AD-8118 SERIES

JOURNAL PRINTER

MAINTENANCE MANUAL

Maintenance-AD-8118-series-v.1.a 93.03.10.

JOURNAL PRINTER

MODELS
AD-8118A
AD-8118B

A&D Company, Limited

Table of Contents

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 U.S.A.)

Features

The AD-8118A/B Universal Printer is designed primarily for use with A&D industrial scales and electronic balances and has the following features:

- Highly reliable printer mechanism for industrial use
- Error-free operation(internal self-check function)
- High noise immunity.
- Dot impact mechanism allows long-term storage of printed contents.
- 24 columns/line printing for high printing density.
- Panel mountable small DIN size. Installation in an instrument panel, etc. is easy.
- Cumulative total function by code and grand total calculation function.
- Calendar/clock function. Date and time may be printed.
- Lithium battery provides cumulative total memory and calendar/clock back-up without AC power for approximately 6 years (with power off)
- 60mm paper used for large printing capability.
- Serial input allows simple connection with only one cable. Current loop input allows connection to remote devices also (about 100m) .
- Interval function performs printing at set times.
- Programmable printing format.
- Inputs can be expanded up to 4 channels by adding options so that the data of four scales can be printed with one printer.

Specifications

Printer Unit Specifications

Printer

1)	Printing system	Dot matrix impact printer
2)	Printing width	24 columns/line for 5 × 7 dot character (standard character) 12 columns/line for 10 × 7 dot character (enlarged character)
3)	Printing speed	Approximately 1.7 lines/second (internal processing time excluded)
4)	Character dimensions	1.7 (W) × 2.6 (H)mm (standard character) 3.4 (W) × 2.6 (H)mm (enlarged character)
5)	Reliability	Approximately 1,000,000 lines

Display and Keys

1)	Display element	Liquid crystal 8 digits (character display)
2)	Character height	6.95mm
3)	Keys	Ten keypad and function keys (16)

Ink Ribbon

1)	Character color	Purple
2)	Life	Approximately 250,000 characters (varies depending on the environment)

Printer Paper (PP-137)

1)	External dimensions	57.5 (W) × 60 (D) mm
2)	Length	Approximately 30m (an ending mark appears approximately 1m from the end)
3)	Number of printing lines	Approximately 8000 lines

General Specifications

1)	Power requirement	100, 120, 220, 240VAC 50/60Hz Approximately 20VA (printing)
2)	Weight	Approximately 3kg
3)	Operating temperature	0 to 40°C (32°F to 104°F)
4)	Operating humidity	range 80% RH (non-condensing)
5)	Physical dimensions	192 (W) 185 (D) X 96 (H)mm
6)	Panel cutout dimensions	$186 \pm {}^{1.0}_{0}$ x $92 \pm {}^{0.8}_{0}$ mm

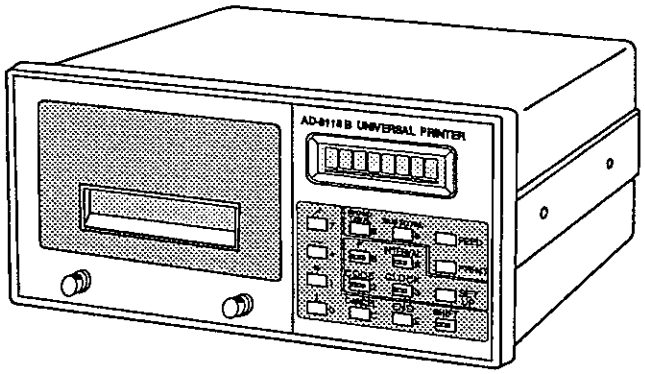
Input Specifications

Method	EIA RS-232C or current loop
Baud rate	2400/600bps
Data bits	7/8 bits
Parity bit	1 (EVEN)
Stop bit	1
Codes used	ASCII

- Specifications and appearance are subject to change without prior notice.

Accessory Check List

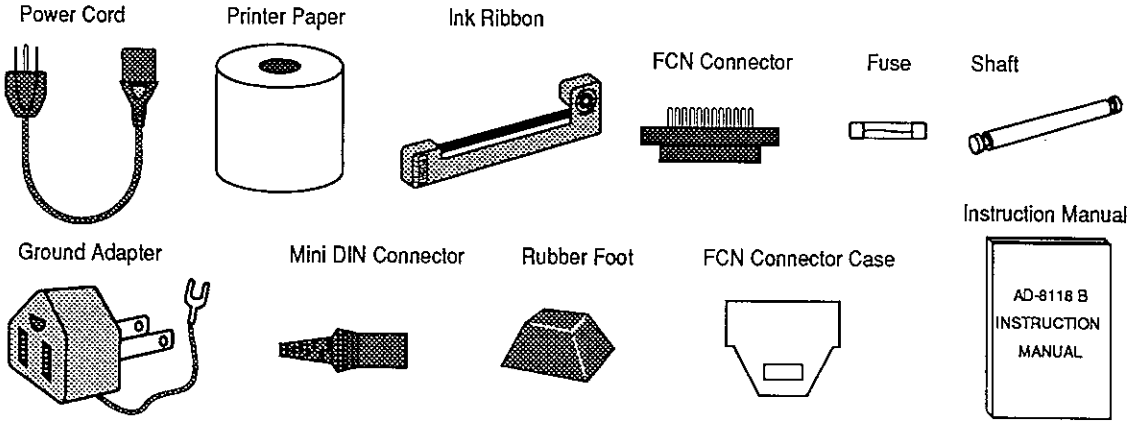
Universal Printer (AD-8118B shown)



Line Voltage	Fuse	Power Cable	Connector Style
100 VAC	FS:F7142-0.5A	KO:115	A2
120 VAC	FS:F7142-0.5A	KO:115	A2
220 VAC	FS:F7142-0.3A	KO:244	S
220 VAC	FS:F7142-0.3A	KO:242	BF
240 VAC	FS:F7142-0.3A	KO:243	C-5

Accessories:

- AC power cord — See table above
- Printer paper — AX-PP137-S
- Ink ribbon — AX-ERC-09-S
- FCN connector — JI:361J024-AG
- Fuse — See table above
- FCN case — JI:361J024-AG
- Ground adapter — ET:9102
- Mini DIN connector — JA:TCP0576
- Rubber foot — 10:SJ-5023
- Shaft — 05:A46423
- Manual



Precautions

This printer is a precision electronic device. Handle it carefully.

Installation

1) The operating temperature range is 0°C to 40°C (32°F to 104°F) . Do not install the printer in direct sunlight.
2) As the printer is not sealed, do not use the printer where dust is prevalent. If conductive substances get inside the printer, trouble may occur.
3) Do not subject to strong vibrations.
4) Be careful not to expose the printer to excessive noise or static electricity, they may cause the printer to malfunction.

Connection of AC Power Supply/Ground

1) Ground the printer. Connect it to an independent ground. Do not share the ground of other power devices. Connect to ground using the accessory power cable.
2) As an unstable or noisy power source may cause the printer to malfunction, use it with a stable power source. Do not use a common power line.

* **Do not apply power. Connect the power plug after all other connections have been made.**

Power-up Procedure

When this printer is connected to other devices, turn on the power of the other devices first, then turn on the power of this printer.

If the power is turned on at the same time, start-up of the CPU of the connected devices may be delayed and when the printer is set to the automatic print or dump print mode, the first data set may not be processed normally.

Principles of Operation

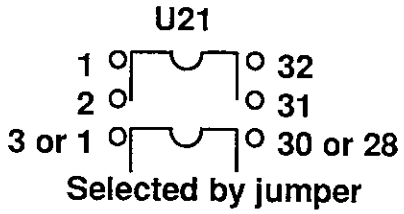
The AD-8118A/B is based on the V25 type microprocessor which incorporates direct memory access, serial I/O, parallel I/O and a timer into a single IC.

The AD-8118A and AD-8118B use the same main board. There are some jumper differences between models and so each has it's own part number.

The data interface bus is structured for 8 data bits for both models.

The CPU (U14) operates at a clock rate of 4.91Mhz which is divided down from 9.83Mhz by U12.

The internal software program is contained in a removable PROM and may be either a 28 pin for the AD-8118A or 32 pin for the AD-8118B.

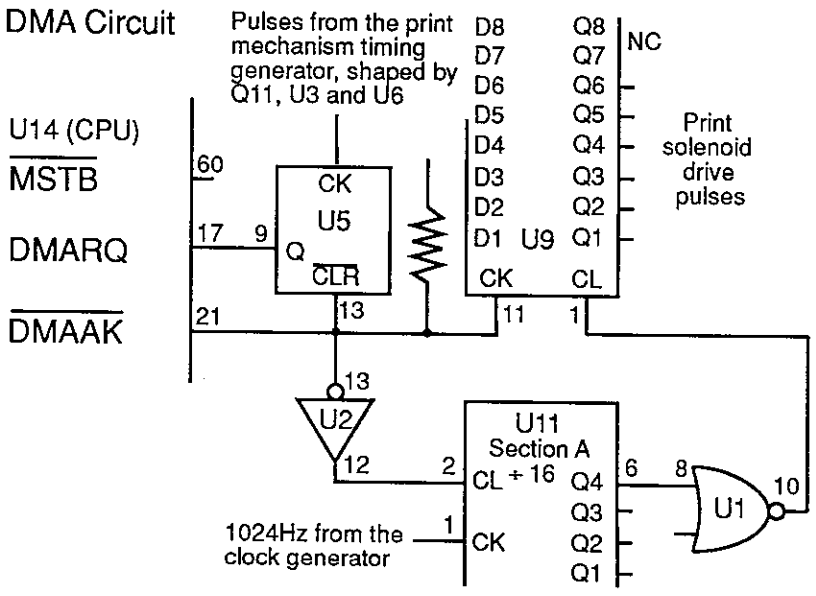


All operational parameters are stored separately in a 1K EEPROM

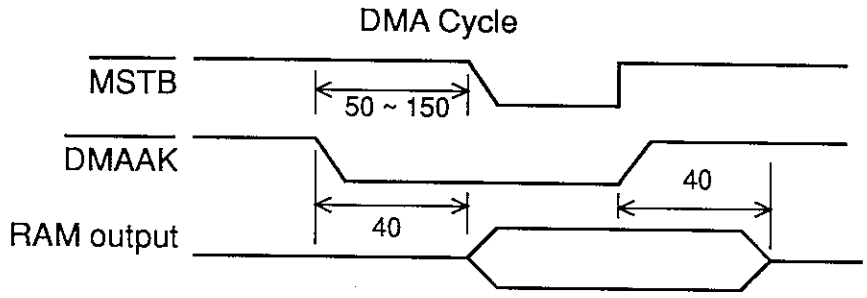
Random access memory is of the static type (SRAM) and may be of 2 different sizes dependent upon the model type. The memory type is jumper selected to 64K for the AD-8118A or 256K for the AD-8118B. In each case the memory is backed up by a long life lithium battery.

A real time clock has been included for date and time. This has an accuracy of within 10 parts per million without local correction.

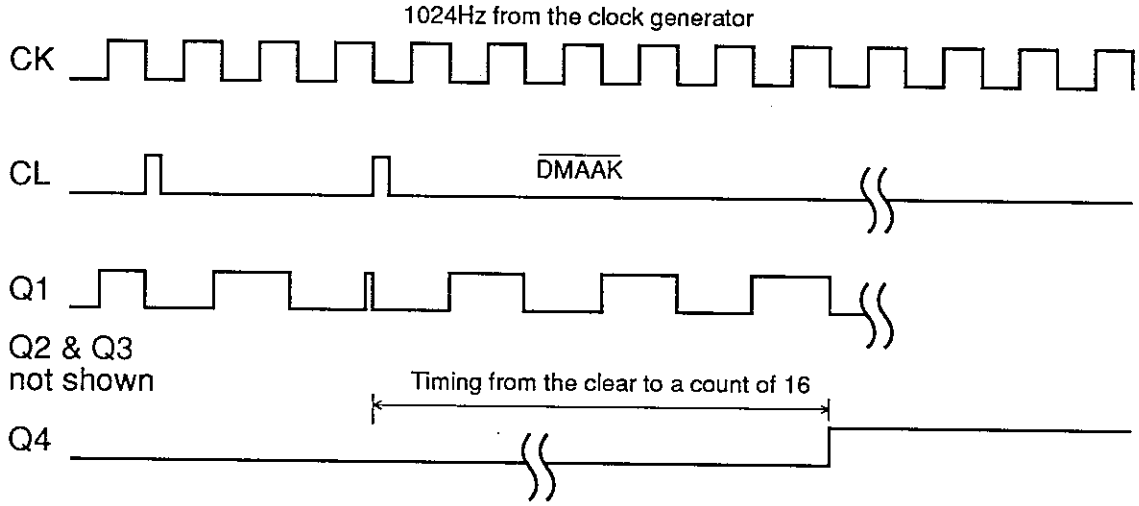
A partial diagram of the DMA request and acknowledge circuit is shown to explain the operation of the print mechanism row and column timing. U9 establishes which solenoids are activated, U5 generates the DMARQ and U11 counts the 1024Hz clock until $\overline{\text{DMAAK}}$ is received from the CPU.



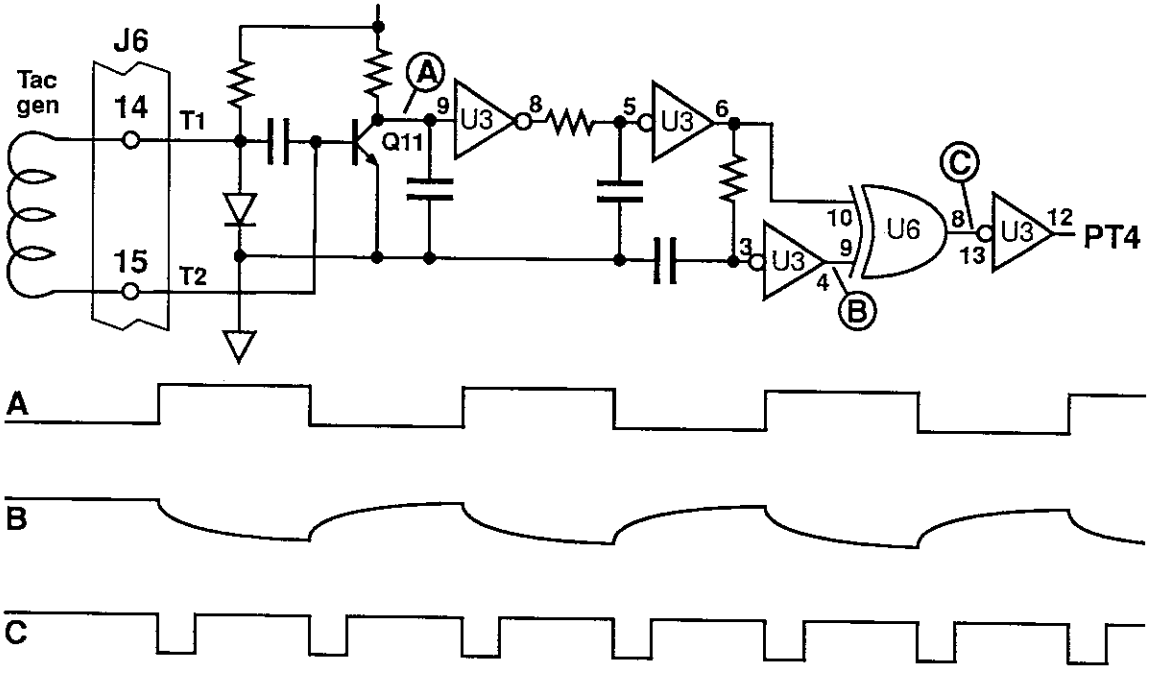
Shown below are simplified timing diagrams for the DMA process.



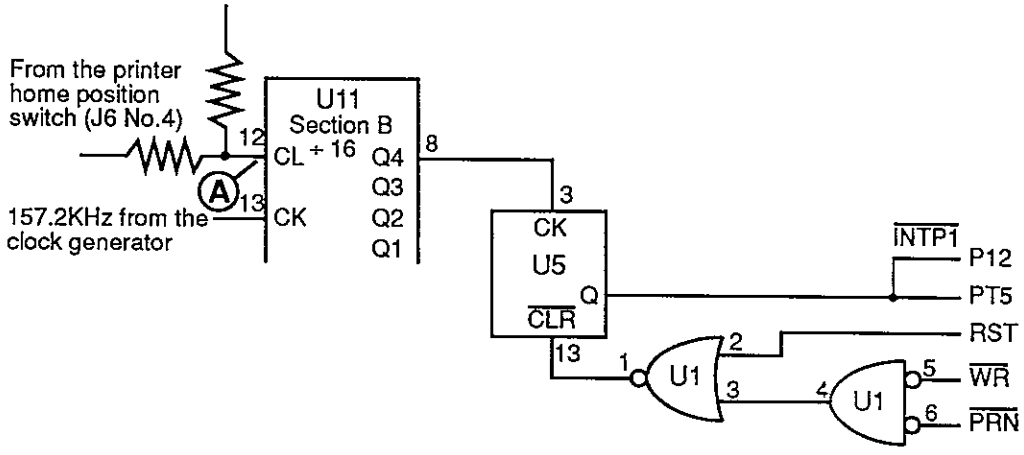
The timing cycle of U11 (a dual 4 bit binary counter) is shown. U11 divides the clock by 16 starting from DMAAK.



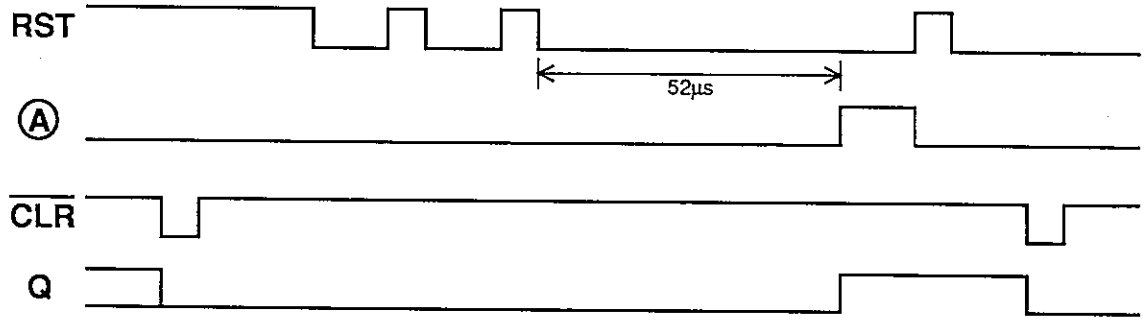
A partial diagram of the tachometer signal shaping circuit is shown to explain the timing diagram that follows. The delay caused by the resistor and capacitor between pins 6 and 3 of U3 produce a pulse for each transition of the output of the print mechanism tachometer generator.



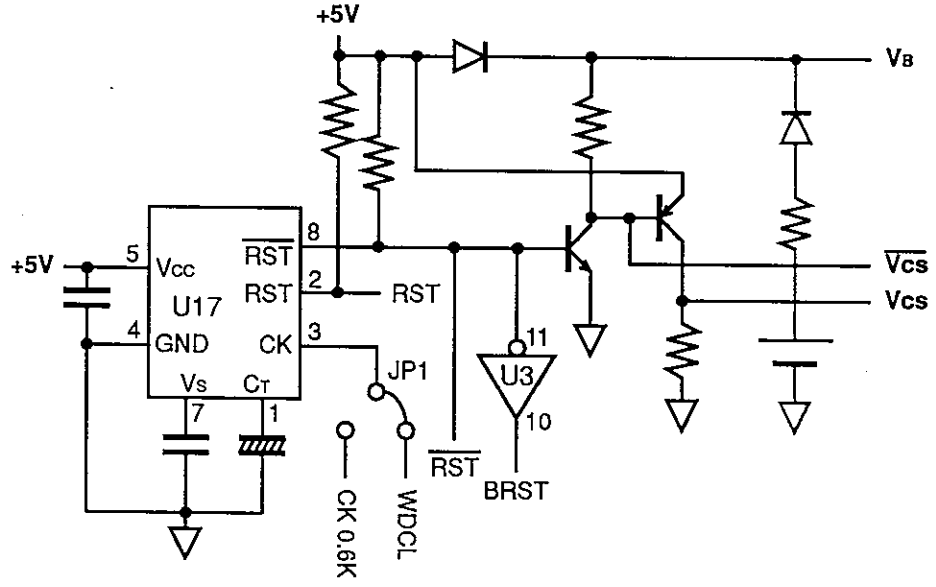
A partial diagram of the print head position circuit is shown to help explain the operation of the print mechanism start position timing. A switch closure in the print mechanism through J6 segment number 4 is used to clear the 4 bit counter U11. U11 is clocked by a 157.2KHz signal from the clock generator U12. The output of U11 is the 157.2KHz divided by 16. This is used as clock for 1/2 of U5. U5 is cleared by signals RST, $\overline{WR}$ and $\overline{PRN}$.



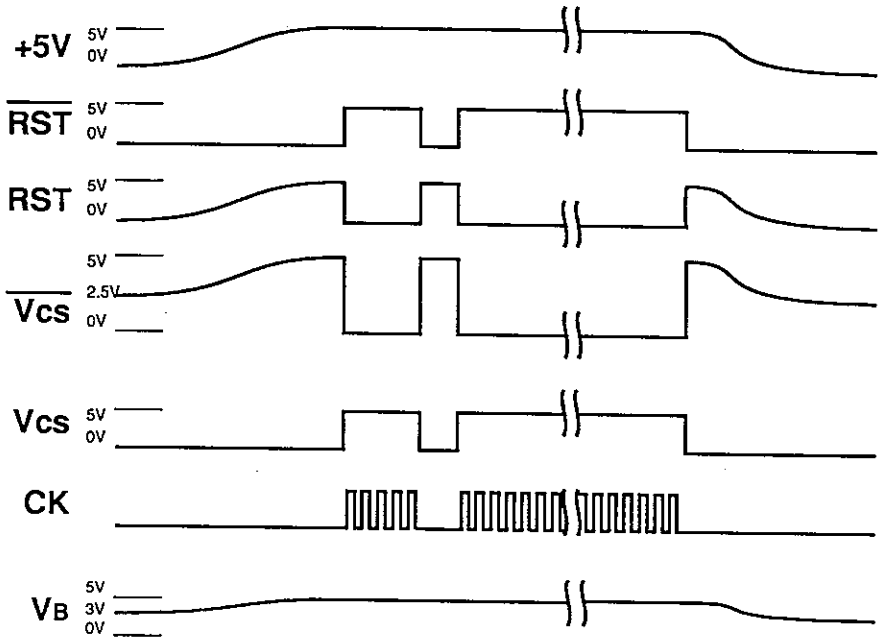
The following waveforms show the relationship of the signals that generate the interrupt to signal the start position. The output of U5 (Q) drives $\overline{INTP1}$ (P12) and PT5. When the motor power is on, U5 is reset at the 44th pulse. The CPU monitors the PT5 line for the next pulse.



VB for the RAM and RTC IC's along with Vcs is generated in the following circuit which must supply 70mA to the RAM IC during normal operation. U17 monitors WDCL timing and will reset the CPU if the time exceeds 110ms. Vcs must be zero volts during shutdown or the back up current will increase.



The waveforms show the relationship between the various supplies at power up and power down. V_B should drop to about 3V and $\overline{Vcs}$ to about 2.5V.



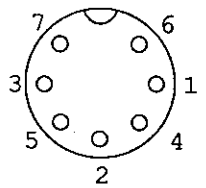
Serial Input Connection

For the AD-4322, 23, 24, 25, etc., 1-to-1 connection to the standard serial output (current loop) is possible. For the FX, FY, FR, FV, FW, AD-4316, AD-4321, etc. connect the serial input by using the RS-232C option. (However, when a current loop output is optional, it can also be used.) An external display, etc. can also be connected. (CH1 only.)

CH1

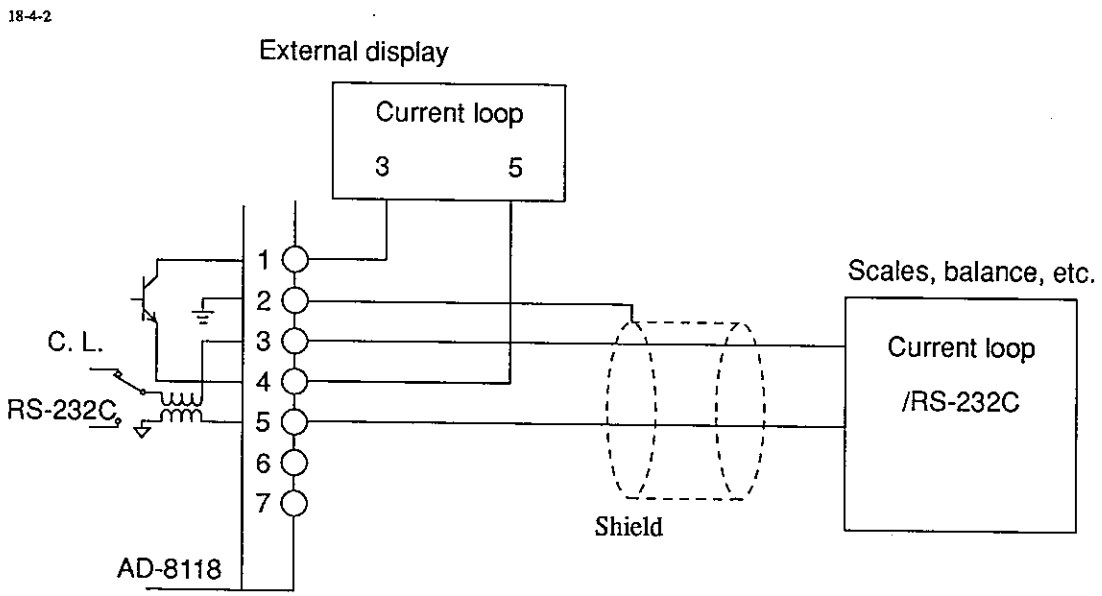
Connection table

Pin No.	Symbol	Contents
1	C.L.OUT	Current loop output
2	F.G.	Frame ground
3	Ser.IN+	Serial input + (TxD)
4	GND	Signal ground
5	Ser.IN-	Serial input (SG)
6	I.C.	Connected internally
7	I.C.	Connected internally



View from rear panel

- Serial input uses both RS-232C and current loop. For RS-232C, pin 5 is signal ground. Connect the shield to pin 2.
- Shielded twisted pair cable is recommended as the signal line.

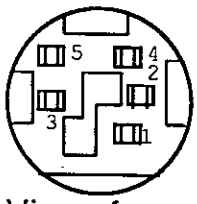


- Serial input connection (OP-01)

Option serial input is switched between RS-232C and current loop as shown below.

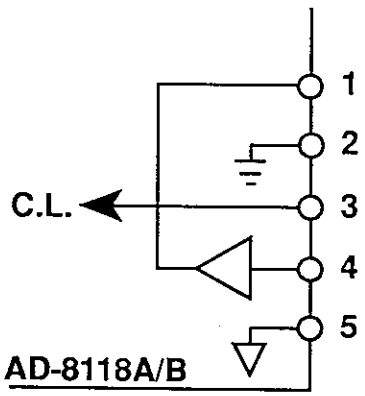
Connection table

Pin No.	Symbol	Contents
1	CONV.OUT	RS-232C conversion output
2	F.G.	Frame ground
3	C.L. IN	Current loop input
4	RS IN	RS-232C input
5	S.G.	Signal ground

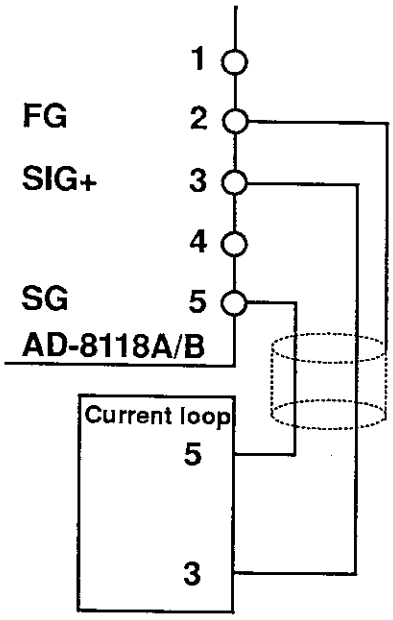


View from rear panel

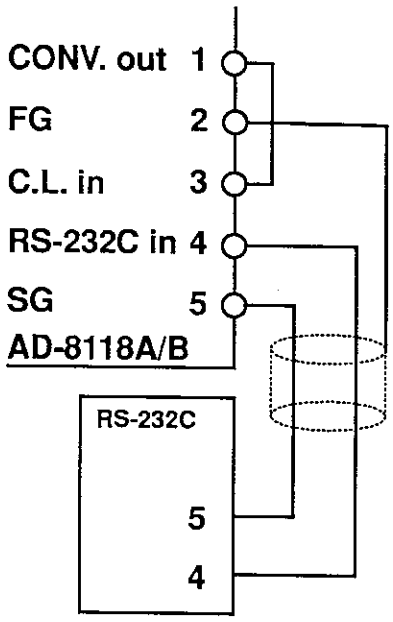
Interface circuit (common to all CHs)



Current loop connection



RS-232C connection



A&D Product Group Compatibility

Standard format input is possible with the following A&D industrial scales:

- AD-4316+OP-04*1
- AD-4321+OP-04
- AD-4322(OP-04)*2
- AD-4323(OP-04)
- AD-4324(OP-04)
- AD-4325(OP-04)

FG SERIES+OP-03
FV SERIES+OP-03
FW SERIES+OP-03
FT SERIES(OP-04)

- Set the baud rate to match the specifications of this printer.
- When connecting the AD-4325, set the output format to output the code number with the data. The cumulative total processing is performed by AD-4325 code.

*1 Products designated +OP-XX must have that option installed.
*2 Products designated (OP-XX) can be connected to standard serial output. Otherwise, they are connectable even if OP-XX is installed.

Connection to Electronic Balance

Standard format input is possible with the following A&D electronic balances:

- EK SERIES+OP-03
- EP SERIES+OP-03
- ER SERIES+OP-03
- ET SERIES+OP-03
- FA SERIES+OP-03
- FC SERIES+OP-03

FR SERIES+OP-03
FX SERIES+OP-03
FY SERIES+OP-03
HA SERIES+OP-03
HX SERIES+OP-03

- However, match the baud rate to the specifications of this printer.

The contents settings related to data output of the devices above are given on the following page.

(Typical settings)

FR

C5 **PRINT**	0 ~ 4
C5 **PAUSE**	1
C6 **BPS**	0 or 2
C6 **PAR**	0
C6 **BIT**	0
C6 **STOP**	0
C6 **CR-LF**	0 or 1
C6 **TYPE**	0 or 1

HA, HX

C5 **PRINT**	0 ~ 4
C5 **PAUSE**	1
C6 **BPS**	0 or 2
C6 **PAR**	0
C6 **BIT**	0
C6 **STOP**	0
C6 **CR-LF**	0 or 1
C6 **TYPE**	0 or 1
C6 **CTS**	0

EP

Print mode	**6-04000**
Baud rate	**6-00000**
Parity	**6-0000**
Data length **Stop bit**	**6-00000**

AD-4324

F20	2
F21	1

FC

F6-1	0,1,2,3
F6-2	0100
	0010
F6-3	0
F6-4	0,2

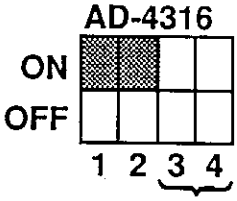
AD-4322A, AD-4323
AD-4325A/V, FT

F21	2	F23	1
F22	1	F24	1

FX/FY, FA

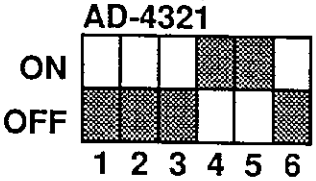
C3	4
C4	2
C5	0

AD-4316

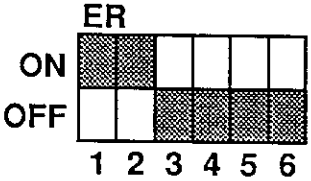


Not used

AD-4321

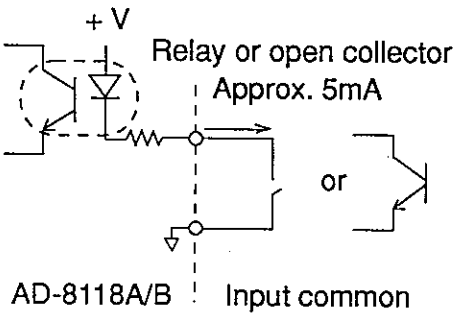


ER

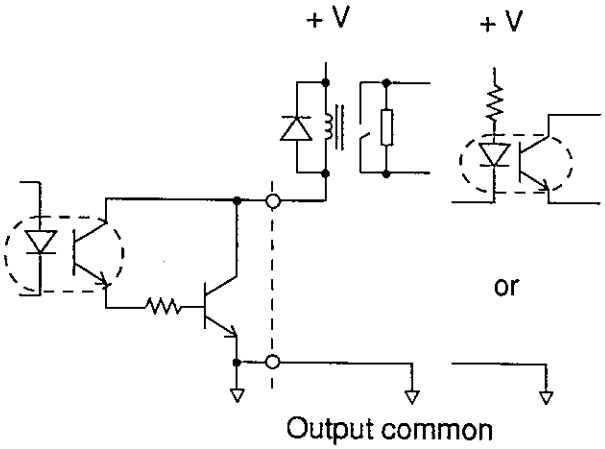


Control I/O Connection

Input circuit

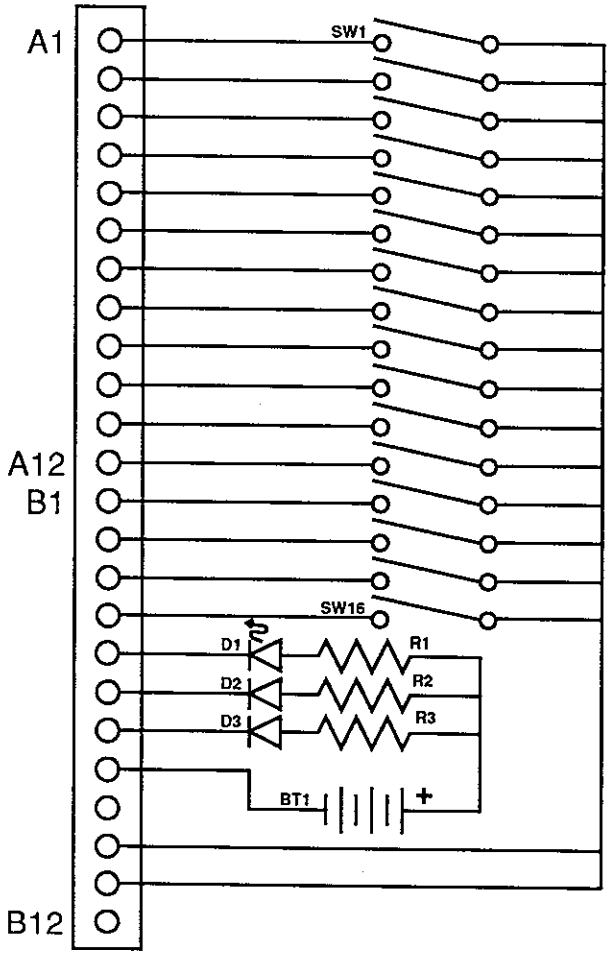


Output circuit



The input and output circuits are shown above. Be careful of the minimum applicable load when connecting the input. Receive the output by auxiliary relay, solid-state relay (SSR), etc. Use a relay with a coil voltage of DC12 to 24V and a current of 50mA or less. (Omron MY Series DC24, etc.) When the environment is noisy, connect the cable shield to frame ground.

The following test fixture can be fabricated to test the function of the Standard I/O port described on the following pages.



Test Fixture

Please fabricate this device to test the I/O port.

SW1 ~ SW16	USE ANY TOGGLE OR MOMENTARY CONTACT SWITCH
R1 ~ R3	RESISTORS ARE 330Ω 1/2W
D1 ~ D3 LED	USE ANY LIGHT EMITTING DIODE AS THE DISPLAY
BT1 4.5V	USE 3 x 1.5V "AA" TYPE BATTERIES

Data Buffer

This printer has a data buffer for 80 data items so that data can be input while the printer is printing. When data temporarily overlaps and the printing speed is exceeded, the data is stored in this buffer. When printed, that data is cleared.

When this buffer exceeds 75 lines, the **I/O output busy** signal is turned on and when it exceeds 80 lines, "B ERROR" is printed one time.

When the buffer drops to 75 lines or less during printing,the I/O output busy signal is turned off, when it exceeds 80 lines again, "B ERROR" is printed again.

Since the printing speed is approximately 1.7 lines/second (the printing speed of one data item by time printing and number of feed lines becomes that number of lines), **do not input data at a rate exceeding this.**

Problems and Solutions

The received data may not be printed depending upon the setting of F5 (receive/or do not receive minus (-) and unstable data).

When you want to print only when the weight data is stable, set the stable condition of the indicator to send all data and set F5 of the AD-8118A/B to 2.

When you want to print the data if it is stable or unstable, set F5 to 1 and set the indicator so that the data is output even if it is unstable.

When F10 (print timing) is set to automatic, printing may not be performed if F5 is not set to receive unstable data.

Printing Errors

Error	Contents
T Error	Data not input within 3 seconds after print command.
U Error	Weighing units not the same as last input.
S Error	Cumulative total weight is overweight.
O Error	Data is overweight.
F Error	Data format does not match.
I Error	Data outside of the set limit.
B Error	Print buffer overflows.
R Error	Code input is not 00 through 99.

AD-8118A TEST PROCEDURE

* Check that the POWER switch on the rear panel is OFF, then remove the program PROM from it's socket on the main board.
* Remove the printer cable plug from connector J6 on the main PC board (PZ:2362).

1. Check the backup battery.

   A. Turn off the main board and check that the voltage at VT+ is within the range specified in the SPEC column below.

	GND	TEST POINT	SPEC.
BATTERY VOLTAGE	TP 1	VT +	3.0 to 3.4VDC
DIFFERENCE	VT -	VT +	50mV or less

2. Measuring Power Supply Voltages

   A. Set the POWER switch on the rear panel to ON.

   Check that logic, printer, external input power supply voltages are within the ranges listed in the SPEC column below.

SIGNAL NAME	GND	TEST POINT	SPEC.
LOGIC POWER	TP 1	U21 PIN 28	4.75 to 5.25V
PRINTER POWER	TP 2	Q10 EMITTER	4.75 to 5.25V
EXTERNAL POWER	TP 3	PCH 2 PIN 1	7.6 to 8.4V

* Set the POWER switch on the rear panel to OFF, then re-mount the program PROM in it's socket on the main board.
* Insert the printer cable plug into connector J6 on the main PC board (PZ:2362). Confirm that the locks on both sides of the connector are securely snapped in the grooves of the plug.
* Set all DIP switch keys to OFF.
* Set the slide switch on the rear panel to C.L.

3. Initializing the Main Unit

   A. Turn the power on while pressing S1 and S2 on the keyboard, and check that the printer prints the following:

      INIT RAM

      INIT EE-PROM

4. Checking the ROM version
   A. Turn the power on while pressing S1 and S3 on the keyboard, and check that the printer prints the current PROM version.
5. Checking the "All Print" mode
   A. Turn the power on while pressing S1 and S3 on the keyboard.
   B. Pressing S4 on the keyboard will select the All Print mode.
   C. Check that the printer prints NL codes.
      (Printer must print NLNLNLNLNLNLNL.)
   D. Pressing S2 on the keyboard will cancel the All Print mode.
6. Checking DIP switches
   A. Turn the power on while pressing S1 and S3 on the keyboard.
   B. Pressing S5 on the keyboard will select the DIP Switch Check mode.
   C. Set each of switches 1-8 of the DS1 (DIP switch 1) to ON and OFF in turn. (Check that the printer prints "Dip Sw Data 10000000" through "Dip Sw Data 00000001".)
   D. Pressing S2 on the keyboard will cancel the DIP Switch Check mode.
7. Checking I/O
   A. Connect the test fixture to the control I/O connector on the rear panel of the AD-8118A.
   B. Turn the power on while pressing S1 and S3 on the keyboard.
   C. Pressing S6 on the keyboard will select the I/O Check mode.
   D. Check that the printer prints "IODATA 1000000000000000" through "0000000000000001".
   E. Pressing S2 on the keyboard will cancel the I/O Check mode.
8. Carrying out an "All Print" Check
   A. Turn the power on while pressing S1 and S3 on the keyboard.
   B. Pressing S1 on the keyboard will start printing all characters.
      Check that the printer prints all the characters, then stops automatically.
9. Checking Paper Feed
   A. Press S3 on the keyboard to check that the print paper is fed properly.
   B. Turn the power off.
10. Check that Date and Time are printed correctly

A. Set switch 3 of the DS1 to ON, then turn the power on.

B. Press SW6 on the keyboard.

C. The printer prints the following:

* G R A N D T O T A L

* 10/24/93 5:10 PM

11. Checking the serial data Input

A. RS-232C

1. Set the slide switch on the rear panel of the AD-8118A to RS-232C.
2. Connect the AD-8118A to a suitable indicator (or other device that can output A&D standard format) set to print using the print key.
3. Turn on the AD-8118A, then press the print key on the indicator.
4. After completion of the check, turn off the AD8118A, then disconnect the RS-232C check cable.

B. Current loop

1. Set the slide switch on the rear panel of the AD-8118A to C.L.
2. Connect the AD-8118A to a suitable indicator set to print using the print key.
3. Turn on the AD-8118A, then press the print key on the indicator.
4. After completion of the check, turn off the AD-8118A, then disconnect the current loop cable.

12. Checking the Country Mode Setting

A. Turn the power on while pressing SW2 and SW4 on the keyboard.

B. The printer prints the currently selected country mode name.

C. Press SW5 repeatedly to check that the printer prints country mode names as follows:

-> JAPAN -> U.S.A. -> EUROPE —

13. Final test

A. Carry out a total print check in the following procedure.

1. Turn the power on while pressing S1 and S3 on the keyboard.
2. Pressing S1 on the keyboard will start total printing.
3. Check the print result for uneven contrast and overlapping.

AD-8118B TEST PROCEDURE

* Each step assumes that you are starting there and you are requested to turn the power off and on for that step. If the steps are done in sequence, you only need to turn off the power for the steps where a cable is connected or disconnected. In most cases SW16 will reset the instrument to check mode.
* Check that the POWER switch on the rear panel is OFF, then remove the program PROM from it's socket on the main board.
* Remove the printer cable plug from connector J6 on the main PC board (PZ:2362).

1. Check the backup battery.

   A. On the main board, check that the voltage at VT+ is within the range specified in the SPEC. column below.

	GND	TEST POINT	SPEC.
BATTERY VOLTAGE	TP 1	VT +	3.0 to 3.4VDC
DIFFERENCE	VT -	VT +	50mV or less

2. Measuring Power Supply Voltages

   A. Set the POWER switch on the rear panel to ON.

   Check that logic, printer, external input power supply voltages are within the ranges listed in the SPEC column below.

SIGNAL NAME	GND	TEST POINT	SPEC.
LOGIC POWER	TP 1	U21 PIN 28	4.75 to 5.25V
PRINTER POWER	TP 2	Q10 EMITTER	4.75 to 5.25V
EXTERNAL POWER	TP 3	PCH 2 PIN 1	7.6 to 8.4V

* Set the POWER switch on the rear panel to OFF, then re-mount the program PROM in it's socket on the main board.
* Insert the printer cable plug into connector J6 on the main PC board (PZ:2362). Confirm that the locks on both sides of the connector are securely snapped in the grooves of the plug.
* Set all DIP switch keys to OFF.

  Set the slide switch on the rear panel to C.L.

3. Initializing the Main Unit

   A. Turn the power on while pressing SW1 and SW3 on the keyboard.

   B. Check that "INIT ALL" is displayed on the LCD panel.

   C. Turn the power off.

4. Checking the ROM version

   A. Turn the power on while pressing S1 and S2 on the keyboard.

   B. "CHECK MD" is displayed on the LCD and that the printer prints the ROM version.

   C. Press SW2 while "CHECK MD" is displayed.

   D. "TEST PRN" is displayed.

   E. Check that the printer prints all the characters, then stops automatically.

   F. Turn the power off.

5. Checking the Keys

   A. Turn the power on while pressing S1 and S2 on the keyboard.

   B. "CHECK MD" is displayed on the LCD and that the printer prints the ROM version.

   C. Press SW3 while "CHECK MD" is displayed.

   D. "KEY CHECK" is displayed to indicate that the Key Check mode has been selected.

   E. Press SW1 to SW15 sequentially. Check that the name of the pressed key is displayed on the LCD.

   F. Press SW16 finally. "SW16" is displayed for about 2 seconds, then "CHECK MD" is displayed again. Turn the power off.

6. Checking the I/O

   A. Connect the test fixture to the control I/O connector on the rear panel of the AD-8118B.

   B. Turn the power on while pressing SW1 and SW2 on the keyboard.

   C. "CHECK MD" is displayed.

   D. Press SW5 while "CHECK MD" is displayed.

   E. "I/O CHECK" is displayed to indicate that the I/O Check mode has been selected.

   F. Check that the printer prints "IODATA 1000000000000000" through "0000000000000001" each time a switch is placed in the no position, on the test fixture. Also check that two LEDs on the checker are lit.

   G. Press SW16 on the keyboard. "CHECK MD" is displayed again.

   H. Turn the power off.

7. Checking an option I/O
   A. Connect the test fixture to the option I/O connector on the rear panel of the AD-8118B.
   B. Turn the power on while pressing SW1 and SW2 on the keyboard.
   C. "CHECK MD" is displayed.
   D. Press SW6 while "CHECK MD" is displayed.
   E. "OPTION" is displayed to indicate that the Check mode in which the option connection terminal is checked has been selected.
   F. Check that the printer prints "IODATA 1000000000000000" through "0000000000000001" each time a switch is placed in the no position, on the test fixture. Also check that two LEDs on the checker are lit.
   G. Press SW16 on the keyboard. "CHECK MD" is displayed again.
8. Checking the LEDs on the main unit
   A. Turn the power on while pressing SW1 and SW2 on the keyboard.
   B. "CHECK MD" is displayed.
   C. Check that five LEDs of key switches SW6, SW7, SW10, SW11, AND SW16 blink sequentially when "CHECK MD" is displayed.
9. Checking channel 2 of an option I/O
   A. Connect the test fixture to the option I/O connector on the rear panel of the AD-8118B.
   B. Turn the power on while pressing SW1 and SW2 on the keyboard.
   C. "CHECK MD" is displayed.
   D. Press SW8 while "CHECK MD" is displayed. "ALL PRINT" is displayed for about 1 second, then "CH No.?" is displayed.
   E. Press SW10 while "CH No.?" is displayed. Then, "CH No.2" is displayed.
   F. Check that the printer prints "IODATA 1000000000000000" through "0000000000000001" each time a switch is placed in the no position, on the test fixture. Also check that two LEDs on the checker are lit.
   G. Press SW16 on the keyboard. "CHECK MD" is displayed again.
10. Carrying out an "All Print" Check
   A. Turn the power on while pressing S1 and S3 on the keyboard.
   B. Pressing S1 on the keyboard will start printing all characters.

      Check that the printer prints all the characters, then stops automatically.

11. Checking Paper Feed
    A. Press S3 on the keyboard to check that the print paper is fed properly.
    B. Turn the power off.
12. Check that Date and Time are printed correctly
    A. Set switch 3 of the DS1 to ON, then turn the power on.
    B. Press SW6 on the keyboard.
    C. The printer prints the following:

        * G R A N D T O T A L
        * 10/24/93 5:10 PM

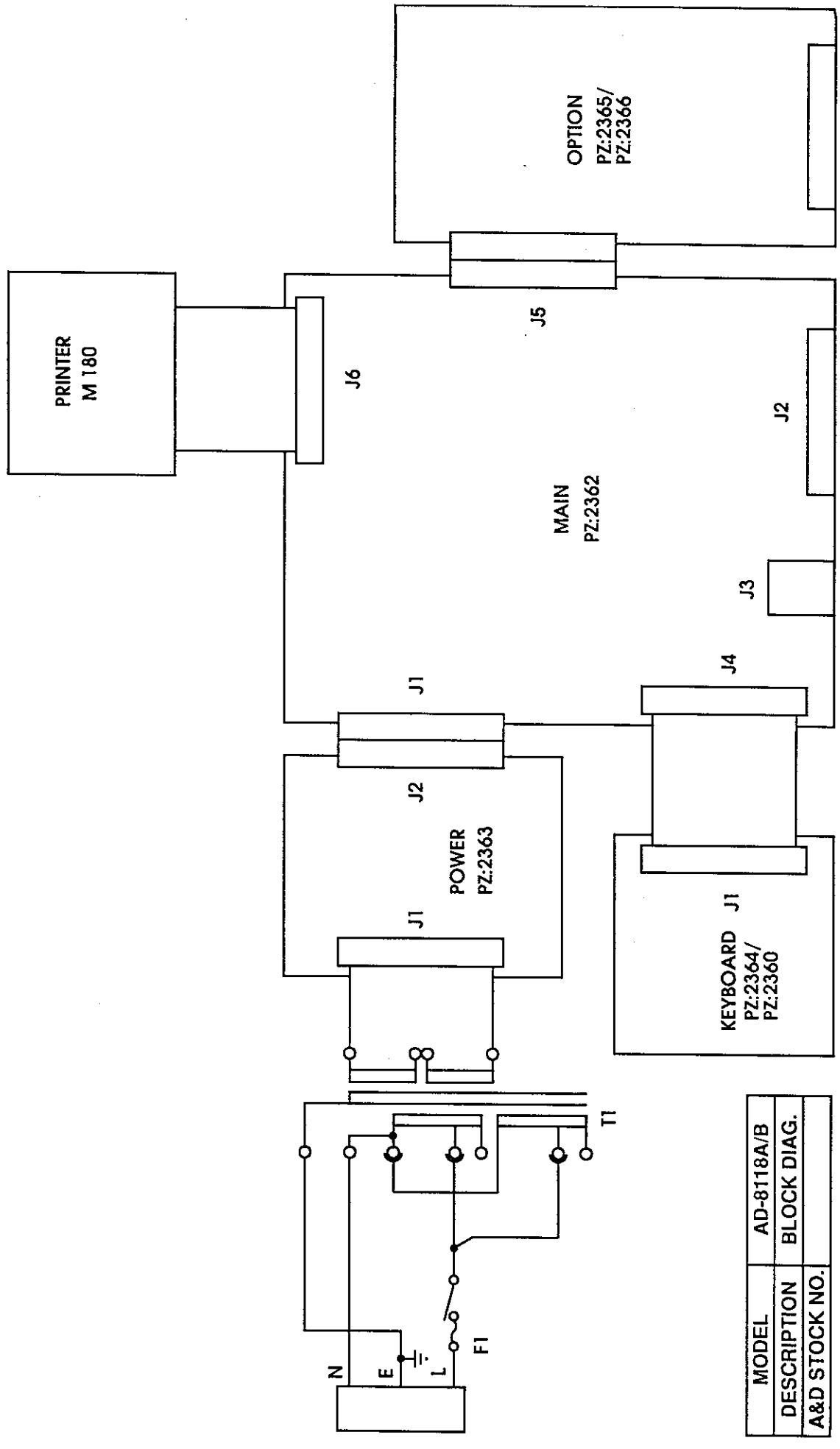
13. Checking the serial data Input
    A. RS-232C
        1. Set the slide switch on the rear panel of the AD-8118B to RS232C.
        2. Connect the AD-8118B to a suitable indicator (or other device that can output A&D standard format) set to print using the print key.
        3. Turn on the AD-8118B, then press the print key on the indicator.
        4. After completion of the check, turn off the AD-8118B, then disconnect the RS232C check cable.
    B. Current loop
        1. Set the slide switch on the rear panel of the AD-8118B to C.L.
        2. Connect the AD-8118B to a suitable indicator set to print using the print key.
        3. Turn on the AD-8118B, then press the print key on the indicator.
        4. After completion of the check, turn off the AD-8118B, then disconnect the current loop cable.
14. Checking the Country Mode Setting
    A. Turn the power on while pressing SW2 and SW4 on the keyboard.
    B. The printer prints the currently selected country mode name.
    C. Press SW5 repeatedly to check that the printer prints country mode names as follows:

        -> JAPAN -> U.S.A. -> EUROPE —

15. Final test
    A. Carry out a total print check in the following procedure.
        1. Turn the power on while pressing S1 and S3 on the keyboard.
        2. Pressing S1 on the keyboard will start total printing.
        3. Check the print result for uneven contrast and overlapping.

Character Code Table

HEX No.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL		(sp)	0	@	P	‾	p	μ	┴						
1			!	1	A	Q	a	q	─	┬						
2			"	2	B	R	b	r	─	┤						
3			#	3	C	S	c	s	─	├						
4			$	4	D	T	d	t	─	─						
5			%	5	E	U	e	u	─	─						
6			&	6	F	V	f	v	─	│						
7			'	7	G	W	g	w	─	│						
8			(	8	H	X	h	x	▌	┌						
9			)	9	I	Y	i	y	▌	┐						
A	LF		*	:	J	Z	j	z	▌	└						
B		ESC	+	;	K	[	k	{	▌	┘						
C			,	<	L	¥	l	|	■	┌						
D	CR		-	=	M	]	m	}	■	┐						
E			.	>	N	^	n	~	■	└						
F			/	?	O	_	o	Σ	+	┘						


OPTION
PZ:2365/
PZ:2366
J5
PRINTER
M 180
J6
J2
MAIN
PZ:2362
J3
J4
J1
J2
POWER
PZ:2363
J1
KEYBOARD
PZ:2364/
PZ:2360
J1
T1
F1
N
E
L
MODEL
AD-8118A/B
DESCRIPTION
BLOCK DIAG.
A&D STOCK NO.

Electronic Parts List

Ckt No.	Part number	Description
	PZ:2360	Keyboard and display (AD-8118B)
C1~2	CC:FK16Y5V1H104	Capacitor 0.1μF
D1~8	DI:1SS53	Diode
J1	JT:1-172429-2	Connector
LCD1	ED:DM0816-0S	Liquid crystal display
R1~5	RC:NAT330R	Resistor 330Ω 1/4W
R6	RC:NAT1.8K	Resistor 1.8KΩ 1/4W
R7	RC:NAT10K	Resistor 10KΩ 1/4W
R8	RN:IHR-8-223MA	Resistor network 22KΩ X 8
R9	RC:NAT22K	Resistor 22KΩ 1/4W
R10	Not used	
SW1~5	SK:TR1-01	Switch
SW6~7	SK:TR2-01-L2	Switch with LED
SW8~9	SK:TR1-01	Switch
SW10~11	SK:TR2-01-L2	Switch with LED
SW12~15	SK:TR1-01	Switch
SW16	SK:TR2-01-L2	Switch with LED
U1	UN:M66006FP	Display driver IC

Ckt No.	Part number	Description
	PZ:2362B (PZ:2362)	Main board (complete)
C1~2	CC:22P	Capacitor 22pF
C3~7	CC:FK16Y5V1H104	Capacitor 0.1μF
C8	CC:100P	Capacitor 100pF
C9	CT:1D2R2	Capacitor 2.2μF 20V
C10	CK:SME16VB10	Capacitor 10μF 16V
C11	CK:SMG10VB10000	Capacitor 10000μF10V
C12	CK:SME16VB10	Capacitor 10μF 16V
C13	CC:FK16Y5V1H104	Capacitor 0.1μF
C14	CC:0.01U	Capacitor 0.01μF
C15	CC:0.0022U	Capacitor 0.0022μF
C16	CC:470P	Capacitor 470pF
C17	Not used	
C18	CM:5002103K1	Capacitor 0.01μF
C19~23	CC:FK16Y5V1H104	Capacitor 0.1μF
C24	CT:1C100	Capacitor 10μF 16V
C25~26	CC:FK16Y5V1H104	Capacitor 0.1μF
D1	DI:MA723	Diode
D2	DI:1SS53	Diode
D3~5	DI:DAN403	Diode array
D6~8	DI:1SS53	Diode
D9	DI:A54H	Diode array
D10	DI:MA723	Diode
EB1	EB:CR2450-HE4	Lithium battery
J1	JI:CL581-0105-4	Connector
J2	JI:365P024-AG	Connector
J3	JA:4470-01-1111	Din Connector
J4	JT:1-172429-2	Connector
J5	JI:365P032-AG	Connector
J6	JI:CL581-0180-0	Connector
	JS:10332-01-445	EPROM socket (AD-8118B)
PHC1~4	DF:PS-2501-4	Photo coupler
PHC5	DF:TLP627-2	Photo coupler
PHC6	DF:TLP552	Photo coupler
PHC7	Not used	

Ckt No.	Part number	Description
Q1	Not used on PZ:2362B	Transistor
(Q1)	QT:A1015Y PZ:2362	Transistor
Q2	QT:BA1L3M	Transistor
Q3	QT:A1015Y	Transistor
Q4	QT:BA1A4P	Transistor
Q5~6	QT:C1815Y	Transistor
Q7~8	Not used	
Q9	QT:C1815Y	Transistor
Q10	QT:A1020Y	Transistor
Q11	QT:C1815Y	Transistor
Q12	QT:BN1L3Z	Transistor
Q13	Not used on PZ:2362B	
(Q13)	QT:BA1L3M PZ:2362	Transistor
R1	RC:NAT4.7K	Resistor 4.7KΩ 1/4W
R2	RC:NAT1K	Resistor 1KΩ 1/4W
R3	Not used on PZ:2362B	
(R3)	RC:NAT1K PZ:2362	Resistor 1KΩ 1/4W
R4	RC:NAT22K	Resistor 22KΩ 1/4W
R5	RC:NAT10K	Resistor 10KΩ 1/4W
R6	RC:NAT4.7K	Resistor 4.7KΩ 1/4W
R7	RC:NAT10K	Resistor 10KΩ 1/4W
R8	RC:NAT470R	Resistor 470Ω 1/4W
R9	RC:NAT10K	Resistor 10KΩ 1/4W
R10	RC:NAT3.9K	Resistor 3.9KΩ 1/4W
R11	RC:NAT10K	Resistor 10KΩ 1/4W
R12~13	RC:NAT3.3K	Resistor 3.3KΩ 1/4W
R14	RC:NAT2.2K	Resistor 2.2KΩ 1/4W
R15	RC:NAT10K	Resistor 10KΩ 1/4W
R16	RC:NAT220R	Resistor 220Ω 1/4W
R17~18	RN:IHR-4-101JB	Resistor network 100Ω X 4
R19	RC:NAT22K	Resistor 22KΩ 1/4W
R20	RC:NAT33K	Resistor 33KΩ 1/4W
R21~22	RC:NAT220K	Resistor 220KΩ 1/4W
R23	RC:NAT1K	Resistor 1KΩ 1/4W
R24	RC:NAT1M	Resistor 1MΩ 1/4W

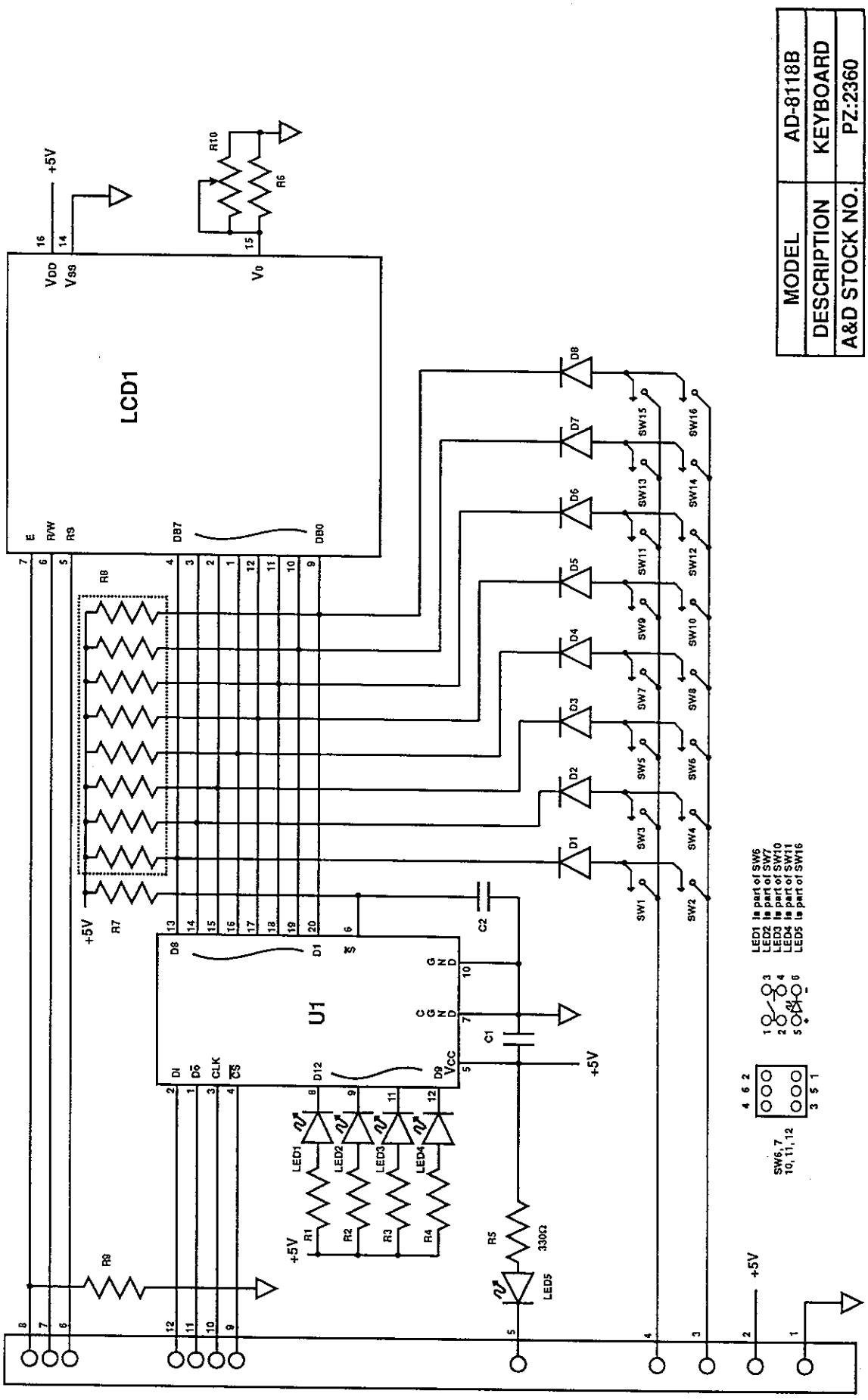
Ckt No.	Part number	Description
R25~28	RN:IHR-4-102JB	Resistor network 100Ω X 4
R29	RC:NAT1K	Resistor 1KΩ 1/4W
R30	RN:IHR-8-223MA	Resistor network 22KΩ X 8
R31	RN:IHR-4-223MA	Resistor network 22KΩ X 4
R32~33	RC:NAT22K	Resistor 22KΩ 1/4W
R34	RN:IHR-4-223MA	Resistor network 22KΩ X 4
R35	RN:IHR-8-223MA	Resistor network 22KΩ X 8
R36	RC:NAT22K	Resistor 22KΩ 1/4W
R37	RN:IHR-4-472MA	Resistor network 4.7KΩ X 4
R38~46	RC:NAT22K	Resistor 22KΩ 1/4W
R47	RN:IHR-8-223MA	Resistor network 22KΩ X 8
R48	RC:NAT470R	Resistor 470Ω 1/4W
R49	RC:NAT22K	Resistor 22KΩ 1/4W
S1	SS:SLHB22	Switch
TP1~3	TM:LC-2-G-0	Test pins
U1	UC:HC02	CMOS IC
U2~3	UC:HC14	CMOS IC
U4	UC:HC32	CMOS IC
U5	UC:HC74	CMOS IC
U6	UC:HC86	CMOS IC
U7	UC:HC138	CMOS IC
U8	UC:HC139	CMOS IC
U9	UC:HC273	CMOS IC
U10	UC:HC367	CMOS IC
U11	UC:HC393	CMOS IC
U12	UC:HC4060	CMOS IC
U13	UC:HC40103P	CMOS IC
U14	UC:D79011GJ-5BG	CPU
U15	UC:5564AFL-15 UC:K58257M-12LL	SRAM (AD-8118A) SRAM (AD-8118B)
U16	UC:S-2914R	EEPROM
U17	UA:MB3773PS-G	Voltage comparator
U18	UC:62421A	Clock IC
U19~20	UA:MP4202	FET array
U21	*** Programmed EPROM ***	Programmed for AD-8118A / AD-8118B
VF1	NF:ZJY51R5-2P	Noise filter
XT1	XT:AT51B-9.83M	Crystal 9.8304MHz

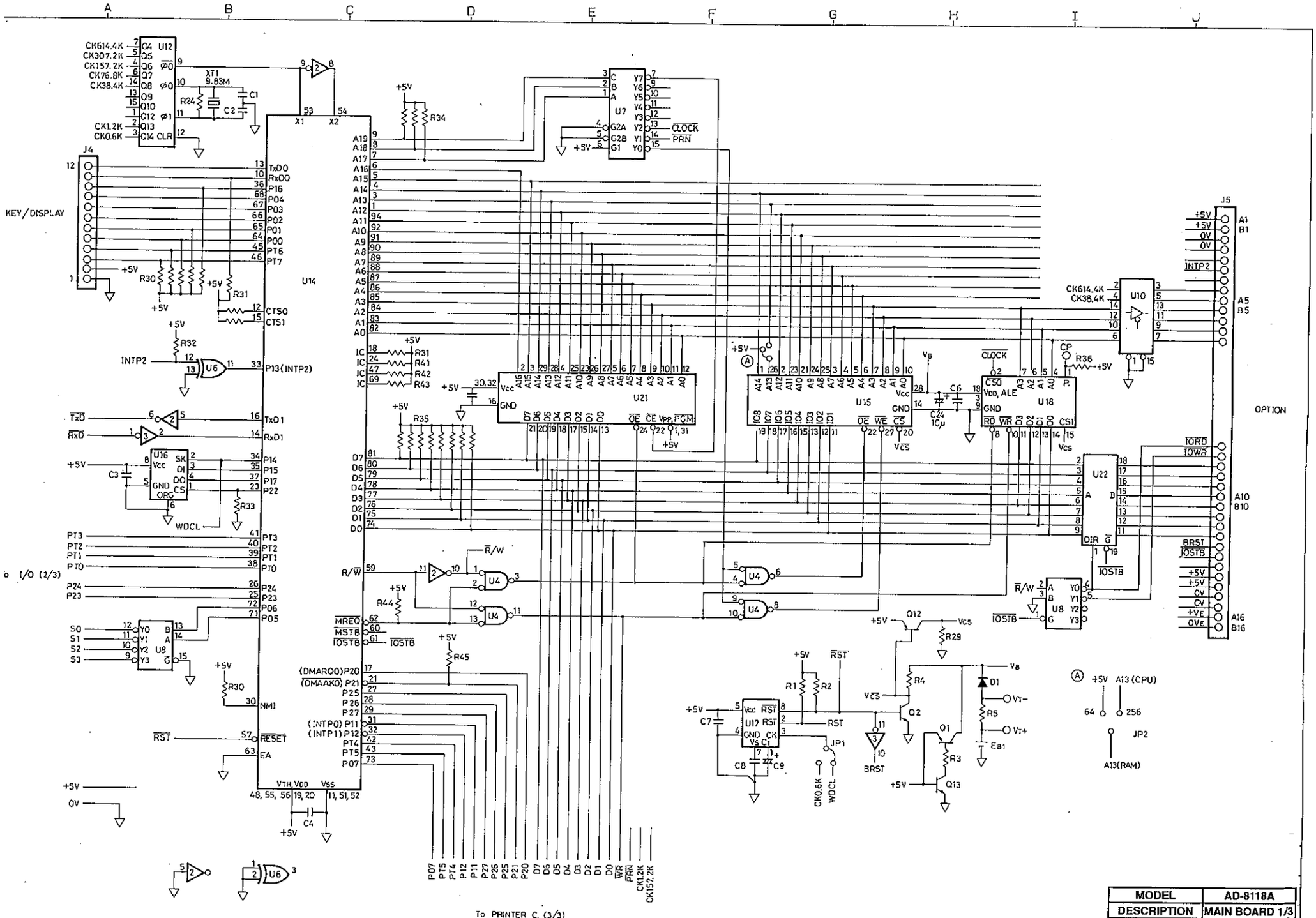
Ckt No.	Part number	Description
	PZ:2363	Power supply board (complete)
C1~2	CK:SME25VB4700	Capacitor 4700μF 25V
C3	CK:SME25VB2200	Capacitor 2200μF 25V
C4~9	CC:0.1U25V	Capacitor 0.1μF 25V
C10~12	CK:SRA25VB-47	Capacitor 47μF 25V
D1	DI:4J4B44	Diode bridge
D2	DI:W02	Diode bridge
D3	DI:EK04	Diode
D4	DI:F14A	Diode
J1	JT:171825-7	Connector
J2	JI:CL581-0101-3	Connector
U1~2	UR:2405HF	Regulator
U3	UR:7808AHF	Regulator
	04:B44169A	Heat sink

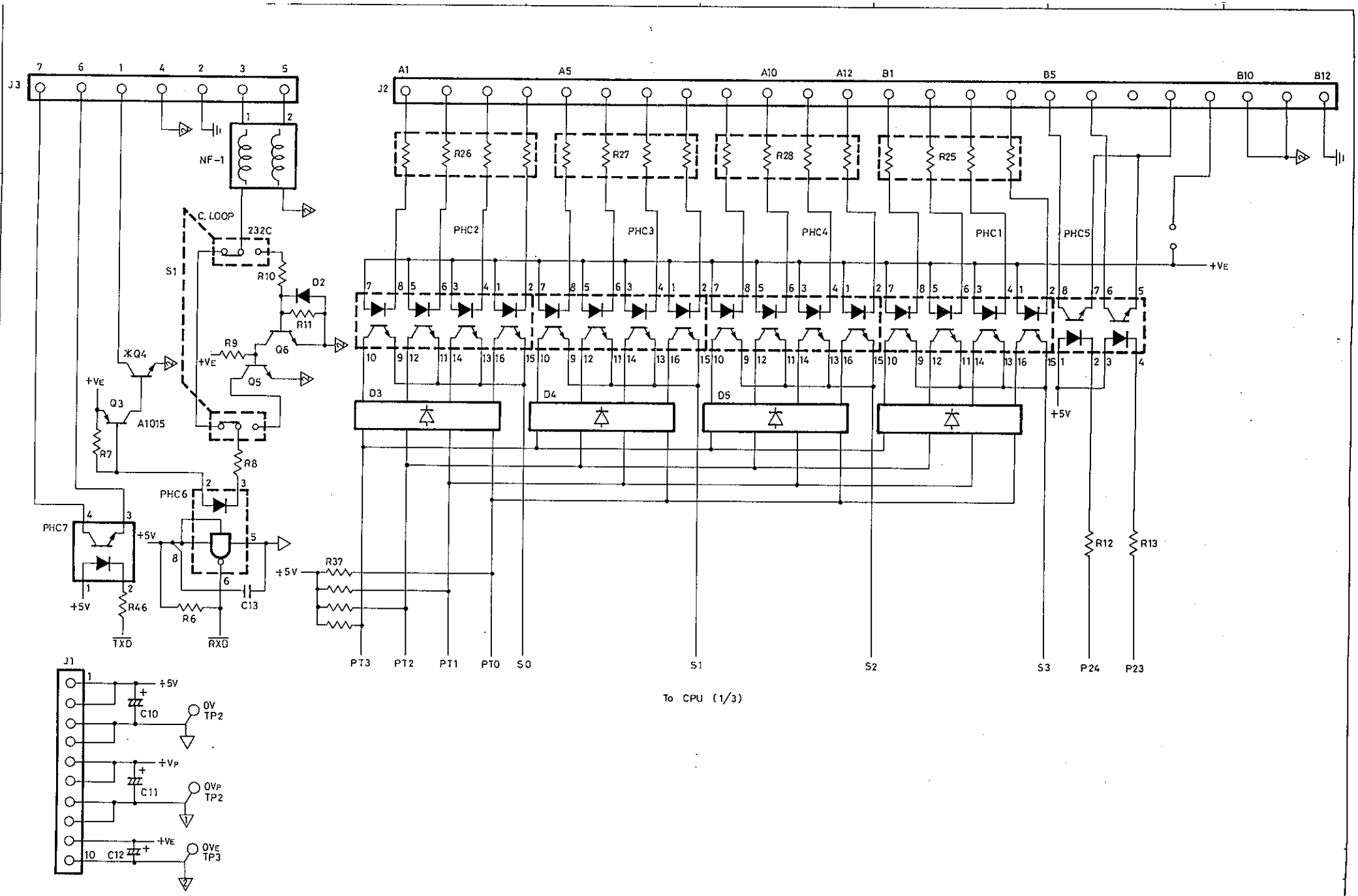
Ckt No.	Part number	Description
	PZ:2364	Keyboard (AD-8118A)
D1~16	DI:1SS53	Diode
D17	DL:SEL1111R	LED
R1	RC:330R	Resistor 330Ω 1/4W
DS1	SD:KSD08	DIP switch
S1~6	SK:TR1-01	Switch
	K0:440-12S30	Connector cable
	DA:LL-4BK	LED spacer 4mm

Ckt No.	Part number	Description
	PZ:2365	AD-8118A/B I/O mother board
C1~2	CT:1A4R7	Capacitor 4.7μF 10V
C3~5	CC:FK16Y5V1H104	Capacitor 0.1μF
J1	JI:365P024-AG	Connector
J2	JI:364J032-AG	Connector
J3	JI:CL581-102-6	Connector
PCH1~5	DF:PS-2501-4	Photo coupler
R1	RN:IHR-8-223MA	Resistor network 22KΩ X 8
R2~4	RC:NAT22K	Resistor 22KΩ 1/4W
R5~8	RN:IHR-4-472MA	Resistor network 4.7KΩ X 4
R9~11	RC:NAT2.2K	Resistor 2.2KΩ 1/4W
R12~15	RN:8-102J-152JE	Resistor network 1KΩ X 4 X 2
U1	UC:D71055G	Parallel transceiver IC
U2~4	UC:D71051G	Parallel to serial transceiver IC
U5	UC:HC14	CMOS IC
U6	UC:HC139	CMOS IC
	TM:LC-2-G-0	Test pins

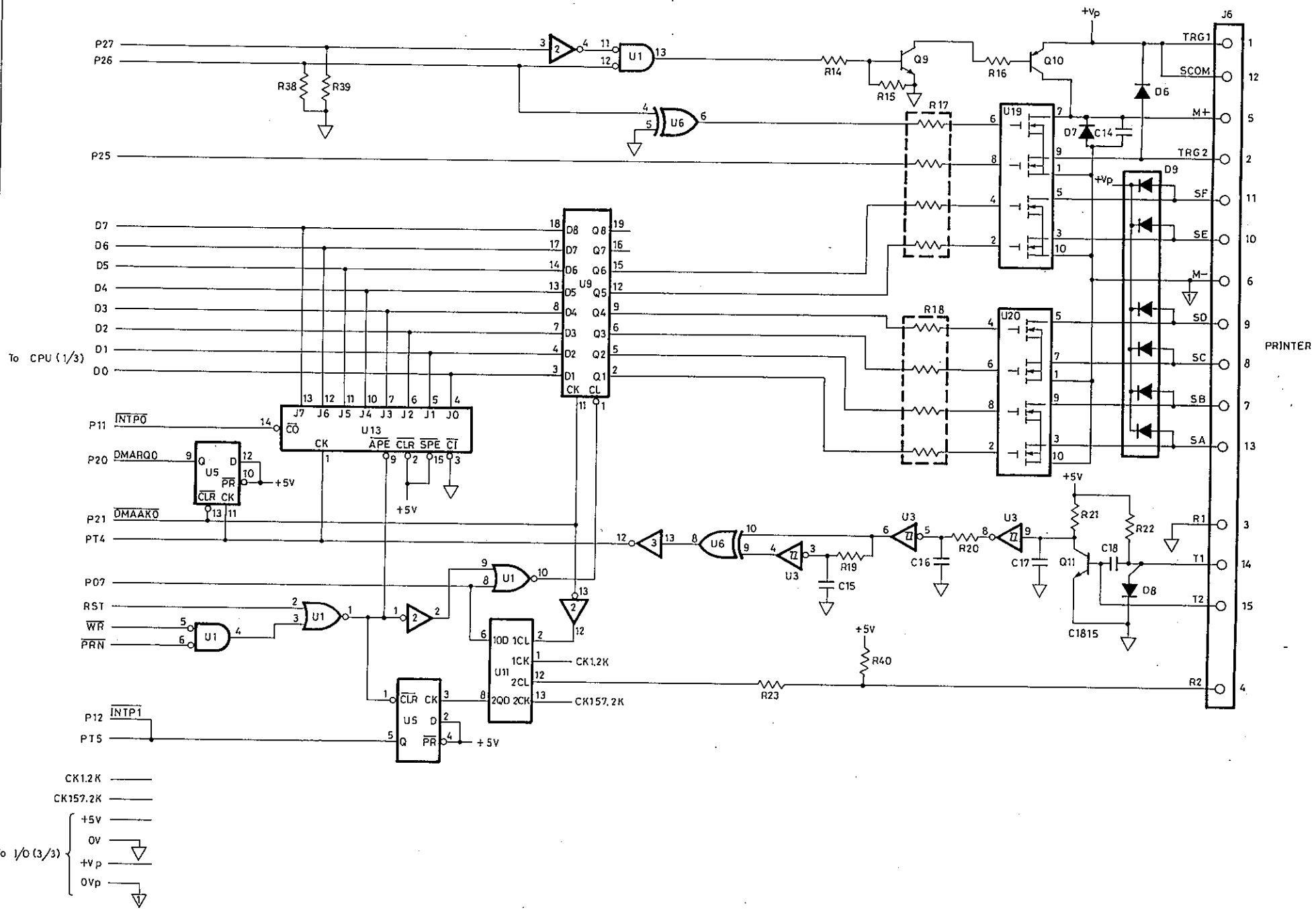
Ckt No.	Part number	Description
	PZ:2366	AD-8118A/B I/O daughter board
C1~3	CC:0.1U25V	Capacitor 0.01μF 25V
C4	CC:FK16Y5V1H104	Capacitor 0.01μF
D1~3	DI:1SS53	Diode
J1	JI:CL581-0105-4	Connector
J2~4	JA:TCS6150	Connector
NF1~6	NF:ZJY51R5-2P	Noise filter
PHC1~3	DF:TPL552	Photo coupler
Q1~3	QT:BA1A4P	Transistor
R1~3	RC:NAT4.7K	Resistor 4.7KΩ 1/4W
R4~9	RC:NAT470R	Resistor 470Ω 1/4W
U1	UT:75189A	TTL IC


MODEL
AD-8118B
DESCRIPTION
KEYBOARD
A&D STOCK NO.
PZ:2360
LCD1
U1
+5V
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10
C1
C2
LED1
LED2
LED3
LED4
LED5
330Ω
D1
D2
D3
D4
D5
D6
D7
D8
SW1
SW2
SW3
SW4
SW5
SW6
SW7
SW8
SW9
SW10
SW11
SW12
SW13
SW14
SW15
SW16
LED1 is part of SW6
LED2 is part of SW7
LED3 is part of SW10
LED4 is part of SW11
LED5 is part of SW16
SW6, 7
10, 11, 12


KEY/DISPLAY
U14
U12
XT1 9.83M
U7
U21
U15
U18
U10
U22
U8
U16
J4
J5
OPTION
To PRINTER C. (3/3)
MODEL AD-8118A
DESCRIPTION MAIN BOARD 1/3
A&D STOCK NO. PZ:2362

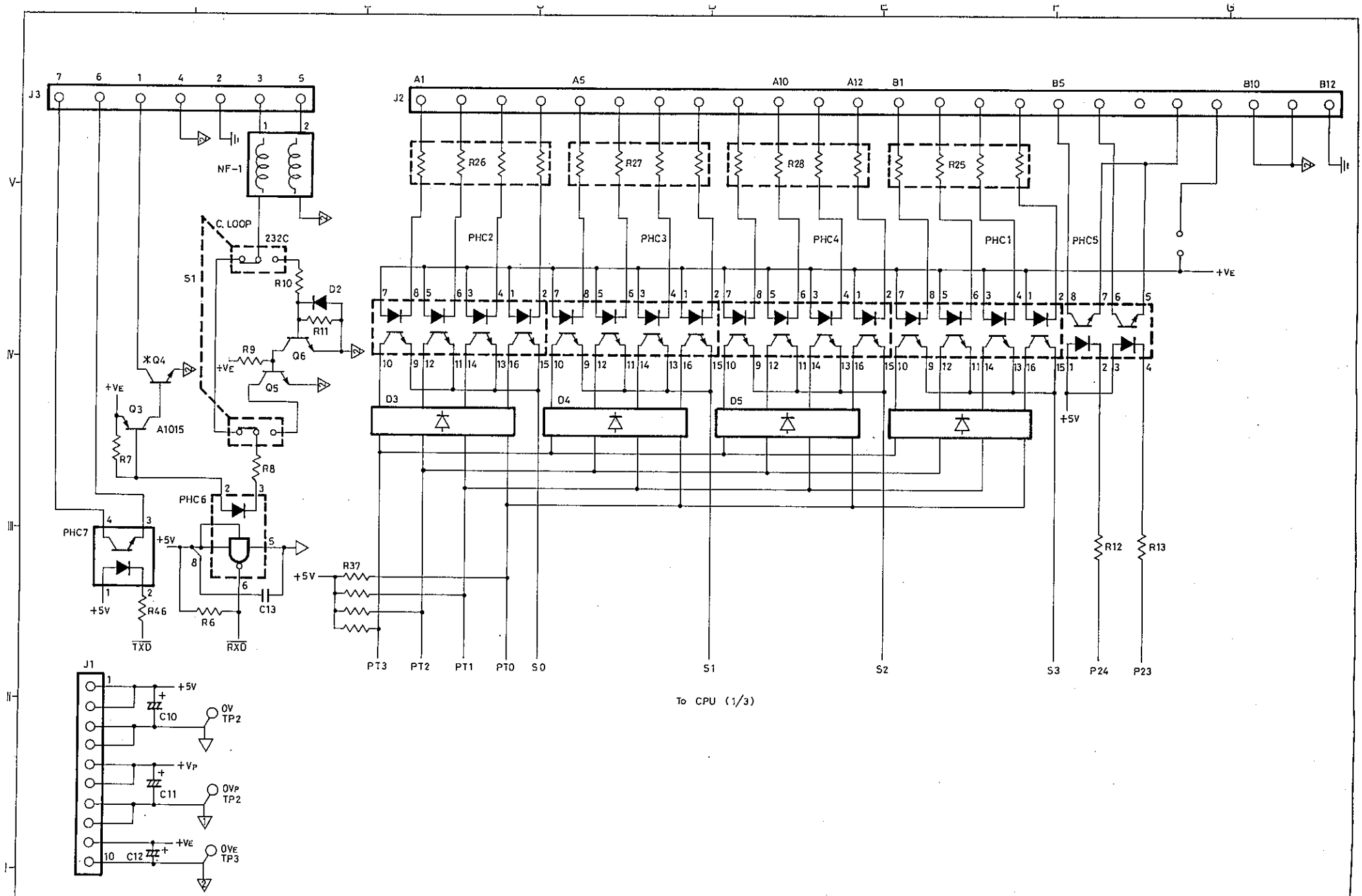


MODEL	AD-8118A
DESCRIPTION	MAIN BOARD 2/3
A&D STOCK NO.	PZ:2362

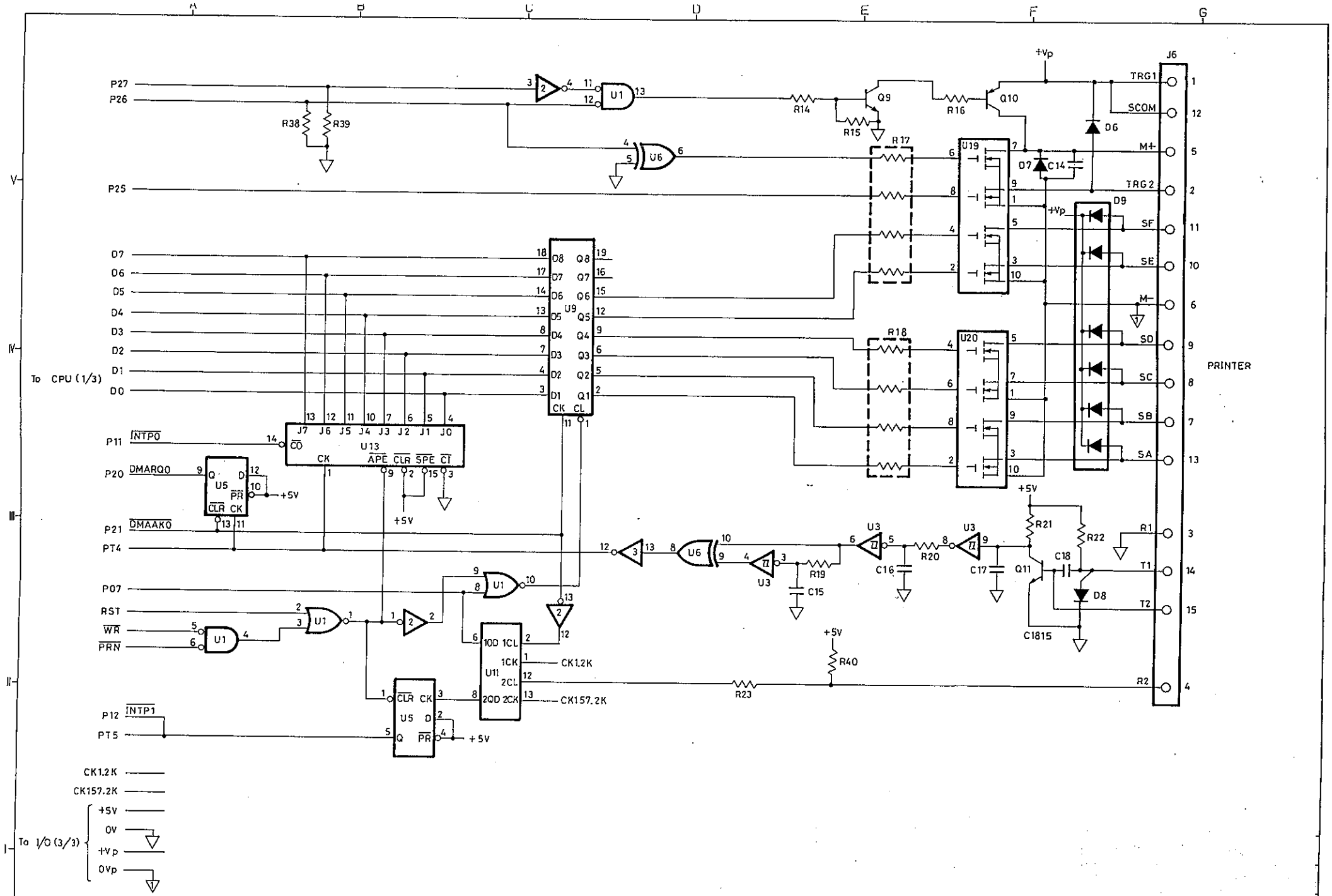


MODEL	AD-8118A
DESCRIPTION	MAIN BOARD 3/3
A&D STOCK NO.	PZ:2362

MODEL	AD-8118B
DESCRIPTION	MAIN BOARD 1/3
A&D STOCK NO.	PZ:2362B

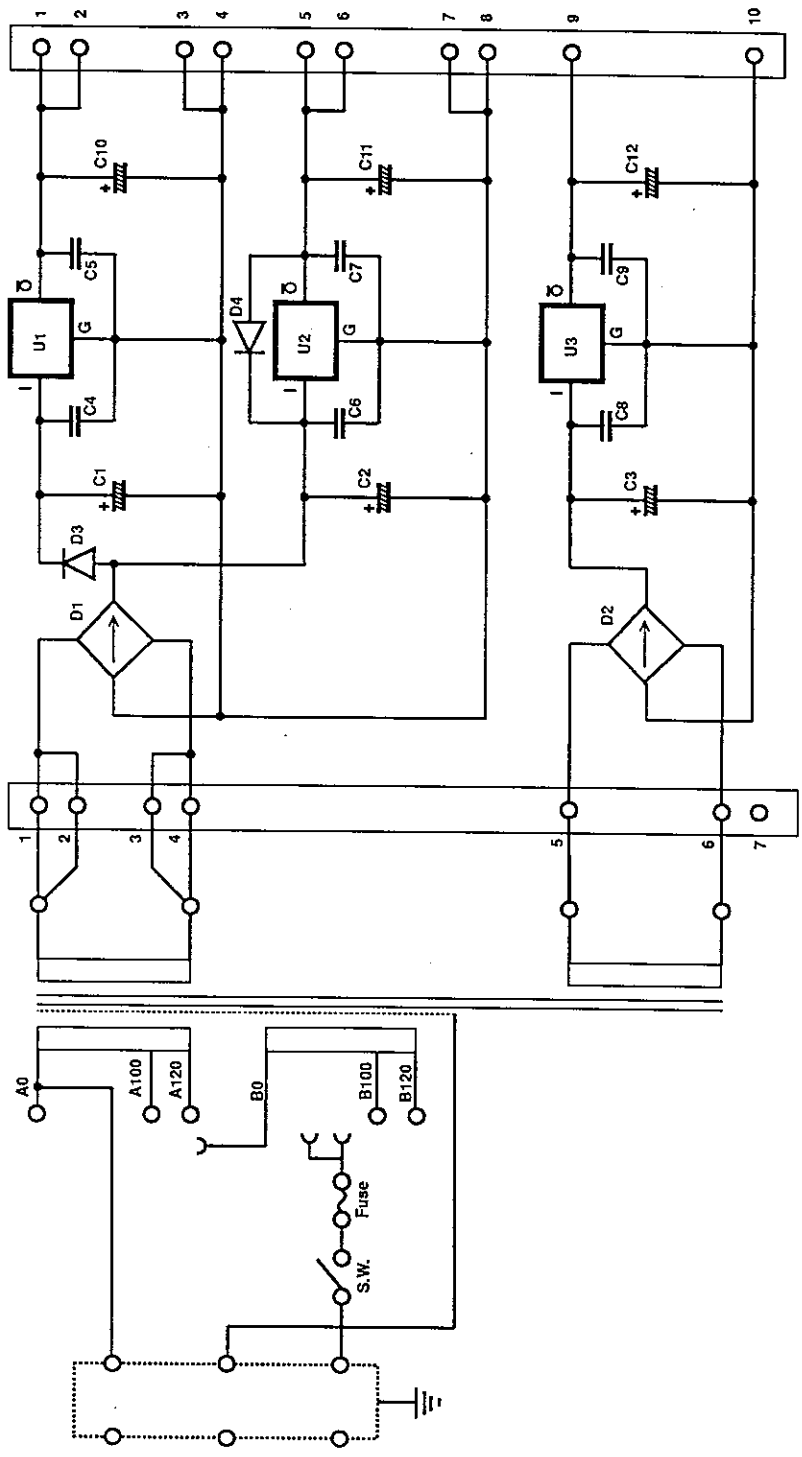


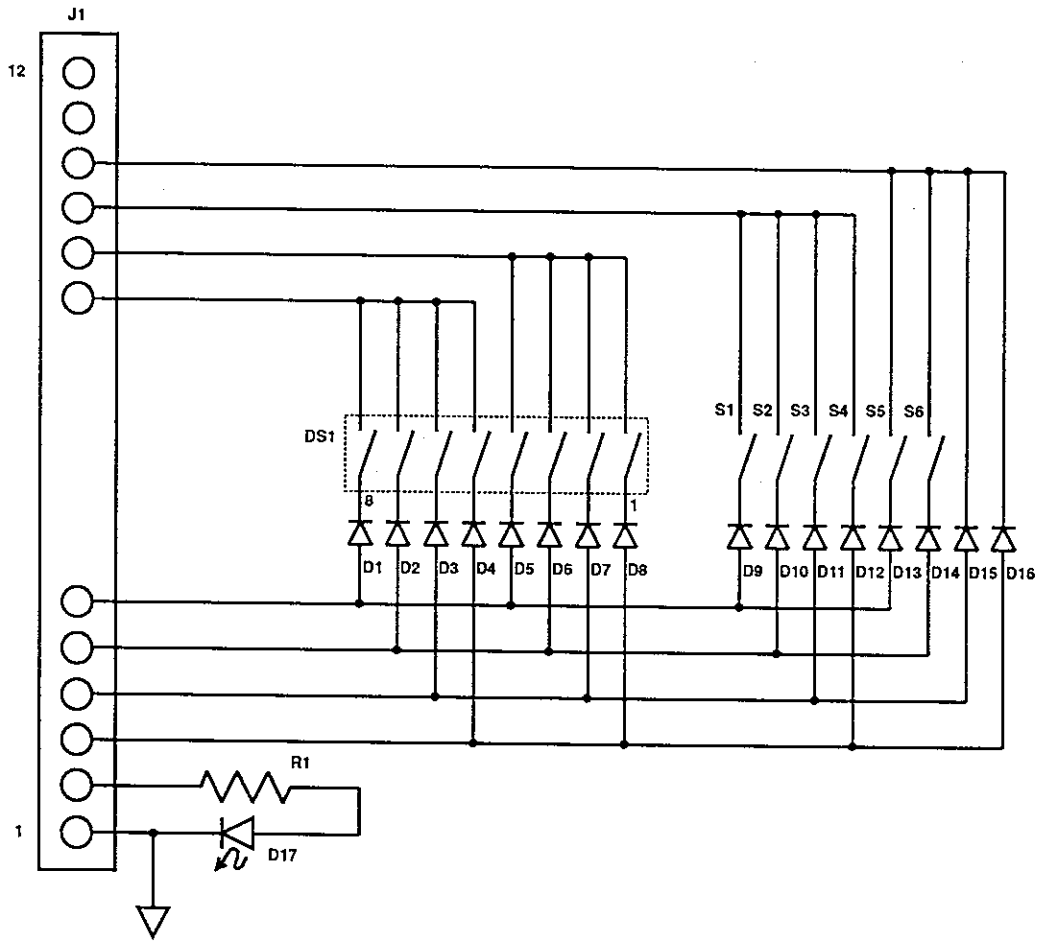
MODEL	AD-8118B
DESCRIPTION	MAIN BOARD 2/3
A&D STOCK NO.	PZ:2362B



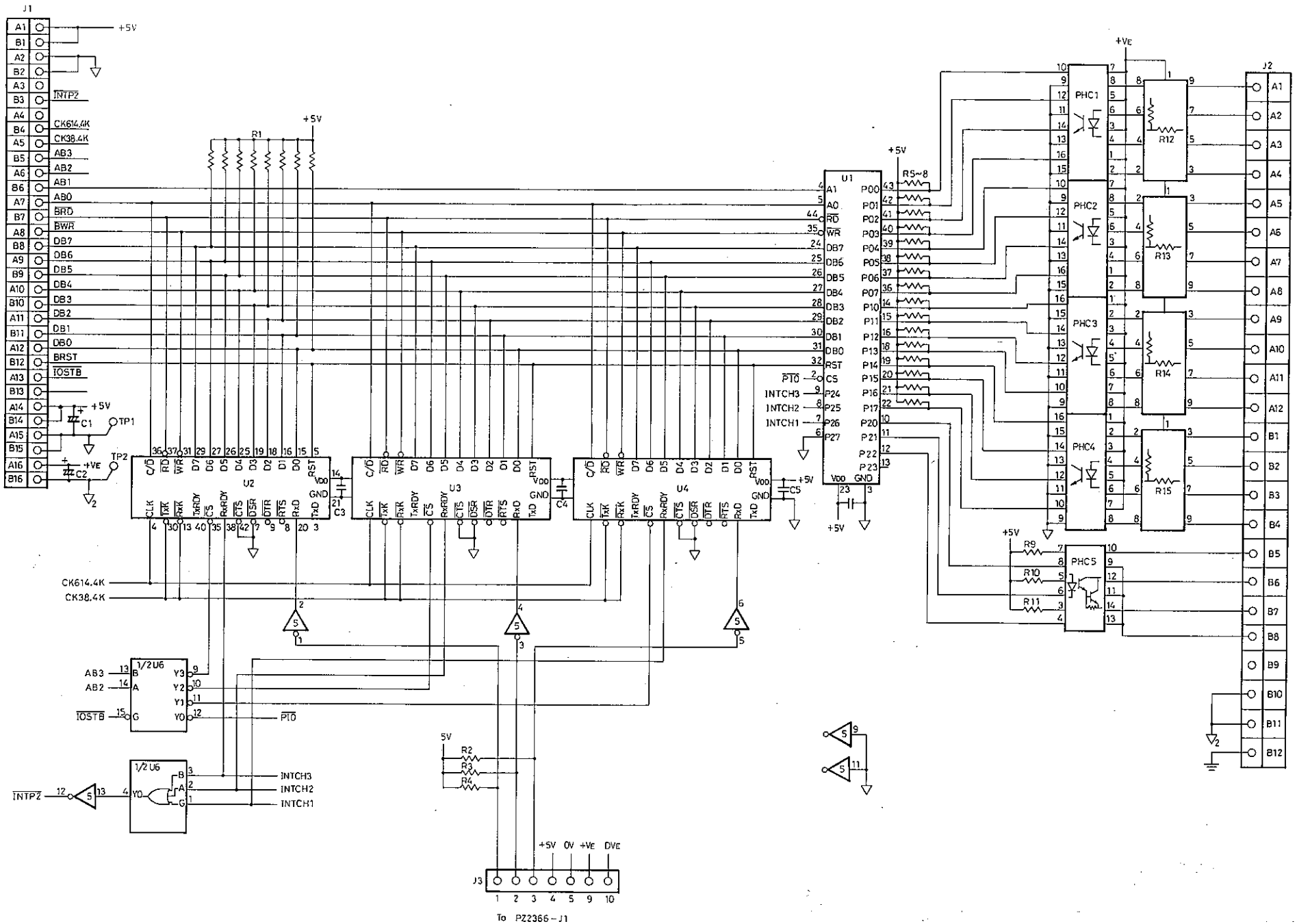
MODEL	AD-8118B
DESCRIPTION	MAIN BOARD 3/3
A&D STOCK NO.	PZ:2362B

MODEL	AD-8118A/B
DESCRIPTION	POWER SUPPLY
A&D STOCK NO.	PZ:2363

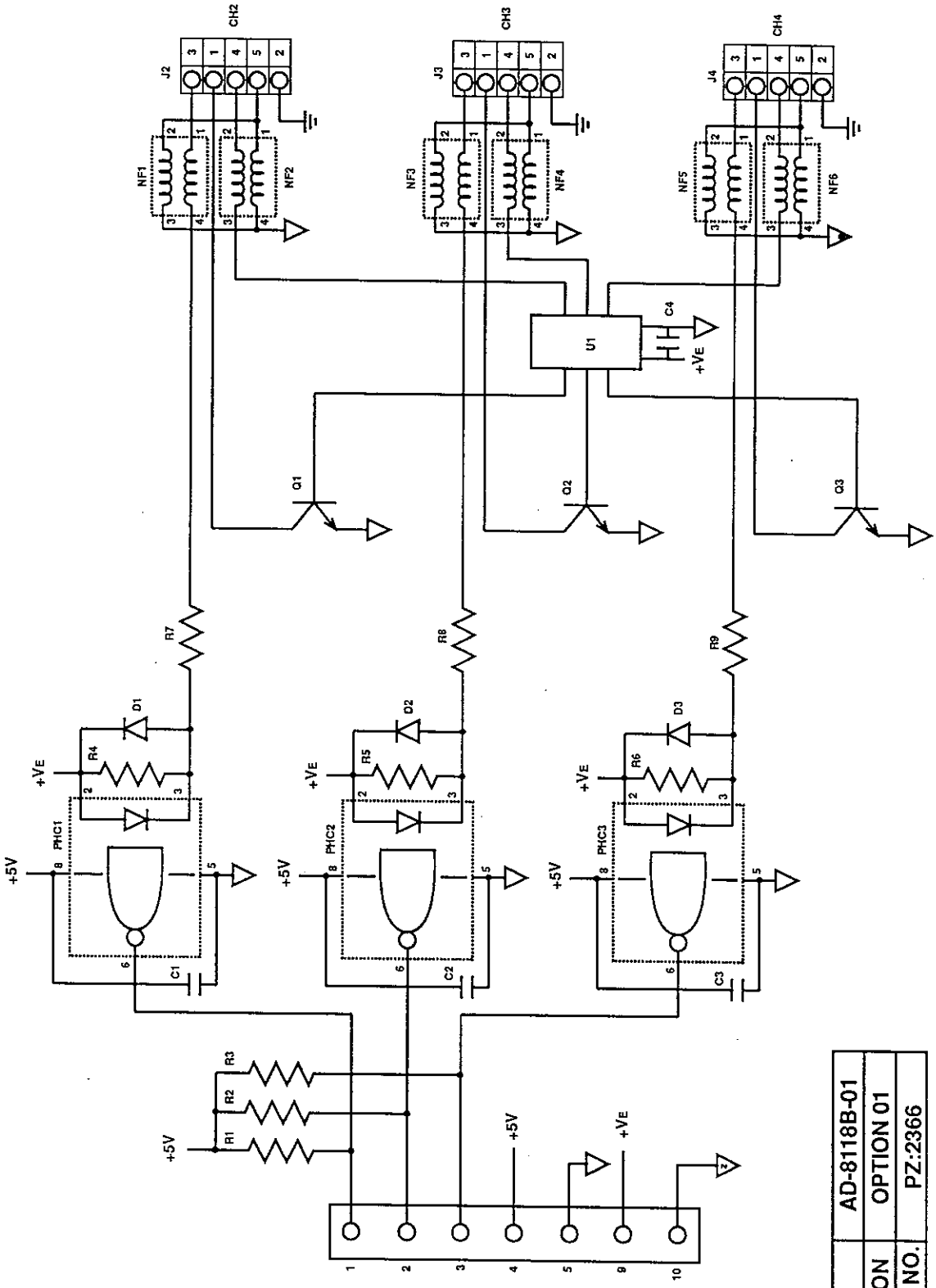




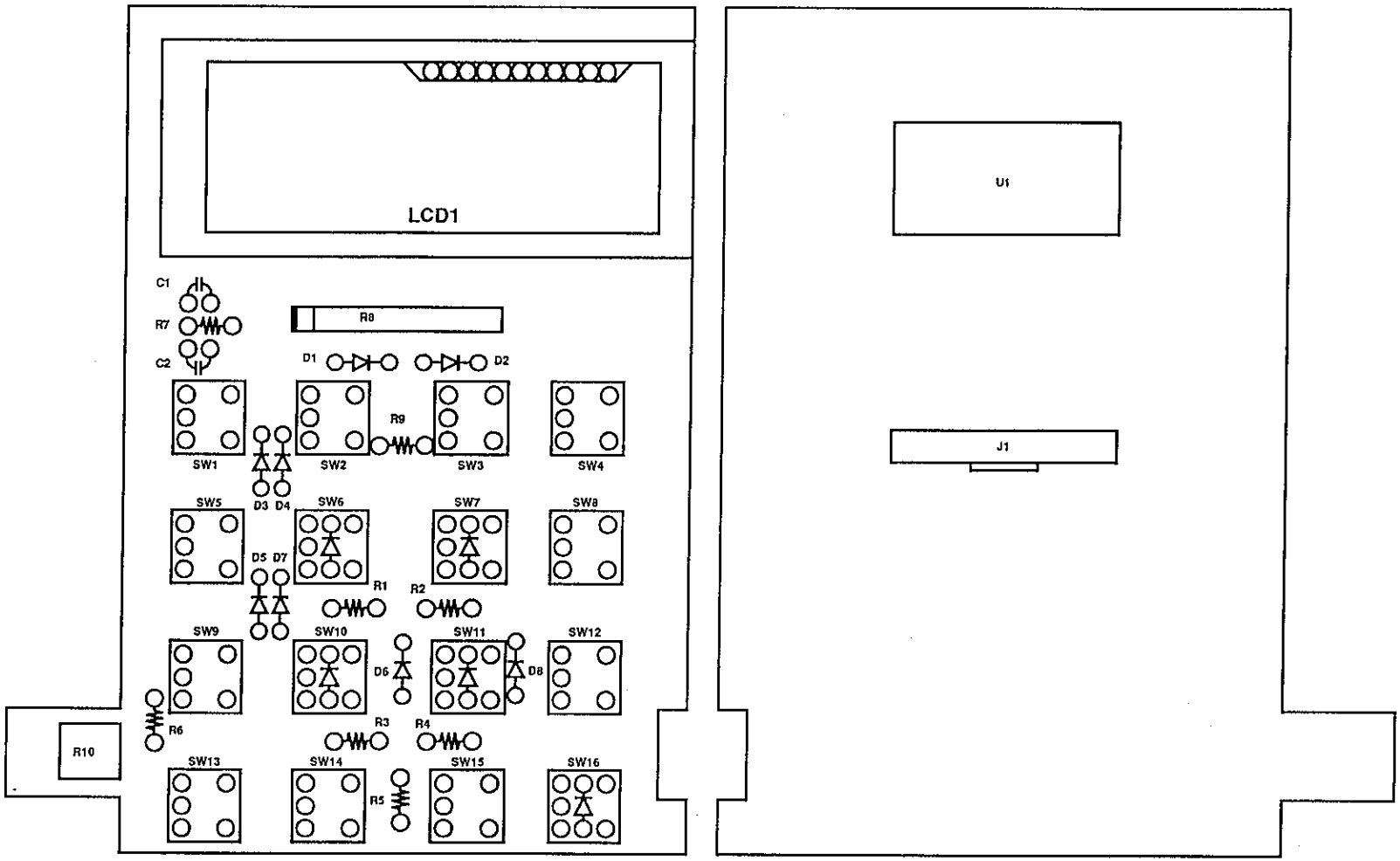
MODEL	AD-8118A
DESCRIPTION	KEYBOARD
A&D STOCK NO.	PZ:2364



MODEL	AD-8118A/B
DESCRIPTION	OPTION 01
A&D STOCK NO.	PZ:2365



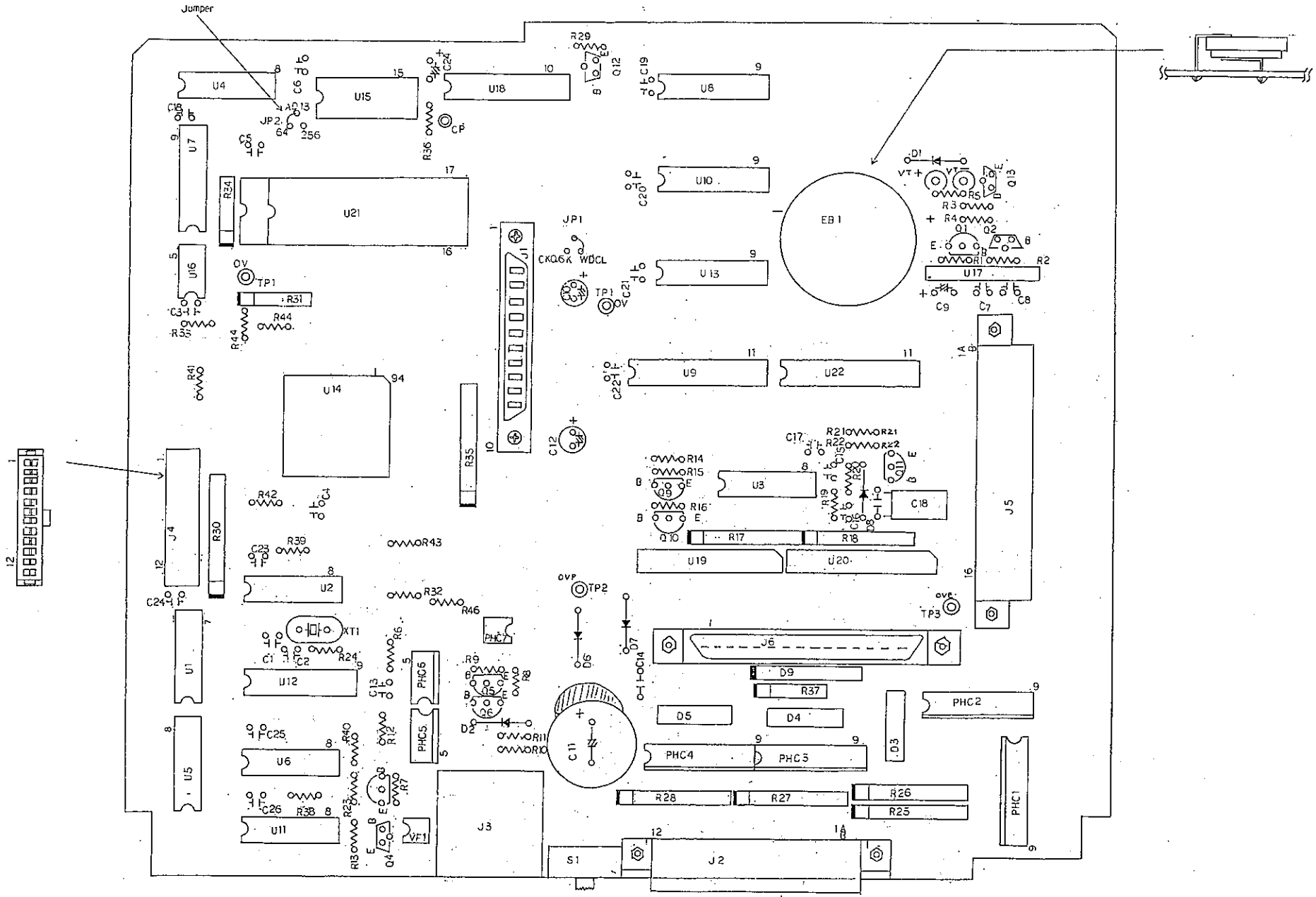
MODEL	AD-8118B-01
DESCRIPTION	OPTION 01
A&D STOCK NO.	PZ:2366



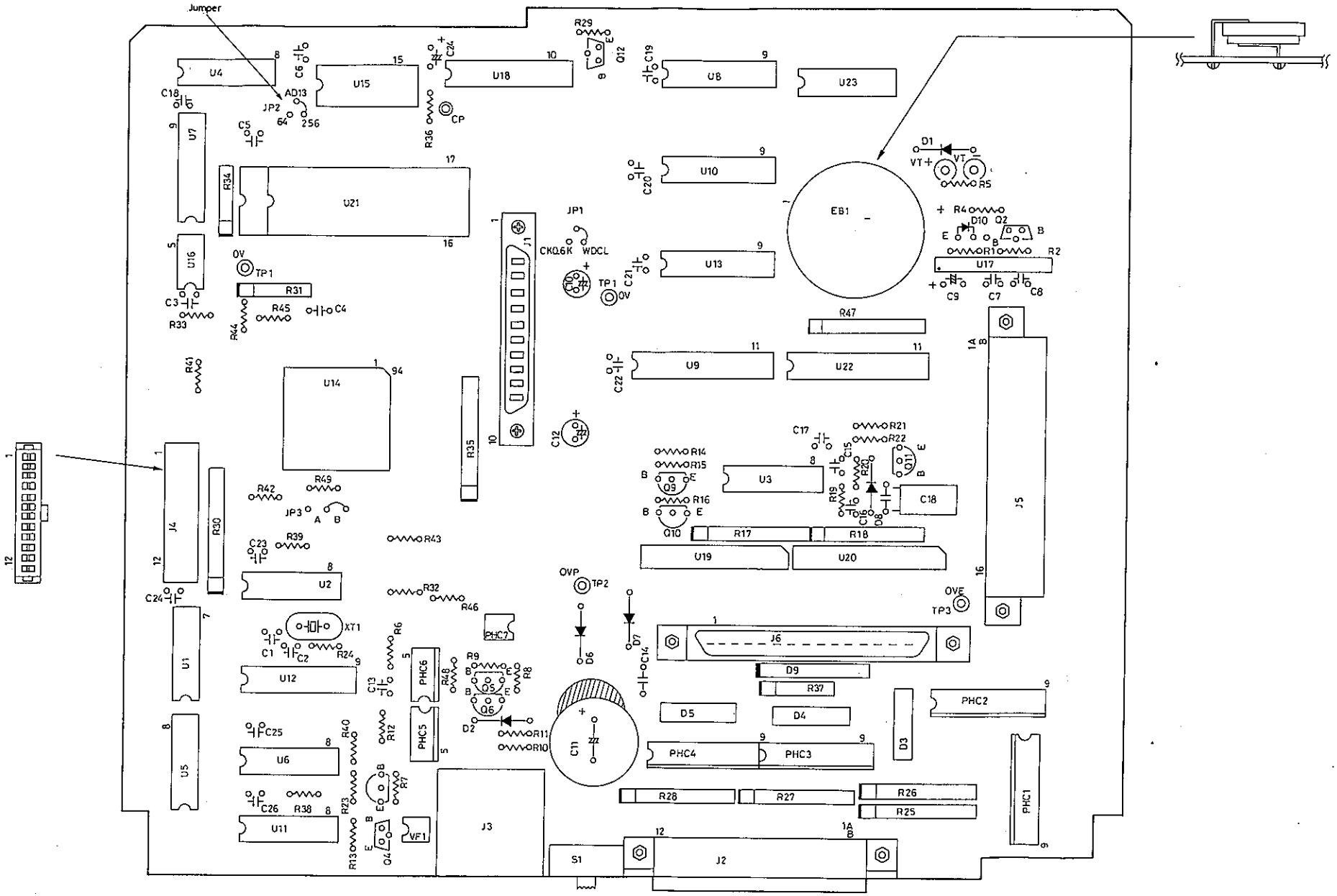
Front

Rear

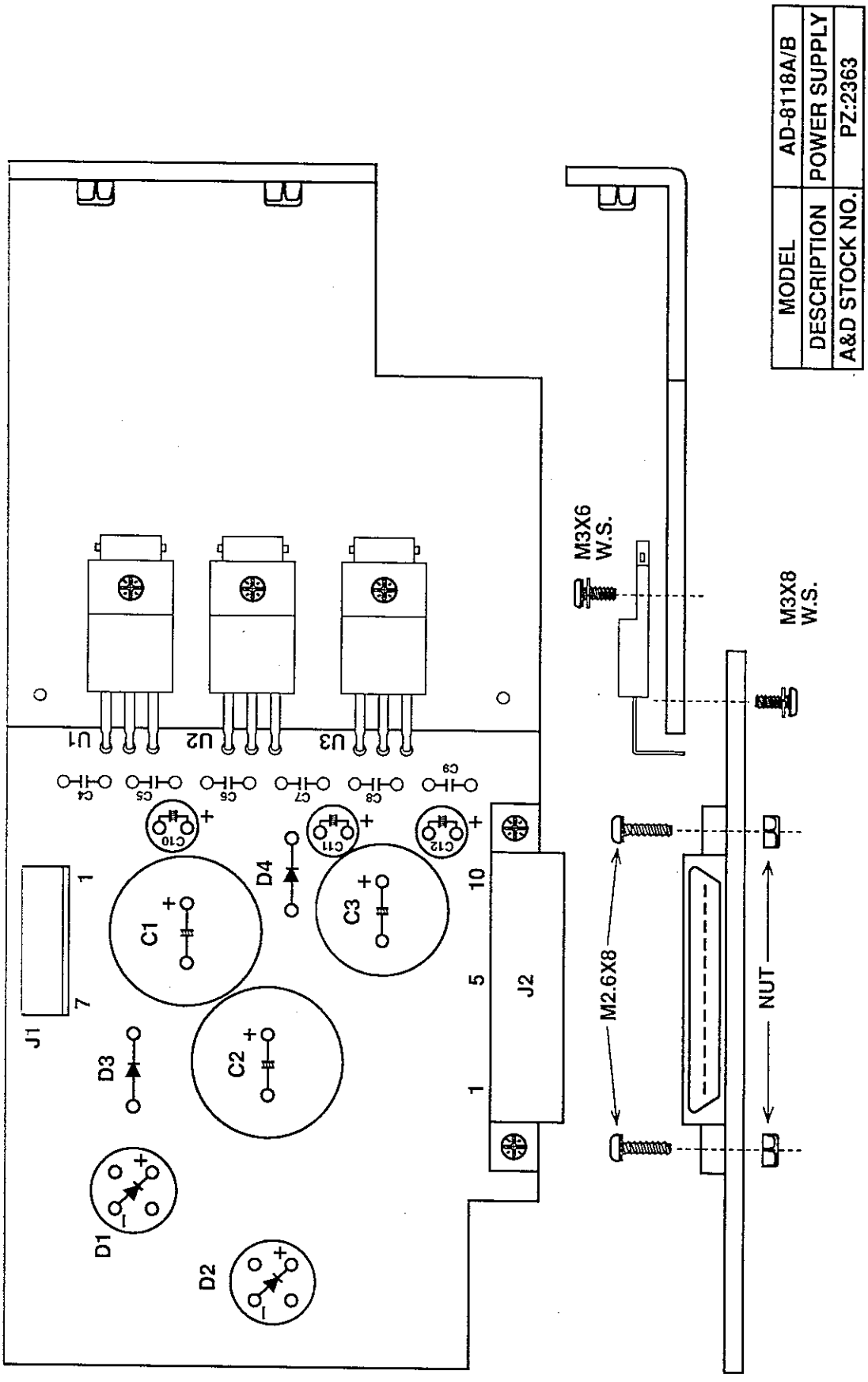
MODEL	AD-8118B
DESCRIPTION	KEYBOARD
A&D STOCK NO.	PZ:2360

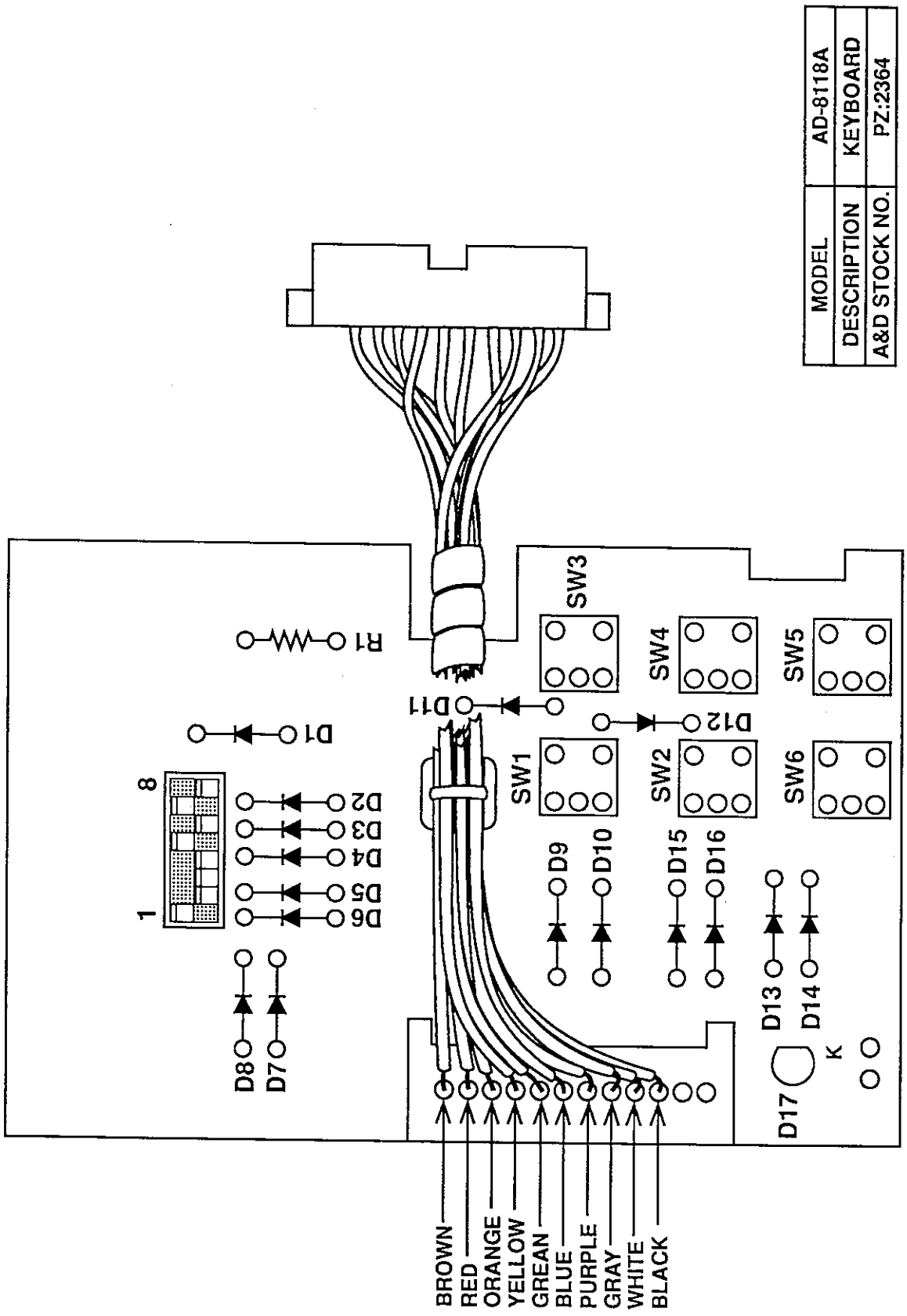


MODEL	AD-8118A
DESCRIPTION	MAIN BOARD
A&D STOCK NO.	PZ:2362



MODEL	AD-8118A/B
DESCRIPTION	MAIN BOARD
A&D STOCK NO.	PZ:2362B


MODEL
AD-8118A/B
DESCRIPTION
POWER SUPPLY
A&D STOCK NO.
PZ:2363
M3X6
W.S.
M3X8
W.S.
M2.6X8
NUT
U1
U2
U3
C1
C2
C3
C4
C5
C6
C7
C8
C9
C10
C11
C12
D1
D2
D3
D4
J1
J2
1
7
1
5
10


MODEL
AD-8118A
DESCRIPTION
KEYBOARD
A&D STOCK NO.
PZ:2364
SW3
SW4
SW5
SW1
SW2
SW6
R1
D1
D11
D12
D2
D3
D4
D5
D6
D7
D8
D9
D10
D15
D16
D13
D14
D17
K
8
1
BROWN
RED
ORANGE
YELLOW
GREAN
BLUE
PURPLE
GRAY
WHITE
BLACK

Mechanical Parts List

AD-8118A Mechanical Parts List

No.	Part number	Description
1	08:B44304	Blank sticker
2	07:A37346-1A	Printer cover
3	07:B45216	Cutter
4	05:B44171	Panel screw
5	02:B44174-1	Blank front panel
6	07:A45440	Lock screw
7	01:A37432	Key sheet
8	07:A10147-1A	Front frame
9	04:B43737	Frame holder
10	05:A34756	Case
11	04:A48924	Slide lock
12	04:A37344B	Unit chassis
13	10:120-400	Card guide
14	05:B44170	Unit rail
15	04:A37345B	Printer chassis
16	07:B44956	Printer roller
17	05:B44172	Board pillow
18	08:B44266	Guide sticker
19	04:B44169A	Heat sink
20	05:A46423	Shaft
21	10:97-438-19	Spring
22	04:B44164B	Guide plate holder
23	07:B45103A	Cable clamp
24	02:B44252	Blank panel
25	01:A37347B	Rear panel
26	04:B42944A	Support
27	05:B43725	Spacer bolt
28	05:A40198	Spacer 9mm
29	WP:PP-137	Printer paper
30	PZ:2364	Key board
31	07:A45532-2	Key top A-2
32	07:A45532-1	Key top A-1

33	EP:M-180	Printer mechanism
34	10:NK-4N	Nylon clamp
35	PZ:2362	Main board
36	PZ:2363	Power supply board
37	TF:382	Power transformer
38	NF:ZUG2203-13AS	Socket
39	FH:FH-B02	Fuse holder
40	ST:T-881SBSS	Switch
	KO:102-7S20	Power transformer cable and connector
	KO:280A-08BR	Power connector leads W/spade lug
	KO:115	Power cable
	KO:804-15S40	Printer cable W/connectors
	KO:440-12S-30	Key board cable W/connector
a	M3X6	W SEMUSU
b	M3X8	W SEMUSU
c	M3X8	SEMUSU
d	M3X10	W SEMUSU
e	M4X8	W SEMUSU
f	M4X8	SEMUSU
g	M4X15	Truss
h	M4X6	Bolt + washer
i	M5X8	Screw
j	M2X4	Screw + S.W.
k	M2X4	Screw + S.W. + washer
l	M3	Nut
m	M4	Nut
n	M3	Lock washer M3
o	M4	Lock washer M4
p	M3	Polyethylene washer
q	M4	Fiber washer
r		E ring M2.6
s	M2.6X6	Tapping screw
t	M5	Washer(s)

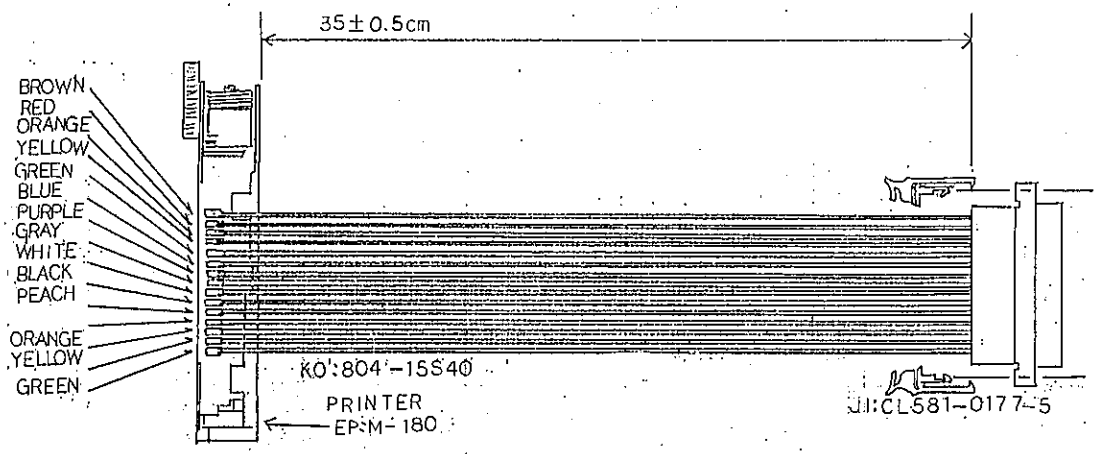
AD-8118B Mechanical Parts List

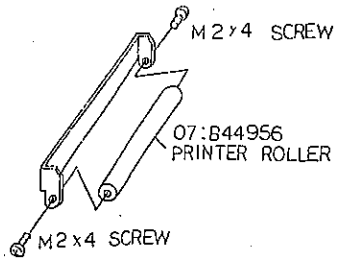
No.	Part number	Description
1	08:B44304	Blank sticker
2	07:A37346-1A	Printer cover
3	07:B45216	Cutter
4	05:B44171	Panel screw
5	07:B44203	Display filter
6	Not used	
7	01:A39067	Key sheet AD-8118B
8	07:A10147-1A	Front frame
9	04:B43737	Frame holder
10	05:A34756A	Case
11	04:A48924	Slide lock
12	04:A39469	Unit chassis
13	10:120-400	Card guide
14	05:B44170	Unit rail
15	04:A37345B	Printer chassis
16	07:B44956	Printer roller
17	05:B44172	Board pillow
18	08:B44266	Guide sticker
19	04:B44169A	Heat sink
20	05:A46423	Shaft
21	10:97-438-19	Spring
22	04:B44164B	Guide plate holder
23	07:B45103A	Cable clamp
24	02:B44252	Blank panel
25	01:A37347B	Rear panel
26	04:B42944A	Support
27	Not used	
28	Not used	
29	WP:PP-137	Printer paper
30	PZ:2360	Key board
31	07:A45533-1	Key top B-1
32	07:A45532-1	Key top A-1

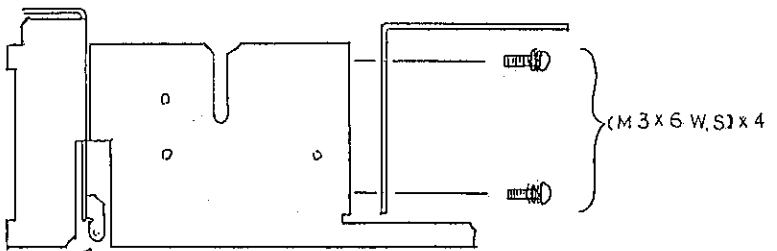
33	EP:M-180	Printer mechanism
34	10:NK-4N	Nylon clamp
35	PZ:2362B	Main board
36	PZ:2363	Power supply board
37	TF:382	Power transformer
38	NF:ZUG2203-13AS	Socket
39	FH:FH-B02	Fuse holder
40	ST:T-881SBSS	Switch
41	10:N0-5575	Stopper ring
	KO:102-7S20	Power transformer cable and connector
	KO:280A-08BR	Power connector leads W/spade lug
	KO:115	Power cable
	KO:804-15S40	Printer cable W/connectors
a	M3X6	W SEMUSU
b	M3X8	W SEMUSU
c	M3X8	SEMUSU
d	M3X10	W SEMUSU
e	M4X10	W SEMUSU
f	M4X8	SEMUSU
g	M4X15	Truss
h	M4X6	Bolt + washer
i	M5X8	Screw
j	M2X4	Screw + S.W.
k	M2X4	Screw + S.W. + washer
l	M3	Nut
m	M4	Nut
n	M3	Lock washer M3
o	M4	Lock washer M4
p	M3	Polyethylene washer
q	M4	Fiber washer
r		E ring M2.6
s	M2.6X6	Tapping screw
t	M3X10	Screw

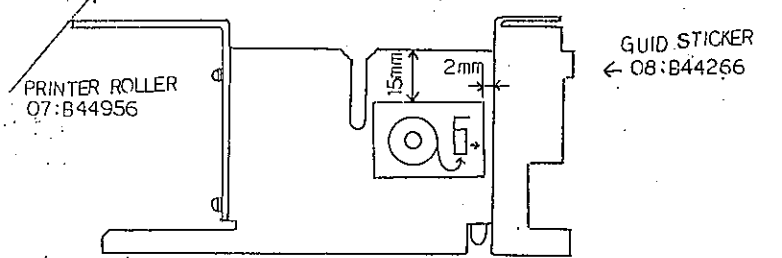
AD-8118B-01

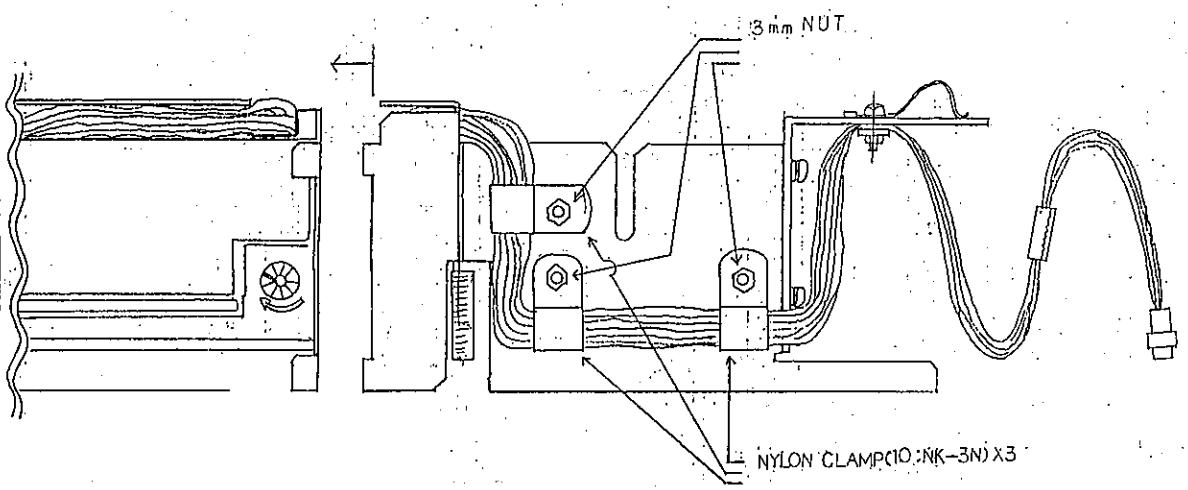
No.	Part number	Description
1	01:B48616	Serial board panel
2	04:B48646	Board cover
3	05:A40331	13mm spacer
4	07:B42408	Serial board spacer
a	M3X8	Pan head screw with spring washer
b	M2.6X8	Pan head screw + S.W.
c	M2.6X4	Pan head screw + S.W.
d	M3X8	Pan head screw

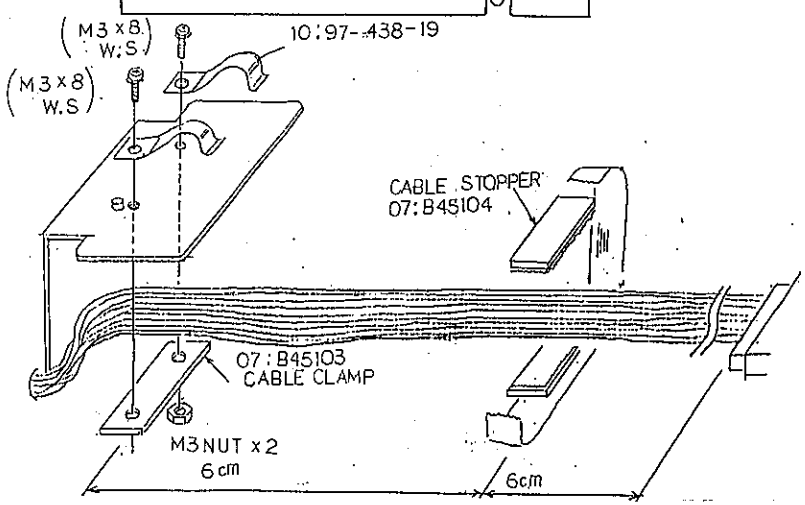


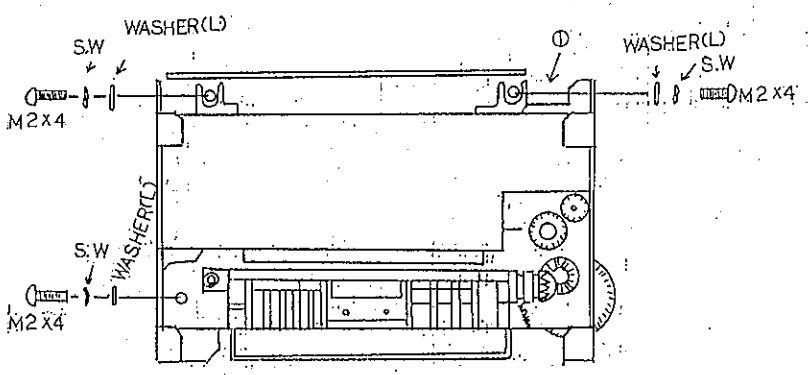




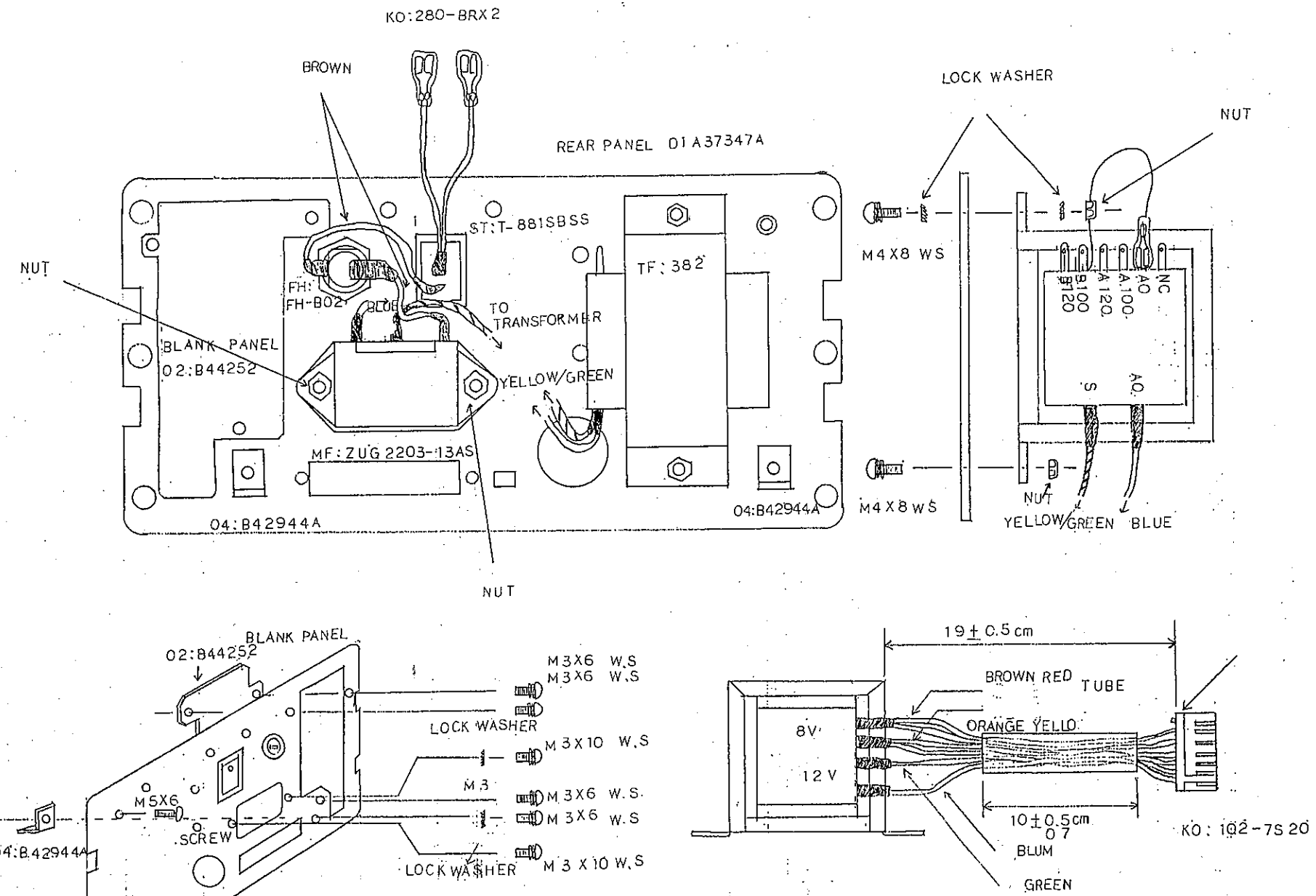






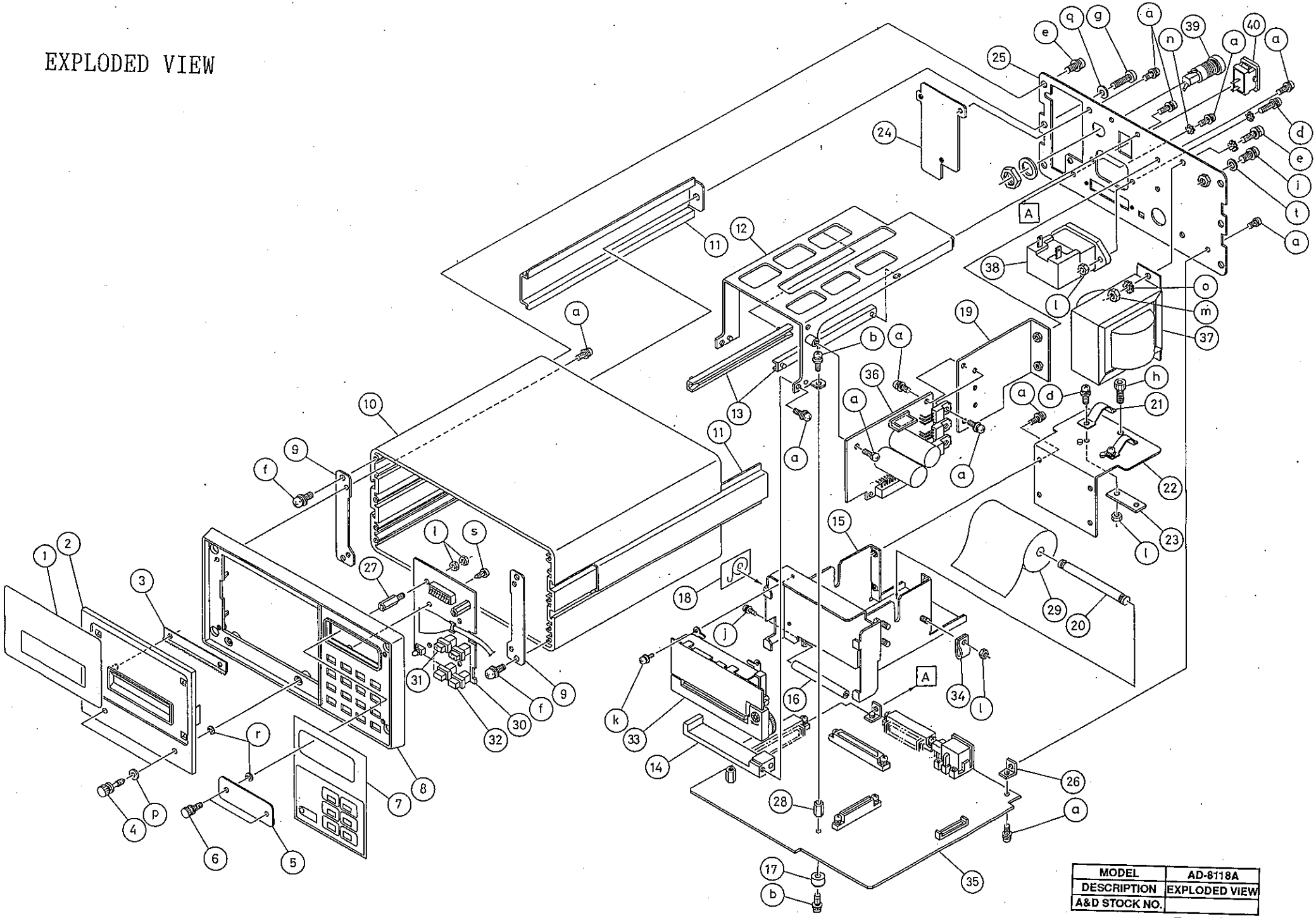


MODEL	AD-8118A/B
DESCRIPTION	PRINTER
A&D STOCK NO.	

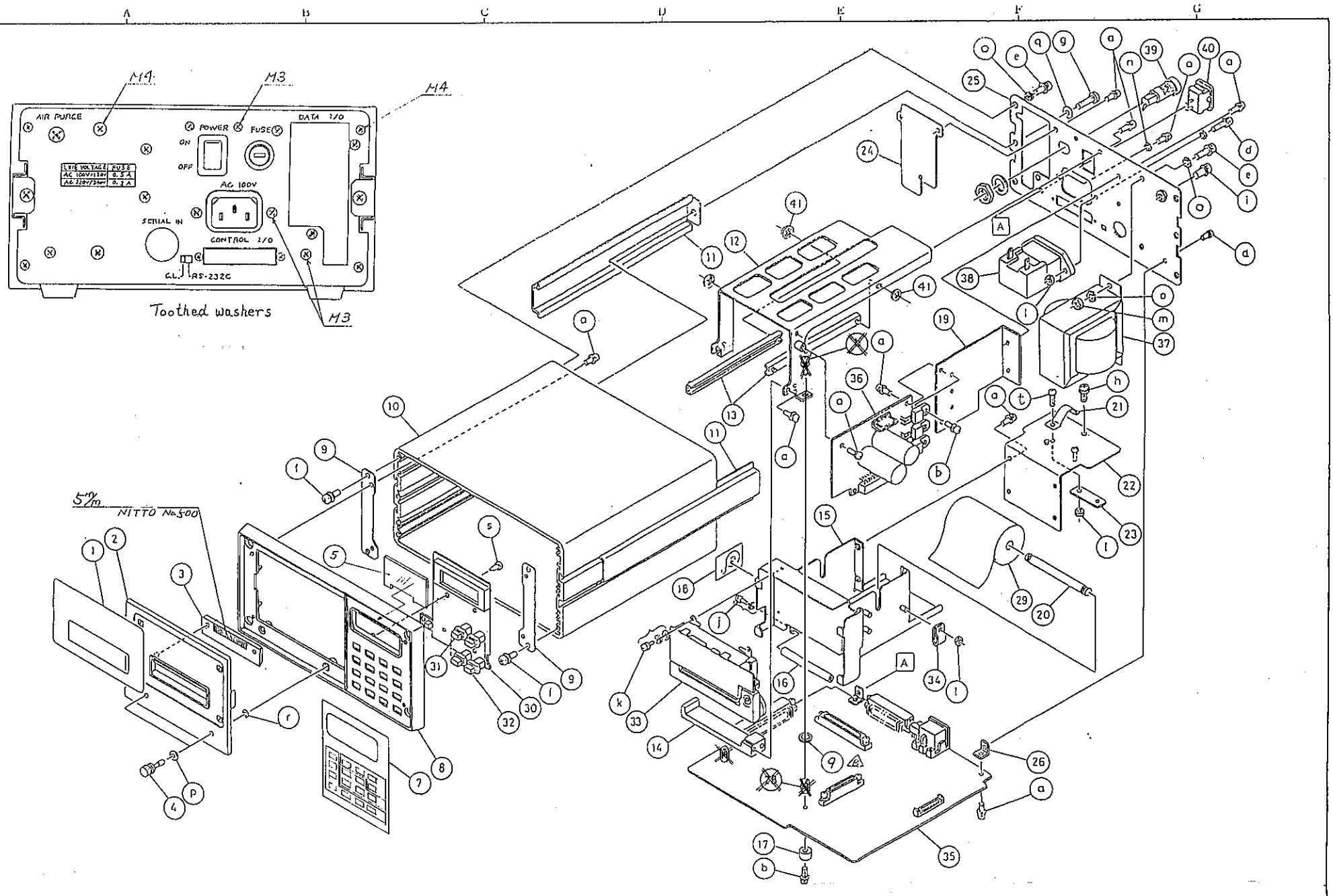


MODEL	AD-8118A/B
DESCRIPTION	POWER SUPPLY
A&D STOCK NO.	PZ:2363

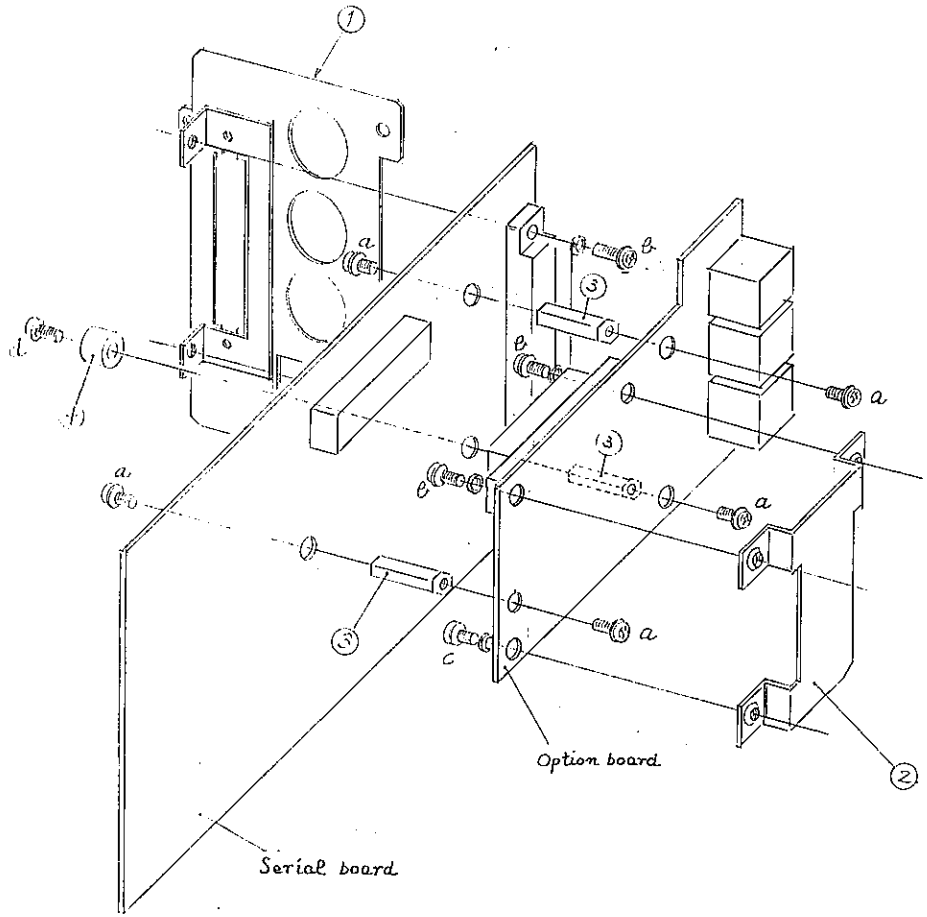
EXPLODED VIEW



MODEL	AD-8118A
DESCRIPTION	EXPLODED VIEW
A&D STOCK NO.	



MODEL	AD-8118B
DESCRIPTION	EXPLODED VIEW
A&D STOCK NO.	



MODEL	AD-8118B-01
DESCRIPTION	OPTION 01
A&D STOCK NO.	

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