taken
01	DATA IN BUFFER	User has tried to set a specific mode on the operation panel while data remains in the input buffer.	Clear the input buffer before making the mode setting.

LCD Window





The LCD driver receives four data signals (DB4~DB7) and three control signals (R/W, E, RS) from the main board and displays various information on LCD panel.

The LCD panel lights up by the segment signals controlling vertical direction and the common signals controlling horizontal direction, both from the LCD driver. However, the LCD panel is susceptible to change in temperature and it may influence the display. Therefore, a thermistor (TH1) is incorporated into the power supply and this thermistor controls the voltages of V1~V5 to optimize the display.

(8) Interface

①Parallel Interface

(a) Transmission mode : 8bits in parallel

(b) Logic level : TTL-compatible

(c) Connectors

Receptacle (printer side) : Amphenol 57-40360 (36pin)

Plug (cable side) : Amphenol 57-30360 (36pin)

(d) Connector Pin Assignment

No.	Name of signal	No.	Name of signal
1	*STROBE	19	Twisted Pair GND
2	DATA 1	20	Twisted Pair GND
3	DATA 2	21	Twisted Pair GND
4	DATA 3	22	Twisted Pair GND
5	DATA 4	23	Twisted Pair GND
6	DATA 5	24	Twisted Pair GND
7	DATA 6	25	Twisted Pair GND
8	DATA 7	26	Twisted Pair GND
9	DATA 8	27	Twisted Pair GND
10	*ACKNOWLEDGE	28	Twisted Pair GND
11	BUSY	29	Twisted Pair GND
12	PAPER END	30	Twisted Pair GND
13	SELECT	31	*INITIALIZE PRINT
14	*AFXT (Epson Only)	32	*FAULT
15	NC	33	Twisted Pair GND
16	0V	34	NC
17	Chassis GND	35	FUSE
18	+5V	36	*SELECT IN(Epson Only)

* : Negative true logic.

(e) Interface Signals

- *STROBE (from host to printer)

  DATA 1-8 signals are read into the printer by this signal.

  The normal condition is "High" and the valid signal is "Low" and pulse.

  This pulse width is needed more than 1 micro second.

- DATA 1-8 (from host to printer)

  8bit parallel input data.

  DATA 1 is LSB and DATA 8 is MSB.

  These signals are normally "Low" level.

  DATA "1" is "High" level and DATA "0" is "Low" level.

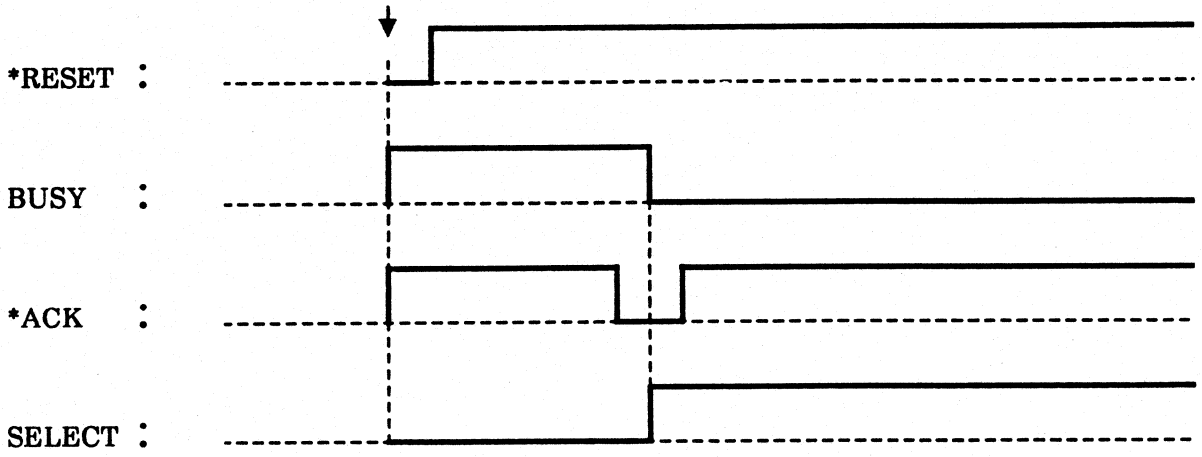
- *AFXT (from host to printer)
  When printer is powered up or reset, this signal is low and operation panel setting are configured for CR=CR Only, the paper is automatically fed one line after printing (CR=NL).
  Internal fixing (printer End) can be selected to fix this signal High (default) by non volatile memory, so the printer doesn't have Internal fix Jumper.
- *SLCT IN (from host to printer)
  Data entry to the printer is possible only when the level of this signal is low.
  Internal fixing (Printer End) can be selected to fix this signal low (default) by non volatile memory, so printer doesn't have Internal fix Jumper.
- *ACKNOWLEDGE (from printer to host)
  This is the recognition signal for data reception, and the falling edge of this signal occurs any time during BUSY, and the rising edge occurs coincident with the falling edge of BUSY.
  This pulse is more than 5 micro seconds wide.
  The host computer can transmit new data after accepting this signal.
- BUSY (from printer to host)
  This signal means whether the printer can receive data or not .
  "High" level means the printer can not receive data from the host.
- PAPER END (from printer to host)
  "High" level means paper end condition.
- SELECT
  When printer is on line, this signal always becomes high level. (For Epson)
  When printer is on condition as follows, this signal becomes low level.
  - Press on-line switch in deselect condition.
  - Receive DC3 code.
  - Printer is on fault condition.
  - Print till end of sheet.
  - Sheet feeder error is occurred.
  - After print 1 line over ride printing.

  When printer is on condition as follows, this signal becomes high level.
  - Press on-line switch in deselect condition.
  - Receive DC code in deselect condition. (For IBM)
- 0V
  Signal ground
- NC
  Not connected
- Chassis GND
  Chassis ground
- +5V
  The external device can use up to 80 mA, +5V.
- Twisted Pair GND
  Signal ground.

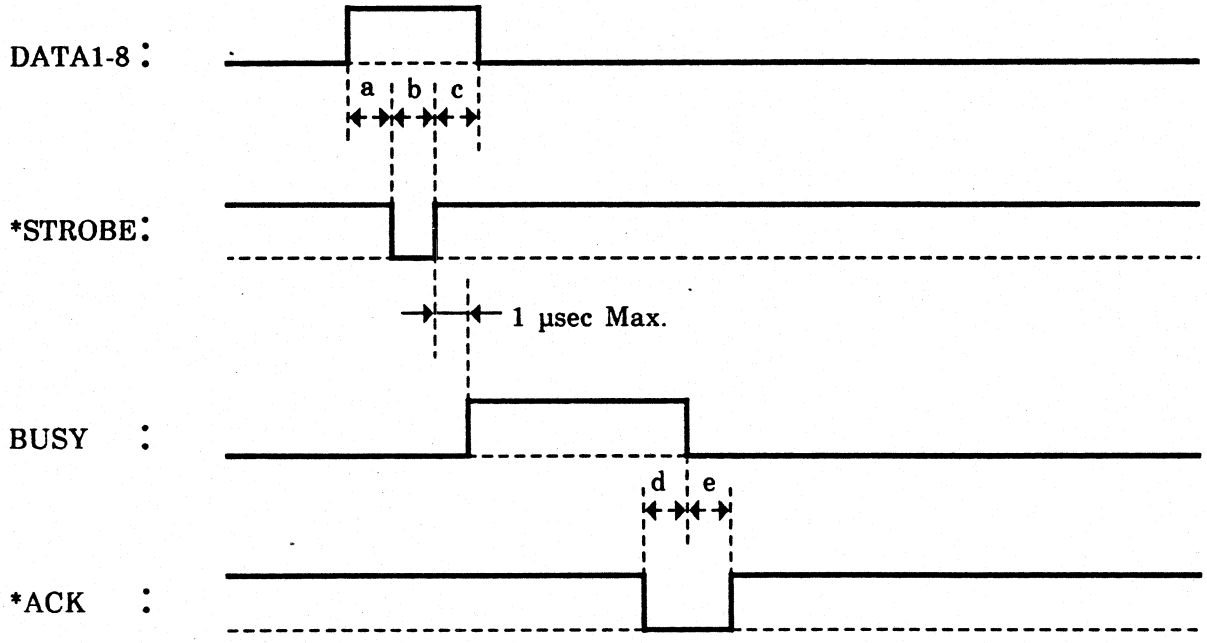
- *FAULT (from printer to host)
  When an error occurs, this signal becomes low level.
  <EX:> PE or Home Sensor Error. (For IBM)
  When printer is on line, this signal becomes high level.
  When printer is off line, this signal becomes low level. (For EPSON)
- *INITIALIZE PRINTER (from host to printer)
  The printer initialized by this signal.
  The pulse width must be more than 50 micro seconds.

(f) Timing chart

[In the case of power on]



[In the case of data received]

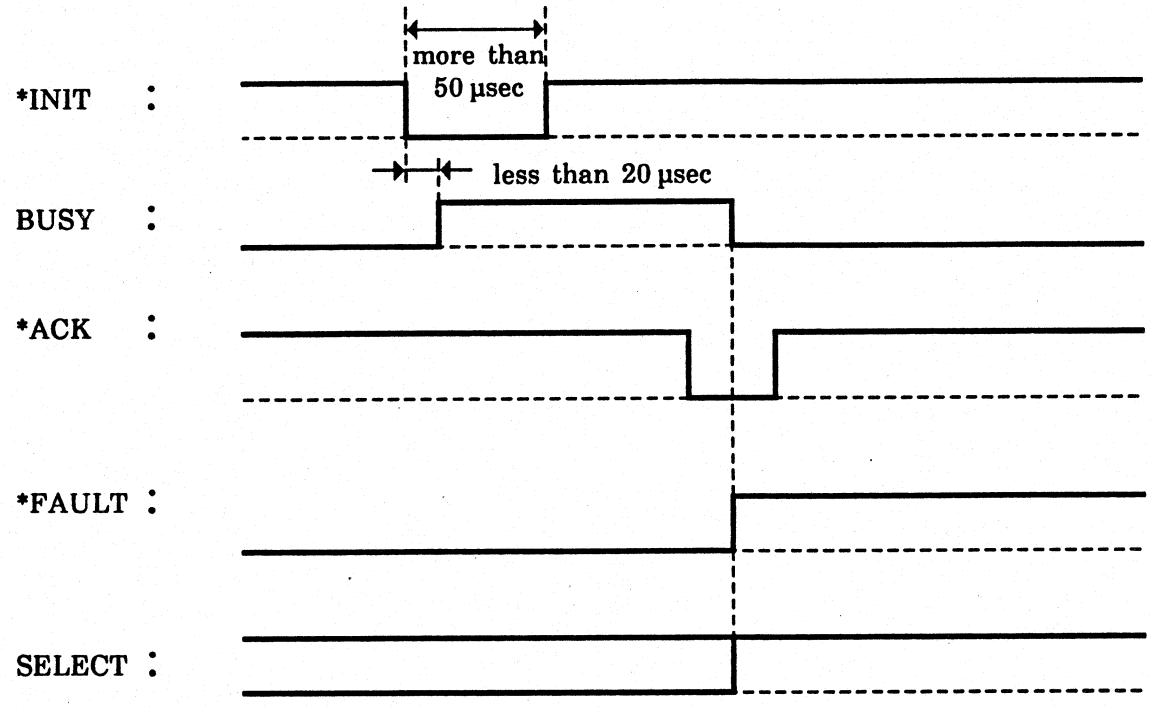


a : 1 µsec Min.
b : 1 µsec Min.
c : 1 µsec Min.

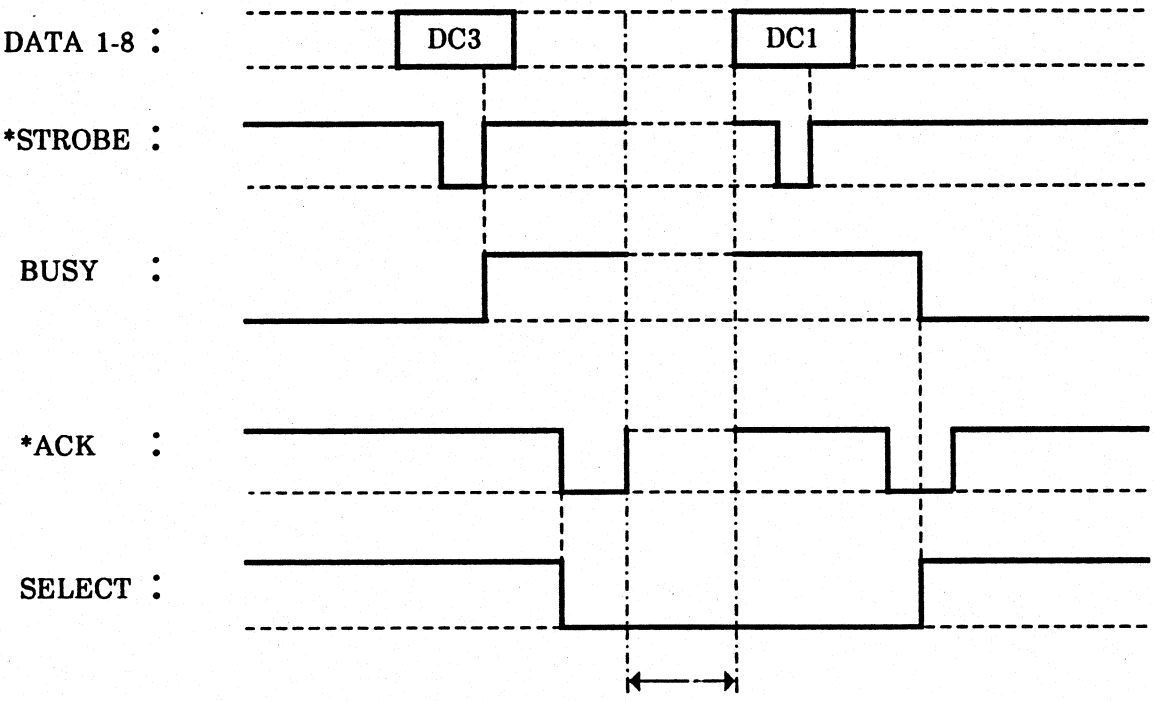
d : About 4 µsec
e : About 4 µsec

(Note) * : Negative true logic.

[In the case of INIT signal received]



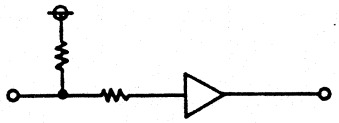
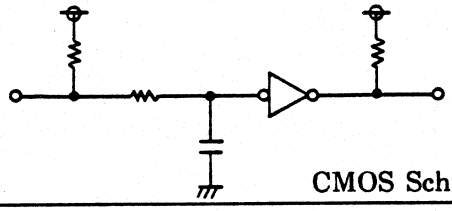
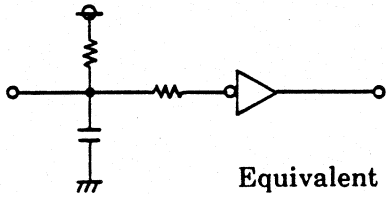
[In the case of DC1 / DC3 Signal received]



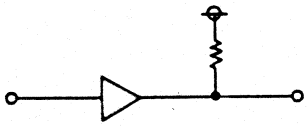
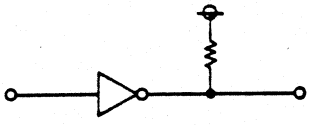
Data should be ignored in this area.

(g) Interface Circuit

(g-1) Receive Circuit

Signal Name	Configuration	Logic Level
DATA 1-8	 CMOS	V_H=2.0V V_L=0.8V
*STROBE	 CMOS Schmidrt	V_H=1.8V V_L=0.9V
*INIT	 Equivalent to 74HC14	V_H=3.15V V_L=0.9V

(g-2) Output Circuit

Signal Name	Configuration
BUSY	 Equivalent to 7407
SELECT *FAULT *ACK PE	 Equivalent to 7406

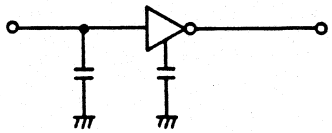
② Serial Interface (Option)

(a) Specifications

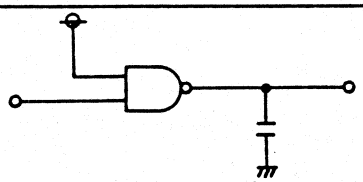
• Transmission mode	Asynchronous full duplex
• Signal level	RS-232C
• Baud rate	110, 300, 600, 1200, 2400, 4800, 9600
• Data length	7 or 8 bits
• Start bit	1 bit
• Stop bit	1 bit or 2 bits
• Parity	Even, Odd, None
• Connector	On the printer : JAE DBLC-J25SAF-106L
• Others	Serial/Parallel interface selection : No interface is selected immediately after the power is turned on. One of the interface through which data is sent to the printer first after the power is turned on will be selected, and will remain selected until the power is turned off. The other interface is deselected, so that data can only be transferred through the selected interface.

(b) Input/output circuit

(b-1) Input circuit

Signal	Composition
RXD DSR	 Equivalent to 75189A

(b-2) Output circuit

Signal	Composition
TXD RTS DTR	 Equivalent to 75188

(c) Protocol

(c-1) X-ON/X-OFF system

Controls data flow by sending the X-ON (11H) code which requires to send data, and the X-OFF (13H) code which requires to stop sending data.

<Conditions in which the X-ON code is issued>

- The printer status is changed from offline to online.
- The empty area in the buffer becomes equal to or more than 512 bytes. (See Fig.1)

<Conditions in which the X-OFF code is issued>

- The printer status is changed from online to offline.
- The ONLINE switch on the operation panel is pressed.
- Paper end status is detected.
- Printer error is detected.
- The empty area in the buffer becomes equal to or less than 256 bytes. (See Fig. 1)

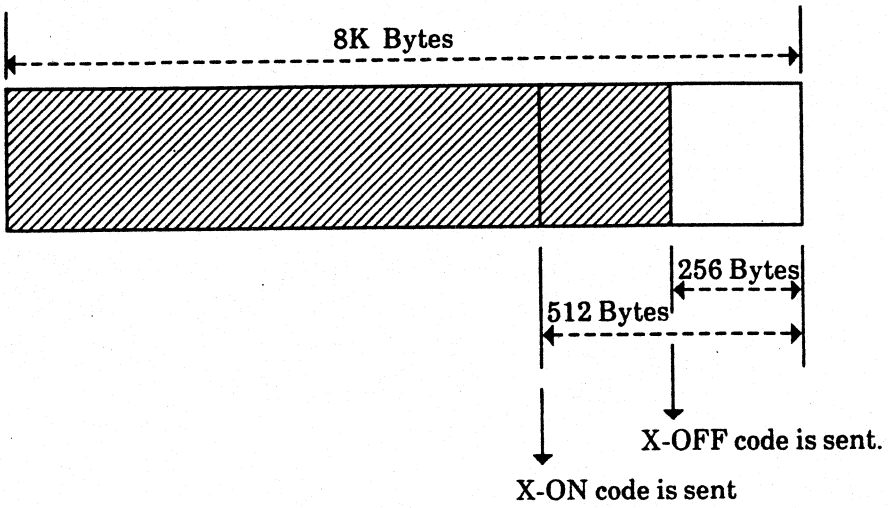


Fig. 1

Note : Even when the condition for the code transmission is set, the same code will not be issuedtwice consecutively. (Except at the initialization by the power-on.)

(c-2) Ready/Busy system

Controls the data flow by the two levels of the DTR signal ; Ready (High) and Busy (Low).

<Conditions in which DTR is set to "High">

The DTR will be "High" when all the following conditions are satisfied :

- The printer is in the online mode.
- The empty area in the buffer is equal to or more than 512 bytes.
- Printer alarm that causes the printer to enter the offline mode is not detected.

<Conditions in which DTR is set to "Low">

- The printer is in the online mode.
- The empty area in the buffer is less than 256 bytes.
- Printer alarm that causes the printer to enter the offline mode is detected.

(d) Pin assignments and signal lines

Pin No.	Signal	Direction	X-ON/X-OFF		Ready/Busy	
1	F.GND		**	Connects printer to host CPU.	**	Connects printer to host CPU.
2	TXD	OUT	**	Data from printer to host CPU. X-ON/X-OFF is issued.		Not used
3	RXD	IN	**	Data from host CPU to printer.	**	Data from host CPU to printer.
4	RTS	OUT	*	Becomes "High" when printer is busy, and "Low" when ready.		Set to "High"
7	S. GND		**		**	
20	DTR	OUT	*	Becomes "Low" when printer is off line, and "High" when online.		Set to "High"
25	+5V	See Note 3.		Power used for test. Not for user.		Power used for test. Not for user.

Note 1 : "IN" means the direction from the host CPU to the printer, and "OUT" means that from the printer to the host CPU.

Note 2 : Connections should be established for at least the signals marked by two asterisks (**). Signals marked by a single asterisk (*) are those that may be used.

Note 3 : The +5V line is connected to the power supply block in the printer. This line should not be used by a user.

- F. GND (Frame Ground)
  Connected to the chassis of the printer.
- TXD (Transmit Data, Send Data)
  Serial data transmission line from the printer to the host CPU.
- RTS (Request to Send)
  Signal used by the printer to indicate that there is data to be sent to host CPU.
- S. GND (Signal Ground)
  Signal ground line.
- DTR (Data Terminal Ready)
  Signal used by the printer to indicate that the printer is ready to send or receive data

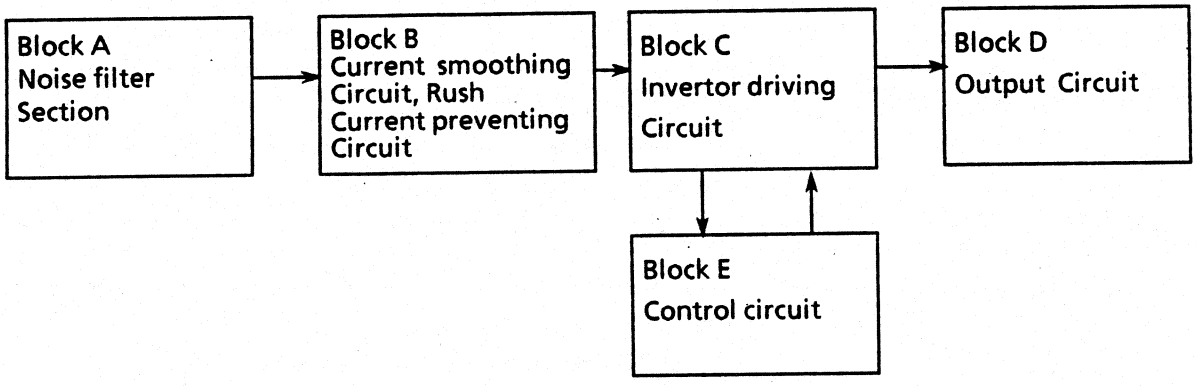
(9) Power supply (115V)

This power supply is a switching regulator of self-exciting reverse type with the continuous output of 47W and the maximum output of 110W.

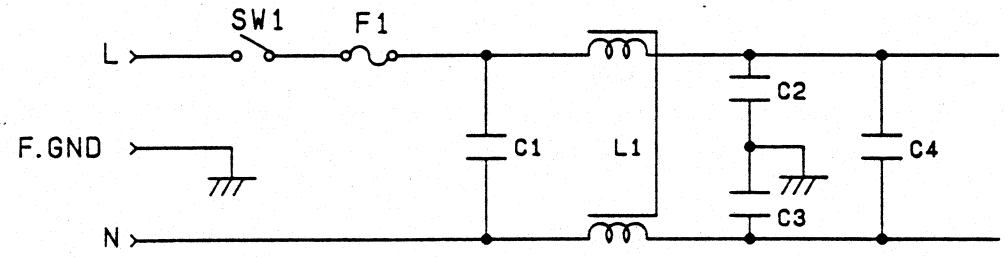
As the output, +27V (1.7A continuous, 4A max.) for the driver system and +5V (1.0A) for the logic system are supplied.

① Block diagram

The following shows a block diagram for this power supply.



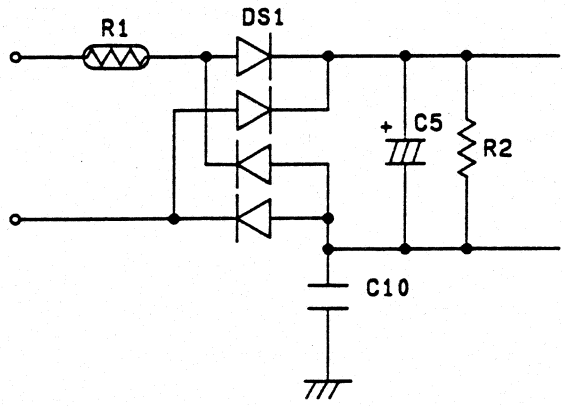
② Block A (Noise filter section)



The filter section consists of the fuse (F1), the X capacitors (C1, C4), the Y capacitors (C2, C3) and the common mode choke coil (L1).

This section eliminates noise generated from the power supply itself to satisfy the noise regulation. Moreover, noise coming from the outlet is attenuated to prevent the noise from passing to the output section and to protect the power supply.

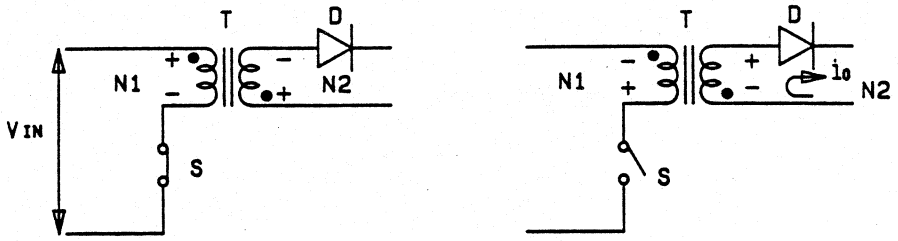
③ Block B (Current smoothing circuit and rush current preventing circuit)



A thermistor is used in R1 to suppress the rush current to C5 at power on and the rush current is suppressed to 30A or less. In continuous operation, the resistance is lowered by the increase in temperature of the thermistor to reduce the loss of the flowing current.
As the rectifying circuit, full-wave rectification of AC input is performed by the diode stack DS1 and ripple is smoothed by the capacitor C5. Resistance R2 is a discharge resistance which discharges the charge remaining in C5 after the power is OFF. Moreover, C10 is used to eliminate the noise generated in the primary side.

④ Block C (Invertor driving circuit)

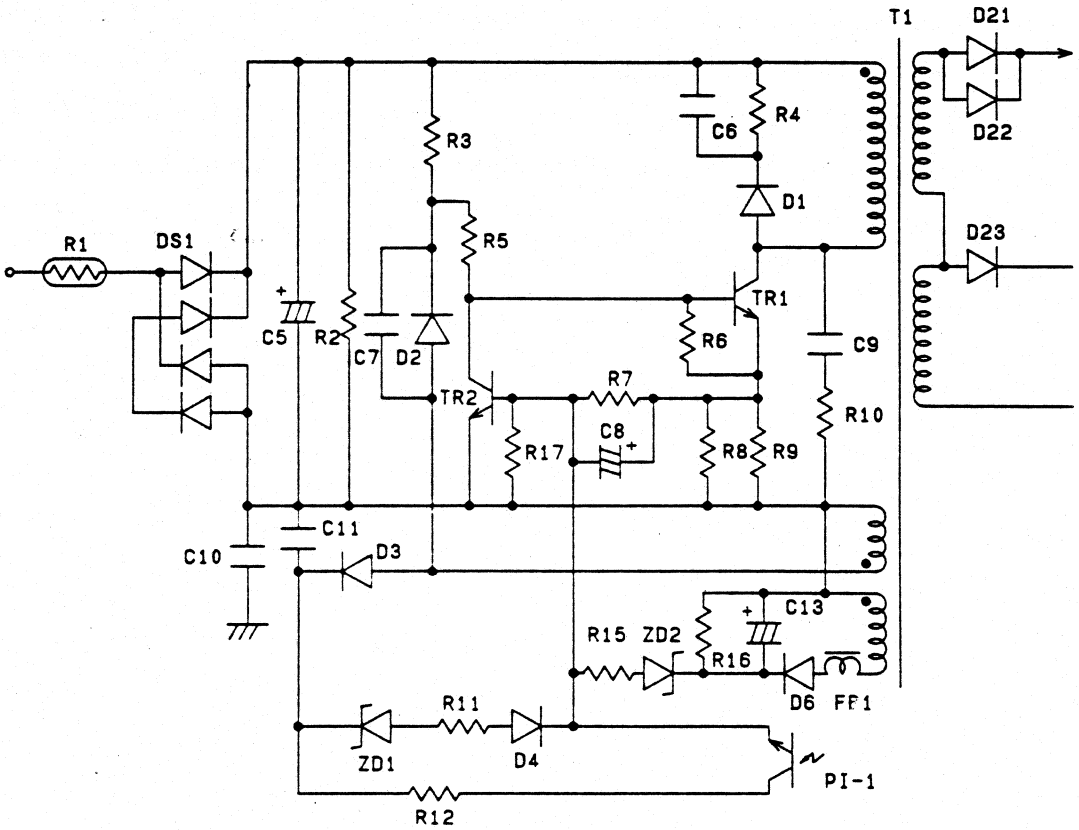
First, the following explains the ringing method used in this power supply.



When the switch S is closed in the circuits (a) and (b), V_{IN} is applied to the winding N1 and the voltage with the polarity shown in (a) is induced in N2.

However, since the diode D is inserted reversely, the current is not flowed and no energy is supplied to the secondary side.

When S is opened, the voltage as shown in (b) is induced in the winding of the transformer. Then, the current flows in D and the energy charged in the transformer while S is closed is supplied to the secondary side.

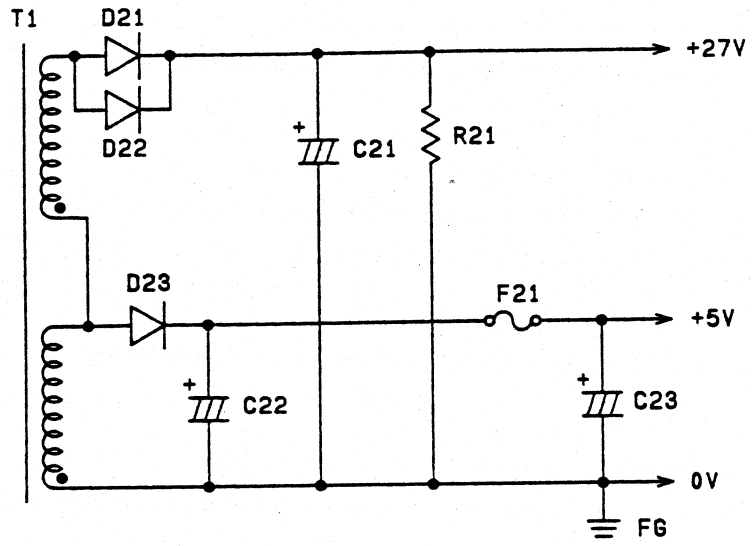


In the actual circuit, the operation of the switch S is performed by TR1. When AC is input, base current flows in TR1 via R3 and R5, TR1 tries to be ON and collector current begins to flow via winding of the transformer. Then, voltage is induced in the base winding and the base current is applied via D2 and R5 to turn ON TR1.

The voltage is applied to TR2 by the current which is flowed as TR1 is ON. If the sum of this voltage and that applied from PI-1 as feedback of the secondary side becomes the value required to turn ON TR2, TR2 is turned ON and TR1 is turned OFF to shut off the base current to TR1. When TR1 is turned OFF, the polarity of the transformer gets reversed and power is supplied to the secondary side via D21, D21 and D23.

After completion of power supply to the secondary side, the polarity reverses again to the original state. At this time, the current flows via D2 and R5 by the voltage generated in the base winding, turning TR1 ON. Oscillation is achieved by repeating the above operations.

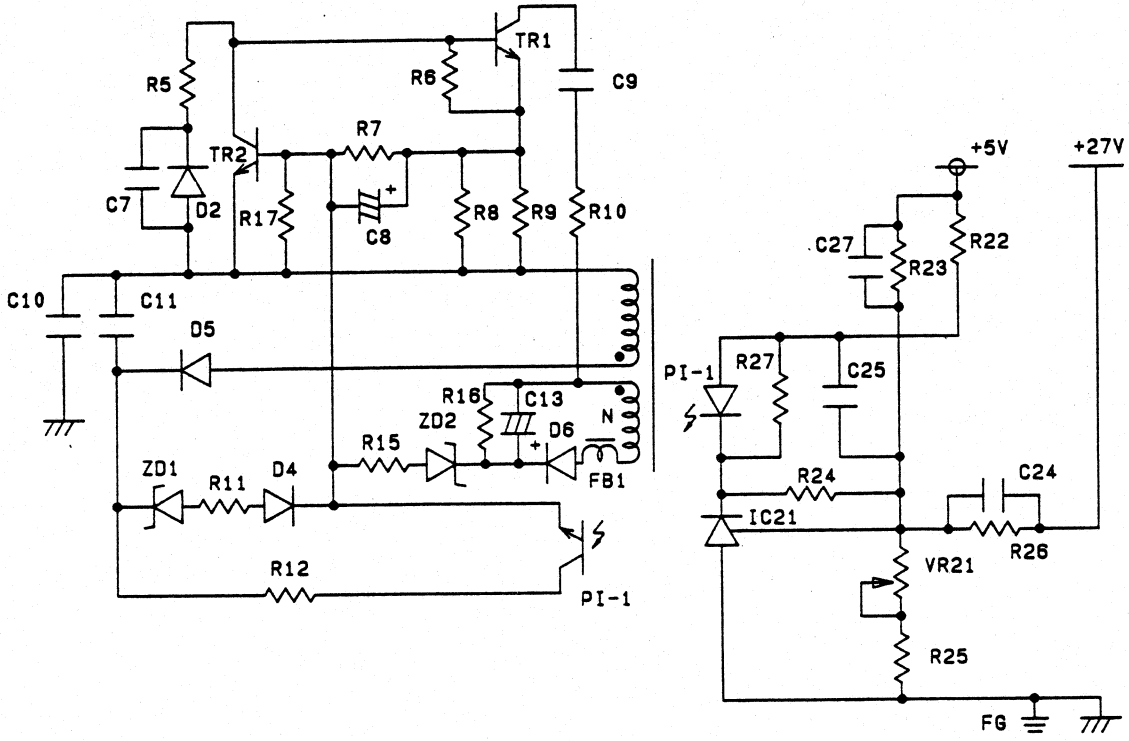
⑤ Block D (Output circuit)



This output circuit obtains DC output of +27V for the driver system and +5V for the logic systems by half-wave rectification and smoothing by D21, D22 and C21 for the former and by D23 and C22 for the latter.

The current capacity of +27V is 0.08~4A and that of +5V is 0.2~1A.

⑥ Block E (Control circuit)



<Output stabilizing circuit>

In this circuit, the output voltage is controlled by feeding back +5V and +27V to the primary side in order to stabilize the voltage. This feedback is made by IC21 and PI-1. The voltage generated at both ends of the detecting resistances R25 and VR21 and the reference voltage of IC21 (approx. 2.5V) are compared. If the former is higher than the latter, the cathode current of PI-1 is increased and the current of the receiving phototransistor is also increased.

Then, TR2 is turned ON by increasing the base current and the output voltage is decreased by turning TR1 OFF.

<Overvoltage protection circuit>

In this power supply, an overvoltage protection circuit is provided as countermeasures in abnormality. This circuit consists of R15, ZD2, R16, C13, D6, FB1 and N.

If the output voltage should be increased, the voltage at both ends of C13 is increased and when it excesses the Zener voltage of ZD2, TR2 is turned ON and TR1 is turned OFF via R15 to suppress the output voltage increase promptly.

<Adjustment of output>

The output of +5V and +27V is adjusted by the variable resistance VR21. Both +5V and +27V changes by varying the resistance of VR21.

Chapter 3
Disassembly and Maintenance

CHAPTER 3 DISASSEMBLY AND MAINTENANCE
TABLE OF CONTENTS

3 - 1 Maintenance Precautions

WARNING

(1) Before starting disassembly/reassembly or adjustment, be sure to disconnect the power code from the power source.
(2) Do not replace a fuse with the power switch turned on.
(3) The fuse is provided to prevent a fire, and so on.When replacing it, use the same type.

Observe the following in maintenance work:

CAUTIONS

(1) Do not disassemble/reassemble or adjust the machine, if it functions properly.Particularly, do not loosen screws of each component, unless necessary.
(2) After completing an inspection, be sure to check before turning on the power that there is no abnormality.
(3) Never try to print without paper or ribbon installed in the printer.
(4) Check that the printing paper has been properly set.
(5) Do not lay anything on the cover or lean against it during maintenance or while the printer is in operation.
(6) At a time of maintenance, be careful not to leave parts or screws unattached or loose inside the printer.
(7) When handling a printed circuit board, do not use gloves, etc.which easily cause static electricity.Since ICs, such as μCPU, RAM and ROM, may be destroyed by static electricity, do not touch lead wires or windows unnecessarily.
(8) Do not put the printed circuit boards directly on the machine or floor.
(9) When disassembling and reassembling, check wires for any damages and do not put them through by force.

3 - 2 Cleaning

Cleaning Spots: listed in table below

Cleaning Position	Description
Carriage Rail	Wipe off ribbon refuse, paper refuse, etc.on the carriage rail.
Paper running surface	Wipe off paper refuse, etc.on and around the paper running surface.

Clean inside the printer in accordance with the following:

Cleaning frequency: Every 6 months or 300 hours of operation
(either period which ever comes first)

Materials: Dry cloth (gauze or soft cloth)
Ethyl alcohol

3 - 3 Lubrication

3-3-1 Lubrication Frequency

This is a maintenance-free machine and requires no lubrication under normal use. However, the machine should be lubricated whenever it is disassembled and reassembled, or cleaned.

3-3-2 Types of Lubricants

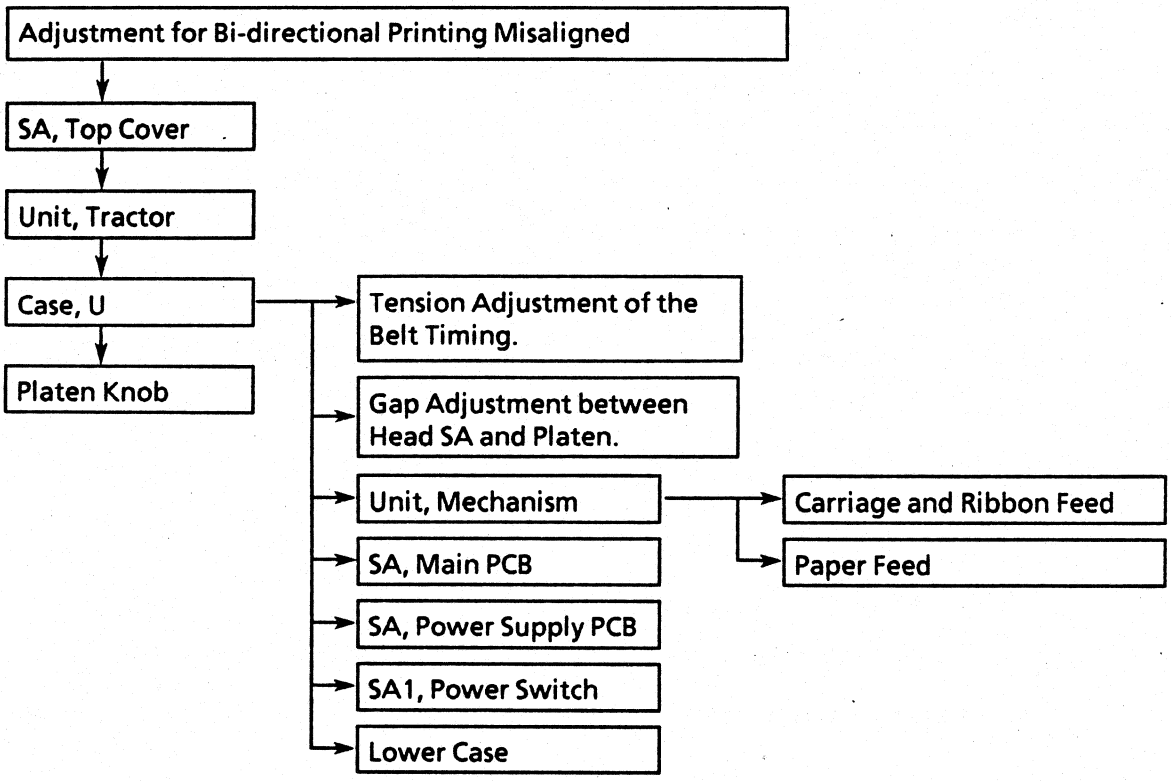
(1) Engine oil Mobil-one (by Mobil Oil Co., Ltd.)
(2) Floil G-311S (by Kanto Chemical Co.,Ltd)
(3) Silicon SC102 Compound (by Toray Silicone)
(4) EM-30L Grease (by Dowcornning Co.,Ltd)

3-3-3 Quantity of Lubricant

Small quantity ..... ★ ..... About 1 drop.
Ordinary quantity ..... ★★ ..... About 3 to 4 drops.About 0.2 mm thick for grease.
Large quantity ..... ★★★ .... Apply sufficiently.

3 - 4 Disassembly Flow

Disassembly the printer in accordance with the following disassembly flow chart.



3 - 5 Maintenance Tools List

Maintenance tools shown below are needed when replacing main PCB in the field, maintenance parts such as a unit, etc.

Maintenance Tools List

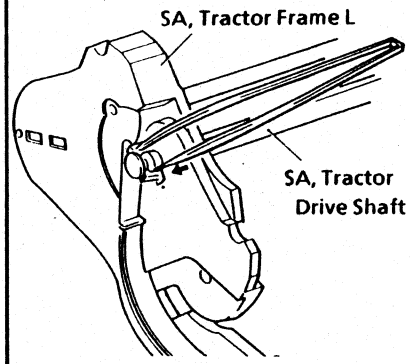
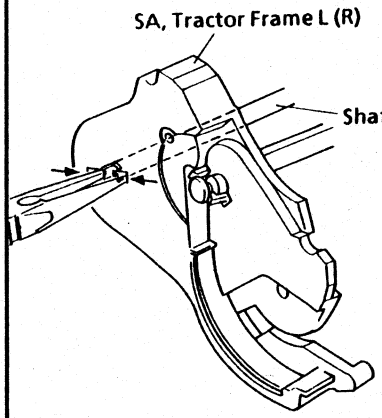
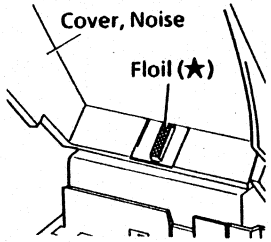
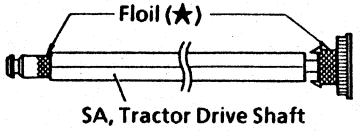
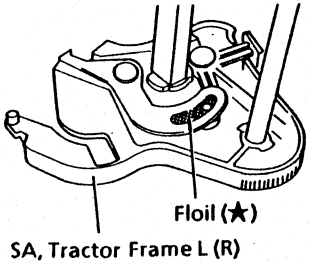
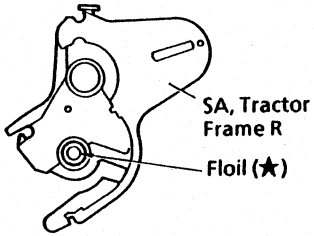
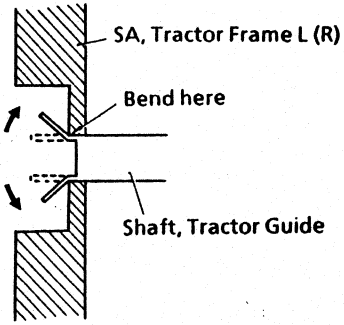
NO.	Description	Qt'y	Description	Remarks
1	Phillips Screwdriver (Length 200 mm)	1	For 3~4 mm screws	
2	Phillips Screwdriver (Length 200 mm)	1	For 2~2.6 mm screws	
3	Slotted Screwdriver	1		
4	Tweezers	1		
5	Round Nose Pliers	1		
6	Thickness Gauge	1set	For adjustment of print head gap.	
7	Dial Tension Gauge(100g)	1		Parts No. J9104-001
8	Cutting Nipper	1		
9	Soldering Copper (30W)	1		
10	Tester (For Voltage checking)	1		
11	L type Slotted Screwdriver	1	For adjustment of print head gap.	

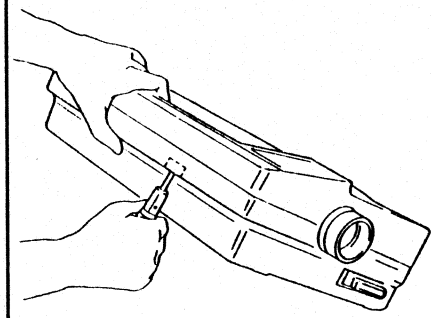
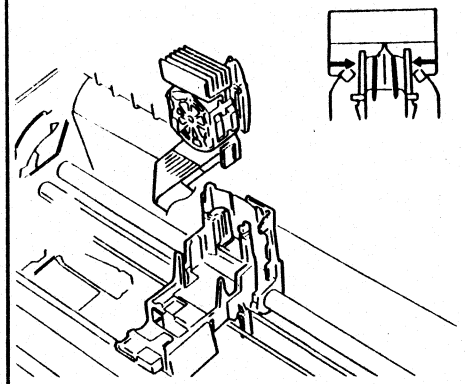
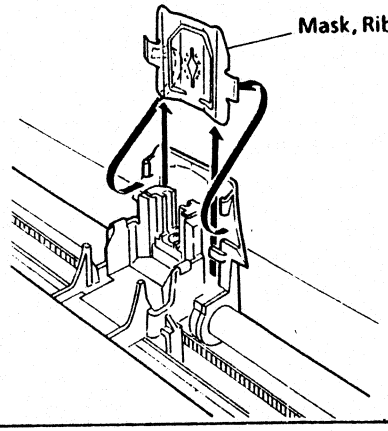
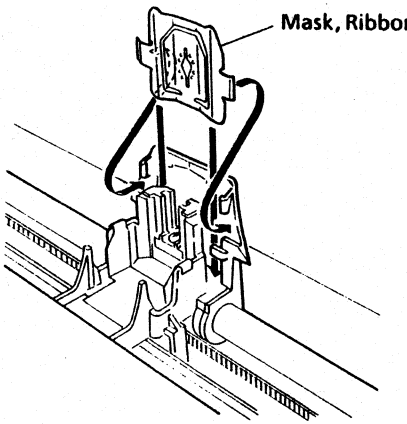
3-6 Disassembly, Reassembly and Lubrication on Each Components

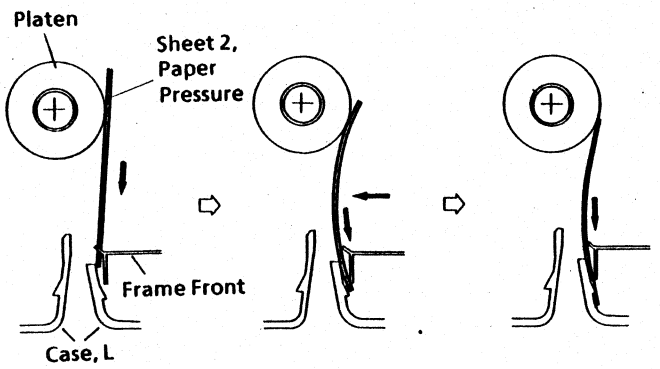
3-6-1 General Assembly

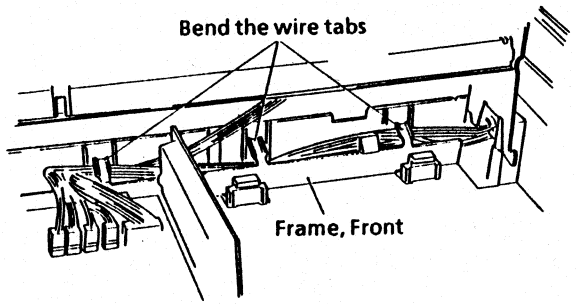
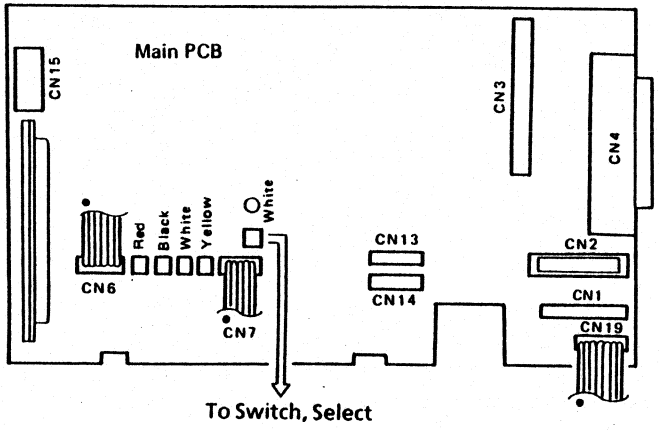
*Note : 1. Refer to Drawing 1 in Chapter 5 for the expanded view.
2. The column "No." stands for the part illustration No. in the drawing.
3. Reassemble in the reverse order of disassembly.

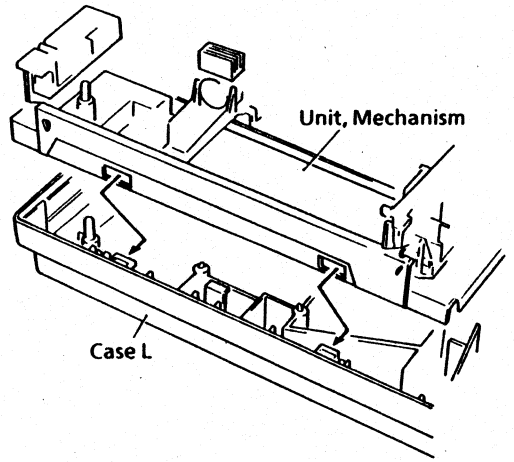
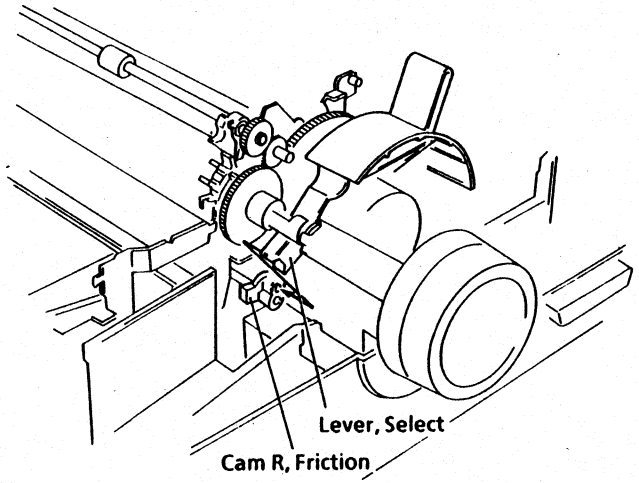
★ : Small
★★ : Optimum
★★★ : Sufficiently

No.	Procedure	Disassembly	Reassembly and Lubrication
1-13 1-14 1-11 1-10 1-6 1-8 1-7 1-9	SA1, Top Cover Cover, Noise SA, Tractor Drive Shaft Gear, Tractor Idle SA, Tractor Frame R Tractor R Tractor L Shaft, Tractor Guide	 Release the lock with tweezers as shown in the drawing and pull out to the direction shown by the arrow.  Return the opened part with round nose pliers and pull out the Shaft of Tractor Guide.	 Lubrication : One location each on right and left.     Expand to the direction shown by the arrow and secure the Shaft of the Tractor Guide. (There shall be no clatter on the thrust direction.)

No.	Procedure	Disassembly	Reassembly and Lubrication
1-20 1-25	Case, U 1 ● Screw, PHT (ST)M3×6	 Release two locks securing the front of the Case L using minus screwdriver as shown in the drawing and remove the Case U while retaining the Select Lever at the center.	Align the locks of the rear side of the Case L with the Case U and assemble the Case U while retaining the Select Lever at the center. Adjust the belt tension. (Refer to 3-7-2) Adjust the head gap. (Refer to 3-7-3)
2-1	SA, Head	 Lift up to the direction shown by the arrow by pinching with fingers and remove it.	
2-2	Mask, Ribbon		 Set the Ribbon Mask as shown in the drawing before assembling the Head SA.

No.	Procedure	Disassembly	Reassembly and Lubrication
1-17 1-16 1-18 1-19	Cable, Ope-pane SA1, Ope-pane SA1, Color PCB ● Screw, PHT (PT), M2.6×5	To remove, apply force evenly to the connector on the Main PCB and pull forcibly.	• Connect the cable of the Color PCB SA to CN19. Assemble it so that the black line comes to the left side when viewed from the front. • Connect the cable of the Operation Panel to CN1. • Set the Shield Plate of the Operation Panel under the PF Motor.
1-26	Sheet 2, Paper Pressure	Slide up the sheet 2 of the Paper Pressure while pressing onto the Platen side.Set the	Insert the Sheet 2 into the gap between the Case L and the Front Frame and push in until it locks at four locks on the Case L. At this time, pay attention to four projections on the Front Frame for pressing the Sheet 2 to the Platen side. 

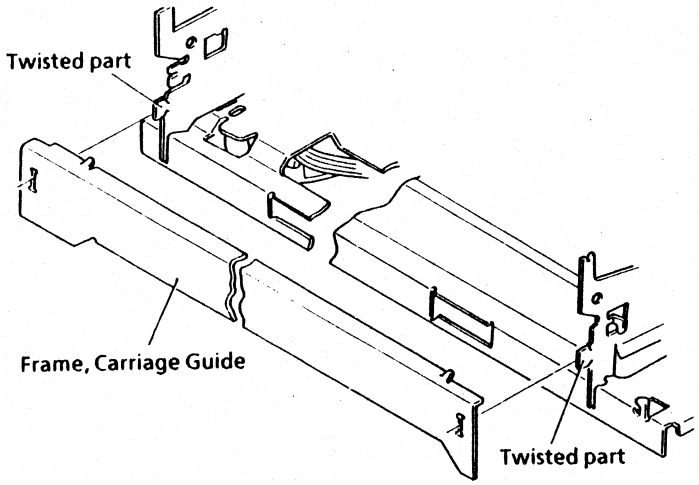
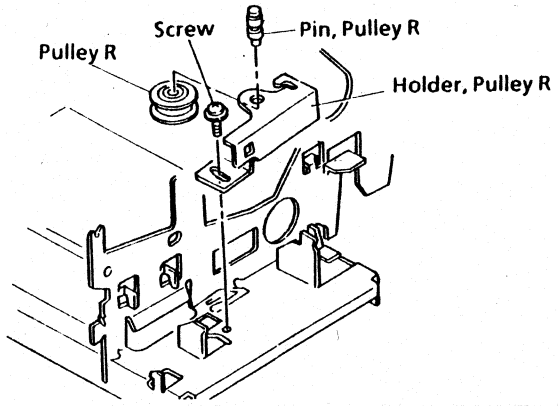
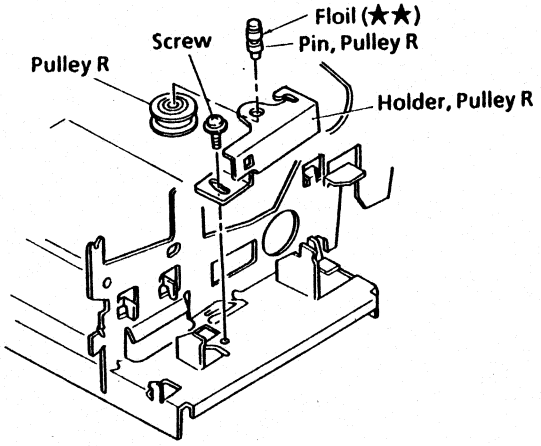
No.	Procedure	Disassembly	Reassembly and Lubrication
1-23	Unit, Mechanism • Four screws, PHT (PT), M3×8	Set the Select Lever to "PIN" side and remove the rear side of the Mechanism Unit by lifting it up.	  Note1 : Note the marked "●" when setting the lead wire. Note2 : Remove the Power Supply PCB prior to cabling. Secure the lead wires at three locations as shown in the drawing. Note3 : Refer to the drawing when connecting the connectors.

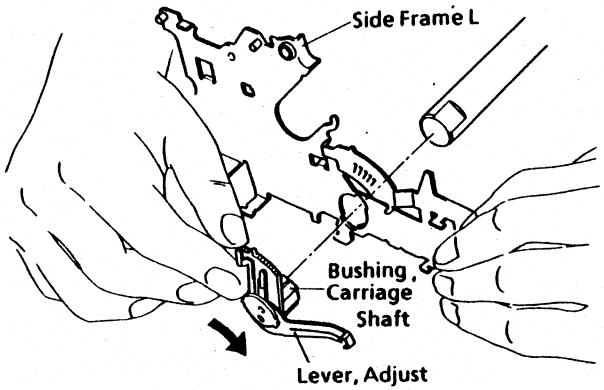
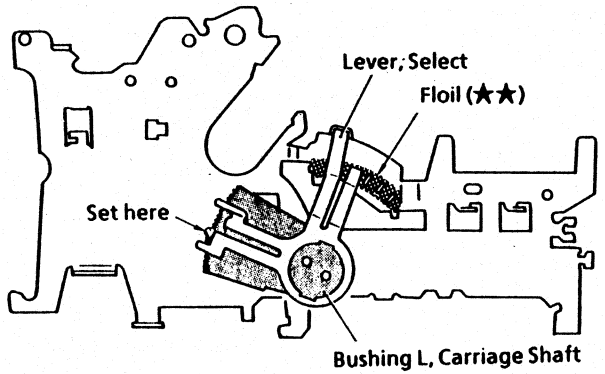
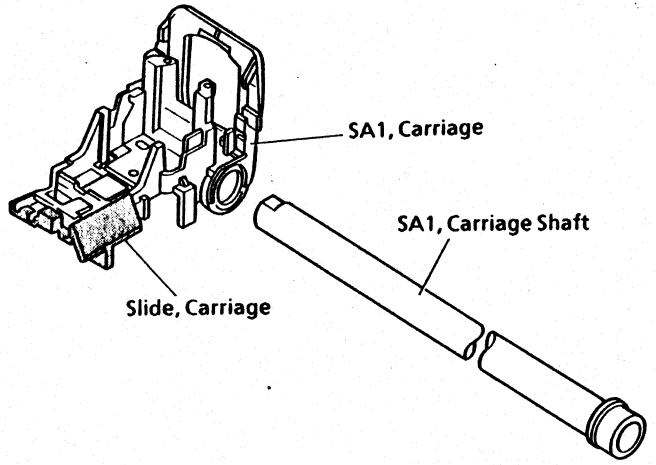
No.	Procedure	Disassembly	Reassembly and Lubrication
			• Fit the Case L at two locations on the front of the Mechanism Unit as shown in the drawing.  • Take the Cable of the Head SA out of the Mechanism Unit. • Engage the Friction Cam R with the Select Lever as shown in the drawing. 

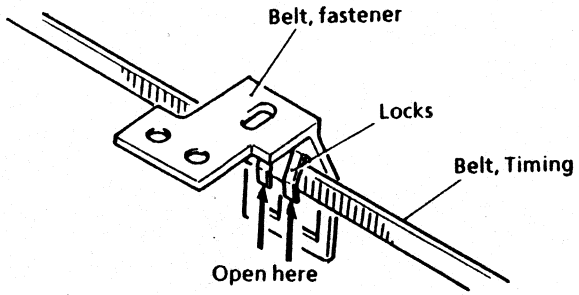
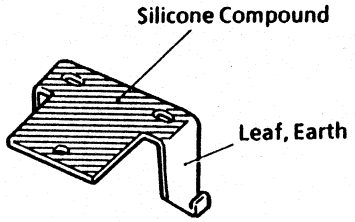
3-6-2 Carriage and Ribbon Feed

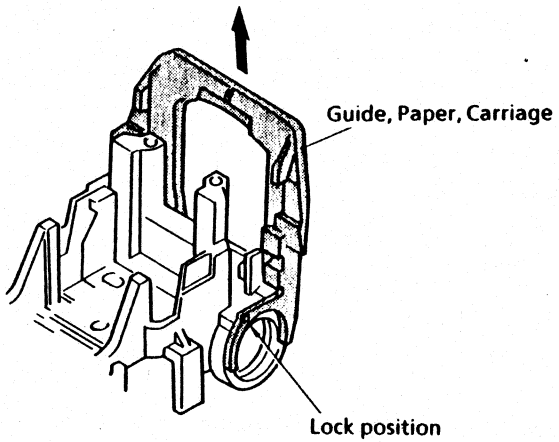
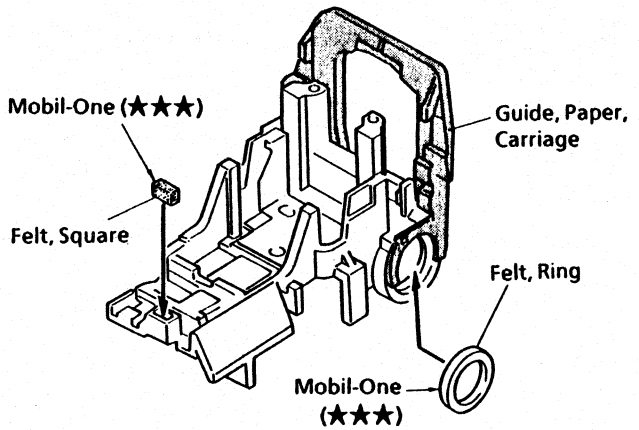
*Note: 1. Refer to Drawing 2 in Chapter 5 for the expanded view.
2. The column "No." stands for the part illustration No. in the drawing.
3. Reassemble in the reverse order of disassembly.

★ : Small
★★ : Optimum
★★★ : Sufficiently

No.	Procedure	Disassembly	Reassembly and Lubrication
2-24	Frame, Carriage Guide	[Release the Mechanism Unit from the Case L.] Turn two twisted parts straight using round nose pliers.  	Assemble the Frame to the slot of the Carriage Slide and twist two locations using round nose pliers.
2-22 2-28 2-23	Pin, Pulley R Holder, Pulley R ● Screw, PT (ST) M3×6	Remove the screw of the Holder and then pull out the Pin.  	

No.	Procedure	Disassembly	Reassembly and Lubrication
2-26 2-25	Lever, Adjust Bushing L, Carriage shaft	Turn the Bushing L to the direction shown by the arrow. Align the notch of the Side Frame L and the Bushing L and pull the Bushing out.  	Assemble the Lever and the Bushing L first, and assemble it to the Carriage Shaft. After assembly, align the Lever at the position as shown in the drawing.  After lubrication, ,make sure that click sound is heard by moving the Lever.
2-18 2-11 2-16	SA1, Carriage Shaft SA1, Carriage Slide, Carriage		Set the Carriage Slide to the Carriage SA1 first, then pass it through the Carriage Shaft. 

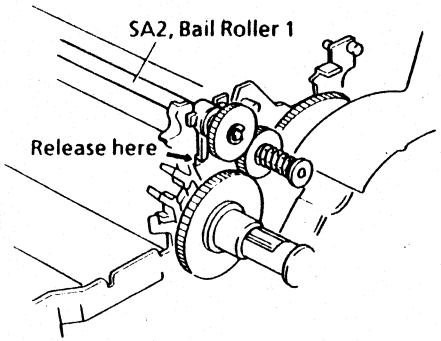
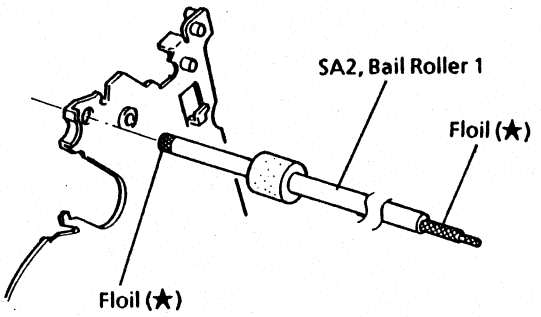
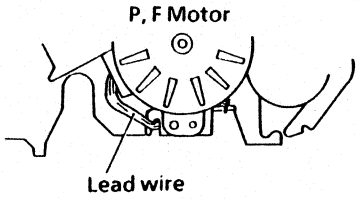
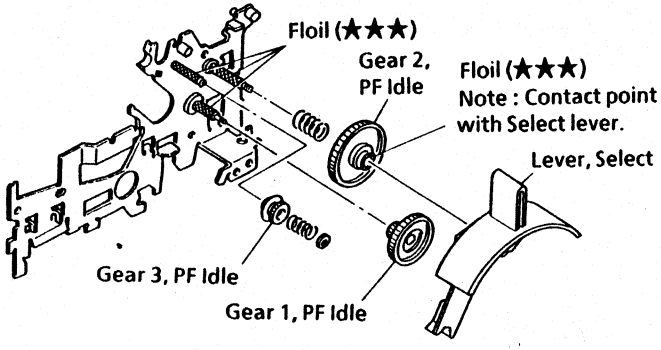
No.	Procedure	Disassembly	Reassembly and Lubrication
2-7	SA, Carriage Motor		Adjust the backlash. (Refer to 3-7-1)
2-8	• Screw, PHT (ST),M3×6		
2-9	• Screw, PHT (ST),M3×14		
2-6	Holder, Pin		
2-5	SA, Pulley L		
2-4	Pin, Parallel (A)		
2-3	SA, Ribbon Gear	Release three locks from the back.	
2-10	Switch, HP		Pass the lead wire to the hole on the Front Frame and lead to the back.
2-12	Belt, Timing	Open two locks on the Belt Fastener and remove the Timing Belt. 	When putting the Belt between two locks and bending the locks, pay attention to the Belt so that it may not be slanted.
22-14	Leaf, Earth		Apply silicon on the back surface. Secure the Leaf together with the Belt Fastener with screw. 
2-17	• Screw, PH M3×6		

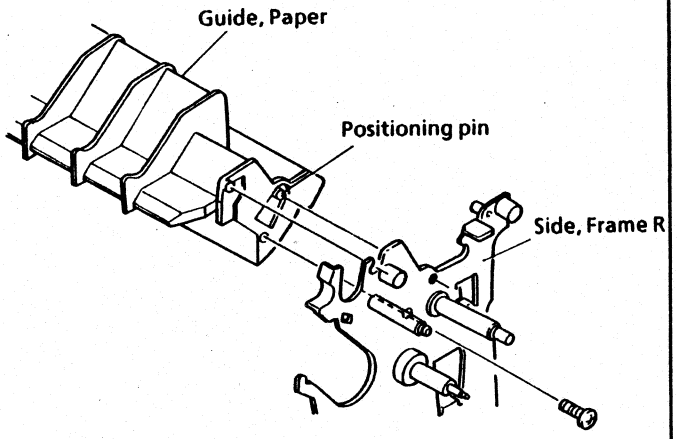
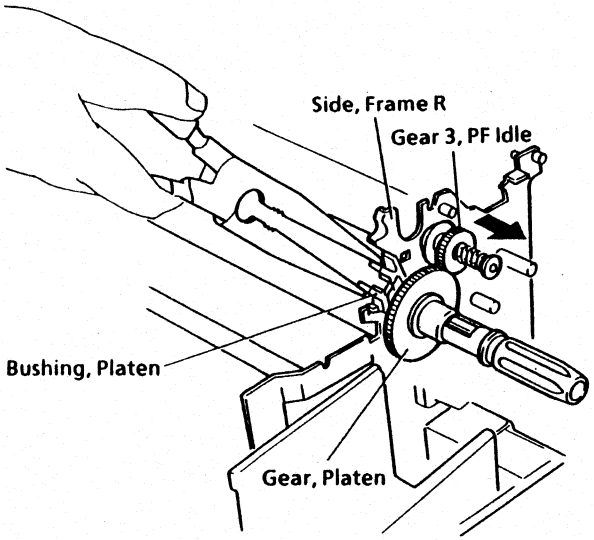
No.	Procedure	Disassembly	Reassembly and Lubrication
2-15 2-17 2-21	Clip, Head ● Screw, PH M3×6 Guide, Paper, Carriage	Release the locks on right and left and pull out the guide upward.  	
2-19 2-20	Felt, Ring Felt, Square		It is recommended to assemble the Carriage Paper Guide to the Carriage SA1 before setting the Ring Felt. 

3-6-3 Paper Feed

*Note: 1. Refer to Drawing 3 in Chapter 5 for the expanded view.
2. The column "No." stands for the part illustration No. in the drawing.
3. Reassemble in the reverse order of disassembly.

★ : Small
★★ : Optimum
★★★ : Sufficiently

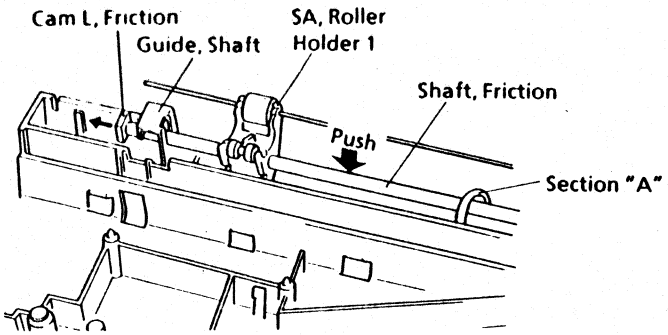
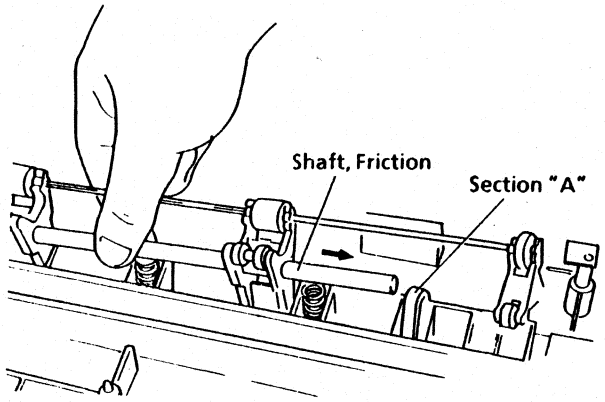
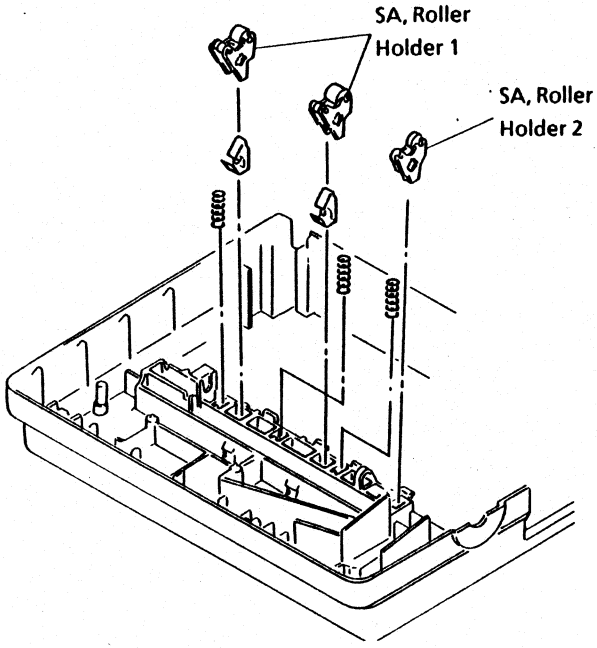
No.	Procedure	Disassembly	Reassembly and Lubrication
3-5	SA2, Bail Roller 1	Release the lock as shown in the drawing and remove it while lifting. 	
3-16	SA, PF Motor	Pay attention to cabling of the lead wire.	Use the hole with larger diameter for the PF Motor.
3-17	• Screw, PHT (ST), M3×6		
3-18	• Nut, M3		
3-14	Lever, Select		
3-13	Gear1, PF Idle		
3-12	Gear2, PF Idle		
3-21	Gear3, PF Idle	Note: Do not disassemble unless replacement is necessary.	

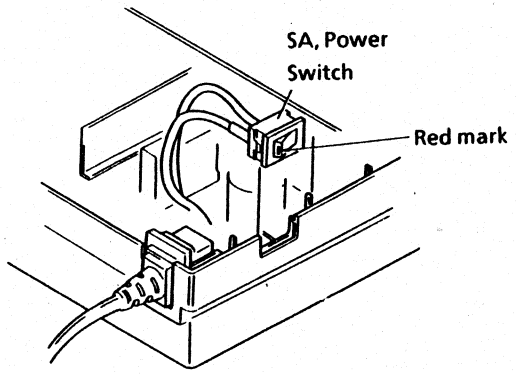
No.	Procedure	Disassembly	Reassembly and Lubrication
3-9 3-10	Guide, Paper ● Two screw, PHT (PT), M3×6	Lift the Paper Guide slightly while pressing the positioning pin fitting the Side Frame R by using tweezers. Then, slightly expand the Side Frame L and remove the Paper Guide while lifting it. (Note : Do not deform the Frame L.)	Assemble the Frame R side after setting to the two positioning pins on the Frame L side. 
3-7	SA, Platen	If the PF Idle Gear 3 is not disassembled, release fitting of the Platen Gear (to the direction shown by the arrow). Then, remove the locking part of the Platen Bushing and the Side Frames L and R with needle point pliers while lifting it. 	
3-24 3-20	Switch, Select ● Screw, PHT (ST), M3×10		
3-19 3-20 3-6	Switch, Pull Tractor ● Screw, PHT (ST), M3×10 SA, Paper Guide Frame		

3-6-4 Lower Case

*Note: 1. Refer to Drawing 4 in Chapter 5 for the expanded view.
2. The column "No." stands for the part illustration No. in the drawing.
3. Reassemble in the reverse order of disassembly.

★ : Small
★★ : Optimum
★★★ : Sufficiently

No.	Procedure	Disassembly	Reassembly and Lubrication
4-7 4-6 4-2 4-3 4-20 4-21	Cam R, Friction Cam L, Friction SA, Roller Holder 1 SA, Roller Holder 2 Guide, Shaft • Screw, PHT (PT) M3×8	While pressing down the Friction Shaft, remove the Friction Shaft from the section A by sliding the Cam to the left. Then, remove the Friction Shaft by sliding to the right.  	

No.	Procedure	Disassembly	Reassembly and Lubrication
4-11 4-24 4-25	SA, Main PCB ● Two screws, PHT (ST), M3×10 ● Two screws, TP (ST), M3×6	● Remove the connector (CN15) from the Power Supply PCB. ● Remove two screws on the Main PCB and two on the Parallel I/F. ● Lift the Parallel I/F Connector on the PCB while pressing the fixing lock on the rear of the Main PCB.	
4-15 4-26	SA, Power Switch ● Screw, PH (EXT. TW), M4×6	Remove the connectors P1 and P2 on the Power Supply PCB. Then, remove the earth set screw.	Set the Case L so that the red mark may be on the rear side. 
4-14 4-25 4-26	SA, Power Supply PCB ● Screw, TP (ST), M3×6 ● Screw, PH (EXT. TW), M4×6	Remove the earth set screw.	Note : Assemble the PCB with the Power switch SA "OFF".
4-16	Switch 2, PE	Remove the Switch body while pressing the fixing lock of the PE Switch 2 to the rear side.	
4-23 4-21	Plate, Fastener ● Screw, PHT (PT), M3×8		

3-6-5 Auto Sheet Feeder (Option)

*Note: 1. Refer to Drawing 7 in Chapter 5 for the expanded view.
2. The column "No." stands for the part illustration No. in the drawing.
3. Reassemble in the reverse order of disassembly.

No.	Procedure	Disassembly	Reassembly and Lubrication
941	Front Sheet Cover		
11	Side Cover (L)		
1081	Side Cover (R)	Remove the connecting part of the set plates (21) and (981) by using minus screw driver.	
271	Shaft	Remove the E-ring (1031) and pull it out to the right.	Assemble the Rollers (L) and (R) by paying attention to their direction. (Refer to Drawing 7 in Chapter 5 "Parts List".)
	Gears	Remove each Gear by removing the tapping screws (131) and (135).	Rotate the Gears (31) and (81) with fingers and check for smooth rotation of the Gears.
411	Shaft AS	Remove the E-rings on the left and right, slide them to the left and right, and pull out from the set plates (L) and (R).	
1061	Lever	Remove the screw (1071).	Apply a drop of locktite on the screw section and tighten the screw.
351	Hopper Bottom	Remove the tapping screws (141) and (1041), then the body downward.	Put between the slits of the Hopper Support.
841	Spring		
381	Shaft	Remove the E-ring (401) and pull out the Gear (391) to the right and the shaft (381) to the left.	As the Lever (1060) is to be set, do not mistake the direction of assembly.

No.	Procedure	Disassembly	Reassembly and Lubrication
361	Shaft	Remove the screw (151) and remove the Shaft together with the hopper section while expanding the set plates (21) and (981).	Pass the Hoppers (L) and (R) through the Shaft (361) and then assemble to the original position.
291	Stacker Bottom AS	Remove the tapping screws (141) and (1041) and remove the set plates (L) and (R) upward while pressing it open.	Lubrication * Location of lubrication Roller bearing section of the shaft and each rotating section of the gear clutch mechanism. * Type of lubricant Grease EM-30L (by Dow Corning Co., Ltd.) * Locations prohibited for lubrication ● Rubber roller section ● Paper path such as the hopper, the stacker, the sheet guide, etc. ● Other locations possible to make paper dirty. * Quantity of lubrication : Small quantity

3 - 7 Adjustments

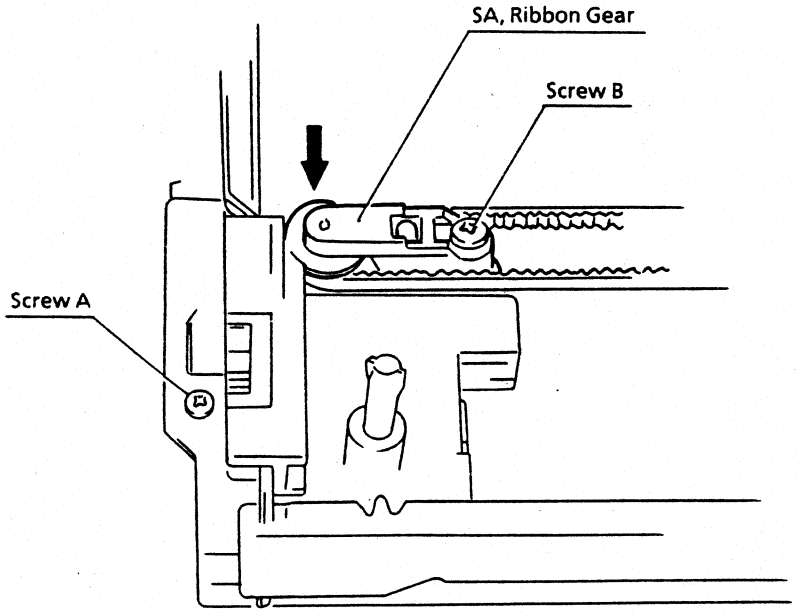
The adjustments mentioned in this section are required when this printer is disassembled and reassembled.

Even if many functions of the printer have been adjusted to respective specifications at the factory, be sure to make the following adjustments for proper functioning of the printer when you disassemble and reassemble it for repair or replacement of the parts mentioned in this section.

3-7-1 Carriage Motor Backlash Adjustment

This adjustment is required when the carriage motor is reassembled.

1. Firmly tighten the screw A of the carriage motor.
2. Gently tighten the screw B of the pin holder.
3. Gently push the ribbon gear SA to the carriage motor gear side (to arrow direction). Thus minimizing a backlash, firmly tighten the screw B of the pin holder.

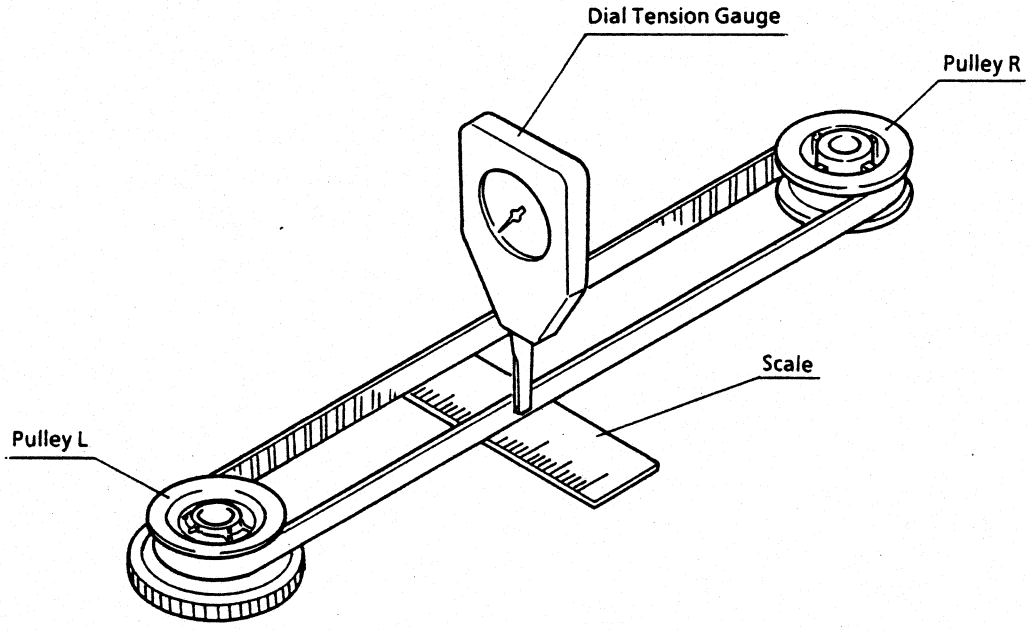


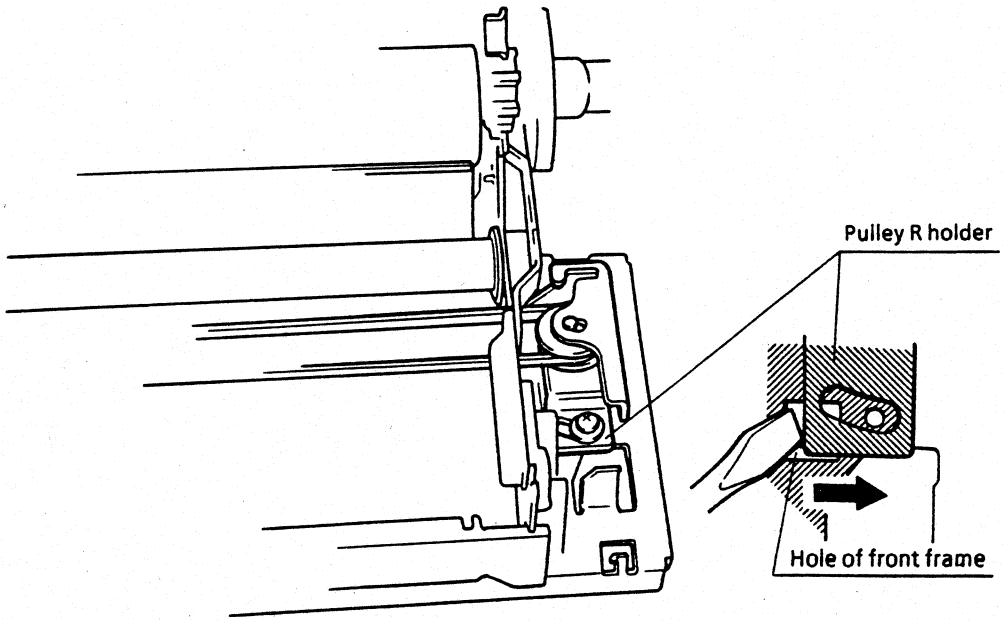
4. After completing the steps above, check that there is a backlash.

3-7-2 Timing Belt Tension Adjustment

This adjustment is required either when the ribbon gear is reassembled or when the pulley L/R are reassembled.

1. Move the print head to the right edge.
2. Apply a dial tension gauge on the side of timing belt and check the tension.
   Standard value : The timing belt should sag 2 mm with 32g ±2.
3. When tension adjustment is required, loosen the screw for the pulley R holder slightly, insert a ⊖ screwdriver into the hole as shown in the illustration and adjust the tension.
4. When adjusted retighten the screw.
5. After completing the steps above, check the tension again.





3-7-3 Platen Gap Adjustment

The gap between platen and the print head should be adjusted when the Carriage SA and the platen are removed.

[Preparation before Adjustment]

1. Remove the ribbon mask.
2. Set an adjust lever position as shown in Fig. 1.

[Adjustment Procedure]

1. Move the print head to the right edge,.
2. Check the gap between the platen and print head nose. (Refer to Fig. 2)
   Standard value : 0.5 mm ± 0.03
   * When a proper gap is not obtained, make adjustment by dislocating fitting of the carriage shaft bushing L and adjust lever. (Refer to Fig. 3)
3. Move the print head to the left edge.
4. Check the gap between the platen and print head nose. (Refer to Fig. 2)
   Standard value : 0.5 mm ± 0.03
   * When a proper gap is not obtained, insert a regular screwdriver into the adjustment hole of the side frame L to make adjustment. (Refer to Fig. 4)
5. After completing the steps above, check the right and left gaps again.

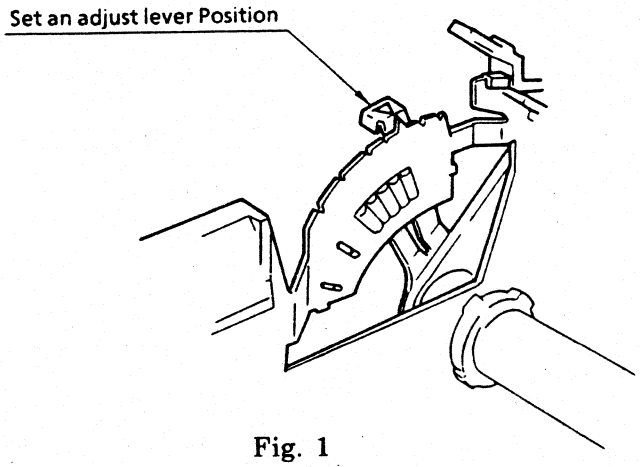


Fig. 1

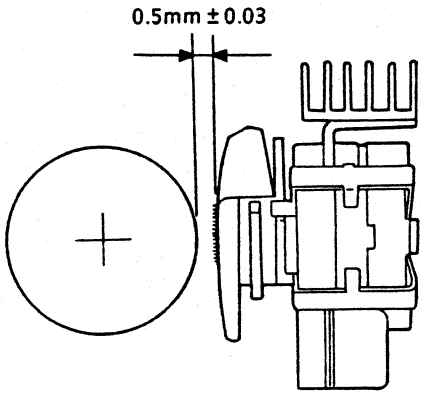


Fig. 2

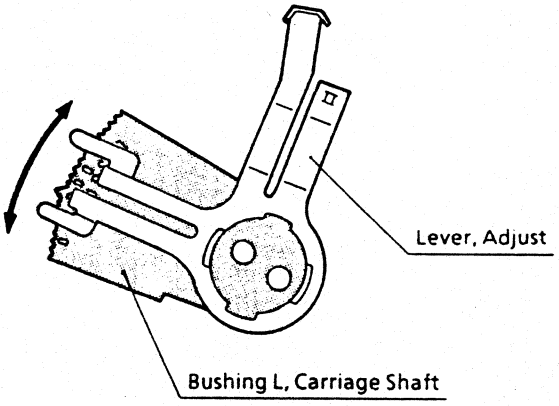


Fig. 3

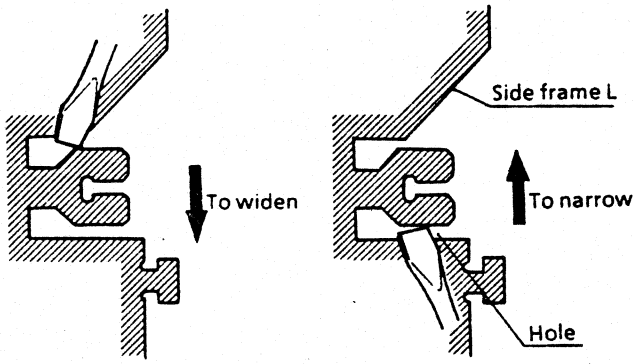


Fig. 4

3-7-4 Printing Position Alignment

- Printing Position Adjustment in Bidirectional Printing Adjust the printing position after completion of the following items.
    1. Timing Belt Tension Adjustment
    2. Platen Gap Adjustment
    3. Main PCB Replacement

Procedure for Adjustment

Step	Procedure	Key Operation	LCD Indication
1	Starting of mainte. test printing.(LQ mode)	Turn the power ON with [ON LINE] and [LF/FF] keys pressed.	TEST MAINTE
2	Stop the print head at right end with bi-directional printing.	Press [ON LINE] key.	OFF LINE
3		Press [MENU] key.	PRNT OUT DEMO
4		Press [JUMP] key 3 times.	PRN STYL FONT
5		Press [SELECT] key N times.	FONT DRAFT
6		Press [SAVE] key.	FONT DRAFT
7		Press [MENU] key.	PRN STYL PITCH
8		Press [SELECT] key N times.	PITCH 10CPI
9		Press [SAVE] key.	PITCH 10CPI
10		Press [JUMP] key twice.	PG LYOUT LINE SP.

Step	Procedure	Key Operation	LCD Indication
11		Press [SELECT] key twice.	LINE SP. 8 LPI
12		Press [SAVE] key.	LINE SP. 8 LPI
13		Press [ON LINE] key.	OFF LINE
14		Press [LF / FF] key twice.	OFF LINE
15	Starting of mainte. test printing.(Draft mode)	Press [ON LINE] key.	TEST MAINTE
16	Stop of mainte. test printing.	Hold [MENU] and [SAVE] keys, and press [SELECT] key for more than 10 seconds.	DOT ALGN N / 720 * ON LINE LED is flashing.

[CHECK]

1. Printing result of draft mode.

	A	B
2 nd Line (→)	H H H H H H H	H H H H H H H
3 rd Line (←)	H H H H H H H	H H H H H H H

2. Check the amount and the direction of the shift in printing.
   1). In case of **A** condition, press [LF / FF] key.
   2). In case of **B** condition, press [PARK LOAD] key.

   Note: Six times pressing the key will shift approx. 1 dot printing position.

Step	Procedure	Key Operation	LCD Indication
17		Press [SAVE] key twice.	SAVED N / 720 ↓ after 1~2 sec. DOT ALGN N / 720
18	Starting of mainte. test printing.(Draft mode)	Press [ON LINE] key.	TEST MAINTE
19	Stop the print head at right end with bi-directional printing.	Press [ON LINE] key.	OFF LINE
20		Press [LF / FF] key twice.	OFF LINE
21	Starting of mainte. test printing.(Draft mode)	Press [ON LINE] key.	TEST MAINTE
22	Stop the print head at right end with bi-directional printing.	Press [ON LINE] key.	OFF LINE

* Check the amount and the direction of the shift in printing.
If not correct, re-adjust it by returning to the step 14.

* Maintenance test will be ended after printing one page.

3-7-5 Paper Cut position (TEAR BAR) adjustment

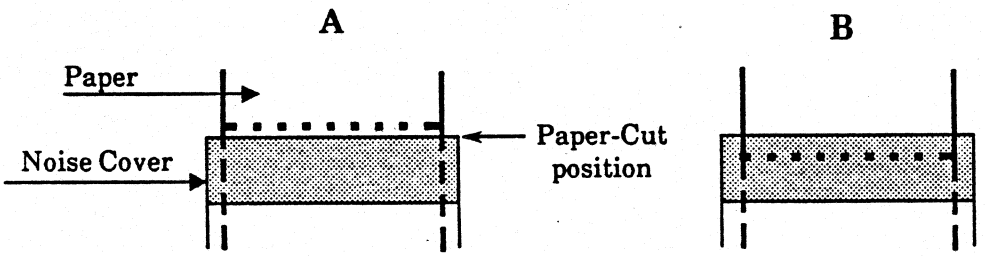
- The paper cut position adjustment allows you to "fine tune" the position the paper advanced to so that you can easily use the paper cutter.

Procedure for Adjustment

Step	Procedure	Key Operation	LCD Indication
1	Power ON		ON LINE
2		Press [ON LINE] key.	OFF LINE
3	Advances the paper to the cut position . (TEAR BAR)	Press [PARK LOAD] key N times.	OFF LINE

[CHECK]

If the perforation does not come exactly under the paper cut position, refer to the following steps.



4		Press [ON LINE] key.	ON LINE
5	Mode entering.	Hold [MENU] and [SAVE] keys, and press [SELECT] key for more than 3 seconds.	TEAR BAR N/60 *ON LINE LED is flashing

Step	Procedure	Key Operation	LCD Indication
6	Adjustment *you can change the value from −10/60 to 10/60.	1) In case of **A** condition : Press [LF/FF] key to reverse the paper. 2) In case of **B** condition : press [PARK LOAD] key to advance the paper.	TEAR BAR N/60 TEAR BAR N/60
7		Press [SAVE] key twice.	SAVED N/60 ↓ after 1~2 sec. TEAR BAR N/60
8	End	Press [ON LINE] key.	ON LINE

Note : This adjustment does not affect the top-of-form (TOF) Position.

CHAPTER 4
TROUBLESHOOTING

CHAPTER 4 TROUBLESHOOTING
TABLE OF CONTENTS

This section provides remedies possible for various troubles that may be incurred (see quick reference table's). Symptoms considered as troubles are given in the left column, and the corresponding remedies in the right column.

Note : Connectors (CN . . .) given in the column of remedies are connected with Power supply PCB and Main PCB. For the location of each connector, refer to section 4-9.

4-1 Troubles in turning the power on

Symptoms	Remedies
(1) No power to the machine.	(Electric trouble) (1) Check voltage on the input power line : Acceptable supply voltage : 95V~132VAC. NOTE : Checking method is covered in section 4-9-(1). (2) Connector CN15 disconnected ? ∘ Connect it firmly. (3) Fuse F1 or F21 on Power Supply PCB. blown ? ∘ If so, replace with new fuse. If new fuse is also blown when power is turned on with connector CN15 disconnected, Power supply PCB. is bad and must be replaced. (4) Failure in the control circuit. ∘ Replace Main PCB.
(2) Power is turned on, but Carriage assembly does not move.	(Electric trouble) (1) Connector CN6 disconnected? ∘ Connect it firmly. (2) Check for + 27V NOTE : Checking method is covered in section 4-9-(2). ∘ If + 27V is not obtained, replace Power supply PCB. (3) Failure in the control circuit or in the carriage motor driver circuit. ∘ Replace Main PCB
(3) Irregular/Incorrect movement of carriage assembly, or irregular motion of carriage motor.	(Electric trouble) (1) Is connector CN6 firmly seated? ∘ Connect it firmly. (2) Failure in the carriage motor driver. ∘ Replace Main PCB.

Symptoms	Remedies
	(Operational or mechanical trouble) **(1) Is the gap between the Print Head SA and Platen too narrow compared to paper stock used ?** ◦ Reset Gap Adjusting lever to a proper position. (2) Does Carriage Plate move slowly ? ◦ Check, clean, and lubricate the driving part. NOTE : See Chap. 3 "Disassembly & Maintenance" (3) Failure in Carriage Motor. ◦ Replace the Carriage Motor. NOTE : See Chap. 3 "Disassembly & Maintenance"

4-2 Troubles in printing

Symptoms	Remedies
(1) No print, but carriage moves back and forth.	**(Electric trouble)** **(1) Are the print head connector or connectors CN13, CN14 disconnected ?** ◦ Reconnect it firmly. (2) Failure in the control circuit or in the print wire driver. ◦ Replace Main PCB. (3) Defective interface (ON LINE connection only) ◦ If data is not sent from the host computer, check the connector of the host or CN2 (Main) CN17, CN18 (Serial) ◦ If data is sent, replace Main PCB or CN4 (Parallel). **(Operational or mechanical trouble)** **(1) Is the gap between the Print Head SA and Platen too wide?** ◦ Reset Gap Adjusting lever to a suitable position. (2) Check ribbon for proper installation. ◦ Set the ribbon again.
(2) Same dot always missing or faint printing.	**(Electric trouble)** **(1) Are connectors CN13, CN14 connected firmly?** ◦ Reconnect it firmly. (2) Failure in the control circuit or in the print wire driver. ◦ Replace Main PCB. (Mechanical trouble) (1) Failure in Print Head due to open coil or bad dot wire mechanism. ◦ Replace the print head SA.

Symptoms	Remedies
(3) Overall faint printing.	**(Electric trouble)** **(1) Check for +27V** NOTE : Checking method is covered in section 4-9- (2) ∘ If voltage is abnormal, replace Power Supply PCB. **(Operational and mechanical trouble)** **(1) Check for worn ink ribbon.** ∘ If not, replace the ribbon. (2) Is the gap between the print head and platen too wide ? ∘ Reset Gap Adjusting Lever to a suitable position. (3) Check to see if the ribbon is wound properly during printing. ∘ Set Ribbon Cassette properly again. Replace the cassette, if it is defective.

4-3. Paper feed trouble

Symptoms	Remedies
(1) No paper feeding.	**(Electric trouble)** **(1) Is the connector CN7 disconnected ?** ∘Reconnect it firmly. (2) Failure in the control circuit or in the paper feed motor driver. ∘ Replace Main PCB.
(2) Irregular paper feed pitch, or Paper Feed pitch, or Paper Feed Motor incorrect drive.	**(Electric troubles)** **(1) Is connector CN7 connected firmly ?** ∘ Reconnect it firmly. (2) Failure in the control circuit or in the paper feed driver. ∘ Replace Main PCB. **(Operational and mechanical troubles)** **(1) Is the gap between Print Head SA and Platen too narrow, compared to the used paper ?** ∘ Reset Gap Adjusting Lever to a suitable position. (2) Does the paper feed mechanism move smoothly ? ∘ Check, clean, and lubricate mechanical part. NOTE : Refer to Chap. 3 "Disassembly & Maintenance".

Symptoms	Remedies
(3) Paper jamming.	**(Operational and mechanical trouble)** **(1) Check to see if paper is properly set.** ∘ Set the paper correctly. (2) Is paper being used within manufacturers specifications ? ∘ Use paper within Manufacturers specs. (3) Is paper select lever in friction mode when using tractor feed ? ∘ Set it to appropriate position. (4) Check the paper feed mechanism and paper path for dust or other foreign matter. ∘ Remove them.

4-4. Ribbon feed trouble

Symptoms	Remedies
(1) No ribbon feeding.	**(Operational and mechanical troubles)** **(1) Is Ribbon Cassette correctly installed ?** ∘ Set it correctly. (2) Is there any failure in the ribbon feed mechanism ? ∘ Check, clean and lubricate the mechanism. NOTE: See Chap. 3 "Disassembly & Maintenance". (3) Does ribbon feed out smoothly from the Ribbon Cassette ? (Check by turning the knob of the cassette.) ∘ Replace the cassette.

4-5. Troubles in sensors

Symptoms	Remedies
(1) No PAPER OUT status can be generated, or PAPER OUT lamp comes on with paper present.	**(Electric troubles)** (1) **Are connectors CN10, CN11 connected firmly ?** ◦ Connect it firmly. (2) Check if the output signal is generated from the P. E. switches. NOTE: For the checking procedure, see section 4-9- (3) . ◦ Replace P. E. switches or CN10, CN11. (3) Failure in the control circuit. ◦ Replace Main PCB. **(Mechanical troubles)** (1) **Defects in the P. E. switches mechanism.** ◦ Replace P. E. switches or check the mechanism in detail.
(2) After the power is turned on, the auto sheet load, ASF and the park load function does not function properly.	**(Electric troubles)** (1) **Is the setting on the operation panel correct ?** ◦ Set correctly, if not. (2) Is the position of the select lever correct ? ◦ Set correctly, if not. (3) Check for Symptom (1).
(3) When the power is turned on, Carriage plate moves to the home position and still keeps moving. Or, Carriage plate will not return to home position.	**(Electric troubles)** (1) **Is connector CN12 positively connected ?** ◦ Connect it correctly. (2) Check if the output signal is generated from the H. P. switch . NOTE: For the checking procedure, see section 4-9- (4) . ◦ Replace H. P. switch or CN12. (3) Failure in the control circuit. ◦ Replace Main PCB.
(4) "PULL TRACTOR" error is not displayed.	**(Electric troubles)** (1) **Is the alarm displayed when the paper back feed command is received ?** ◦ Replace SA Pull tractor switch.
(5) "COVER OPEN" error is not displayed. (Only for CEL version)	**(Electric troubles)** (1) Is the alarm displayed when the top cover is opened ? ◦ Replace color PCB SA.

4-6. Troubles in Ope-pane SA

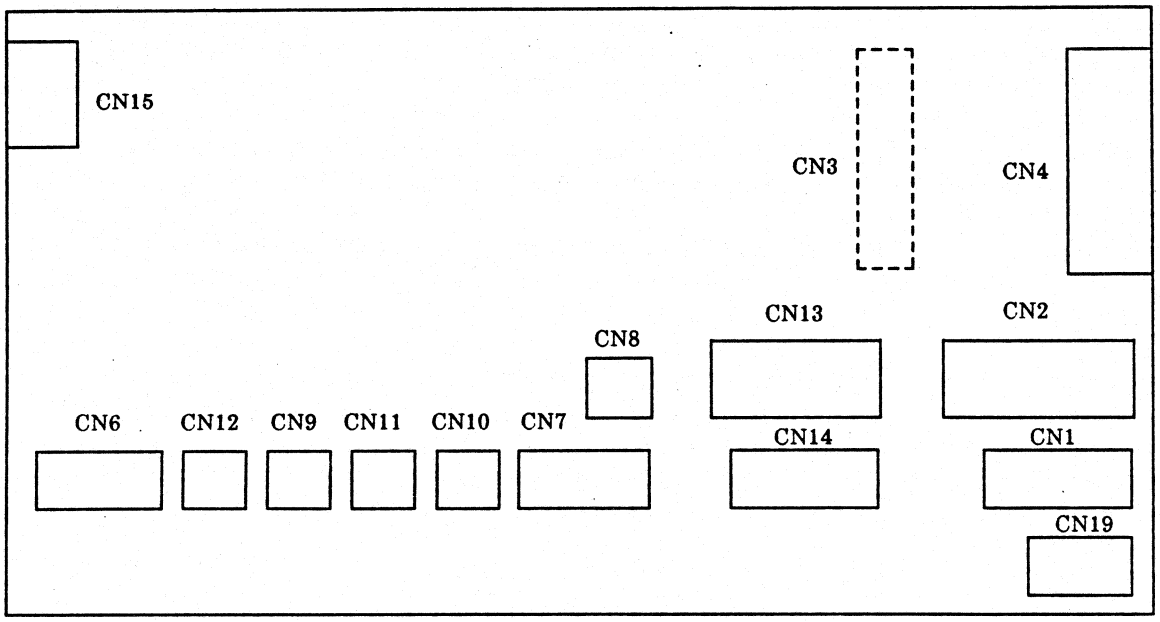
Symptoms	Remedies
(1) LCD does not display	(1) Are connector CN 1 (Main), CN16 (Ope-pane) connected firmly ? ◦ Connect it firmly. (2) Check for + 5V. ◦ For the checking procedure, see section 4-9- (5). (3) The LCD may be defective. ◦ Replace the Ope-pane SA.
(2) LED does not light.	(1) **Is connector CN 1 (Main), CN16 (Ope-pane) connected firmly ?** ◦ Connect it firmly. (2) Check for + 5V. ◦ For the checking procedure, see section 4-9- (5). (3) The Ope-pane SA . may be defective. ◦ Replace Ope-pane SA .
(3) Switches are not read.	(1) **Is connector CN 1 (Main), CN16 (Ope-pane) connected firmly ?** ◦ Connect it firmly. (2) The Ope-pane SA may be defective. ◦ Replace Ope-pane SA .

4-7. Troubles in color kit (Option)

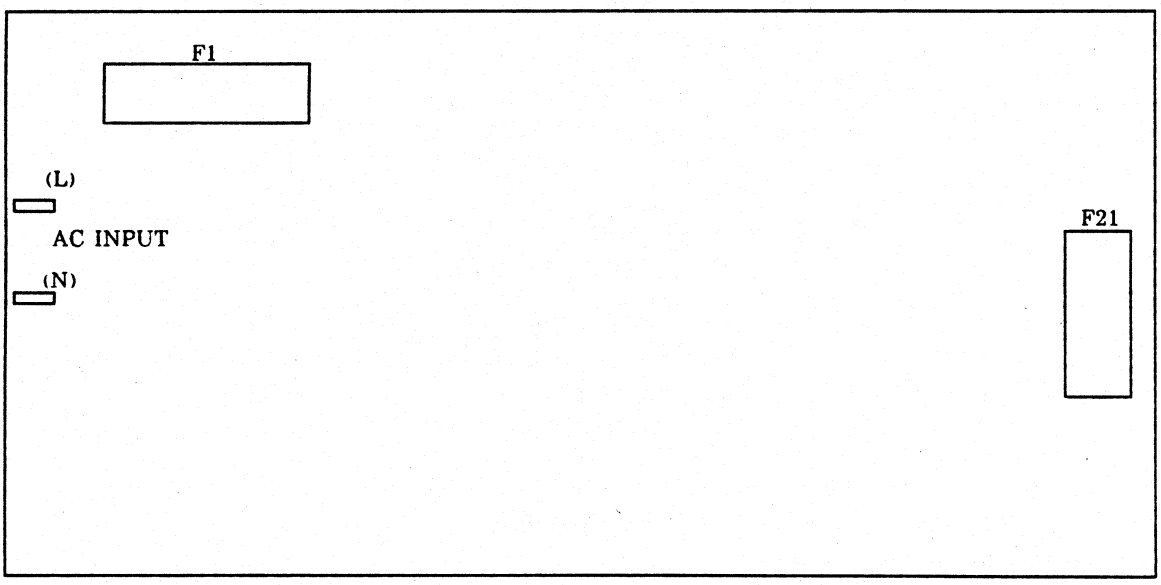
Symptoms	Remedies
(1) When the power is turned on, the ribbon cassette (color ribbon) does not move up and down, although the print head has already detected home position.	(1) **Check whether the ribbon Selection is set to color mode.** ∘ Set it to color mode. (2) Check whether the ribbon cassette is mounted properly. ∘ Remove the ribbon cassette and mount it again. (3) **Check whether the color motor unit is mounted properly.** ∘ Remove the color motor unit and mount it again.
(2) When the power is turned on, the ribbon cassette (color ribbon) moves up but not down, although the pint head already detected home position.	(1) Check whether the ribbon cassette is mounted properly. ∘ Remove the ribbon cassette and mount it again. (2) The color motor unit may be defective. ∘ Replace the color motor unit. (3) The color PCB SA may be defective. ∘ Replace the color PCB SA. (4) The control circuit may be defective. ∘ Replace the main PCB.
(3) No color printing is available.	(1) Run the self Printing. ∘ If this function does not run, the main PCB may be defective. Replace the main PCB. (2) Check whether the ribbon selection is set to color mode. ∘ If not, set it to color mode. (3) Defective interface (ON LINE connection only) ∘ Is the correct color printing command send from the host computer? ∘ If not, replace the main PCB. (4) The control circuit may be defective. ∘ Replace the main PCB.
(4) The color fails to change even the quick operation color or the normal color is set on the operation panel.	(1) Check whether the ribbon cassette is mounted properly. ∘ Remove the ribbon cassette and mount it again. (2) Check whether the color motor unit is mounted properly. ∘ Remove the color motor unit and mount it again. (3) When color setting with the operation panel, check whether LCD is changed to color mode. ∘ If it does not change, the Ope-pane SA may be defective. Replace the Ope-pane SA and re-check whether it changed.

4-8. Connector configuration

4-8-1 Main PCB SA



4-8-2 Power supply PCB



4-9. Troubleshooting procedure

(1) Checking the voltage on the input power line.

① Plug in the AC power cord to the AC power source.
② Turn on the Power Switch.
③ Measure the voltage between (N) and (L) of connector CN15 with a Volt Meter.
④ If no voltage is obtained, measure voltage again between (N) and (L) to the AC IN side.
- If the result is normal voltage, Power supply PCB is defective, and it should be replaced.

(2) Checking + 27V

① Measure the voltage between pins 5-6 (+) and pins 2-4(–) of the power connector CN15 with a Volt Meter with the CN2 disconnected form Main PCB.
- If incorrect, replace Power supply PCB.

② Measure the voltage between pins 5-6 (+) and pins 2-4(–) of the power connector CN15 with a Volt Meter with the CN15 connected to Main PCB.
- If incorrect, replace Main PCB.

(3) Checking the P. E. switches

① While measuring the voltage between pin 1 (+) and pin 2 (–) of the connector CN10, CN11 with a Volt Meter, alternately OPEN and CLOSE with a mechanical switch of the P. E. switches to check the switch is turned ON and OFF correctly.

(4) Checking the H. P. switch

① While measuring the voltage between pin 1 (+) and pin 2 (–) of the connector CN12 with a Volt Meter, alternately OPEN and CLOSE with a mechanical switch of the H. P. switch to check the switch is turned ON and OFF correctly.
- If not, replace the H. P. switch.

(5) Checking + 5V

Measure the voltage between pin 1-2 (+) and pin 3-4 (–) of the connector CN16 on Ope-pane PCB SA with a Volt Meter.
- If + 5V is not obtained, replace Ope-pane SA.

Chapter 5
Parts Lists

CHAPTER 5 PARTS LISTS
TABLE OF CONTENTS

GSX 140

Recommended Spare Parts List

Revision Up List		
Sheet No.	Rev. No.	Date
1/2	0	May 26,1989
2/2	0	May 26,1989

REV. NO. 0

Item No.	Location	Parts No.	Parts Name	Q'ty / Mach.	Maint. Class		Machine Population					@ ¥
					Worn	Casual	10	50	100	500	1000	
1	1-4	AH37901-0S	Cassette, Ribbon (1pc. per box)	1	○							
2	–	AH37901-0M	Cassette, Ribbon (30pcs. per carton)		○							
3	–	AH27801-0	Unit, Tractor	1		○						
4	1-12	AH24208-0	Knob 1, Platen	1		○						
5	1-13	AH59703-0	SA1, Top Cover	1		○						
6	1-16	AH59702-0	SA1, Opc-pane	1		○						
7	1-18	AH66790-1	SA1, Color PCB	1		○						
8	2-1	AH09701-0	SA, Head	1		○						
9	2-2	AH14105-0	Mask, Ribbon	1		○						
10	2-3	AH39701-0	SA, Ribbon Gear	1	○							
11	2-7	AH15701-0	SA, Carriage Motor	1	○							
12	2-10	AH68903-0	Switch, HP	1		○						
13	2-12	AH16901-0	Belt, Timing	1	○							
14	3-16	AH25701-0	SA, PF Motor	1	○							
15	3-19	AH68901-0	Switch, Pull Tractor	1		○						
16	3-24	AH68902-0	Switch, Select	1		○						
17	4-8	AH67703-0	SA, Head Cable	1	○							
18	4-11	AH66701-0	SA, Main PCB (With ROM)	1		○						
19	4-12	AH66703-0	SA, Main PCB (Without ROM)	1		○						
20	4-13	AH66801-0S	Unit, Serial I/F (Inch) (Option) (1pc. per box)	1		○						

REV. NO. 0

Item No.	Location	Parts No.	Parts Name	Q'ty / Mach.	Maint. Class		Machine Population					@ ¥
					Worn	Casual	10	50	100	500	1000	
21	–	AH66801-0M	Unit, Serial I/F (Inch) (Option) (50pcs. per carton)			○						
22	4-14	AH66710-0	SA, Power Supply PCB	1		○						
23	4-15	AH68701-1	SA1, Power Switch	1		○						
24	4-16	AH68905-0	Switch 2, PE	1		○						
25	–	C6701-003	Wire, Tie (T18S Kyoritsu)	3								
26	–	C7301-311	Fuse (F1)	1								
27	–	C7301-312	Fuse (F21)	1								
		J0006	Oil : Engine Oil Mobil One									
		J1005	Oil : Floil G-311S									
		J00018	Silicon : SC102 Compound									
		J00019	Grease : EM-30L (For ASF)									

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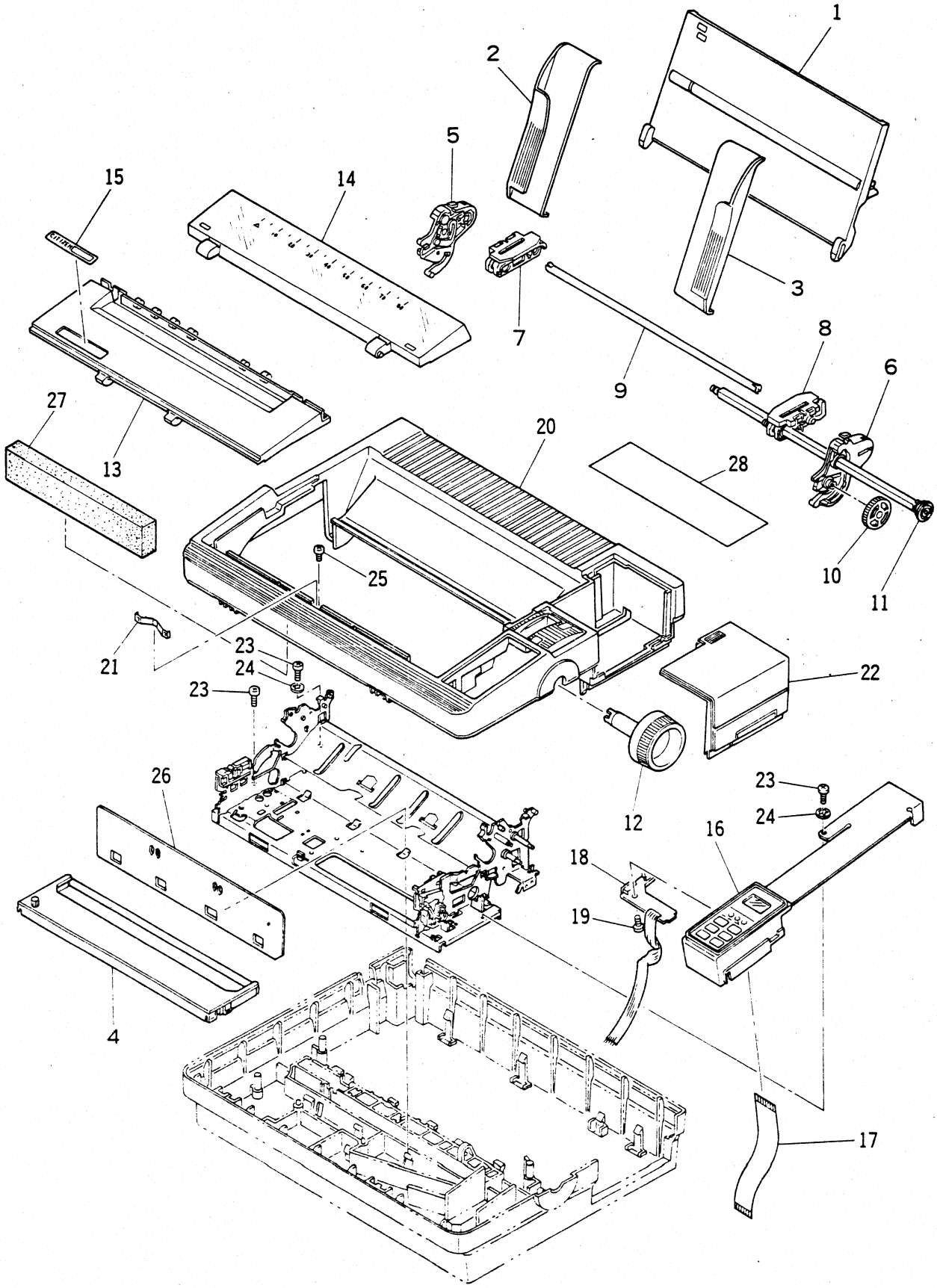
DRAWING No. 1

Parts List & Location for General Assembly

Revision Up List		
Sheet No.	Rev. No.	Date
1/2	0	May 26,1989
2/2	0	May 26,1989

DRAWING NO.1 General Assembly (Rev. 0)



PARTS LIST for GSX 140 TITLE : General Assembly Sheet No. 1/2

Drawing No. 1 REV. No. 0

Location	Parts Name	Parts No.	Q'ty	Remarks	@ $
	Unit, Insertion Plate	AH29801-0	1	Location No. 1, 2, 3	
1-1	Plate, Insertion	AH24210-0	1		
-2	SA, Guide L	AH29707-0	1		
-3	Guide R	AH24212-0	1		
-4	Cassette, Ribbon (1pc. per box)	AH37901-0S	1	30pcs. per carton (AH37901-0M)	
	Unit, Tractor	AH27801-0	1	Location No. 5, 6, 7, 8, 9, 10, 11	
-5	SA, Tractor Frame L	AH29704-0	1		
-6	SA, Tractor Frame R	AH29705-0	1		
-7	Tractor L	AH27901-0	1		
-8	Tractor R	AH27902-0	1		
-9	Shaft, Tractor Guide	AH22006-0	1		
-10	Gear, Tractor Idle	AH20206-0	1		
-11	SA, Tractor Drive Shaft	AH29706-0	1		
-12	Knob 1, Platen	AH24208-0	1		
-13	SA1, Top Cover	AH59703-0	1	With Cover Noise (AH54208-0)	
-14	Cover, Noise	AH54208-0	1		
-15	Label 1, Name	AH99901-0	1		
-16	SA1, Ope-pane	AH59702-0	1		
-17	Cable, Ope-pane	AH67903-0	1		
-18	SA1, Color PCB	AH66790-1	1		

Location	Parts Name	Parts No.	Q'ty	Remarks	@ $
1-19	Screw, PHT (PT), M2.6×5	E11226-05	1	For Color PCB	
-20	Case U	AH54203-0	1		
-21	Leaf, Case U	AH53102-0	1		
-22	Cover, IC Card	AH54204-0	1		
-23	Screw, PHT (PT), M3×8	E11230-08	4	For Mechanism	
-24	Washer, Int. T, 3	E50630-00	2	For Mechanism and Ope-pane	
-25	Screw, PHT (ST), M3×6	E11130-06	1	For Case U	
-26	Sheet 2, Paper Pressure	AH24103-0	1		
-27	Absorber 3	AH57103-0	1		
-28	Label, Tractor	AH99924-0	1		

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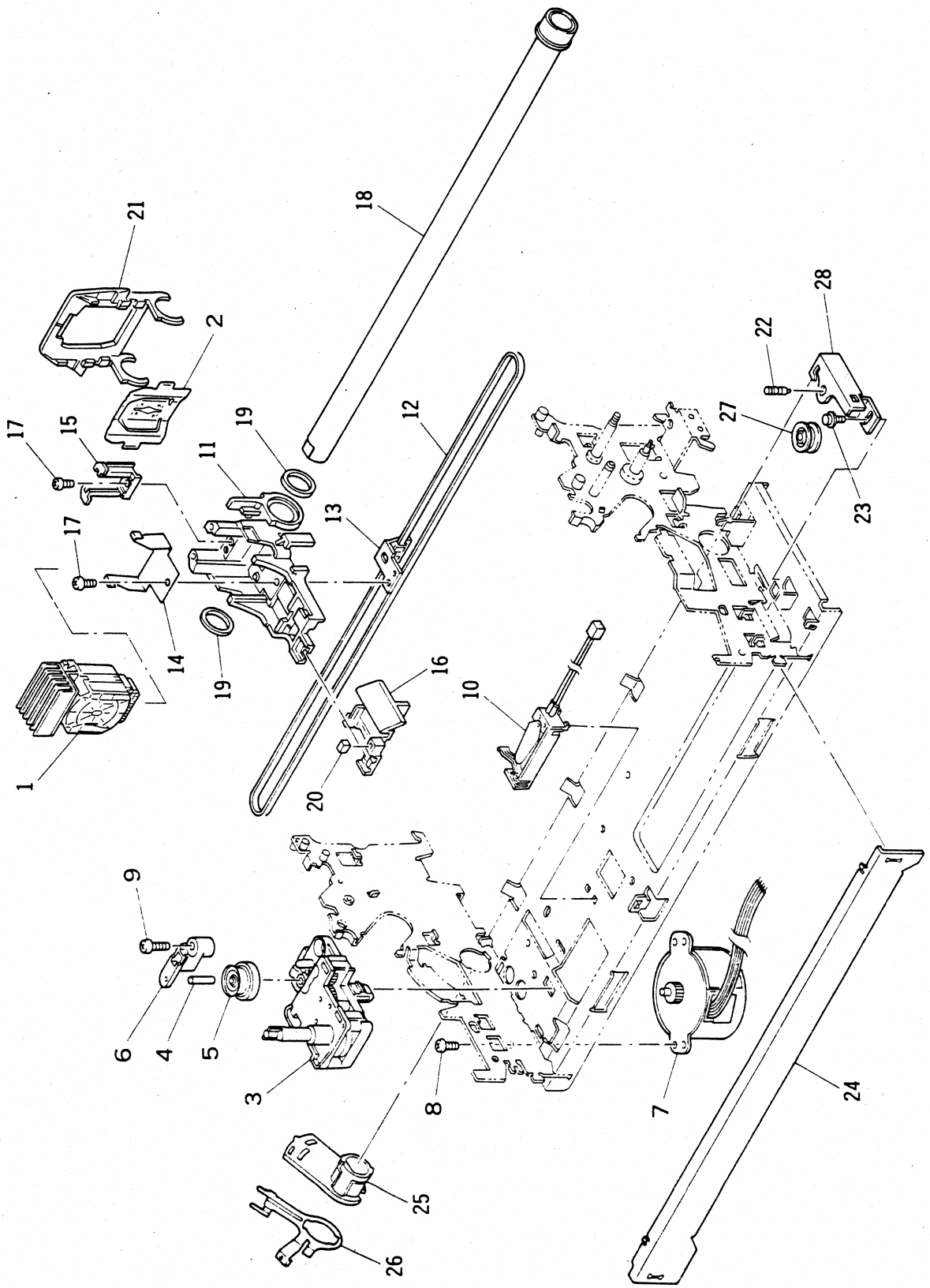
DRAWING No. 2

Parts List & Location for Mechanism Unit (Carriage & Ribbon Feed)

Revision Up List		
Sheet No.	Rev. No.	Date
1/2	0	May 26,1989
2/2	0	May 26,1989

DRAWING NO.2 Mechanism Unit (Carriage & Ribbon Feed) (Rev. 0)



PARTS LIST for GSX 140 TITLE : Mechanism Unit (Carriage & Ribbon Feed) Sheet No. 1/2

Drawing No. 2 REV. No. 0

Location	Parts Name	Parts No.	Q'ty	Remarks	@ $
2-1	SA, Head	AH09701-0	1		
-2	Mask, Ribbon	AH14105-0	1		
-3	SA, Ribbon Gear	AH39701-0	1		
-4	Pin, Parallel (A), 3×12	E70130-12	1		
-5	SA, Pulley L	AH19705-0	1		
-6	Holder, Pin	AH14204-0	1		
-7	SA, Carriage Motor	AH15701-0	1		
-8	Screw, PHT (ST), M3×6	E11130-06	1	For Carriage Motor	
-9	Screw, PHT (ST), M3×14	E11130-14	1	For Holder, Pin	
-10	Switch, HP	AH68903-0	1		
	SA2, Carriage	AH19702-0	1	Location N0. 11, 12, 13, 14, 15, 16, 17	
-11	SA1, Carriage	AH19701-0	1		
-12	Belt, Timing	AH16901-0	1		
-13	Fastener, Belt	AH14102-0	1		
-14	Leaf, Earth	AH13101-0	1		
-15	Clip, Head	AH14201-0	1		
-16	Slide, Carriage	AH14202-0	1		
-17	Screw, PH, M3×6	E00130-06	2	For Leaf, Earth and Clip, Head	
-18	SA1, Carriage Shaft	AH19703-0	1		
-19	Felt, Ring	AH19101-0	2		

PARTS LIST for GSX 140

TITLE : Mechanism Unit (Carriage & Ribbon Feed)

Sheet No. 1/2

Drawing No. 2

REV. No. 0

Location	Parts Name	Parts No.	Q'ty	Remarks	@ $
2-1	SA, Head	AH09701-0	1		
-2	Mask, Ribbon	AH14105-0	1		
-3	SA, Ribbon Gear	AH39701-0	1		
-4	Pin, Parallel (A), 3×12	E70130-12	1		
-5	SA, Pulley L	AH19705-0	1		
-6	Holder, Pin	AH14204-0	1		
-7	SA, Carriage Motor	AH15701-0	1		
-8	Screw, PHT (ST), M3×6	E11130-06	1	For Carriage Motor	
-9	Screw, PHT (ST), M3×14	E11130-14	1	For Holder, Pin	
-10	Switch, HP	AH68903-0	1		
	SA2, Carriage	AH19702-0	1	Location N0. 11, 12, 13, 14, 15, 16, 17	
-11	SA1, Carriage	AH19701-0	1		
-12	Belt, Timing	AH16901-0	1		
-13	Fastener, Belt	AH14102-0	1		
-14	Leaf, Earth	AH13101-0	1		
-15	Clip, Head	AH14201-0	1		
-16	Slide, Carriage	AH14202-0	1		
-17	Screw, PH, M3×6	E00130-06	2	For Leaf, Earth and Clip, Head	
-18	SA1, Carriage Shaft	AH19703-0	1		
-19	Felt, Ring	AH19101-0	2		

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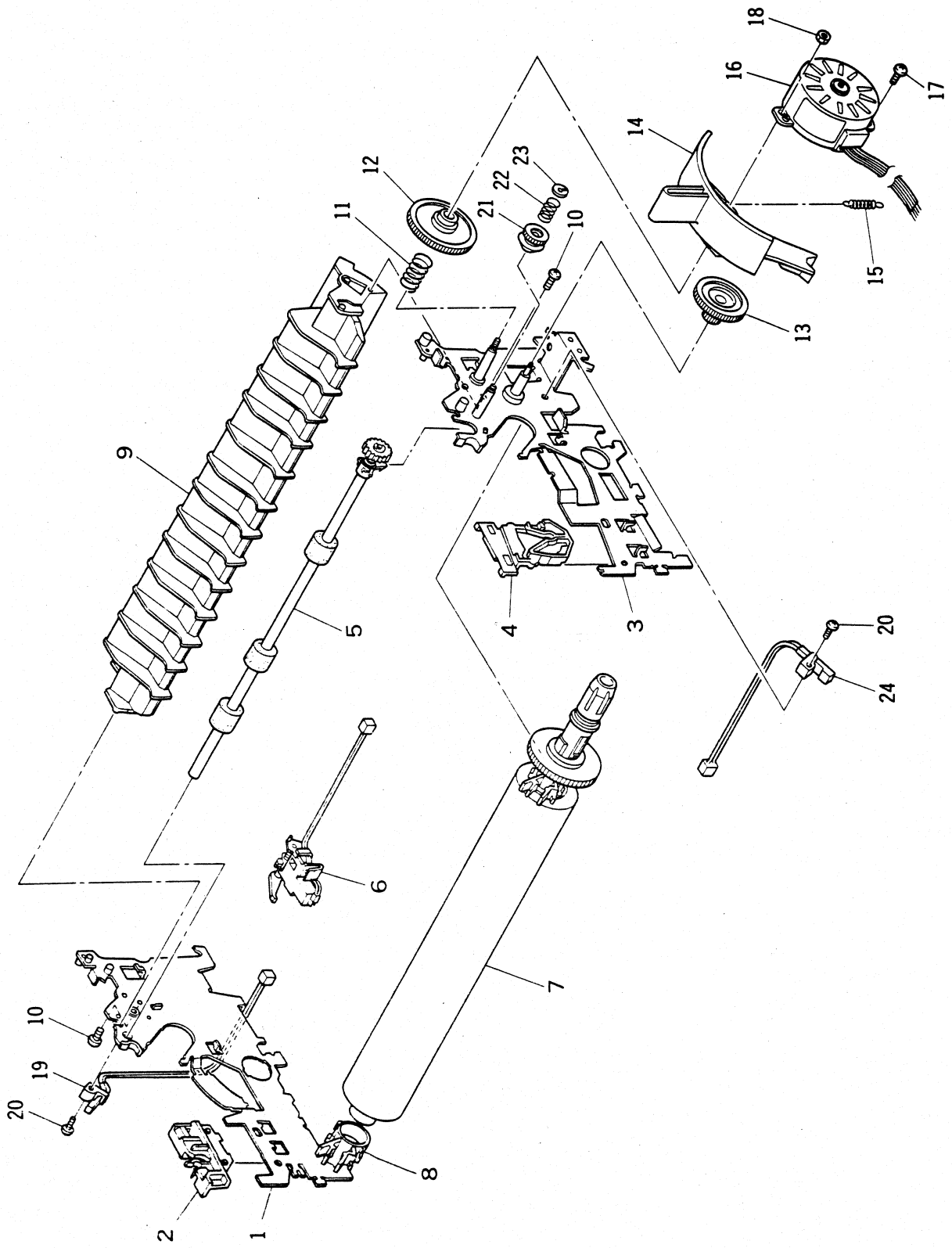
DRAWING No. 3

Parts List & Location for Mechanism Unit (Paper Feed)

Revision Up List		
Sheet No.	Rev. No.	Date
1/2	0	May 26,1989
2/2	0	May 26,1989

DRAWING NO.3 Mechanism Unit (Paper Feed) (Rev. 0)



PARTS LIST for GSX 140 TITLE : Mechanism Unit (Paper Feed) Sheet No. 1/2

Drawing No. 3 REV. No. 0

Location	Parts Name	Parts No.	Q'ty	Remarks	@ $
3-1	SA1, Side Frame L	AH49701-0	1		
-2	Guide L, Ribbon Cassette	AH34201-0	1		
-3	SA1, Side Frame R	AH49703-0	1		
-4	Guide R, Ribbon Cassette	AH34202-0	1		
-5	SA2, Bail Roller 1	AH29709-0	1		
-6	SA, Paper Guide Frame	AH49705-0	1		
-7	SA, Platen	AH28701-0	1		
-8	Bushing, Platen	AH21201-0	1		
-9	Guide, Paper	AH24201-0	1		
-10	Screw, PHT (PT), M3×6	E11230-06	2	For Guide, Paper	
-11	Spring, PF Idle Gear 2	AH23602-0	1		
-12	Gear 2, PF Idle	AH20203-0	1		
-13	Gear 1, PF Idle	AH20204-0	1		
-14	Lever, Select	AH24202-0	1		
-15	Spring, Select	AH23605-0	1		
-16	SA, PF Motor	AH25701-0	1		
-17	Screw, PHT (ST), M3×6	E11130-06	1	For PF Motor	
-18	Nut, M3	E40130-00	1		
-19	Switch, Pull Tractor	AH68901-0	1		
-20	Screw, PHT (ST), M3×10	E11130-10	2	For Switch of Pull Tractor and Select	

Drawing No. 3 REV. No. 0

Location	Parts Name	Parts No.	Q'ty	Remarks	@ $
3-21	Gear 3, PF Idle	AH20201-0	1		
-22	Spring, PF Idle Gear 3	AH23601-0	1		
-23	Washer 1	AH24213-0	1		
-24	Switch, Select	AH68902-0	1		

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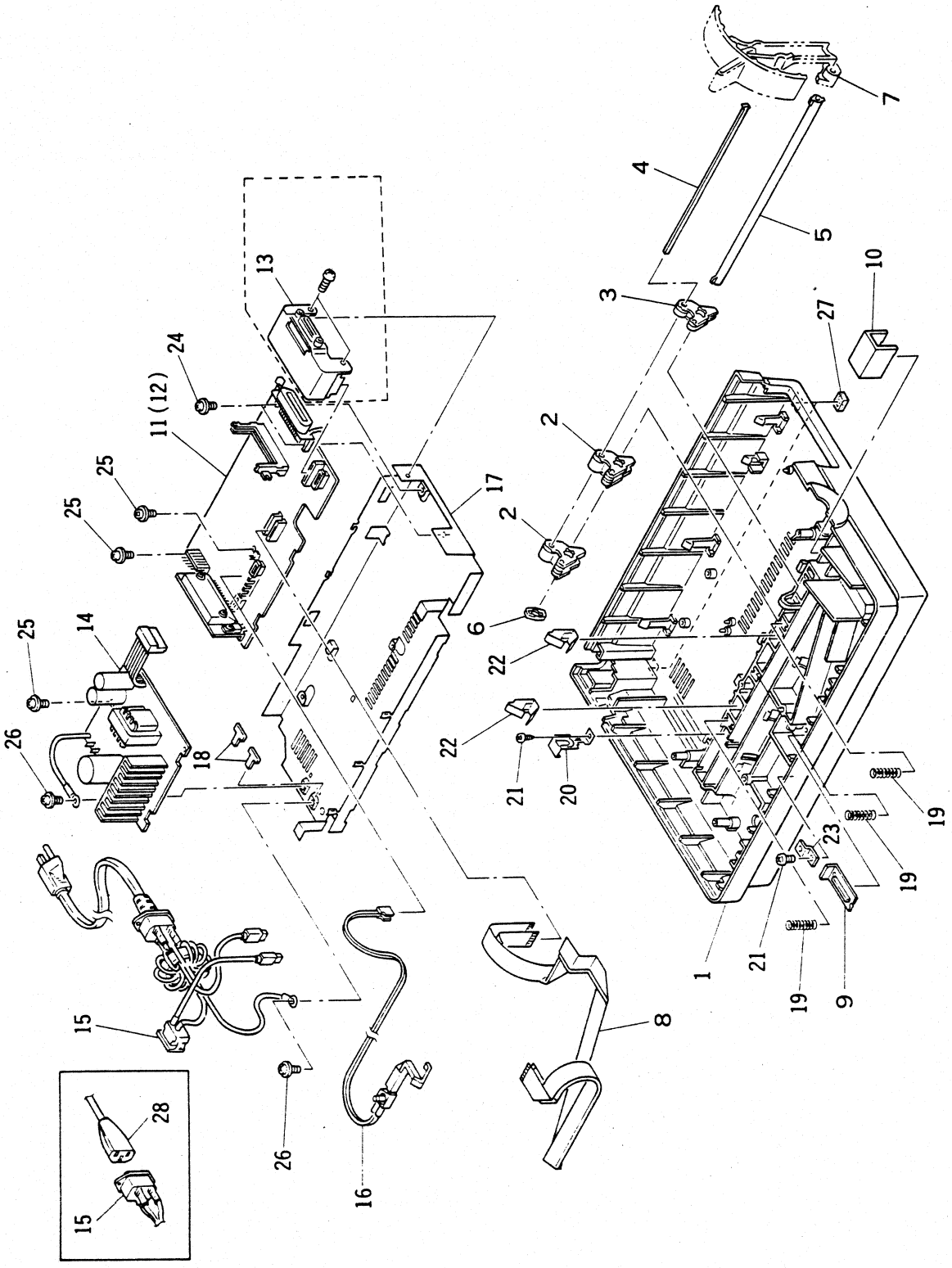
DRAWING No. 4

Parts List & Location for Lower Case

Revision Up List		
Sheet No.	Rev. No.	Date
1/2	0	May 26,1989
2/2	0	May 26,1989

DRAWING NO.4 Lower Case (Rev. 0)



PARTS LIST for GSX 140 TITLE : Lower Case Sheet No. 1/2

Drawing No. 4 REV. No. 0

Location	Parts Name	Parts No.	Q'ty	Remarks	@ $
4-1	SA, Case L	AH59701-0	1		
-2	SA, Roller Holder 1	AH29702-0	2		
-3	SA, Roller Holder 2	AH29703-0	1		
-4	Shaft, Roller	AH22002-0	1		
-5	Shaft, Friction	AH22003-0	1		
-6	Cam L, Friction	AH29201-0	1		
-7	Cam R, Friction	AH29202-0	1		
-8	SA, Head Cable	AH67703-0	1		
-9	Holder 1, Head Cable	AH64201-0	1		
-10	Holder 2, Head Cable	AH64202-0	1		
-11	SA, Main PCB (With ROM)	AH66701-0	1		
-12	SA, Main PCB (With out ROM)	AH66703-0	1		
-13	Unit, Serial I/F (Inch) (Option) (1pc. per box)	AH66801-0S	1	50pcs. per carton (AH66801-0M)	
-14	SA, Power Supply PCB	AH66710-0	1		
-15	SA1, Power Switch	AH68701-1	1		
-16	Switch 2, PE	AH68905-0	1		
-17	Plate, Shield	AH64101-0	1		
-18	Plate, Nut, Earth	AF44116-0	2		
-19	Spring, Friction	AH23604-0	3		
-20	Guide, Shaft	AH24102-0	1		

Location	Parts Name	Parts No.	Q'ty	Remarks	@ $
4-21	Screw, PHT (PT), M3×8	E11230-08	2	For Guide, Shaft and Plate, Fastener.	
-22	Leaf, Holder	AH23102-0	2		
-23	Plate, Fastener	AH54104-0	1		
-24	Screw, PHT (ST), M3×10	E11130-10	2	For Main PCB	
-25	Screw, TP (ST), M3×6	E11630-06	3	For Main PCB and Power Supply PCB	
-26	Screw, PH (EXT. TW), M4×6	E00840-06	2	For Power SW and Power Supply PCB	
-27	Leg	AH54101-0	2		

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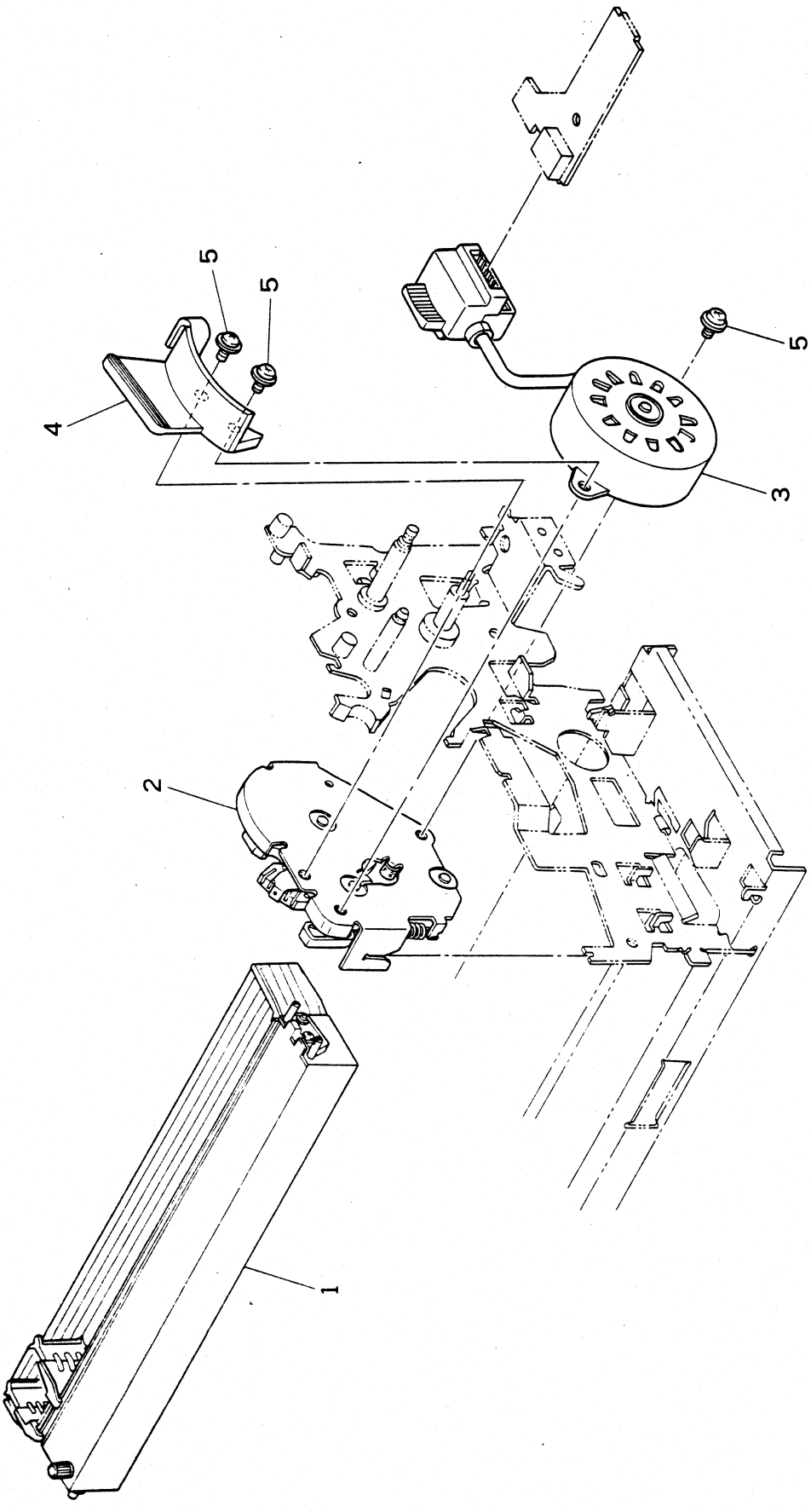
DRAWING No. 5

Parts List & Location for Color Kit (Option)

Revision Up List		
Sheet No.	Rev. No.	Date
1/1	0	May 26,1989

DRAWING NO.5 Color Kit (Option) (Rev. 0)



PARTS LIST for GSX 140 TITLE : Color Kit (Option) Sheet No. 1/1

Drawing No. 5 REV. No. 0

Location	Parts Name	Parts No.	Q'ty	Remarks	@ $
-	Kit, Color (1pc. per box)	AH39801-0S	1	50pcs. per carton (AH39801-0M)	
5-1	Cassette, Color Ribbon (1pc. per box)	AH37903-0S	1	50pcs. per carton (AH37903-0M)	
	Unit, Color Motor	AH35801-0	1	Location No. 2, 3, 4, 5	
-2	SA2, Color Frame	AH39704-0	1		
-3	SA, Color Motor	AH35701-0	1		
-4	Holder, Frame	AH34208-0	1		
-5	Screw, PH (PW), M3×6	E00630-06	3		

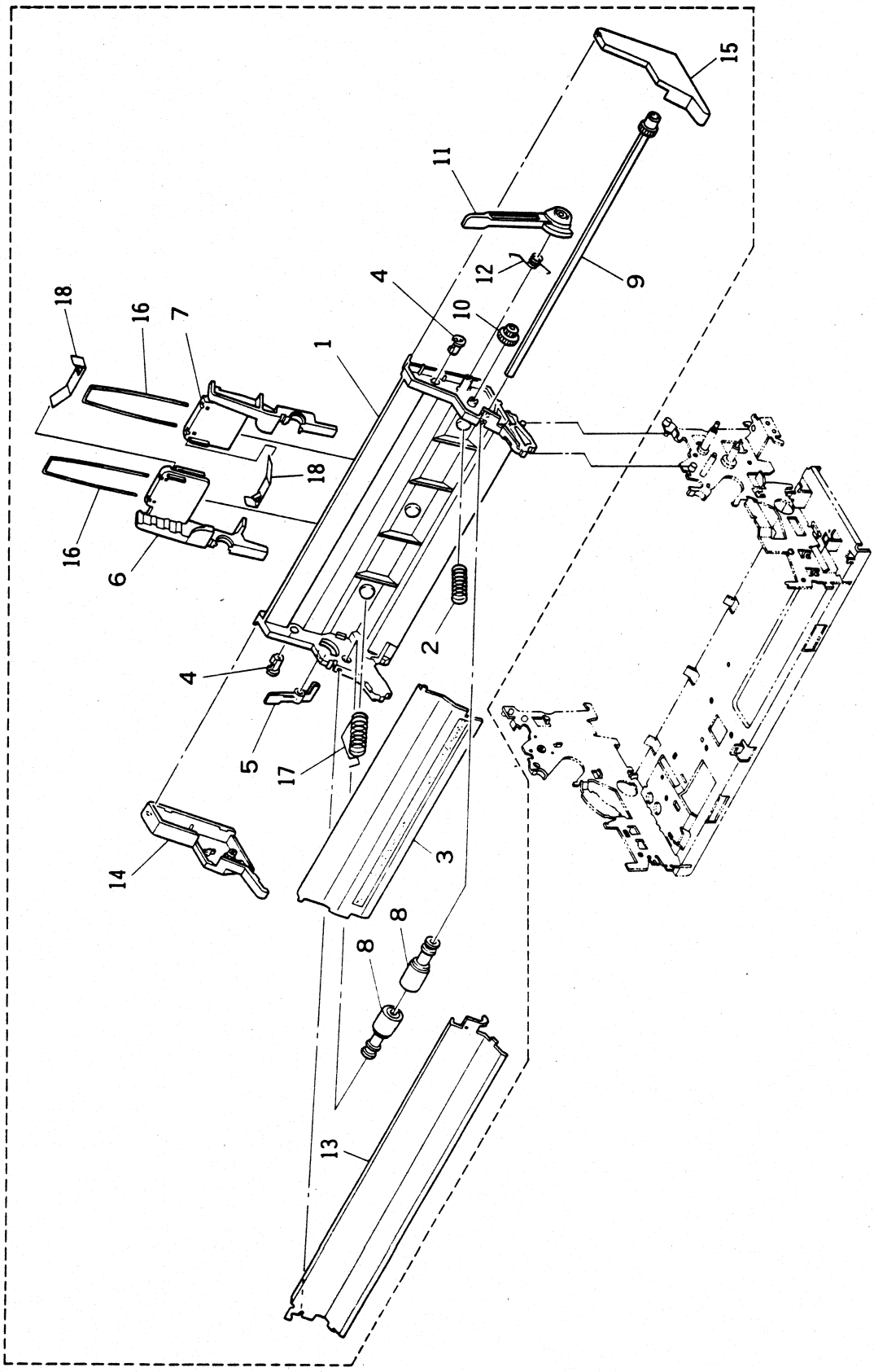
GSX 140

DRAWING No. 6

Parts List & Location for Manual Sheet Feeder (Option)

Revision Up List		
Sheet No.	Rev. No.	Date
1/1	0	May 26,1989

DRAWING NO.6 Manual Sheet Feeder (Option) (Rev. 0)



PARTS LIST for GSX 140 TITLE : Manual Sheet Feeder (Option) Sheet No. 1/1

Drawing No. 6 REV. No. 0

Location	Parts Name	Parts No.	Q'ty	Remarks	@ $
	Unit, Manual Sheet Feeder (1pc. per box)	AH29804-0S	1	10pcs. per carton (AH29804-0M)	
6-1	Frame, Main	AH24216-0	1		
-2	Spring, Paper Pressure	AH23606-0	1		
-3	SA, Pressure Plate	AH24701-0	1		
-4	Bushing, Pressure Plate	AH24217-0	2		
-5	Lever, Set	AH24218-0	1		
-6	Tray L, Paper	AH24219-0	1		
-7	Tray R, Paper	AH24220-0	1		
-8	SA, Roller Holder	AH29708-0	2		
-9	SA, Roller Shaft	AH22701-0	1		
-10	Gear, Idle	AH20209-0	1		
-11	Lever, Feed	AH24221-0	1		
-12	Spring, Return	AH23608-0	1		
-13	Frame, Paper Guide	AH24109-0	1		
-14	Cover L, Side	AH24223-0	1		
-15	Cover R, Side	AH24224-0	1		
-16	Guide 1, Paper	AH22010-0	2		
-17	Spring L, Paper Pressure	AH23610-0	1		
-18	Leaf, Tray	AH23104-0	2		

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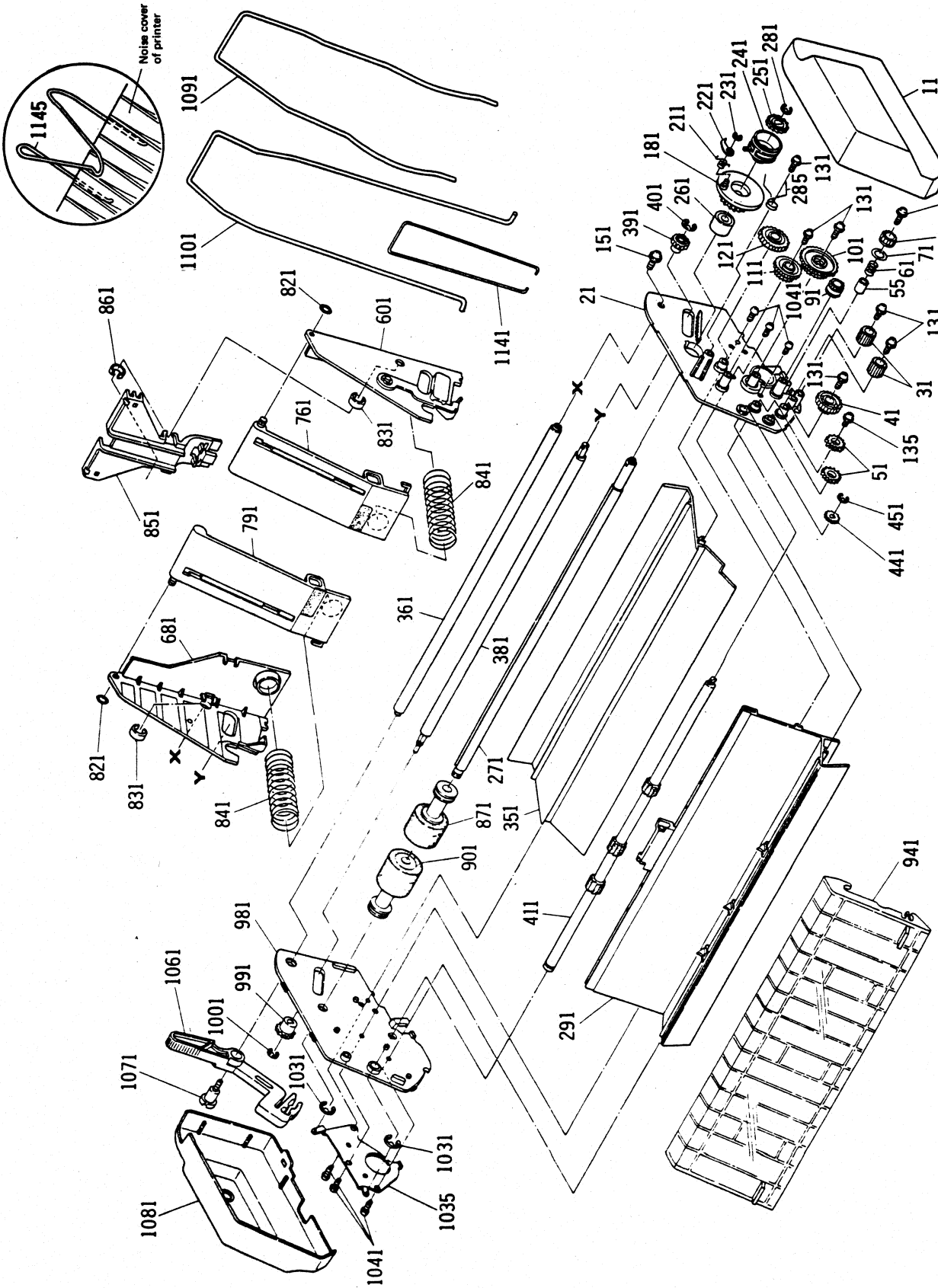
DRAWING No. 7

Parts List & Location for Auto Sheet Feeder (Option)

Revision Up List		
Sheet No.	Rev. No.	Date
1/4	0	May 26,1989
2/4	0	May 26,1989
3/4	0	May 26,1989
4/4	0	May 26,1989

DRAWING NO.7 Auto Sheet Feeder (Option) (Rev. 0)



PARTS LIST for GSX 140 TITLE : Auto Sheet Feeder (Option) Sheet No. 1/4

Drawing No. 7 REV. No. 0

Location	Parts Name	Parts No.	Q'ty	Remarks	@ $
	Unit, ASF (1set per box)	AH29802-0S	1	5sets per carton (AH29802-0M)	
0011	Side Cover (R)	AH29903-0	1	EA0799010	
0021	Set Plate (R)	AH29901-0	1	EA0797011	
0031	Gear	AH29906-0	2	EA0805010	
0041	Gear	AH29907-0	1	EA0806010	
0051	Gear	AH29908-0	2	EA0807010	
0055	Collar	AH29920-0	1	EA1048010	
0061	Spring	AH29921-0	1	EA0954010	
0071	Washer	AH29922-0	1	EA1000010	
0081	Gear	AH29909-0	1	EA0951010	
0091	Gear	AH29910-0	1	EA0952010	
0101	Gear	AH29915-0	1	EA0808010	
0111	Gear	AH29916-0	1	EA0809010	
0121	Gear	AH29917-0	1	EA0953010	
0131	Screw, TP, M3×8	AH29956-0	7	EA0145010	
0135	Screw, TP, M3×6	AH29957-0	1	EA0145020	
0151	Screw, PH, M3×8	AH29959-0	1	EA0146010	
0181	Clutch A-AS	AH29923-0	1	EA0213012	
0211	Spring	AH29924-0	1	EA0215011	
0221	Claw	AH29925-0	1	EA0216011	

Drawing No. 7 REV. No. 0

Location	Parts Name	Parts No.	Q'ty	Remarks	@ $
0231	E-ring ø2	E60320-00	1	EA0123020	
0241	Clutch B	AH29926-0	1	EA0217011	
0251	Ratchet	AH29927-0	1	EA0218010	
0261	One-way Bearing	AH29928-0	1	EA0247011	
0271	Shaft	AH29929-0	1	EA0949040	
0281	E-ring ø3	E60330-00	1	EA4140020	
0285	Spring	AH29930-0	1	EA0219012	
0291	Stacker Bottom AS	AH29931-0	1	EA0962010	
0351	Hopper Bottom	AH29914-0	1	EA0936010	
0361	Shaft	AH29933-0	1	EA0223060	
0381	Shaft	AH29934-0	1	EA0224060	
0391	Gear	AH29935-0	1	EA0064012	
0401	E-ring ø4	E60340-00	1	EA4138020	
0411	Shaft AS	AH29936-0	1	EA0965010	
0441	Gear	AH29937-0	1	EA0678010	
0451	E-ring ø3	E60330-00	1	EA4140020	
0601	Hopper (R) UN	AH29938-0	1	EZ0020010	
0681	Hopper (L) UN	AH29939-0	1	EZ0030010	
0761	Pressure Plate (R) AS	AH29940-0	1	EA0248040	
0791	Pressure Plate (L) AS	AH29941-0	1	EA0249040	

Drawing No. 7 REV. No. 0

Location	Parts Name	Parts No.	Q'ty	Remarks	@ $
0821	O-ring	AH29960-0	2	EA0127011	
0831	Bushing	AH29942-0	2	EA0138011	
0841	Spring	AH29943-0	2	EA0114020	
0851	Hopper Support	AH29944-0	1	EA0043102	
0861	Bushing	AH29945-0	1	EA0138011	
0871	Roller (R) AS	AH29946-0	1	EA0230011	
0901	Roller (L) AS	AH29947-0	1	EA0230011	
0941	Front Sheet Cover AS	AH29948-0	1	EA0966011	
0981	Setting Plate (L)	AH29902-0	1	EA0798011	
0991	Gear	AH29949-0	1	EA0064012	
1001	E-ring ø4	E60340-00	1	EA4138020	
1031	E-ring ø5	E60350-00	2	EA0124010	
1035	Earth Plate	AH29950-0	1	EA1045010	
1041	Screw, TP, M3×10	AH29958-0	6	EA4141010	
1061	Lever	AH29951-0	1	EA0031022	
1071	Screw	AH29952-0	1	EA0116010	
1081	Side Cover (L)	AH29904-0	1	EA0800010	
1091	Hopper Wire	AH29953-0	1	EA0955010	
1101	Rear Stack Wire	AH29954-0	1	EA0082011	
1141	Front Short Wire	AH29911-0	1	EA0895010	

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Drawing No. 7 REV. No. 0

Location	Parts Name	Parts No.	Q'ty	Remarks	@ $
1145	Loop Wire	AH29955-0	1	EA1064010	

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Parts List & Location for SA, Main PCB

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Item No.	Parts No.	Parts Name	Type	Q'ty	Manufacturer	Location	@ $
1	AH66701-**	SA, Main PCB (With ROM)		1			
2	AH94901-**	ROM-SET 1 (Program)		1		IC6	
3	C2304-620	EP-ROM (Blank)	MBM27C512-20	1	Fjitsu	(IC6)	
			(200nS Max./512K-bits)				
4	AF99916-00	Label, ROM (Blank)	K5688-411	1	Central	(IC6)	
5	AH95901-**	ROM-SET 3 (C.G)		1		IC7	
6	C2304-715	EP-ROM (Blank)	µPD27C1000D-15	1	NEC	(IC7)	
			(150ns Max.)				
			(1M-bits (×8bits))				
			(M-ROM Compatible)				
			(32pin type)				
7	AF99916-00	Label, ROM (Blank)	K5688-411	1	Central	(IC7)	
8	AH66703-**	SA, Main PCB (Without ROM)		1			
9	C2400-001	CPU	µPD70208G	1	NEC	IC1	
10	C2321-512	RAM	HM65256B(L)SP-12	1	Hitachi	IC8	
	(C2321-512)		TC51832SP(L)-12		Toshiba		
	(C2321-510)		HM65256B(L)SP-10		Hitachi		
	(C2321-510)		TC51832SP(L)-10		Toshiba		
	(C2321-508)		TC51832SP(L)-85		Toshiba		

Item No.	Parts No.	Parts Name	Type	Q'ty	Manufacturer	Location	@ $
1	C2321-512	RAM (Option)	HM65256BSP-12	1	Hitachi	IC9 (option)	
	(C2321-512)		TC51832SP(L)-12		Toshiba		
	(C2321-510)		HM65256B(L)SP-10		Hitachi		
	(C2321-510)		TC51832SP(L)-10		Toshiba		
	(C2321-508)		TC51832SP(L)-85		Toshiba		
2	C2320-001	EE-PROM	MSM16911RS	1	Oki	IC15	
			CAT59C11		Catalyst		
			ER5911		GI		
3	C2503-300	Gate Array	CF77065FTIX	1	TI	IC10	
4	C2215-000	IC (C-MOS)	74HC00P	1	Hitachi	IC5	
5	C2215-014	IC (C-MOS)	74HC14P	1	Hitachi	IC4	
6	C2215-138	IC (C-MOS)	74HC138P	1	Hitachi	IC3	
7	C2215-174	IC (C-MOS)	74HC174P	3	Hitachi	IC16,17,18	
8	C2215-244	IC (C-MOS)	74HC244P	1	Hitachi	IC11	
9	C2215-367	IC (C-MOS)	74HC367P	1	Hitachi	IC12	
10	C2215-375	IC (C-MOS)	74HC375P	1	Hitachi	IC2	
11	C2101-006	IC (TTL)	7406	1	TI	IC14	
12	C2102-007	IC (TTL)	74LS07	1	TI	IC13	
13	C2900-003	IC (Reset)	M51957BL	1	Mitsubishi	IC23	
14	C2900-001	IC (Reset)	M51958BL	1	Mitsubishi	IC24	

Item No.	Parts No.	Parts Name	Type	Q'ty	Manufacturer	Location	@ $
1	C2601-339	IC (Comparator)	µPC339C	1	NEC	IC22	
			µA339PC		Fairchild		
			LM339N		N.S		
			LM339N		Motorola		
			LM339N		TI		
			HA17339P		Hitachi		
			TA75339P		Toshiba		
			NJM2901D		JRC		
			AN1339		Matsushita		
			LA6339D		Sanyo		
			M5234P		Mitsubishi		
2	C2701-300	IC (Drive)	SI-7300A	1	Sanken	IC21	
3	C3600-033	Diode (Silicon)	1S1588	5	Toshiba	D2,3,4,5,6	
	(C3600-020)		1S953		NEC		
	(C3600-030)		1S2075K		Hitachi		
	(C3600-044)		1S2473		Rohm		
	(C3600-051)		MA150		Matsushita		
4	C3702-560	Diode (Zener)	RD56EB	8	NEC	ZD1~8	
			05AZ56		Toshiba		
5	C3511-532	Transistor Array	M54532P	2	Mitubishi	IC19,20	

Item No.	Parts No.	Parts Name	Type	Q'ty	Manufacturer	Location	@ $
1	C3551-031	Transistor Array	SMA-4031	6	Sanken	TA1~6	
	(C3541-764)		FT5764M		Fujitsu		
2	C3540-070	Transistor Array	SLA4070	1	Sanken	TA7	
3	C3200-907	Transistor	2SB907	2	Toshiba	TR5,6	
	(C3201-098)		2SB1098		NEC		
	(C3201-099)		2SB1099		NEC		
	(C3201-224)		2SB1224		Sanyo		
4	C3301-815	Transistor	2SC1815Y	4	Toshiba	TR3,4,7,9	
	(C3302-320)		2SC2320		Mitsubishi		
	(C3303-330)		2SC3330		Sanyo		
	(C3300-458)		2SC458		Hitachi		
5	C3401-796	Transistor	2SD1796	1	Sanken	TR8	
6	C3301-841	Transistor	2SC1841	2	NEC	TR1,2	
	(C3301-890)		2SC1890A		Hitachi		
	(C3302-909)		2SC2909		Sanyo		
	(C3301-915)		2SC1915		Mitsubishi		
7	C7404-146	Oscillator (Ceramic)	CSA14.74MX40	1	Murata	Y1	
8	C4293-108	Res.Oxydized Metal Film	RNS3B1.8ΩJ	2	Fukushima Futaba	R19,20	
			CHR300R-02J1R8		Rohm		
9	C4414-561	Res. Array (SIP, Separate Type)	1/8W, 560Ω×4, ±5%	1		RN16	

Item No.	Parts No.	Parts Name	Type	Q'ty	Manufacturer	Location	@ $
1	C4414-222	Res. Array (SIP, Separate Type)	1/8W, 2.2KΩ×4, ±5%	9		RN4~9,12,14,15	
2	C4414-103	Res. Array (SIP, Separate Type)	1/8W, 10KΩ×4, ±5%	2		RN10,11	
3	C4408-332	Res. Array (SIP, Common Type)	1/8W, 3.3KΩ×8, ±5%	4		RN1,2,3,13	
4	C4114-150	Res. carbon	1/4W, 15Ω, ±5%	2		R17,18	
5	C4114-361	Res. carbon	1/4W, 360Ω, ±5%	1		R10	
6	C4114-101	Res. carbon	1/4W, 100Ω, ±5%	1		R3	
7	C4114-102	Res. carbon	1/4W, 1KΩ, ±5%	2		R2,25	
8	C4114-911	Res. carbon	1/4W, 910Ω, ±5%	1		R30	
9	C4114-332	Res. carbon	1/4W, 3.3KΩ, ±5%	17		R4~9,21~24,26~29,51,53,54	
10	C4114-132	Res. carbon	1/4W, 1.3KΩ, ±5%	1		R40	
11	C4114-103	Res. carbon	1/4W, 10KΩ, ±5%	13		R1,12~14,31~35,44,46,49,52	
12	C4114-153	Res. carbon	1/4W, 15KΩ, ±5%	1		R42	
13	C4114-822	Res. carbon	1/4W, 8.2KΩ, ±5%	1		R43	
14	C4114-183	Res. carbon	1/4W, 18KΩ, ±5%	1		R45	
15	C4114-223	Res. carbon	1/4W, 22KΩ, ±5%	2		R15,16	
16	C4114-393	Res. carbon	1/4W, 39KΩ, ±5%	1		R41	
17	C4114-104	Res. carbon	1/4W, 100KΩ, ±5%	4		R36~39	
18	C4114-105	Res. carbon	1/4W, 1MΩ, ±5%	1		R47	
19	C4114-202	Res. carbon	1/4W, 2KΩ, ±5%	1		R50	
20	C4114-182	Res. carbon	1/4W, 1.8KΩ, ±5%	1		R55	

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Item No.	Parts No.	Parts Name	Type	Q'ty	Manufacturer	Location	@ $
1	C5185-220	Cap. Electrolytic	TD04-KMC10VB220	1	Nippon chemi-con	C23	
2	C5411-225	Cap. Tantalum	ECSS1CF225	2	Matsushita	C3,38	
3	C5411-475	Cap. Tantalum	ECSS1CF475	1	Matsushita	C28	
4	C5216-150	Cap. ceramic	RT-HE40TJSL150J	2	KCK	C1,2	
5	C5216-330	Cap. ceramic	RT-HE50SJCH330J	1	KCK	C46	
6	C5224-101	Cap. ceramic	RT-HE40TJYB101K	7	KCK	C5~11	
7	C5224-391	Cap. ceramic	RT-HE40SJHD391K	1	KCK	C20	
8	C5226-102	Cap. ceramic	RT-HE40TJYF102Z	3	KCK	C19,25,29	
9	C5254-103	Cap. ceramic	RT-DSXE40SJYF103Z	21	KCK	C13~17,24,30~37,39~45	
10	C5254-104	Cap. ceramic	RT-DSXC75SJYF104Z	4	KCK	C21,22,26,27	
11	C7532-012	Ferrite (Bead)	2943-666671	1	Fair-rite	L1	
12	C7100-132	IC Socket	DILB32P-8J	1	Burndy	IC7	
	(C7100-332)		IC87-3206S4		Yamaichi		
13	AH69902-00	IC Socket (Processed)		2		IC6	
14	C7102-001	IC Socket	DILB28SP-8J	1	Burndy	IC9	
15	C6139-001	Connector	IL-FPC-22S-S1T1-SBN	1	JAE	CN1	
16	C6179-001	Connector	PCN13-20S-2.54DSA	1	Hirose	CN2	
17	C6143-010	Connector	57RE-40360-730B (D3)	1	DDK	CN4	
18	C6159-001	Connector	SBRK5S-1	1	Burndy	CN7	
19	C6159-002	Connector	SBRK6S-1	1	Burndy	CN6	

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Item No.	Parts No.	Parts Name	Type	Q'ty	Manufacturer	Location	@ $
1	C6159-003	Connector	SBRK7S-1	1	Burndy	CN19	
2	C6108-002	Connector	5233-02A(White)	2	Molex	CN8,CN11	
3	C6193-902	Connector	5233-02A(Black)	1	Molex	CN9	
4	C6194-002	Connector	5233-02A(Yellow)	1	Molex	CN10	
5	C6194-102	Connector	5233-02A(Red)	1	Molex	CN12	
6	C6139-002	Connector	IL-FPC-15S-S1T1-SBN	1	JAE	CN14	
7	C6139-003	Connector	IL-FPC-17S-S1T1-SBN	1	JAE	CN13	
8	C6190-706	Connector	MLSS156-6	1	Panduit	CN15	
9	AH64903-10	Heat Sink		1		(IC21)	
10	E00630-06	Screw, PH (PW) M3×6		1		(TA8)	
11	E00630-12	Screw, PH (PW) M3×12		2		(IC21)	

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Parts List & Location for SA, Serial I/F PCB (Option)

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Item No.	Parts No.	Parts Name	Type	Q'ty	Manufacturer	Location	@ $
1	AH66720-**	SA, Serial I/F PCB (Inch)		1			
2	C2110-188	IC (I/F)	75188 (1488)	1		IC2	
3	C2111-189	IC (I/F)	75189A (1489A)	1		IC1	
4	C7521-001	Transformer	L5-C10-F	1	Mitsumi	T1	
5	C3301-815	Transistor	2SC1815Y	1	Toshiba	TR1	
	(C3300-945)		2SC945		NEC		
6	C3401-207	Transistor	2SD1207	1	Sanyo	TR2	
	(C3302-655)		2SC2655		Toshiba		
7	C3600-033	Diode (Silicon)	1S1588	2	Toshiba	D1, 2	
	(C3600-020)		1S953		NEC		
	(C3600-030)		1S2075K		Hitachi		
	(C3600-051)		MA150		Matsushita		
	(C3600-053)		1S2473		Rohm		
8	C3702-120	Diode (Zener)	RD12EB2	1	NEC	ZD1	
9	C4114-471	Res. carbon	1/4W, 470Ω, ±5%	2		R2, 3	
10	C4114-183	Res. carbon	1/4W, 18KΩ, ±5%	1		R1	
11	C5224-101	Cap. Ceramic	RT-HE40TJYB101K	1	KCK	C8	
12	C5224-391	Cap. Ceramic	RT-HE40SJHD391K	5	KCK	C2~5,9	
13	C5226-102	Cap. Ceramic	RT-HE40TJYF102Z	1	KCK	C10	
14	C5254-103	Cap. Ceramic	RT-DSXE40SJYF103Z	8	KCK	C11~18	

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Item No.	Parts No.	Parts Name	Type	Q'ty	Manufacturer	Location	@ $
1	C5173-470	Cap. Electrolytic	TD04-SME25VB47	2	Nippon Chemi-con	C6,7	
2	C5171-101	Cap. Electrolytic	TD04-SME10VB100	1	Nippon Chemi-con	C1	
3	C6179-002	Connector	PCN10HB-20P-2.54DSA	1	Hirose	CN17	
4	C6149-104K	Connector	17LE-13250-27(D4CK)	1	DDK	CN18 (Inch)	
	(C6180-004)		FCN675J025-L/E#JA-01		Fujitsu		
	(C6169-001)		M59-25-39-295SS-1		Mitsumi		
5	AH99917-00	Label, I/F Screw (Inch)		1			

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Parts List & Location for SA, Ope-pane PCB

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Parts List for GSX 140

TITLE : SA, Ope-pane PCB

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Item No.	Parts No.	Parts Name	Type	Q'ty	Manufacturer	Location	@ $
1	AH66730-**	SA, Ope-pane PCB		1	Citizen		
2	AH69901-01	L.C.D.	AD-1946C	1	Citizen		
3	C2900-016	IC (Custom)	HD44780A00	1	Hitachi	IC1	
4	C3803-029	L.E.D.	GL1HS111	1	Sharp	LD1	
5	C3803-030	L.E.D.	GL1HD111	1	Sharp	LD2	
6	C3803-031	L.E.D.	GL1PG111	1	Sharp	LD3	
7	C4910-151	Res. Chip	MCR18EZHUJ151	1	Rohm	R9	
8	C4910-331	Res. Chip	MCR18EZHUJ331	2	Rohm	R8,10	
9	C4910-681	Res. Chip	MCR18EZHUJ681	1	Rohm	R7	
10	C4910-222	Res. Chip	MCR18EZHUJ222	4	Rohm	R1,2,4,5	
11	C4910-913	Res. Chip	MCR18EZHUJ913	1	Rohm	R6	
12	C4600-018	Thermistor	10KC10-3212	1	Ishizuka-Denshi	TH1	
13	C7640-006	Key Switch	SKHHAJ	6	Alps	SW1~6	
14	C6139-001	Connector	IL-FPC-22S-S1T1-SBN	1	JAE		

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Parts List & Location for SA, Power Supply PCB

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Item No.	Parts No.	Parts Name	Type	Q'ty	Manufacturer	Location	@ $
1	AH66710-**	SA, Power Supply PCB (115V)		1			
2	C4112-121	Res. Carbon	ERDS1TJ121	1	Matsushita	R12	
3	C4112-151	Res. Carbon	ERDS1TJ151	1	Matsushita	R16	
4	C4112-224	Res. Carbon	1/2W, 220KΩ, ±5%	1		R2	
5	C4112-154 ~334	Res. Carbon (Adjustment)	1/2W, 150K~ 330KΩ, ±5%	1		R3	
6	C4114-750	Res. Carbon	1/4W, 75Ω, ±5%	2		R15,R22	
7	C4114-182	Res. Carbon	1/4W, 1.8KΩ, ±5%	1		R25	
8	C4114-471 ~103	Res. Carbon (Adjustment)	1/4W, 470Ω~10KΩ, ±5%	1		R11	
9	C4114-222	Res. Carbon	1/4W, 2.2KΩ, ±5%	1		R7	
10	C4114-512	Res. Carbon	1/4W, 5.1KΩ, ±5%	1		R23	
11	C4114-103	Res. Carbon	1/4W, 10KΩ, ±5%	1		R17	
12	C4114-473	Res. Carbon	1/4W, 47KΩ, ±5%	1		R26	
13	C4114-105	Res. Carbon	1/4W, 1MΩ, ±5%	1		R24	
14	C4394-220 ~∞	Res. Carbon (Adjustment)	1/4W, 2.2Ω~∞ ±5%	1		R9	
15	C4508-102	Res. Variable	RVF6P01-102N	1	Murata	VR21	
16	C4290-030 /026/027	Res. Cement (Adjustment)	MPC70-0.15 or 0.22 or 0.27	1	Fukushima Futaba	R8	

Item No.	Parts No.	Parts Name	Type	Q'ty	Manufacturer	Location	@ $
1	C4242-680	Res. Oxydized metal film	ERG2SJ680P	1	Matsushita	R10	
			RSF2SL680J		Sanno Tsushin		
2	C4242-102	Res. Oxydized metal film	ERG2SJ102P	2	Matsushita	R21-1,-2	
			RSF2SL102J		Sanno Tsushin		
3	C4243-180	Res. Oxydized metal film	ERG3SJ180H	1	Matsushita	R5	
			RSF3SL180J		Sanno Tsushin		
4	C4243-333	Res. Oxydized metal film	ERG3SJ333P	1	Matsushita	R4	
			RSF3SL333J		Sanno Tsushin		
5	C4800-006	Res. Fuse	ERD2FCG202	1	Matsushita	R6	
6	C4295-001	Res. Metal Film	ERDS2TJ202	1	Matsushita	R27	
7	C5270-002	Cap. Ceramic	DE0907BN471K-2KV	1	Murata	C9	
8	C5270-005	Cap. Ceramic	DE0807E222Z-AC250V	1	Murata	C10	
9	C5270-010	Cap. Ceramic	DE0807F472Z-AC250V	2	Murata	C2,3	
10	C5190-021	Cap. Electrolytic	CESEM1A471	1	Marcon	C23	
11	C5190-031	Cap. Electrolytic	RSG-16V102MS55	1	Elna	C22	
12	C5190-026	Cap. Electrolytic	CEUSM1C101	1	Marcon	C13	
13	C5190-023	Cap. Electrolytic	UVR1V332MRA	2	Nichicon	C21-1,-2	
	(C5190-043)		ECEA1VU332Y		Matsushita		
14	C5190-025	Cap. Electrolytic	CEUSM1HR47	1	Marcon	C8	

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Item No.	Parts No.	Parts Name	Type	Q'ty	Manufacturer	Location	@ $
1	C5190-027	Cap. Electrolytic	ECOS2DG471M	1	Matsushita	C5	
	(C5190-028)		LGK2D471HMSA		Nichicon		
	(C5190-029)		LPG200V471MS6		Elna		
2	C5809-007	Cap. Film	ECQ-M6103JZ	1	Matsushita	C6	
3	C5809-011	Cap. Film	ECQ-B1H103KH	1	Matsushita	C11	
	(C5809-045)		AMZ-103K-50V		Nissei Elec.		
4	C5809-009	Cap. MP	ECQ-V1H104JZ	1	Matsushita	C7	
	(C5809-057)		MMT104K-50V		Nissei Elec.		
5	C5165-010	Cap. Electrolytic	CEBPM1H010M	1	Marcon	C25	
6	C5809-063	Cap. MP	ECQ-E2A473MW	1	Matsushita	C4	
7	C5809-062	Cap. MP	ECQ-E2A224MW	1	Matsushita	C1	
8	C3603-009	Diode Stack	D3SB40	1	Shindengen	DS1	
	(C3603-022)		D3SBA40		Shindengen		
	(C3603-010)		D3SB60		Shindengen		
	(C3603-019)		D3SBA60		Shindengen		
	(C3603-023)		RBV404		Sanken		
	(C3603-003)		RBV406		Sanken		

Item No.	Parts No.	Parts Name	Type	Q'ty	Manufacturer	Location	@ $
1	C4242-680	Res. Oxydized metal film	ERG2SJ680P	1	Matsushita	R10	
			RSF2SL680J		Sanno Tsushin		
2	C4242-102	Res. Oxydized metal film	ERG2SJ102P	2	Matsushita	R21-1,-2	
			RSF2SL102J		Sanno Tsushin		
3	C4243-180	Res. Oxydized metal film	ERG3SJ180H	1	Matsushita	R5	
			RSF3SL180J		Sanno Tsushin		
4	C4243-333	Res. Oxydized metal film	ERG3SJ333P	1	Matsushita	R4	
			RSF3SL333J		Sanno Tsushin		
5	C4800-006	Res. Fuse	ERD2FCG202	1	Matsushita	R6	
6	C4295-001	Res. Metal Film	ERDS2TJ202	1	Matsushita	R27	
7	C5270-002	Cap. Ceramic	DE0907BN471K-2KV	1	Murata	C9	
8	C5270-005	Cap. Ceramic	DE0807E222Z-AC250V	1	Murata	C10	
9	C5270-010	Cap. Ceramic	DE0807F472Z-AC250V	2	Murata	C2,3	
10	C5190-021	Cap. Electrolytic	CESEM1A471	1	Marcon	C23	
11	C5190-031	Cap. Electrolytic	RSG-16V102MS55	1	Elna	C22	
12	C5190-026	Cap. Electrolytic	CEUSM1C101	1	Marcon	C13	
13	C5190-023	Cap. Electrolytic	UVR1V332MRA	2	Nichicon	C21-1,-2	
	(C5190-043)		ECEA1VU332Y		Matsushita		
14	C5190-025	Cap. Electrolytic	CEUSM1HR47	1	Marcon	C8	

Item No.	Parts No.	Parts Name	Type	Q'ty	Manufacturer	Location	@ $
1	C5190-027	Cap. Electrolytic	ECOS2DG471M	1	Matsushita	C5	
	(C5190-028)		LGK2D471HMSA		Nichicon		
	(C5190-029)		LPG200V471MS6		Elna		
2	C5809-007	Cap. Film	ECQ-M6103JZ	1	Matsushita	C6	
3	C5809-011	Cap. Film	ECQ-B1H103KH	1	Matsushita	C11	
	(C5809-045)		AMZ-103K-50V		Nissei Elec.		
4	C5809-009	Cap. MP	ECQ-V1H104JZ	1	Matsushita	C7	
	(C5809-057)		MMT104K-50V		Nissei Elec.		
5	C5165-010	Cap. Electrolytic	CEBPM1H010M	1	Marcon	C25	
6	C5809-063	Cap. MP	ECQ-E2A473MW	1	Matsushita	C4	
7	C5809-062	Cap. MP	ECQ-E2A224MW	1	Matsushita	C1	
8	C3603-009	Diode Stack	D3SB40	1	Shindengen	DS1	
	(C3603-022)		D3SBA40		Shindengen		
	(C3603-010)		D3SB60		Shindengen		
	(C3603-019)		D3SBA60		Shindengen		
	(C3603-023)		RBV404		Sanken		
	(C3603-003)		RBV406		Sanken		

Rev. No. 0

Item No.	Parts No.	Parts Name	Type	Q'ty	Manufacturer	Location	@ $
1	C3703-047 ~075	Diode (Zener) (Adjustment)	RD4.7EB3~RD7.5EB3	1	NEC	ZD1	
	(C3713-047 ~075)		05Z4.7Z~05Z7.5Z		Toshiba		
2	C3703-051 ~082	Diode (Zener) (Adjustment)	RD5.1EB1~RD8.2EB1	1	NEC	ZD2	
	(C3713-051 ~082)		05Z5.1X~05Z8.2X		Toshiba		
3	C3600-021	Diode (Silicon)	1S954	2	NEC	D3,6	
	(C3600-049)		1S1585		Toshiba		
4	C3602-003	Diode (Silicon)	RGP10G	1	G.I.	D1	
5	C3602-001	Diode (Silicon)	RGP10D	1	G.I.	D2	
	(C3601-030)		RMPG06D		G.I.		
6	C3600-020	Diode (Silicon)	1S953	1	NEC	D4	
	(C3600-033)		1S1588		Toshiba		
7	C3603-021	Diode (Silicon)	UF5402	2	G.I.	D21.22	
	(C3601-025)		ERD32-02		Fuji Elec.		
	(C3601-013)		EPG30D		G.I.		

Rev. No. 0

Item No.	Parts No.	Parts Name	Type	Q'ty	Manufacturer	Location	@ $
1	C3600-003	Diode (Silicon)	RK44	1	Sanken	D23	
	(C3600-004)		SB340		G.I.		
	(C3604-002)		ERC81-004		Fuji Elec.		
2	C3802-007	Photo Coupler	PS2501-1	1	NEC	PI-1	
3	C7520-018	Transformer (Ringing)	CT4121	1	Eastern	T1	
4	C7510-024	Choke Coil	SU16V-12035	1	Tokin	L1	
5	C3323-420	Transistor	2SC3420-GR	1	Toshiba	TR2	
	(C3323-422)		2SC3422-Y		Sanyo Denki		
6	C3333-833	Transistor	2SC3833-Y	1	Sanken	TR1	
7	C2800-003	Regulator	μPC1093J	1	NEC	IC21	
	(C2800-006)		NJM431L		JRC		
8	C4600-023	Thermistor	NTH13D8R0LA	1	Murata	R1	
	(C4600-024)		8D-13		Ishizuka Elec.		
9	C6400-103	Fasten Pin	42082	1	Kyoshin	P1	
10	C6400-302	Fasten Pin	86028	1	Kyoshin	P2	
11	C7800-030	Heat Sink	CT4151	1	Eastern	(TR1)	
12	C7800-031	Heat Sink	TM0155-4	1	Eastern	(D21,22)	
13	C7802-006	Insulating Sheet	CT0171-4	1	Eastern	(TR1)	
14	E01003-10	Screw, PH (SW+PH#2), M3×10		1		(TR1)	

Rev. No. 0

Item No.	Parts No.	Parts Name	Type	Q'ty	Manufacturer	Location	@ $
1	C7301-311	Fuse	239-003	1	Little	F1	
	(C7301-313)		5TT3		Bell		
2	C7301-312	Fuse	239-002	1	Little	F21	
	(C7301-314)		5TT2		Bell		
3	C7321-102	Fuse Clip	FP-218B	4	Nagasawa	F1(×2), F21(×2)	
4	C6900-003	Earth Wire SA	CT4143	1	Eastern	F. G.	
5	C6900-002	Power Connector SA	CT4141	1	Eastern		
6	C7510-025	Ferrite(Bead)	LAL03NAR68	1	Taiyo Yuden	FB1	
	(C7510-026)		ELEMHR68MA		Matsushita		

Chapter 6
Circuit Diagrams

CHAPTER 6 CIRCUIT DIAGRAMS
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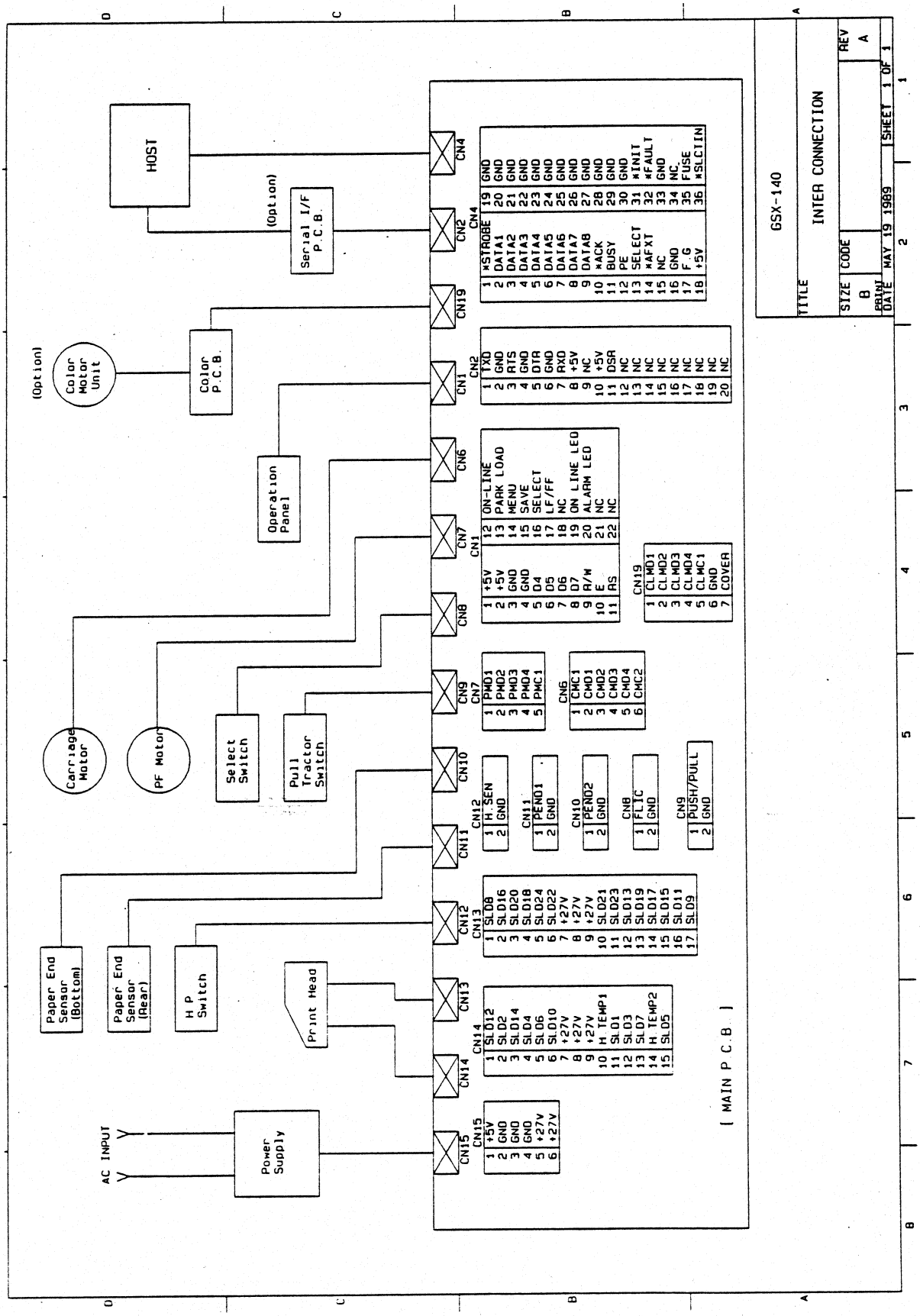

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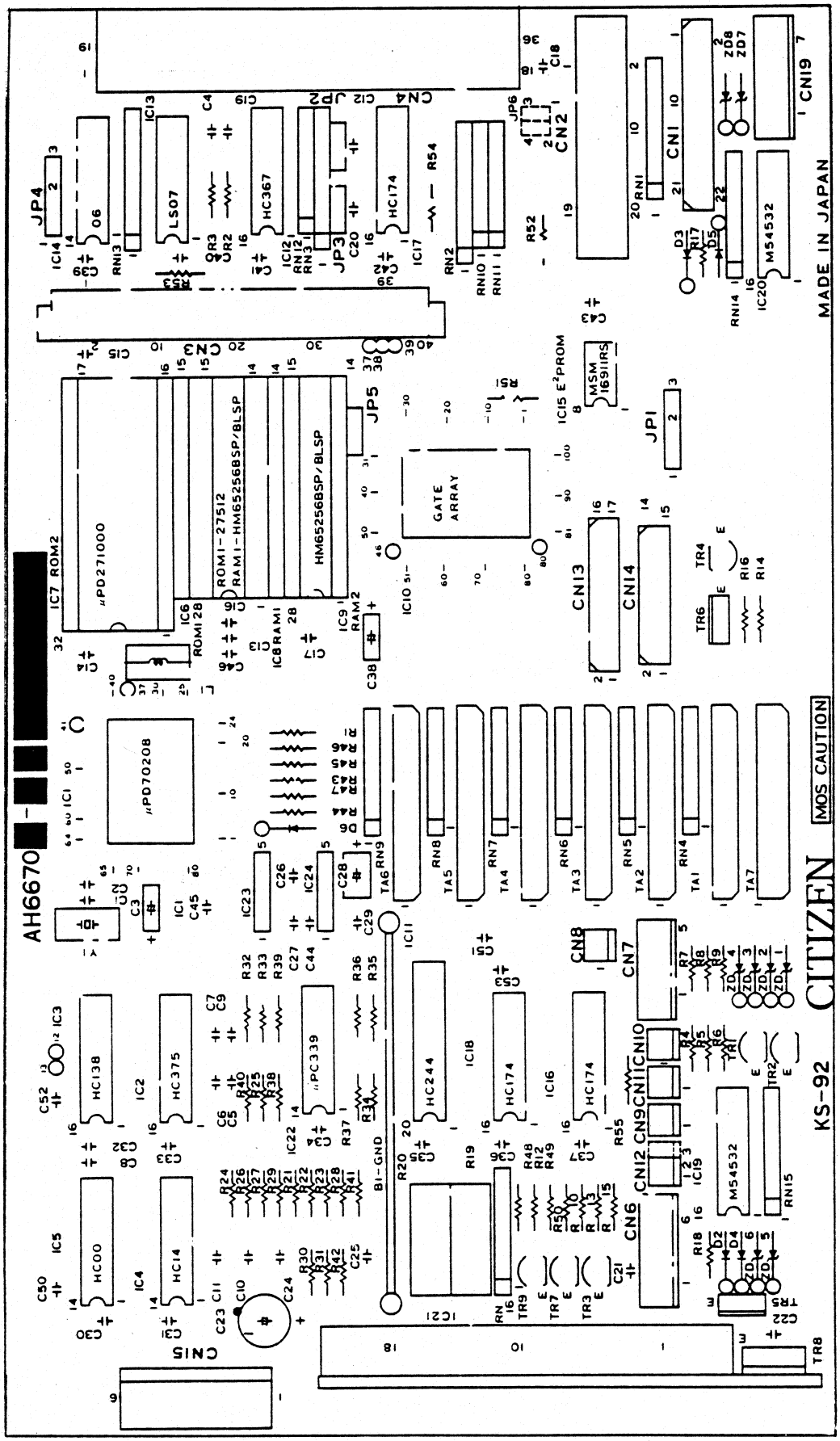
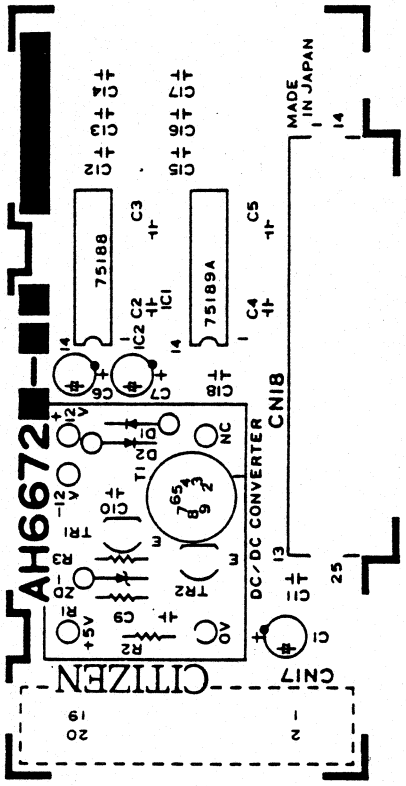
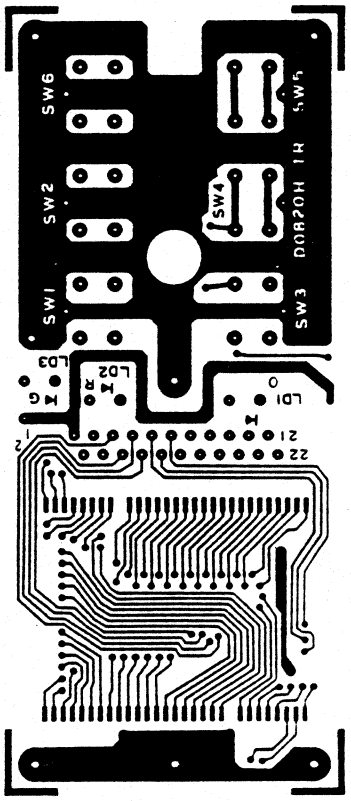


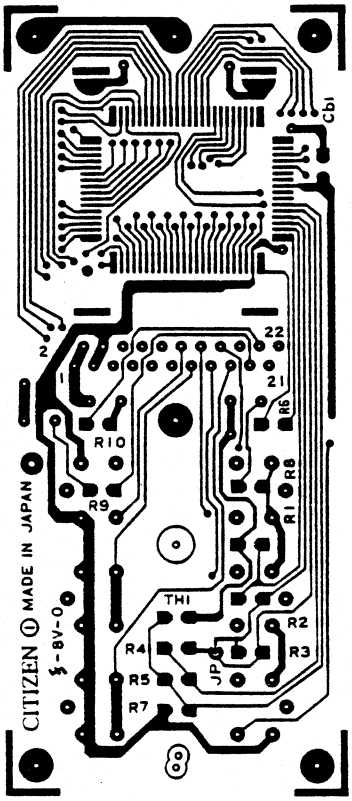
Mounting Diagram (Main PCB)



Mounting Diagram (Serial I/F PCB (Option))

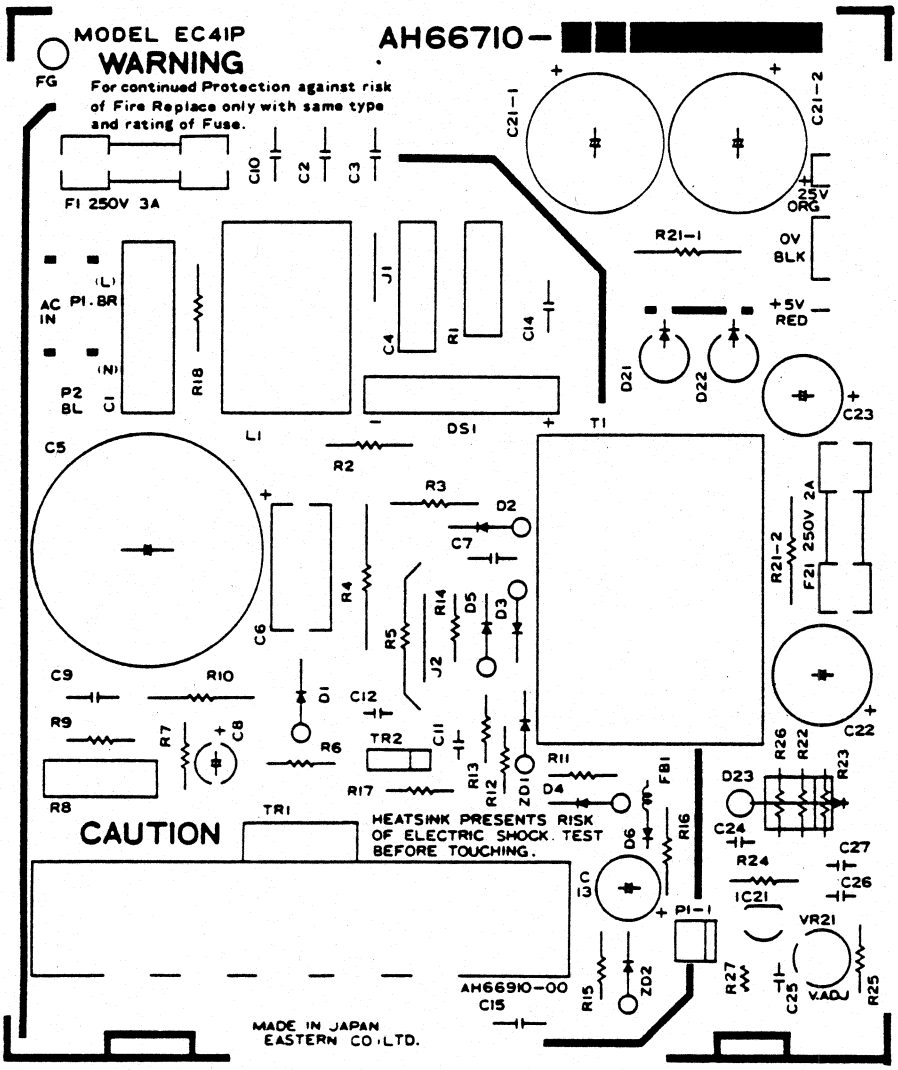


(Top)

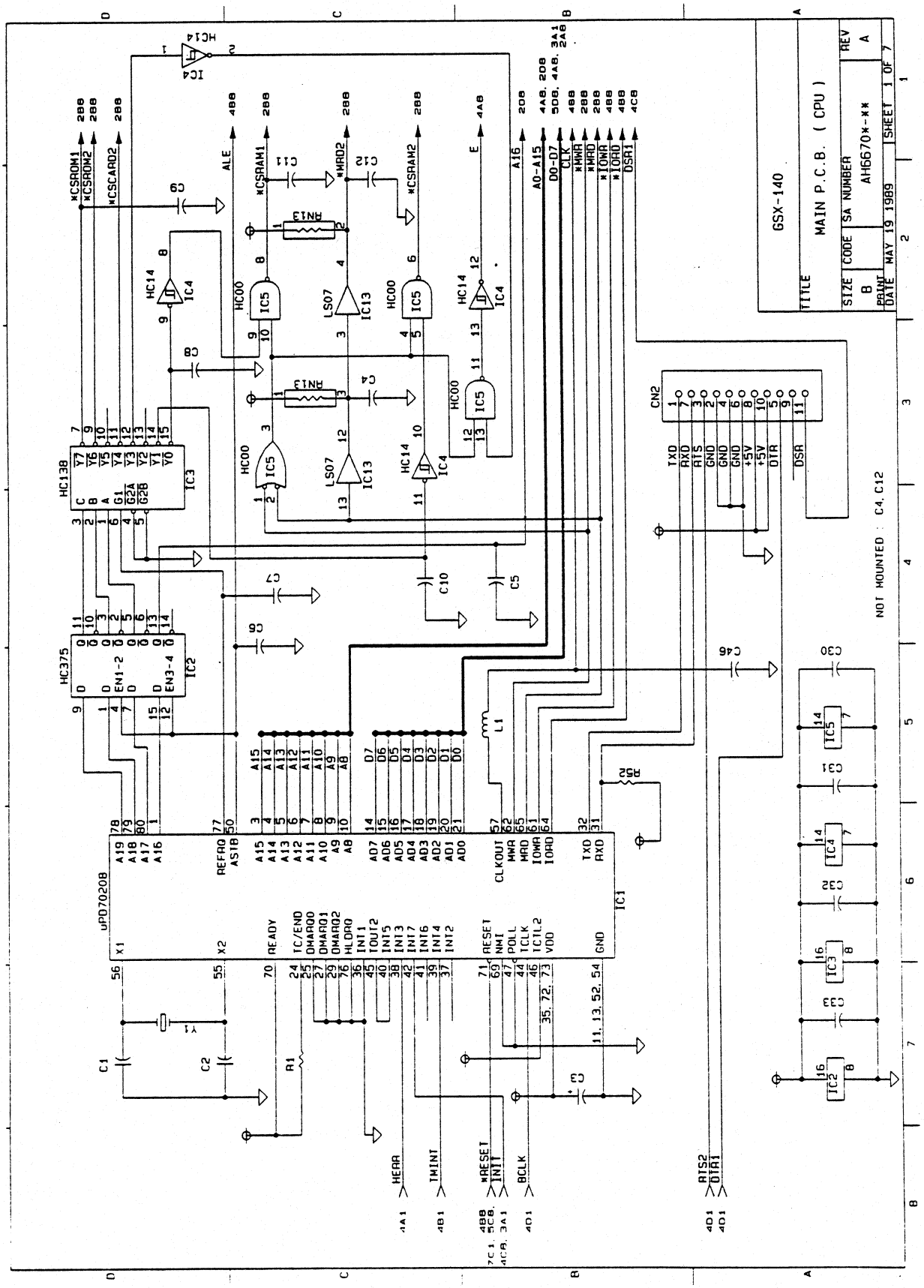


(Bottom)

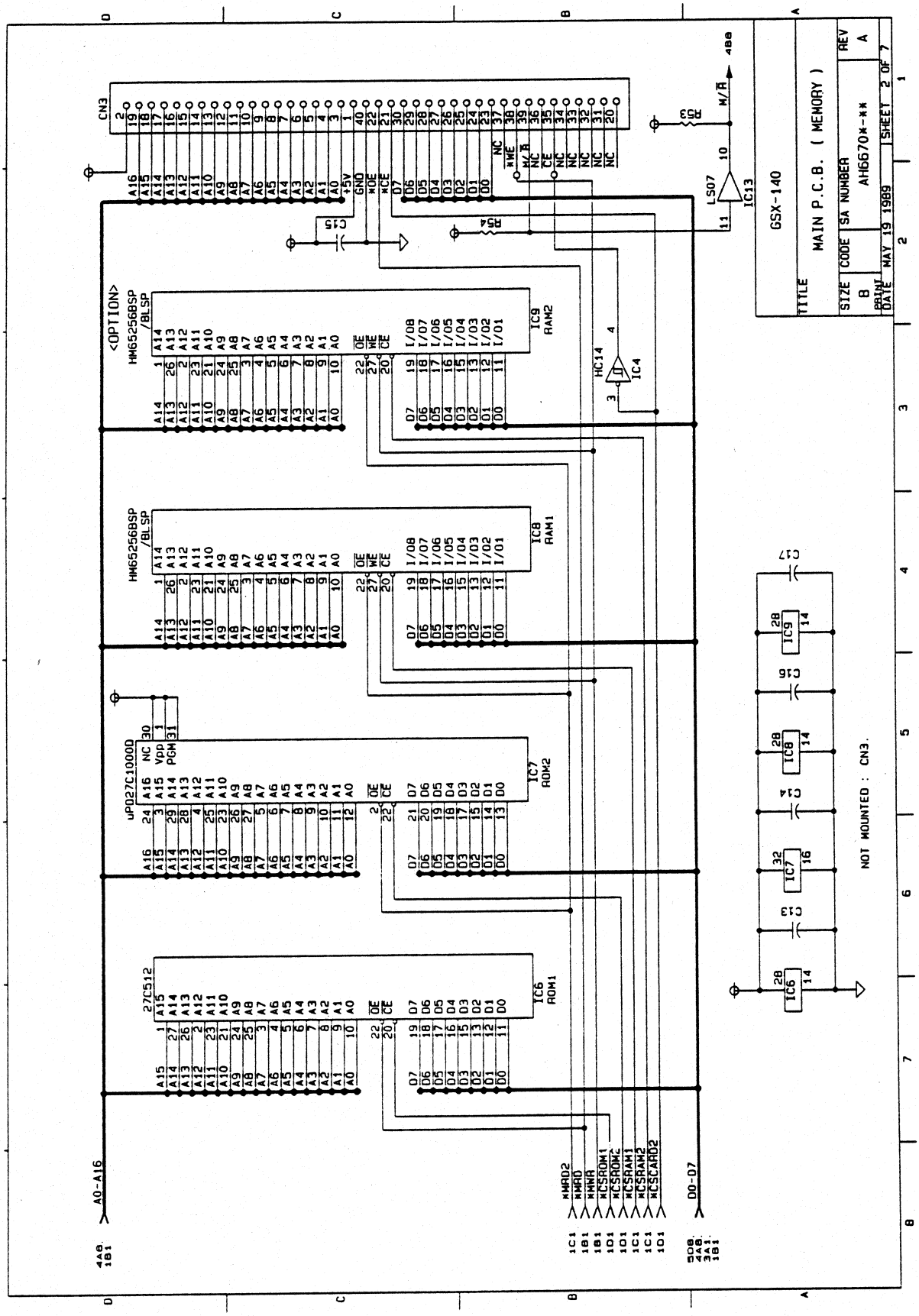
Mounting Diagram (Operation Panel)



Mounting Diagram (Power Supply PCB (115V))



Circuit Diagram (Main 1)



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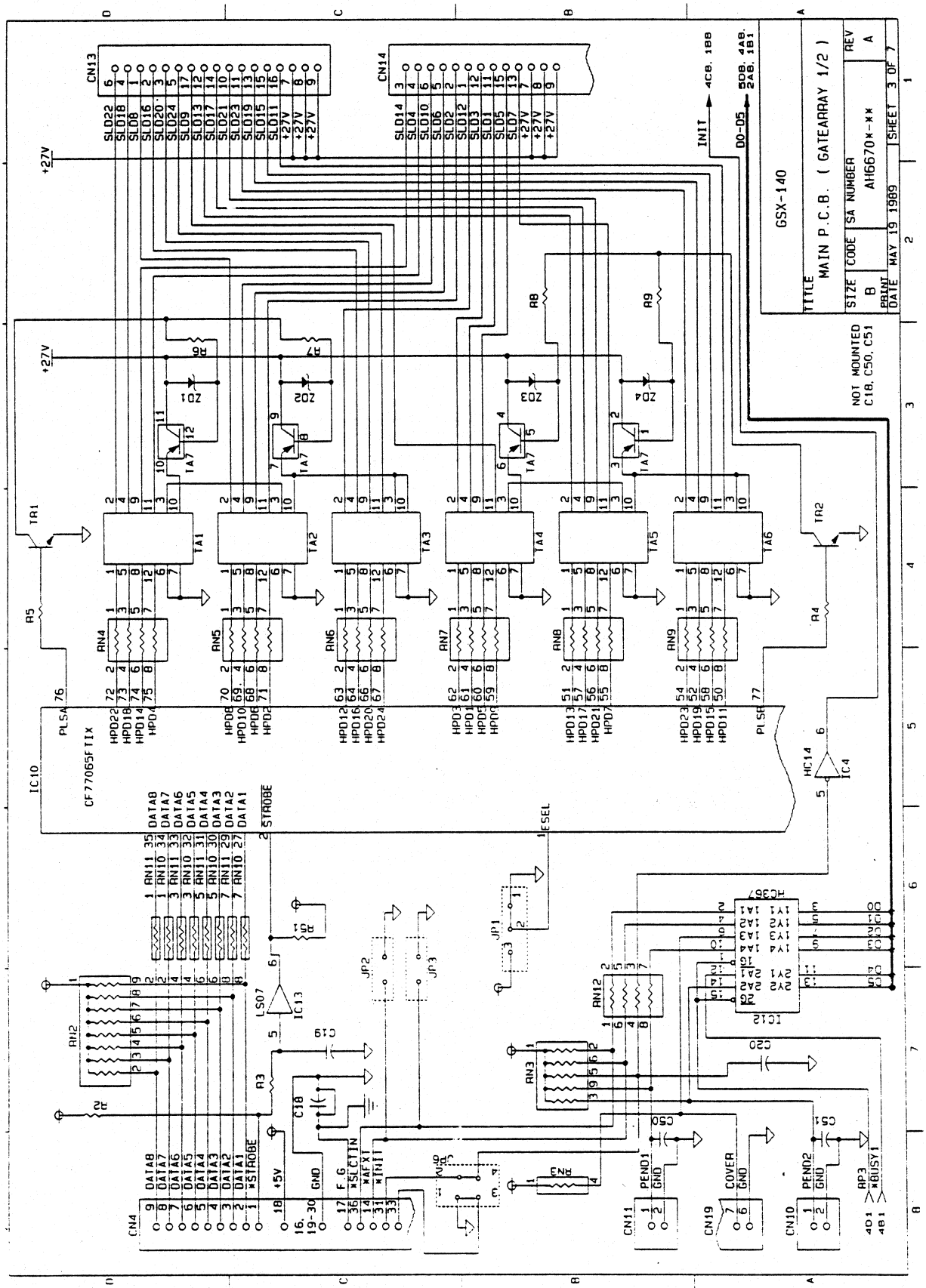
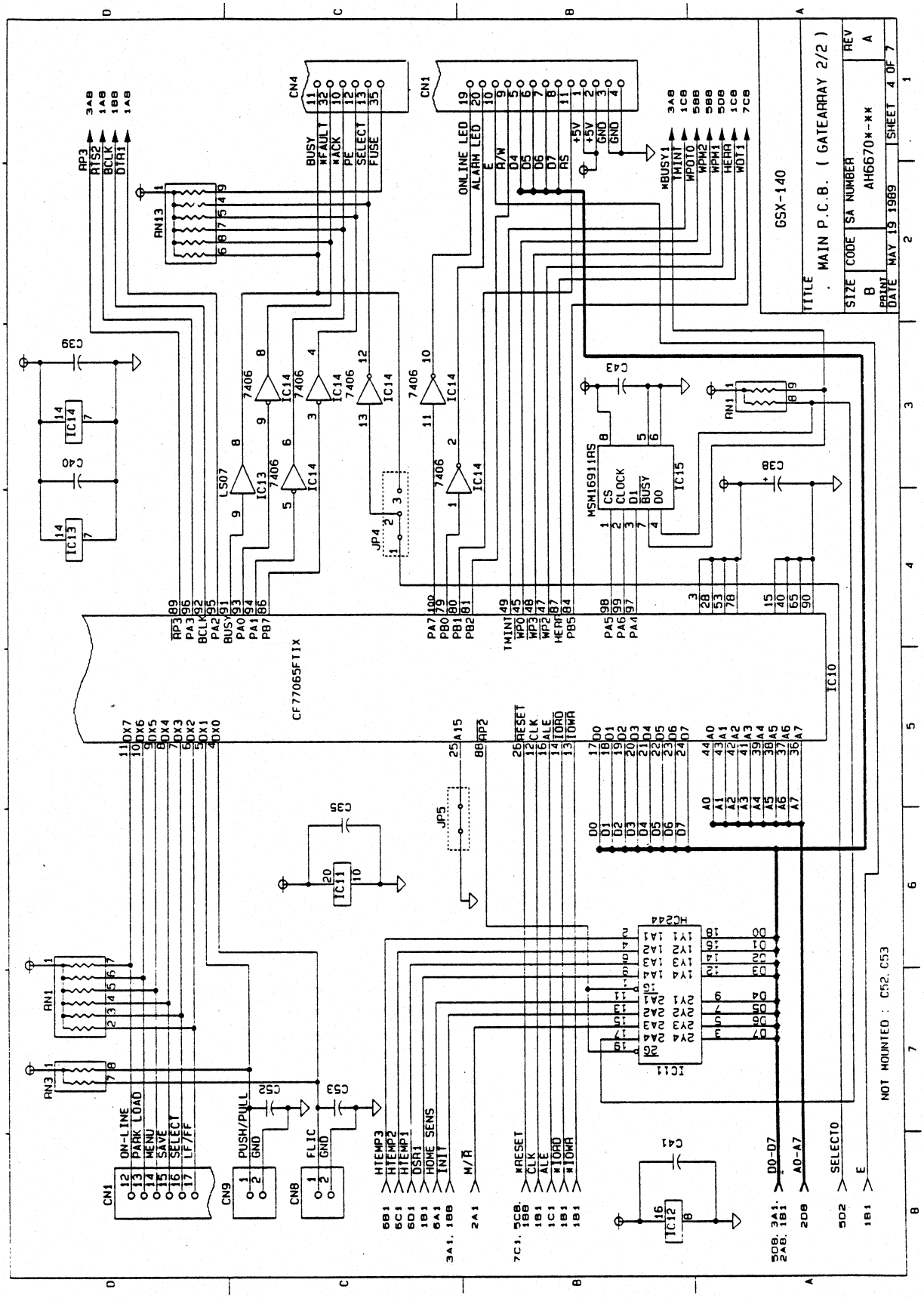


Circuit Diagram (Main 3)



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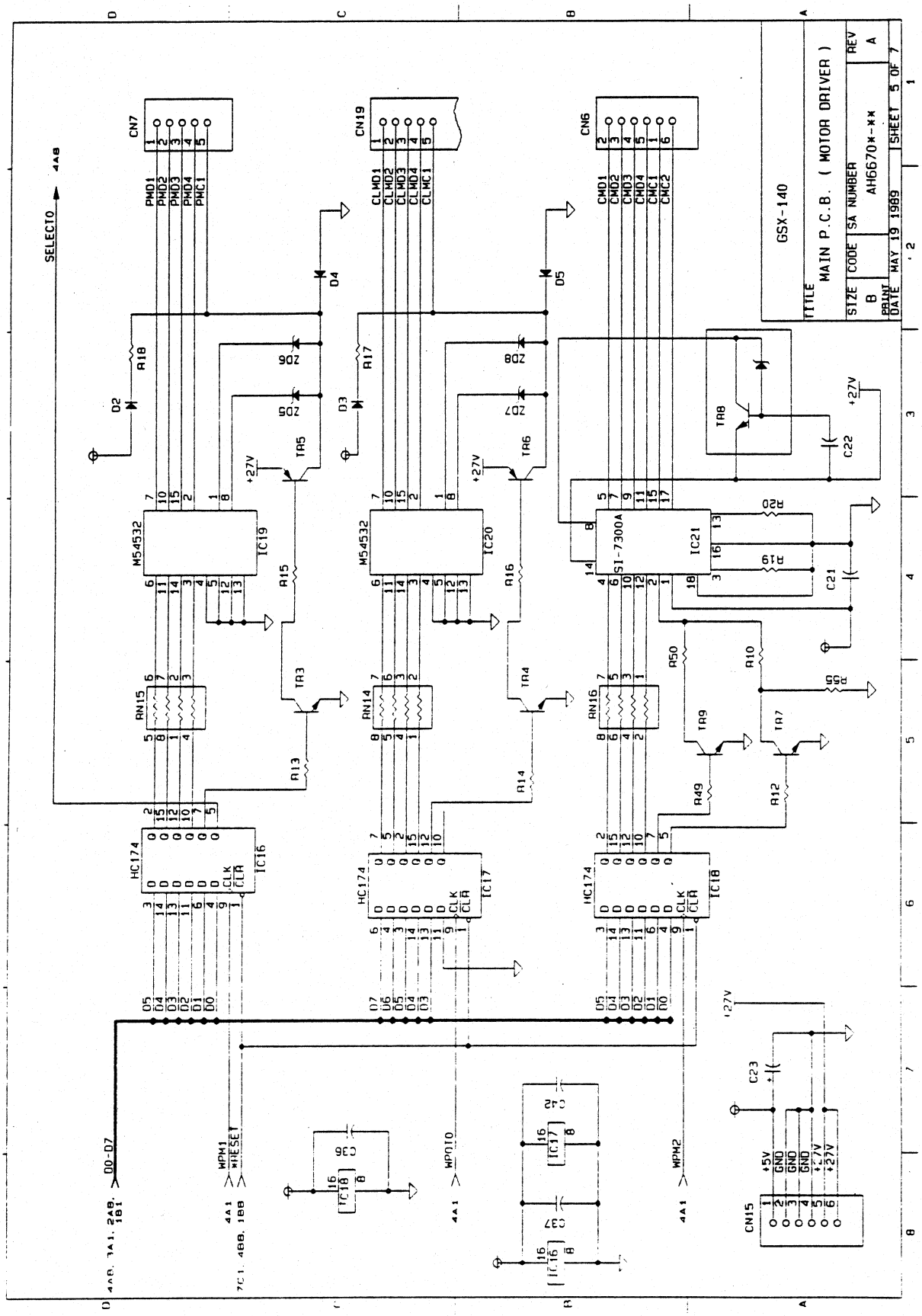
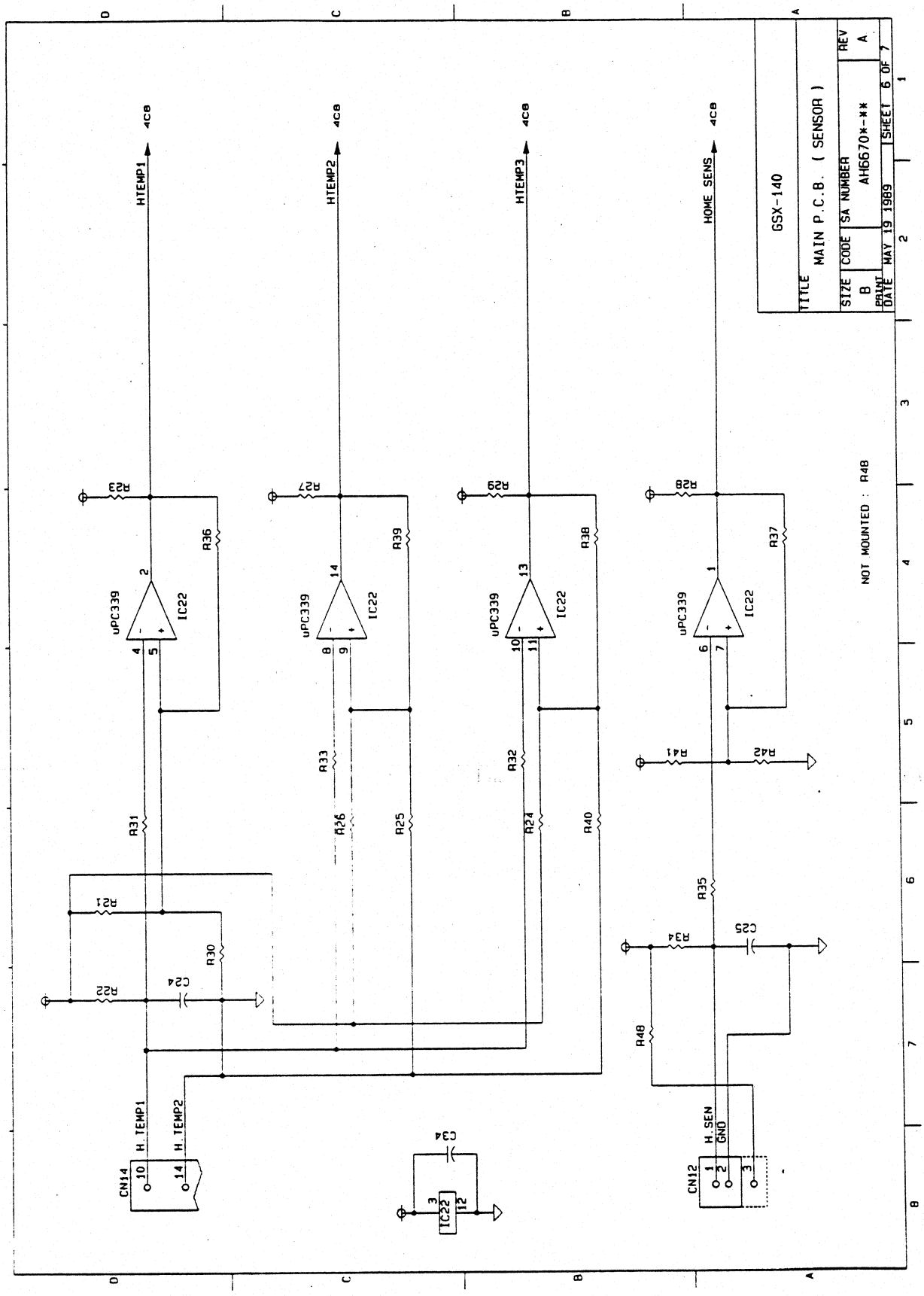


Circuit Diagram (Main 5)



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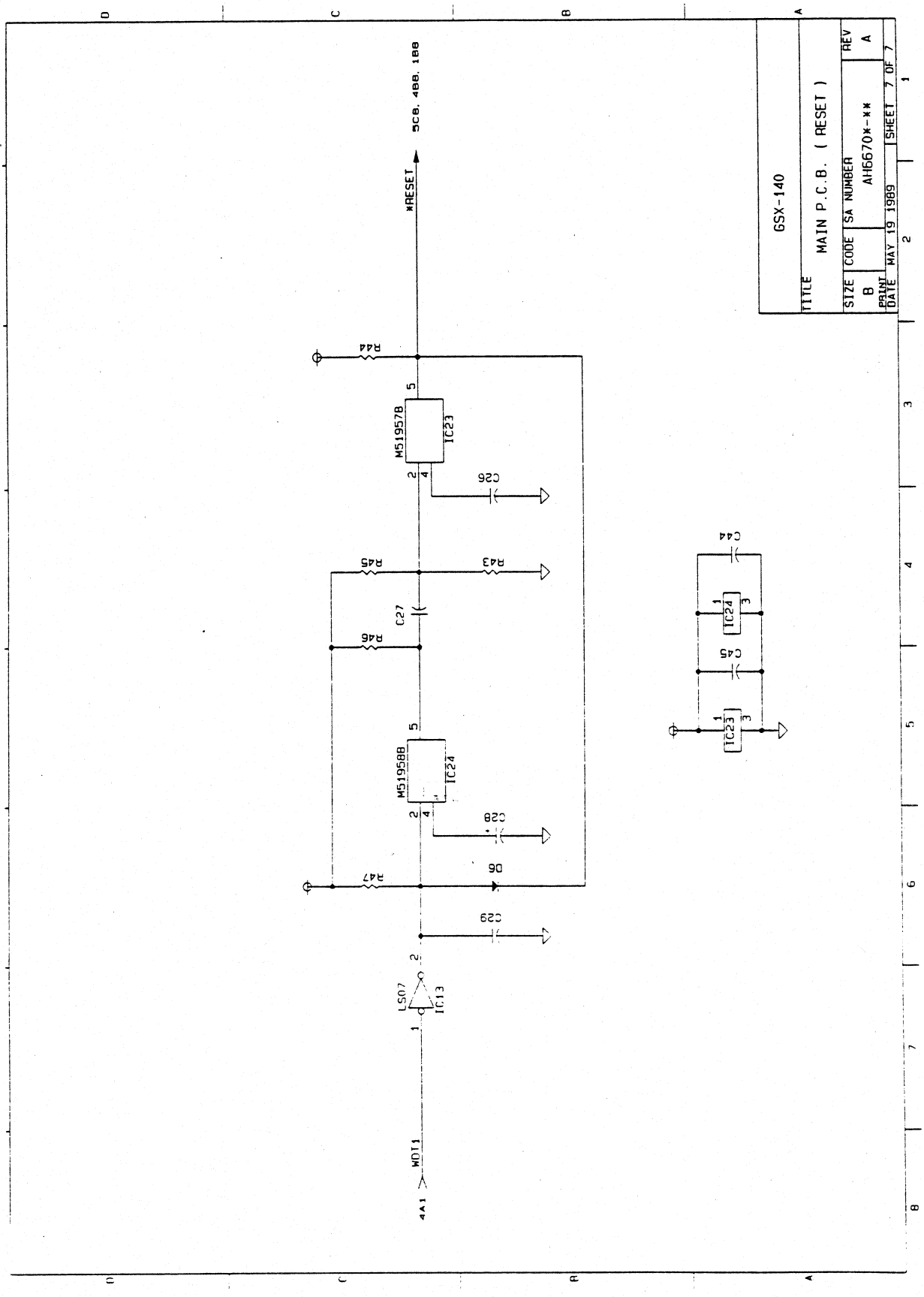

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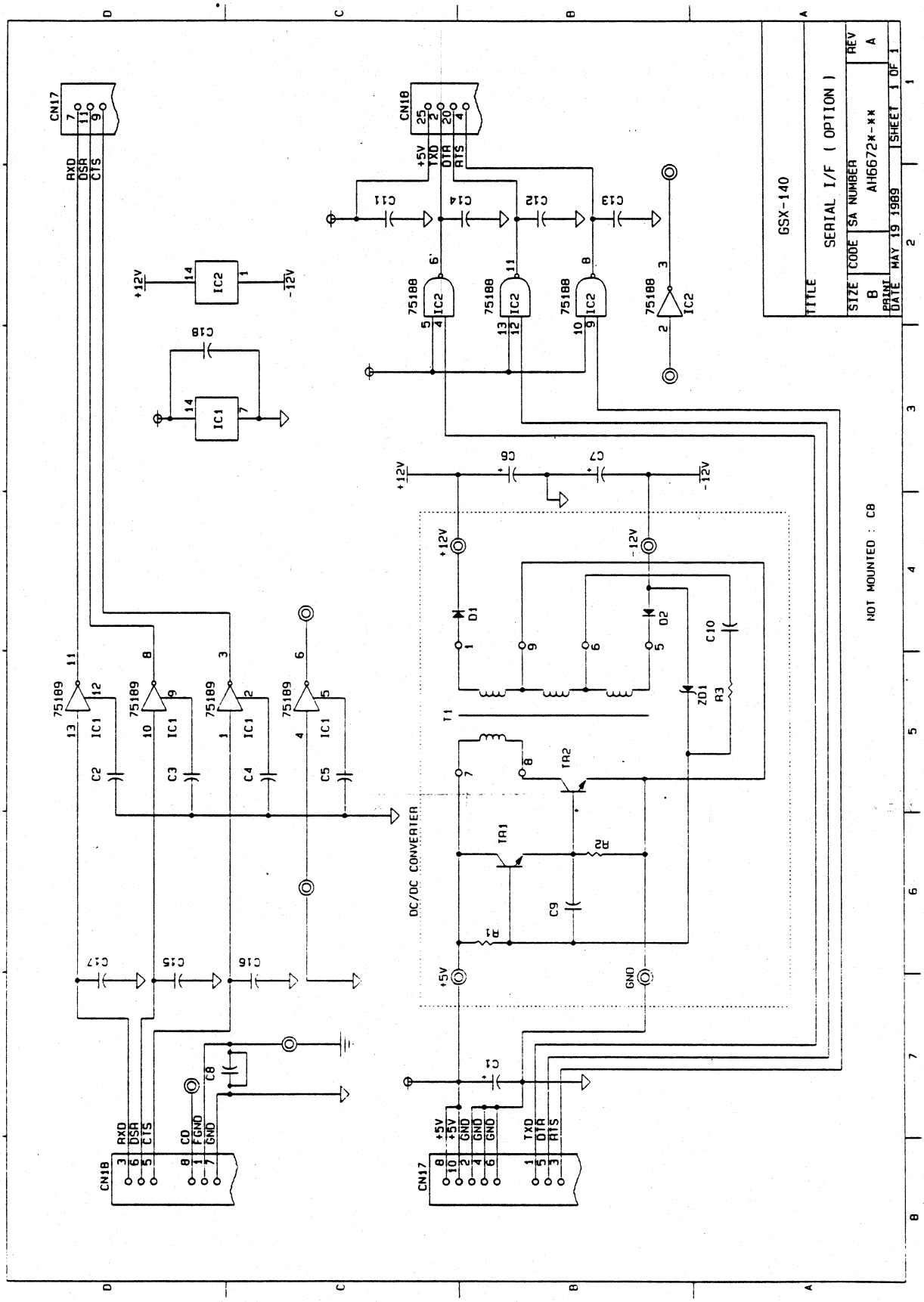
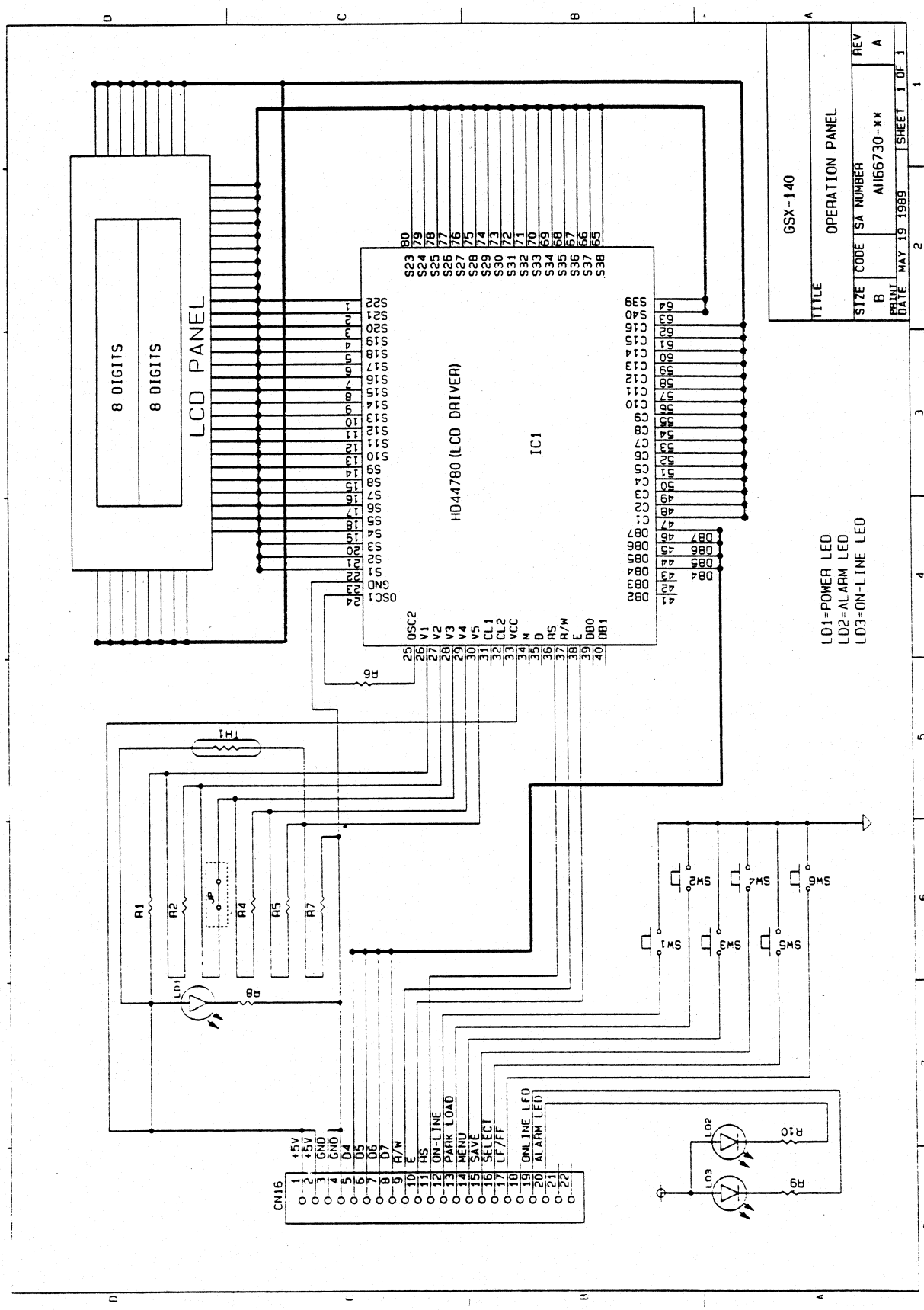
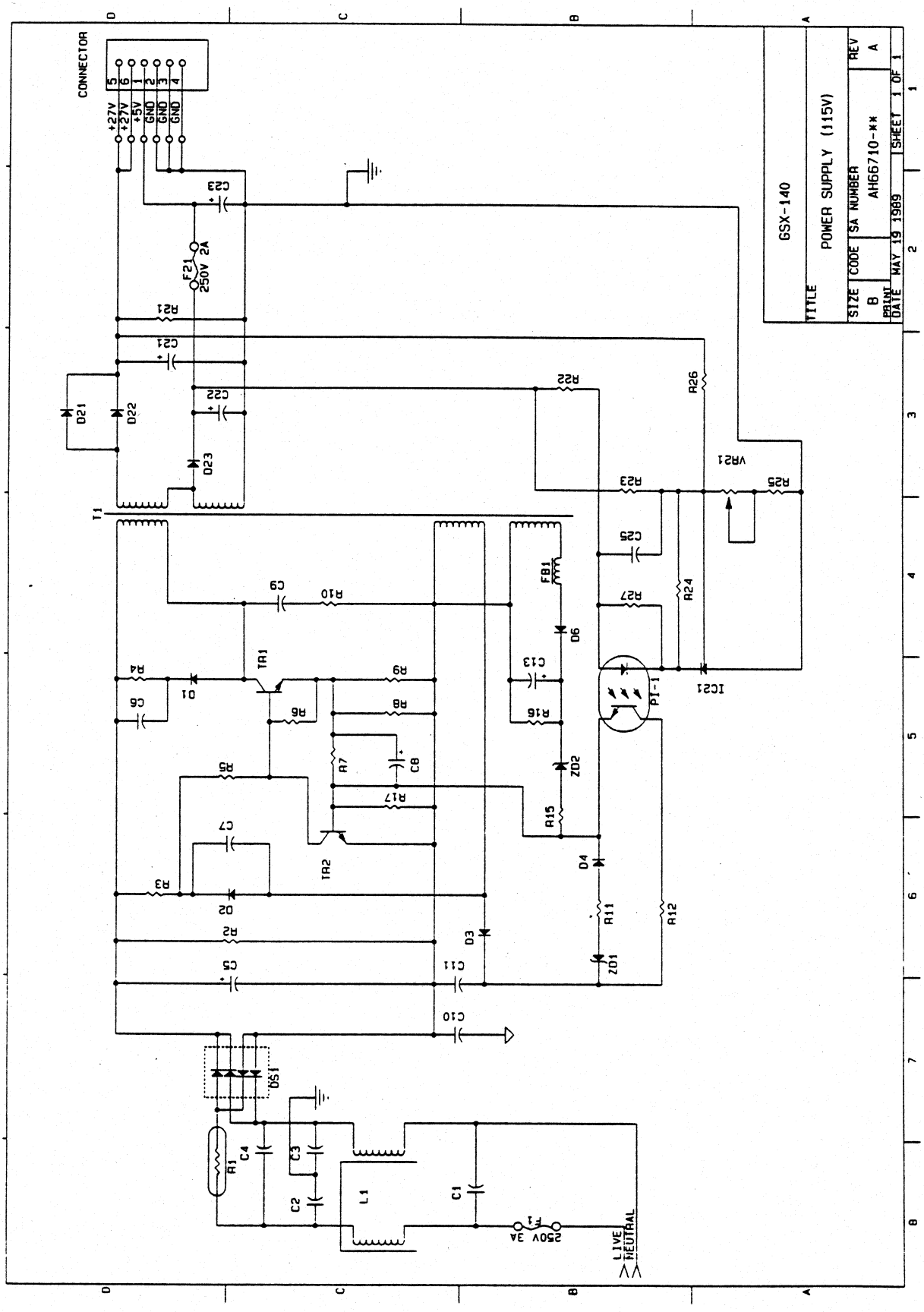


Circuit Diagram (Serial I/F) (Option)



Circuit Diagram (Operation Panel)



Circuit Diagram (Power-supply (115V))

APPENDICES

APPENDICES
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A. Lead Identification

This section covers specifications for the semiconductors and ICs used on PCBs.

A-1. Semiconductors Lead Identification.

Table 1. List of Semiconductors

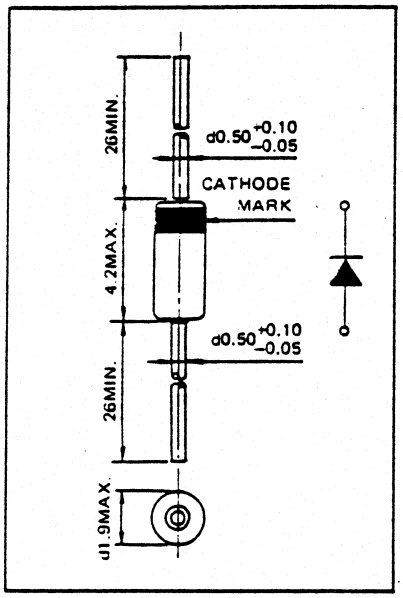
Board Name	Parts Name	Location	Type	Parts No.	Description
Main PCB	Diode (Silicon)	D2~6	1S1588	C3600-033	See Page AP-3
Power Supply	Diode (Silicon)	D1	RGP10G	C3602-003	See Page AP-3
Power Supply	Diode (Silicon)	D2	RGP10D	C3602-001	See Page AP-3
Power Supply	Diode (Silicon)	D3, 6	1S954	C3600-021	See Page AP-3
Power Supply	Diode (Silicon)	D4	1S953	C3600-020	See Page AP-3
Power Supply	Diode (Silicon)	D21, 22	UF5402	C3603-021	See Page AP-3
Power Supply	Diode (Silicon)	D23	RK44	C3600-003	See Page AP-3
Serial I/F	Diode (Silicon)	D1, 2	1S1588	C3600-033	See Page AP-3
Main PCB	Diode (Zener)	ZD1~8	RD56EB	C3702-560	See Page AP-3
Power Supply	Diode (Zener)	ZD1	RD5. 6EB3	C3703-056	See Page AP-3
Power Supply	Diode (Zener)	ZD2	RD6. 8EB2	C3703-068	See Page AP-3
Serial I/F	Diode (Zener)	ZD1	RD12EB2	C3702-120	See Page AP-3
Power Supply	Diode Stack	DS1	D3SB40	C3603-009	See Page AP-4
Main PCB	Transistor	TR1, 2	2SC1841	C3301-841	See Page AP-4
Main PCB	Transistor	TR3, 4, 7, 9	2SC1815Y	C3301-815	See Page AP-4
Main PCB	Transistor	TR5, 6	2SB907	C3200-907	See Page AP-4
Main PCB	Transistor	TR8	2SD1796	C3401-796	See Page AP-5
Power Supply	Transistor	TR1	2SC3833-Y	C3333-833	See Page AP-5
Power Supply	Transistor	TR2	2SC3420-GR	C3323-420	See Page AP-5
Serial I/F	Transistor	TR1	2SC1815Y	C3301-815	See Page AP-4
Serial I/F	Transistor	TR2	2SD1207	C3401-207	See Page AP-5
Main PCB	Transistor Array	IC19, 20	M54532P	C3511-532	See Page AP-6
Main PCB	Transistor Array	TA1~6	SMA-4031	C3551-031	See Page AP-6
Main PCB	Transistor Array	TA7	SLA4070	C3540-070	See Page AP-6

A-2. IC's Lead Identification

Table 2. List of IC's

Board Name	Parts Name	Location	TYPE	Parts No.	Description
Main PCB	CPU	IC1	µPD70208G	C2400-001	See Page AP-12
Main PCB	IC (C-MOS)	IC2	74HC375P	C2215-375	See Page AP-8
Main PCB	IC (C-MOS)	IC3	74HC138P	C2215-138	See Page AP-8
Main PCB	IC (C-MOS)	IC4	74HC14P	C2215-014	See Page AP-7
Main PCB	IC (C-MOS)	IC5	74HC00H	C2215-000	See Page AP-7
Main PCB	EP-ROM	IC6	27C512	C2304-620	See Page AP-10
Main PCB	EP-ROM	IC7	27C1000	C2304-715	See Page AP-10
Main PCB	RAM	IC8	HM65256 B(L) SP-12	C2321-512	See Page AP-10
Main PCB	Gate Array	IC10	CF77065FTIX	C2503-300	See Page AP-12
Main PCB	IC (C-MOS)	IC11	74HC244P	C2215-244	See Page AP-7
Main PCB	IC (C-MOS)	IC12	74HC367P	C2215-367	See Page AP-8
Main PCB	IC (TTL)	IC13	74LS07	C2102-007	See Page AP-7
Main PCB	IC (TTL)	IC14	7406	C2101-006	See Page AP-7
Main PCB	EE-PROM	IC15	MSM16911RS	C2320-001	See Page AP-9
Main PCB	IC (C-MOS)	IC16~18	74HC174P	C2215-174	See Page AP-8
Main PCB	IC (Drive)	IC21	SI-7300A	C2701-300	See Page AP-11
Main PCB	IC (Comparator)	IC22	µPC339C	C2601-339	See Page AP-11
Main PCB	IC (Reset)	IC23	M51957BL	C2900-003	See Page AP-9
Main PCB	IC (Reset)	IC24	M51958BL	C2900-001	See Page AP-9
Power Supply	Photo Coupler	PI-1	PS2501-1	C3802-007	See Page AP-9
Power Supply	Regulator	IC21	µPC1093J	C2800-003	See Page AP-11
Serial I/F	IC (I/F)	IC1	75189A	C2111-189	See Page AP-9
Serial I/F	IC (I/F)	IC2	75188	C2110-188	See Page AP-9
Ope-Pane	IC (Custom)	IC1	HD44780A00	C2900-016	See Page AP-9

1S1588



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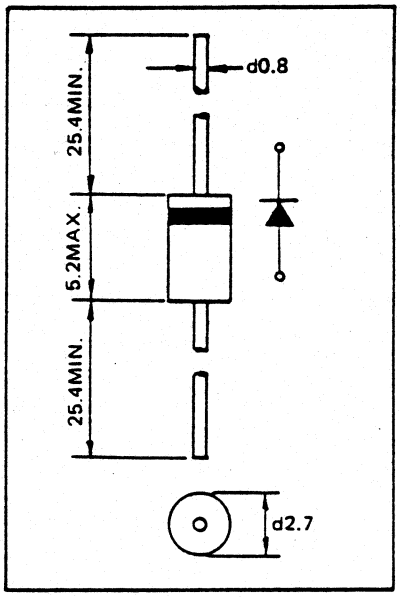
RGP10D



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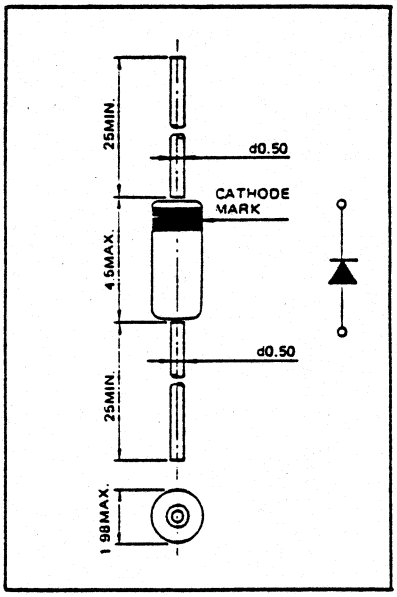
1S954



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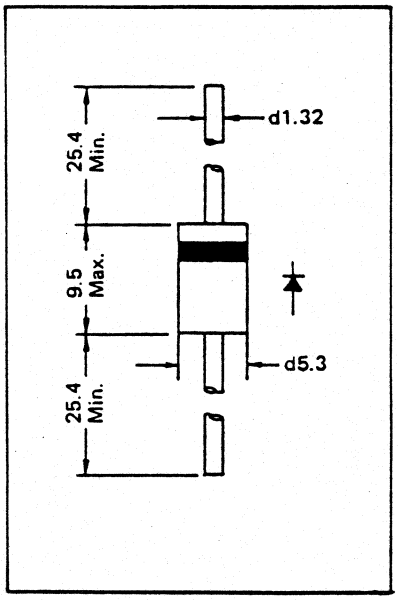

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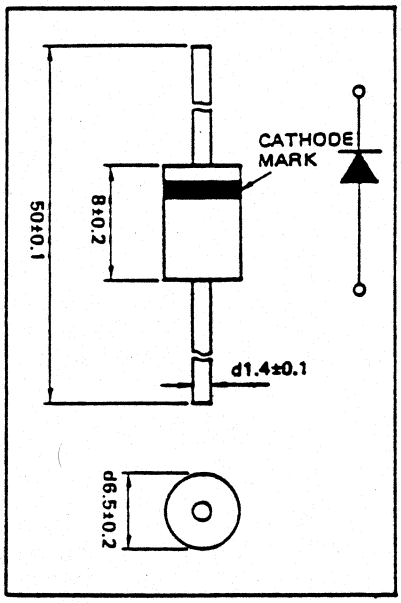

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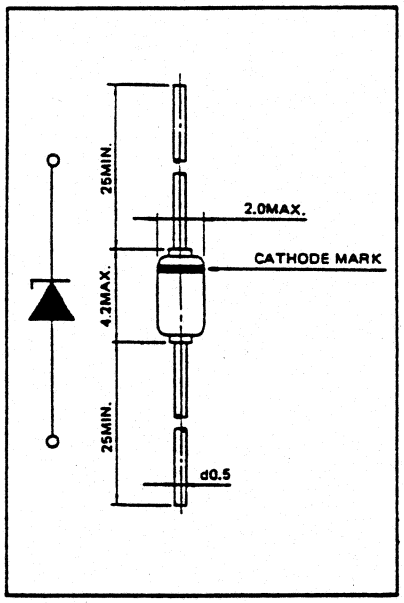

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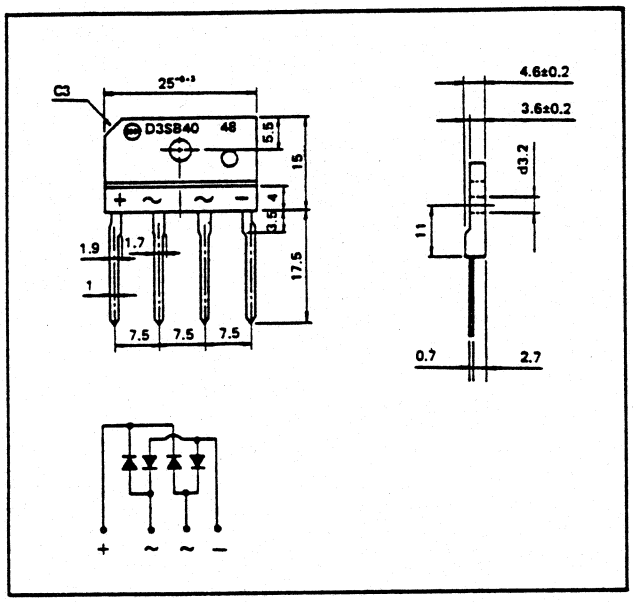

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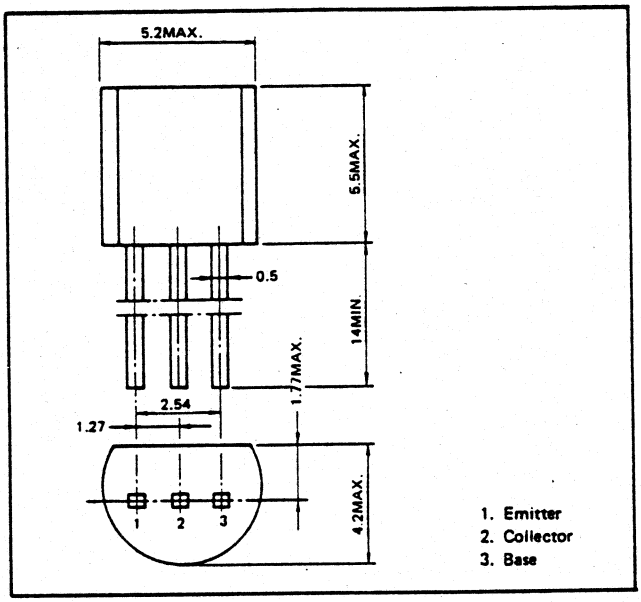

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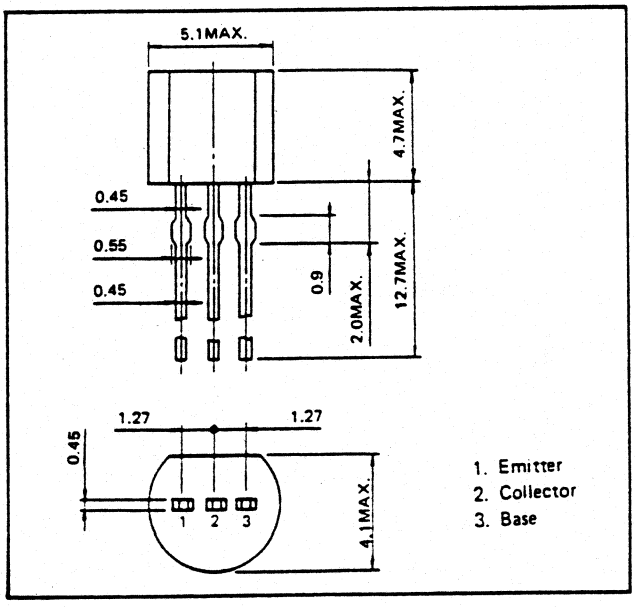

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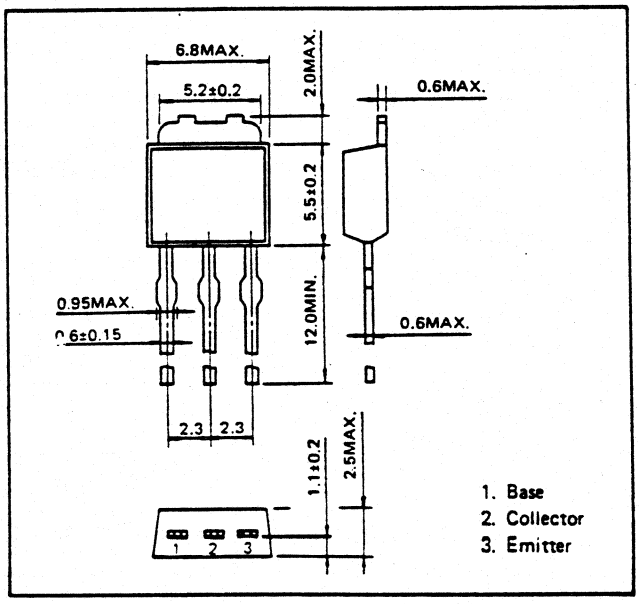

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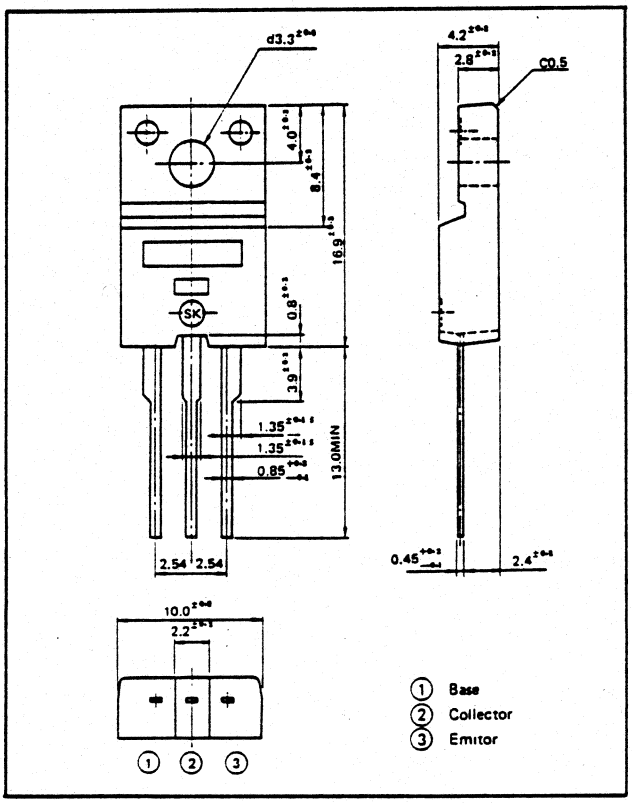
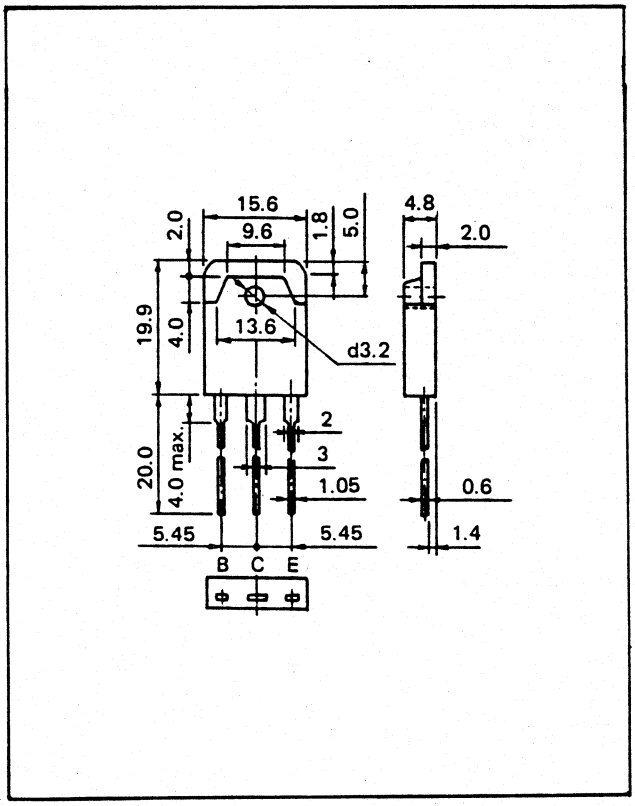


2SC3833-Y



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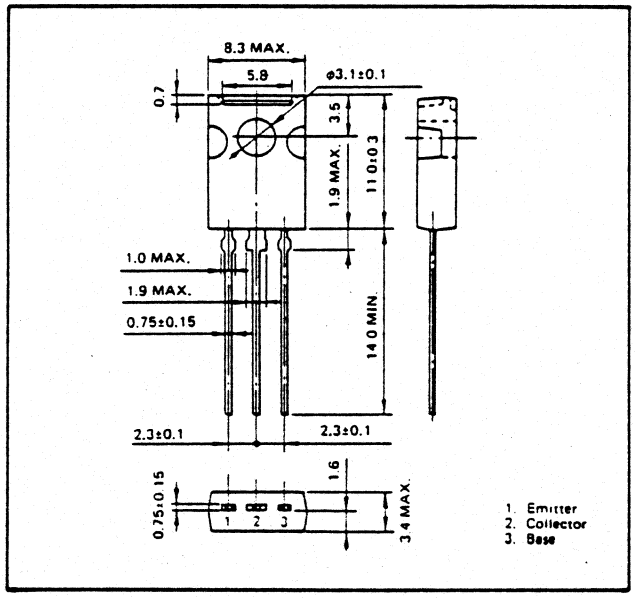

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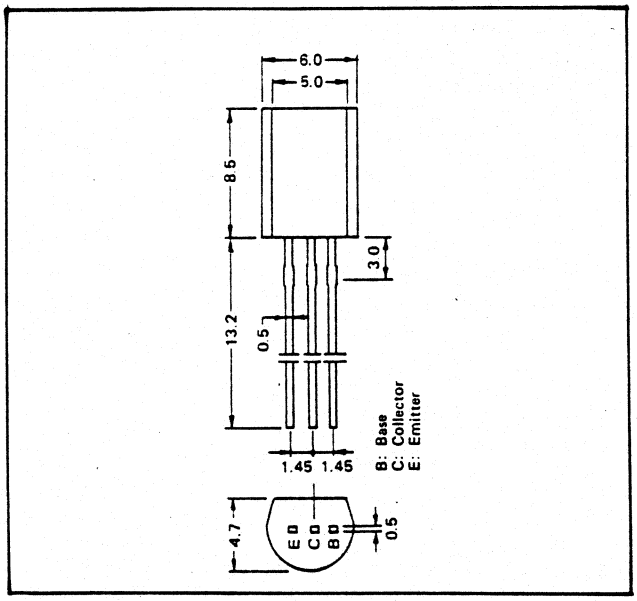
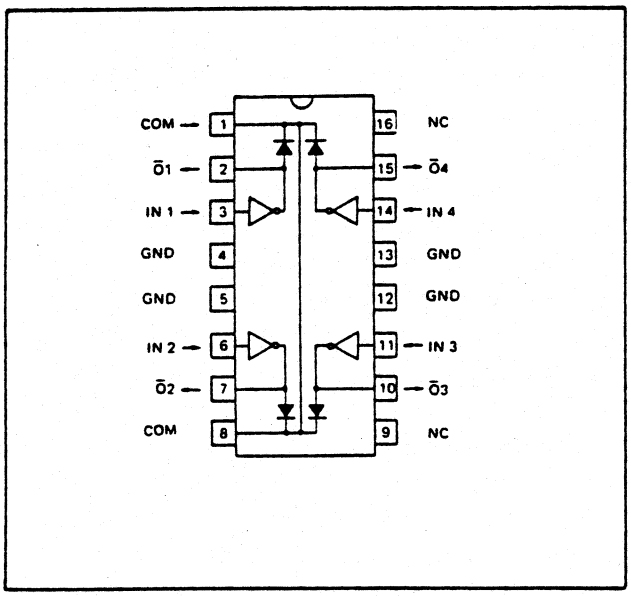
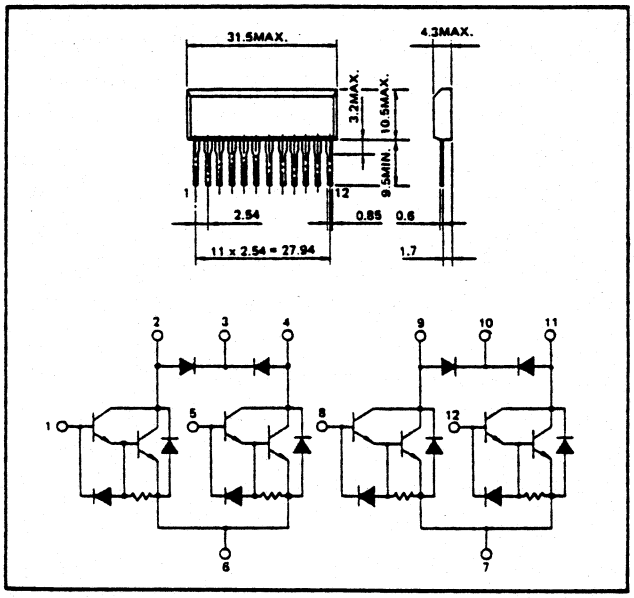


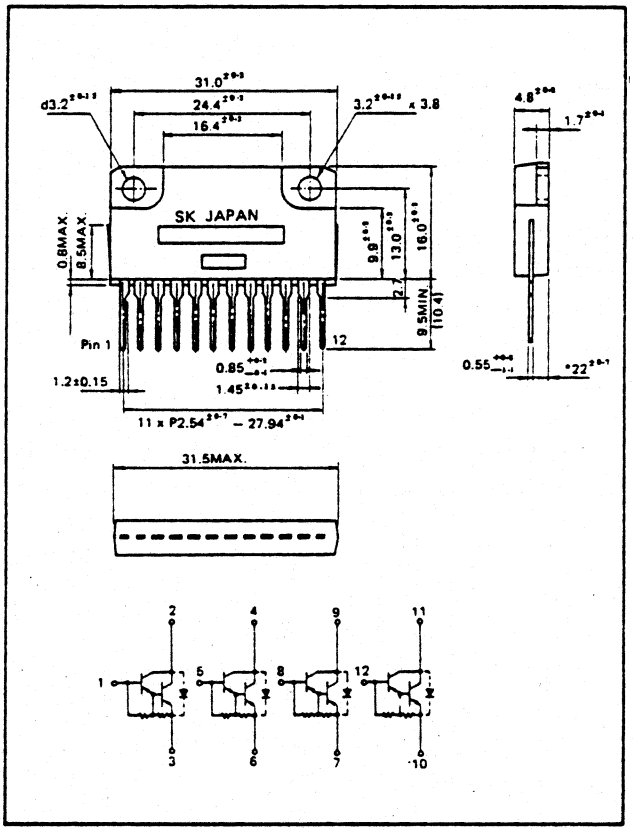
M54532P (Transistor Array)



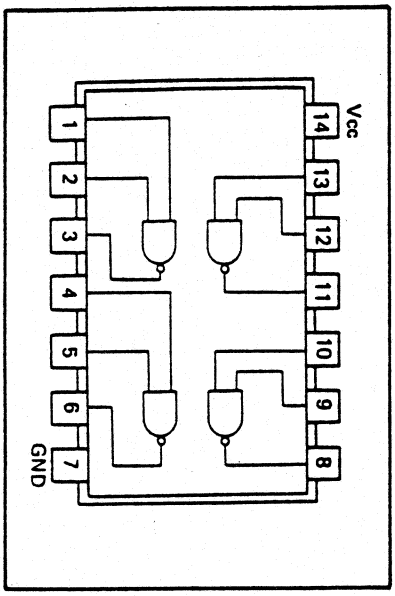
SMA-4031



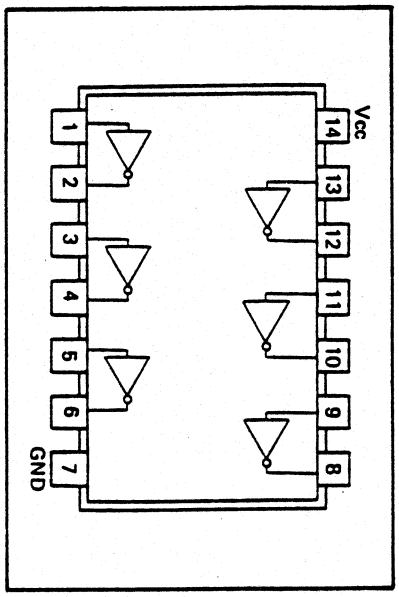
SLA4070



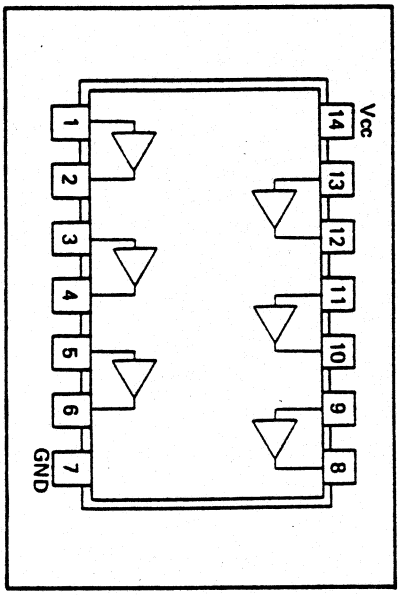
74HCOOP
(2-Input NAND Gates)



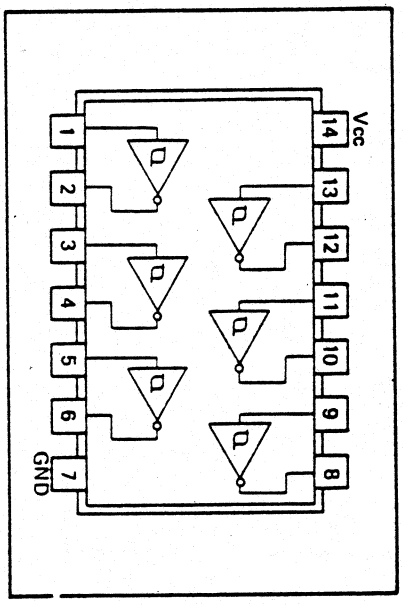
7406
(Hex Inverters with open-collector)



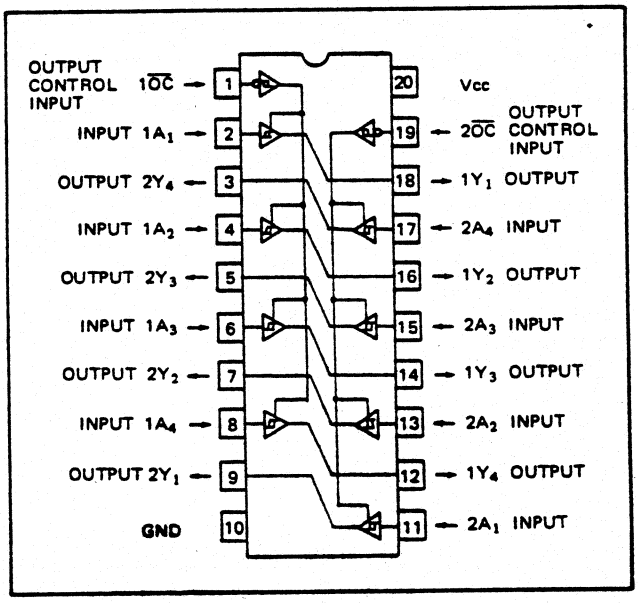
74LS07
(Hex Buffers with open-collector)



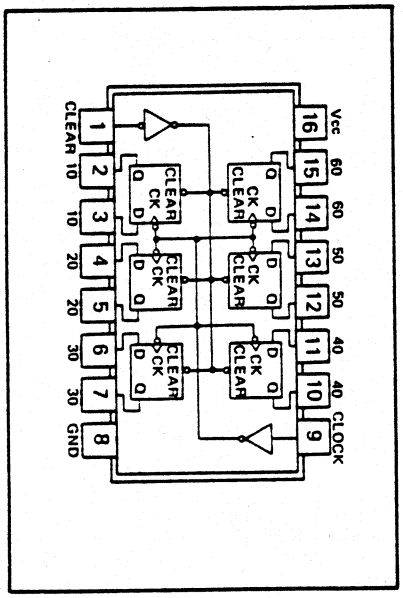
74HC14P
(Hex Schmitt-Trigger Inverters)



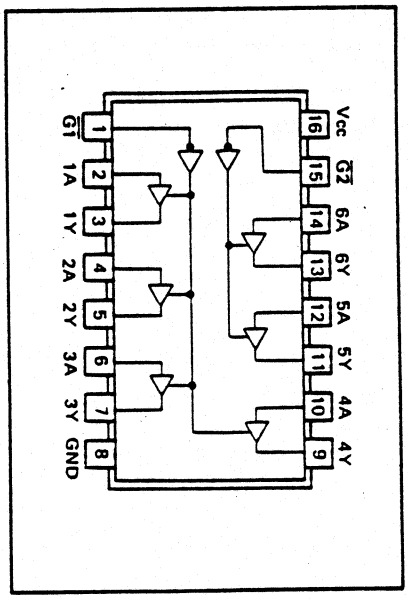
74HC244P



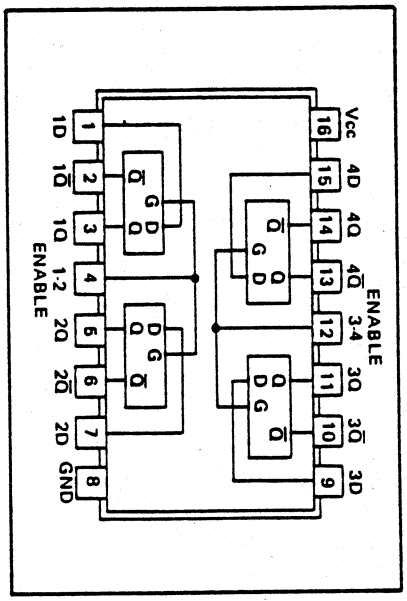
74HC174P
(Hex D-Type Flip-Flop)



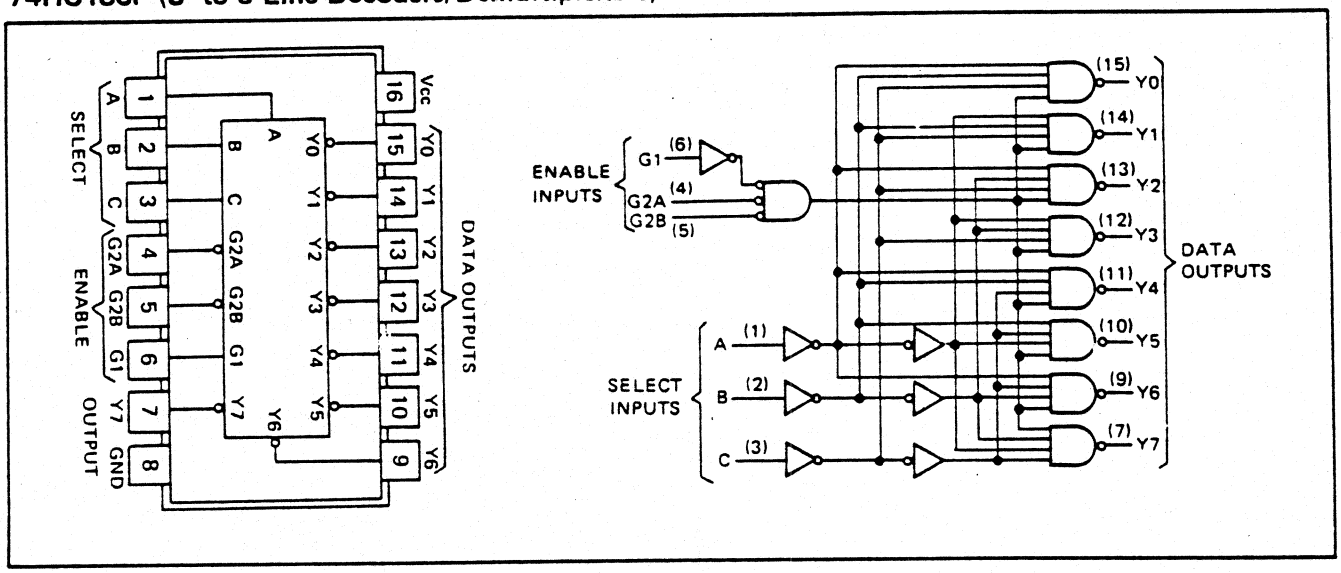
74HC367P
(Hex Bus Drivers)



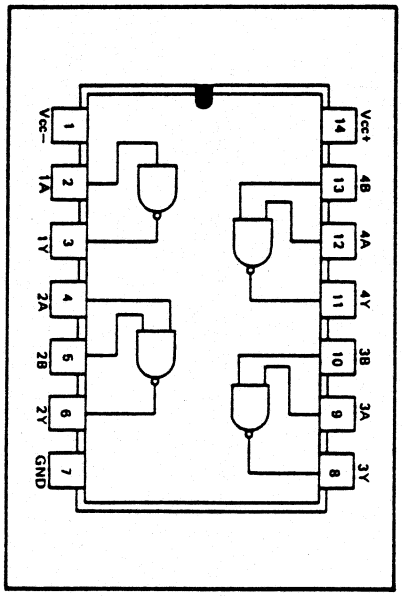
74HC375P
(4-bit Bistable Latches)



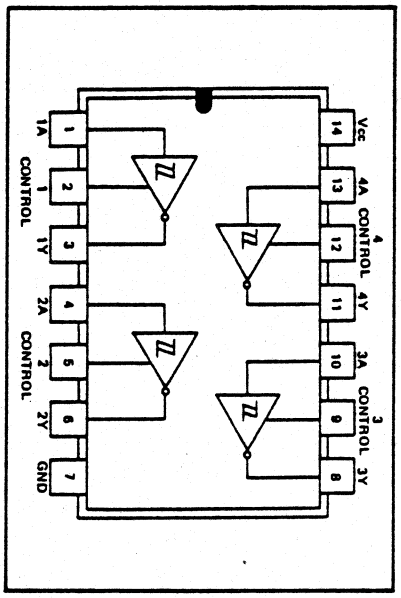
74HC138P (3- to 8-Line Decoders/Demultiplexers)



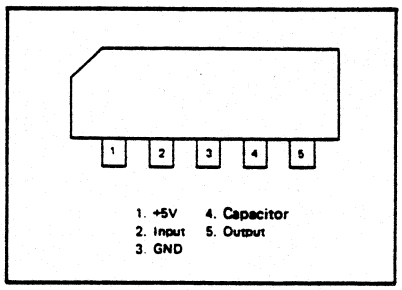
75188
(Quadruple Line Drivers)



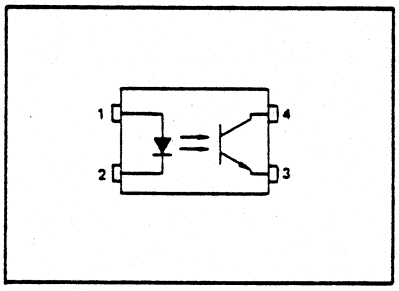
75189A
(Quadruple Line Receivers)



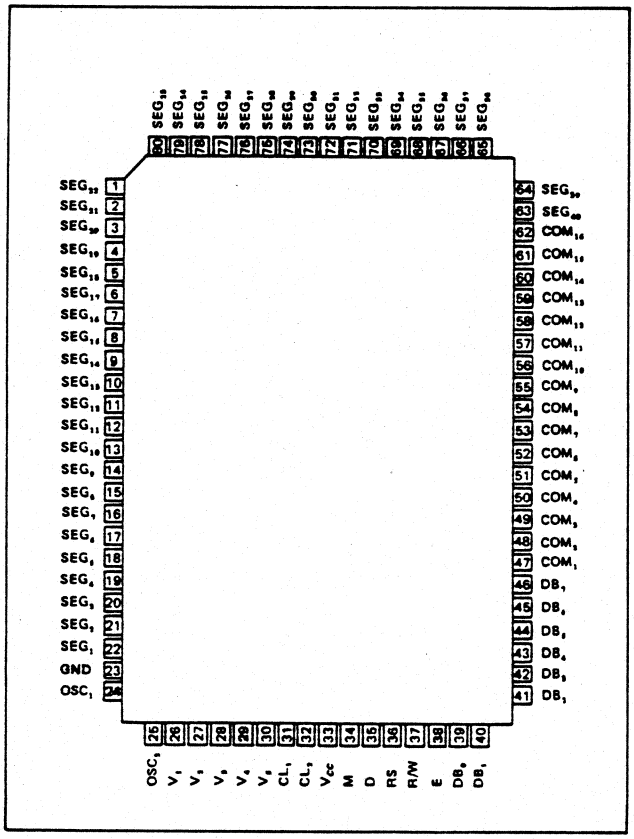
M51958B (Reset IC)
M51957B (Reset IC)



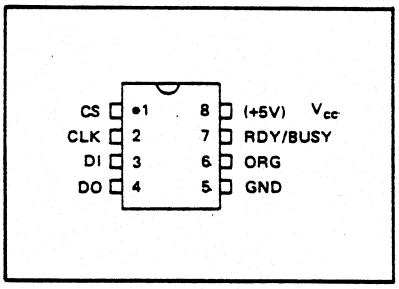
PS2501-1 (Photo-Coupler)



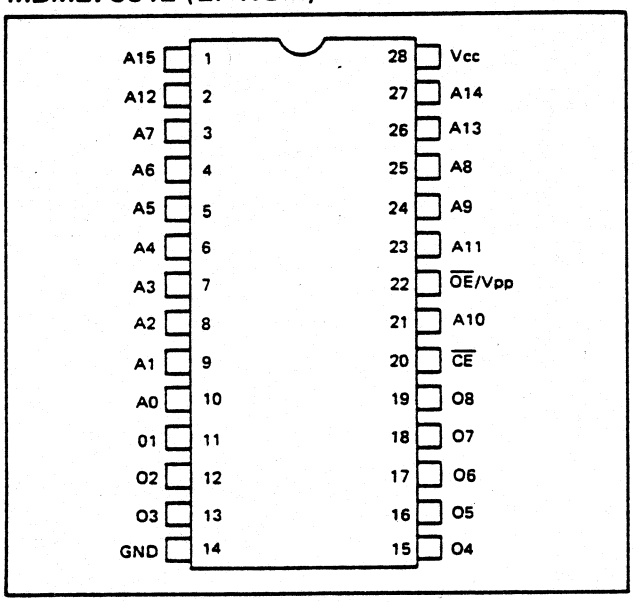
HD44780A00 (Custom IC)



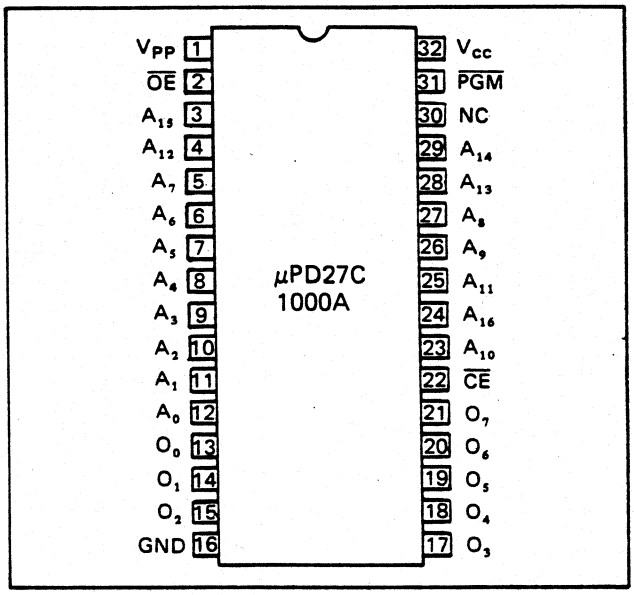
MSM16911RS (EE-PROM)



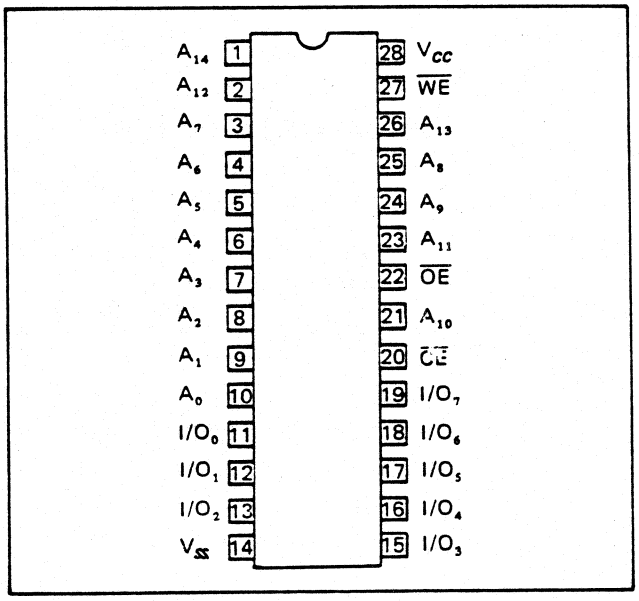
MBM27C512 (EP-ROM)



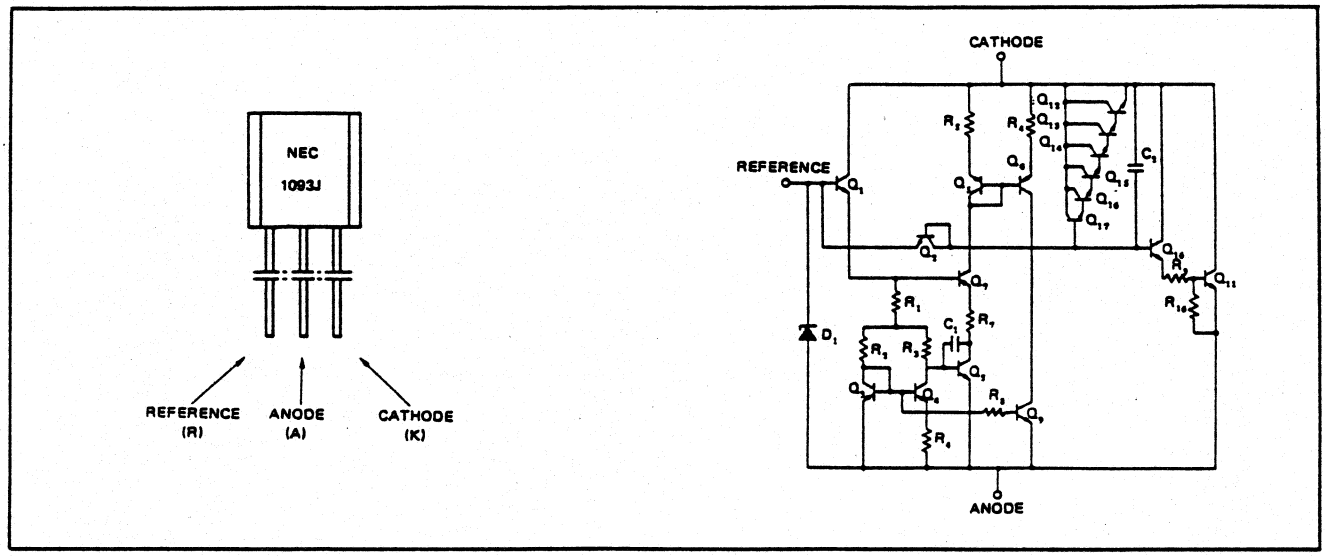
27C1000 (EP-ROM)



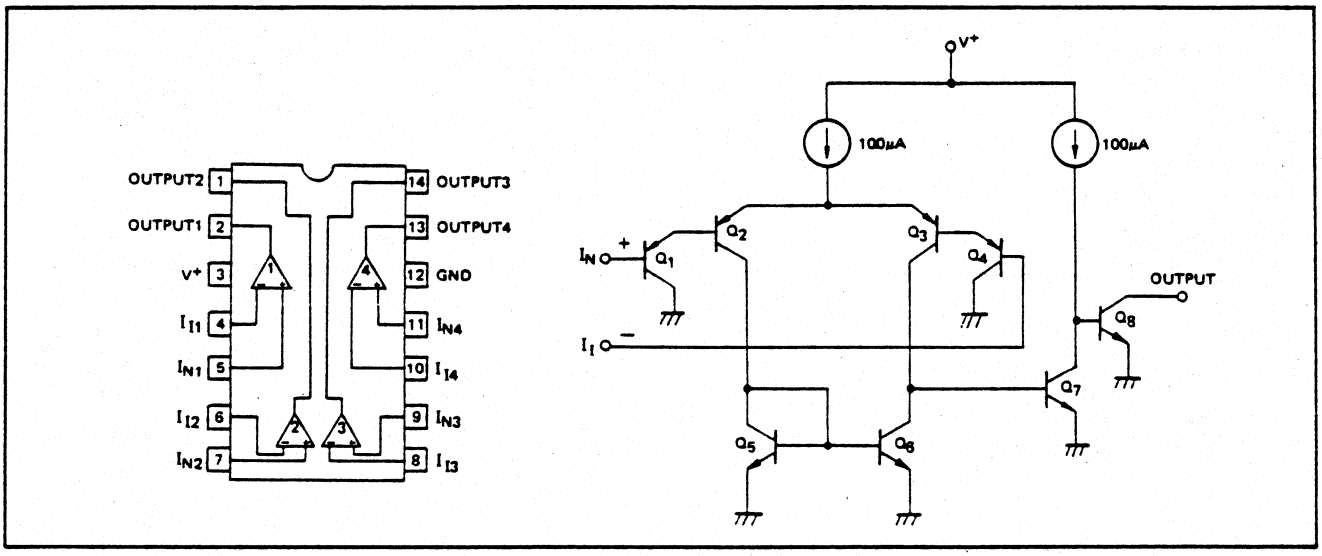
HM65256B (L) SP-12 (RAM)



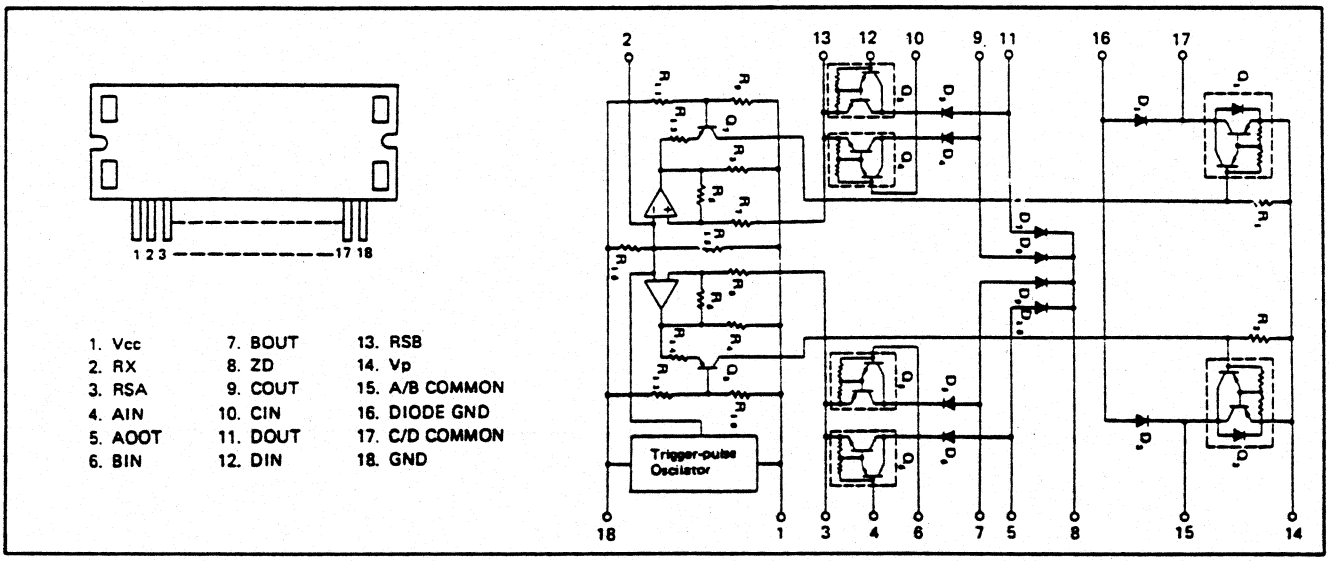
μPC1093J (Regulator)



μPC339C (Quad Comparators)



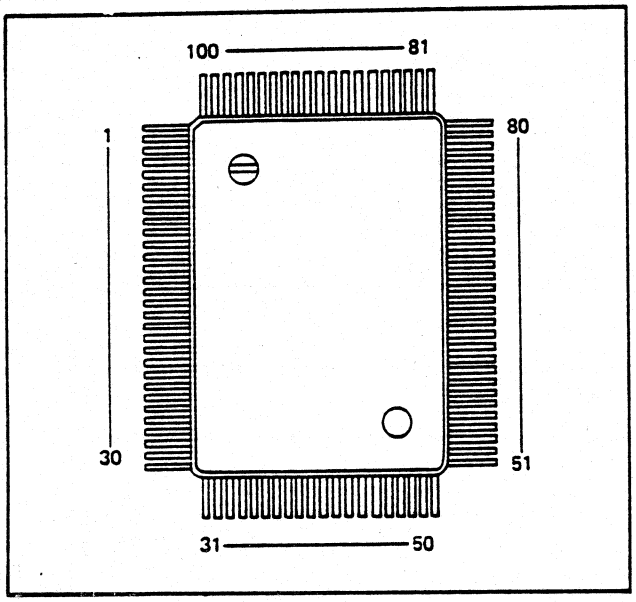
SI-7300A (Unipolar Stepper Motor Drive Hybrid IC)



1. Vcc
2. RX
3. RSA
4. AIN
5. AOOT
6. BIN
7. BOUT
8. ZD
9. COUT
10. CIN
11. DOUT
12. DIN
13. RSB
14. Vp
15. A/B COMMON
16. DIODE GND
17. C/D COMMON
18. GND

(Custom IC)

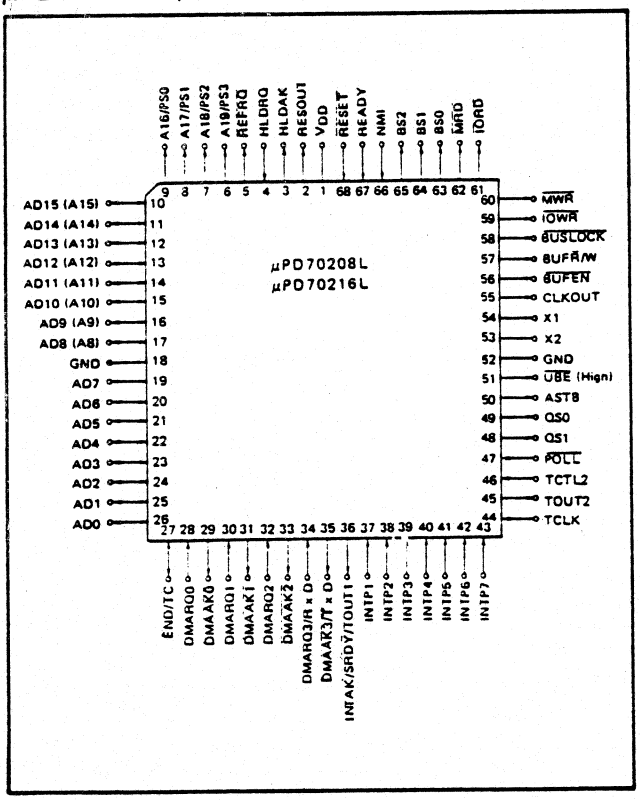
CF77065FTIX (Gate Array)



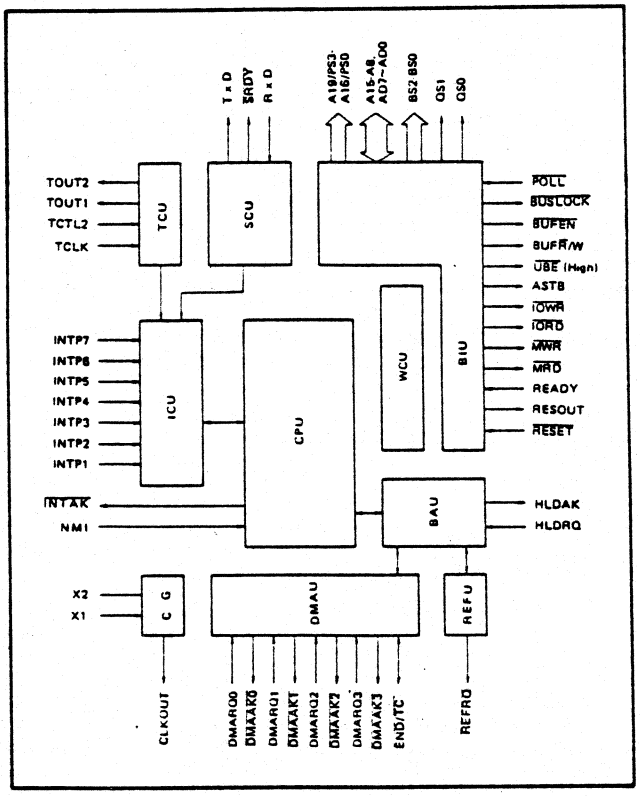
CF77065FTIX Pin Functions

1	ESEL	21	D4	41	A3	61	HPD1	81	PB2
2	STROBE	22	D5	42	A2	62	HPD3	82	PB3
3	VCC	23	D6	43	A1	63	HPD12	83	PB4
4	DX0	24	D7	44	A0	64	HPD16	84	PB5
5	DX1	25	A15	45	WP0	65	GND	85	PB6
6	DX2	26	RESET	46	WP1	66	HPD20	86	PB7
7	DX3	27	DATA1	47	WP2	67	HPD24	87	HERR
8	DX4	28	VCC	48	WP3	68	HPD6	88	RP2
9	DX5	29	DATA2	49	TMINT	69	HPD10	89	RP3
10	DX6	30	DATA3	50	HPD11	70	HPD8	90	GND
11	DX7	31	DATA4	51	HPD13	71	HPD2	91	BUSY
12	CLK	32	DATA5	52	HPD19	72	HPD22	92	BCLK
13	IOWR	33	DATA6	53	VCC	73	HPD18	93	PA0
14	IORD	34	DATA7	54	HPD23	74	HPD14	94	PA1
15	GND	35	DATA8	55	HPD7	75	HPD4	95	PA2
16	ALE	36	A7	56	HPD21	76	PLSA	96	PA3
17	D0	37	A6	57	HPD17	77	PLSB	97	PA4
18	D1	38	A5	58	HPD15	78	VCC	98	PA5
19	D2	39	A4	59	HPD9	79	PB0	99	PA6
20	D3	40	GND	60	HPD5	80	PB1	100	PA7

μPD70208G (8 Bit CPU)

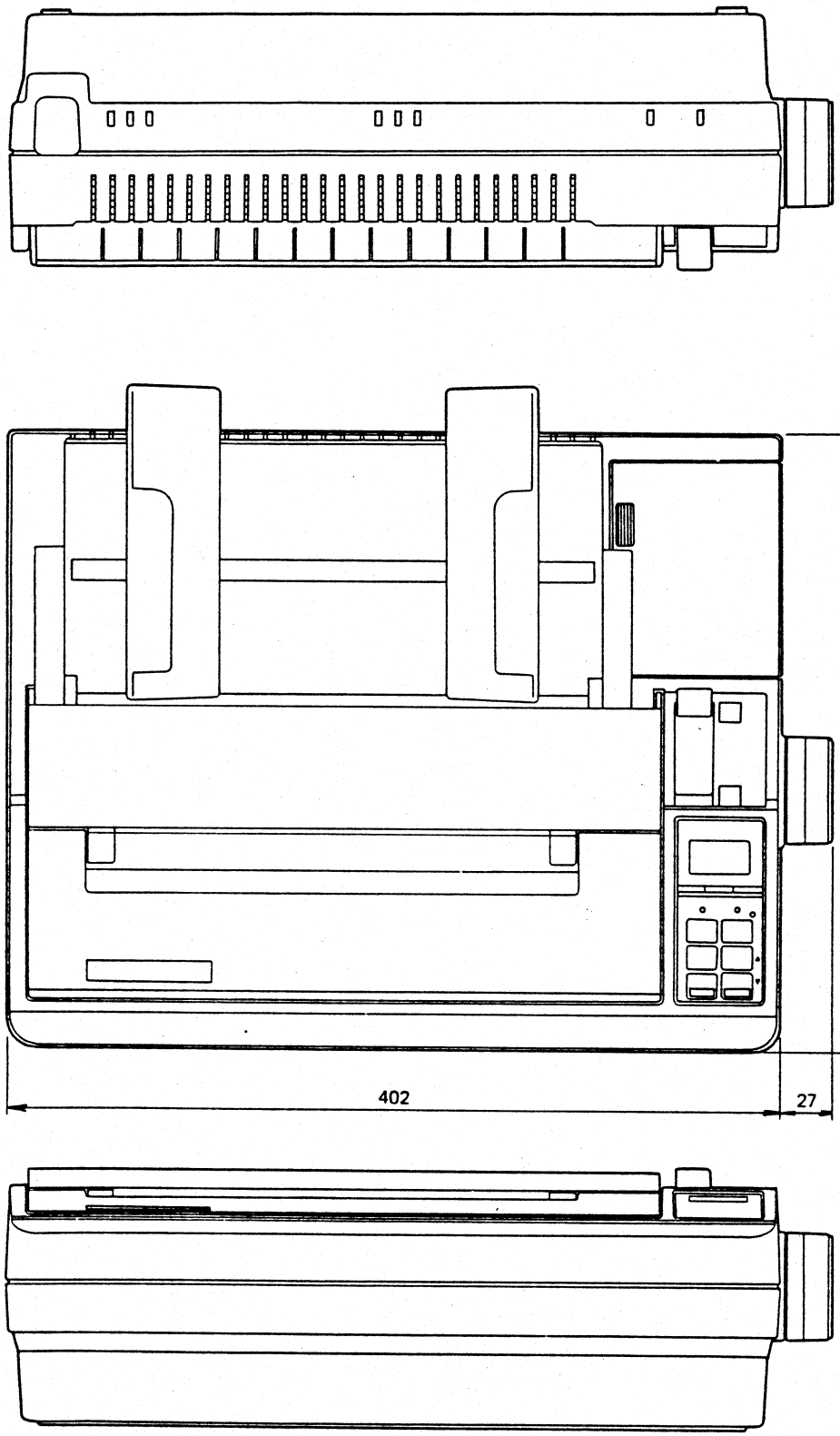


μPD70208G Block Diagram



B. Out Side View

Unit : mm



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Parts No. ~~AH74004-00~~

Printed in Japan JUNE '89