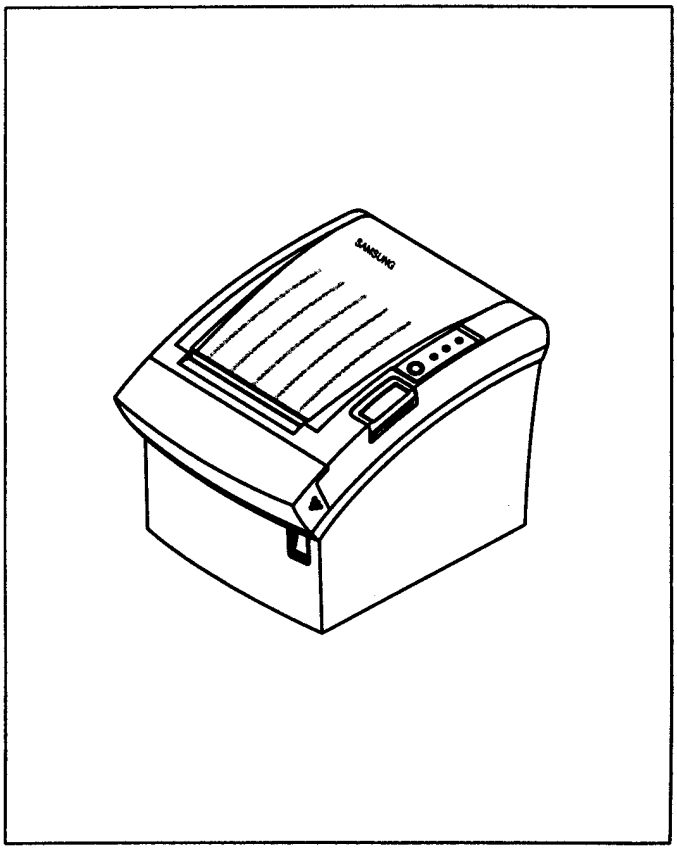
SAMSUNG

THERMAL RECEIPT PRINTER
SRP - 350U

SERVICE Manual

THERMAL RECEIT PRINTER



CONTENTS

Overview of this Receipt Printer

This System Receipt Printer is a microprocessor-based system, using a 16 bit-microprocessor .

This service manual provides the technical information for many individual component systems, circuits and gives an analysis of the operations performed by the circuits. If you need more technical information, please contact our service branch or R&D center. Schematics and specifications provide the needed information for the accurate troubleshooting.

About this Manual

This service manual describes how to perform hardware service maintenance for the Samsung SRP-350 Receipt Printer.

Notes

Notes may appear anywhere in the manual. They draw your attention to additional information about the item.

Precaution symbols

⚠ indicates a Safety Precaution that applies to this part component.

⚠ indicates the part or component is an electro-statically sensitive device. Use caution when handling these parts.

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1 Precaution Statements

Follow these safety, servicing and ESD precautions to prevent damage and to protect against potential hazards such as electrical shock.

1-1 Safety Precautions

1. Be sure that all built-in protective devices are replaced. Restore any missing protective shields.
2. When reinstalling the chassis and its assemblies, be sure to restore all protective devices, including nonmetallic control knobs and compartment covers.
3. Make sure there are no cabinet openings through which people - particularly children - might insert fingers and contact dangerous voltages.
   Such openings include excessively wide cabinet ventilation slots and improperly fitted covers and drawers.
4. Leakage Current Hot Check :
   WARNING : Do not use an isolation transformer during this test
   Use a leakage current tester or a metering system that complies with American National Standards Institute(*ANSI C101.1,Leakage Current for Appliances*), and Underwriters Laboratories(UL Publication UL1410,59.7).
   With the unit completely reassembled, plug the AC line cord directly into a 120V AC or 230V AC outlet of the Adapter.
   With the unit's AC switch first in the ON position and then OFF, measure the current between a known earth ground (metal water pipe, conduit, etc.) and all exposed metal parts, including : metal cabinet, frame, screwheads and printer. The current measured should not exceed 0.1 milliamp. Reverse the power plug prongs in the AC outlet and repeat the test.
5. Design Alteration Warning :
   Never alter or add to the mechanical or electrical design of the Receipt Printer. Unauthorized alterations might create a safety hazard. Also, any design changes or additions will void the manufacturer's warranty.
6. Components, parts and wiring that appear to have overheated or that are otherwise damaged should be replaced with parts that meet the original specifications. Always determine the cause of damage or over- heating, and correct any potential hazards.
7. Observe the original lead dress, especially near the following areas : sharp edges, and especially the AC and high voltage supplies.
   Always inspect for pinched, out-of-place, or frayed wiring. Do not change the spacing between components and the printed circuit board. Check the AC power cord for damage. Make sure that leads and components do not touch thermally hot parts.
8. Product Safety Notice:
   Some electrical and mechanical parts have special safety-related characteristics which might not be obvious from visual inspection.
   These safety features and the protection they give might be lost if the replacement component differs from the original - even if the replacement is rated for higher voltage, wattage, etc.
   Components that are critical for safety are indicated in the circuit diagram by shading, (⚠) or (⚠). Use replacement components that have the same ratings, especially for flame resistance and dielectric strength specifications. A replacement part that does not have the same safety characteristics as the original might create shock, fire or other hazards.

1-2 Servicing Precautions

WARNING: First read the "Safety Precautions"section of this manual. if some unforeseen circumstance creates a conflict between the servicing and safety precautions, always follow the safety precautions.

WARNING: An electrolytic capacitor installed with the wrong polarity might explode.

1. Always unplug the units AC power cord from the AC power source or power switch off before attempting to:
   a)Remove or reinstall any component or assembly
   b)Disconnect an electrical plug or connector
   c)Connect a test component in parallel with an electrolytic capacitor
2. Some components are raised above the printed circuit board for safety. An insulation tube or tape is sometimes used. The internal wiring is sometimes clamped to prevent contact with thermally hot components. Reinstall all such elements to their original position.
3. After servicing, always check that the screws, components and wiring have been correctly reinstalled. Make sure that the portion around the serviced part has not been damaged.
4. Check the insulation between the blades of the AC plug and accessible conductive parts (examples : metal panels and input terminals).
5. Insulation Checking Procedure:
   Disconnect the power cord from the AC source and turn the power switch ON. Connect an insulation resistance meter (500V) to the blades of AC plug. The insulation resistance between each blade of the AC plug and accessible conductive parts (see above) should be greater than 1 megohm.
6. Never defeat any of the B+ voltage interlocks. Do not apply AC power to the unit (or any of its assemblies) unless all solid-state heat sinks are correctly installed.
7. Always connect an instrument's ground lead to the instrument chassis ground before connecting the positive lead ; always remove the instrument's ground lead last

1-3 Precautions for Electrostatically Sensitive Devices (ESDs)

1. Some semiconductor (solid state) devices are easily damaged by static electricity. Such components are called Electrostatically Sensitive Devices (ESDs); examples include integrated circuits and some field-effect transistors. The following techniques will reduce the occurrence of component damage caused by static electricity.
2. Immediately before handling any semiconductor components or assemblies, drain the electrostatic charge from your body by touching a known earth ground. Alternatively, wear a discharging wrist-strap device. (Be sure to remove it prior to applying power - this is an electric shock precaution.)
3. After removing an ESD-equipped assembly, place it on a conductive surface such as aluminum foil to prevent accumulation of electrostatic charge.
4. Do not use freon-propelled chemicals. These can generate electrical charges that damage ESDs.
5. Use only a grounded-tip soldering iron when soldering or unsoldering ESDs.
6. Use only an anti-static solder removal device. Many solder removal devices are not rated as anti-static; these can accumulate sufficient electrical charge to damage ESDs.
7. Do not remove a replacement ESD from its protective package until you are ready to install it. Most replacement ESDs are packaged with leads that are electrically shorted together by conductive foam, aluminum foil or other conductive materials.
8. Immediately before removing the protective material from the leads of a replacement ESD, touch the protective material to the chassis or circuit assembly into which the device will be installed.
9. Minimize body motions when handling unpackaged replacement ESDs. Motions such as brushing clothes together, or lifting a foot from a carpeted floor can generate enough static electricity to damage an ESD.

1-4 Operational Precautions

1. The hitting element of the printer mechanism's thermal head and the driver IC are easily damaged. Never allow these components to come into contact with metal or other hard objects.

2. Never touch the printer mechanism's heating element with your hand. Doing so can damage the heating element and affect proper operation.

3. The head and motor areas are very hot during and immediately after printing. Do not touch components in these areas directly with your hand.

4. Do not use any paper other than these specified in this manual, otherwise print head reliability and print quality are affected adversely.

5. Thermal paper starts to color at around 70°. Take care to protect unused and printed thermal paper against the affects of heat, light and humidity, which can cause the paper to color and characters on the paper to feed.

6. Take the roll paper out of the printer when you will not use the printer for a long time in a high temperature and humidity environment.

2 Product Specifications

2-1 General Specifications

Item	Description	Remark
Product	• SRP-350 : RS-232 Serial Communication • SRP-350S : RS-485 Serial Communication • SRP-350P : IEEE1284 Parallel Communication	
Processor	• MITSUBISHI M16C/62 Group M30624FGFP (16 Bit) Internal ROM Size: 256K Byte Internal RAM Size: 20K Byte	Flash ROM Version
Memory	• RAM SRAM : 1Mbits (KM681000B*1) FLASH RAM : 8Mbits (AM29F800B*1)	
Interface Serial (RS-232C / RS-485)	• Flow Control : ① DTR / DSR (H/W Flow Control) ② XON / XOFF (S/W Flow Control) • Baud Rate : 2400 / 4800 / 9600 / 19200 Bps • Receive Buffer : 4 Kbytes • Connector : DB25P Female (I/F PBA Side)	The Flow Control, Baud Rate, Stop Bit and Parity Are determined by DIP S/W position.
Interface Parallel	• Mode : ① Forward Mode : Compatibility Mode ② Reverse Mode : Nibble / Byte Mode • Connector : 36 Pin Centronics (Ribbon Type)	
USB	• Transfer Type : BULK • Speed : 12 Mbps (Full - Speed) • Power : Self - Powered	
Printer	• Printing Method : Thermal Line Printing • Printing Speed : 150 mm/Sec, 35.5 Line/Sec (Font A,1/6" Feed)	
Auto Cutter	• Type : Guillotine • Cutting Method : 1 Point Partial Cutting	
Power Consumption	• Approx. 27W (Peak)	
AC Adapter	• Input : AC 120V ~ 230V, 50Hz ~ 60Hz • Output : DC24V + 5%, 2.3A	
Environment Condition	• Temperature : 0°C ~ 40°C • humidity : 30% ~ 80% RH	
Weight	• 2.3 Kg (With Packing)	
Dimensions(mm)	• 145(W) x 195(D) x 146(H)	

Table 2-1 General Specification

2-2 Appearance

2-2-1 Printer Dimensions (mm)

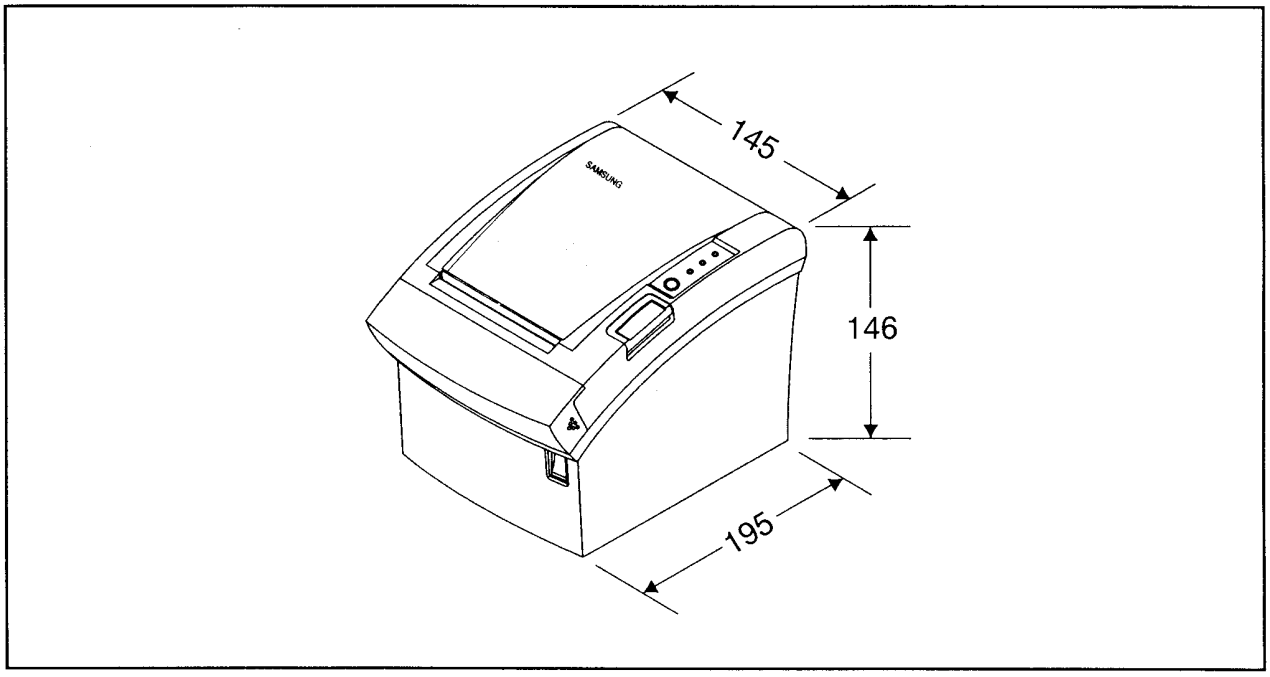


Figure 2-1 Printer Dimensions

2-2-2 AC Adapter Dimensions (mm)

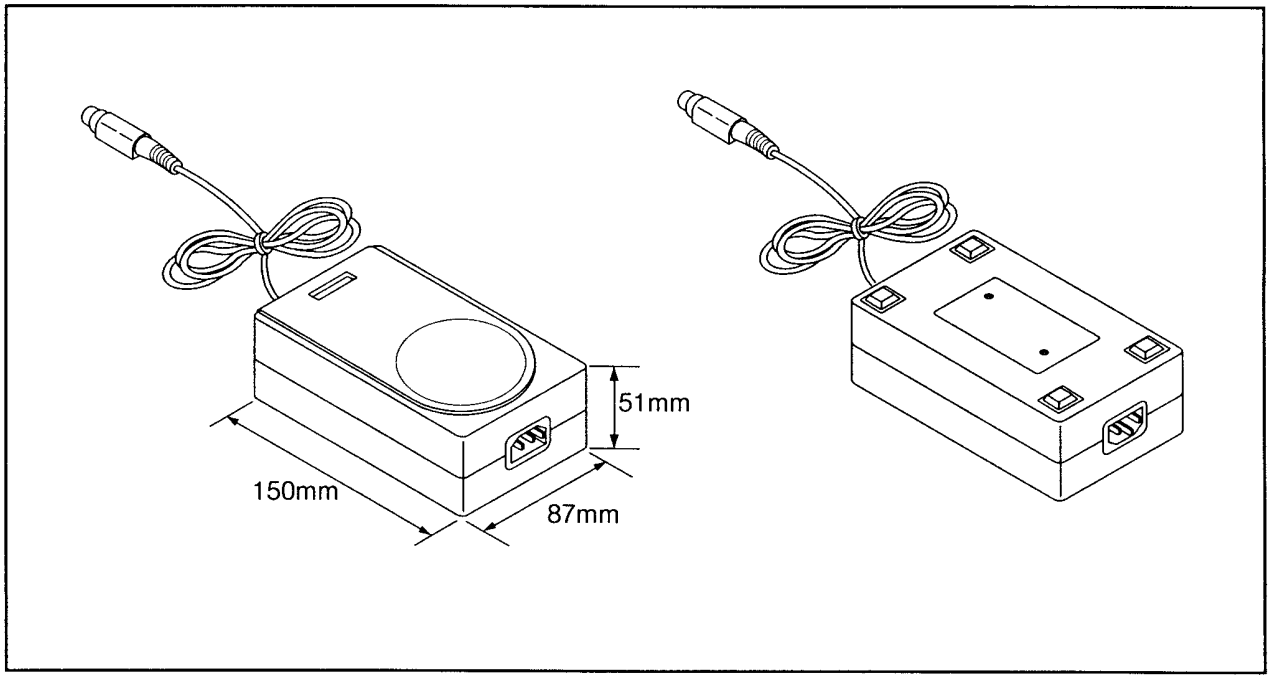
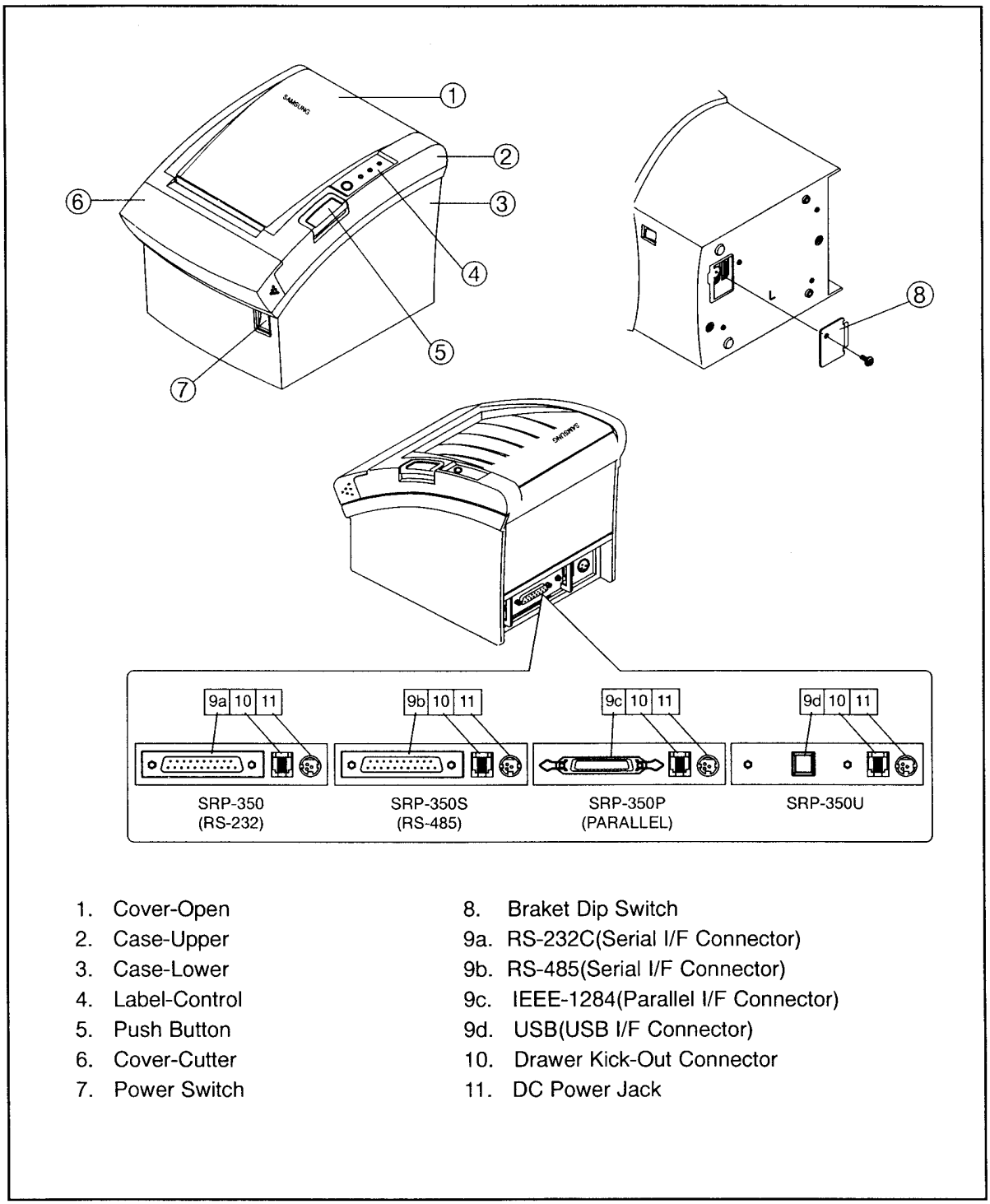


Figure 2-2 Adapter Dimensions

2-1 Appearance

2-2-3 Feature Locations



1. Cover-Open
2. Case-Upper
3. Case-Lower
4. Label-Control
5. Push Button
6. Cover-Cutter
7. Power Switch
8. Braket Dip Switch
9a. RS-232C(Serial I/F Connector)
9b. RS-485(Serial I/F Connector)
9c. IEEE-1284(Parallel I/F Connector)
9d. USB(USB I/F Connector)
10. Drawer Kick-Out Connector
11. DC Power Jack

Figure 2-3 Feature Location

2-3 Thermal Printer Specifications

2-3-1 Printer Specifications

Item	Description	Remark
Model	• SRP-350 (TPH : KF1803-GF14B-ROHM)	Samsung
Printer Method	• Thermal Line Printing	
Dot Density	• 0.141 mm (7.09 Dots / mm)	
Printing Direction	• Unidirection with friction feed	
Printing Width	• 72.192 ± 0.2mm, 512 dot Position	
Character / Line	• 42 (Font A : 12 x 24) • 56 (Font B : 9 x 17)	
Character Spacing	• 0.28mm (0.01") (2 dots) (Font A) • 0.28mm (0.01") (2 dots) (Font B)	
Printing Speed	• Max. 35.5 Lines / Sec (1/6inch feed) • Max. 150mm / Sec (5.9" / Sec)	
Paper feeding Speed	• Approx. 150mm / Sec	

Table 2-2 Thermal Printer Specification

2-3-2 Character Specifications

Item	Description	Remark
Number of Character	• Alphanumeric Characters : 95	
	• Extended Characters : 128 x 6Page(Including one space page)	
	• International Characters : 32	
Character Structure	• 12 x 24 (Font A) (Including 2-dot spacing in horizontal) • 9 x 17 (Font B) (Including 2-dot spacing in horizontal) Font A is selected as the default	

Table 2-3 Thermal Printer Character Specification

2-3 Thermal Printer Specifications

2-3-3 Paper Specification

Item	Description	Remark
Paper Type	• JUJO AF50KS-E	
Paper Form	• Paper Roll	
Paper Width	• 80 (+0, -1) , 3.14"(+0, -0.039")	
Paper Roll Size	• Max 83mm	
Spool Inside Dia.	• 12mm (0.47")	
Spool Outside Dia.	• 18mm (0.71")	

Table 2-4 Thermal Printer Paper Specification

Note: The Following paper can be used instead of the specified paper above.

TF50KS-E : Nippon Paper industries Co.,Ltd.
PD 160R : New Oji Paper Mfg, Co.,Ltd
F380 : Kansaki Specialty Papers,Inc.(USA)

2-3-4 Reliability and Environment Specification

Item	Description	Remark
Life	• Mechanism : 15Million lines • Head : 1 x 10 Pulses / 100Km • Auto Cutter : 500,000 Cut	
MCBF	• 37,000,000 Line	
Environmental Temperature	• Operating : 0°C ~ +45°C • Storage : -10°C ~ +50°C (Except for Paper)	
Humidity	• 10% ~ 90% RH	

Table 2-5 Thermal Printer Reliability Specification

2-3 Thermal Printer Specifications

2-3-5 Printable Area

The Printable area of a paper with width of 80-1.0mm(3.13″± 0.02″) is 72.2 ± 0.2mm(2.84″ ± 0.008″)(512 dots) and the space on the right and left sides are approximately 2.5mm(0.098″).

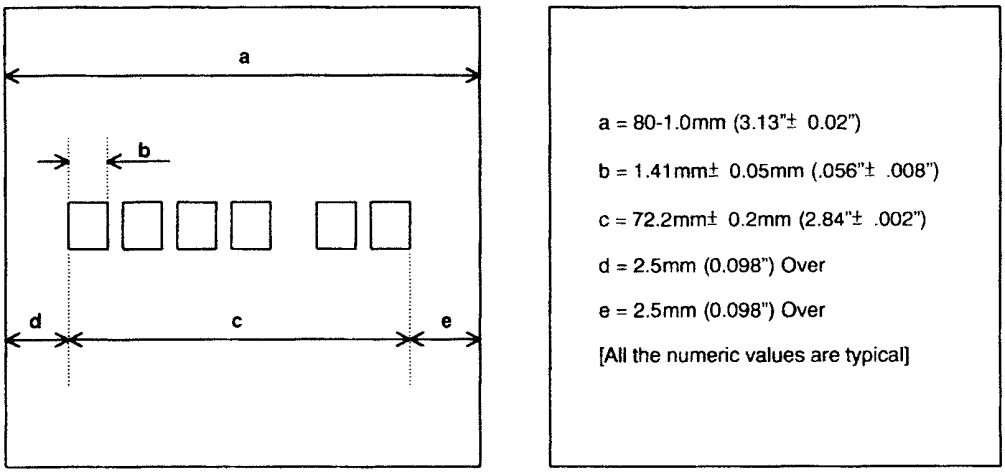


Figure 2-4 Printable Area

2-3-6 TPH(Thermal Printer Head) Specification

Item	Description	Remark
Heat Element Structure	2 Heaters / Dot	
Number of Heat Element	512 Dots	
Heat Element Pitch	0.141 mm/dot, 7.09 Dot / mm (180DPI)	
Print Width	72.192 ± 0.2mm	
Average Resistance	650Ω ± 3%	
Thermister	① Resistance R25 : 30kΩ ± 5%(At 25°C) ② B Value : 3950K ± 2% ③ Temperature : -20°C ~ +80°C	

Table 2-6 TPH Specification

2-3 Thermal Printer Specifications

Item	Maximum Conditions	Unit	Conditions
Print Cycle(S.L.T.)	1.068	ms/Line	Tsub = 25°C
Supply Energy	0.315	mJ/Dot	
Supply Voltage	26.4	V	Vp < 28.0V (Vp : Peak of VH)
Substrate Temperature	65	°C	Thermister Temperature
Number of Dots to be Energized simultaneously	256	Dots	Note1
Logic Supply Voltage (Vdd)	7	V	Include Peak Voltage of Vdd
Logic Input Voltage(Vin)	-0.5 ~ Vdd+0.5	V	

Table 2-6 TPH Maximum Condition (At 25°C)

2-3-7 Other Component Specification

Item	Description	Remark
Auto Cutter	• Model : ORC-RUY80(OHYANE RIK MFG,Co.,LTD) • Type : Guillotine Type • Motor : DC Brush Motor FK-180SH-12280 (Mabuchi Motor) • Voltage : 24V DC ± 7% • Current : 800mA (Average), 1.6A (Peak)	
Paper Feed Motor	• Model : PM35L-048 (NMB) • Type : 4-Phase, 48-Polarity (PM Type Bi-Polar Driver) • Voltage : 24V ± 10% DC • Resistance : 20Ω at 25°C per Phase	
Paper End Sensor	• Reflection Type Photo Sensor	
Paper Roll Near End Sensor	• Micro Switch	

Table 2-8 Other Component Specification

2-4 SMPS Specifications

2-4-1 SMPS (Switching Mode Power Supply) Specification

Item	Description	Remark
Input Voltage	• Typical : 120V / 230V AC • Min : 90 V AC • Max : 264V AC	
Input Current	• Max : 1.5A (When 120V), 0.75A(When 230V)	
In rush Current	• Max : 40 A (Peak to Peak)	
Line Regulation	• +24V ± 1%	
Load Regulation	• +24V ± 5%	
Ripple Noise	• Peak 300mV	
O.C.P (Over Current Protect)	• 3.0A ~ 6.0A	
S.C.P (Short Current Protect)	• Fold - Back Method	

Table 2-9 Power Adapter(SMPS) Specification

2-4-2 SMPS Output Connector

Pin Number	Signal Name
1	+24 VDC
2	GND
3	N.C
Shield	Frame GND

Table 2-10 Power Connector Pin Description

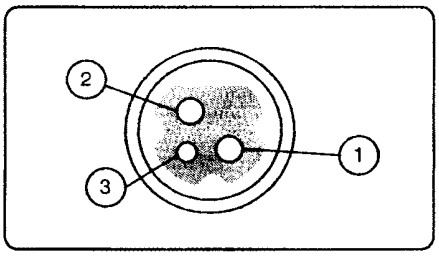


Figure 2-5 Power Connector

2-5 Interface Specifications

2-5-1 RS-232C Serial Interface

2-5-1-(a) Specification

Item	Description	Remark
Data Transmission	• Serial	
Synchronization	• Asynchronous	
HandShaking (Flow Control)	• H/W : DTR / DSR • S/W : XON / XOFF	XON : ASC Code 1th XOFF : ASC Code 13th
Signal Level	• Logic"1" (MARK) : -3V ~ -15V • Logic"0" (SPACE) : +3V ~ +15V	
Baud Rate	• 2400 / 4800 / 9600 / 19200 Bps	
Data Word Length	• 7 Bit / 8 Bit	
Parity	• None / Even / Odd	
Connector	• DB25P Female (I/F PBA)	

Table 2-11 RS-232C Specification

Note : The HandShaking (Flow Control) / Data Word Length / Baud Rate / Parity functions depend on the DIP switch settings. Refer to the Operation Manual.

2-5-1-(b) RS-232C I / F Cable

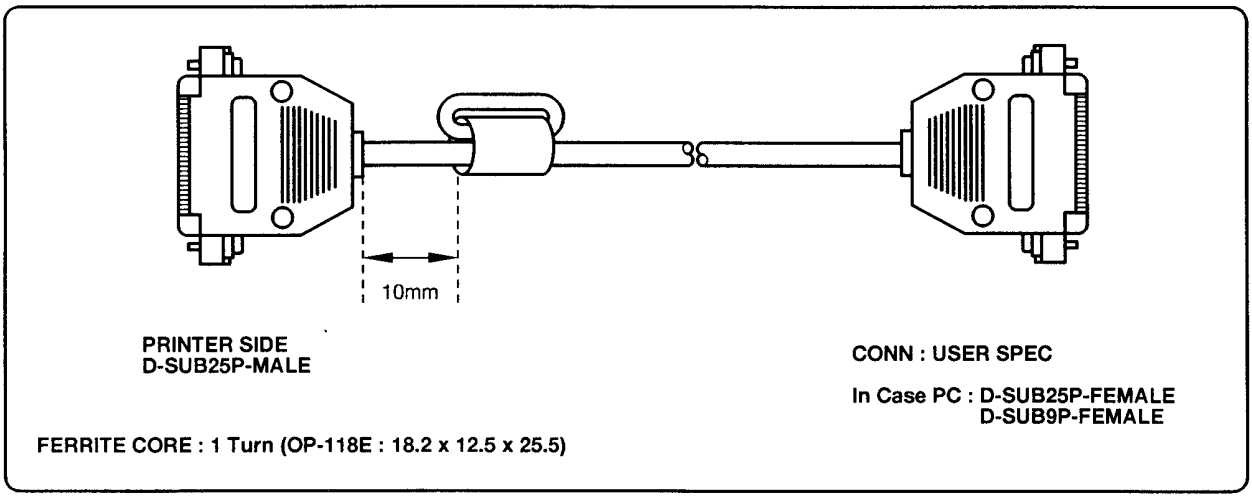


Figure 2-6 RS-232C Cable

2-5 Interface Specifications

2-5-1-(c) Cable Connection

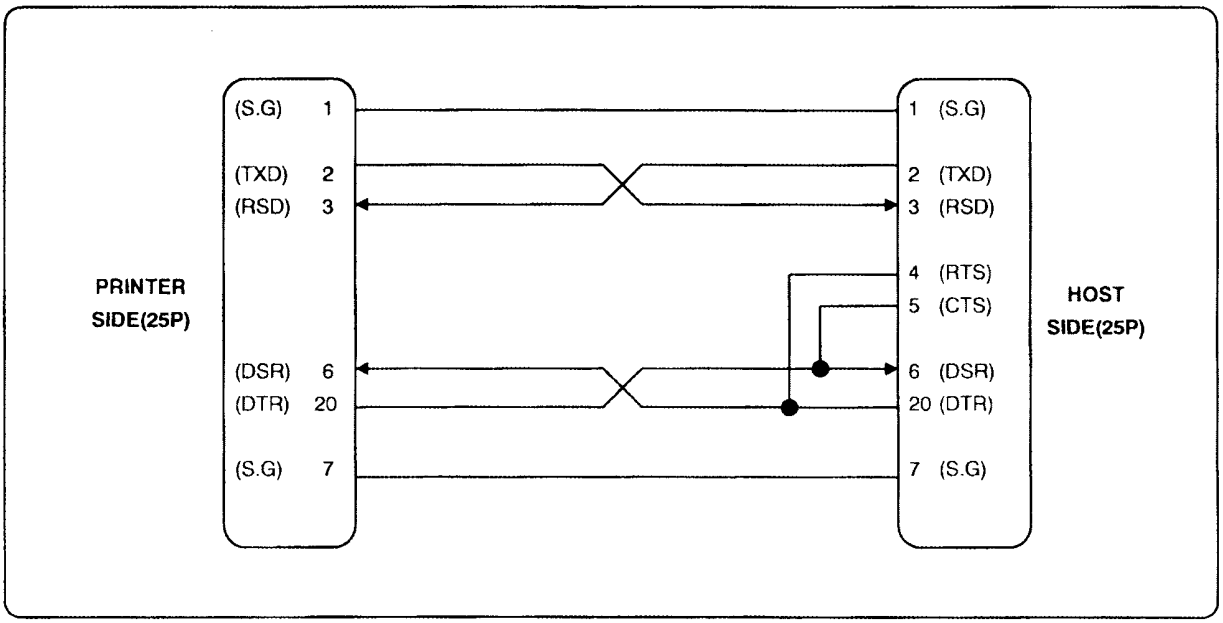


Figure 2-7 RS-232C Cable Connection

2-5-1-(d) Signal Description

Pin No.	Signal Name	Signal Direction	Function
BODY	Frame GND	-	Frame Ground
2	TXD	Output	Transmit Data
3	RXD	Input	Receive Data
6	DSR	Input	This signal indicates whether the host computer can receive data. (H/W flow control) ① MARK(Logic 1) : The host can recive a data. ② SPACE(Logic 0) : The host can not recive a data. ③ The printer transmits a data to the host, after confirming this signal. ④ When XON/XOFF flow control is selected, the printer does not check this signal.
7	Signal GND	-	Signal Ground
20	DTR	Output	This Signal indicates whether the printer is busy. (H/W flow control) ① MARK(Logic 1) : The printer is busy ② SPACE(Logic 0) : The printer is not busy ③ The host transmits a data to the printer, after confirming this signal. ④ When XON/XOFF flow control is selected, the host does not check this signal.

Table 2-12 RS-232C Pin Description

Note : Refer to the Operation Manual about the busy condition

2-5 Interface Specifications

2-5-1-(e) H/W Flow Control

When DTR/DSR flow control is select, before transmitting a data, the Printer checks whether the host is BUSY or not. If the host is BUSY, the Printer does not transmit a data to the host. If the host is not BUSY, the Printer transmits a data to the Host. The host is same. Refer to the Interface Part of Chapter 7 (Special Circuit Diagrams).

2-5-1-(f) S/W Flow Control

When XON/XOFF flow control is selected, the printer transmits XON(ASCII 11h) or XOFF(ASCII 13h) signal though the TXD line.
If the printer is busy, the printer transmits XOFF(ASCII 13h) to host though the TXD line. Then the host recognize that the printer is busy. So, the host does not transmit a data to the printer. If printer is released from busy, the printer transmits XON(ASCII 11h) to host through the TXD line. Then the host recognize that the printer is not busy. And the host transmit a data to the printer.

Note : Refer to the Dperation Manual about XON/XOFF flow control.

2-5-2 RS-485 Serial Interface

2-5-1-(a) Specification

Item	Description	Remark
Data Transmission	• Serial	
Synchronization	• Asynchronous	
HandShaking (Flow Control)	• H/W : DTR / CTS(Same as DSR) • S/W : XON / XOFF	XON : ASC Code 11th XOFF : ASC Code 13th
Signal Level	• Logic "1" : SD1-SD2 ≥ 0.2V, RD1-RD2 ≥ 0.2V • Logic"0" :SD1-SD2 ≤ 0.2V, RD1-RD2 ≤ 0.2V	
Baud Rate	• 2400 / 4800 / 9600 / 19200 bps	
Data Word Length	• 7 Bit / 8 Bit	
Parity	• None / Even / Odd	
Connector	• DB25P Female (I/F PBA)	

Table 2-13 RS-485 Specification

Note : The HandShaking (Flow Control) / Data Word Length / Baud Rate / Parity functions depend on the DIP switch settings. Refer to the Operation Manual.

2-5-1-(b) RS-485 I/F Cable

Same as the appearance of RS-232C Cable

2-5 Interface Specifications

2-5-2-(c) Cable Connection

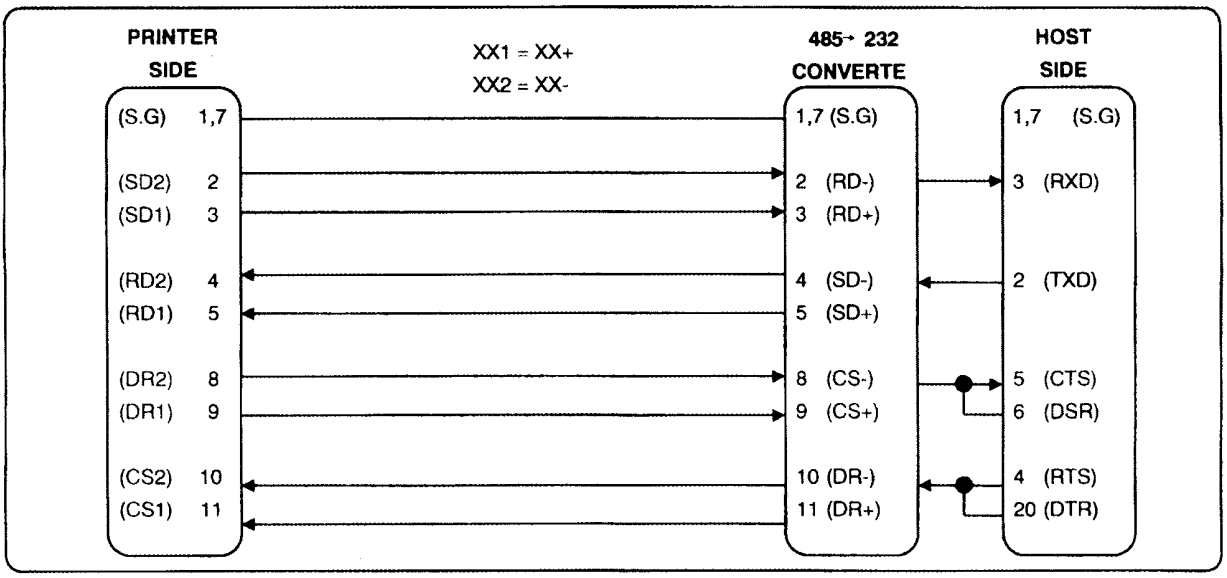


Figure 2-8 RS-485 Cable Connection

2-5-1-(d) Signal Description

Pin No.	Signal Name	Signal Direction	Function
BODY	Frame GND	-	Frame Ground
2	SD2	Output	Transmit Data
3	SD1	Output	"H" : SD1 > SD2, "L" : SD1 < SD2
4	RD2	Input	Receive Data
5	RD1	Input	"H" : RD1>RD2(RD1-RD2 ≥ 0.2V),"L":RD1 < RD2(RD1-RD2 ≤ 0.2V)
7	Signal GND	-	Signal Ground
8 9	DR2 DR1	Output	When DTR/DSR is selected, this signal indicates whether the printer is BUSY or READY. (H/W flow control) ① DR1 > DR2 (H) : The printer is BUSY. ② DR1 < DR2 (L) : The printer is READY. ③ The host computer transmits a data to the host, after confirming this signal.
10 11	CS2 CS1	Input	When DTR/DSR is selected, this signal indicates whether the host computer is BUSY or READY. (H/W flow control) ① CS1 > CS2 (H) : The host computer is BUSY. ② CS1 < CS2 (L) : The host computer is READY. ③ The printer transmits a data to the host, after confirming this signal.

Table 2-14 RS-485 Pin Description

Note : BUSY condition and other information refer to the Operation Manual.

Note : This format is used when the UART for RS-232C is connected to the RS-485 driver.

2-5 Interface Specifications

2-5-1-(e) H/W Flow Control Timing

When DR1,2/ CS1,2 flow control is select, before transmitting a data, the Printer checks whether the host is BUSY or not. If the host is BUSY, the Printer does not transmit a data to the host. If the host is not BUSY, the Printer transmit a data to the Host. The host is the same. Refer to the Interface Part of Chapter 7(Special Circuit Diagrams).

2-5-1-(f) S/W Flow Control Timing

When XON/XOFF flow control is selected, the printer transmits XON(ASCII 11h) or XOFF(ASCII 13h) signal through the TXD line.
If the printer is busy, the printer transmits XOFF(ASCII 13h) to host through the TXD line. Then the host recognize that the printer is busy. So, the host does not transmit a data to the printer. If the printer is released from busy, the printer transmits XON(ASCII 11h) to host through the TXD line. Then the host recognize that the printer is not busy. And the host transmit a data to the printer.

Note : Refer to the Operation Manual about XON/XOFF flow control.

2-5-3 IEEE 1284 Parallel Interface

Bidirectional parallel interface : in accordance with the IEEE 1284 Nibble /Byte mode

2-5-3-(a) Forward Mode Specification(Compatibility mode)

Data transmission from host computer to printer : Centronics compatiable

Item	Description	Remark
Data Transmission	• 8-Bit Parallel	
Synchronization	• External supplied nStrobe signals	
HandShaking	• nACK and Busy signals	
Signal Level	• TTL compatiable	
Connector	• Centronics 36P	

Table 2-15 IEEE1284 Specification

2-5-3-(b) Reverse Mode Specification(Nibble/Byte mode)

Data transmission from the printer to the host computer.
The STATUS data transmission from the printer to the host computer is accomplished in the Nibble or Byte mode. This mode allows data transmission from the asynchronous printer under the control of the host computer. Data transmission in the Nibble mode are made via the existing control lines in units of for bits(Nibble). In the Byte mode, data transmission in accomplished by making the 8-bits data lines bidirectional.
Neither mode can operate at the same time as the compatibility mode, so switching is always required.

2-5 Interface Specifications

2-5-3-(c) Signal Specification (Compatibility / Nibble / Byte mode)

Pin No.	Source	Compatibility Mode	Nibble Mode	Byte Mode
1	Host	Nstrobe	HostClk	HostClk
2	Host / Printer	Data 0 (LSB)	-	Data 0 (LSB)
3	Host / Printer	Data 1	-	Data 1
4	Host / Printer	Data 2	-	Data 2
5	Host / Printer	Data 3	-	Data 3
6	Host / Printer	Data 4	-	Data 4
7	Host / Printer	Data 5	-	Data 5
8	Host / Printer	Data 6	-	Data 6
9	Host / Printer	Data 7(MSB)	-	Data 7(MSB)
10	Printer	Nack	PtrClk	PtrClk
11	Printer	Busy	PtrBusy / Data3,7	PtrBusy
12	Printer	Perror	AckDataReq / Data2,6	AckDataReq
13	Printer	Select	Xflag / Data1,5	Xflag
14	Host	NautoFd	HostBusy	HostBusy
15		NC	ND	ND
16		GND	GND	GND
17		FG	FG	FG
18	Printer	Logic-H	Logic-H	Logic-H
19~30		GND	GND	GND
31	Host	NInit	NInit	nInit
32	Printer	Nfault	nDataAvail / Data0,4	nDataAvail
33		GND	ND	ND
34	Printer	DK_Status	ND	ND
35	Printer	+5V	ND	ND
36	Host	NselectIn	1284-Active	1284-Active

Table 2-16 IEEE1284 Pin Descirption

2-5 Interface Specifications

2-5-3-(c) IEEE 1284 I/F Cable

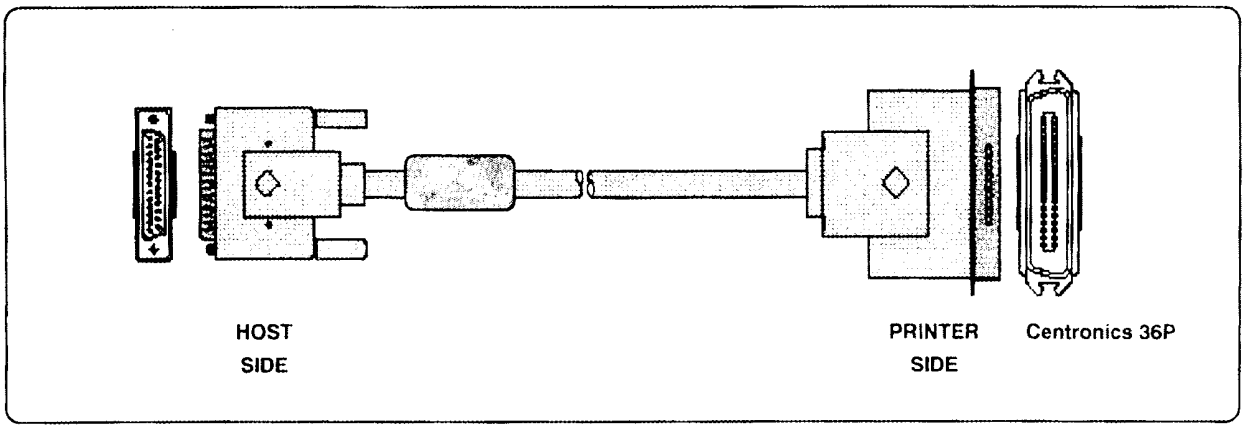


Figure 2-9 IEEE 1284 I/F Cable

2-5-4 USB Interface

SRP-350 support the USB (Universal Serial Bus) Serial Communication.

2-5-4-(a) Specification

Item	Description	Remark
Transfer Type	• BULK	
Data Signal	• Bi - direction, Half - Duplex • Differential Signal Pair (D+ / D-)	
Data Format	• NRZI Format • Zero Bit Stuffing after 6 ones	
Transceiver	• Differential Receive Sensitivity : 200[mV] • Differential Common Mode Range : 0.8 ~ 2.5[V] • Single - End Receiver Threshold : 0.8 ~ 2.0[V]	
Speed	• 12Mbps	
Power	• Self - Powered	
Cable & Connector	• Cable : 5m / 2m • Connector : B Type	
Other	• Support USB SPEC V1.1	

Table 2-17 USB Specification

2-5 Interface Specifications

2-5-4-(b) Signal Description

Pin No.	Signal Name	Assignment(Color)	Function
Shell	Shield	Drain Wire	Frame Ground
1	VBUS	Red	Host Power : DC5[V] / 500[mA]
2	D-	White	Differential Data Line
3	D+	Green	Differential Data Line
4	GND	Black	Signal Ground

Table 2-18 USB Pin Description

2-5-4-(c) USB I/F Cable

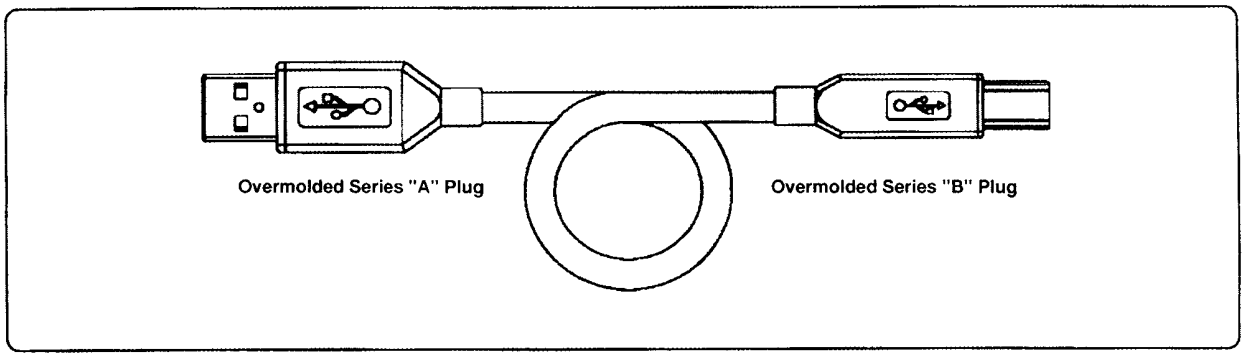


Figure 2-10 USB Cable

2-6 Drawer Kick-Out Specifications

2-6-1 Drawer Cable

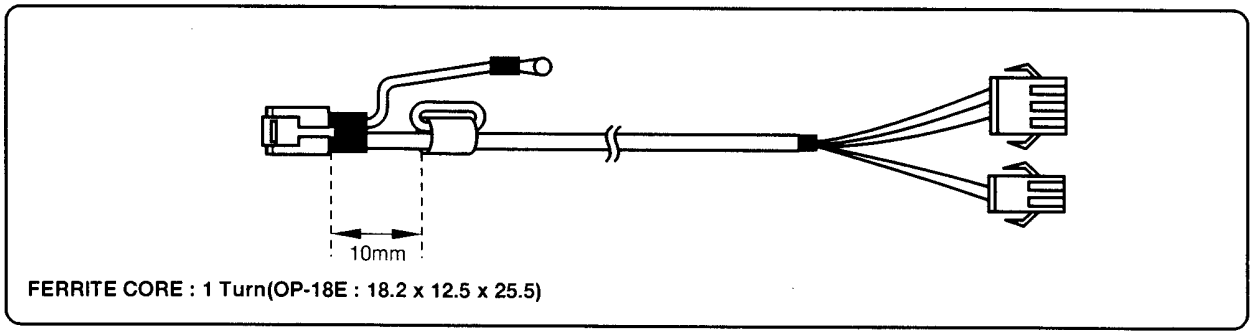


Figure 2-11 Drawer Cable

2-6-2 Cable Connection

Pin no.	Description	Direction
1	• Frame GND	-
2	• Drawer Kick-Out Driver Signal #1	Output
3	• Drawer Open / Close Signal	Input
4	• +24V	-
5	• Drawer Kick-Out Driver Signal #2	Output
6	• Signal GND	-

Table 2-19 Drawer Cable Connection

Note : +24V is always output through pin 4 during power on.

3 Installation and Operation

3-1 Installation

3-1-1 AC Adapter Installation

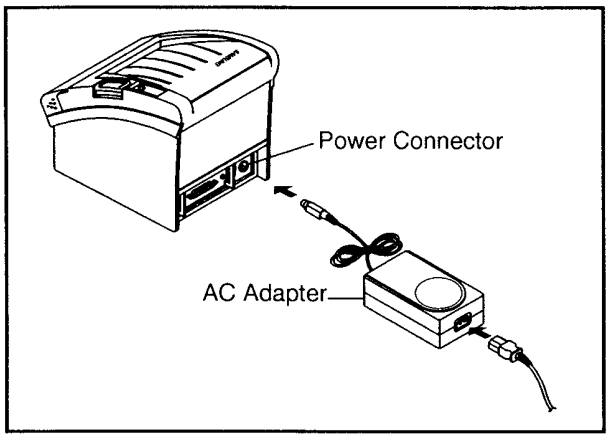


Figure3-1 AC Adapter Installation

1. Make sure the printer is turned off with the 0 side of the switch
2. Plug the DC cord connector into the power jack on the printer. (Plug the flat side down)
3. Plug the AC Adapter power cord into the wall outlet.

3-1-2 Interface Cable Installation

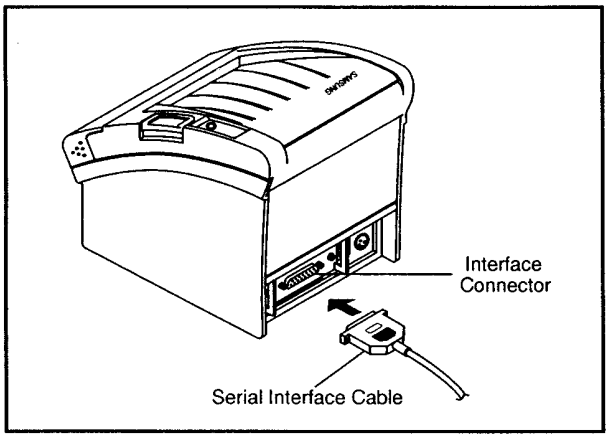


Figure3-2 I/F Cable Installation

1. Turn off the printer, host ECR and Computer.
2. Plug RS-232, RS-485 or Parallel Cable connector into the I/F connector on the printer.
3. Tighten the screws on both sides of the connector.
4. Turn on the printer, host ECR and computer.

3-1-3 Drawer Cable Installation

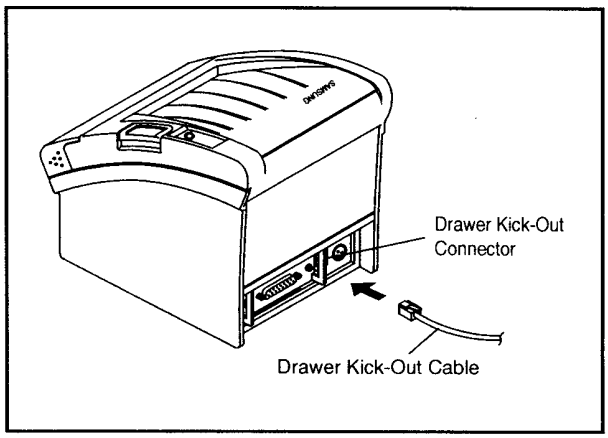


Figure3-3 Drawer Cable Installation

1. Turn the printer off.
2. Plug the drawer kick-out cable connector into the connector on the printer.
   (To remove the drawer kick-out cable, press the clip on the connector, grasp the connector and pull it out)

3-1-4 Paper Roll Installation

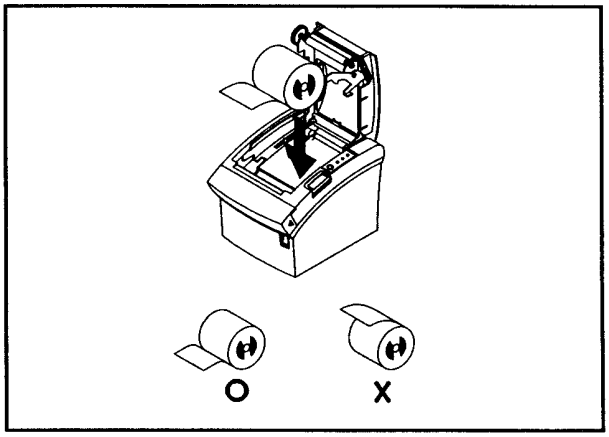


Figure3-4 Paper Roll Installation

1. Open the cover printer and remove the used paper roll core if there is one
2. Load the paper roll on the paper holder as shown.
3. Close the cover printer.

3 Installation

3-1-5 Wall Mount Installation

1. Press the Push Button. After opening the cover, insert the Wall-Guide "L","R" to the Upper-Left Hole and the Upper-Right Hole inside of the printer (Figure3-5).
2. Loosen the detector screw with a coin or similar tool. Pull the Near-End Sensor Tab until Near-End Sensor is placed in the other hole. While pulling the Tab, tighten the detector screw. (Figure3-6)
3. Remove the three screws from the bottom of the Case-Lower. Separate the Case-Lower from the Main Body (Figure 3-7)
4. Attach the Plate-Spring to the right side of Frame-Body and tighten a screw as illustrated in the Figure 3-8.
5. Check whether it works properly by pressing the Push Button after tightening the screw. (Figure 3-9)
6. After assembling the Plate Spring, the height will be 7~10[mm] when pressing the Push Button. If no problem Re-assemble in the reverse order.
7. After assembling the Case-Lower to Set Body, turn the Set over and attach the BRKT Hanger to the Case Lower then tighten four screws. (Figure 3-10)
8. Attach the BRKT Mount to the wall firmly with the eight screws. Be sure that the BRKT attached properly to match the direction of arrow as illustrated in the Figure 3-11. And the BRKT Mount should be always fixed vertically. (Figure 3-11)
9. Insert the BRKT Hanger of Set to the BRKT Mount as illustrated in the Figure 3-12.

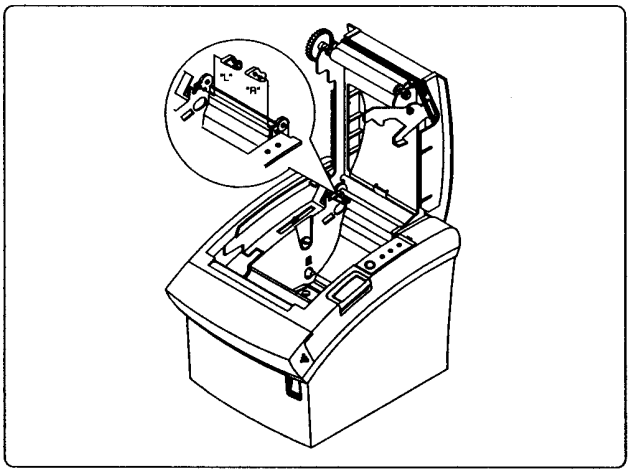


Figure 3-5 Wall Mount #1

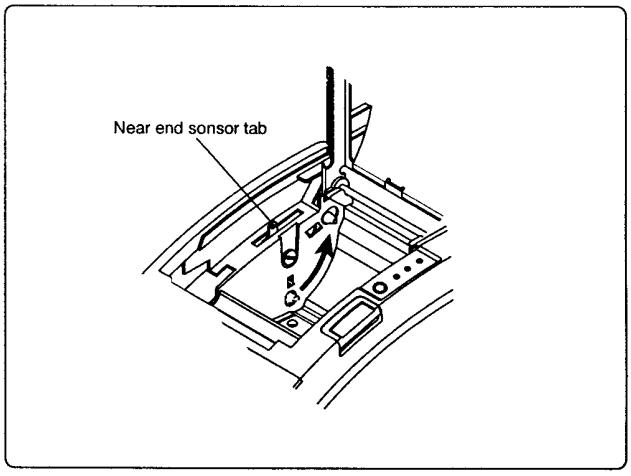


Figure 3-6 Wall Mount #2

3-1 Installation

3-1-5 Wall Mount Installation (Continue)

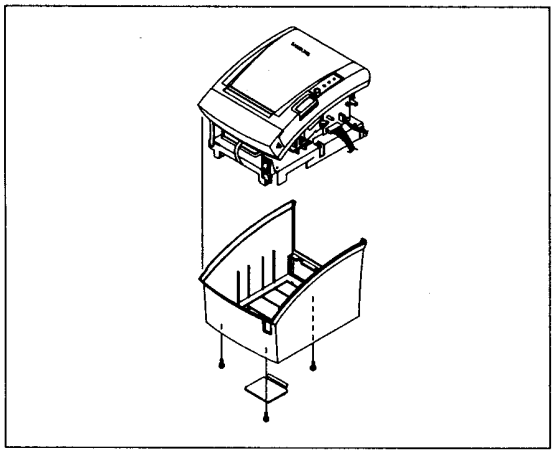


Figure 3-7 Wall Mount #3

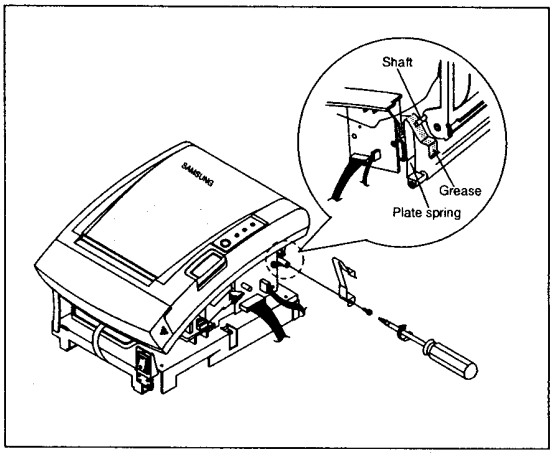


Figure 3-8 Wall Mount #4

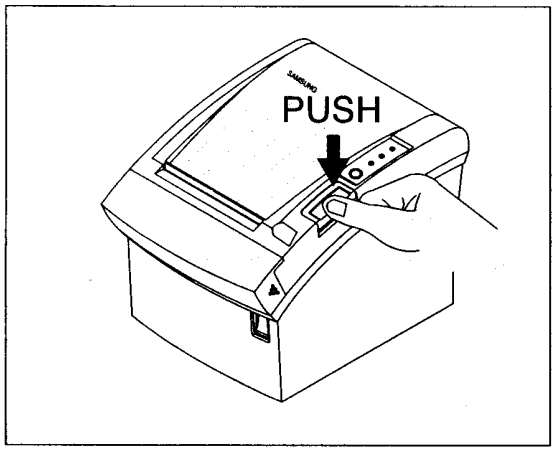


Figure 3-9 Wall Mount #5

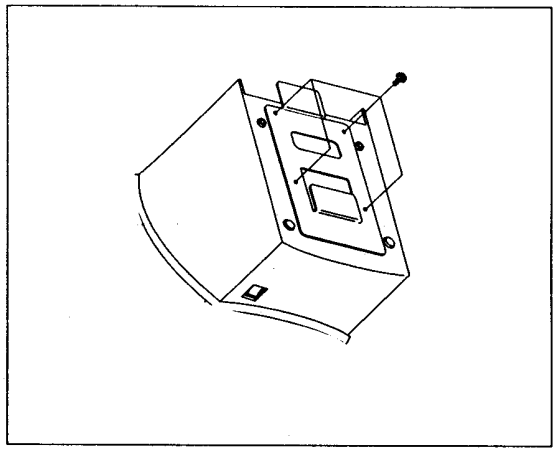


Figure 3-10 Wall Mount #6

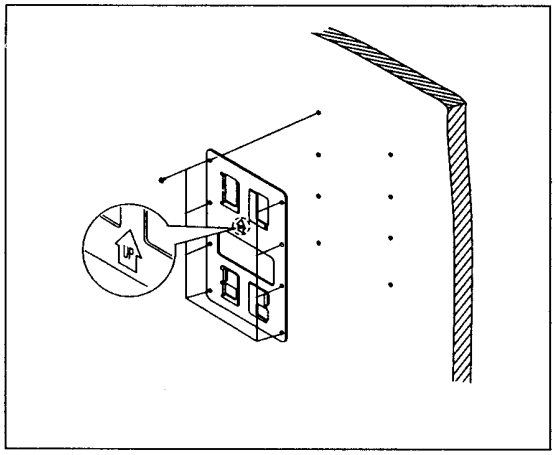


Figure 3-11 Wall Mount #7

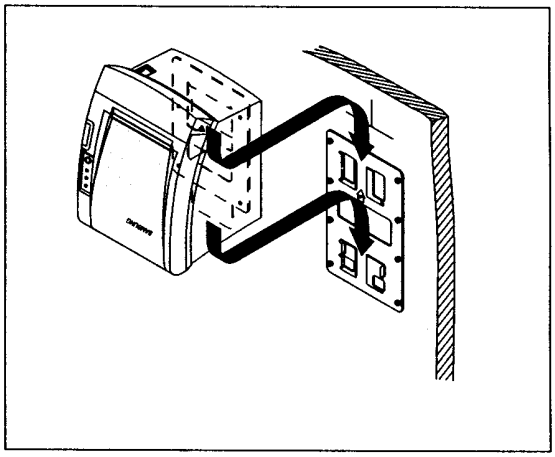


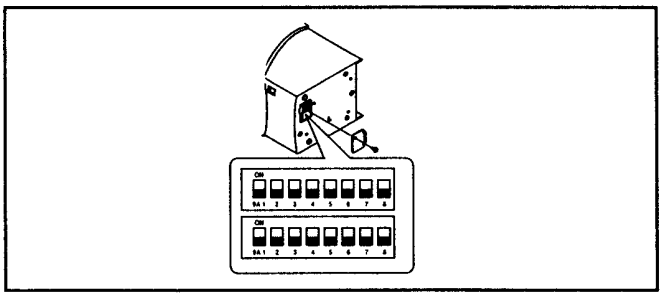
Figure 3-12 Wall Mount #8

3-2 Operation

3-2-1 Setting the DIP switches

The DIP switches are located on the bottom of the printer. The DIP switches are used to set the printer to perform various functions. Follow these steps when changing DIP switches setting:

1. Turn the printer power switch off.
2. Remove the screw on the bottom of the printer and open the bracket.
3. Flip the DIP switches using tweezers or another narrow-ended tool. Switches are on when up and off when down in the Figure below.
4. The new setting takes effect when you turn on the printer.



Note : Always change DIP switch settings only when the printer is turned off.
Change made with the power on have no effect and then on again.

3-2-2 Setting the DIP switch (RS-232C, RS-485 Serial Interface)

Switch No.	Function	ON	OFF	Default
SW1-1	Data Receive Error	Ignore	Print "?"	OFF
SW1-2	Mode Selection	STAR	EPSON	OFF
SW1-3	Handshaking	XON/XOFF	DTR/DSR	OFF
SW1-4	Data Length	7 Bit	8 Bit	OFF
SW1-5	Parity Check	YES	No	OFF
SW1-6	Parity Selection	EVEN	ODD	OFF
SW1-7	Baud Rate selection	Refer to below Table		ON
SW1-8				OFF

Table 3-1 DIP switch Setting 1 Function

SW 1-7	SW 1-8	Transmission Speed	Remark
ON	ON	2400 Baud	
OFF	ON	4800 Baud	
ON	OFF	9600 Baud	Default
OFF	OFF	19200 Baud	

Table 3-2 Baud Rate Selection

3-2 Operation

Switch No.	Function	ON	OFF	Default
SW2-1	Reserved	-		
SW2-2				
SW2-3				
SW2-4				
SW2-5	Select Printer Density	Refer to below Table		OFF
SW2-6				OFF
SW2-7	Reserved	-		
SW2-8				

Table 3-3 DIP switch Setting 2 Function

SW 2-5	SW 2-6	Print Density	Remark
ON	ON	1(Light)	
OFF	OFF	2	
ON	OFF	3	
OFF	ON	4(Dark)	

Table 3-4 Print Density

3-2-3 Setting the DIP switch (IEEE1284 Parallel, USB Interface)

Switch No.	Function	ON	OFF	Default
SW2-1	Reserved	-		
SW2-2				
SW2-3				
SW2-4				
SW2-5	Selection Print Density	Refer to below Table		OFF
SW2-6				OFF
SW2-7	Reserved	-		
SW2-8				

Table 3-5 DIP switch Setting 1 Function

Note : In Parallel Mode, DIP Switch 1 is not used.

3-2 Operation

SW 2-5	SW 2-6	Print Density	Remark
ON	ON	1(Light)	
OFF	OFF	2	
ON	OFF	3	
OFF	ON	4(Dark)	

Table 3-4 Print Density

3-2-4 Hexadecimal Dumping

This feature allows experienced users to see exactly what data is coming to the printer. This can be useful in finding
software problems. When you turn on the hexadecimal dump function, the printer prints all commands and data in
hexadecimal format along with a guide section to help you find specific commands.
To use the hexadecimal dump function, follow these steps:

1. After you make sure that the printer is off.
2. Set DIP switch 2 to On.
3. Turn on the printer, then the printer enters the hexadecimal dump mode.
4. Run any software program that sends data to the printer. The printer will print all the codes it receives in a two-column format. The first column contains the hexadecimal codes and the second column gives the ASCII characters that corresponds to the codes.

```
1B 21 00 1B 26 02 40 40        .!..&.@@
02 0D 1B 44 0A 14 1E 28        ...D....(
00 01 0A 41 0D 42 0A 43        ...A.B.C
```

Note : A period (.) is printed for each code that no ASCII equivalent.
Note : During the hex dump all commands expect **DLE EOT** and **DLE ENQ** are disabled.

5. When the printing finishes, turn off the printer, and then change DIP switch 2 to OFF.
6. Turn on the printer and then the hexadecimal mode is off.

3-2-5 The Self Test Mode

The self-test checks whether the printer has any problem. If the printer does not function properly, contact your dealer. The self-test checks the following;
1. Make sure paper roll has been installed properly.
2. Turn on the power while holding down the FEED button. The self-test begins.
3. The self-test prints the current printer status, which provides the control ROM version and the DIP switch setting.
4. After printing the current printer status, self-test printing will print the following and pause (The PAPER LED light blinks.)

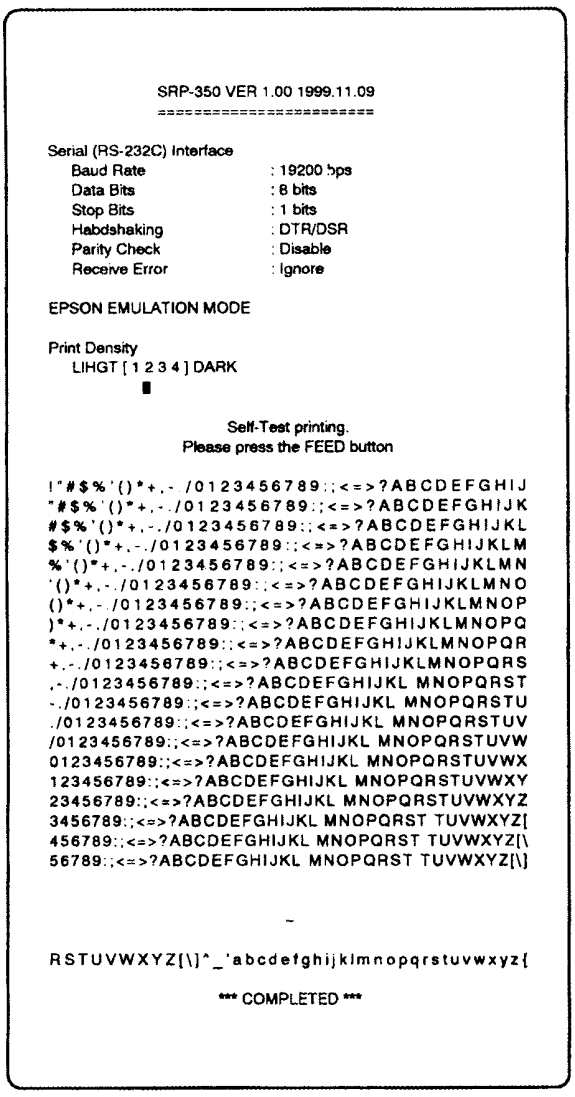
3-2 Operation

Self-Test printing
Please press the Feed button

5. Press the FEED button to continue printing. The printer prints a pattern using the built-in character set.
6. The self-test automatically ends and cuts the paper after printing the following.

***** Completed*****

The printer is ready to receive data as soon as it completes the self-test.



SRP-350 VER 1.00 1999.11.09

Serial (RS-232C) Interface
Baud Rate : 19200 bps
Data Bits : 8 bits
Stop Bits : 1 bits
Habdshaking : DTR/DSR
Parity Check : Disable
Receive Error : Ignore

EPSON EMULATION MODE

Print Density
LIHGT [1 2 3 4] DARK

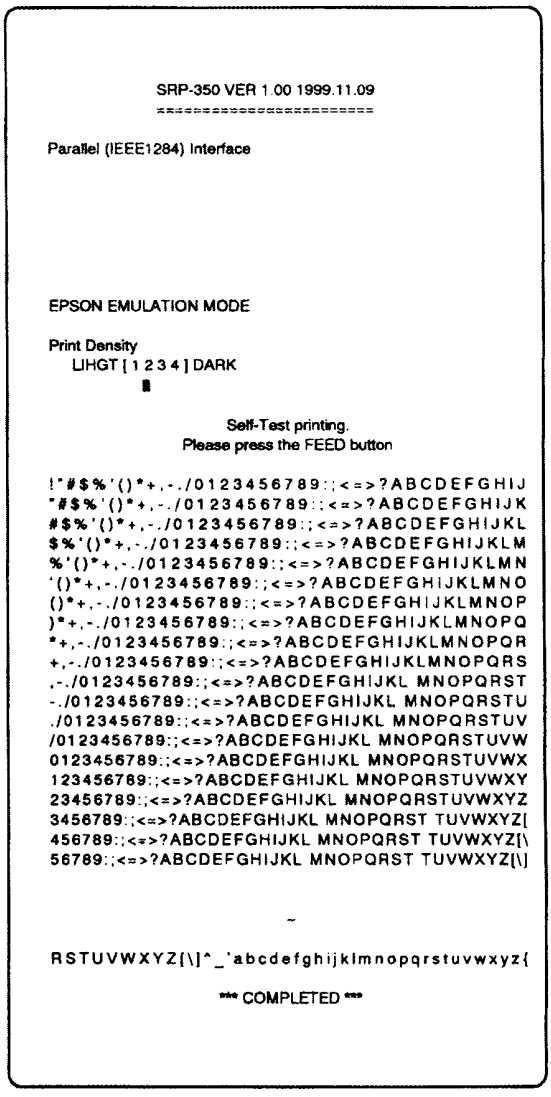
Self-Test printing.
Please press the FEED button

!"#$%'()*+,-./0123456789:;<=>?ABCDEFGHIJ
"#$%'()*+,-./0123456789:;<=>?ABCDEFGHIJK
#$%'()*+,-./0123456789:;<=>?ABCDEFGHIJKL
$%'()*+,-./0123456789:;<=>?ABCDEFGHIJKLM
%'()*+,-./0123456789:;<=>?ABCDEFGHIJKLMN
'()*+,-./0123456789:;<=>?ABCDEFGHIJKLMNO
()*+,-./0123456789:;<=>?ABCDEFGHIJKLMNOP
)*+,-./0123456789:;<=>?ABCDEFGHIJKLMNOPQ
*+,-./0123456789:;<=>?ABCDEFGHIJKLMNOPQR
+,-./0123456789:;<=>?ABCDEFGHIJKLMNOPQRS
,-./0123456789:;<=>?ABCDEFGHIJKL MNOPQRST
-./0123456789:;<=>?ABCDEFGHIJKL MNOPQRSTU
./0123456789:;<=>?ABCDEFGHIJKL MNOPQRSTUV
/0123456789:;<=>?ABCDEFGHIJKL MNOPQRSTUVW
0123456789:;<=>?ABCDEFGHIJKL MNOPQRSTUVWX
123456789:;<=>?ABCDEFGHIJKL MNOPQRSTUVWXY
23456789:;<=>?ABCDEFGHIJKL MNOPQRSTUVWXYZ
3456789:;<=>?ABCDEFGHIJKL MNOPQRST TUVWXYZ[
456789:;<=>?ABCDEFGHIJKL MNOPQRST TUVWXYZ[\
56789:;<=>?ABCDEFGHIJKL MNOPQRST TUVWXYZ[\]

RSTUVWXYZ[\]^_'abcdefghijklmnopqrstuvwxyz{

*** COMPLETED ***

(A) Serial Self-Test Sheet



SRP-350 VER 1.00 1999.11.09

Parallel (IEEE1284) Interface

EPSON EMULATION MODE

Print Density
LIHGT [1 2 3 4] DARK

Self-Test printing.
Please press the FEED button

!"#$%'()*+,-./0123456789:;<=>?ABCDEFGHIJ
"#$%'()*+,-./0123456789:;<=>?ABCDEFGHIJK
#$%'()*+,-./0123456789:;<=>?ABCDEFGHIJKL
$%'()*+,-./0123456789:;<=>?ABCDEFGHIJKLM
%'()*+,-./0123456789:;<=>?ABCDEFGHIJKLMN
'()*+,-./0123456789:;<=>?ABCDEFGHIJKLMNO
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-./0123456789:;<=>?ABCDEFGHIJKL MNOPQRSTU
./0123456789:;<=>?ABCDEFGHIJKL MNOPQRSTUV
/0123456789:;<=>?ABCDEFGHIJKL MNOPQRSTUVW
0123456789:;<=>?ABCDEFGHIJKL MNOPQRSTUVWX
123456789:;<=>?ABCDEFGHIJKL MNOPQRSTUVWXY
23456789:;<=>?ABCDEFGHIJKL MNOPQRSTUVWXYZ
3456789:;<=>?ABCDEFGHIJKL MNOPQRST TUVWXYZ[
456789:;<=>?ABCDEFGHIJKL MNOPQRST TUVWXYZ[\
56789:;<=>?ABCDEFGHIJKL MNOPQRST TUVWXYZ[\]

RSTUVWXYZ[\]^_'abcdefghijklmnopqrstuvwxyz{

*** COMPLETED ***

(B) Parallel Self-Test Sheet

Figure 3-13 The Self-Test Sheet

4 Disassembly and Assembly

4-1 Case-Lower Block

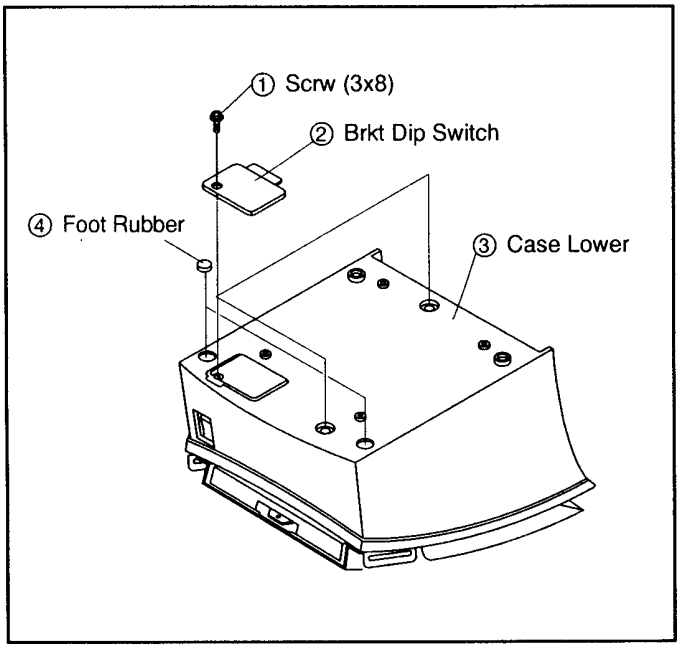


Figure 4-1 Disassembly Case-Lower #1

1. Remove the three screws ① .
2. Sparate the BRKT DIP Switch ②, the Case-Lower③ and the Foot-Rubber ④ from the printer.

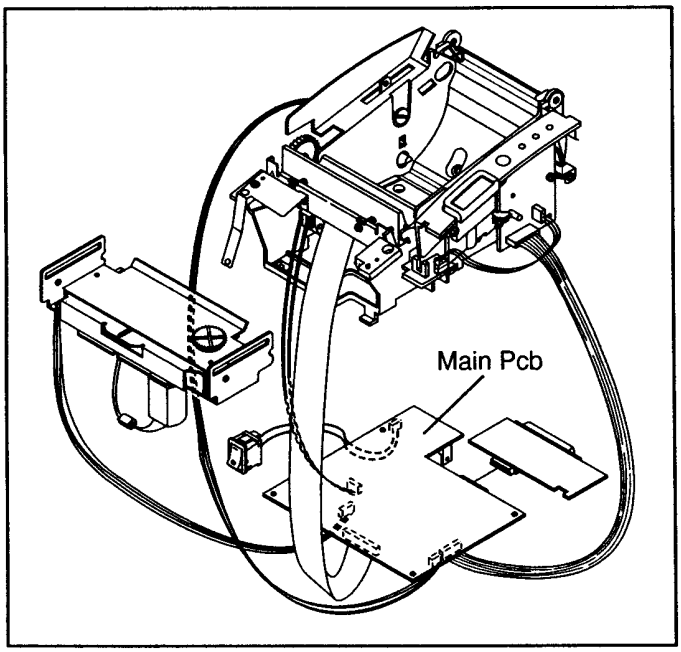


Figure 4-2 Disassembly Case-Lower #2

1. Remove the connector wires from main PBA and sub assembly.

4-1 Case-Lower Block

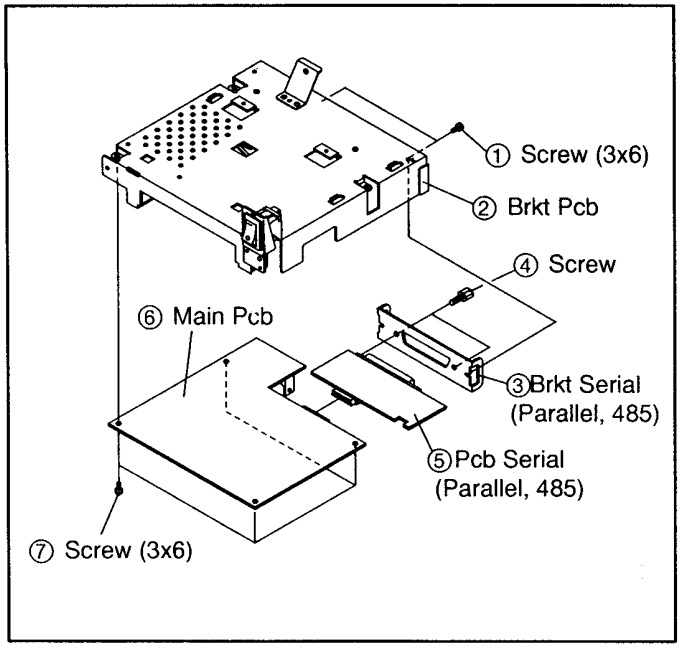


Figure 4-3 Disassembly Case-Lower #3

1. Remove the three screws ① from the BRKT PBA ②.
2. Sparate the BRKT Serial 232 ③ (Parallel, 485).
3. Remove the two screws ④.
4. Separate the BRKT Serial ③ from the I/F PBA Assembly ⑤.
5. Separate the I/F PBA ⑤ from the Main PBA ⑥.
6. Remove the four screws ⑦.
7. Separate the Main PBA ⑥ from the BRKT PCB ②.

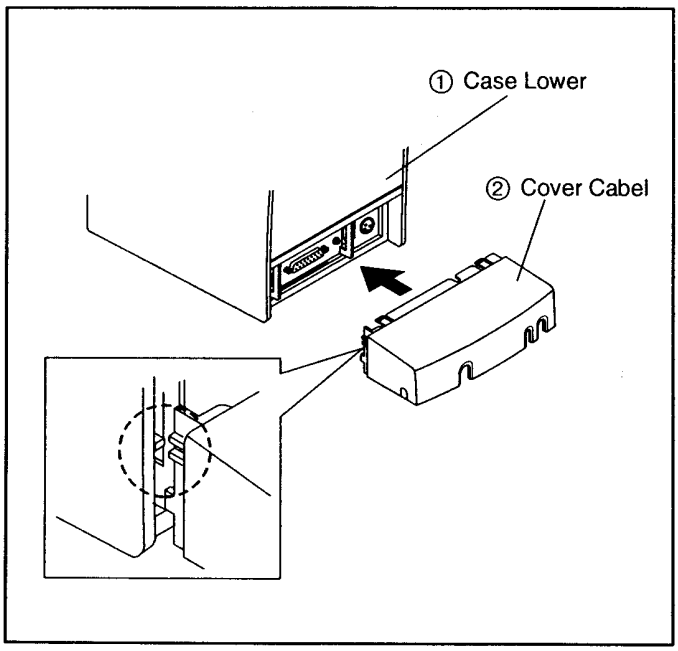


Figure 4-4 Disassembly Case-Lower #4

1. Separate the Cover-Cable ② from the Case-Lower ①.

4-2 Case-Upper Block

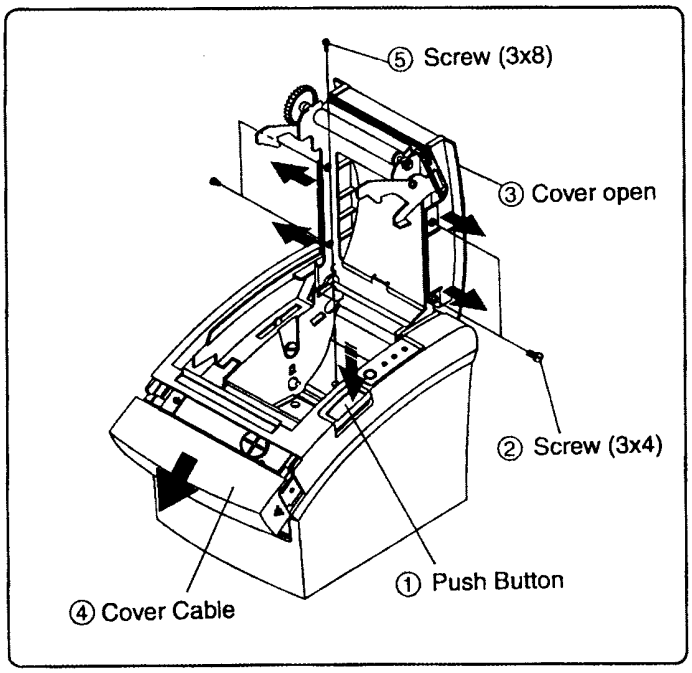


Figure 4-5 Disassembly Case-Upper #1

1. Push the button ① to open the Cover-Open ③.
2. Remove the four screws ②.
3. Separate the Cover-Open ③.
4. Separate the Cover-Cutter ④.
5. Remove the screws ⑤.

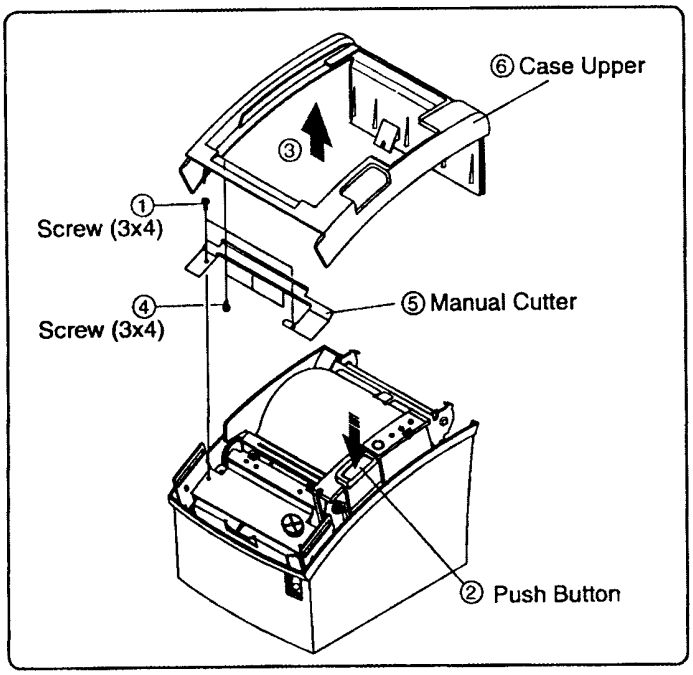


Figure 4-6 Disassembly Case-Upper #2

1. Remove the two screws ①.
2. Lift the Case-Upper in the direction of an arrow ③ during pushing the Push-Button ②.
3. Remove the three screws ④.
4. Separate the Manual-Cutter ⑤ from the Case-Upper ⑥.

4-2 Case-Upper Block

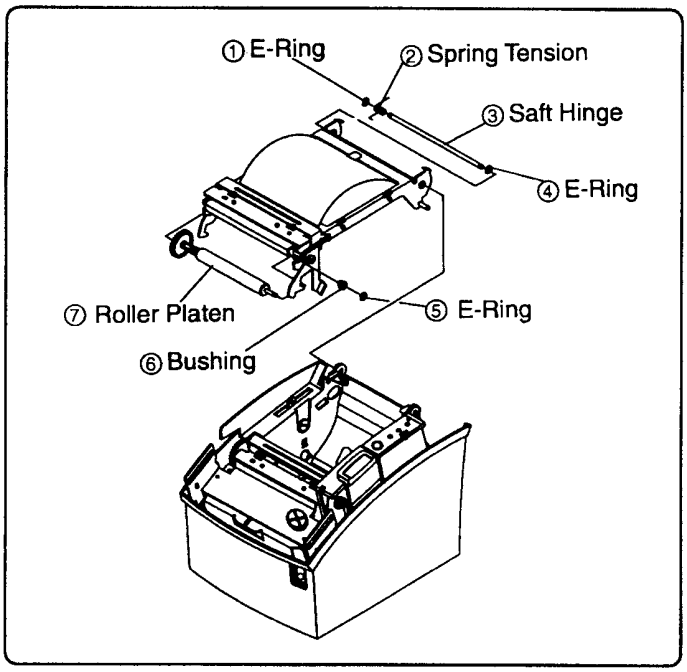


Figure 4-7 Disassembly Case-Upper #3

1. Remove the E-Ring ①.
2. Separate the Spring Tension ②, the Shaft Hinge ③ and the E-Ring ④.
3. Remove the E-Ring ⑤.
4. Separate the Bushing ⑥ and the Roller Platen Assembly ⑦.

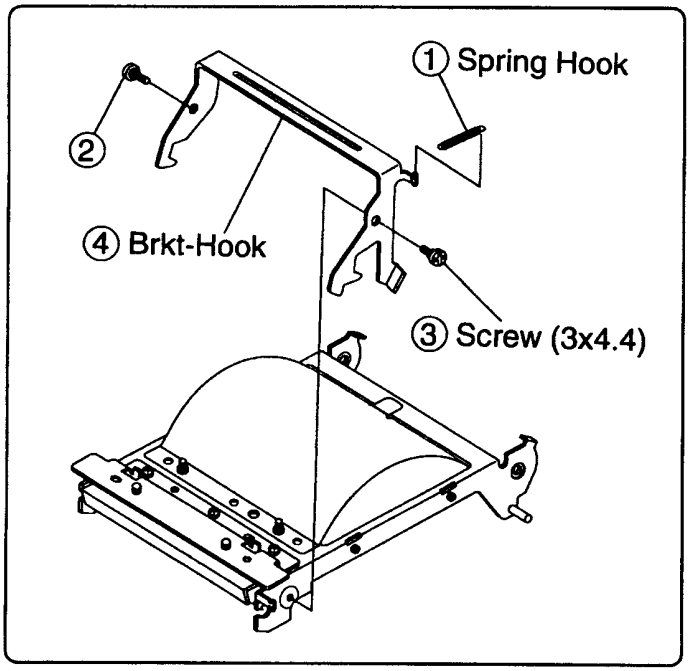


Figure 4-8 Disassembly Case-Upper #4

1. Remove the Spring Hook ①.
2. Remove the two screws ②③.
3. Separate the BRKT-Hook ④.

4-2 Case-Upper Block

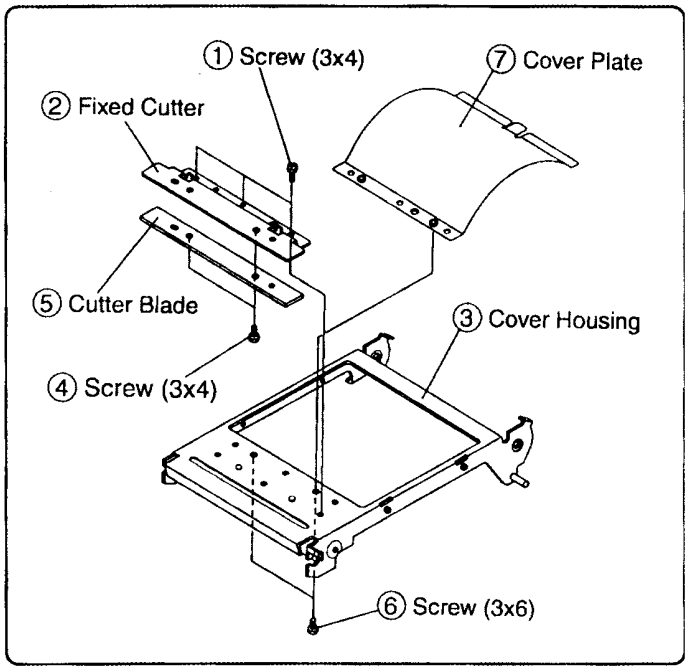


Figure 4-9 Disassembly Case-Upper #5

1. Remove the three screws ①.
2. Separate the Fixed-Cutter ② from the Cover-Housing ③.
3. Remove the two screws ④.
4. Separate the Cutter-Blade ⑤ from the Fixed-Cutter ②.
5. Remove the two screws ⑥.
6. Separate the Cover-Plate ⑦ from the Cover-Housing ③.

4-3 Frame Block

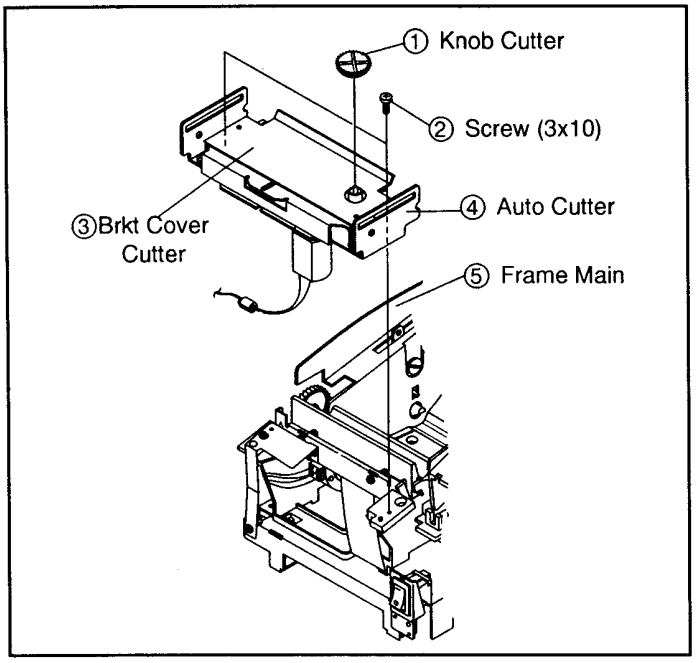


Figure 4-10 Disassembly Frame #1

1. Pull out the Knob-Cutter ① and separate it.
2. Remove the two screws ②.
3. Separate the BRKT Cover-Cutter ③ and the Auto-Cutter ④ from the Frame Main ⑤.

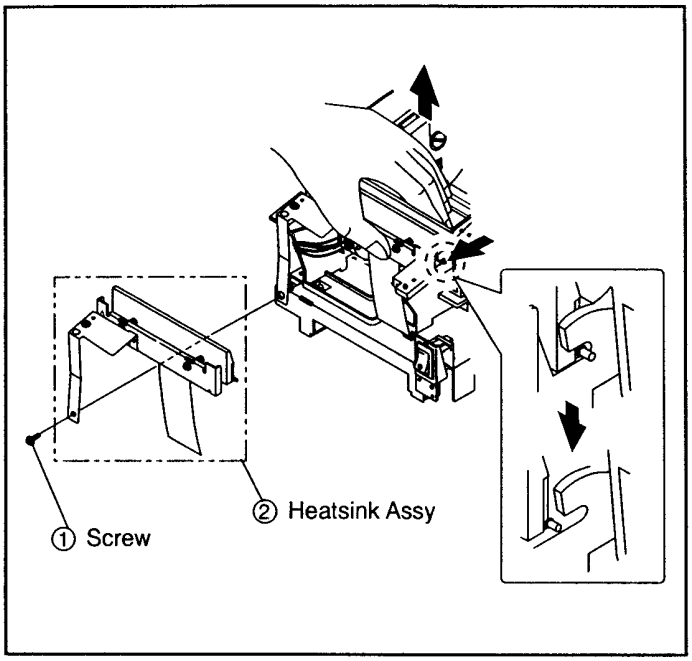


Figure 4-11 Disassembly Frame #2

1. Remove the screws ①.
2. Push the Heat-Sink Assembly ② in the direction of an arrow and separate it.

4-3 Frame Block

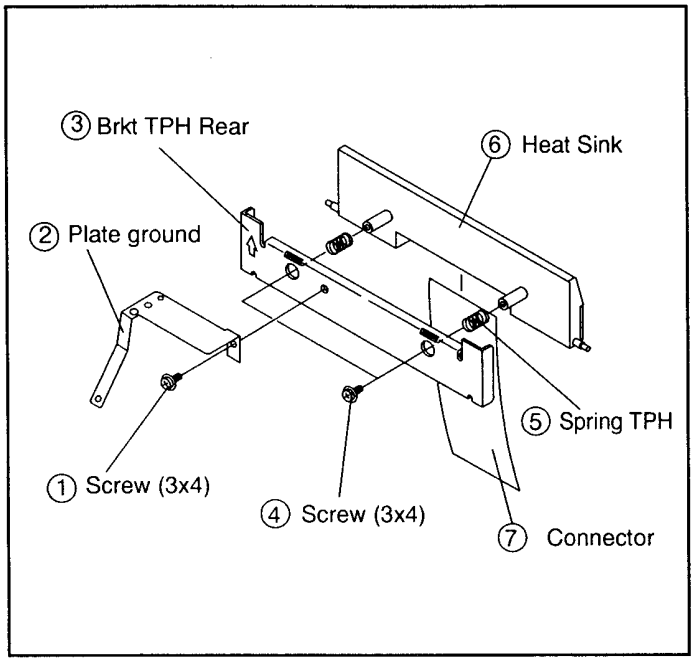


Figure 4-12 Disassembly Frame #3

1. Remove the screws ①.
2. Separate the Plate-ground ② and BRKT TPH Rear ③.
3. Remove the two screws ④.
4. Separate the Heat-Sink ⑥ and the Spring-TPH ⑤.
5. Separate the Connector ⑦ from the Heat-Sink ⑥.

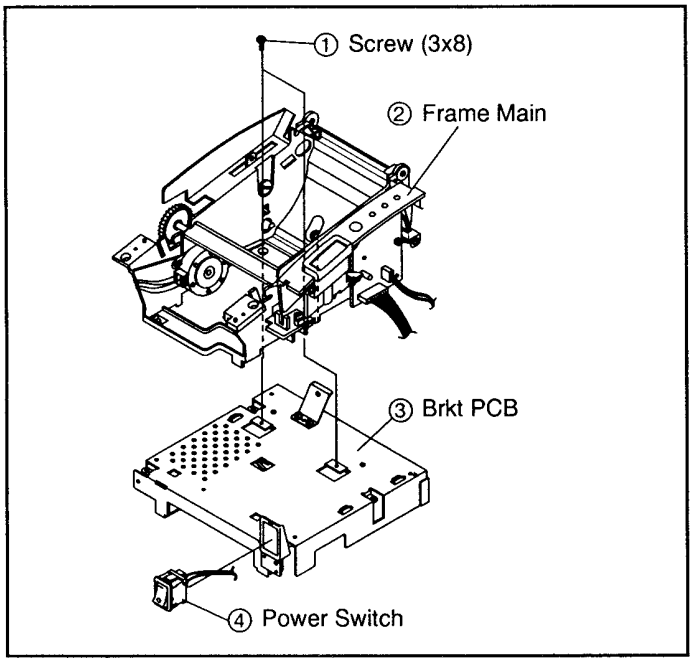


Figure 4-13 Disassembly Frame #4

1. Remove the two screws ①.
2. Separate the Frame-Main ② from the BRKT PCB ③.
3. Separate the Power-Switch ④ from the BRKT PCB ③.

4-3 Frame Block

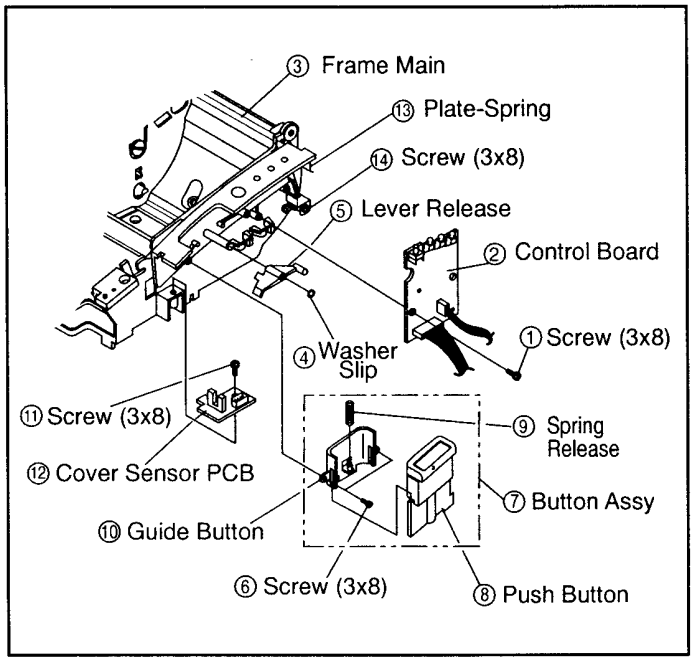


Figure 4-14 Disassembly Frame #5

1. Remove the screw ①. And separate the Control-Board ② from the Frame-Main ③.
2. Remove the washer slip ④.
3. Separate the Lever-Release ⑤ from the Frame-Main ③.
4. Remove the two screw ⑥.
5. Separate the Button Assembly ⑦ from the Frame-Main ③.
6. Push the Button ⑧. Then, the Button Assembly is separated (Internal Spring Release ⑨, Guid-Button ⑩).
7. Remove the screw ⑪. And separate the Cover-Sense PCB ⑫ from the Frame-Main ③.
8. Remove the screw ⑭. And separate the Plate-Spring ⑬ from the Frame-Main ③.

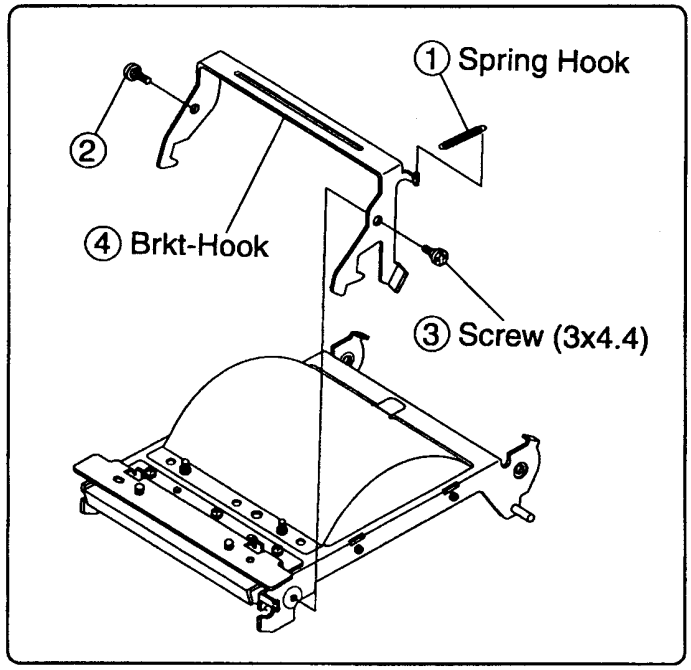


Figure 4-15 Disassembly Frame #6

1. Loosen the Detector screw ② with a coin or similar tool in the Frame-Main ①.
2. Separate the Paper-End Sensor Assembly from Frame-Main ①.
3. Remove the screw ③. And separate the Micro-Switch ④.
4. After Removing the Knob Paper-End ⑤, Separate the Nut ⑥ and the Housing Paper-End ⑦.
5. Remove the washer slip ⑧. And separate the Gear-Idle ⑨ from the Frame-Main ①.
6. Remove the two screws ⑩. And separate the Motor-Step ⑪ from the Frame-Main ①.

5 Maintenance and Adjustments

5-1 Adjustment

5-1-1 Remaining Roll Paper Adjustment

This sensor has two settings, which are lower and upper position. This sensor is set to the lower position at the factory. If you find that there is not enough paper remaining on the roll when the near-end sensor is triggered, you can change the setting to the upper position as described below.

Note : The factory setting is based on a paper roll core with an outside diameter of 18mm. If you use a paper roll with a core with an outside diameter of more than 18mm, it is better to change to the upper position as described below.

1. Open the paper roll cover, and remove the paper roll.
2. Loosen the adjustment screw with a coin or flathead screw driver.
3. Move the tab up to the upper position.
4. Tighten the adjustment screw, and check to be sure that the detecting lever moves freely.
5. Replace the paper roll.

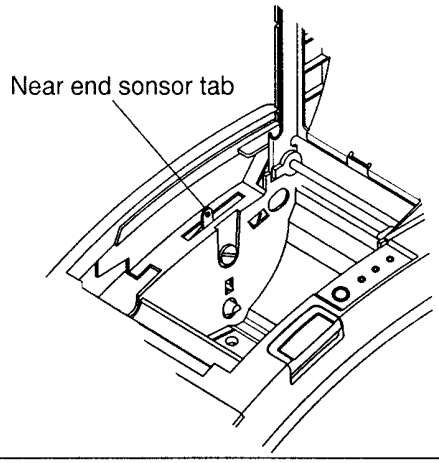


Figure 5-1 Adjusting the Paper Near End Sensor

Note : For your reference, this shows the diameter at which the near-end sensor is triggered. Note that this figure is a calculated value, and there may be some variations depending on the printer.

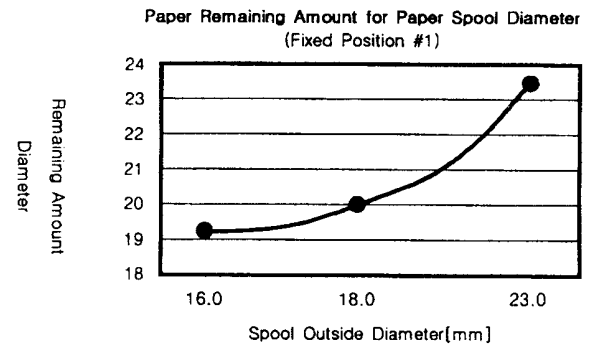


Figure 5-2 Paper Remaining Amount for Paper Spool Diameter

5-1 Adjustment

5-1-2 Near End Sensor Mechanism

The Near End(N.E) Sensor Lever is supported by the N.E Sensor Holder so it can move. The spring force of the Micro switch fixed by a screw to the N.E sensor holder presses the N.E sensor lever in the direction of an arrow(1) in Figure5-2. The micro switch is linked to the switch circuit board assembly by the N.E sensor lead wore.
The N.E sensor holder is attached to the paper guide by the sensor adjustment screw.
When the paper roll is large than the prescribed roll paper diameter, the pressure of the outer surface of the paper roll
on the N.E sensor lever causes the lever to press the micro switch, maintaining it in an ON state.
When the remaining paper on the roll is below the prescribed diameter, contact between the tip of the N.E sensor lever and the paper roll surface is broken, causing the lever to move in the direction of arrow(1), into the core of the paper roll. This causes the micro switch to turn off, indicating near end of the roll paper.
The prescribed near end roll paper amount can be changed between two different levels: one with the N.E sensor tab fixed in a raised position, and one with the N.E sensor tab fixed in a lowered position.

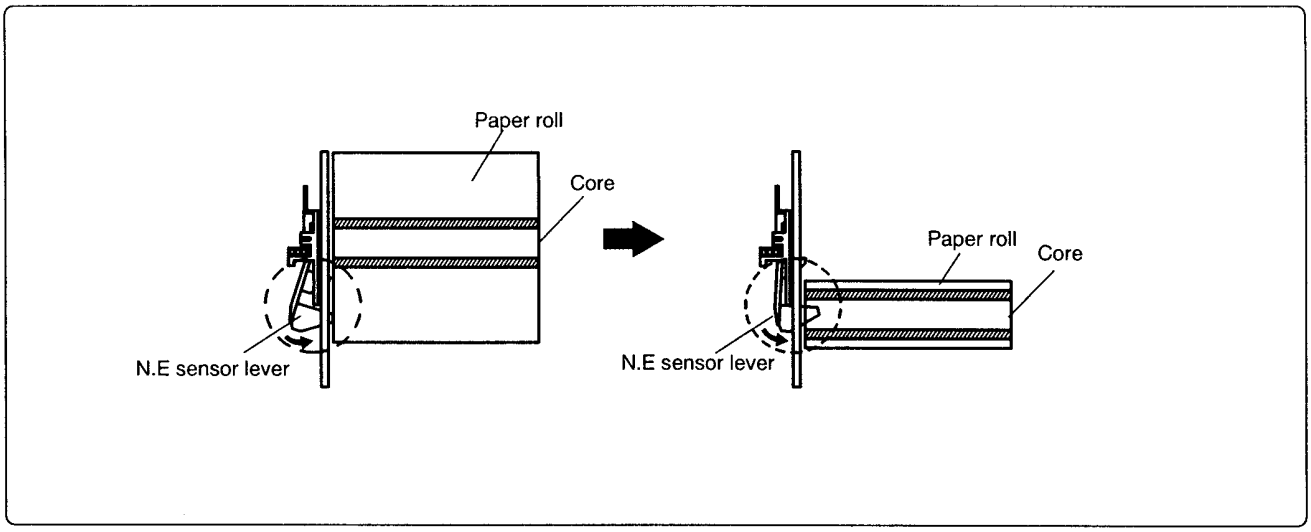


Figure 5-3 Paper Near End Sensor Mechanism

5-1 Adjustment

5-1-2 Paper Jam

If the paper jam occur, the buzzer will beep. If the cover-open can be opened, open the cover-open and remove the paper. If the cover-open can not be opened, follow the below.

1. Open the auto cutter cover with power ON.
2. Then turn the knob clockwise with a coin or similar tool until the buzzer beep stops.
3. Close the auto cutter cover.
4. Pull up the roll paper cover by hand.

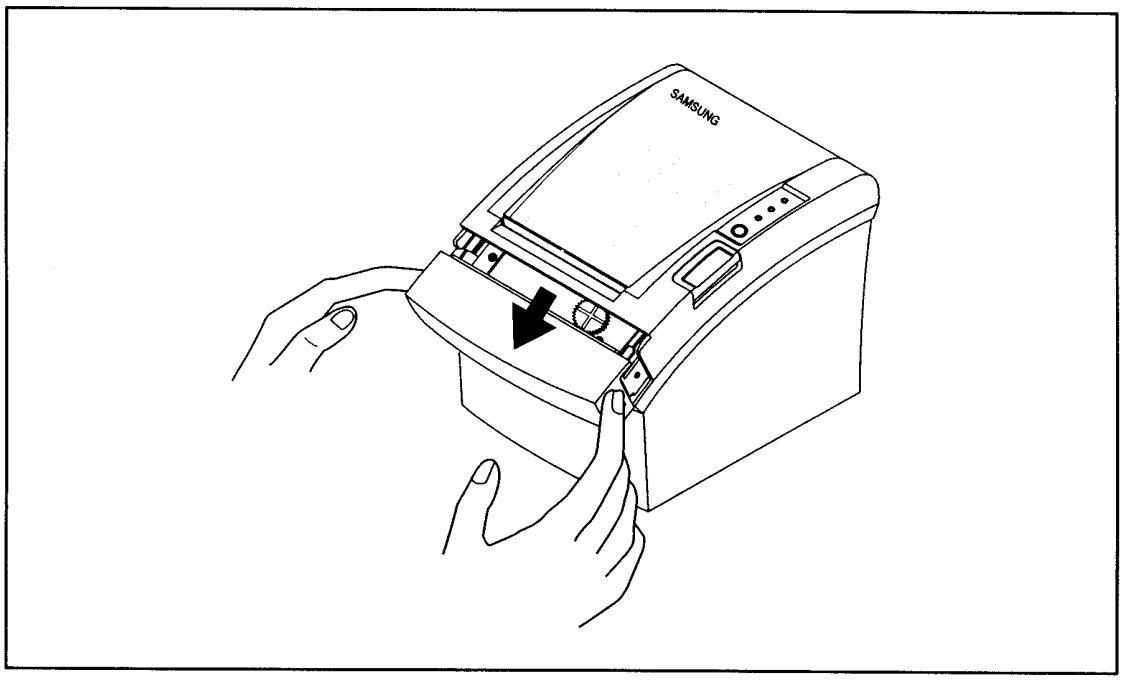


Figure 5-4 Paper Jam

5-2 Maintenance

5-2-1 Cleaning Head

Paper dust on the heating elements may lower the print quality. In this case, clean the print head as follows:

Caution : Turn off the printer power before cleaning.
Caution : Note that the thermal head (Thermal Element and Radiation Plate) becomes very hot during normal operation, creating the danger of burn injury. Bu sure to wait for about 10 minutes after turning printer power off before beginning the cleaning.

1. Open the cover-open.
2. Clean the thermal element (the area that looks like it is marked a thin black line) of the thermal head with a cotton swab moistened with an alcohol solvent (ethanol, methanol, or IPA).
3. After confirming that the alcohol solvent has been dried up completely, close the cover-open.

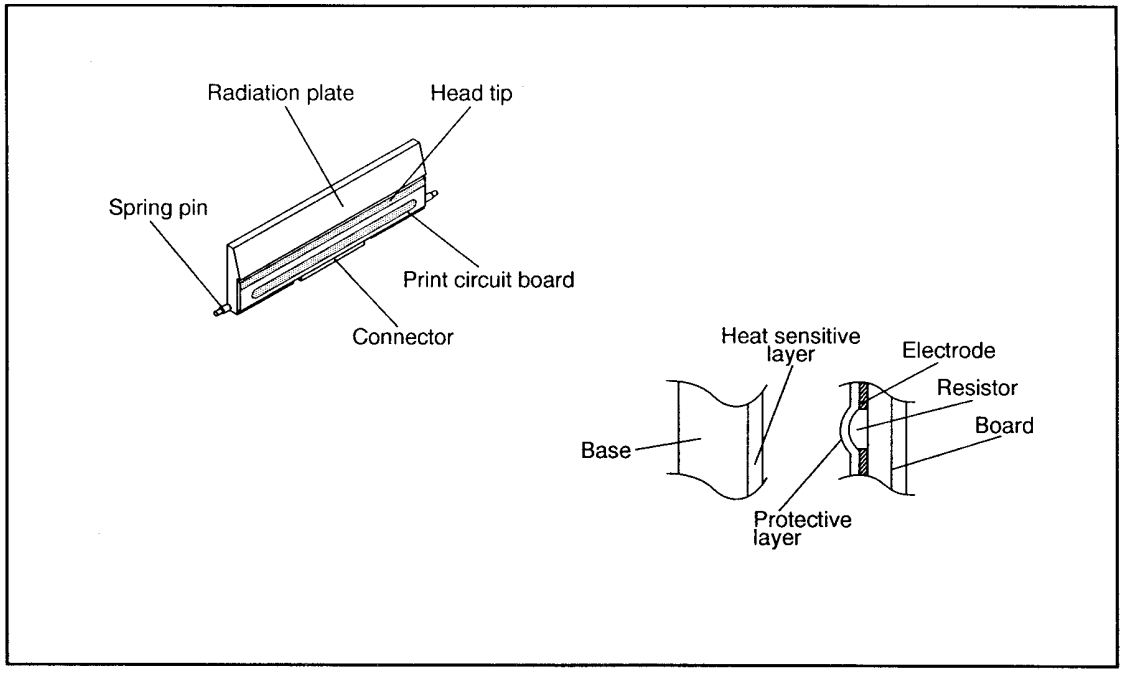


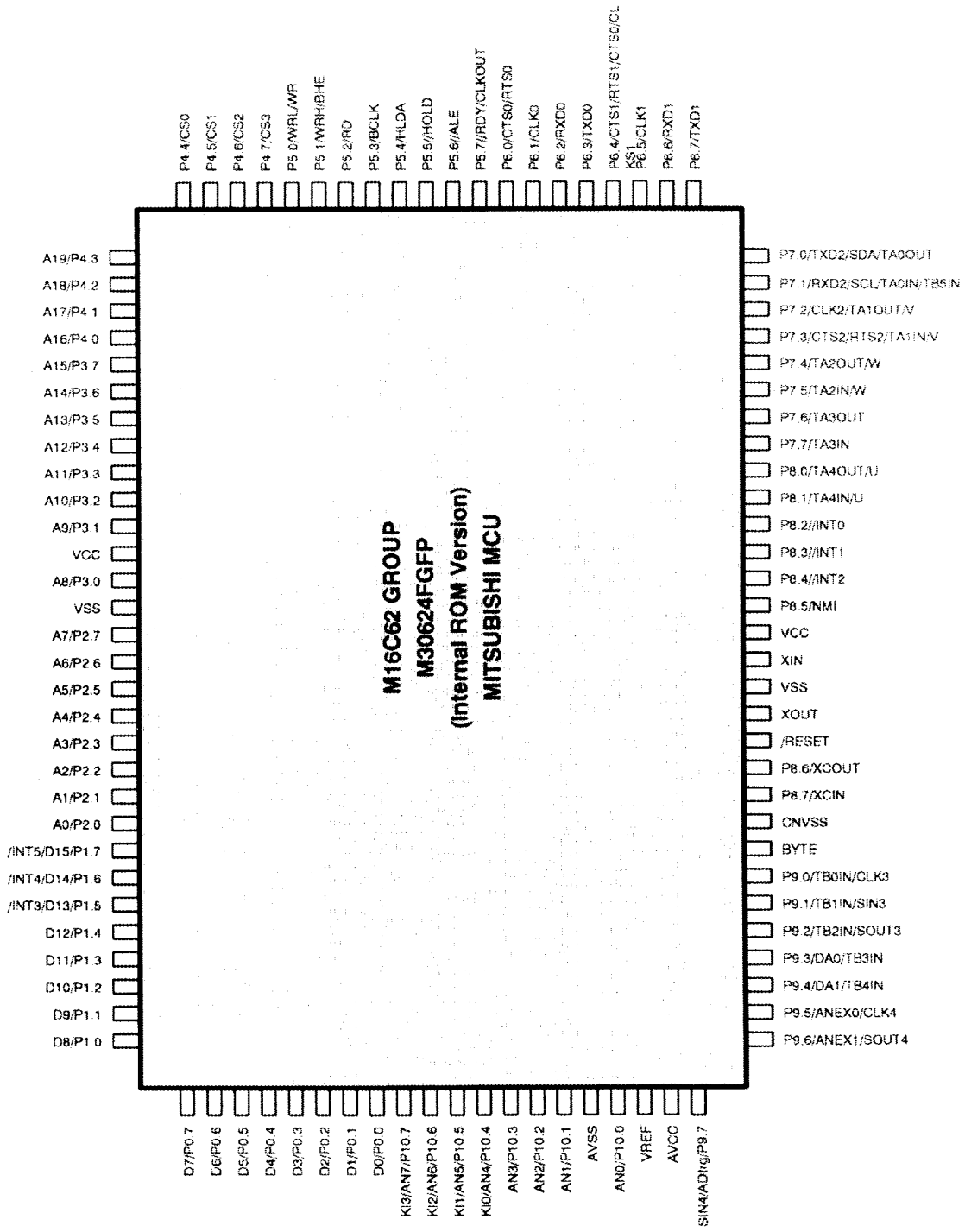
Figure5-5 Cleaning the Printer Head

Note : Never touch the thermal element with your hand. Doing so can damage the thermal element.
Note : Do not scratch the Printer Head.

6 Reference Information

6-1 Semiconductor Base Diagram

6-1-1 CPU

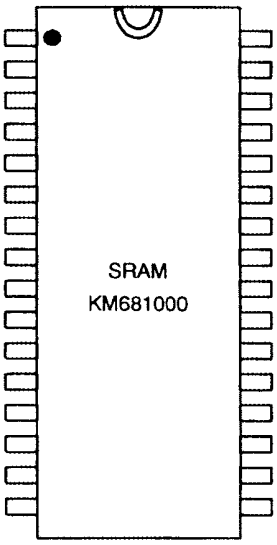


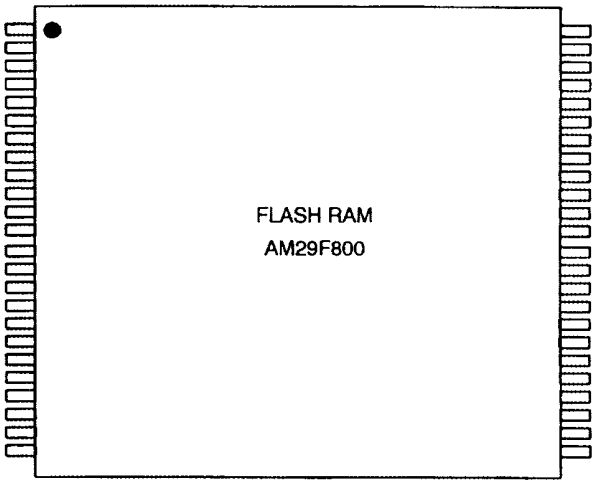
6-1 Semiconductor Base Diagram

Pin	Port	Function	I/O	Pin	Port	Function	I/O
1	P9.6	DIP_C3	In	51	P4.3	Address 19	Out
2	P9.5	DIP_C2	In	52	P4.2	Address 18	Out
3	P9.4	DIP_C1	In	53	P4.1	Address 17	Out
4	P9.3	DIP_R3	Out	54	P4.0	Address 16	Out
5	P9.2	DIP_R2	Out	55	P3.7	Address 15	Out
6	P9.1	DIP_R1	Out	56	P3.6	Address 14	Out
7	P9.0	DIP_R4	Out	57	P3.5	Address 13	Out
8	BYTE	+5V(VCC)	-	58	P3.4	Address 12	Out
9	CNVSS	+5V(VCC)	-	59	P3.3	Address 11	Out
10	P8.7	Parallel Paper Error	Out	60	P3.2	Address 10	Out
11	P8.6	Stepl1	Out	61	P3.1	Address 9	Out
12	RESET	Reset	In	62	VCC	+5V / VCC	-
13	XOUT	N.C	-	63	P3.0	Address 8	Out
14	VSS	Ground	-	64	VSS	Ground	Out
15	XIN	X-TAL(16.00MHz)	In	65	P2.7	Address 7	Out
16	VCC	+5V (VCC)	-	66	P2.6	Address 6	Out
17	P8.5	NMI Pull-Up (VCC)	-	67	P2.5	Address 5	Out
18	P8.4	Parallel / Init	Out	68	P2.4	Address 4	Out
19	P8.3	Parallel / SelectIn	In	69	P2.3	Address 3	Out
20	P8.2	Parallel / USB Interrupt	In	70	P2.2	Address 2	Out
21	P8.1	Step_B	Out	71	P2.1	Address 1	Out
22	P8.0	Step_A	Out	72	P2.0	Address 0	Out
23	P7.7	Parallel Write	Out	73	P1.7	Drawer #2	Out
24	P7.6	Buzzer	Out	74	P1.6	Drawer #1	Out
25	P7.5	Parallel Read	Out	75	P1.5	Paper LED	Out
26	P7.4	N.C	-	76	P1.4	Error LED	Out
27	P7.3	TPH Strobe #2	Out	77	P1.3	Parallel Auto Feed	In
28	P7.2	TPH Strobe #1	Out	78	P1.2	Parallel / Fault	Out
29	P7.1	Stepl0	Out	79	P1.1	Auto Cutter B	Out
30	P7.0	I/F Board Select	Out	80	P1.0	Auto Cutter A	Out
31	P6.7	TPH Data	Out	81	P0.7	Data7	In / Out
32	P6.6	TPH Latch	Out	82	P0.6	Data6	In / Out
33	P6.5	TPH Clock	Out	83	P0.5	Data5	In / Out
34	P6.4	DSR(RS-232),CTS(RS-485)	In	84	P0.4	Data4	In / Out
35	P6.3	ACK(Parallel),TXD(RS-232,RS-485)	Out	85	P0.3	Data3	In / Out
36	P6.2	SLCT(Parallel),RXD(RS-232,RS-485)	In	86	P0.2	Data2	In / Out
37	P6.1	Thermal Head Voltage On / Off	Out	87	P0.1	Data1	In / Out
38	P6.0	DTR(RS-232),RTS(RS-485)	Out	88	P0.0	Data0	In / Out
39	P5.7	/RDY	Out	89	P10.7	Thermal Temperature ADC Voltage	In
40	P5.6	Pull-Up (ALE)	-	90	P10.6	Parallel Busy	In
41	P5.5	Pull-Up (/HOLD)	-	91	P10.5	Auto Cutter Sensing S/W	In
42	P5.4	Pull-Up (/HLDA)	-	92	P10.4	Cover Sensing S/W	In
43	P5.3	N.C (BCLK)	-	93	P10.3	Near End Sensing S/W	In
44	P5.2	/RD	Out	94	P10.2	PaperFeed S/W	In
45	P5.1	N.C (/BHE)	-	95	P10.1	Paper End Sensing S/W	In
46	P5.0	/WR	Out	96	AVSS	Ground	-
47	P4.7	/CS3 (Chip Select 3) -USB CS	Out	97	P10.0	Drawer Compulsory Sensing S/W	In
48	P4.6	/CS2 (Chip Select 2)	Out	98	VREF	AD Reference Voltage Input	In
49	P4.5	/CS1 (Chip Select 1)	Out	99	AVCC	+5V (VCC)	-
50	P4.4	/CS0 (Chip Select 0)	Out	100	P9.7	DIP_C4	In

6-1 Semiconductor Base Diagram

6-1-2 Memorys



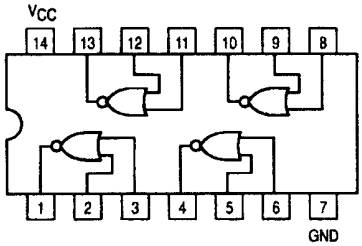


SRAM KM681000				FLASH RAM AM29F800					
Pin	Function	Pin	Function	Pin	Function	Pin	Function	Pin	Function
1	N.C	32	VCC	1	Address15	17	Address17	33	Data 2
2	Address16	31	Address15	2	Address14	18	Address7	34	Data 10
3	Address14	30	CS2	3	Address13	19	Address6	35	Data 3
4	Address12	29	/we	4	Address12	20	Address5	36	Data 11
5	Address7	28	Address13	5	Address11	21	Address4	37	VCC
6	Address6	27	Address8	6	Address10	22	Address3	38	Data 4
7	Address5	26	Address9	7	Address9	23	Address2	39	Data 12
8	Address4	25	Address11	8	Address8	24	Address1	40	Data 5
9	Address3	24	/OE	9	N.C	25	Address0	41	Data 13
10	Address2	23	Address10	10	N.C	26	/CE	42	Data 6
11	Address1	22	/CS1	11	/WE	27	VSS	43	Data 14
12	Address0	21	Data7	12	/RESET	28	/OE	44	Data 7
13	Data0	20	Data6	13	N.C	29	Data0	45	Data15
14	Data1	19	Data5	14	N.C	30	Data8	46	VSS
15	Data2	18	Data4	15	/RY/BY	31	Data1	47	/BYTE
16	GND	17	Data3	16	Address18	32	Data9	48	Address16

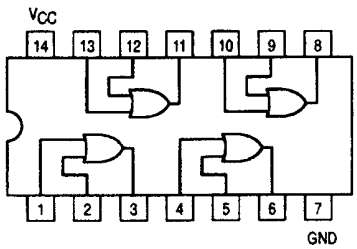
6-1 Semiconductor Base Diagram

6-1-3 Logic ICs

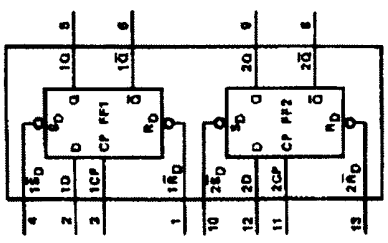
74HC02

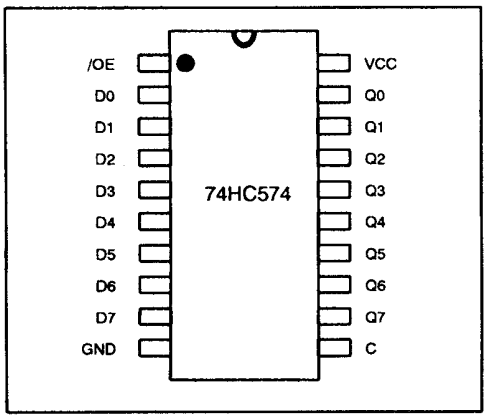


74HC32



74HC74



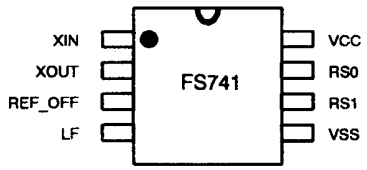


74HC574 FUNCTION TABLE

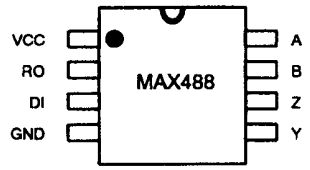
INPUT			OUTPUT Q
/OC	C	D	
L	H	H	H
L	H	L	L
L	L	X	Q0
H	X	X	Z

6-1-4 Other Semiconductor Chip

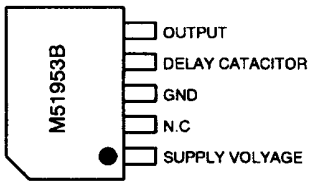
Low EMI Spectrum Spread Clock



Differential Bus Transceivers



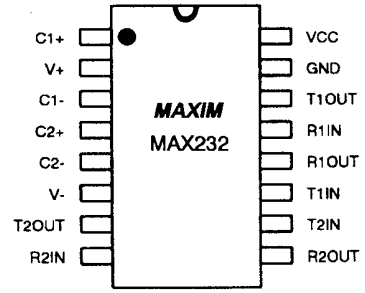
Voltage Detect System Reset IC



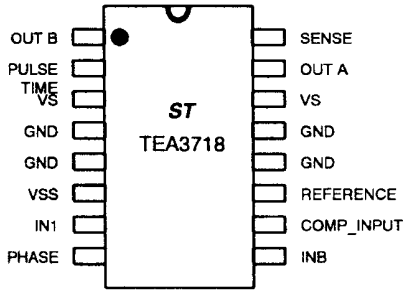
MAX488 DRIVER			MAX488 RECEIVER		
INPUT	OPERATION		DIFFERENTIAL INPUT		OUTPUT
DI	Y	Z	A-B		RO
H	H	L	$V_{ID} \geq$ 0.2 V		H
L	L	H	-0.2 V < V_{ID} < 0.2 V		?
			$V_{ID} \leq$ -0.2 V		L

6-1 Semiconductor Base Diagram

Serial Comm Driver/Receiver



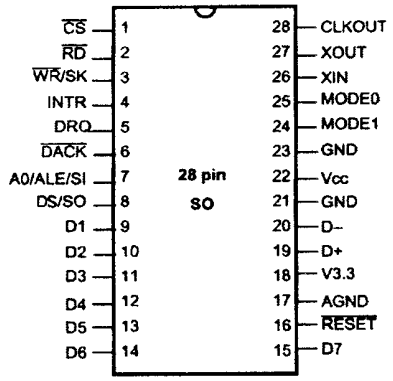
Step Motor Driver



TEA3718 DRIVER TRUTH TABLE

IN1	IN2	CURRENT	REMARK
H	H	NO CURRENT	
L	H	LOW CURRENT	
H	L	MEDIUM CURRENT	
L	L	MAXIUM CURRENT	

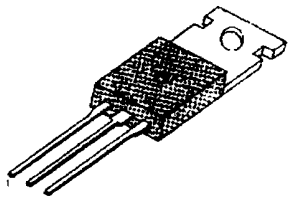
USB Controller : USBN9602



6-1 Semiconductor Base Diagram

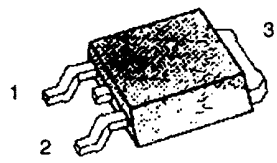
6-1-5 TR, FET, Diode Component

TR D560



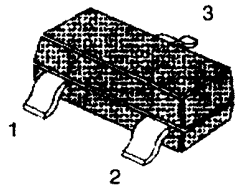
1: Base 2: Collector 3: Emitter

FET IRFR9024



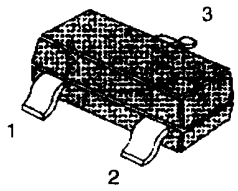
1: Drain 2: Gate 3: Source

TR MMBT2222



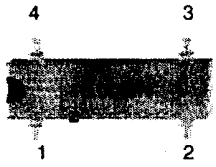
1:Base 2: Emitter 3: Collector

DIODE MMBD6050L



1:Anode 2: N.C 3: Cathode

OSCILLATOR 16[MHz]



1:X1 2: N.C 3: N.C 4: X2

7 Special Circuit Descriptions

7-1 Power Circuit

This system is operated under 120Vac or 230Vac. The power circuit supplies the three different DC voltage sources.

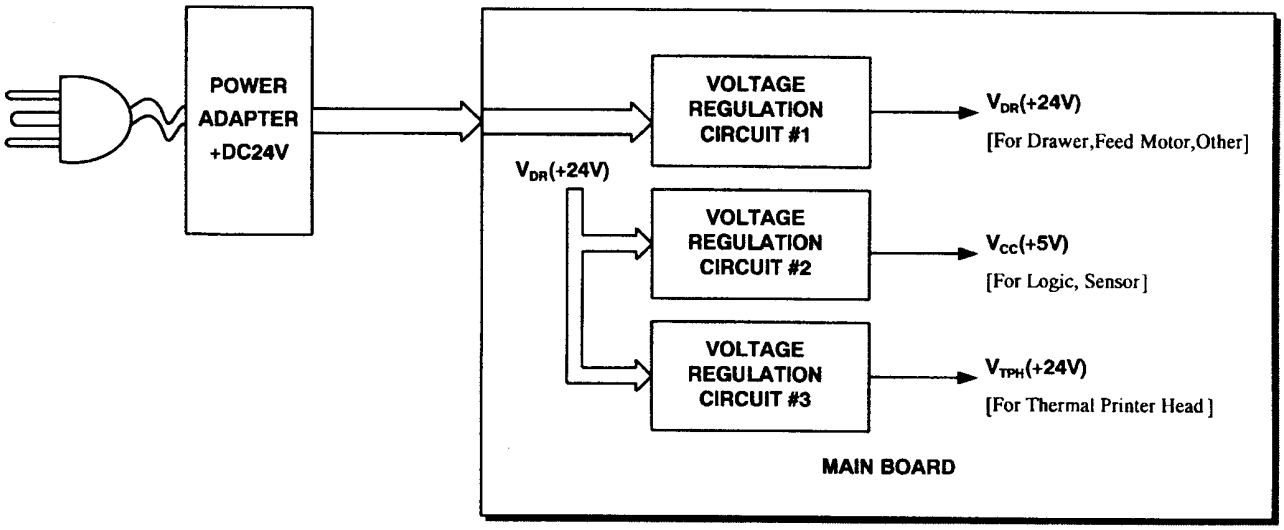


Figure 7-1 Power Block Diagram

NO.	VOLTAGE	DESCRIPTION
1	V_{DR} (+24VDC)	Cash Drawer Solenoid Driving / Step Motor Voltage
2	V_{CC} (+5VDC)	Logic IC Driving Voltage
3	V_{TPH} (+24VDC)	Thermal Printer Head(TPH) Voltage

Table 7-1 Power Source Voltage Descriptions

7-1-1 Drawer Driving and Feed, Auto Cutter Motor Voltage : +24Vdc

+24VDC is supplied from SMPS. This Voltage is smoothed by capacitors(C4,201,202,207). This voltage is used as a Cash Drawer Solenoid driving voltage, Step motor driving voltage and a source voltage of the other voltage sources.

7-1-2 Logic IC Driving Voltage: +5V

+5Vdc Logic driving voltage is produced by the step-down dc-dc converter U5(34063A). That is, U5 produces rectangular wave. This makes D6(IN5822) and L1 store energy. The voltage is smoothed by C5(470uF) and then +5Vdc Logic voltage is produced .

7-1-3 TPH Driving Voltage: +24Vdc

Q3(2222) is turned on by ON_OFF(P6.1) signal on CPU.

7-2 RESET Circuit

Reset signal is a signal in order to start-up CPU under Power-on. Reset circuit uses a reset ICM51953B(U10). When +5Vdc is fallen under 4.3Vdc by Power-off, reset signal prohibits the system from misoperating by lowering down to 0V.

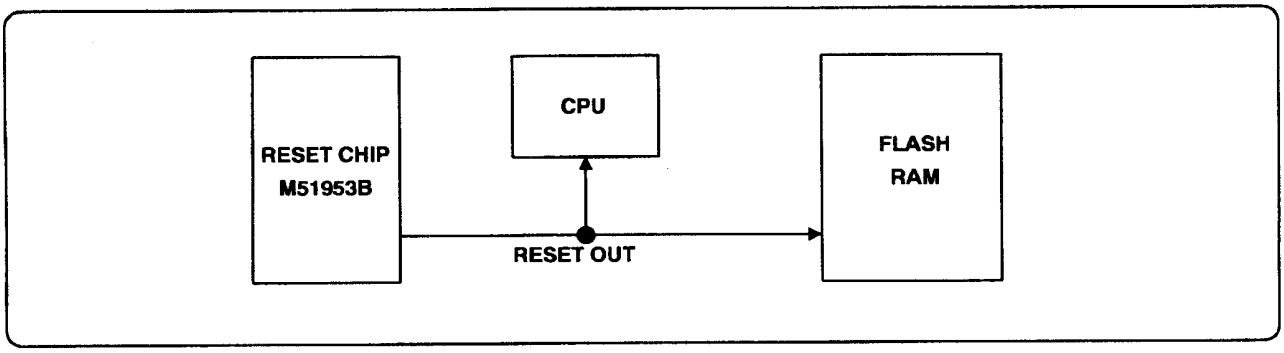


Figure 7-2 Reset Block Diagram

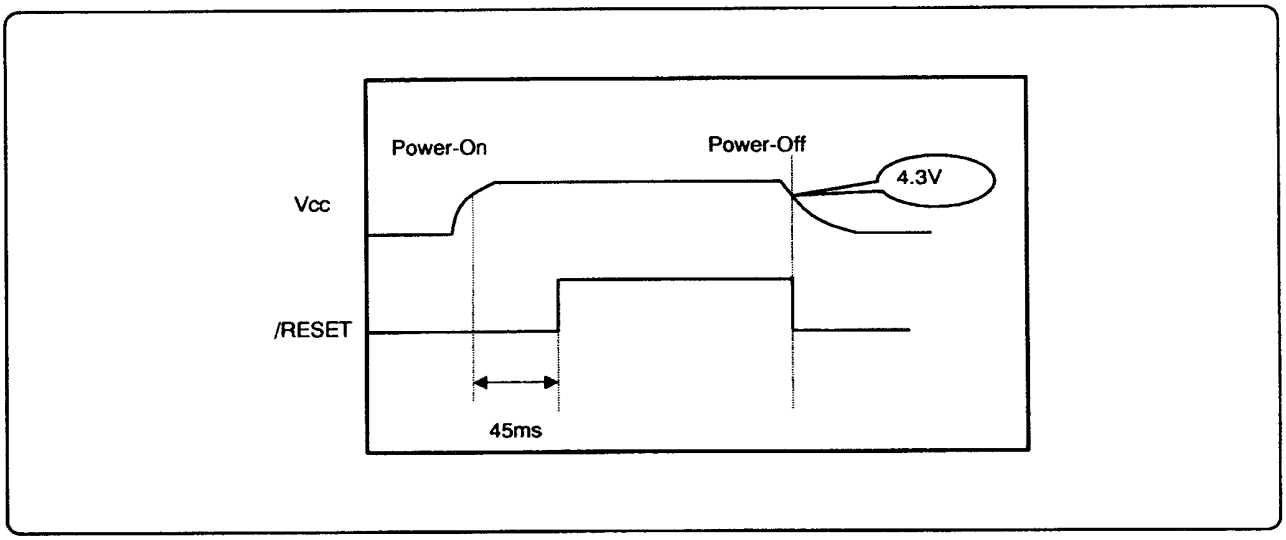


Figure 7-3 Reset Waveform

7-3 Buzzer and Cash Drawer circuits

7-3-1 Buzzer Driving Circuit

The Buzzer is used to inform several kinds of states which occur under system operating and gives some information to users by controlling the P7.6 of CPU(M30624FGFP).

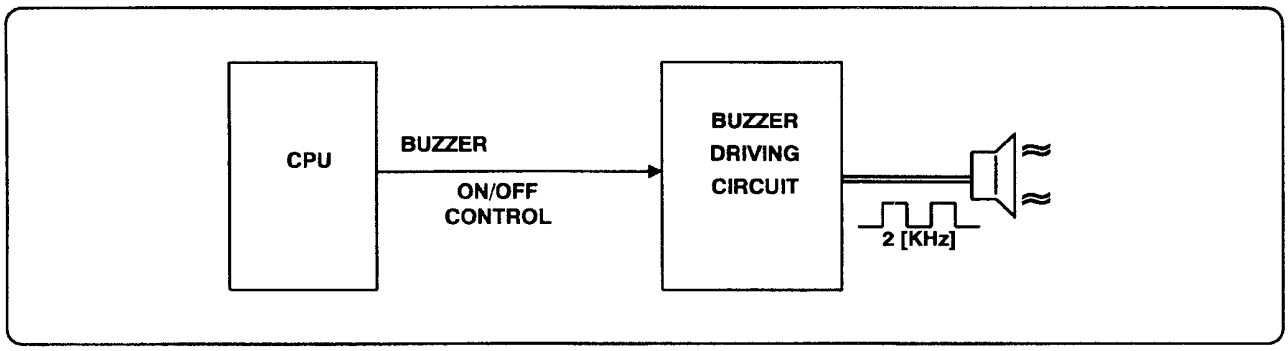


Figure 7-4 Buzzer Block Diagram

7-3-4 Cash Drawer Driving Circuit

The circuit is used for opening cash drawer and driven by the Q1,Q2(D560). When its state is high level signal, Q1 or Q2 (D560) drive the solenoid to open the cash drawer. As an optional item, we provide sensor switch (we call it a compulsory switch) which checks the drawer whether it is opened or not. This sensor switch turns on for the drawer open condition, and turns off for the other.

Caution: make sure that the Cash Drawer solenoid resistance is more than 20Ω

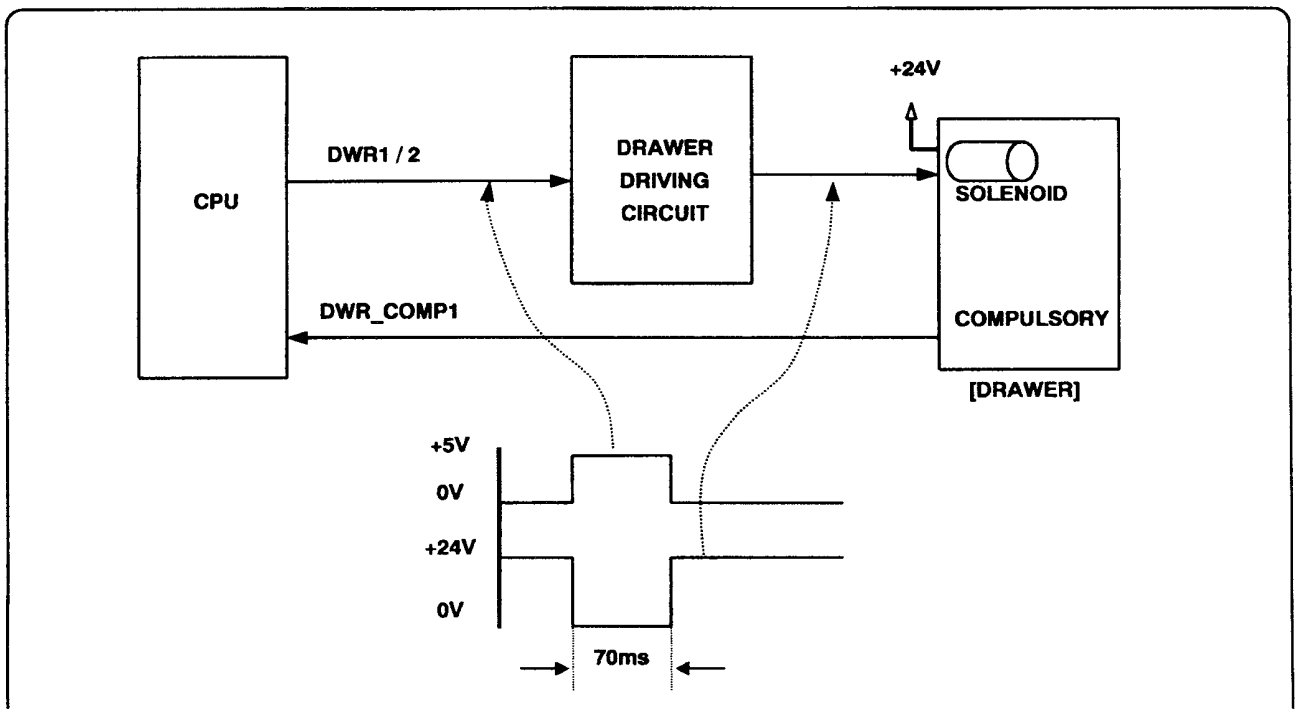


Figure 7-5 Cash Drawer Block Diagram

7-4 I/F PBA Detect Block Diagram

When the printer is ON, the printer checks what kind of the I/F PBA is installed. After detection, the CPU specify the I/O port properly. The following is the method of I/F PBA detection.
First, The CPU sends a "I/F Sel " signal (P7.0) to I/F PBA. The I/F PBA has the three return Signal (DIP1~3). The CPU recognize the I/F PBA by the value of the three return signal.

I/F PBA	DIP_C1	DIP_C2	DIP_C3
RS-232C	L	L	H
RS-485	L	H	L
IEEE1284	H	L	L
USB	H	H	L
NO CONNECTION	L	L	L

Table 7-2 I/F PBA Detector Descriptions

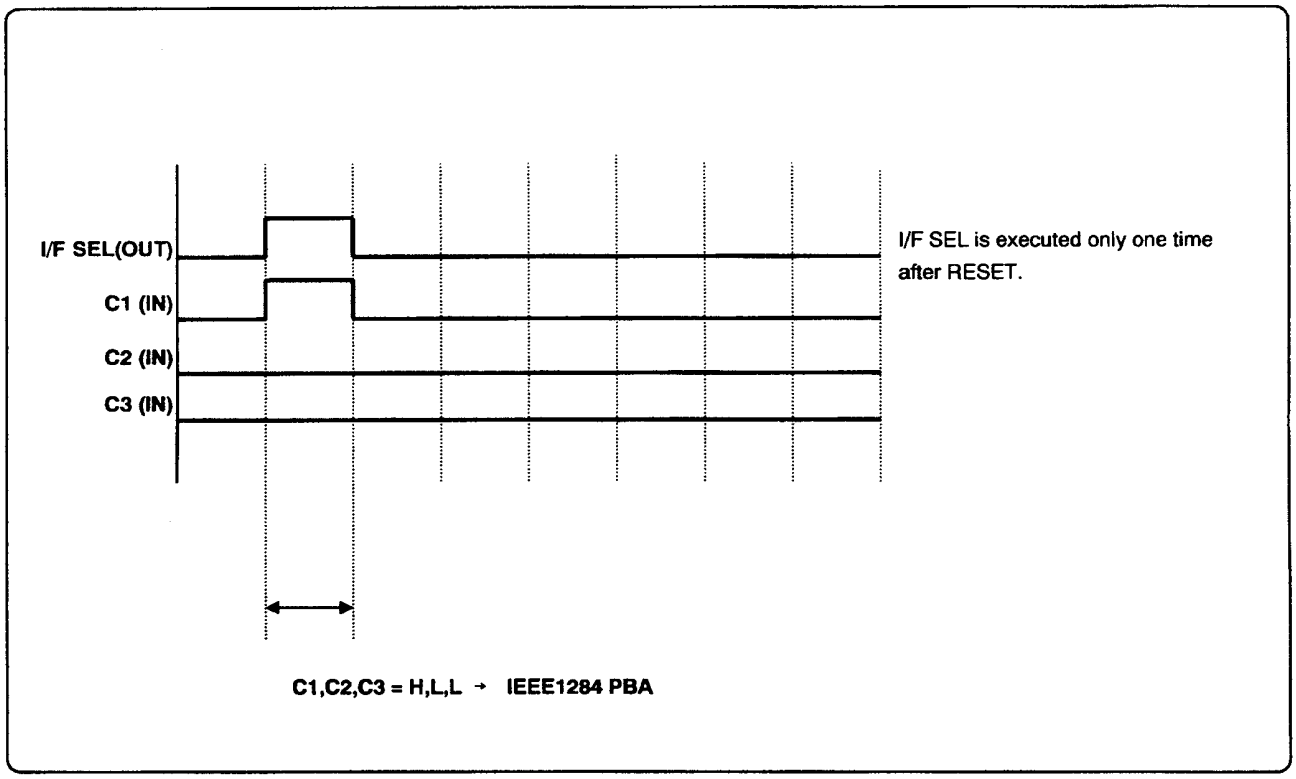


Table 7-6 I/F PBA Detector Block Diagram

7-4 RS-232C Communication Block Diagram

The CPU is used for serial communication. And also RS-232C Driver(MAX232), is used to serial communication. Show following block diagram

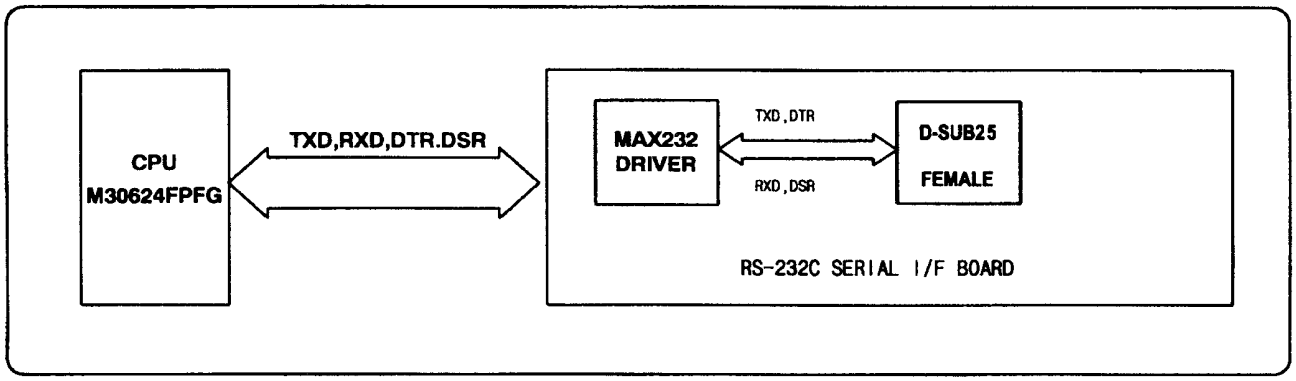


Figure 7-7 RS-232C Communication Block Diagram

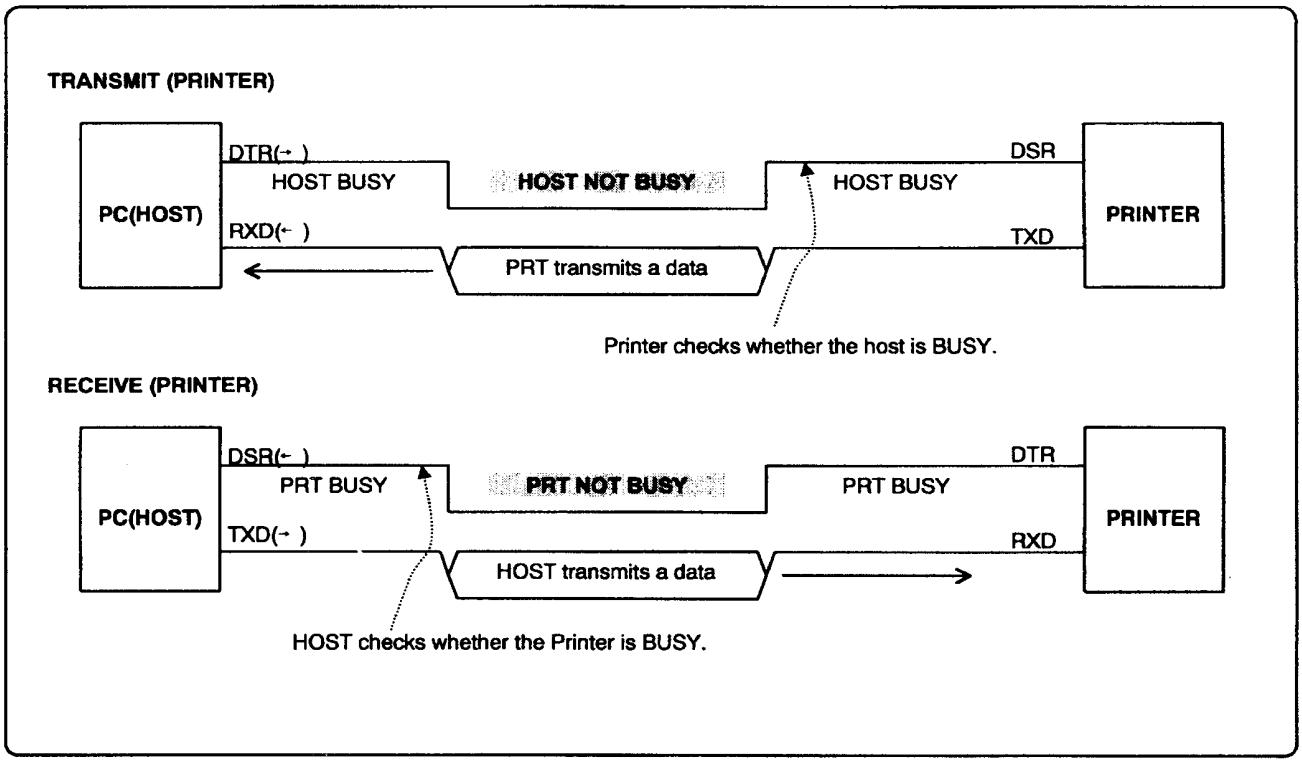


Figure 7-8 RS-232C Communication Waveform

7-5 RS-485 Communication Block Diagram

The CPU is used for serial communication. And also RS-485 Driver(MAX488), is used to serial communication. Show following block diagram

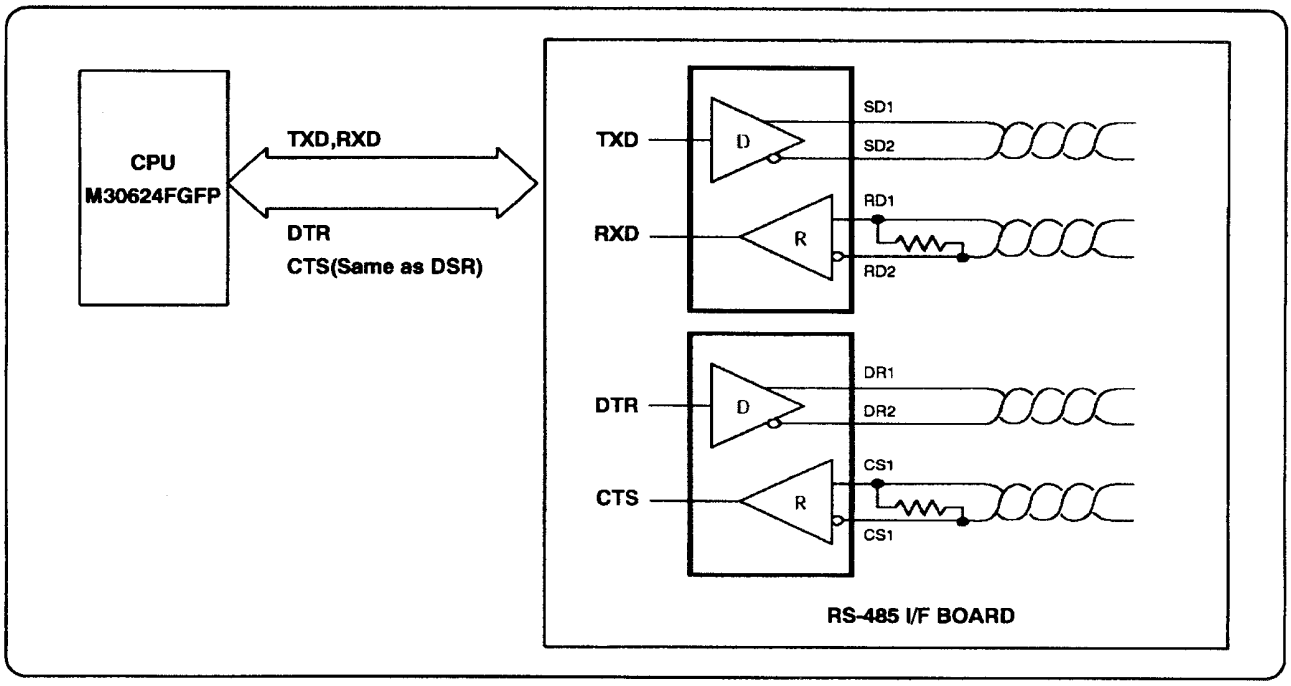


Figure 7-9 RS-485 Communication Block Diagram

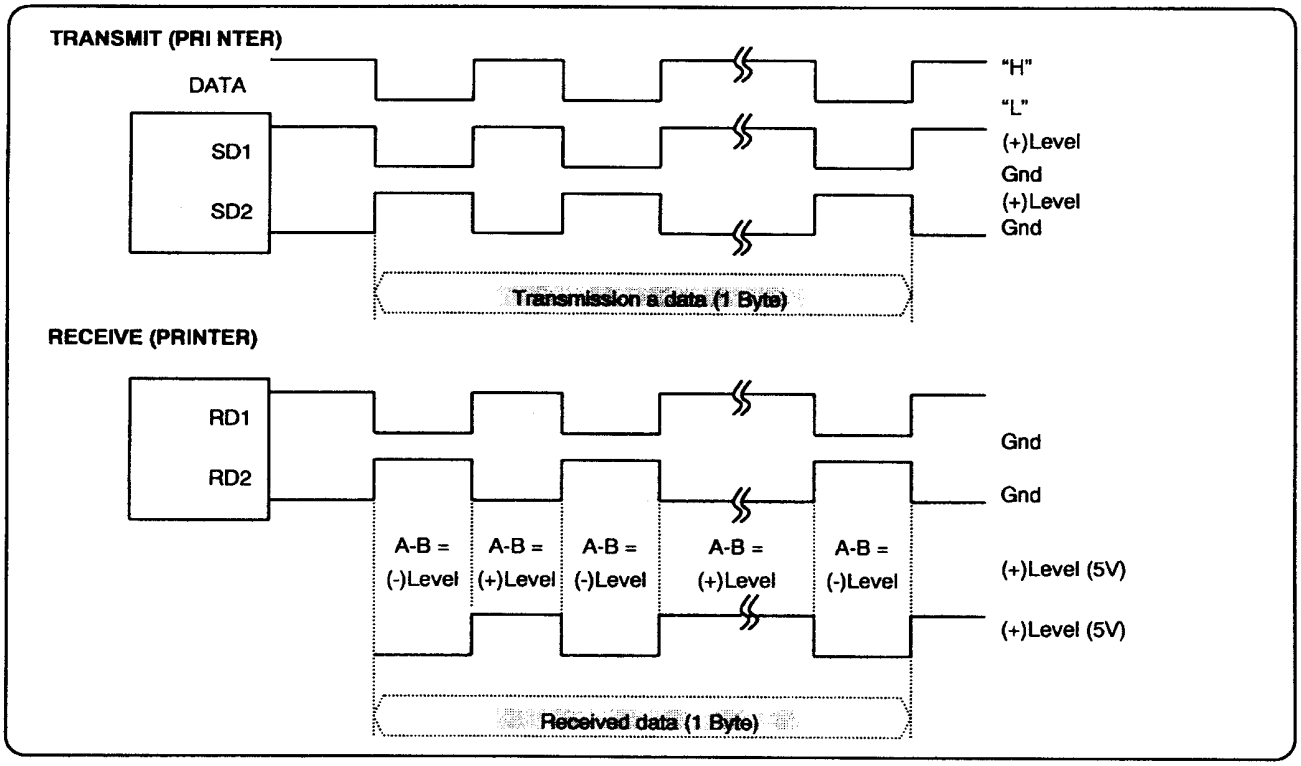


Figure 7-10 RS-485 Waveform

7-6 Parallel Communication Block Diagram

The printer support the budirectional Parallel Interface with Centronics, Nibble, Byte Mode.
The Centronics is Forward Mode and the Nibble, Byte are Reverse Mode.

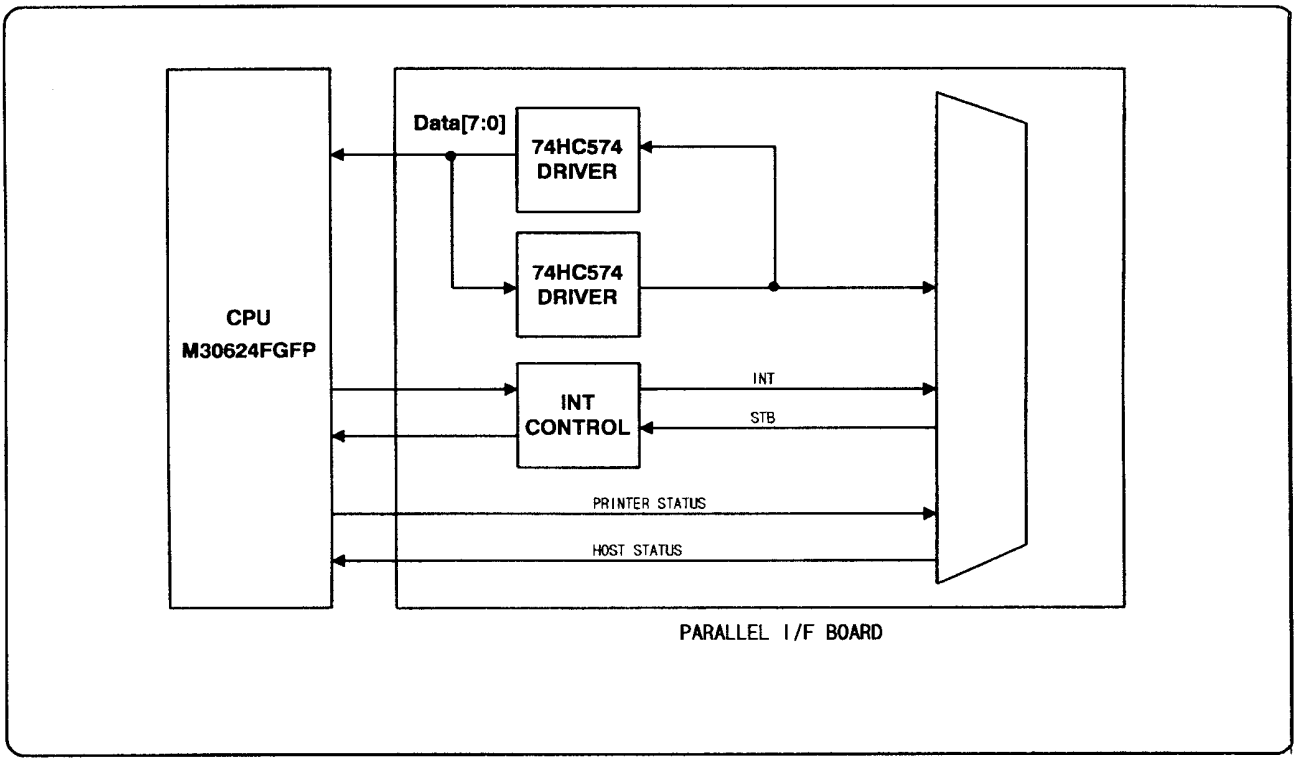


Table 7-11 IEEE-1284 Communication Block Diagram

7-7 USB Communication Block Diagram

The printer support the USB(Universal Serial Bus). The transfer type of the printer is the BULK.

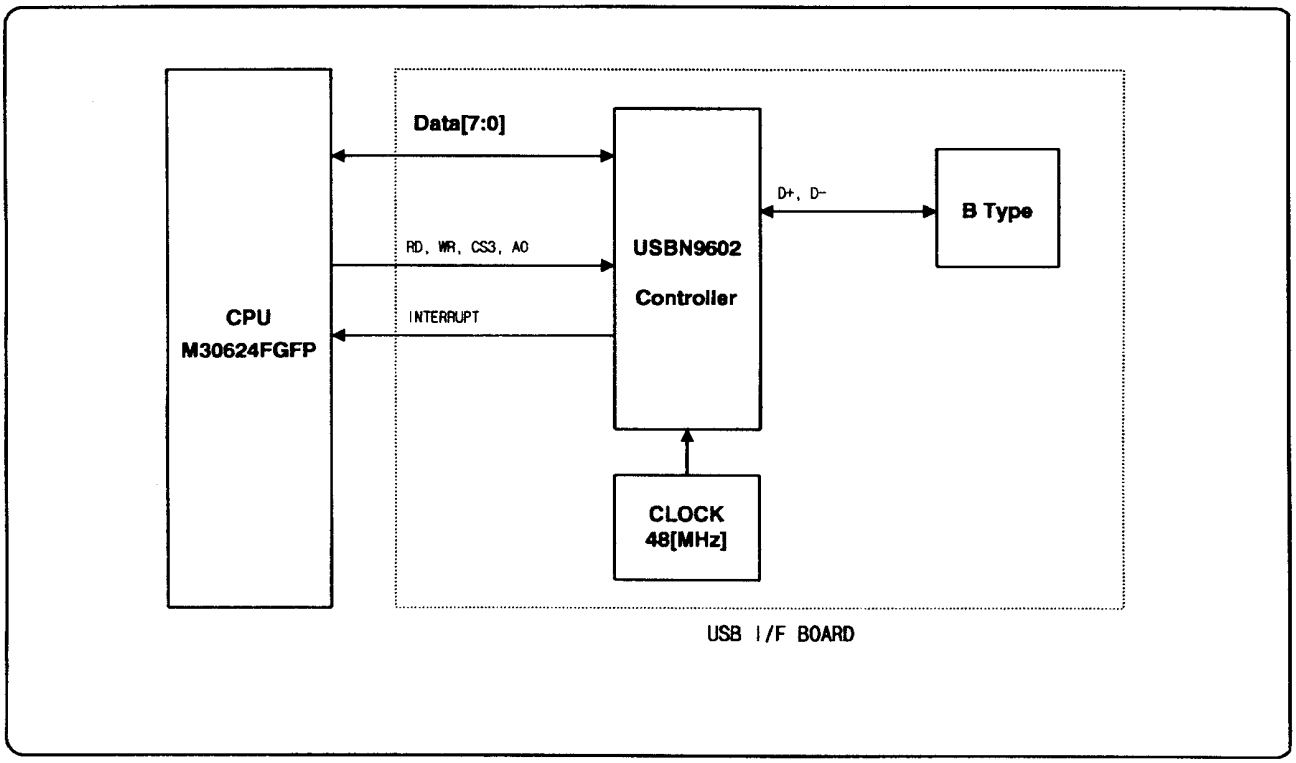


Table 7-12 USB Communication Block Diagram

7-8 DIP Switch Circuit

The key Board Circuit consist of the scan signal of 4 lines and the return signal of 4-line. The CPU sends repeatedly and continuously the scan data R1~R4 through P9.0~P9.3. The DIP S/W information input in the return signal if the specific DIP S/W is ON Status during the given time. The CPU reads the data through C1~C4 and analyzes what DIP S/W is ON and performs the selected function.

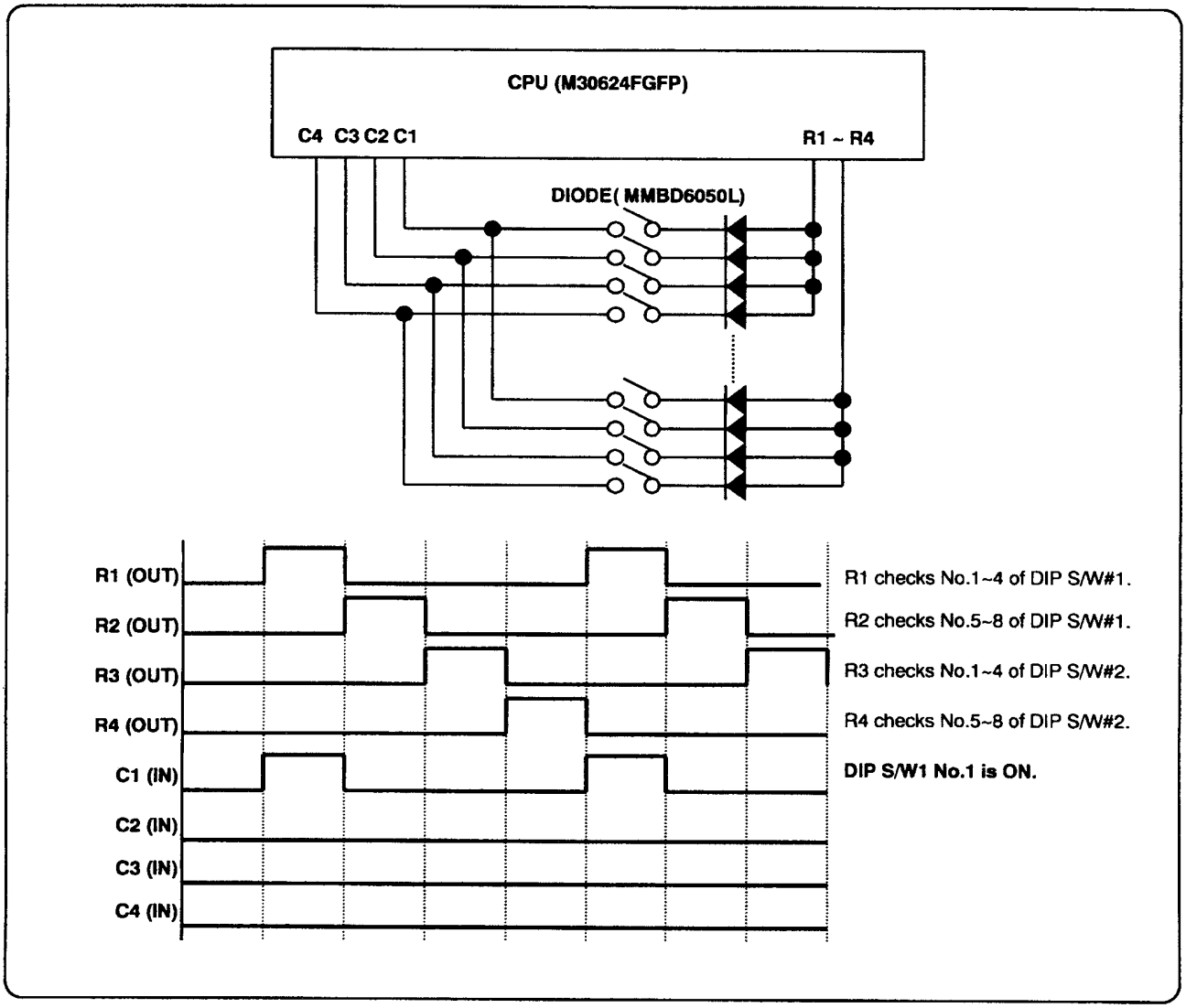


Figure 7-13 DIP Switch Block Diagram

7-9 Thermal Printer Circuit

First, the CPU sends a Serial Clock and Serial Data 256Bits(32 Bytes) to the Shift Register of the Thermal Printer. The Serial Data are stored to each Shift Register in the Thermal Printer. Because the Data#1 Pin and the Data#2 pin are shorted on Main PCB, the Data(256Bits) are stored in both Shift Register#1 and #2. Second, the CPU send a Latch Signal to the Thermal Printer. Then, the Data of both Shift Register#1 and #2 (256*2=512 Bits) are moved to the Latch Register. After that, the CPU sends a Strobe Signal to the Thermal Printer. Then, the Printer outputs the Serial Data. Each Strobe Signal manages the Printer Dot.

STB No.	DOT No.	DOTs/STB	SRP-350 Strobe Processing
STB1	1 ~ 256	256	The content of data is same.
STB2	257 ~ 512	256	

Table 7-3 Printer Head Strobe Processing

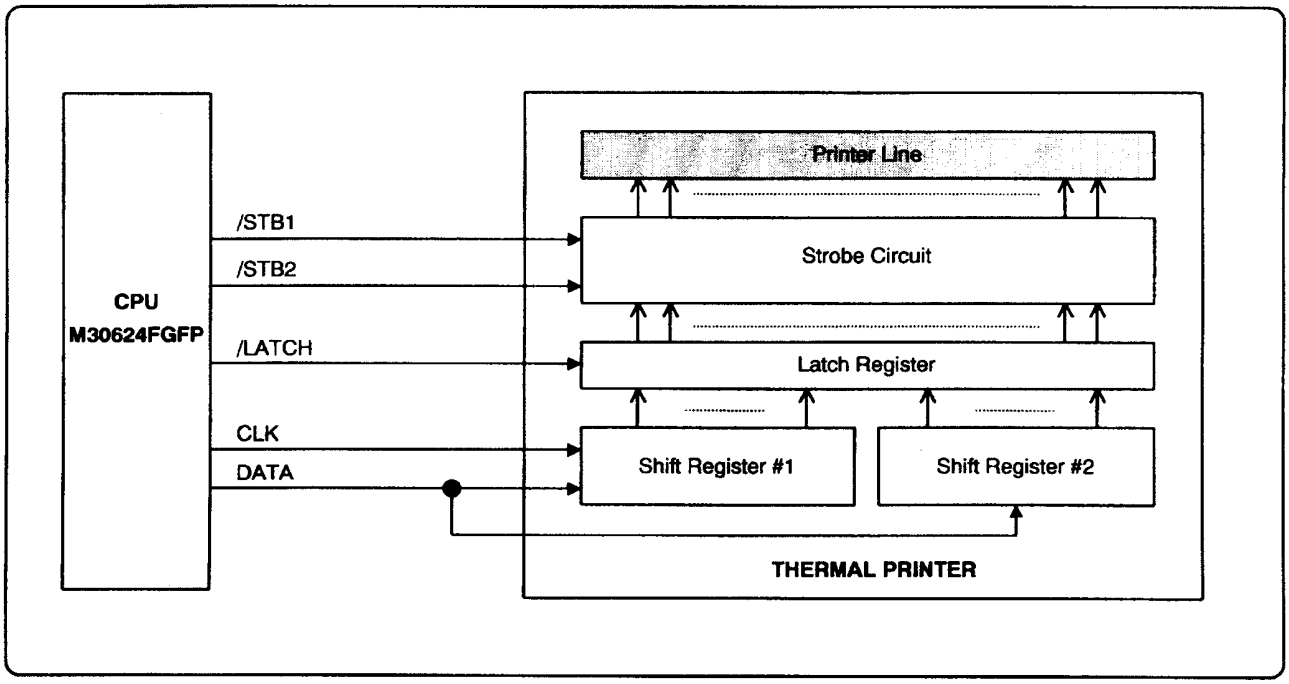


Figure 7-14 Thermal Printer Block Diagram

7-9 Thermal Printer Circuit

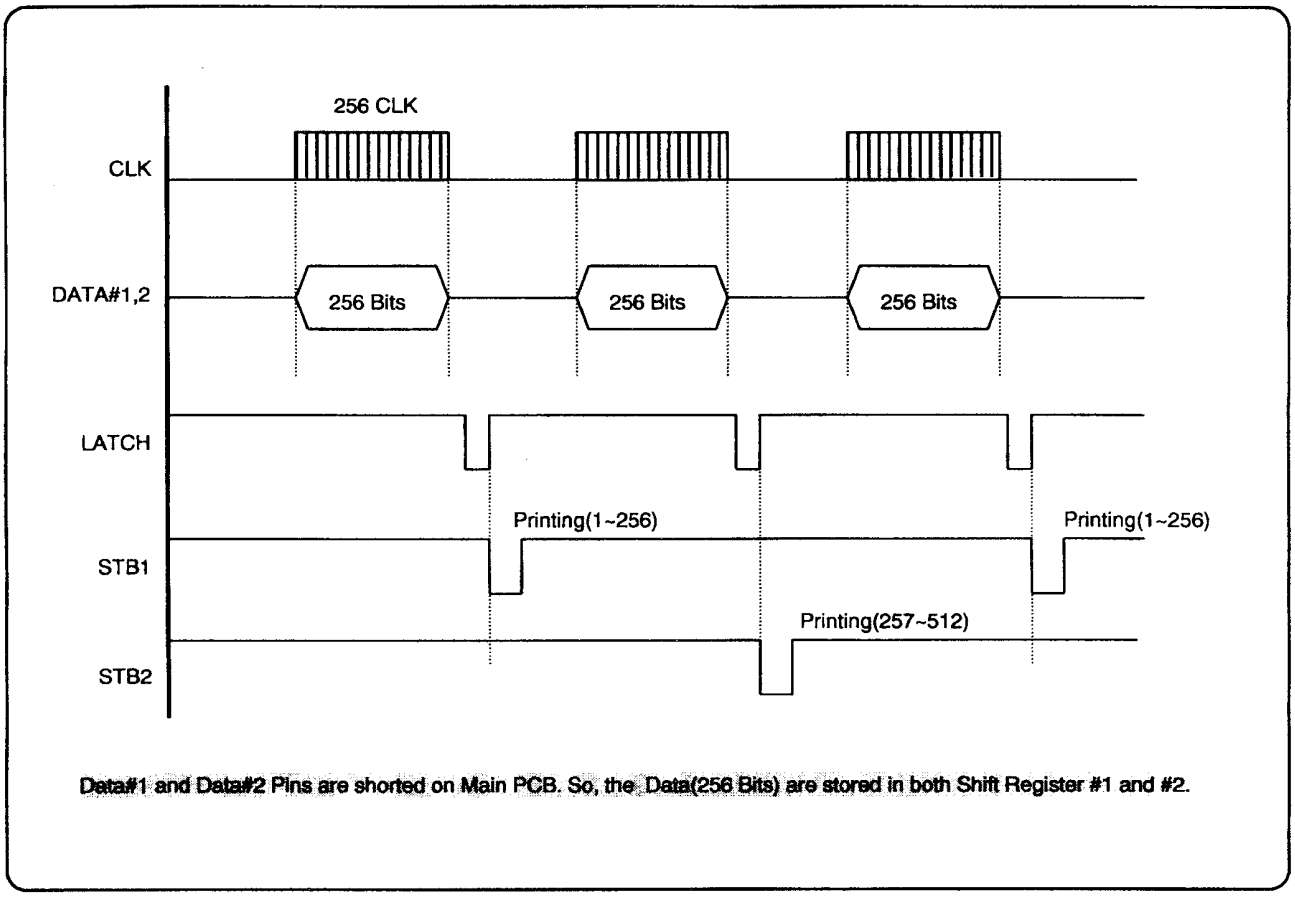
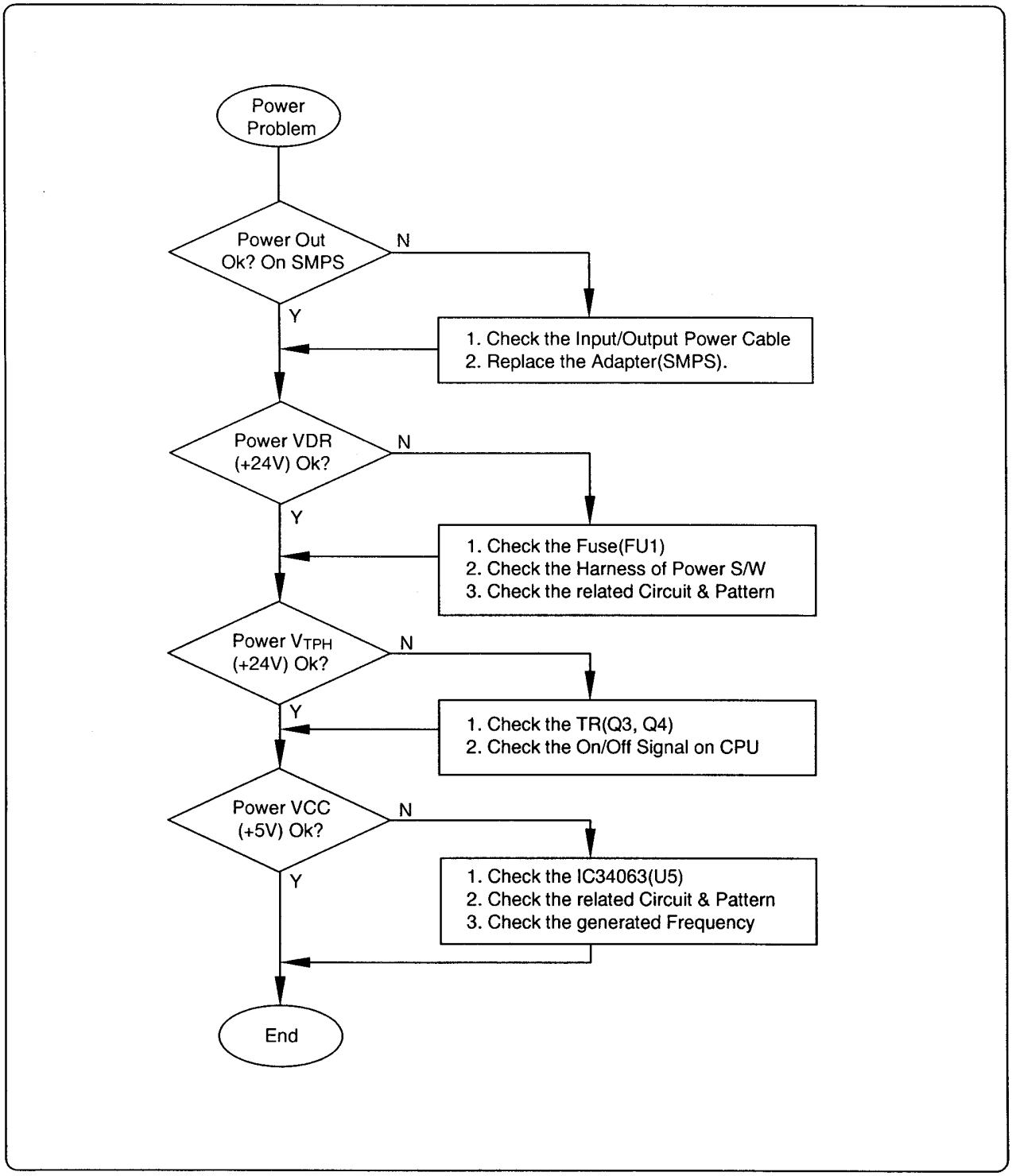


Table 7-15 Thermal Printer Timing Waveform

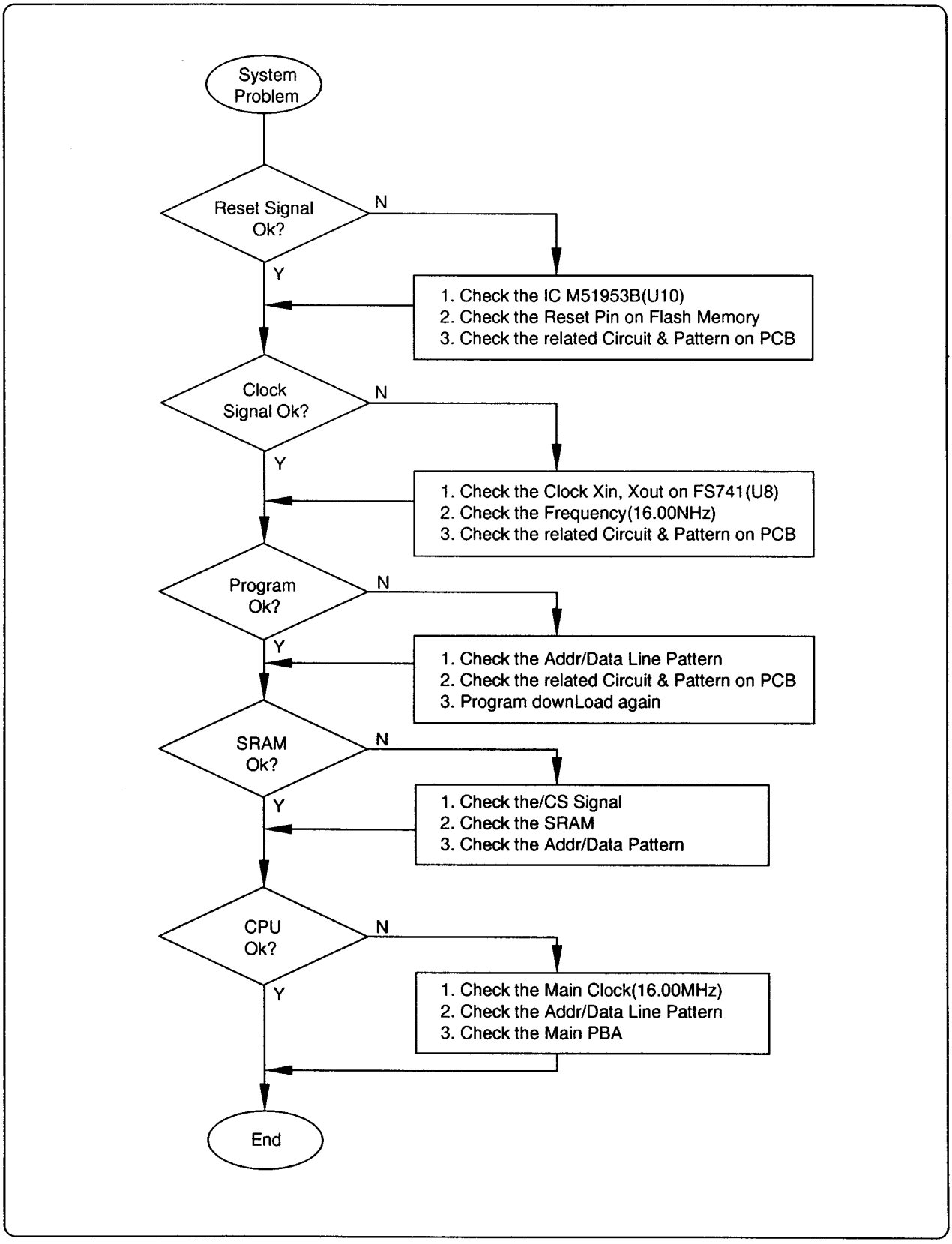
8 Troubleshooting

This chapter describes the methods for troubleshooting in this Receipt Printer.

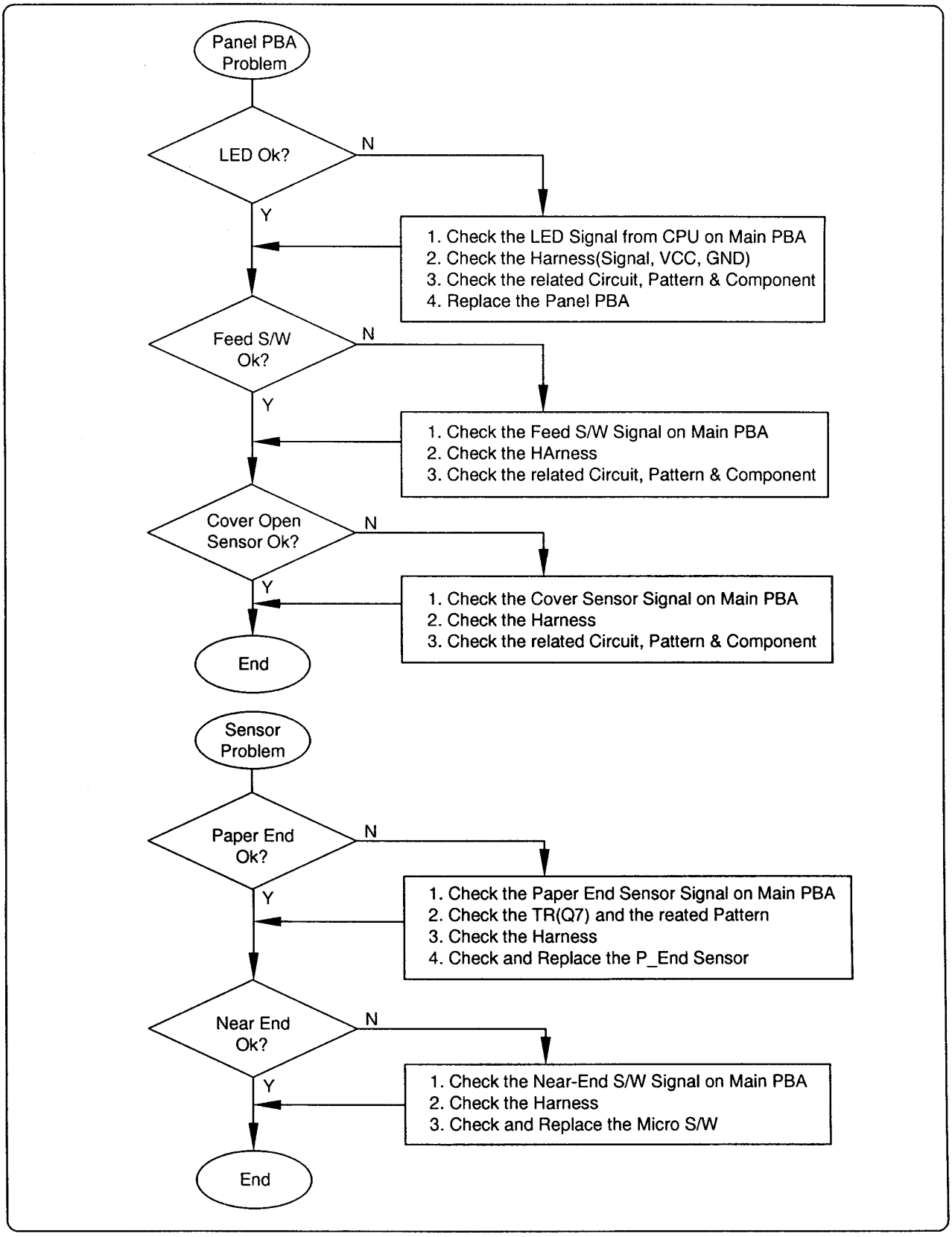
8-1 Power Problem



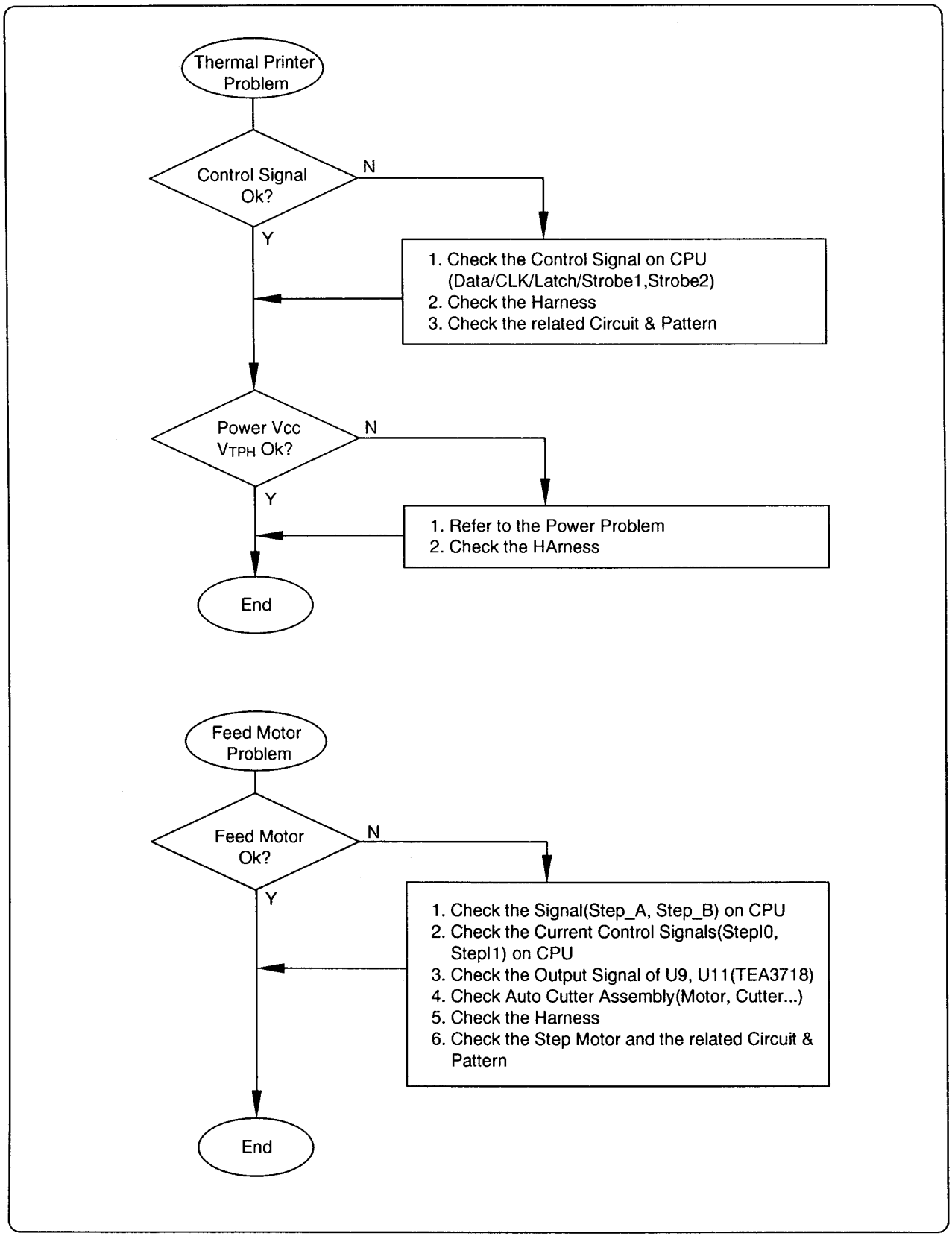
8-2 System Problem



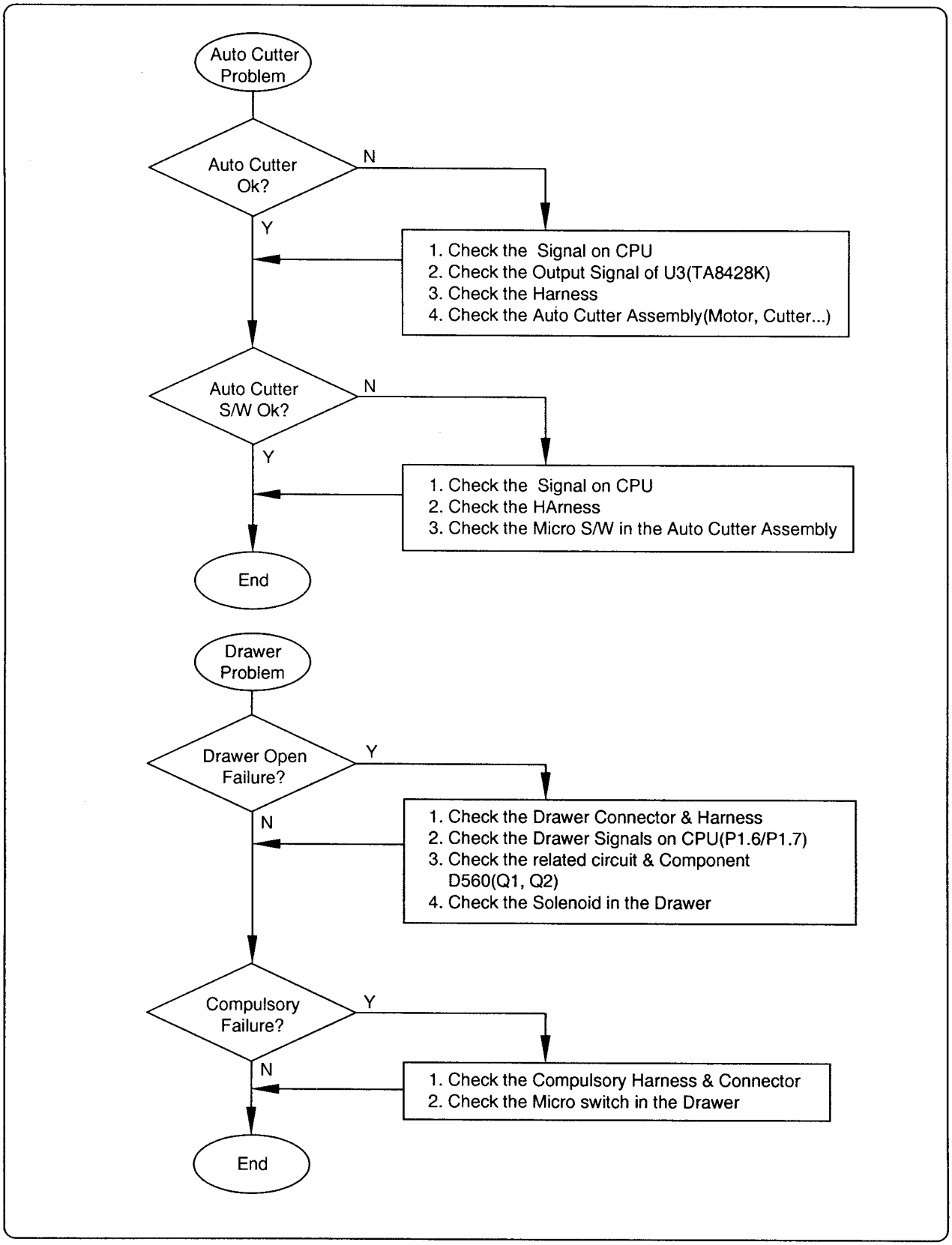
8-3 Panel PBA and Sensor Problem



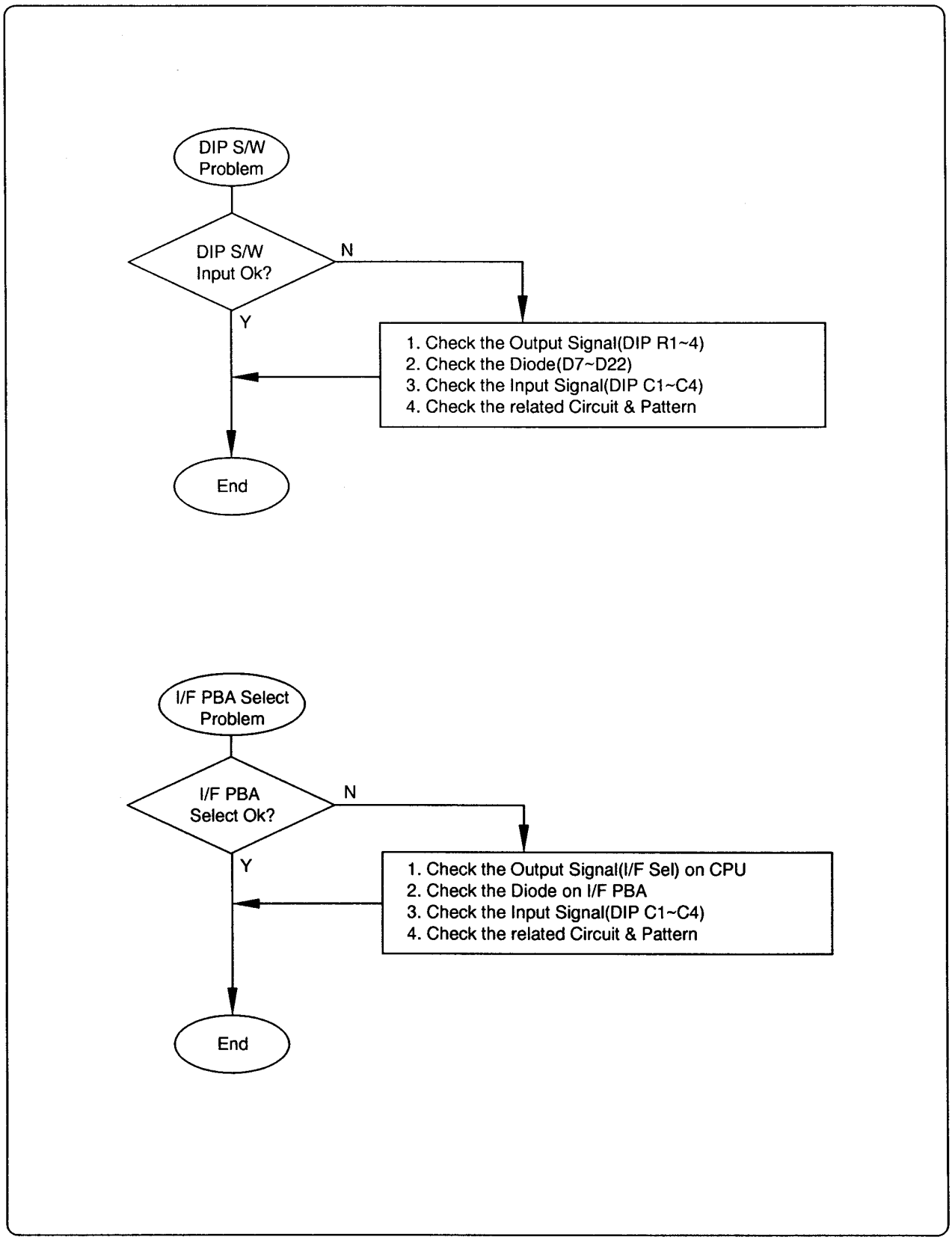
8-4 Thermal Printer and Feed Motor Problem



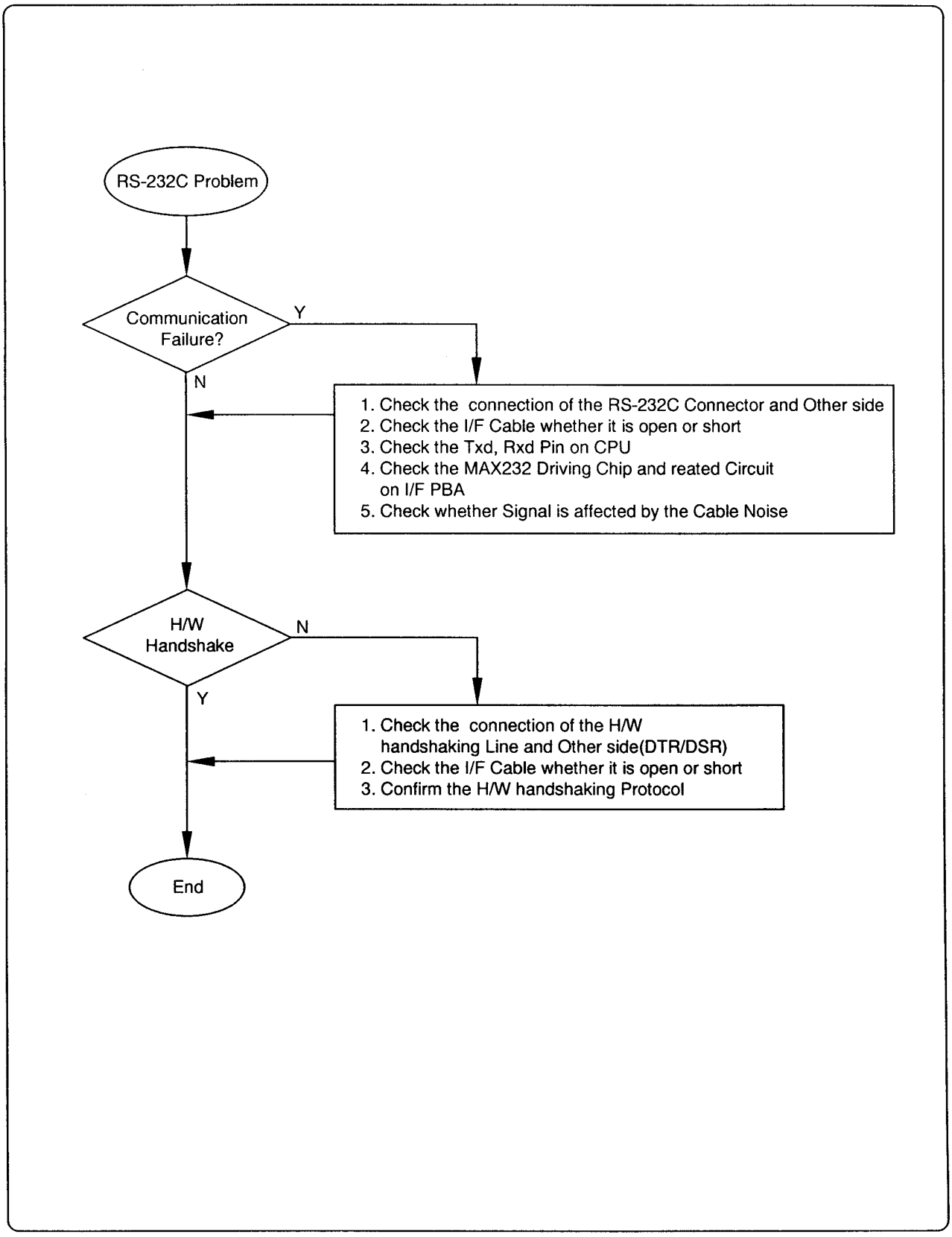
8-5 Auto Cutter and Drawer Problem



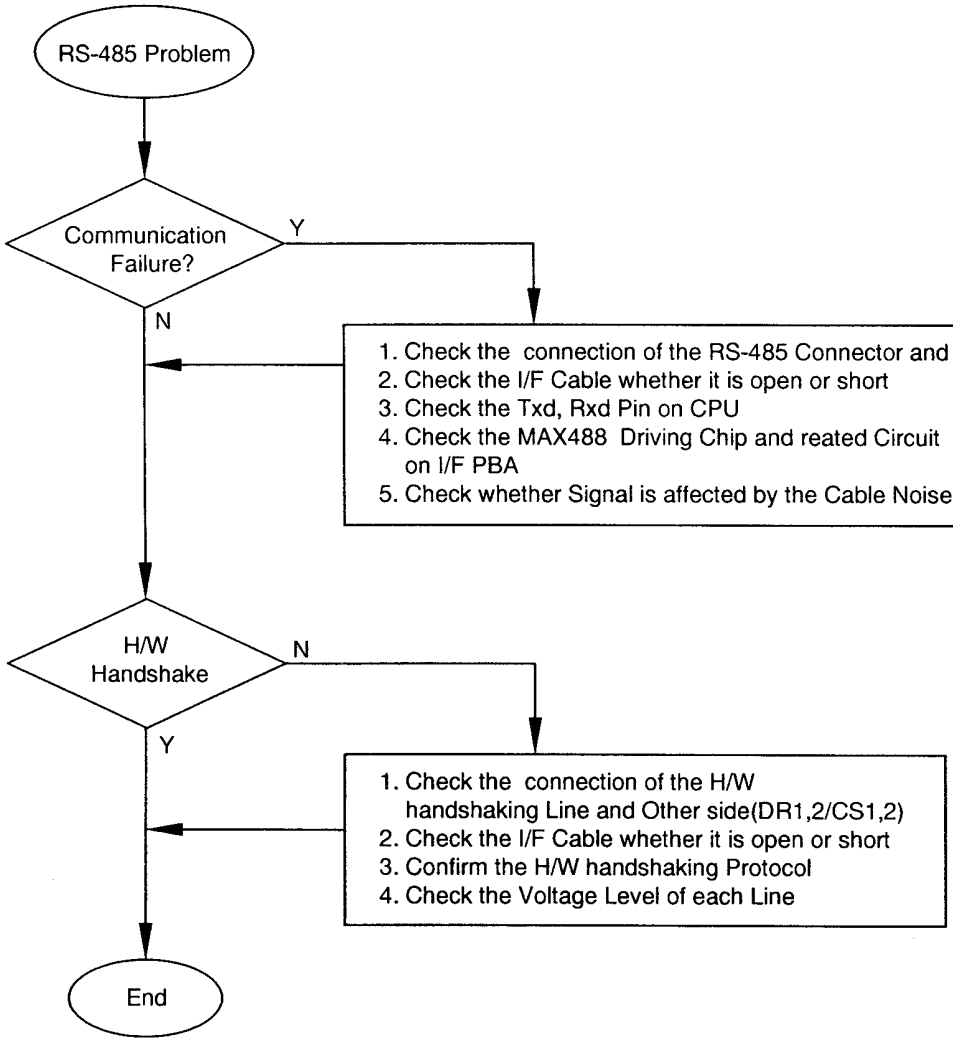
8-6 DIP S/W and I/F PBA Select Problem



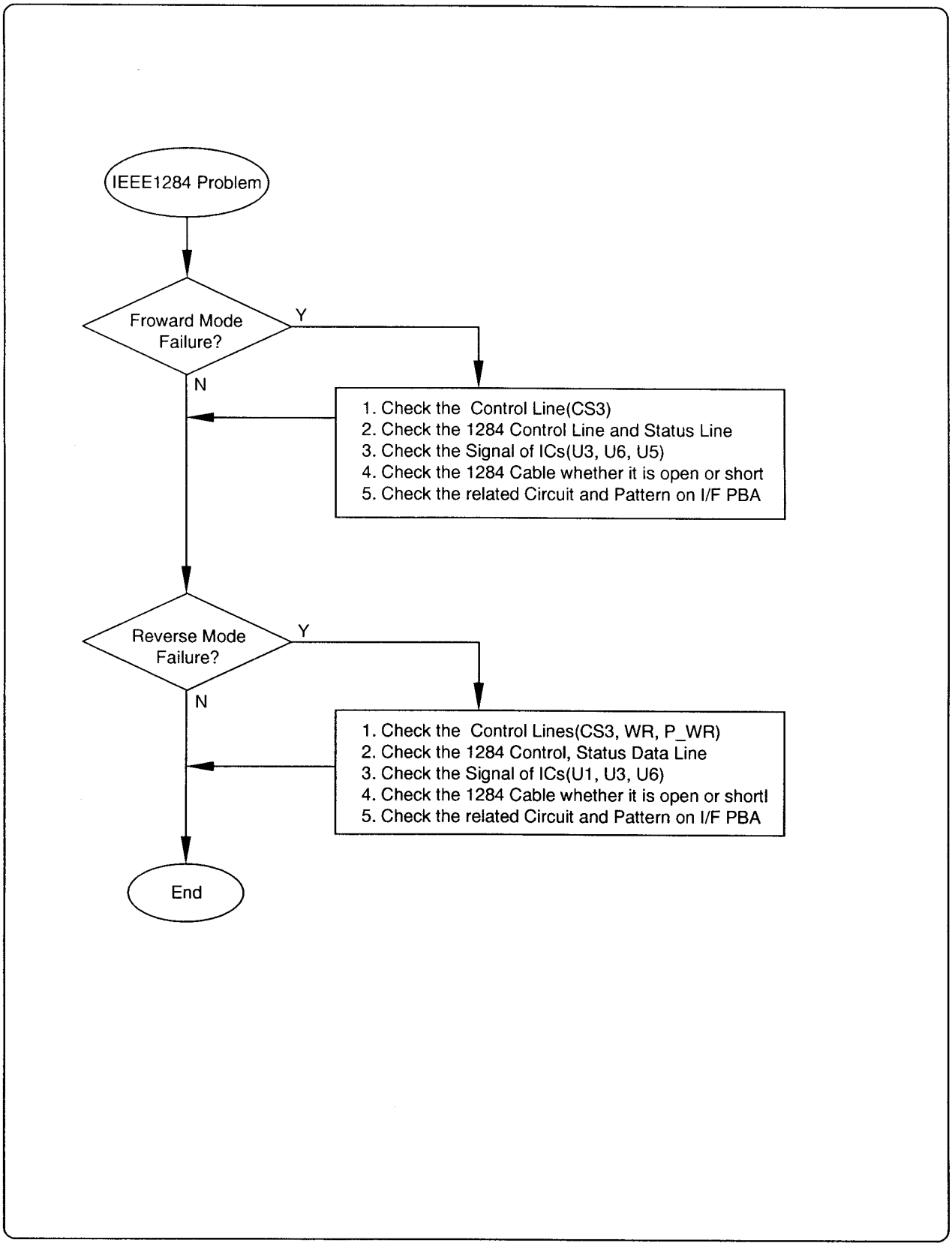
8-7 RS-232C Serial Communication Problem



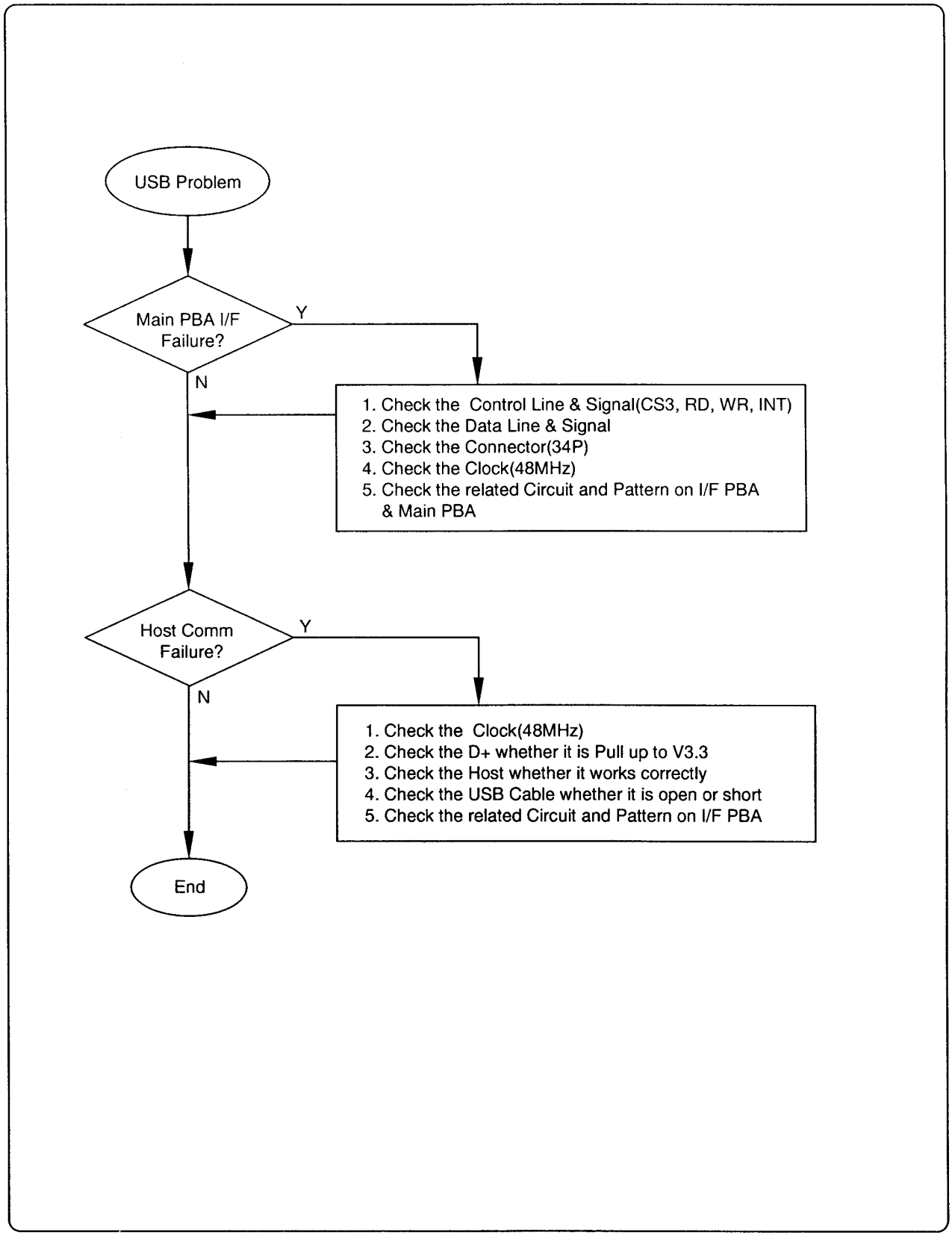
8-8 RS-485 Serial Communication Problem



8-9 IEEE-1284 Parallel Communication Problem



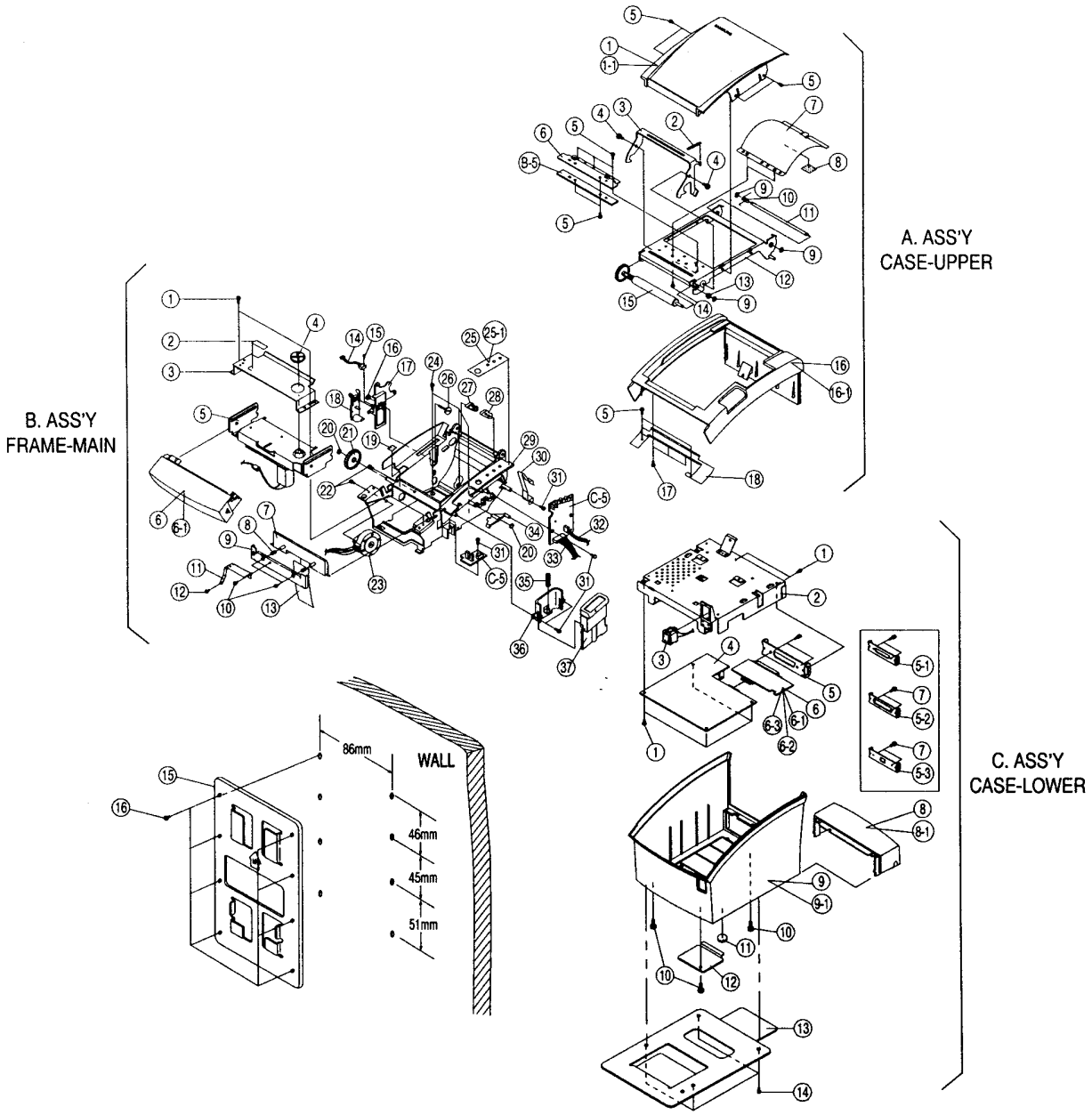
8-10 USB Communication Problem



9 Exploded Views and Parts List

9-1 Main Set

9-1-1 Whole Set Exploded View



9-1 Main Set

9-1-2 Parts List

9-1-2 (a) Case Upper Assembly

No.	Code No.	Description	Specification	Q'ty	Remark	Serviceable
1	JK72-00018A	PMO-COVER OPEN	ABS,HB,IV30	1	IVORY	Y
1-1	JK72-00018B	PMO-COVER OPEN	ABS,HB,GR30	1	GRAY	Y
2	JK61-00003A	SPRING-HOOK	SWP-SN	1		Y
3	JK70-00018A	IPR-BRKT HOOK	SPCC T1.0	1		Y
4	JK60-00003A	SPECIAL SCREW	SWRCH Ø6.9XL5.7	2		Y
5	6001-000665	SCREW MACHINE	PWH, +2,M3.L4	7		Y
6	JK70-00032A	IPR-FIXED CUTTER	SECC,T1.0	1		Y
7	JK70-00017A	IPR-COVER PLATE	SPCC,T1.0	1		Y
8	JK68-00048A	LABEL(R)WARNING COVER	TETRON PAPER	1		Y
9	6044-000123	RING-E	OD7,ID3,T0.6	3		Y
10	JK61-00005A	SPRING-TENSION	SWP-SN	1		Y
11	JK70-00050A	SHAFT-HINGE	SUS304	1		Y
12	JK70-00014A	IPR-COVER HOUSING	SPCC, T1.0	1		Y
13	JK70-00055A	BUSHING	SBF2218	1		Y
14	6003-000261	SCREW TAPTITE	BH,+2,M3XL6	2		Y
15	JK75-00005A	UNIT-PLATEN ROLLER	SI RUBBER,BLACK	1		Y
16	JK72-00019A	PMO-CASE UPPER	ABS,HB,IV30	1	IVORY	Y
16-1	JK72-00019B	PMO-CASE UPPER	ABS,HB,GR30	1	GRAY	Y
17	JK70-00036A	IPR-MANUAL CUTTER	SUS304	1		Y
18	6002-000315	SCREW TAPPING	PH,+2,M3XL4	3		Y

9-1-2 (b) Main Frame Assembly

No.	Code No.	Description	Specification	Q'ty	Remark	Serviceable
1	6002-000174	SCREW TAPPING	PWH,+2,M3XL10	2		Y
2	JK68-00049A	LABEL(R) WARNING CUTTER	TETRON PAPER	1		Y
3	JK70-00054A	IPR-BRKT COVER CUTTER	SPCC T1.0	1		Y
4	JK72-00055A	PMO-KNOB CUTTER	POM,IVORY	1		Y
5	JK96-01059A	UI\NIT-CUTTER	RUY80	1		Y
6	JK72-00017A	PMO-COVER CUTTER	ABS,HB,IV30	1	IVORY	Y
6-1	JK72-00017B	PMO-COVER CUTTER	ABS,HB,GR30	1	GRAY	Y
7	JK97-01062A	UNIT-TPH	HEAT SINK+TAPE	1		Y
8	JK61-00004A	SPRING-TPH	SWP-SN	2		Y
9	JK70-00020A	IPR-BRKT TPH REAR	SECC T1.0	1		Y
10	6001-000665	SCREW MACHINE	PWH,+2,M3,L4	3		Y

9-1 Main Set

9-1-2 (b) Main Frame Assembly (Continue)

No.	Code No.	Description	Specification	Q'ty	Remark	Serviceable
11	JK70-00041A	IPR-PLATE GROUND	STS304	1		Y
12	6003-000261	SCREW TAPTITE	BH,+2,M3XL6	1		Y
13	JK39-00029A	CBF-SIGNAL MAIN FPC	21PIN,120MM	1		Y
14	JK96-00995A	ELA ETC-SWITCH MICRO	30V DC,0.1A	1		Y
15	6002-000351	SCREW TAPPING	PH,+2,M2XL8	1		Y
16	6021-000222	NUT-HEXAGON	2C,M3,ZPC	1		Y
17	JK72-00022A	PMO-HOUSING P/END	ABS,HB,IV30	1		Y
18	JK72-00023A	PMO-KNOB P/END	PMO,BLACK	1		Y
19	JK68-00018A	LABEL(R)-WARNING HOT	TETRON PAPER	1		Y
20	JK72-00058A	WASHER SLIP	PET,T0.5	2		Y
21	JK66-00002A	GEAR-IDLE	NYLON	1		Y
22	JK60-00001A	SCREW ASSY TAPPING	WT,PH,M3XL8	2		Y
23	JK31-00001A	MOTOR STEP FEEDING	SRP-350,24V-DC,1000mA	1		Y
24	6003-000267	SCREW TAPTITE	PWH,+2,M3,L8	3		Y
25	JK68-00036A	LABEL(P)-CONTROL	PC T0.254	1	IVORY	Y
25-1	JK68-00036B	LABEL(P)-CONTROL	PC T0.254	1	GRAY	Y
26	JK60-00002A	SPECIAL SCREW	SWRCH Ø11XL15.1	2		Y
27	JK72-00036A	PMO-WALL GUIDE L	POM,BLACK	1		Y
28	JK72-00037A	PMO-WALL GUIDE R	POM,BLACK	1		Y
29	JK72-00021A	PMO,FRAME MAIN	ABS+GF25%	1		Y
30	JK70-00015A	IPR-PLATE SPRING	SUS304	1		Y
31	6002-000175	SCREW TAPPING	PWH,+2,M3XL8	5		Y
32	JK39-00032A	CBF-HARNESS COVER SENSOR		1		Y
33	JK39-00031A	CBF-HARNESS LED		1		Y
34	JK72-00025A	PMO-LEVER RELEASE	POM,BLACK	1		Y
35	JK61-00006A	SPRING-RELEASE	SWP-SN	1		Y
36	JK72-00056A	PMO-GUIDE BUTTON	ABS,HB,BLACK	1		Y
37	JK72-00024A	PMO-PUSH BUTTON	ABS,HB,BL15	1		Y

9-1 Main Set

9-1-2 (c) Case Lower Assembly

No.	Code No.	Description	Specification	Q'ty	Remark	Serviceable
1	6003-000261	SCREW TAPTITE	BH,+2,M3XL6	5	IVORY	Y
2	JK75-00006A	UNIT-BRKT PCB	SECC T1.0	1	GRAY	Y
3	JK39-00035A	CBF HARNESS-POWER SWITCH		1		Y
4	JK92-00943A	PBA MAIN-MAIN BOARD		1		Y
5	JK70-00034A	IPR-BRKT PARALLEL	SECC T1.0	1		Y
5-1	JK70-00034B	IPR-BRKT 232	SECC T1.0	1		Y
5-2	JK70-00034C	IPR-BRKT 485	SECC T1.0	1		Y
5-3	JK70-00059A	IPR-BRKT USB	SECC T1.0	1		Y
6	JK92-00944A	PBA SUB I/F-232		1		Y
6-1	JK92-00945A	PBA SUB I/F-485		1		Y
6-2	JK92-00946A	PBA SUB I/F-IEEE1284		1		Y
6-3	JK92-00987A	PBA SUB I/F-USB		1		Y
7	6003-000119	SCREW TAPTITE	BH,+2,M3XL8	5		Y
8	JK72-00020A	PMO-CASE LOWER	ABS,HB,IV30	1	IVORY	Y
8-1	JK72-00020A	PMO-CASE LOWER	ABS,HB,GR30	1	GRAY	Y
9	JK72-00035A	PMO-COVER CABLE	ABS,HB,IV30	1	IVORY	Y
9-1	JK72-00035A	PMO-COVER CABLE	ABS,HB,GR30	1	GRAY	Y
10	6003-000119	SCREW TAPTITE	PWH,+2,M3XL8	3		Y
11	JK61-40902A	FOOT-RUBBER	NR,T3.5	2		Y
12	JK70-00037A	IPR-BRKT DIP S/W	SECC T1.0	1		Y
13	JK70-00043A	IPR-BRKT HANGER	SECC T1.6	1		Y
14	6002-000175	SCREW TAPPING	PWH,+2,M3XL8	4		Y
15	JK70-00044A	IPR-BRKT HANGER	SECC T1.6	1		Y
16	6002-000171	SCREW TAPPING	PH,+2,M4XL10	8		Y

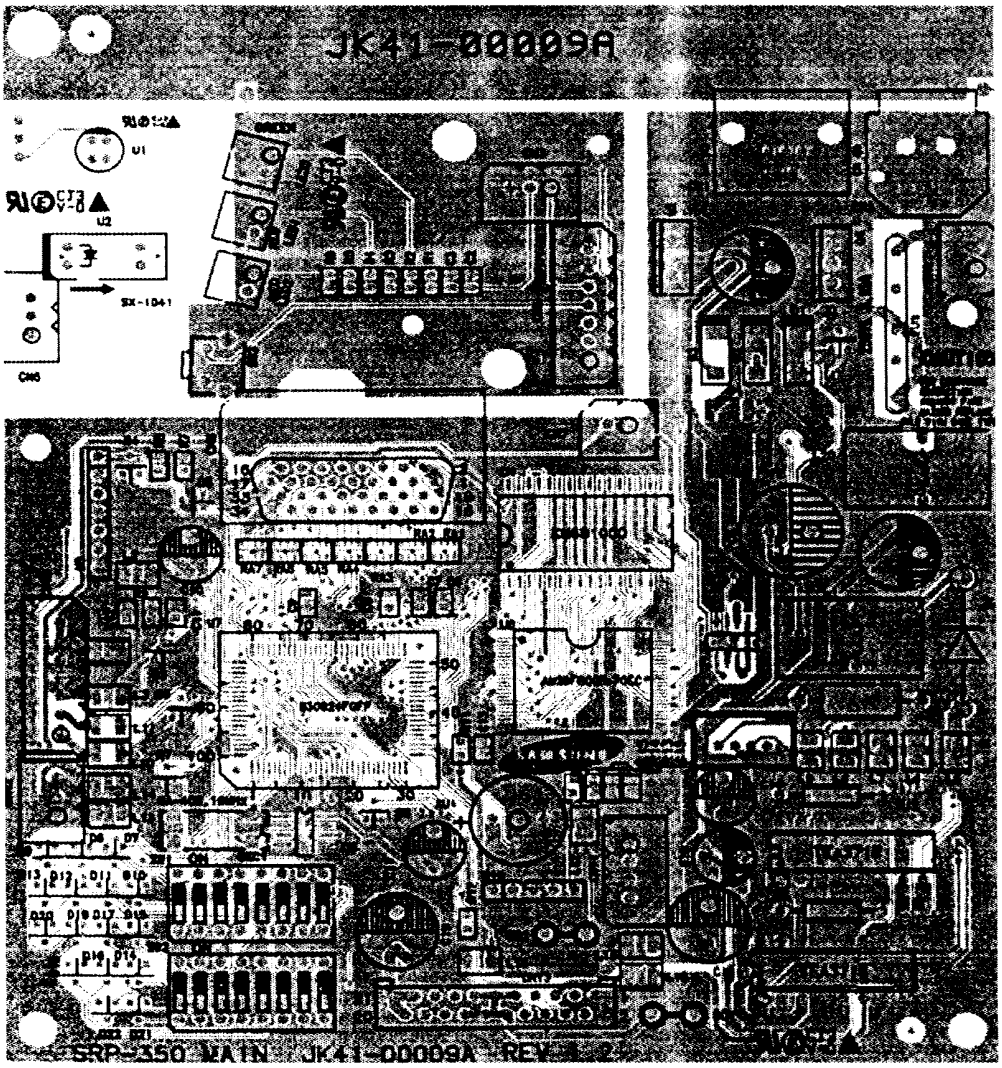
9-1-2 (d) SMPS (Power Adapter) Assembly

No.	Code No.	Description	Specification	Q'ty	Remark	Serviceable
1	JK44-00001A	SMPS-SRP350	PW105KA2400FXX	1	Common	Y
2	JF39-40692A	CBF-HARNESS	POWER CORD,2.5M,BLK	1	U.S.A	Y
3	JF39-50053A	CBF-LINE CORD	250MM,BLK	1	Europe	Y
4	JC39-10100A	CBF-POWER CORD	250V,10A,BLK,1850MM	1	Australia	Y
5	GA39-10100A	CBF-POWER CORD	KP610,2000MM	1	U.K	Y
6	JG39-100001A	CBF-CHNIA POWER CORD	SF4000,250VAC,10A	1	China	Y

10 PCB Layout and Parts List

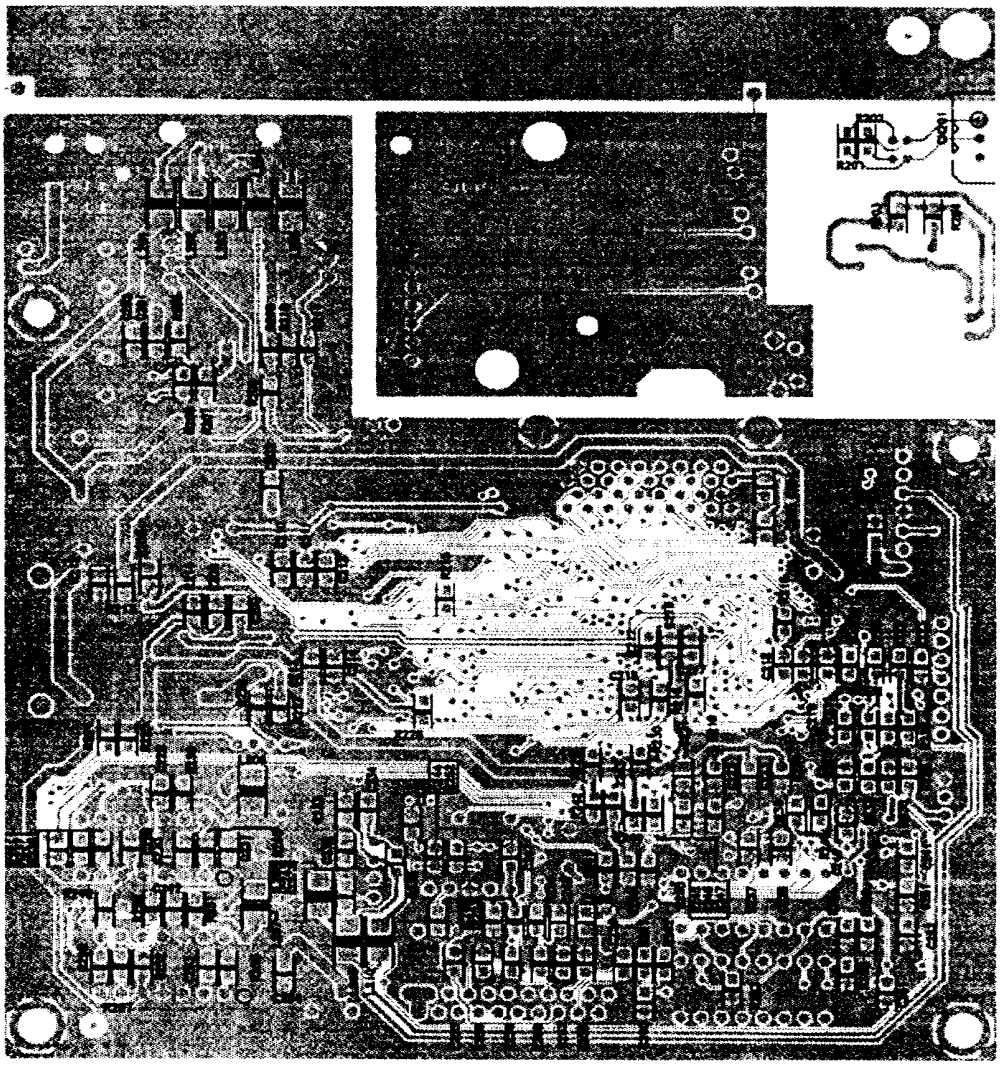
10-1 Main PCB Layout

10-1-1 Component Side



10-1 Main PCB Layout

10-1-2 Solder Side



10-1 Main PCB Layout

10-1-3 Parts List (Manual)

Code No.	Description / Specification	Q'TY	Remarks	Serviceable
JK92-00943A	PBA-MAIN(SRP-350)	1		Y
0402-000168	DIODE-RECTIFIER;1N5822,40V,3A	1	D6	Y
0503-000117	TR-DARLINGTON;2SD560-R,NPN,1.5	2	Q1,2	Y
0601-000105	LED;CBI-ANGEL,GRN,5mm,560nm	1	LED3	Y
0601-000204	LED;CBI-ANGEL,RED,5mm,655nm	2	LED1,2	Y
0604-000180	PHOTO-INTERRUPTER;TR,-,-,-,-	1	U2	Y
0604-001157	PHOTO-INTERRUPTER;TR,-,75MW,AXI	1	U1	Y
1003-001102	IC-MOTOR DRIVER;TEA3718DP,DIP,	2	U9,11	Y
1003-001118	IC-CURRENT DRIVER;TA8428K,SIP,	1	U3	Y
1209-001089	IC-DETECTOR;M51953B,SIP,5P,-,P	1	U10	Y
2001-000202	R-CARBON;0.5HM,5%,1/2W,AA,TP,	2	R12,16	Y
2005-000210	R-WIRE WOUND;0.33ohm,5%,1W,AC,	1	R10	Y
2401-000032	C-AL;100uF,20%,50V,GP,TP,8x12,	1	C4	Y
2401-000042	C-AL;100uF,20%,16V,GP,TP,6.3x7	2	C16,17	Y
2401-000172	C-AL;1000uF,20%,35V,GP,TP,12.5x20	1	C19	Y
2401-000880	C-AL;220uF,20%,50V,WT,TP,10x16	1	C1	Y
2401-001363	C-AL;470uF,20%,16V,GP,TP,10x12	1	C5	Y
2401-001698	C-AL;470uF,20%,35V,WT,TP,10x20	1	C18	Y
2401-002300	C-AL;47uF,20%,50V,GP,TP,6.3x11	2	C10,14	Y
3002-001027	BUZZER-PIEZO;85dB,1.5V,24mA,2.	1	AU1	Y
3301-000344	CORE-FERRITE BEAD;ZZ,3.5x6.5mm	2	BD1,2	Y
3404-001100	SWITCH-TACT;12V,50MA,160GF,8.5	1	SW3	Y
3407-000177	SWITCH-DIP;5V,10mA,SLIDE,SPST	2	SW1,2	Y
3601-000261	FUSE-FERRULE;250V,3.15A,TL,GLA	1	FUSE	Y
3602-000001	FUSE-CLIP;-,-,30mohm	2	FU1	Y
3702-001124	CONNECTOR-RIBBON;34P,MALE,ANGL	1	CN8	Y
3706-001044	CONNECTOR-CIRCULAR;FEMALE,3P,#	1	CN2	Y
3708-000217	CONNECTOR-FPC/FC/PIC;21P,1.25m	1	CN13	Y
3711-000470	CONNECTOR-HEADER;3WALL,4P,1R,2	1	CN9	Y
3711-000961	CONNECTOR-HEADER;BOX,4P,1R,2.5	1	CN11	Y
3711-001097	CONNECTOR-HEADER;BOX,7P,1R,2.5	2	CN5,10	Y
3711-003968	CONNECTOR-HEADER;BOX,3P,1R,2.5	5	CN3,4,6,7,12	Y
3722-001034	JACK-MODULAR;6P/2C,0.76mm,AU,G	1	CN1	Y
JK27-60100D	COIL FILTER-;ER-350,140 UH,-,-	2	L1,20	Y
JK39-00030A	CBF HARNESS-P_END SENSOR;SRP-3		P_END SENSOR	Y

10-1 Main PCB Layout

10-1-4 Parts List (Auto)

Code No.	Description / Specification	Q'TY	Remarks	Serviceable
JK94-00022A	PHANTOM AU JK92-00943A	1		N
0401-001003	DIODE-SWITCHING;MMBD6050LT1,70	18	D4,5,7,8,9,10,11,12,13,14, D15,16,17,18,19,20,21,22	Y
0402-001189	DIODE-RECTIFIER;M4,400V,1A,SMD	3	D1,2,3	Y
0501-000457	TR-SMALL SIGNAL;MMBT2222A,NPN,	5	Q3,5,6,7,8	Y
0505-000145	FET-SILICON;IRFR9024,P,-60V,1.	1	Q4	Y
0903-001159	IC-MICROCOMPUTER;30624,16BIT,Q	1	U7	Y
1106-000131	IC-SRAM;681000,128Kx8BIT,SOP,3	1	U4	Y
1107-001121	IC-FLASH MEMORY;29F800,512Kx16	1	U6	Y
1203-000404	IC-DC/DC CONVERTER;34063,SOP,8	1	U5	Y
2007-000026	R-CHIP;200OHM,5%,1/10W,DA,TP,2	8	R17,241,246,254,259,260, R261,262	Y
2007-000028	R-CHIP;39OHM,5%,1/10W,DA,TP,20	1	R219	Y
2007-000258	R-CHIP;1.6KOHM,5%,1/10W,DA,TP,	1	R249	Y
2007-000290	R-CHIP;100OHM,5%,1/10W,DA,TP,2	4	R13,14,221,243	Y
2007-000300	R-CHIP;10KOHM,5%,1/10W,DA,TP,2	8	R206,209,210,212,213,228, R250,253	Y
2007-000352	R-CHIP;12KOHM,1%,1/10W,DA,TP,2	1	R226	Y
2007-000409	R-CHIP;15KOHM,5%,1/10W,DA,TP,2	4	R263,264,265,266	Y
2007-000468	R-CHIP;1KOHM,5%,1/10W,DA,TP,20	7	R9,216,233,234,239,245, R251	Y
2007-000477	R-CHIP;1MOHM,5%,1/10W,DA,TP,20	1	R207	Y
2007-000493	R-CHIP;2.2KOHM,5%,1/10W,DA,TP,	4	R205,211,229,248	Y
2007-000766	R-CHIP;330OHM,5%,1/10W,DA,TP,2	6	R202,204,237,238,256,257	Y
2007-000804	R-CHIP;36KOHM,5%,1/10W,DA,TP,2	1	R227	Y
2007-000872	R-CHIP;4.7KOHM,5%,1/10W,DA,TP,	19	R7,8,11,15,208,214,215,217 R218,220,222,224,225,230, R231,232,235,236,244,	Y
2007-000931	R-CHIP;470OHM,5%,1/10W,DA,TP,2	7	R1,2,3,4,5,6,252	Y
2007-000941	R-CHIP;47KOHM,5%,1/10W,DA,TP,2	4	R201,203,247,255	Y
2007-001013	R-CHIP;51OHM,5%,1/10W,DA,TP,20	1	R242	Y
2007-001039	R-CHIP;56KOHM,5%,1/10W,DA,TP,2	2	R240,258	Y
2007-001113	R-CHIP;680KOHM,5%,1/10W,DA,TP,	1	R223	Y
2011-001094	R-NETWORK;39ohm,5%,1/16W,L,CHI	7	RA1,2,3,4,5,6,7	Y

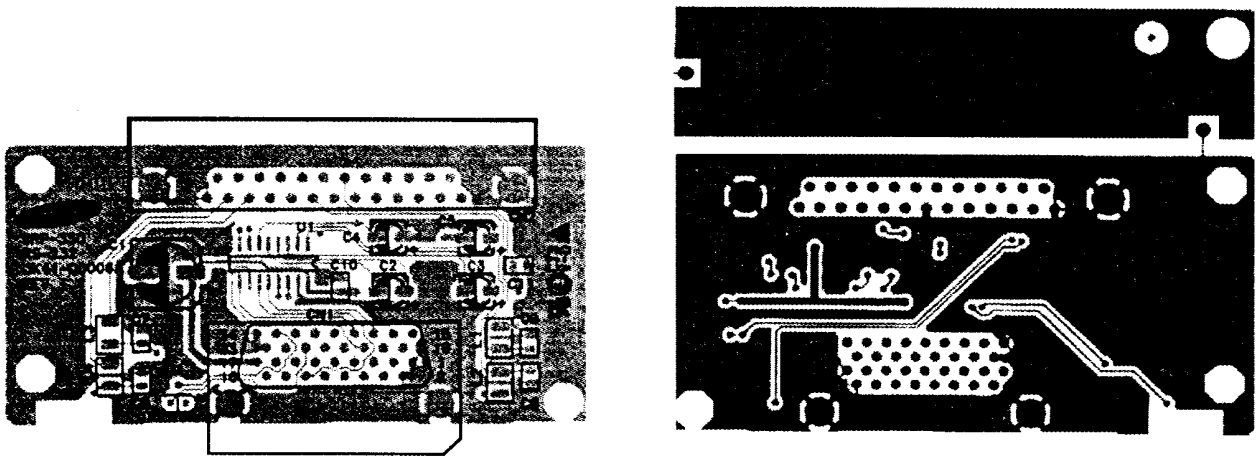
10-1 Main PCB Layout

10-1-5 Parts List (Auto)

Code No.	Description / Specification	Q'TY	Remarks	Serviceable
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	39	C3,8,11,12,13,15,201,202, C203,204,206,207,208,209, C212,213,215,217,218,219, C220,221,224,225,226,228, C232,233,234,235,236,243, C245,246,247,249,250,252, C254	Y
2203-000595	C-CERAMIC,CHIP;0.22nF,5%,50V,N	4	C210,248,256,257	Y
2203-000634	C-CERAMIC,CHIP;0.022nF,5%,50V,	12	C6,7,9,227,230,237,238,239 C255,258,259,260	Y
2203-000748	C-CERAMIC,CHIP;0.03nF,5%,50V,N	1	C244	Y
2203-000938	C-CERAMIC,CHIP;0.47nF,5%,50V,N	1	C240	Y
2003-001223	C-CERAMIC,CHIP;0.82nF,10%,50V,N	4	C229,231,242,253	Y
2203-001801	C-CERAMIC,CHIP;10nF,10%,100V,X	11	C2,205,211,214,216,222, C223,241,251,261	Y
2801-003315	CRYSTAL-SMD;16MHz,50ppm,28-AAV	1	OSC1	Y
3301-000325	CORE-FERRITE BEAD;AB,3.2x2.5x1	14	L3,4,10,11,12,13,14,16,201, L202,203,204,205,208	Y
3301-000362	CORE-FERRITE BEAD;AB,3.2x2.5x1	12	L2,5,6,7,8,9,15,18,206,207,L 209,210	Y
4701-001020	FREQ-ATTENUATOR;5-80MHz,15dB,-	1	U8	Y
JK41-00009A	PCB-MINI PRINTER;SRP-350,FR-4,1	1		Y

10-2 RS-232C Serial I/F PCB Layout

10-2-1 Component and Solder Side

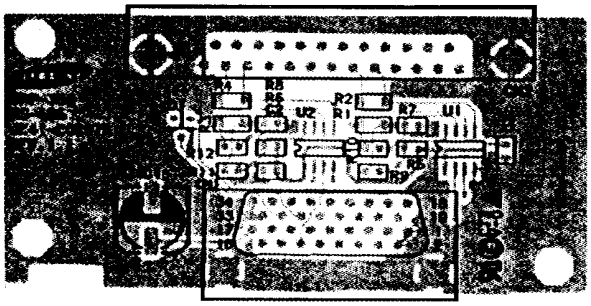


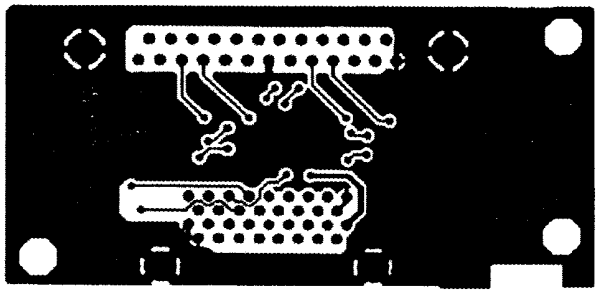
10-2-2 Parts List

Code No.	Description / Specification	Q'TY	Remarks	Serviceable
JK92-00944A	PBA-RS232C(SRP-350)	1		Y
3701-000154	CONNECTOR-DSUB;25P,2R,FEMALE,A	1	CN2	Y
3702-001125	CONNECTOR-RIBBON;34P,FEMALE,AN	1	CN1	Y
JK94-00023A	PHANTOM AU JK92-00944A	1		N
0401-001003	DIODE-SWITCHING;MMBD6050LT1,70	1	D1	Y
1006-000133	IC-DRIVER/RECEIVER;232,SOP,16P	1	U1	Y
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	2	C10,11	Y
2203-000938	C-CERAMIC,CHIP;0.47nF,5%,50V,N	4	C6,7,8,9	Y
2402-000168	C-AL,SMD;100uF,20%,16V,GP,TP,8	1	C1	Y
2402-000170	C-AL,SMD;1uF,20%,50V,GP,TP,4.3	4	C2,3,4,5	Y
3301-000325	CORE-FERRITE BEAD;AB,3.2x2.5x1	4	L1,2,3,4	Y
JK41-00006A	PCB-RS232;SRP-350,FR-4,2L,T1.6	1		N

10-3 RS-485 Serial I/F PCB Layout

10-3-1 Component and Solder Side



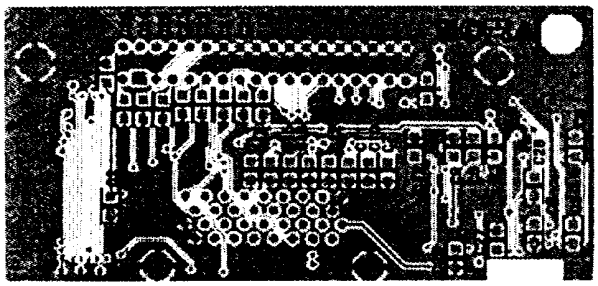


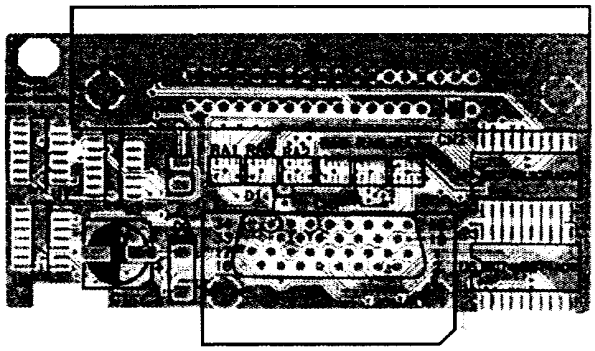
10-3-2 Parts List

Code No.	Description / Specification	Q'TY	Remarks	Serviceable
JK92-00945A	PBA-RS485(SRP-350)	1		Y
3701-000154	CONNECTOR-DSUB;25P,2R,FEMALE,A	1	CN2	Y
3702-001125	CONNECTOR-RIBBON;34P,FEMALE,AN	1	CN1	Y
JK94-00027A	PHANTOM AU JK92-00945A	1		N
0401-001003	DIODE-SWITCHING;MMBD6050LT1,70	1	D1	Y
1006-001057	IC-LINE TRANSCEIVER;488,SOP,8P	2	U1,2	Y
2007-000293	R-CHIP;100OHM,5%,1/8W,DA,TP,32	4	R1,2,3,4	Y
2007-000300	R-CHIP;10KOHM,5%,1/10W,DA,TP,2	4	R5,6,7,8	Y
2007-000766	R-CHIP;330OHM,5%,1/10W,DA,TP,2	4	R9,10,11,12	Y
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	2	C2,3	Y
2402-000168	C-AL,SMD;100uF,20%,16V,GP,TP,8	1	C1	Y
JK41-00007A	PCB-RS485;SRP-350,FR-4,2L,T1.6	1	PCB	N

10-4 IEEE 1284 Parallel I/F PCB

10-4-1 Component and Solder Side



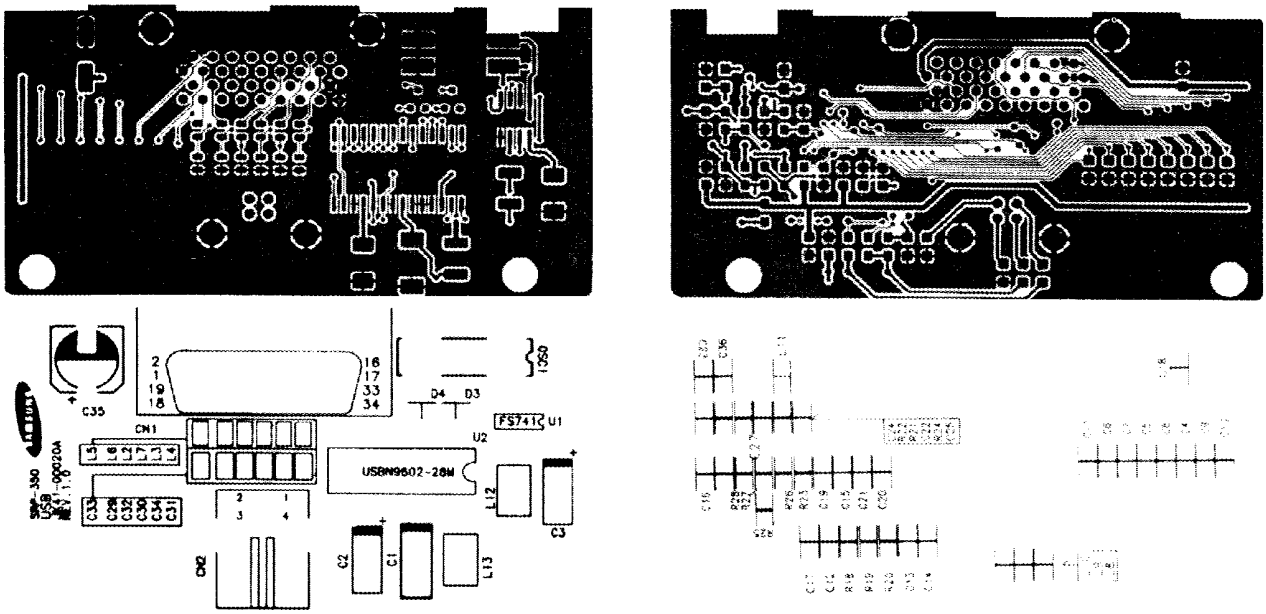


10-4-2 Parts List

Code No.	Description / Specification	Q'TY	Remarks	Serviceable
JK92-00946A	PBA-IEEE1284(SRP-350)			Y
3702-000118	CONNECTOR-RIBBON;36P,FEMALE,AN	1	CN2	Y
3702-001125	CONNECTOR-RIBBON;34P,FEMALE,AN	1	CN1	Y
JK94-00024A	PHANTOM AU JK92-00946A	1		N
0401-001003	DIODE-SWITCHING;MMBD6050LT1,70	1	D1	Y
0404-001051	DIODE-SCHOTTKY;SK14,40V,1A,DO-	1	D2	Y
0801-000408	IC-CMOS LOGIC;74HC02,NOR GATE,	1	U3	Y
0801-000454	IC-CMOS LOGIC;74HC74,D FLIP-FL	1	U1	Y
0801-000719	IC-CMOS LOGIC;74HC574,D FLIP-F	2	U4,5	Y
0801-000891	IC-CMOS LOGIC;74HCT32,OR GATE,	1	U6	Y
2007-000028	R-CHIP;39OHM,5%,1/10W,DA,TP,20	1	R4	Y
2007-000493	R-CHIP;2.2KOHM,5%,1/10W,DA,TP,	1	R3	Y
2011-001094	R-NETWORK;39ohm,5%,1/16W,L,CHI	2	RA1,2	Y
2011-001097	R-NETWORK;5.1Kohm,5%,1/16W,L,C	4	RA5,6,7,8	Y
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	5	C2,3,4,5,6	Y
2203-000634	C-CERAMIC,CHIP;0.022nF,5%,50V,	9	C7,10,11,12,13,14,15,16,17	Y
2203-000938	C-CERAMIC,CHIP;0.47nF,5%,50V,N	10	C9,19,20,21,22,23,24,25,26 C29	Y
2203-001801	C-CERAMIC,CHIP;10nF,10%,100V,X	3	C8,27,28	Y
2402-000168	C-AL,SMD;100uF,20%,16V,GP,TP,8	1	C1	Y
3301-000325	CORE-FERRITE BEAD;AB,3.2x2.5x1	1	L1	Y
JK41-00008A	PCB-IEEE1284;SRP-350,FR-4,2L,T	1		N

10-5 USB I/F PCB

10-5-1 Component and Solder Side



10-5-2 Parts List

Code No.	Description / Specification	Q'TY	Remarks	Serviceable
0401-001003	DIODE-SWITCHING;MMBD6050LT1,70	2	D3,4	Y
0904-001319	IC-USB CONTROLLER;USBN9602-28M,28P	1	U2	Y
2007-000028	R-CHIP;39OHM,5%,1/10W,DA,TP,20	1	R21	Y
2007-000241	R-CHIP;1.5K,5%,1/10W,DA,TP,20	1	R20	Y
2007-000290	R-CHIP;100,5%,1/10W,DA,TP,20	1	R26	Y
2007-000300	R-CHIP;10K,5%,1/10W,DA,TP,20	1	R23	Y
2007-000308	R-CHIP;10,5%,1/10W,DA,TP,20	1	R25	Y
2007-000468	R-CHIP;1K,5%,1/10W,DA,TP,20	2	R27,28	Y
2007-000477	R-CHIP;1M,5%,1/10W,DA,TP,20	1	R22	Y
2007-000551	R-CHIP;20,5%,1/10W,DA,TP,20	2	R18,19	Y
2007-000671	R-CHIP;2K,5%,1/10W,DA,TP,20	1	R24	Y
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	9	C12,13,14,15,16,17,18,19 C36	Y
2203-000239	C-CERAMIC,CHIP;100pF,+80-20%,5	11	C4,5,6,7,8,9,10,11,29,31 C34	Y
2203-000361	C-CERAMIC,CHIP;150pF,+80-20%,5	1	C27	Y
2203-000634	C-CERAMIC,CHIP;22pF,+80-20%,5	6	C20,21,22,30,32,33	Y
2203-000683	C-CERAMIC,CHIP;27pF,+80-20%,5	2	C23,24	Y
2203-000938	C-CERAMIC,CHIP;470pF,+80-20%,5	1	C25	Y

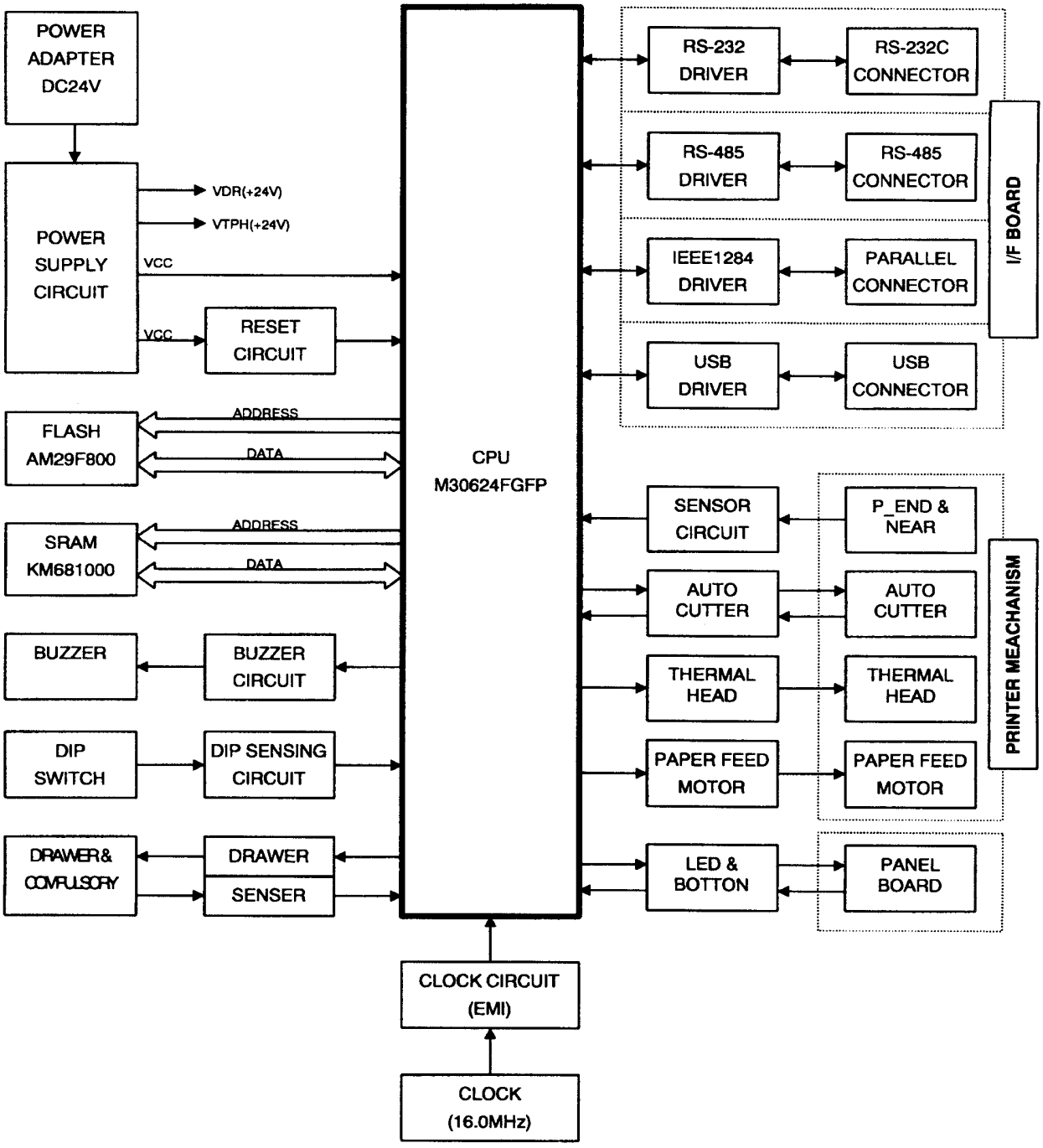
10-5 USB I/F PCB

10-5-2 Parts List

Code No.	Description / Specification	Q'TY	Remarks	Serviceable
2402-000168	C-AL,SMD;100uF,20%,16V,GP,TP,8	1	C35	Y
2404-000128	C-TAN,SMD;10uF, 16V,6032	2	C2,3	Y
2404-000468	C-TAN,SMD;33uF, 16V,7343	1	C1	Y
2703-000214	FERRITE-BEAD;MLF2012DR47KT	1	L11	Y
2801-003699	CLOCK;48MHZ	1	OSC1	Y
3301-001074	FERRITE-BEAD;CIM21J121NES	9	L2,3,4,5,6,7,8,9,10	Y
3301-001117	FERRITE-BEAD;HF50ACC453215-T	2	L13,L12	Y
3702-001125	CONNECTOR-RIBBON;34P,FEMALE,AN	1	CN1	Y
3722-001101	CONNECTOR-USB;4P,B-TYPE	1	CN2	Y
4701-001020	FREQ-ATTENUATOR;5-80MHz,15dB,FS741	1	U1	Y
JK41-00020A	PCB-USB;SRP-350,FR-4,2L,T	1	PCB	N

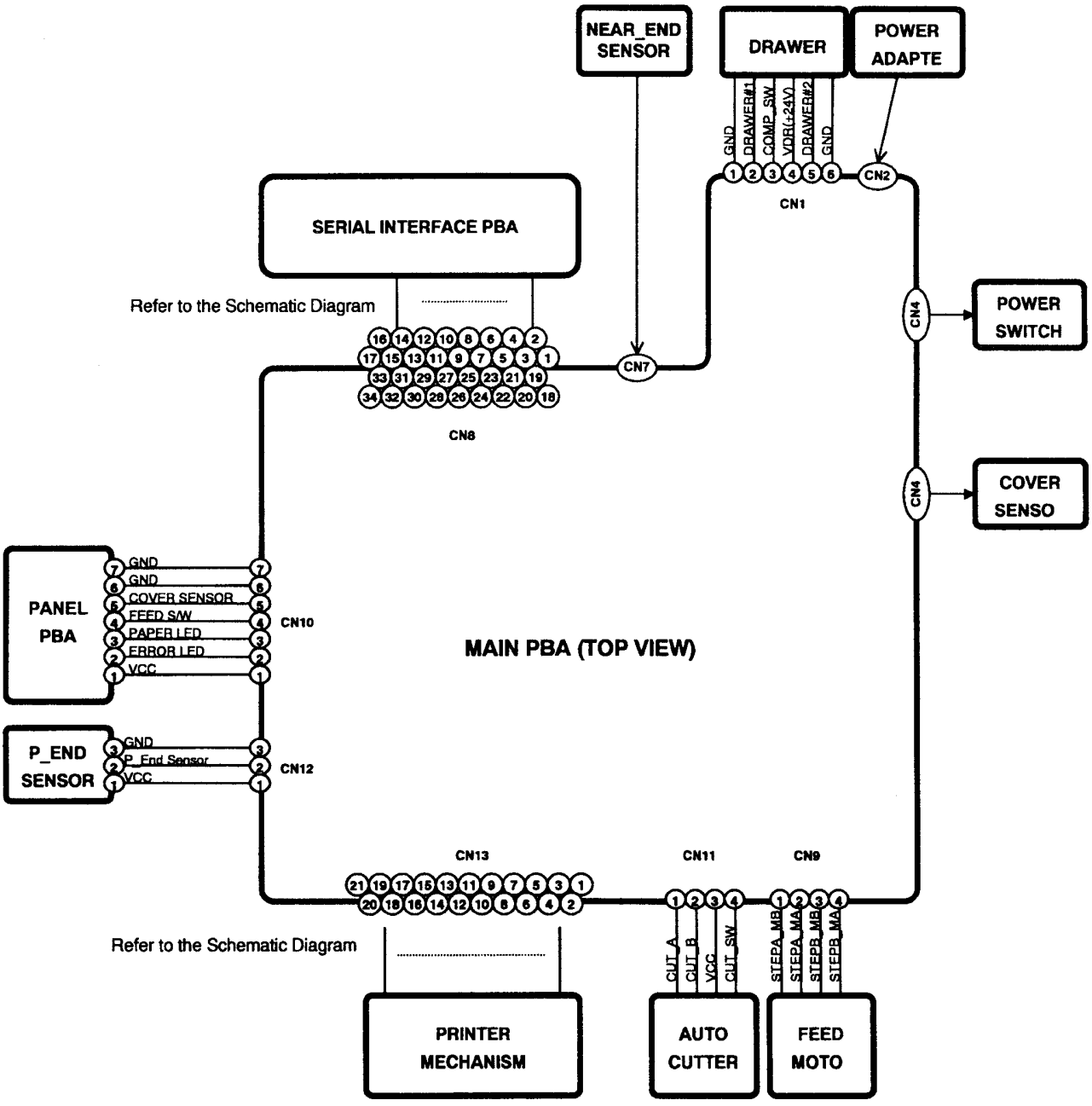
11 Block Diagram

11-1 SRP-350 / SRP-350S / SRP-350P / SRP-350U



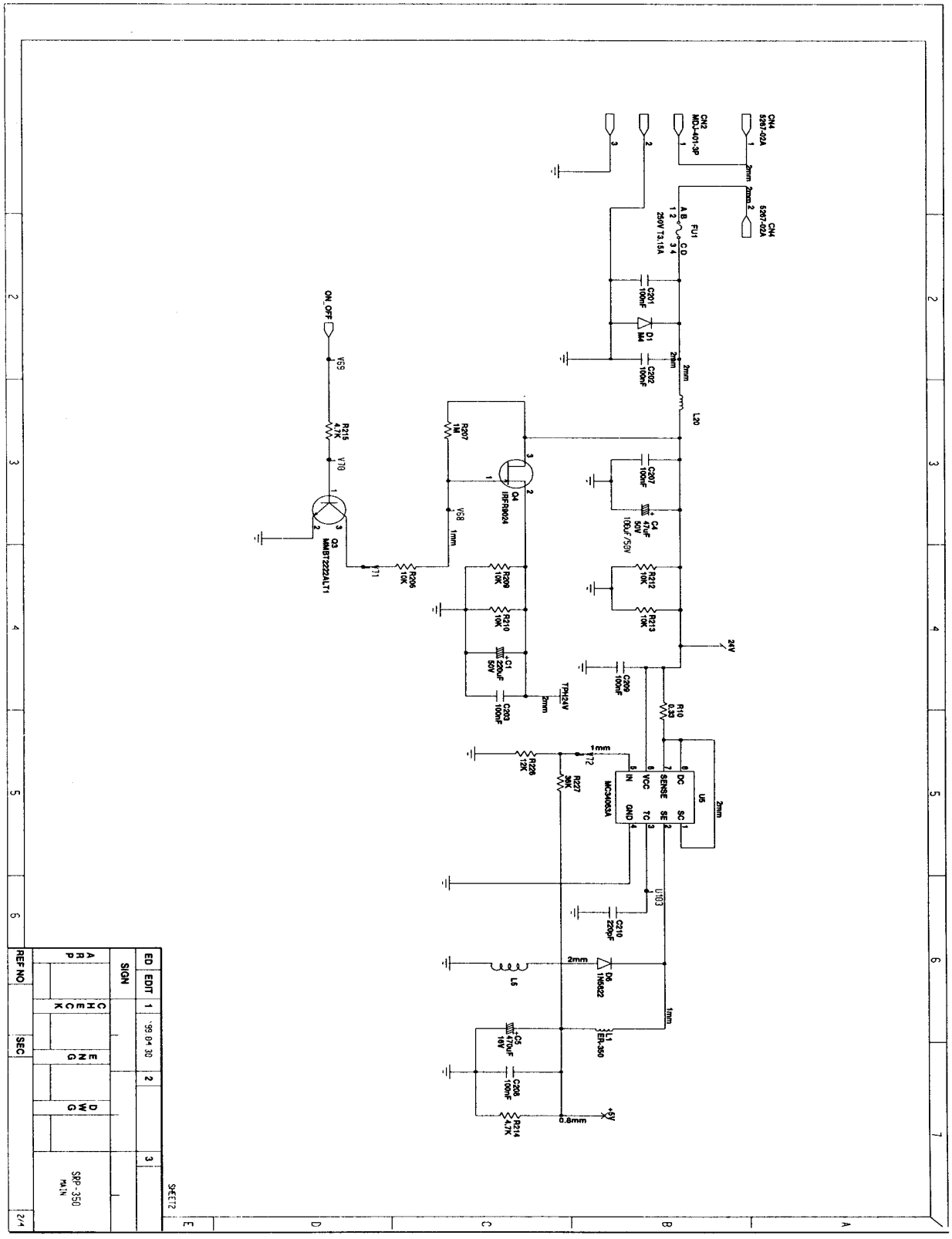
12 Wiring Diagram

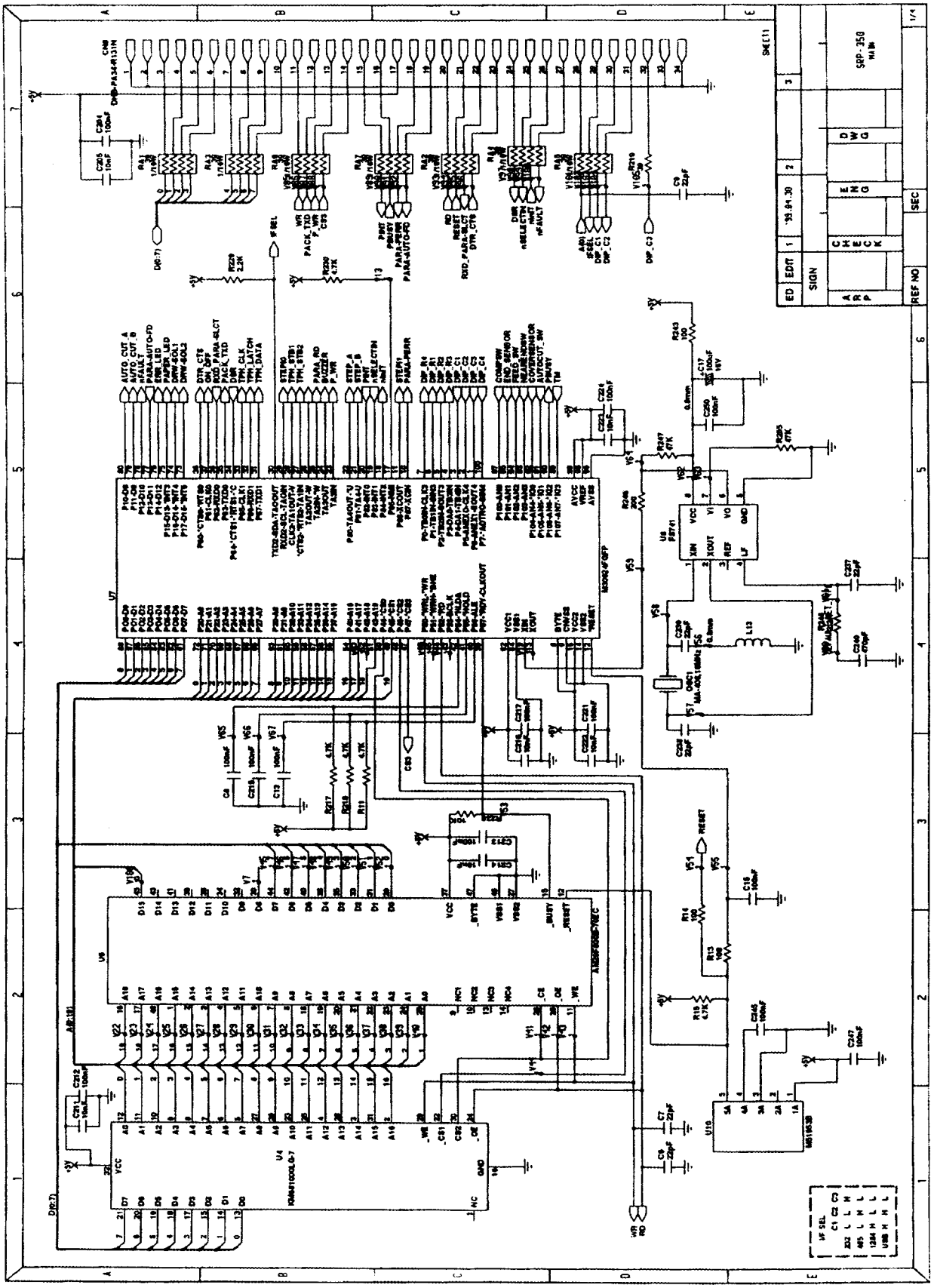
12-1 SRP-350 / SRP-350S / SRP-350P / SRP-350U

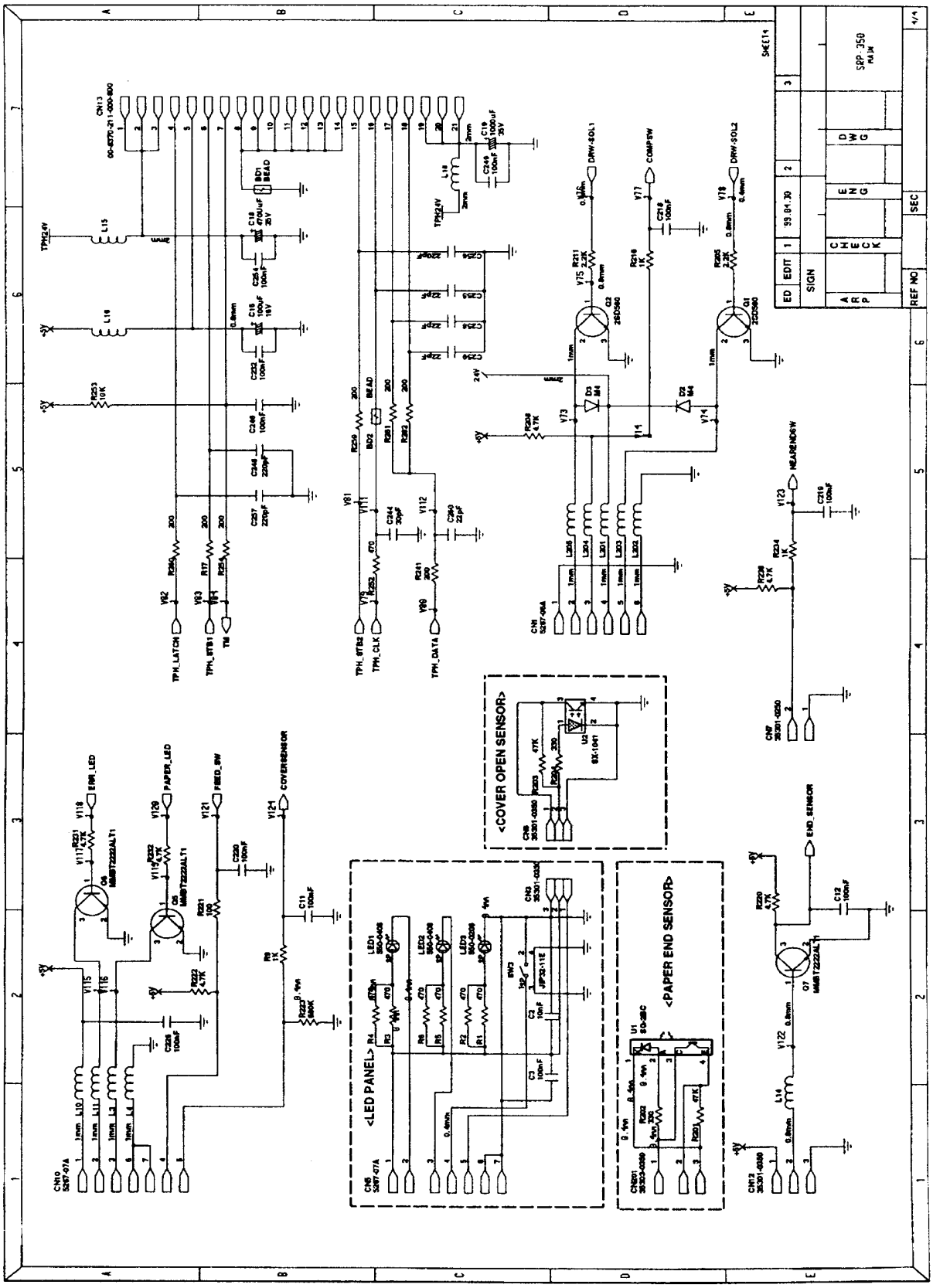


13 Schematic Diagrams

13-1 Main Circuit Diagrams



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<COVER OPEN SENSOR>
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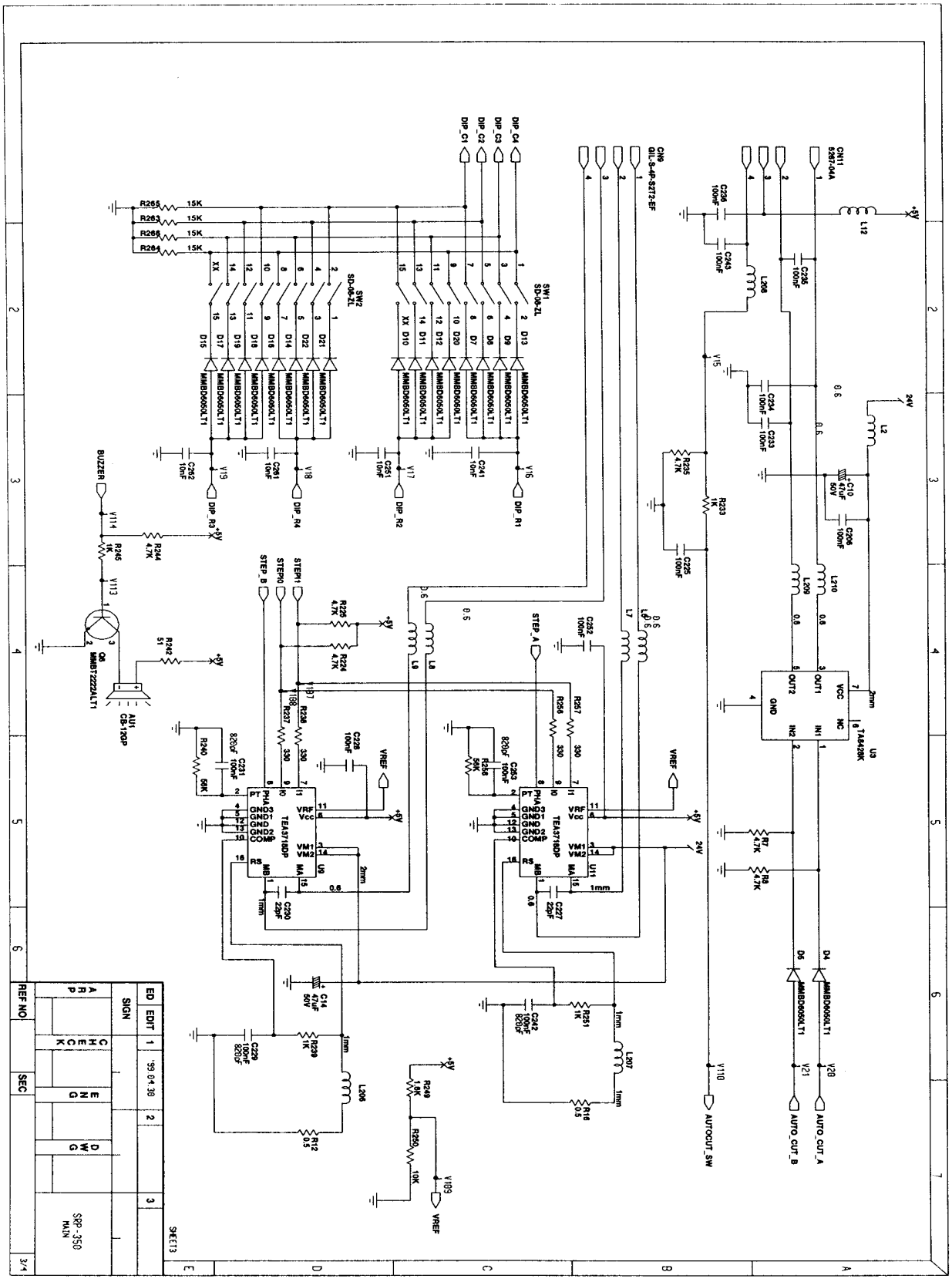
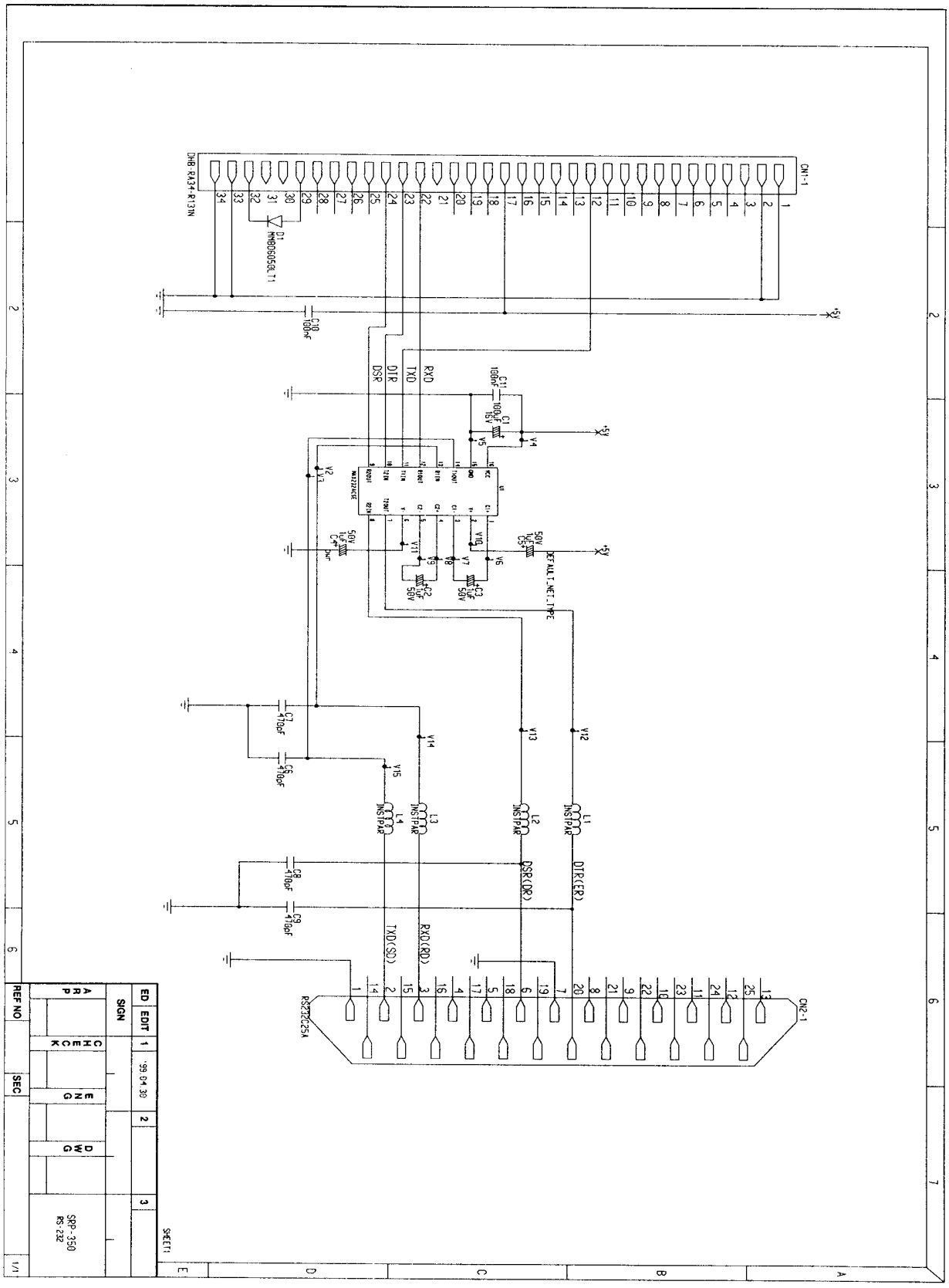
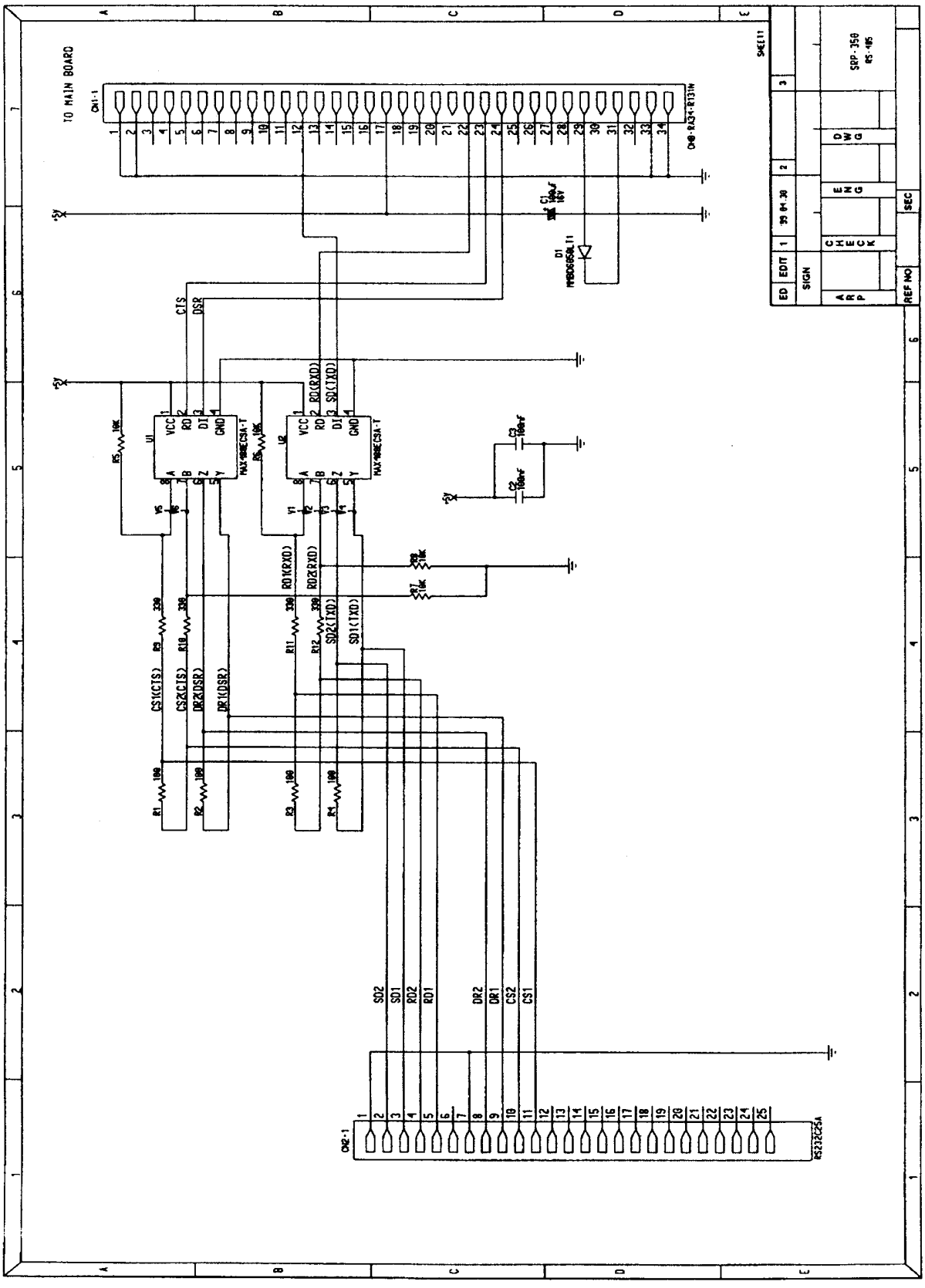
TPH_STB1
TPH_STB2
TPH_CLK
TPH_DATA
DRW-SOL1
DRW-SOL2
COMPSW
HEADEND&W
END_SENSOR
COVERSENSOR
PAPER_LED
FEED_SW
ERR_LED


SRP-350
MAIN
SHEET3
REF NO
SEC
SIGN
EDIT
CHECK
ENG
DWG
APP
AUTOCUT_SW
AUTO_CUT_A
AUTO_CUT_B
BUZZER
VREF
TEA3718DP
T4A420K
MMBD6050LT1

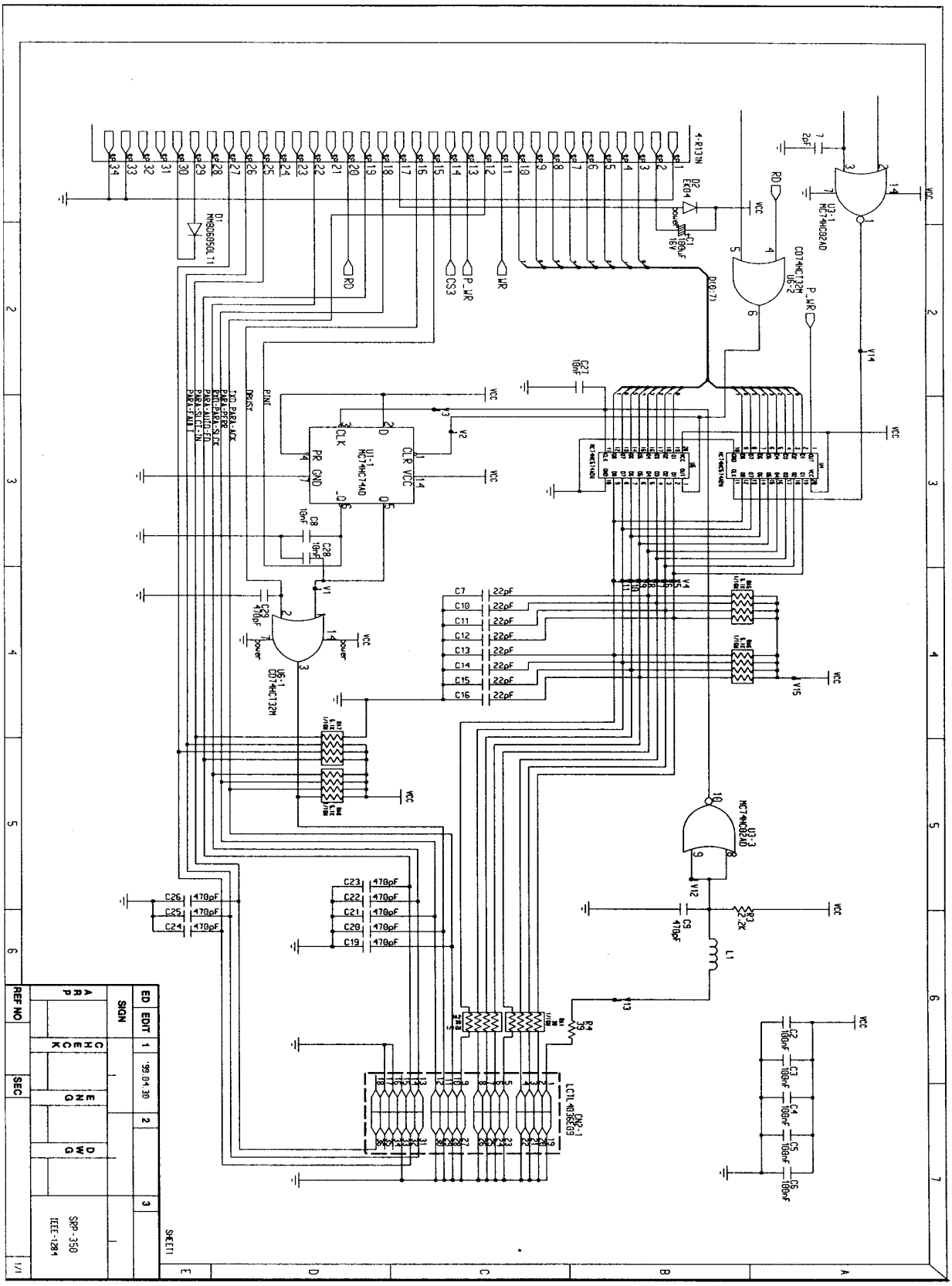
13-2 Serial Interface Diagrams (RS-232C)



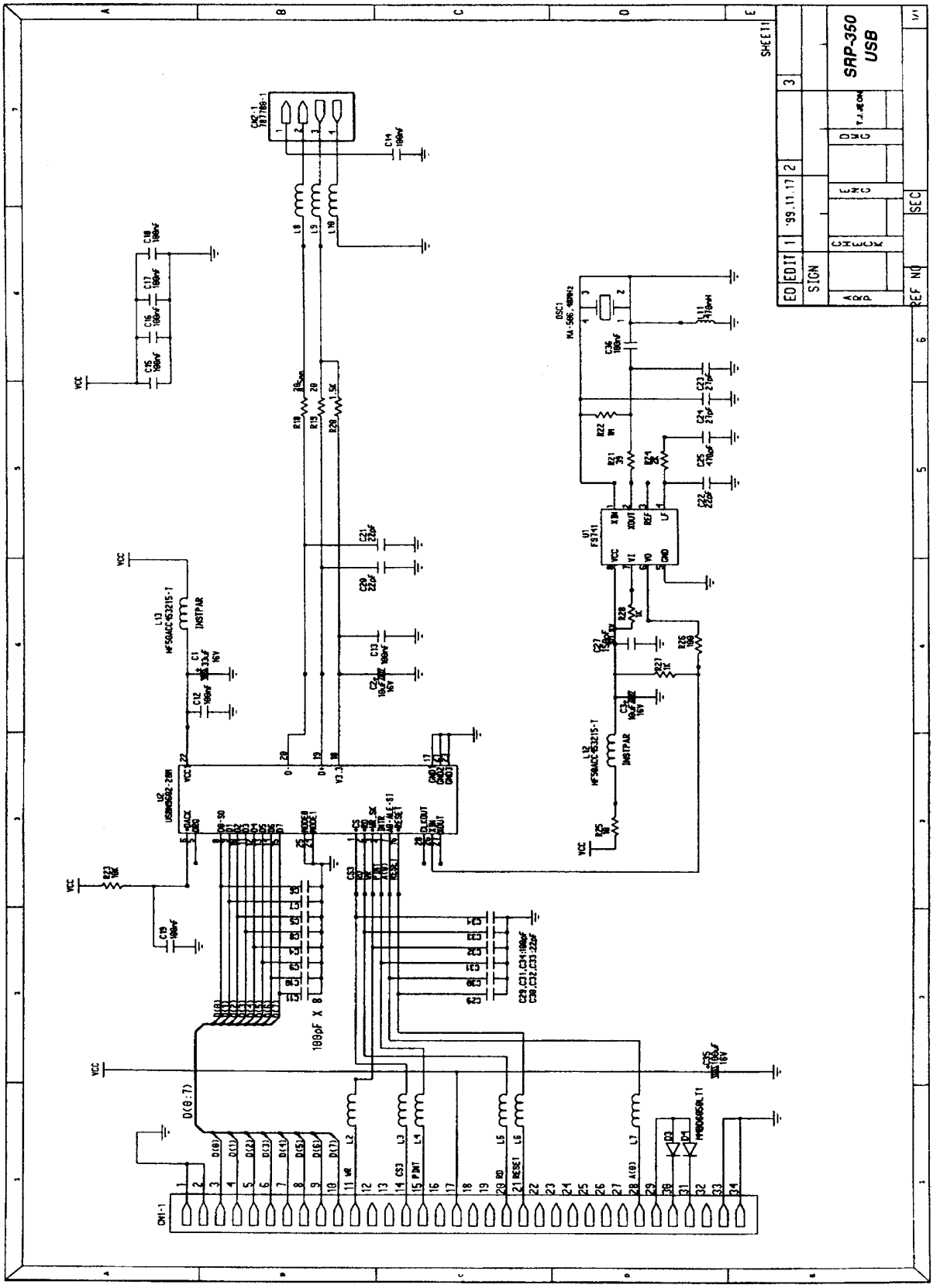
13-3 Serial Interface Diagrams (RS-485)



13-4 Parallel interface Diagrams (IEEE1284)



13-5 USB interface Diagrams (Universal Serial Bus)



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