

# AD-8119

## LABEL PRINTER

### MAINTENANCE MANUAL

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Maintenance-AD-8119-v.1.a 93.02.27

## LABEL PRINTER



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## Compliance with FCC Rules

Please note that this equipment generates, uses and can radiate radio frequency energy. This equipment has been tested and has been found to comply with the limits of a Class A computing device pursuant to Subpart J of Part 15 of FCC rules. These rules are designed to provide reasonable protection against interference when equipment is operated in a commercial environment. If this unit is operated in a residential area it might cause some interference and under these circumstances the user would be required to take, at his own expense, whatever measures are necessary to eliminate the interference.

(FCC = Federal Communications Commission in the United States of America.)



# Introduction

*This is a Maintenance Manual for the AD-8119 Label printer. The AD-8119 is a product of years of design, development, and in-field testing. It is designed to withstand harsh environmental conditions - and each printer is subjected to several levels of quality control before it leaves the factory. Every care has been taken during the manufacturing process of this printer to ensure that it will perform accurately and reliably for many years .*

The AD-8119 Label Printer is mainly for use with A&D's industrial scales, weighing indicators and electronic balances. The AD-8119 Label Printer is designed to receive data from A&D's RS-232C or current loop interface. The AD-8119 prints on special tack or plain paper by means of a dot impact printing mechanism.

The highly reliable printer mechanism is perfect for industrial use. Easy to operate, the Label Printer provides fast dependable printing.



## Features

- ☐ Can register product names by six-digit ID code and 26 alphanumerics in its 1,000 sample memory.
- ☐ The display uses a liquid crystal display made up of 5 x 7 dots, permitting easy operation while viewing the operation menu.
- ☐ The weight data, counting data, ID code, product name, date and time can be printed in enlarged characters.
- ☐ You can print multiple copies of the same label by setting the number of copies required.
- ☐ Cumulative total function by code.
- ☐ Able to print 1,200 labels on the supplied tack printer paper.
- ☐ Dump print capability for applications requiring mixed types of printing.
- ☐ Calendar/clock function.
- ☐ A rechargeable battery provides approximately two months back up for the real time clock without AC power applied.
- ☐ A Lithium battery provides back up for totals without AC power applied.
- ☐ Rugged construction for dependable operation.



# Specifications

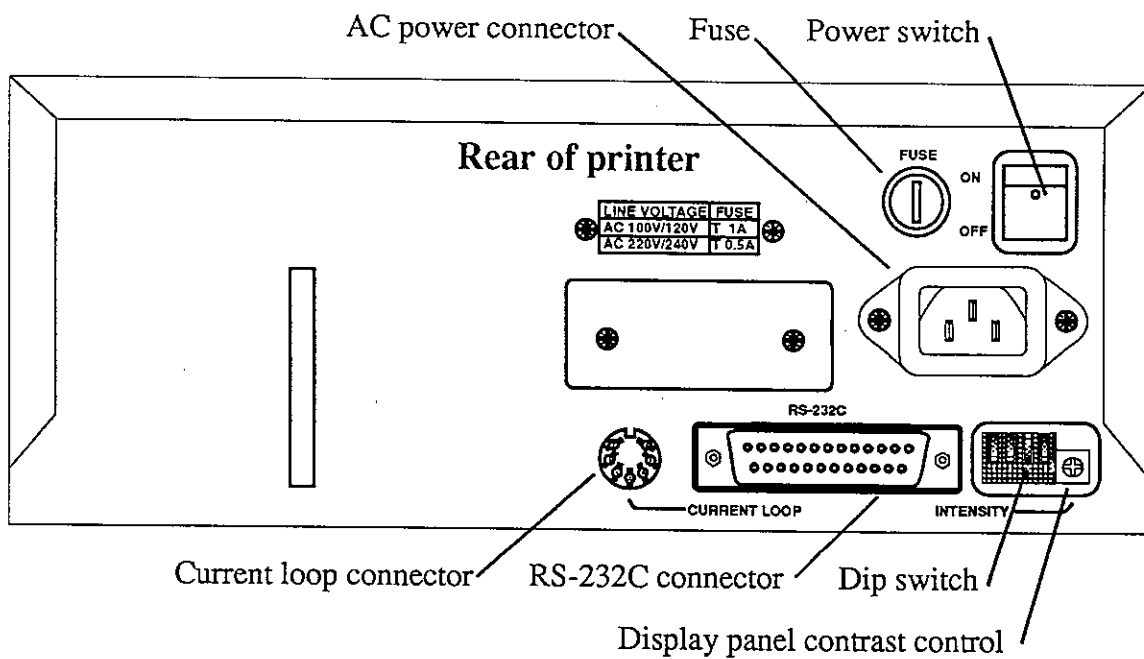
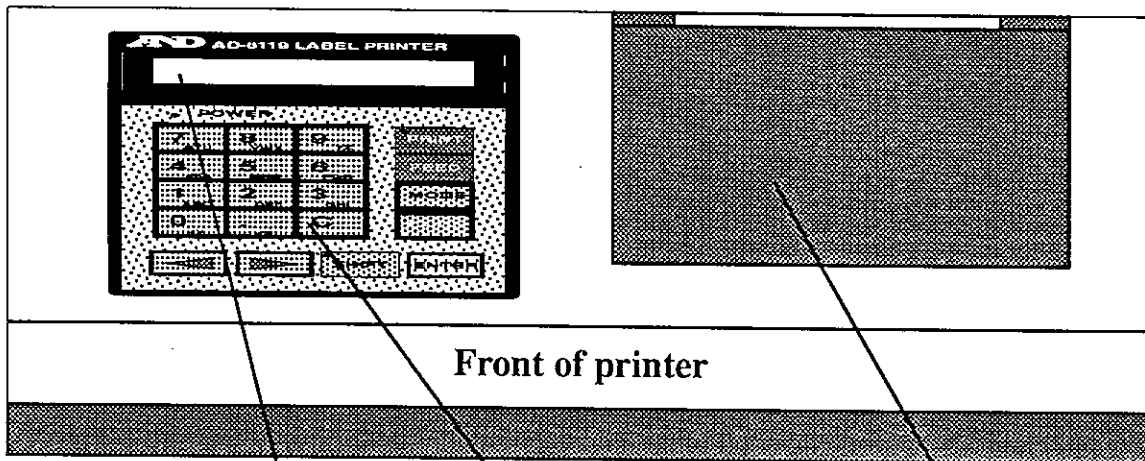
Printer Specifications	
Printing system	Electro-mechanical type impact printer
Print style	5 x 7 dot matrix
Printing speed	Approximately 3.3 lines per second
Character dimensions	1.5mm wide, 2.4mm high
Ink ribbon	
Character color	Black
Life	Approximately 2.6 million characters
Printing paper	
Standard labels (PP-139)	1200 labels (size 38.1mm (H) x 63.5mm (W))
Plain paper (PP-108)	500 sections 88.9mm (W) x 152.4mm (L)

Input Specifications	
Method	RS-232C or 20mA current loop (active)
Type	Asynchronous, receive only
Baud rate	
RS-232C	600, 1200, 2400, 4800 and 9600 BPS
Current loop	600, 1200 and 2400 BPS
Data bits	
7 data bits	Even parity
8 data bits	No parity
Stop bit	1 bit
Code used	ASCII

General Specifications	
Power supply	100, 117, 220, 240V AC + 10 / - 15% 50/60 Hz
	Approx. 5VA during standby
	Approx. 20VA during printing
Weight	Approx. 6.3 kg
Dimensions	290mm (W) x 350mm (D) x 121mm (H)
Environmental considerations	
Operating temperature	0°C to 40°C (32°F to 104°F)
Storage temperature	-10°C to 60°C (14°F to 140°F)
Maximum humidity	80% RH (non-condensing)



# Description of Panels





# Principles of Operation

The AD-8119 consists of 4 major blocks (see Block diagram), The Main Board, the Keyboard, the Display and the Print Mechanism. The power transformer is mounted separately on the rear frame, but will be included with the Main Board.

1. The Main Board contains all of the circuitry to translate the incoming data into a dot pattern to drive the print mechanism. It consists of 2 processor ICs and support ICs.
  - a) The main processor (IC1) accepts level conditioned data from the input and stores it in memory until the print processor can break it down into a dot pattern for printing.
  - b) The main processor is supported by a 256k program EPROM and 512k of RAM. An RTC (IC11) supplies the main processor with the date and time. The RTC IC is backed up by a rechargeable battery and will keep accurate time with no power applied to the printer for about 2 months.
  - c) A specialized IC (IC7) controls access to main memory.
  - d) IC5 translates the RS-232C data levels to TTL level. IC13 along with PH1 translate current levels to TTL levels.
  - e) Scanning for the keyboard is provided directly by the processor. The closed key data is read back through IC14 directly onto the data bus (A\_BUS).
  - f) Switch settings (rear panel dip switch) are read through IC13 directly onto the data bus (A\_BUS) at power up or reset.
  - g) The power supply consists of a 5V and a 24V source for logic and the print mechanism. A fault detector (IC10) monitors the supplies and provides a reset for the main processor.
2. The keyboard consists of 20 keys and diodes in a 4 by 5 matrix driven by the main processor directly and decoded by IC14. There are 3 LED displays to indicate when power is applied, the print function is enabled and when the shift function is enabled.
3. The display board has only the liquid crystal display panel mounted on it. It is driven directly by the data bus and controlled by the address bus bits A0, A1 and the output of IC13.
4. The print mechanism is driven by the second processor (IC20) on the main board. This processor is dedicated to conversion the data in main memory into a row and column pattern to drive the print mechanism to print each character.
  - a) The print mechanism motor has a 2 section pulse generator attached to the main shaft. Section one provides one pulse per rotation of the shaft (head position, HP) and the other provides 17 pulsed (dot position, DP).
  - b) The head position, dot position and reset pulses are monitored by the print processor to determine where each dot of each character must be placed.

- c) The print processor computes the character position and drives the print head solenoids through IC17. Carriage direction is also computed for the end of character row.
- d) Motor power, carriage control and paper feed are also controlled by the print processor through IC18 and IC19.
- e) The print processor has it's own program memory (IC22) and RAM (IC23). It is isolated from the main processor with the exception of the print mechanism status (paper out, busy, fault detection).
- f) The data is passed to the print processor using the print data lines and only the print status tells the main processor when to stop sending data.



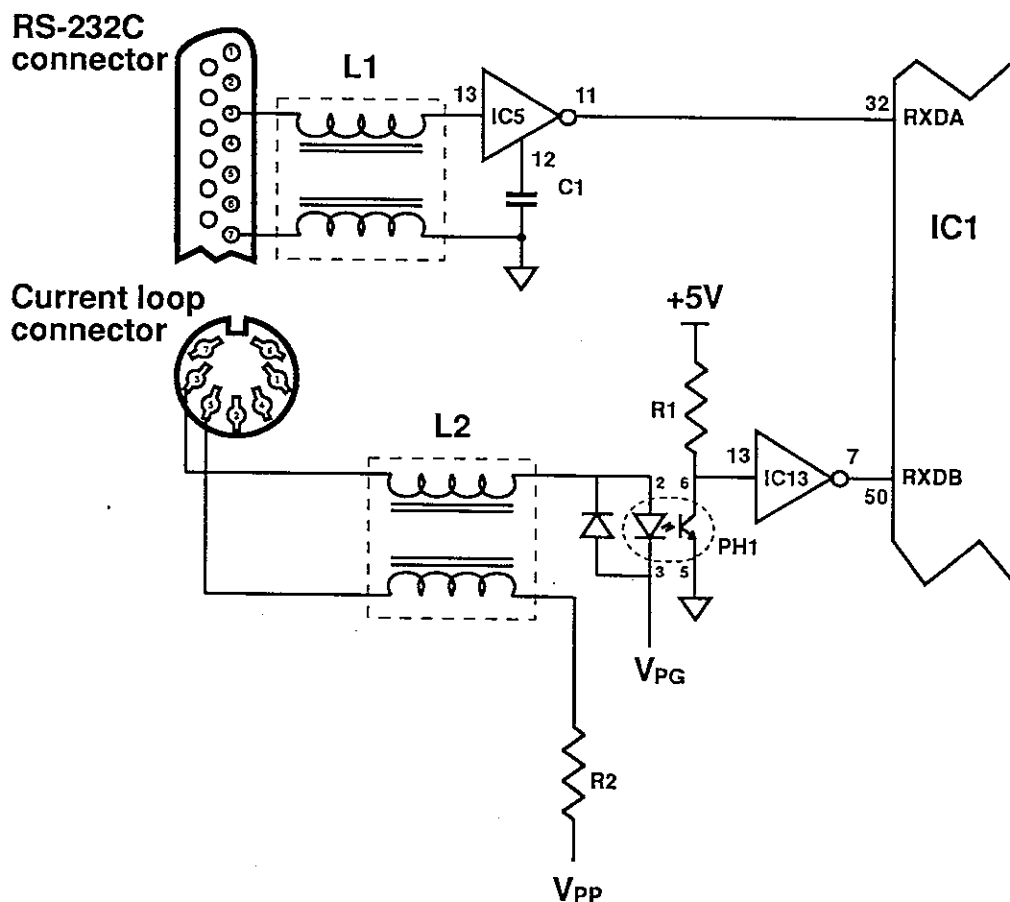


# Serial Input Connections

The AD-8119 may be connected using the RS-232C or the current loop input. There is no switch to determine which is in use.

Only pins 3 (RXD) and 7 (SG) are used for the RS-232C input and a simple cable may be fabricated to connect the printer to source of data.

The current loop is "active" and will source 20mA. Although there is an optical coupler in the input, the current source is internally connected to ground. Only pins 3 (signal) and 5 (current source) are used.





## Product Compatibility

A&D products that will connect directly using current loop. Use cable A&D Part No. KO:359 or fabricate a cable as shown below.

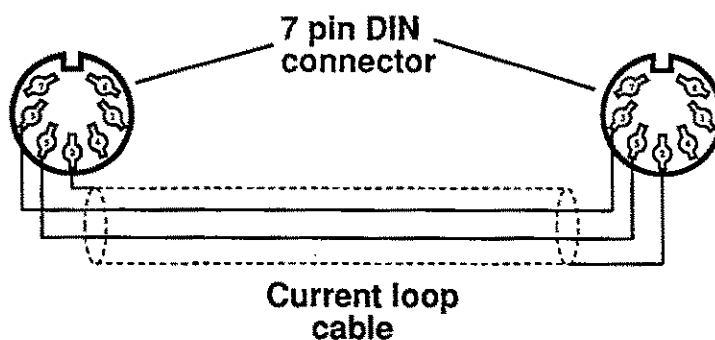
AD-4322A  
AD-4322A MK II  
AD-4323  
AD-4324  
AD-4325A/V

A&D products that can be connected using an optional RS-232C interface. Use cable A&D Part No. KO:445 or a commercial DCE (modem) cable.

AD-4316	FC	HA
AD-4321A/B	FX/FY	HX
AD-4322A	FP	EP
AD-4322A MK II	FR	ER
AD-4323	FT	EK (RS-232C only)
AD-4324	FP	
AD-4325A/V	FG	

A&D products that can be connected using an optional RS-232C interface. Use cable A&D Part No. KO:557A

FV (RS-232C only)  
FW (RS-232C only)





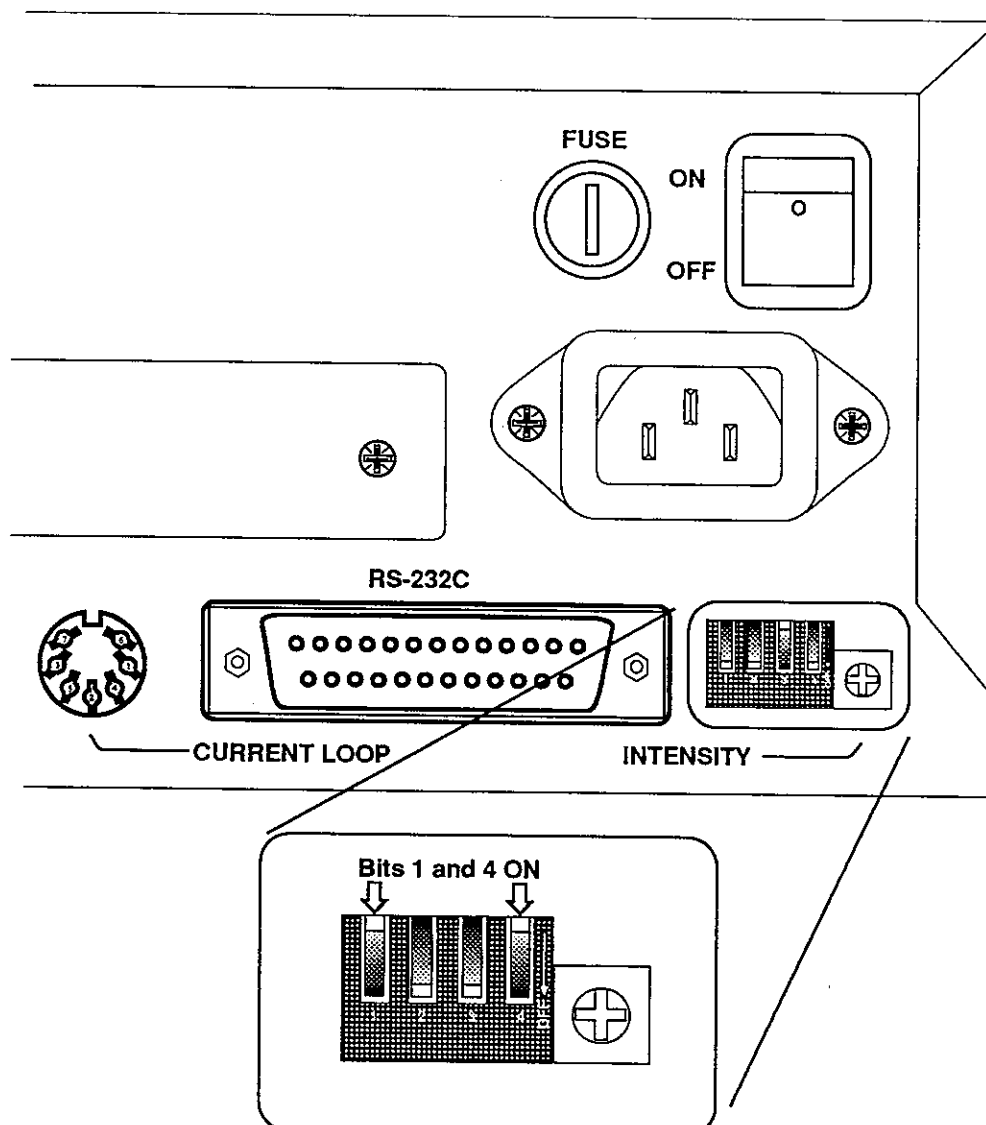
# Performance Check

## 1. Initialization.



The following procedure resets the AD-8119 to the original factory settings. It will clear memory and all totals. All customer data will be erased.

- Set the dip switch on the rear panel as shown in the figure below. Bits 1 and 4 on.
- Turn the power ON. The LCD panel displays the message "INITIALIZE ALL DATA OK? (Y=1 N=0)".
- Press the "1" key to initialize the AD-8119. The LCD panel will then display the message "TURN POWER SW OFF SET DIP SW4 OFF".
- Turn the power OFF and set the dip switch bit number 4 off. Dip SW1 must remain on for an English style display.



## 2. Checking the keys, LEDs and printing.

- a) Turn the power ON. The LCD panel displays the message "ID\_CODE 000000 02/22/93 11:42 AM" The date and time will be what the real time clock IC was set to. If the date and time are not correct, use the procedure outlined below to set it.
- b) Press the keys in this order: MODE, ENTER, ENTER, <, <, ENTER, >, ENTER. The LCD panel will display "!! TEST MODE !! (date and time)". The printer will print the test characters
- c) Press each key on the keyboard and confirm that each key is correctly identified on the printout. As each key is pressed, a "beep" should be also be heard.
- d) Turn the power OFF then ON again. Confirm that the "POWER" LED is on and the "PRINT" and "SHIFT" LEDs are off.
- e) Press the "PRINT" key. Confirm that the "PRINT" LED is on.
- f) Press the keys in this order: MODE, <, ENTER, ENTER, 1, ENTER, SHIFT. Check that the "SHIFT" LED is on.
- g) Turn the power OFF.

## 3. Setting the date and time.

- a) Turn the power ON.
- b) Press the keys in this order: MODE, ENTER, >, ENTER, >, ENTER.
- c) Select M/D/Y or D/M/Y using the "<" and ">" keys, then press the "ENTER" key.
- d) Press the "ENTER" key twice to set the clock. The date will be displayed. Enter the date numerically on the keyboard. You may move around to the digit requires using the "<" and ">" keys. When the date is correct, press the "ENTER" key.
- e) The time will now be displayed. Using the same method as in the previous step. When the time is correct, press the "ENTER" key.
- f) Turn the power OFF.

## 4. Checking The RS-232C and current loop inputs.

- a) With the power OFF, connect the AD-8119 to an A&D indicator such as an AD-4321A (or any of the AD-43XX series), using a DCE cable (A&D part No. KO:445) cable. Have the indicator set for 2400 baud, 7 data bits, 1 stop bit, parity even and stream mode. The AD-8119 does not return status, so only pins 3 (data) and 7 (signal ground) are actually used.
- b) Load plain paper (not labels) into the printer and set the dip switch on the rear of the printer to: Bits 1 and 2 on (up), bits 3 and 4 off (down).
- c) Apply power to the system and turn the printer power on and then the indicator power. This will allow the printer to do a self check prior to receiving any transmitted data.

- d) The LCD panel will display "!! DUMP MODE !! (date and time)".
- e) With the indicator displaying a positive weight, press the "PRINT" key on the AD-8119. Press the "PRINT" key again to stop the printing.
- f) Compare the printed data with the displayed data on the indicator. All of the header, weight data and unit of weight must agree with the data transmitted by the indicator.
- g) Turn off and remove power from both the printer and the indicator.
- h) Replace the RS-232C cable with a current loop cable (A&D part No. KO:359) and repeat steps "c" through "g".
- i) Remove the paper from the paper holder. Set the dip switch on the rear panel to: Bit 1 on (up) and bits 2,3 and 4 off (down). Apply power and turn both instruments on. Press the "PRINT" key and verify that the LCD panel displays "!! Paper empty !!". Turn both instruments off.
- j) Remove the data input cable from the printer, Apply power to the printer only. Turn the printer power ON. Press the "PRINT" key. The LCD panel will display "No data !! Push any key !!" and a "beep" for one second. Turn the printer power OFF.
- k) The printer may also be tested using a personal computer by sending a string of data in ASCII format. If you are familiar with the use of a personal computer, send a string consisting of this data:

**AA,BB,S0000.00UUUTT**  
Header  
No.1
Header  
No.2
Sign
Weighing data with  
or without decimal  
point. Up to 7 digits
Unit of weight
Terminator

Where AA can be ST (stable), US (unstable) or OL (overload)  
 Where BB can be NT (net), GS (gross) or TR (tare)  
 Where S can be "+" or "-"  
 Where UUU can be " g" or " g", "kg" or " kg", "lb" or "DWT"  
 Where TT can be CR (carriage return) or CR LF (carriage return and line feed)

These are the two standard A&D formats. With or without header 2.  
 Please note that there can be 1 or 2 spaces prior to the "g" This is dependent on the instrument driving the AD-8119.

In the "Dump Print Mode", the AD-8119 will accept any data and print it as it was sent. The printer will not attempt to place the data on a label in any preset fashion.



## Problems and Solutions

The AD-8119 may be used with plain paper or special peel off labels. The labels supplied with the printer have a strong adhesive backing. The use of labels other than the type supplied can cause the printer to jam. The AD-8119 does not return status. If it develops a problem such as running out of labels, it will display an error and stop. Any data sent after the printer stopped will not be totalled.

- a) Use only labels that do not peel off of the backing easily or they might peel off in the print mechanism.
- b) Do not "back" a label up or try to pull the backing out of the rear of the print mechanism.
- c) If a label does peel off in the print mechanism, stop printing immediately and remove the label from the mechanism.

Using plain paper.

- a) Set the dip switches on the rear panel to bit 1 and 3 on, 2 and 4 off to print and total.
- b) The printer will not feed by it's self, set the terminator of the sending unit to supply a line feed. Turn the power off to set the switches.

Switching from plain paper to labels and the printer does not feed.

- a) If you have been using plain paper in the dump print mode and switch back to labels, reset the dip switches on the rear panel for label printing (bit 1 on, bits 2,3 and 4 off). Turn the power off to set the switches.
- b) If the dip switches are left as they were for labels, the printer will print as if it was using labels. Turn the power off, reset the switches to the mode required and turn the power on again

Changing modes and the printer seems to be stuck in the original mode.

- a) Turn the power off, then on again. The main processor only reads the dip switches at power up.

Paper out sensor will not go off or on.

- a) check the paper tray, the sensor is on the left side in front. The paper must be flat against the sensor for it to work. A roll or stack of labels that is not flat will not be detected.
- b) if you are using plain paper or labels over the back of the printer and they run out, with a stack in the paper bin, the printer can not detect when the paper is out and will continue as if it has paper.

Dump print mode.

- a) The only keyboard keys that will work in dump print mode is "PRINT" which sets the printer on line or off line and the "FEED" key that feeds paper.
- b) To access any other keys, turn the printer off, set the dip switches to bit 1 on and bits 2, 3 and 4 off, then turn the power back on.



# Repair Strategy

The AD-8119 was developed for A&D as an OEM product and as such, there is some operational data missing.

The repair strategy is:

- a) Isolate the problem by substitution.
- b) Replace a defective block with one that is working properly.

A block diagram, circuit diagram, parts location and parts list are provided.

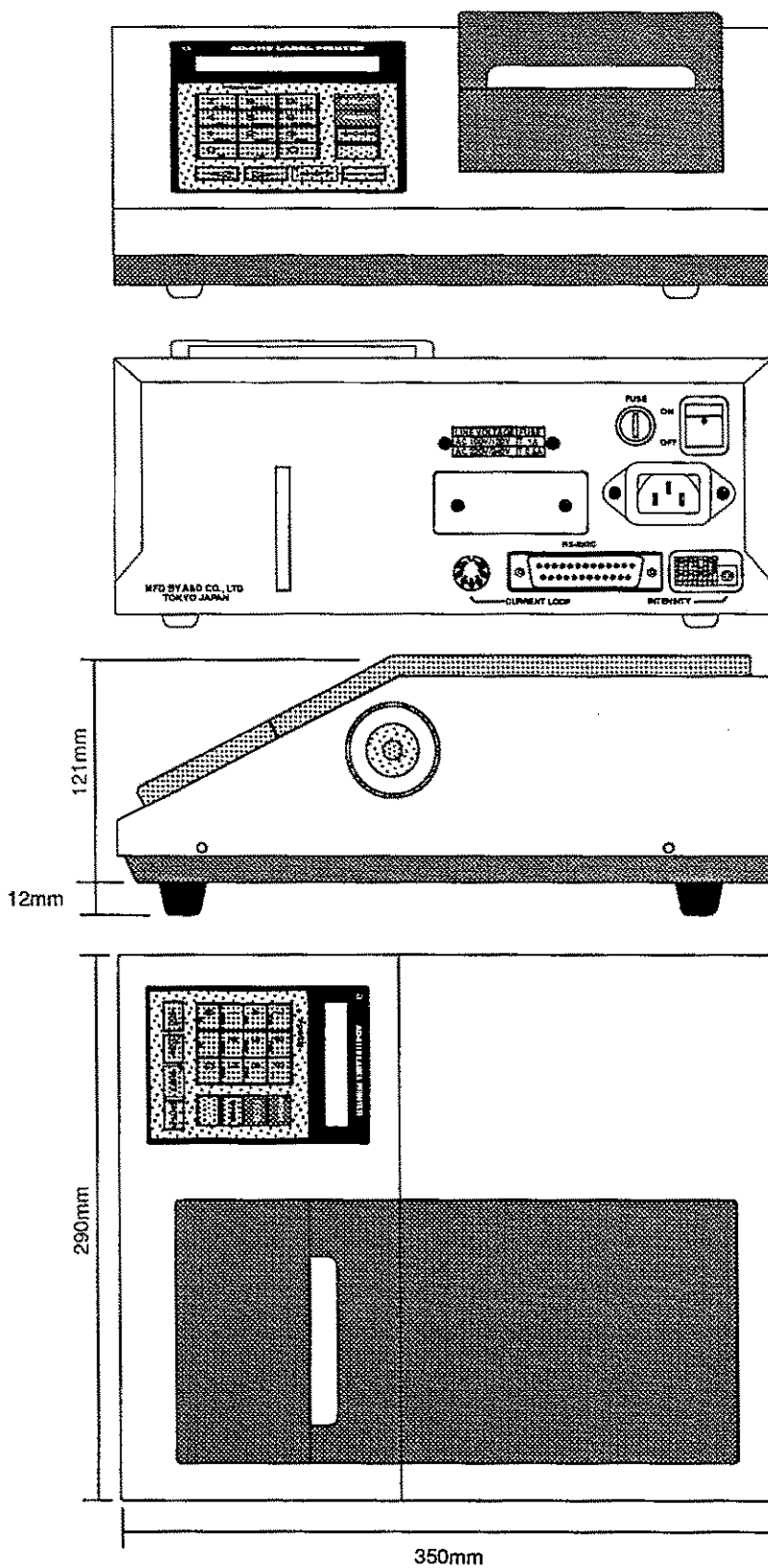
It is recommended that the print mechanism be replaced as a unit.

The following table lists the major components

A&D Part No.	Description
7PZ:2419B	Main printed circuit board (does not include program IC)
7PZ:2420B	Keyboard
7PZ:2421B	Paper out sensor board
7ET:DMC2061	Display board
7EP:DP-612-DPC	Print mechanism
701:A38548	Keyboard membrane
ST:T-884DBBF1	Power switch
FH:FH-B02	Fuse holder
TF:393A	Power transformer



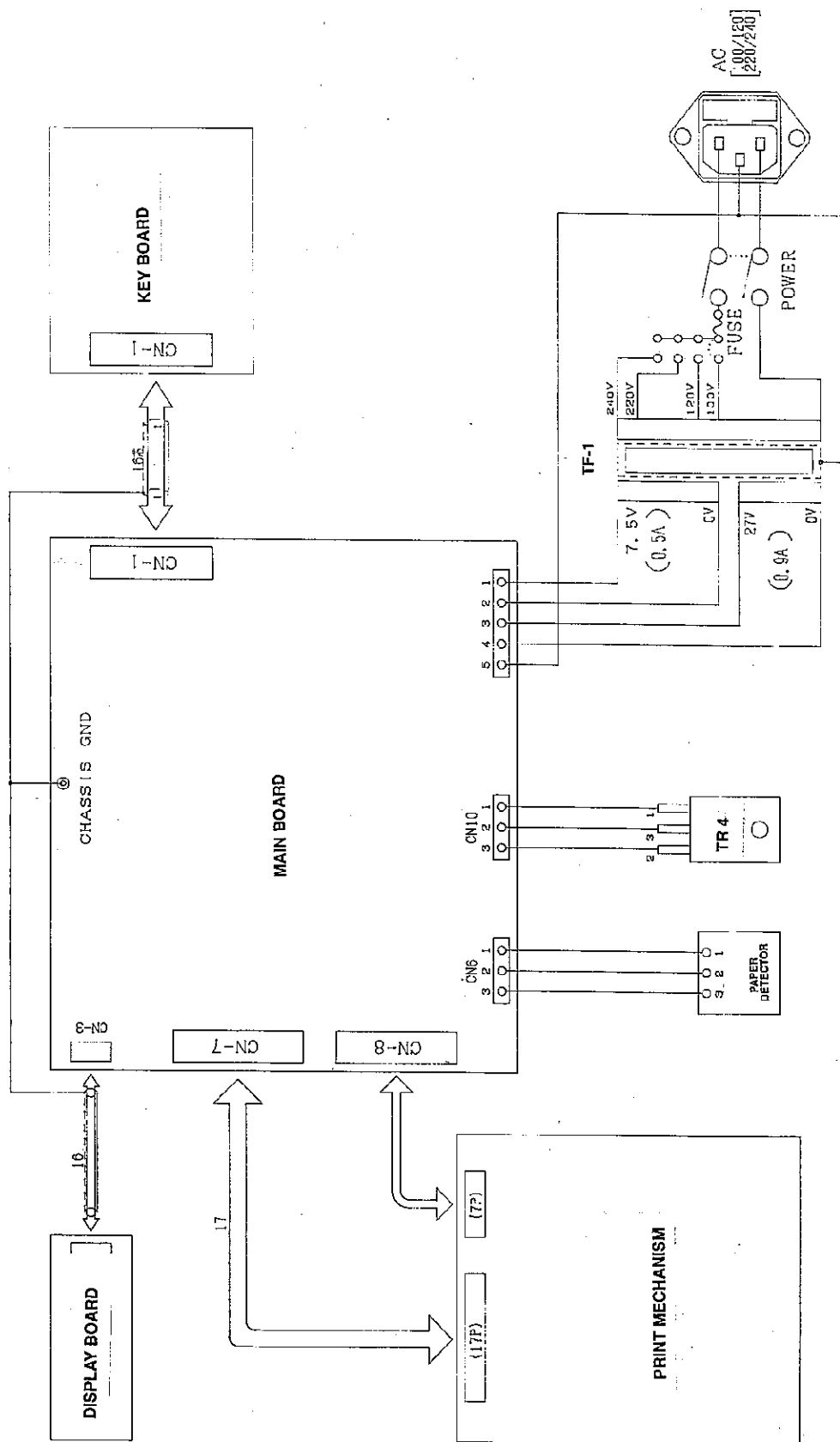
# Physical Characteristics



Drawings not to scale



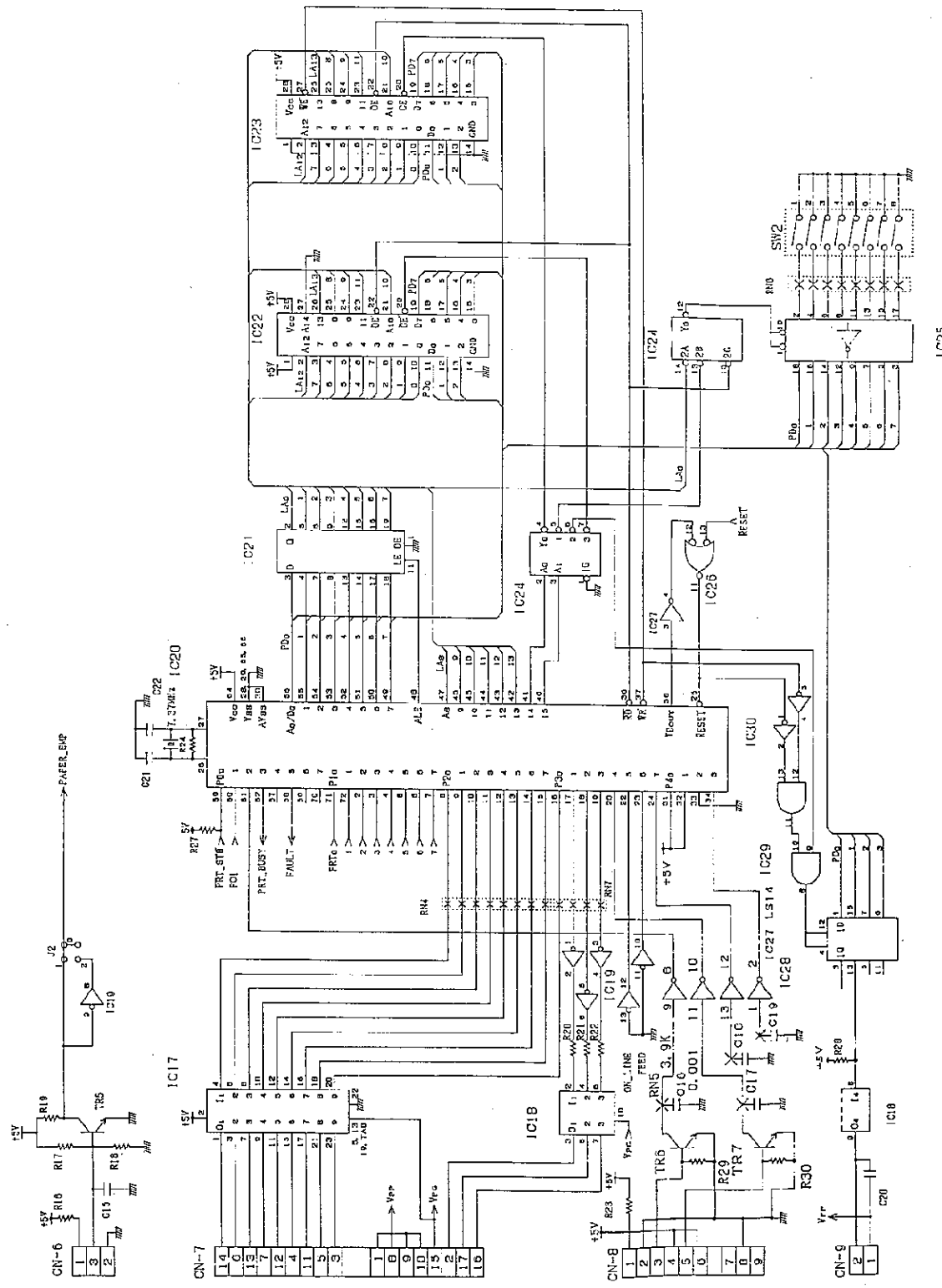
1805 → MP-2425 92-229



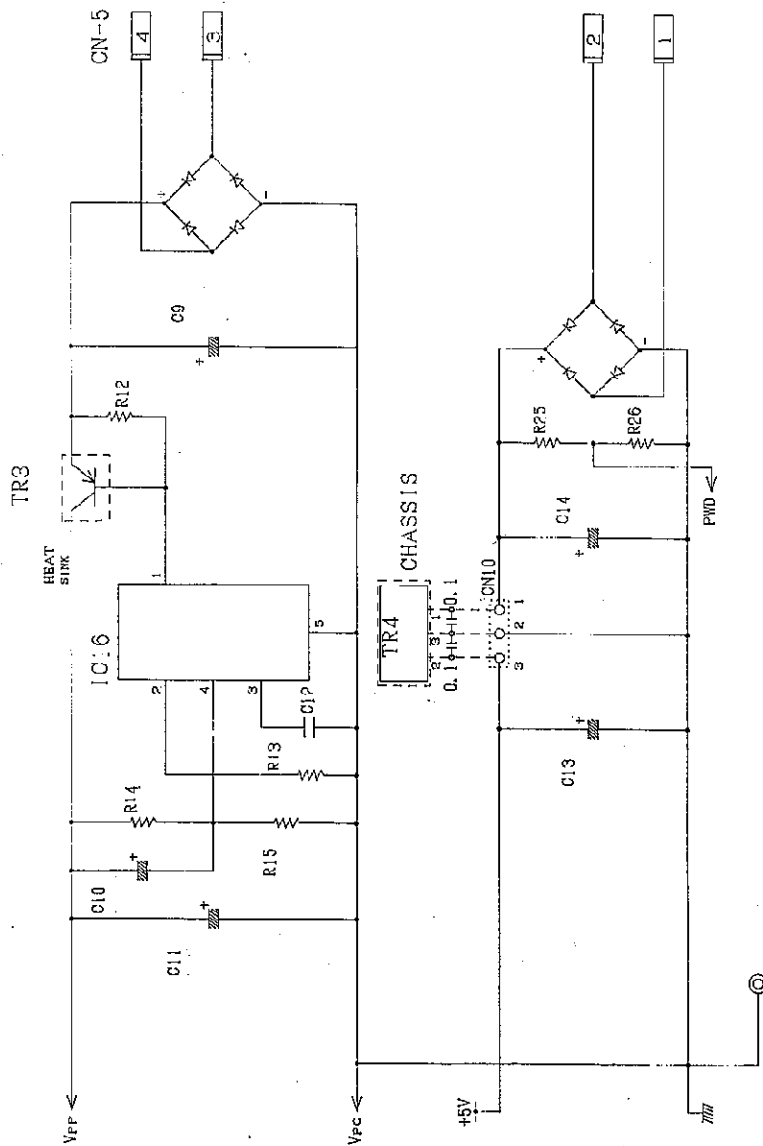
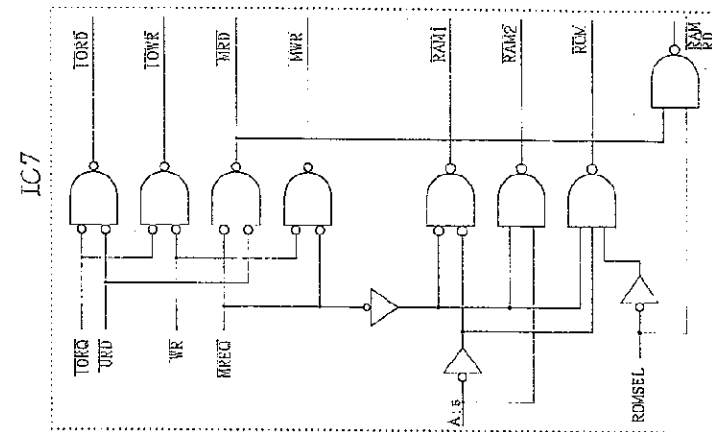
MODEL	AD-8119
DESCRIPTION	BLOCK DIAG.
A&D STOCK NO.	



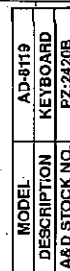




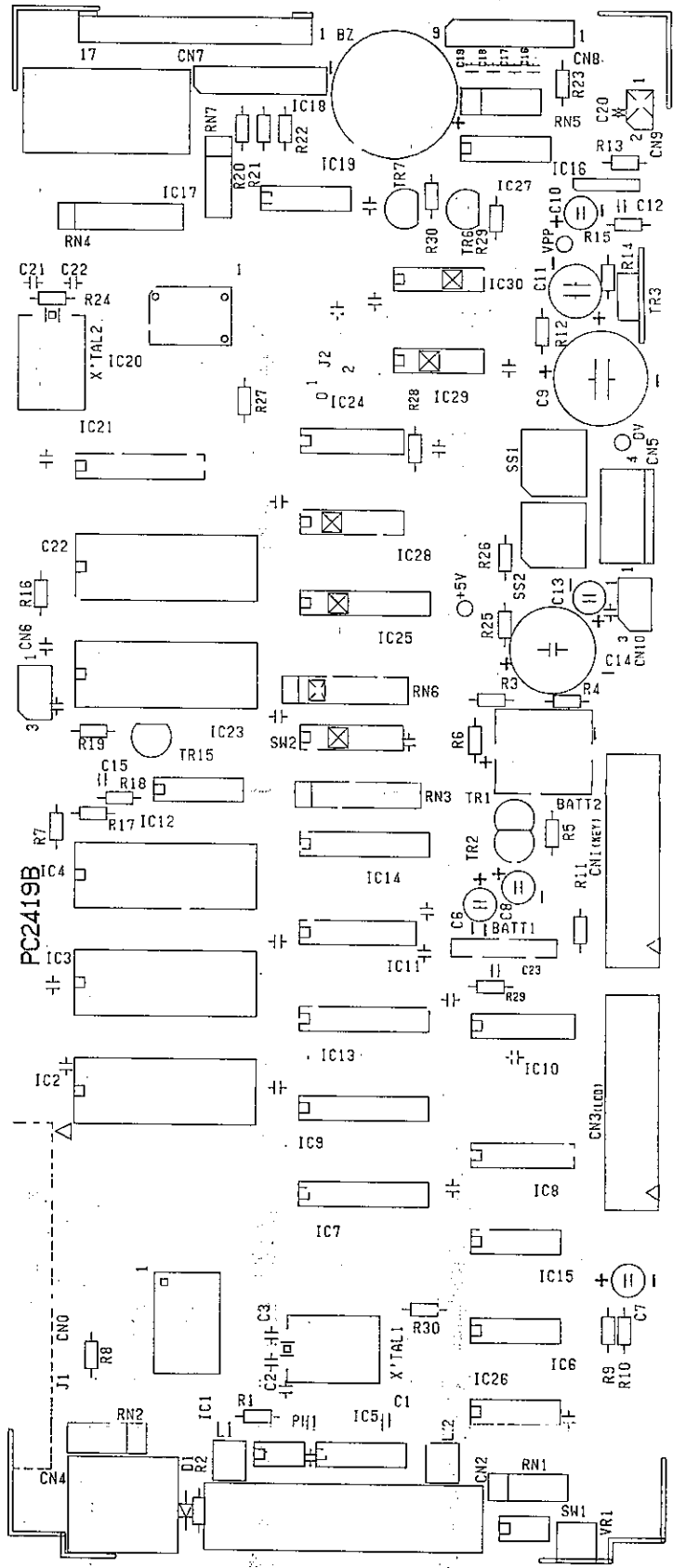
MODEL	AD-8119
DESCRIPTION	MAIN BOARD 3/4
A&D STOCK NO.	PZ:2419B



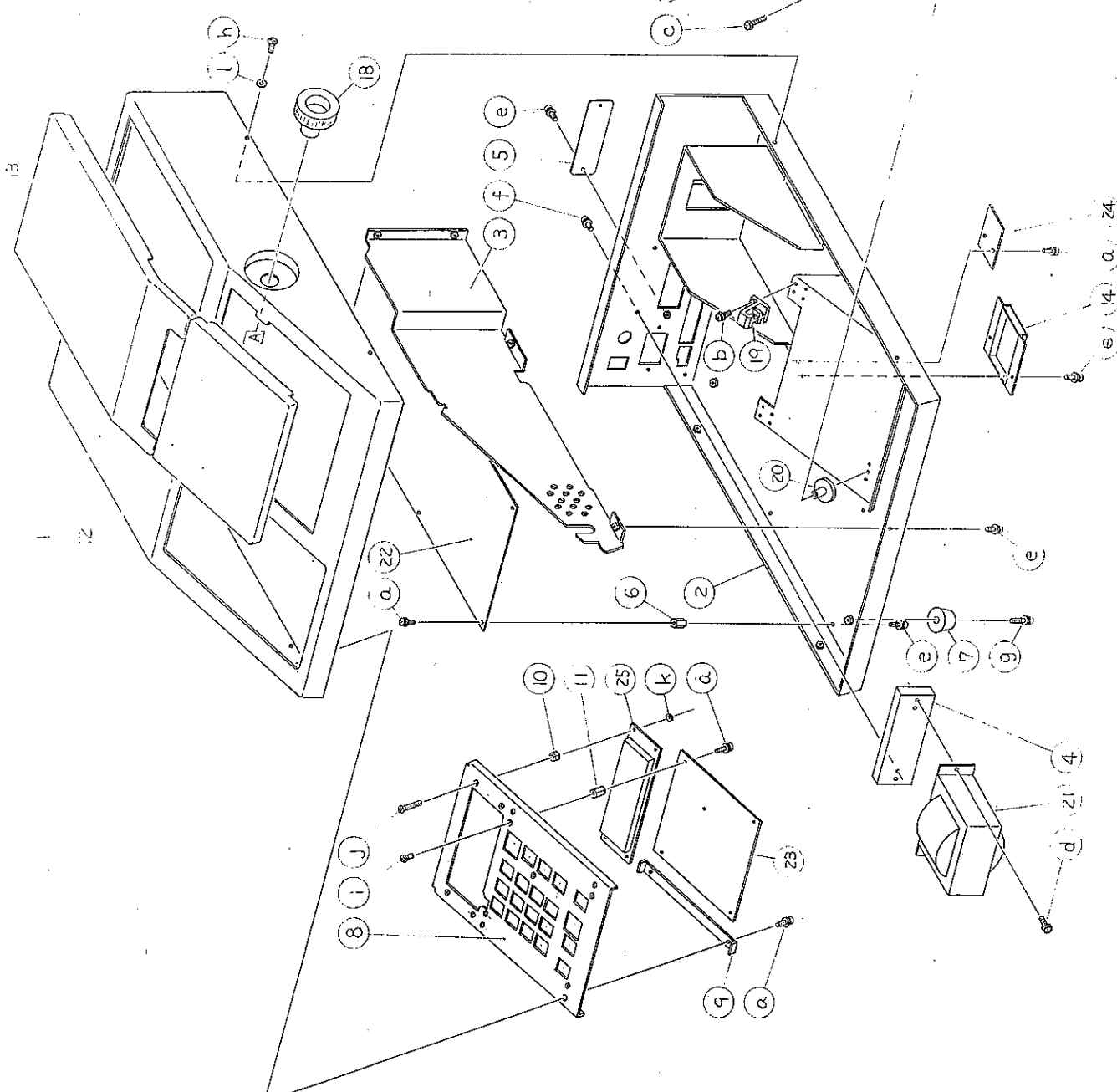
MODEL	AD-8119
DESCRIPTION	MAIN BOARD 4/4
A&D STOCK NO.	PZ-2419B



MODEL	AD-8119
DESCRIPTION	PARTS LAYOUT
A&D STOCK NO.	PZ:2419B



a	M3x6 + spring washer	1	Top cover
b	M3x8 + spring washer	2	Chassis
c	M3x12 + fiber washer	3	Sub frame
d	M4x8 + spring washer	4	Transformer support
e	M3x6 + nylon washer	5	Cover plate
f	M4x8 + nylon washer	6	9mm spacer
g	M4x10	7	Foot
h	M3x8	8	Keyboard frame
i	M3x4	9	Keyboard support
j	M3x12	10	3.6mm spacer
k	M3 nut	11	8.2mm spacer
l	M3 nylon washer	12	Printer cover
m	2.5mm "E" ring	13	Paper bin cover
		14	Paper detector cover
		15	Locking lever
		16	Locking lever support
		17	Print mechanism
		18	Knob plastic
		19	Part of print Mechanism
		20	Part of print Mechanism
		21	Power transformer
		22	Main board
		23	Keyboard
		24	Paper sensor
		25	Display board



MODEL	AD-8119
DESCRIPTION	EXPLODED VIEW
A&D STOCK NO.	





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