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SECTION 3 ELECTRONICS

3.1 PCB LOCATION

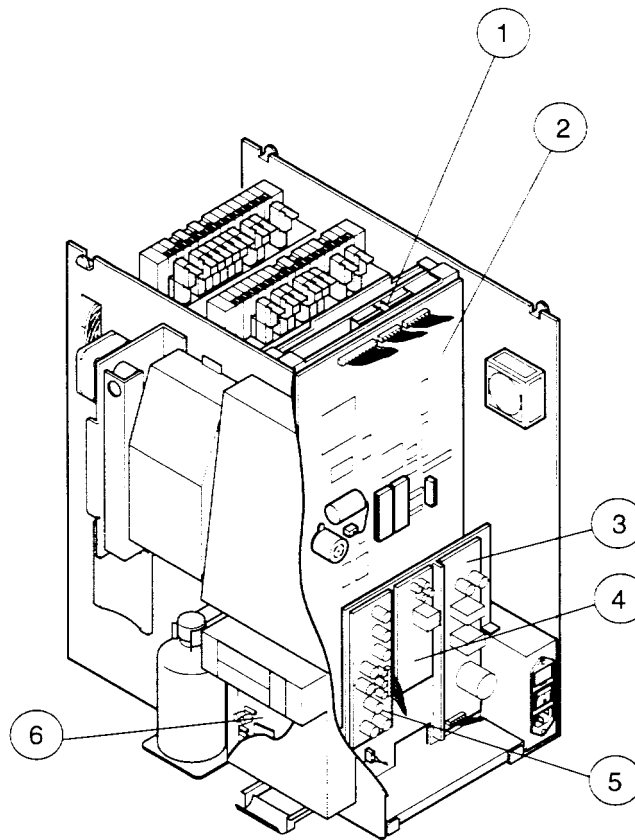


Figure 3-1: PCB Location

3

No.	Description	Function
1	PCB No. 2135 (KX-21) PCB No. 2150 (KX-21N)	Analog Board
2	PCB No. 6363 (KX-21) PCB No. 6370 (KX-21N)	Digital Board
3	VS15B-5	5 V Switching Regulator
4	VS50B-12	12 V Switching Regulator
5	PCB No. 4087	Power Supply Board
6	PCB No. 6350	Printer Driver Board

3.2 BLOCK DIAGRAM

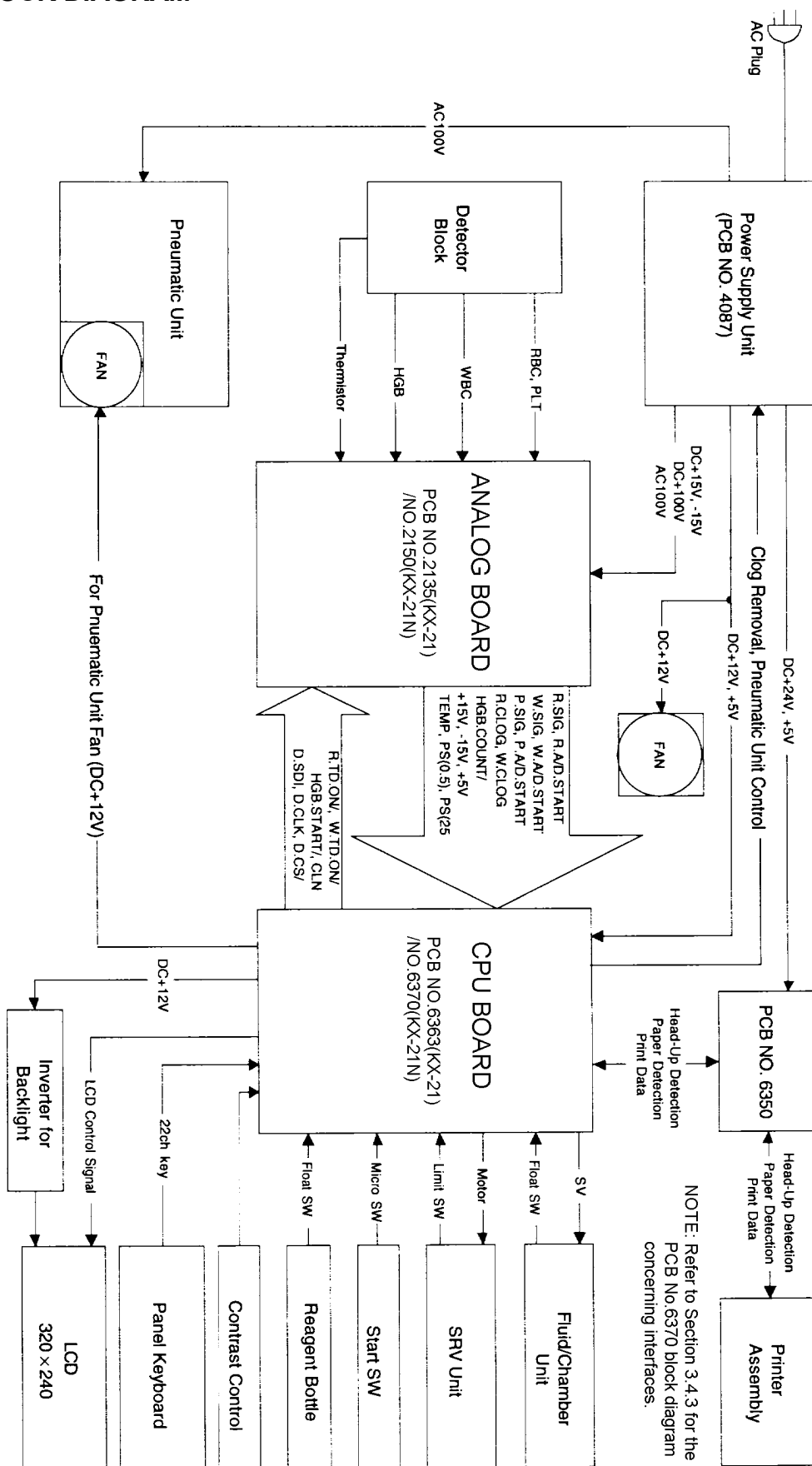


Figure 3-2: Block Diagram [3]

3.2.1 Hardware Configuration

- (1) PCBs
Digital board (PCB No. 6363 (KX-21)/No. 6370 (KX-21N))

3

Analog board (PCB No. 2135 (KX-21)/No. 2150 (KX-21N))

3

Printer control (PCB No. 6350)
- (2) Power Supply Block
AC inlet equipped with fuse holder and power switch
Noise filter
Power transformer (PT-094 or PT-095)
PCB No. 4087
Switching regulator (VS15B-5, VS50B-12)
- (3) LCD
Graphics LCD (320 x 240 dots, monochrome, STN blue)
Model: LRUBL601XA
Size: 166 x 112.3 x 8.5 (mm)
LCD life: 50,000 hours min.
CLF life: 17,000 hours min. (half-life period)
- (4) Built-in Printer
Thermal Printer model FTP-421MCL001
Dimensions: 110 x 60 x 40 (mm)
Head life: 50 million pulses

3.3 PCB NO. 2135/PCB NO. 2150 (ANALOG MAIN)

3.3.1 Function

PCB No. 2135 (KX-21)/ No. 2150 (KX-21N) is the analog main board. 3
Refer to Section 3.3.7 for the major differences between these two boards.

3.3.2 Description

(1) RBC/PLT Detection Circuit

Amplifies the blood signal transmitted from the RBC detector, discriminates it into RBC and PLT signals, and then sends the peak hold signal to the digital board. The RBC/PLT circuit also internally generates an A/D START signal for each signal and sends it to the digital board. The peak hold and A/D START signals are transmitted as they are generated. The start and end of counting are controlled on the digital board in accordance with the predetermined sequence.

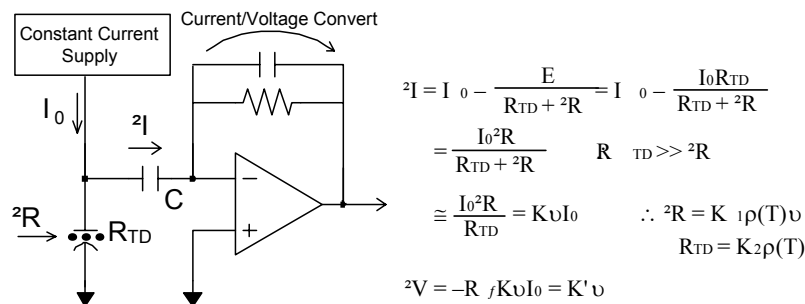
(2) WBC Detection Circuit

Amplifies the blood signal transmitted from the WBC detector and then sends the peak hold signal to the digital board. The WBC circuit also internally generates the A/D START signal and sends it to the digital board. The peak hold and A/D START signals are transmitted as they are generated.

• Blood cell signal amplification method

The analog main board uses a current-responsive amplifier to detect the blood cell signal. Below is an overview of this method.

E serves as constant power supply within the blood cell signal band, according to the operation of C.



(3) HGB Detection Circuit

Firstly converts the photodiode current signal transmitted from the HGB unit into a voltage signal and then into a time signal. The digital board then converts the time signal into pulses. The constant-current circuit for the LED (555 nm), light source for HGB measurement, is also included in the configuration.

(4) Temperature Monitoring Circuit

Measures the ambient temperature in the vicinity of detectors. The thermistor temperature (TEMP) is transmitted as an analog signal, which is then converted to a digital signal on the digital board.

(5) Clog Detection Circuit

Measures the DC voltage in detectors. The DC voltage level is transmitted as an analog signal, which is then converted to a digital signal on the digital board.

(6) Pressure Detection

Two pressure sensing (monitoring) systems, 0.5 kg/cm² and 250 mmHg, are adopted, using adjustment-free pressure sensors. The sensor outputs are converted to pressure values by the formulas below.

- 0.5 kg/cm²
 $P = (X - 0.2)/4.41 \text{ [kg/cm}^2\text{]}$
- 250 mmHg
 $V = (X - 0.2)/0.006 \text{ [mmHg]}$
Here, X represents sensor output (V).

3.3.3 Block Diagram

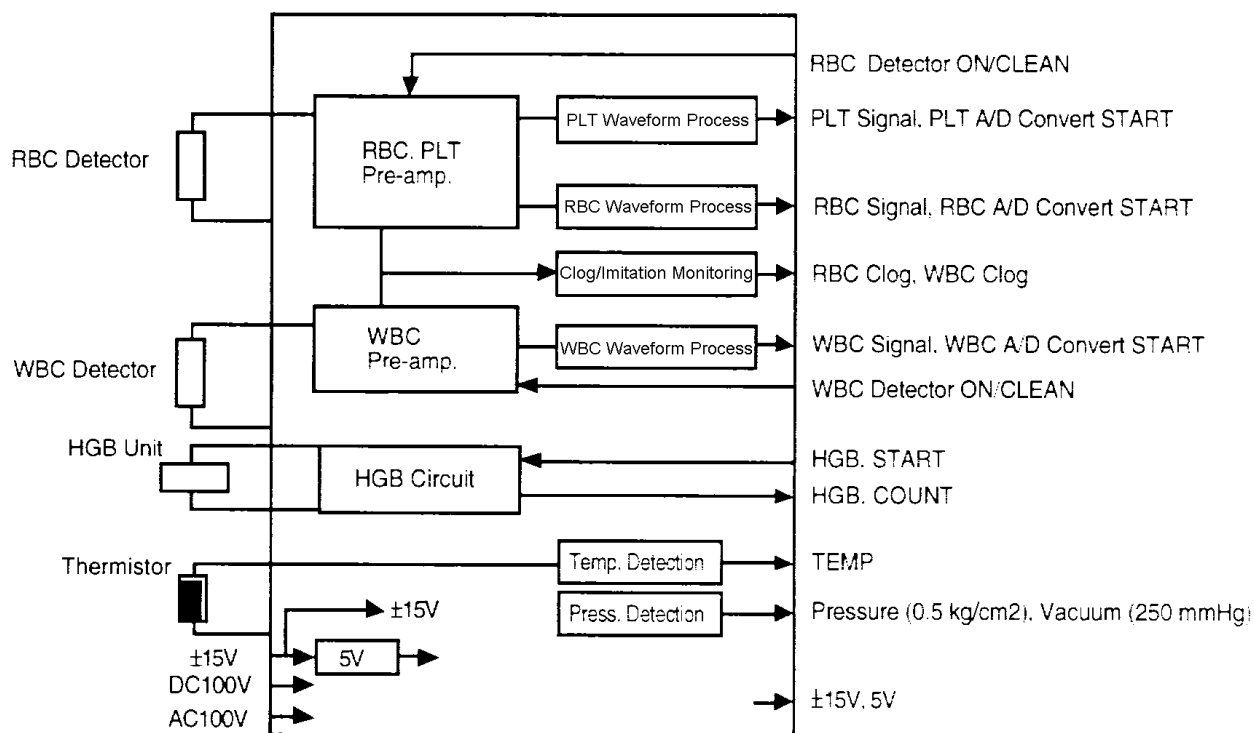


Figure 3-3: PCB No. 2135/No. 2150 Block Diagram 3

3.3.4 Adjustment and Test point

See Section 4.

3.3.5 Connector Pin Assigns

1) J7 (±15 V, DC 100V: B6PS-VH) 3

Pin No.	Signal	Pin No.	Signal
1	DC 100V	4	+15 V
2	GND (DC 100V)	5	GND
3	A. GND	6	-15 V

2) J2 (AC 100V: B3PS-VH)

Pin No.	Signal
1	AC 100V (H)
2	AC 100V (C)
3	A. GND

3) J3 (RBC Transducer: FFC-04LAMEP1)

Pin No.	Signal	Pin No.	Signal
1	Used to prevent connector misconnection.	3	RBC. TD (+)
2	A. GND (Shield)	4	RBC. TD (-)

4) J4 (WBC Transducer: FFC-04LAMEP1)

Pin No.	Signal	Pin No.	Signal
1	A. GND (Shield)	3	WBC. TD (+)
2	Used to prevent connector misconnection.	4	WBC. TD (-)

5) J5 (HGB Unit: FFC-06LBMEP1)

Pin No.	Signal	Pin No.	Signal
1	HGB. SIG	4	—
2	HGB. GND	5	A. GND
3	HGB. LED	6	A. GND

6) J6 (Thermistor: FFC-04LAMEP1)

Pin No.	Signal	Pin No.	Signal
1	TH	3	NC
2	NC	4	TH (GND)

7) J1 (PCB No. 6363: PCN10HA-44PA-2. 54DSA) 3

Pin No.	Signal	Pin No.	Signal
1A	+5 V	1B	+15 V
2A	GND	2B	—15 V
3A	GND	3B	P. SIG
4A	GND	4B	R. SIG
5A	GND	5B	W. SIG
6A	GND	6B	P. A/D. START/
7A	GND	7B	R. A/D. START/
8A	GND	8B	W. A/D. START/
9A	NC	9B	HGB. COUNT (Sig)
10A	HGB. START (+5 V)	10B	HGB. START (Sig)
11A	W. TD. ON (Sig)	11B	R. TD. ON (Sig)
12A	W. TD. ON (+5 V)	12B	R. TD. ON (+5 V)
13A	CLN (Sig)	13B	GND
14A	GND	14B	CLN (+5 V)
15A	PS. 0.5	15B	PS. 250
16A	R. CLOG	16B	TEMP
17A	GND	17B	W/ C;PG
18A	GND	18B	GND
19A	NC	19B	GND
20A	DVR (5 V)	20B	D. SDI
21A	NC	21B	D. CLK
22A	NC	22B	D. CS/

3.3.6 Assembly Drawing

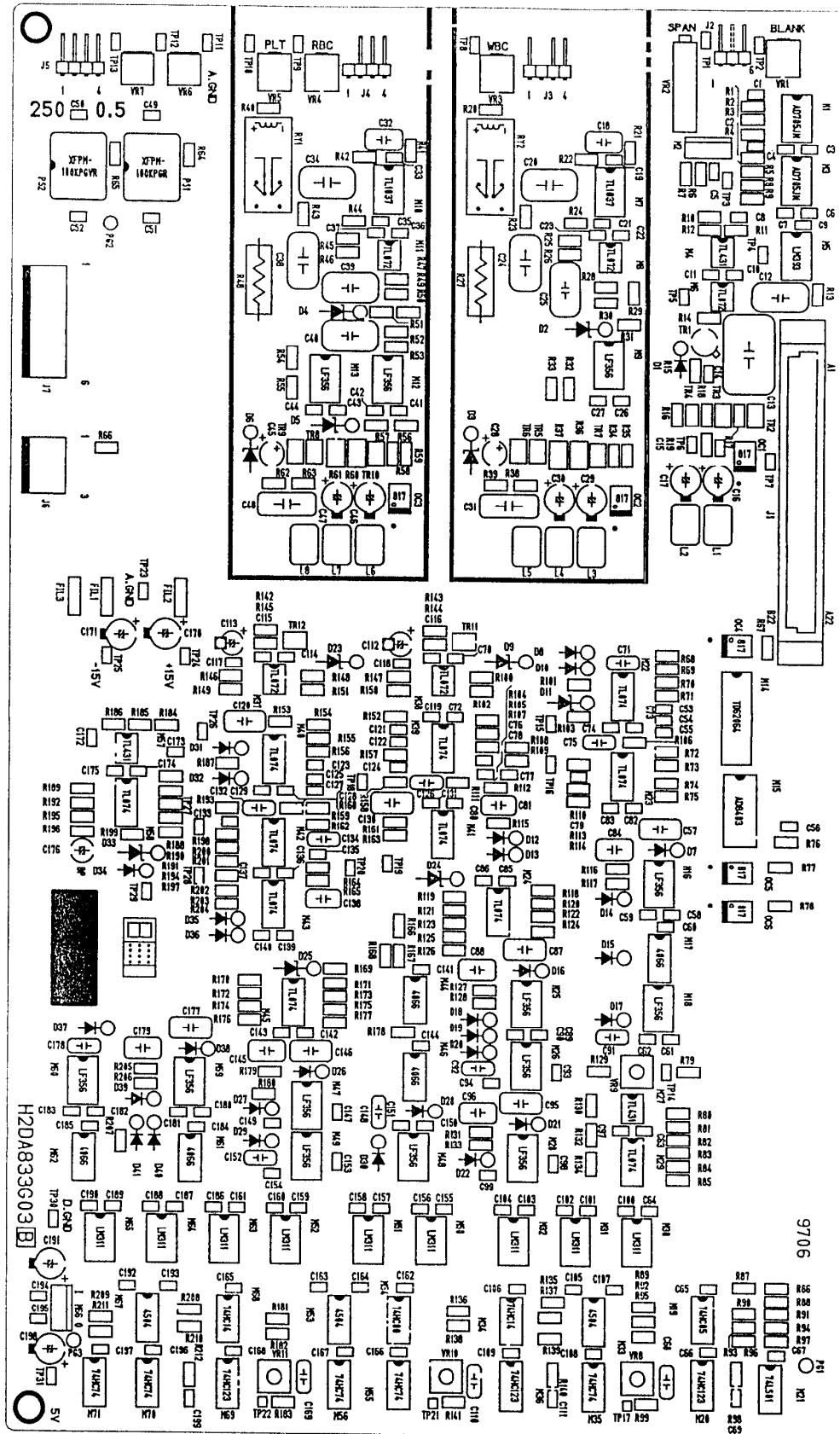


Figure 3-4: PCB No. 2135 Assembly Drawing (KX-21) 3

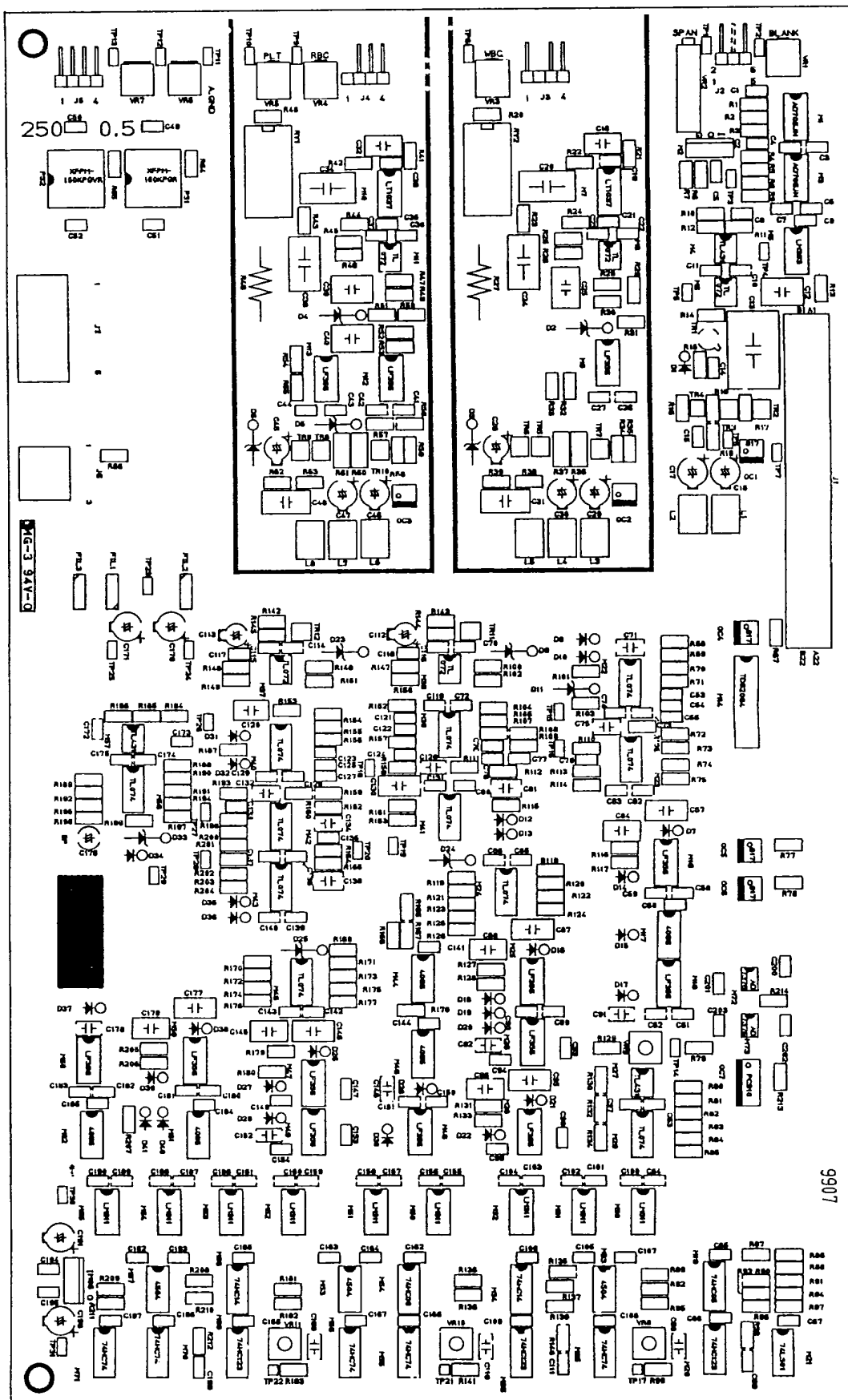


Figure 3-5: PCB No. 2150 Assembly Drawing (KX-21N) [3]

3.3.7 Differences between PCBs No. 2135 and No. 2150 3

	PCB No. 2135	PCB No. 2150
HGB circuit resistance	- R15: 6.8 kOhm - R16: 4.7 kOhm	- R15: 39 kOhm - R16: 8.2 kOhm
Digital potentiometer	- M15: AD8403 - D2, 5: HZ5B1 - R76, 77, 78:	- M15: AD7376 x 2 (pull-up resistance added) - D2, 5: Not mounted - R76, 77, 78: 4.7 kOhm - Photo coupler PC910 added in D.CLK line
PCB recognition		- PCB No. 6370 recognizes PCB No. 2150 by the J1-9A pull-down signal.

3.4 PCB NO. 6363/PCB NO. 6370 (MAIN CPU)

3.4.1 Function

PCB No. 6363 (KX-21)/ No. 6370 (KX-21N) is the CPU board that controls the Main Unit. 3

3.4.2 Description

(1) Main Memory (CPU)

The MC68306 (Motorola) is used as the MPU. Core processor is the equivalent of the MC68EC000. The operation clock is 16.67 Mhz.

Contains DRAM Controller, Interruption Controller, Chip Select, 16-bit Timer, 2 channels of Serial Communication Ports, and max. 16 channels of Parallel I/O Ports.

2 Mbytes DRAM is used (extendable up to 4 Mbytes) for work memory. No wait-state access (speed grade requirement: 70 ns or higher). DRAM controller eliminates the need for external ACK.

3 On the PCB No.6370, 4 Mbytes work memory is mounted.

(2) BBURAM

Nonvolatile memory (SRAM) up to 256 Kbytes is available. Used as 128-Kbyte memory using only odd-numbered addresses for storage of analysis results, QC charts, etc.; odd-numbered addresses. No wait-state access (speed grade requirement: 70 ns or higher). Chip select controller in MPU eliminates the need for external ACK. (Battery life is approx. 11 years.)

3 On the PCB No.6370, 256 Kbytes memory is mounted.

NOTE: After the BBURAM is replaced, the display language will automatically be changed to Japanese. Refer to Section 5.9.3 Factory Initialize of this manual to change the display language.

(3) EEPROM

256 bytes memory (BR93LC56) is available for storage of preset values. BR93LC46 (128 bytes) or BR93LC66 (512 bytes) can also be used in place of BR93LC56, using a different access method according to the capacity. Data are inputted/output via serial interface.

3 On the PCB No.6370, 512 bytes memory is available and extendable up to 1 Mbytes.

Device Pin	MPU Pin	I/O*	Description
CS	PA0	O	Chip select ("H" when selected)
SK	PA1	O	Serial clock (Data are verified by "□.")
DI	PA2	O	Start bit, operation code, address, and write data
DO	PA3	I	Read data and READY/*BUSY (internal status)

*Input (I) or output (O) is defined as seen from the MPU side.

- (4) Program ROM [3]
1 Mbyte programmable ROM is available for KX-21 (PCB No. 6363). Chip select controller in MPU eliminates the need for external ACK. Immediately after booting the system, ROM image is assigned to all addresses in the MPU except for the internal register area. This is a function of the chip select controller in the MPU. Accordingly, the internal register of the MPU must be initialized before making access to other I/O (including work memory).
On KX-21N, 1 Mbyte flash memory card is used as the program source.
- (5) HGB Counter (82C54)
Counts the number of 1-MHz pulses upon entry of external gate signal to determine the HGB value. It also outputs base clock signal to reduce the motor current.
- (6) A/D Converter (ADC0848)
This converter has eight 8-bit channels for sensing pressure, temperature, and clogging, with a fixed input range of 0 to +5 V. Its conversion time is approximately 40 μ s. It converts data when corresponding data are inputted to a channel. Note that conversion is terminated if reading is attempted during conversion. Read the data after the end-of-conversion flag is detected via the parallel I/O port.
- (7) PDA (SG0001-B)
Converts inputted 3 channels of analog blood cell signals (RBC, PLT, and WBC analysis results) into digital data, which are recorded as histogram representing 128 channels.
- (8) Motor Controller
4-phase stepping motor x 1 channel (constant speed driving only). Starts or stops the motor, enables or disables the limit, and selects operating direction. Motor Counter (82C54) outputs clock signals for motor operation and current reduction. It counts the number of motor operation steps to output end-of-operation signal.
- (9) Graphics LCD Control (SED1351)
The microcomputer system controls the monochrome graphics LCD (320 x 240). It has 256 Kbits of SRAM as VRAM, which can store up to 3 screens of created image. 5 VDC is converted to 30 VDC for LCD panel driving.
- [3] KX-21N is provided with backlight dimmer.
- (10) Calendar Clock
Provided.
- (11) Buzzer
Provided.
- (12) Power Supply
+5 VDC (digital)
+12 VDC (SV, motor, etc.)
 \pm 15 VDC (supplied from analog board)
+5 VDC (supplied from analog board)
- (13) Parallele I/F
The parallel I/O IC (PL121) has twelve 8-bit ports. 11 ports are used for either inputting or outputting; 1 port is used exclusively for outputting. PL121 also has one channel of 82C53-compatible counter although functions are limited. 24-bit output are used for driving solenoid valve and LED, and 7-bit input are used for sensor input.
- [3] 1 channel is provided for output to the built-in printer (KX-21).
3 channels are provided for output to the built-in printer, to the optional data printer, and to the optional graphic printer.
- (14) Serial I/F [3]
1 channel of serial interface (RS-232C) is provided for the host computer output (KX-21).
3 channels of serial interface are provided for the host computer output, hand-held type bar code reader connection and for the network adapter (future equipment) connection (KX-21N). SM0006 is used as the serial interface controller on PCB No. 6370.

(15) Variable reference voltage

The reference voltage used for digital data conversion can be controlled via software for 1 channel of particle size distribution function. (Reflects calibrated values.)

3.4.3 Block Diagram

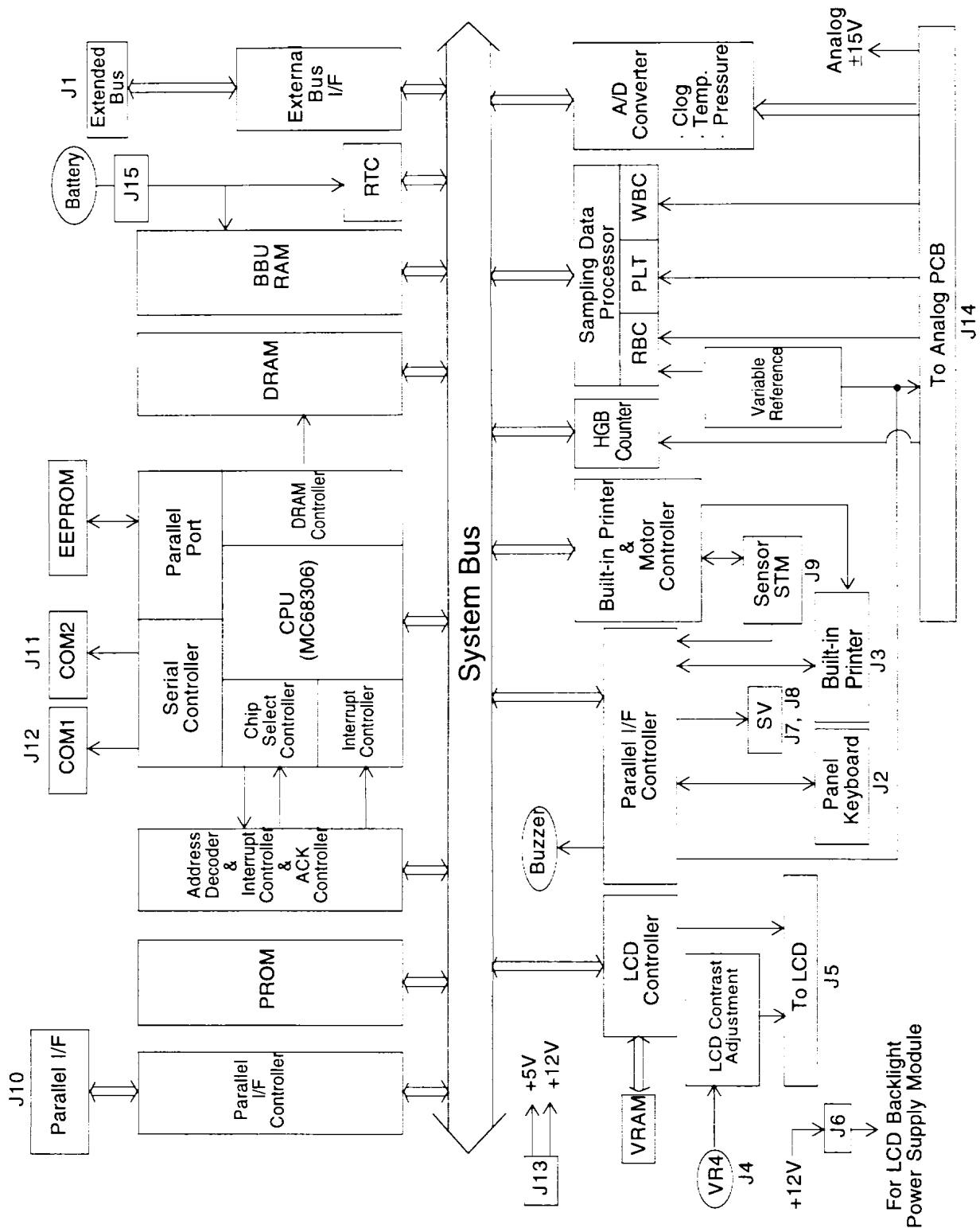


Figure 3-6: PCB No. 6363 Block Diagram (KX-21) [3]

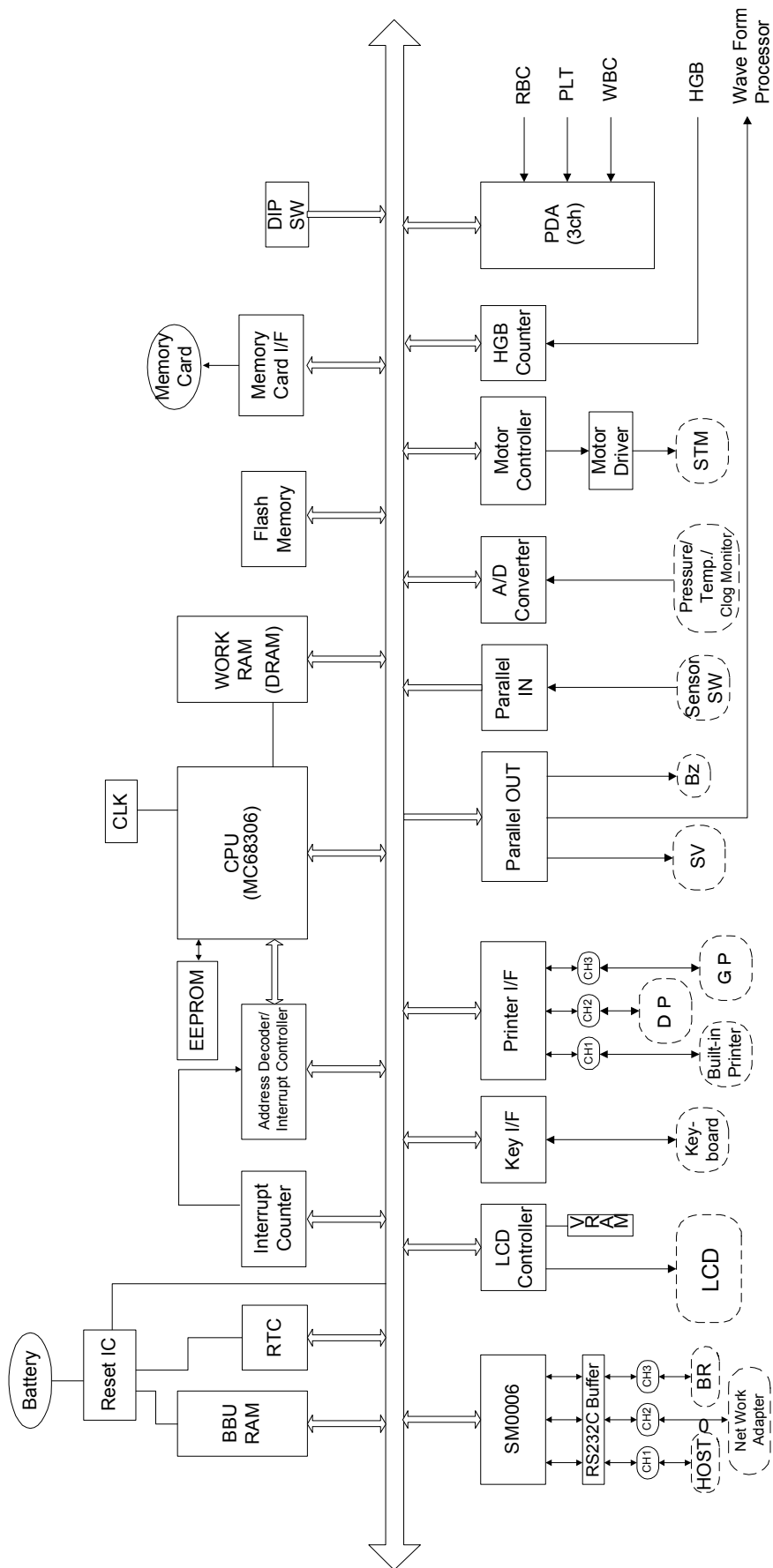


Figure 3-7: PCB No. 6370 Block Diagram (KX-21N) 3

3.4.4 Adjustment and Test point

See Section 4.

3.4.5 Connector Pin Assign

1) J1 (Flash Memory Card) (PCB No. 6370/KX-21N only) [3]

Pin No.	Signal	Pin No.	Signal
1	GND	35	GND
2	D3	36	CD1b
3	D4	37	D11
4	D5	38	D12
5	D6	39	D13
6	D7	40	D14
7	CE1b	41	D15
8	A10	42	CE2b
9	OEb	43	VS1b
10	A11	44	IORDb
11	A9	45	IOWRb
12	A8	46	A17
13	A13	47	A18
14	A14	48	A19
15	WEb	49	A20
16	READY/IREQb	50	A21
17	VCC	51	VCC
18	N.C.	52	N.C.
19	A16	53	A22
20	A15	54	A23
21	A12	55	A24
22	A7	56	A25
23	A6	57	VS2b
24	A5	58	RESET
25	A4	59	WAITb
26	A3	60	N.C.(INPACKb)
27	A2	61	REGb
28	A1	62	BVD2/SPKRb
29	GND(A0)	63	BVD1/STSCHGb
30	D0	64	D8
31	D1	65	D9
32	D2	66	D10
33	WP/IOIS16b	67	CD2b
34	GND	68	GND

2) J2 (Keyboard interface) [3]

Pin No.	Signal	Pin No.	Signal
1	KEYSCAN1	2	KEYSCAN2
3	KEYSCAN3	4	KEYSCAN4
5	KEYDATA0	6	KEYDATA1
7	KEYDATA2	8	KEYDATA3
9	KEYDATA4	10	KEYDATA5
11	KEYDATA6	12	KEYDATA7
13	N.C.	14	N.C.

3) J3 (Built-in printer) 3

Pin No.	Signal	Pin No.	Signal
1	IP_PE	2	IP_ERR
3	IP_BUSY	4	IP_FEED
5	IP_INIT	6	IP_STB
7	IPDATA0	8	IPDATA1
9	IPDATA2	10	IPDATA3
11	IPDATA4	12	IPDATA5
13	IPDATA6	14	IPDATA7
15	GND	16	GND

4) J4 (Contrast adjustment volume)

Pin No.	Signal	Pin No.	Signal
1	VEE	2, 3	V0

5) J5 (LCD module) 3

Pin No.	Signal	Pin No.	Signal
1	YD	2	N.C.
3	LP	4	XSCL
5	LCDENV	6	UD0
7	UD1	8	UD2
9	UD3	10	VCC
11	GND	12	VEE
13	Vo	14	F.G.

6) J6 (LCD backlight power supply)

Pin No.	Signal	Pin No.	Signal
1	+12 V	2	GND
3	+12 V	4	GND
5	N.C.	—	—

7) J7 (SV output port -1)

Pin No.	Signal	Pin No.	Signal
1	+12 V	2	SV1-S
3	+12 V	4	SV2-S
5	+12 V	6	SV3-S
7	+12 V	8	SV4-S
9	+12 V	10	SV5-S
11	+12 V	12	SV6-S
13	+12 V	14	SV7-S
15	+12 V	16	SV8-S
17	+12 V	18	SV9-S
19	+12 V	20	SV10-S
21	+12 V	22	SV11-S
23	+12 V	24	SV12-S
25	+12 V	26	SV13-S
27	+12 V	28	SV14-S
29	+12 V	30	SV15-S
31	+12 V	32	SV16-S

8) J8 (SV output port -2)

Pin No.	Signal	Pin No.	Signal
1	+12 V	2	SV17-S
3	+12 V	4	SV18-S
5	+12 V	6	SV19-S
7	+12 V	8	SV20-S
9	+12 V	10	SV21-S
11	+12 V	12	SV22-S
13	+12 V	14	SV23-S
15	+12 V	16	SV24-S

9) J9 (Motor control output/Sensor input)

Pin No.	Signal	Pin No.	Signal
1	+12 V	2	+12 V
3	STM-A	4	STM-B
5	STM-#A	6	STM-#B
7	GND	8	FSW1
9	GND	10	FSW2
11	GND	12	CCW LIM
13	GND	14	CW LIM
15	GND	16	START_SW
17	GND	18	SW6
19	GND	20	SW7
21	VCC	22	VCC

10) J10 (Parallel Interface) (PCB No. 6363/KX-21) 3

Pin No.	Signal	Pin No.	Signal
1	*PR_STB	2	*PR_AUTOFEED
3	PRDATA0	4	*PR_ERR
5	PRDATA1	6	*PR_INIT
7	PRDATA2	8	*PR_SELIN
9	PRDATA3	10	GND
11	PRDATA4	12	GND
13	PRDATA5	14	GND
15	PRDATA6	16	GND
17	PRDATA7	18	GND
19	*PR_ACK	20	GND
21	PR_BUSY	22	GND
23	PR_PE	24	GND
25	PR_SEL	26	N.C.

J10 (Parallel Interface) (PCB No. 6370/KX-21N) [3]

Pin No.	Signal	Pin No.	Signal
1	DP-STB	2	DP-FEED
3	DPDATA0	4	DP-ERR
5	DPDATA1	6	DP-INIT
7	DPDATA2	8	VCC
9	DPDATA3	10	GND
11	DPDATA4	12	GND
13	DPDATA5	14	GND
15	DPDATA6	16	GND
17	DPDATA7	18	GND
19	DP-ACK	20	GND
21	DP-BUSY	22	GND
23	DP-PE	24	GND
25	DP-SEL	26	GP-STB
27	GP-FEED	28	GPDATA0
29	GP-ERR	30	GPDATA1
31	GP-INIT	32	GPDATA2
33	GP-SELIN	34	GPDATA3
35	GND	36	GPDATA4
37	GND	38	GPDATA5
39	GND	40	GPDATA6
41	GND	42	GPDATA7
43	GND	44	GP-ACK
45	GND	46	GP-BUSY
47	GND	48	GP-PE
49	GND	50	GP-SEL

11) J11 (Serial Interface-2) (PCB No. 6363/KX-21) [3]

Pin No.	Signal	Pin No.	Signal
1	N.C.	2	DSR2
3	RXD2	4	RTS2
5	TXD2	6	CTS2
7	DTR2	8	N.C.
9	GND	10	GND

J11 (Serial Interface-HOST/Network Adapter) (PCB No. 6370/KX-21N) [3]

Pin No.	Signal	Pin No.	Signal
1	N.C.	2	HOST-DSR
3	HOST-RXD	4	HOST-RTS
5	HOST-TXD	6	HOST-CTS
7	HOST-DTR	8	N.C.
9	GND	10	GND
11	N.C.	12	NW-DSR
13	NW-RXD	14	NW-RTS
15	NW-TXD	16	NW-CTS
17	NW-DTR	18	N.C.
19	GND	20	GND

12) J12 (Serial Interface-1) (PCB No. 6363/KX-21) 3

Pin No.	Signal	Pin No.	Signal
1	N.C.	2	DSR1
3	RXD1	4	RTS1
5	TXD1	6	CTS1
7	DTR1	8	N.C.
9	GND	10	GND

J12 (Serial Interface-Hand held type bar code reader) (PCB No. 6370/KX-21N) 3

Pin No.	Signal	Pin No.	Signal
1	GND	2	BR-DSR
3	BR-RXD	4	BR-RTS
5	BR-TXD	6	BR-CTS
7	BR-DTR	8	GND
9	GND	10	VCC

13) J13 (Power Supply)

Pin No.	Signal	Pin No.	Signal
1	+5 V	2	GND
3	+12 V	4	GND
5	N.C.	—	—

14) J14 (Analog Interface)

Pin No.	Signal	Pin No.	Signal
1 (1A)	A +5 V	23 (1B)	A + 15 V
2 (2A)	AGND	24 (2B)	A – 15 V
3 (3A)	AGND	25 (3B)	P-PLS (A)
4 (4A)	AGND	26 (4B)	R-PLS (A)
5 (5A)	AGND	27 (5B)	W-PLS (A)
6 (6A)	AGND	28 (6B)	*P-ADSTART
7 (7A)	AGND	29 (7B)	*R-ADSTART
8 (8A)	AGND	30 (8B)	*W-ADSTART
9 (9A)	BOARDSEL	31 (9B)	*HGB_COUNT
10 (10A)	VCC	32 (10B)	*HGB_START-S
11 (11A)	*W-TDON-S	33 (11B)	*R-TDON-S
12 (12A)	VCC	34 (12B)	VCC
13 (13A)	*CLN-S	35 (13B)	AGND
14 (14A)	AGND	36 (14B)	VCC
15 (15A)	PS_0.5	37 (15B)	PS_250
16 (16A)	R. CLOG	38 (16B)	TEMP
17 (17A)	AGND	39 (17B)	W. CLOG
18 (18A)	AGND	40 (18B)	AGND
19 (19A)	*PDATEST	41 (19B)	AGND
20 (20A)	VCC	42 (20B)	*PM-SDI-S
21 (21A)	N.C.	43 (21B)	*PM-CLK-S
22 (22A)	N.C.	44 (22B)	*PM-CS-S

15) J15 (Battery)

Pin No.	Signal	Pin No.	Signal
1	VBATT	2	GND

16) J16 (Reserved) 3

17) J17 (Manual reset)

Pin No.	Signal	Pin No.	Signal
1	MANUAL RESET	2	GND

3.4.6 Assembly Drawing

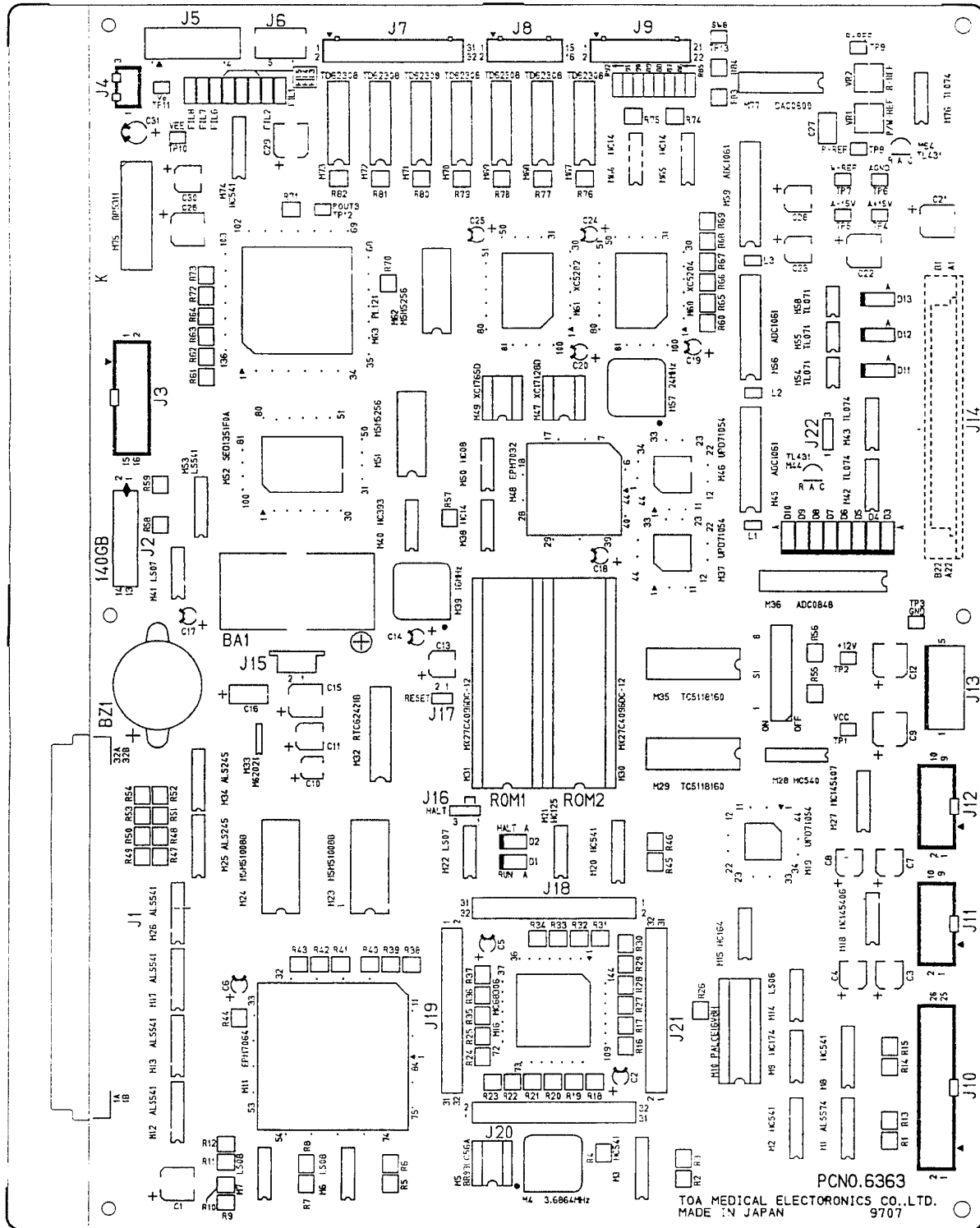


Figure 3-8: PCB No. 6363 Assembly Drawing (KX-21) 3

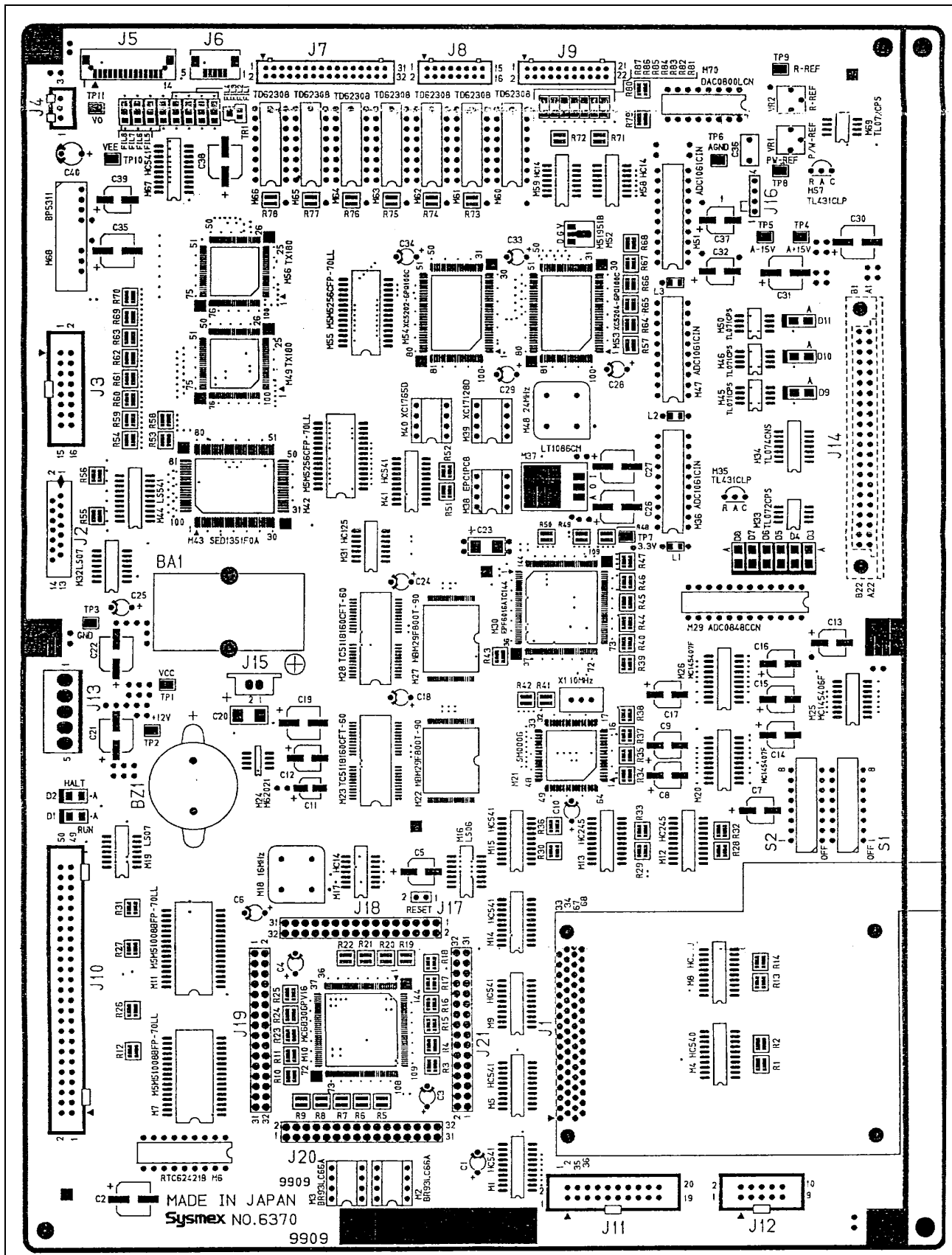


Figure 3-9: PCB No. 6370 Assembly Drawing (KX-21N) [3]

3.5 PCB NO. 6350 (PRINTER DRIVER BOARD)

3.5.1 Function

Drives the built-in printer head. (Compatible with K-4500)

3.5.2 Description

- 1) CPU:
MSM65X513SS (clock 8 MHz, built-in RBM 192 bytes)
- 2) ROM:
The ROM capacity is 256 K bits (including the character generator)
- 3) Applicable printer mechanism:
Model FTP-421MCL001 (Compatible with K-4500/F-820)
- 4) Printer control circuit:
Interface signals are listed below (connector: CN 1)

Pin No.	Signal	IN/OUT	Function
1	PE	OUT	Indicates an "out-of-paper" condition from the printer to the CPU ("H"). The ERROR signal is "H".
2	ERROR	OUT	When this signal is "L" and PE is "H", the printer head is UP.
3	READY/BUSY	OUT	Indicates whether data reception from the printer to the CPU is ready or not. Signal READY (reception enabled) is "L" and signal BUSY (reception disabled) is "H".
4	FEED	IN	A manual paper feed signal. Enabled only when the printer is not printing. While this signal is "L", paper is fed every dot line.
5	INIT	IN	When this signal turns "L", the printer controller is reset to the initial state and the reception buffer is cleared.
6	STROBE	IN	A data transfer timing signal. After this signal is received, the system starts reading data.
7 ~ 14	DATA 0 ~ DATA 7	IN	Data from the CPU is read at the trailing edge of the STROBE signal.

3.5.3 Block Diagram

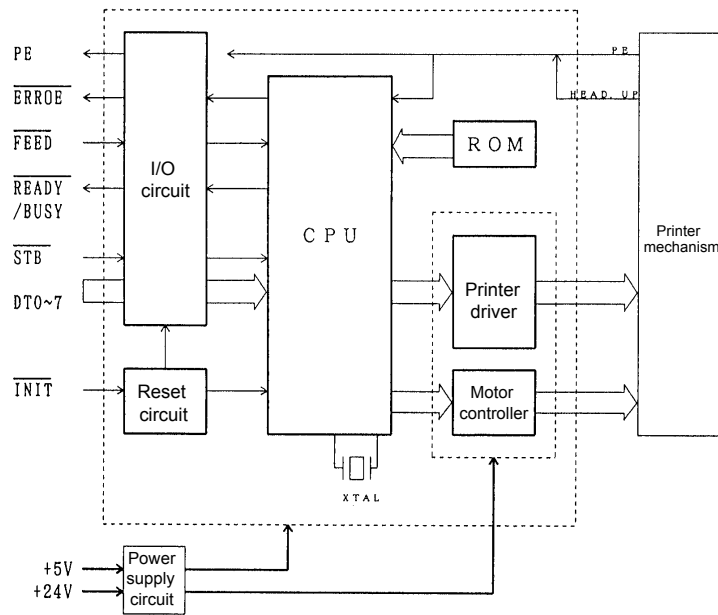


Figure 3-10: PCB No. 6350 Block Diagram

3.5.4 Adjustment and Test point

None.

3.5.5 Assembly Drawing

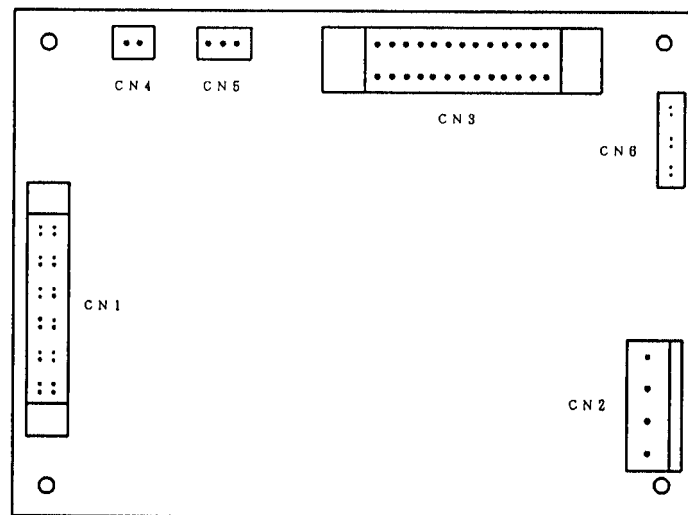


Figure 3-11: PCB No. 6350 Assembly Drawing

3.6 POWER SUPPLY UNIT (PCB NO. 4087)

3.6.1 Function

The unit has two types of power supplies for 100-V and 200-V groups of AC lines for different markets. The connector on the primary side of the transformer is used as voltage selector.

Configuration of the Power Supply Unit is as follows:

- AC inlet, fuse holder, and power switch
- Noise filter
- Power transformer
- Power supply board (PCB NO. 4087)
- Switching regulators (VS15B-5 and VS50B-12)

3.6.2 Description

(1) Power Input

Input voltage: 100-V group: 100 V, 117 V
200-V group: 220 V, 230 V, 240 V
Frequency: 50 Hz/60 Hz

(2) Power Output

Rated Voltage	Average Current	Peak Current	Application
+15 VDC	0.5 A	0.7 A	Analog circuits and analog 5 V
-15 VDC	0.4 A	0.5 A	Analog circuits
100 VDC	10 mA	20 mA	Constant-current supply
100 VAC	10 mA	20 mA	Clog removal
+5 VDC	2.0 A	2.1 A	Digital circuits, LCD drive, and control of built-in printer
+12 VDC	2.0 A	2.8 A	Solenoid valve, motor, and LCD backlight
+24 VDC	0.7 A	2.7 A	Printer head, motor drive
100 VAC	1.2 A	1.2 A	Pneumatic unit drive

Output specifications above are guaranteed at an ambient temperature below 60 °C.

(3) Power consumption

Maximum: 250 VA

(4) Dimensions and weight

Dimensions: W x D x H = 215 x 235 x 120 (mm)
Weight: Approx. 5.2 kg

(5) Power Supply Types and Performance

Voltage	Type	Constant Voltage Accuracy	Load Regulation	Ripple Voltage
+15 VDC	Series	±0.75 V	2%	15 mV max.
-15 VDC	Series	±0.75 V	2%	15 mV max.
100 VDC	Series	±3 V	2%	10 mV max.
+5 VDC	Switching	±0.1 V	2%	120 mV max.
+12 VDC	Switching	±0.2 V	2%	150 mV max.
+24 VDC	Series	±1.2 V	2%	200 mV max.
100 VAC	Transformer output	—	—	—

(6) Power Transformer

Primary side input voltage	100 VAC, 117 V, 220 V, 230 V, 240 V
Secondary side output voltage	108 VAC, 100 V, 16.5 V - 0 - 16.5 V, 25.0 V
Capacity	279 VA
Insulation	Type A
Dimension	W x D x H = 152 x 128 x 75 (mm)
Weight	Approx. 3.8 kg

(7) Fuses

PCB No. 4087

Circuit Symbol	Part Name
F1	K19374/0.5 A
F2, 3	K19374/1.6 A
F4	K19374/3.15 A
F5	K19374/0.05 A
F6	K19374/4 A

AC inlet

Voltage	Part Name
100 V, 117 V	ST4 - 3.15 A - N1
220 V, 230 V, 240 V	NO. 19195 (250 V, 2A)

(8) Voltage Selection

Connect the Wiring Cord No. 2370 as below according to the required voltage.

1) 117 V

Pin 1 (light blue) and Pin 3 (brown)

2) 220V

Pin 1 (light blue) and Pin 4 (brown)

3) 230 V

Pin 1 (light blue) and Pin 5 (brown)

4) 240 V

Pin 1 (light blue) and Pin 6 (brown)

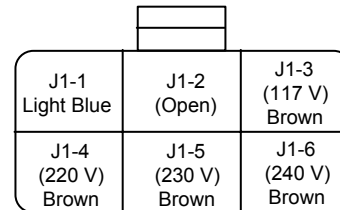


Figure 3-12: Wiring at Connector J1

3.6.3 Adjustment and Test point

See Section 4.

3.6.4 Block Diagram

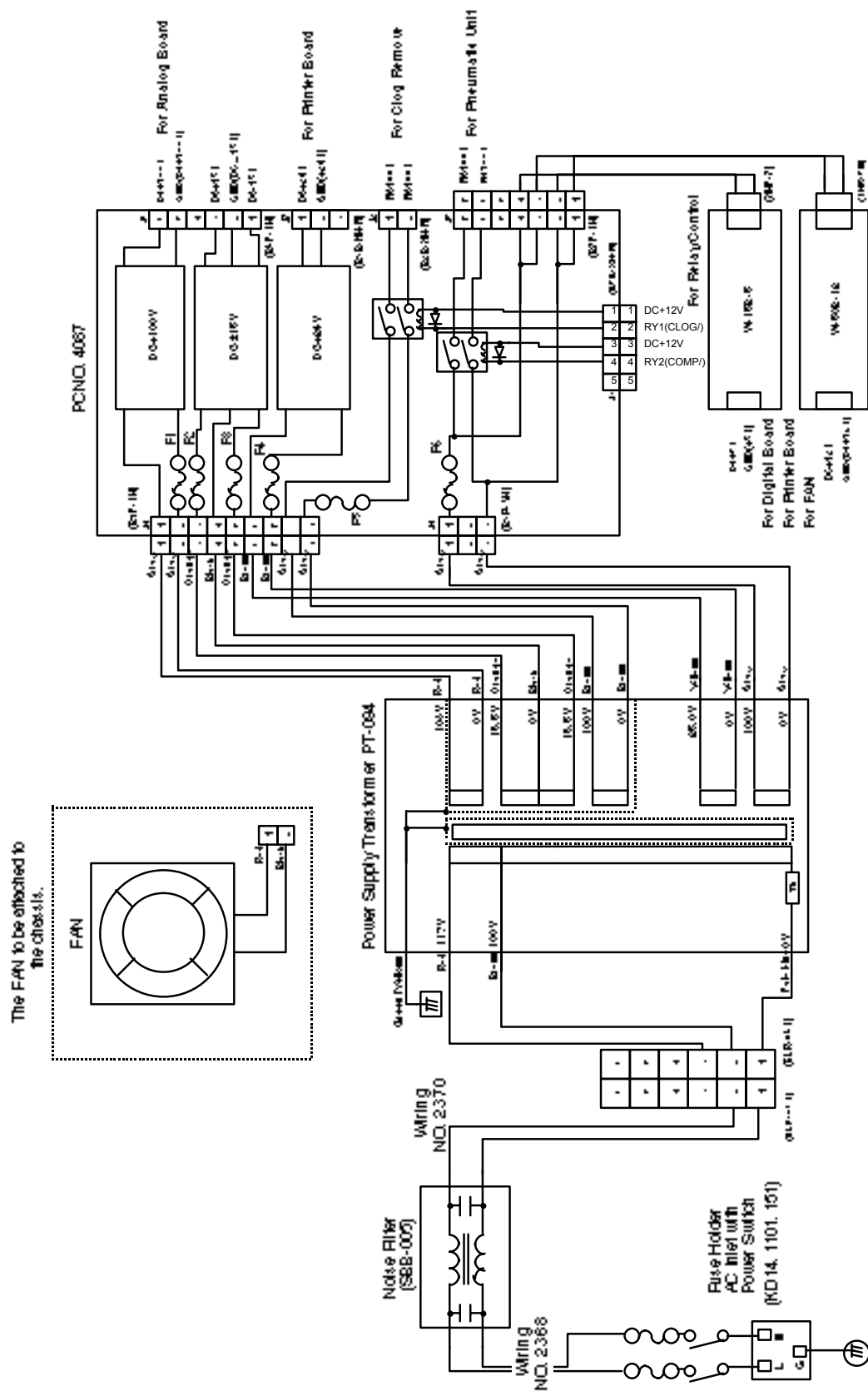


Figure 3-13: Power Supply Unit Block Diagram

3.6.5 Assembly Drawing

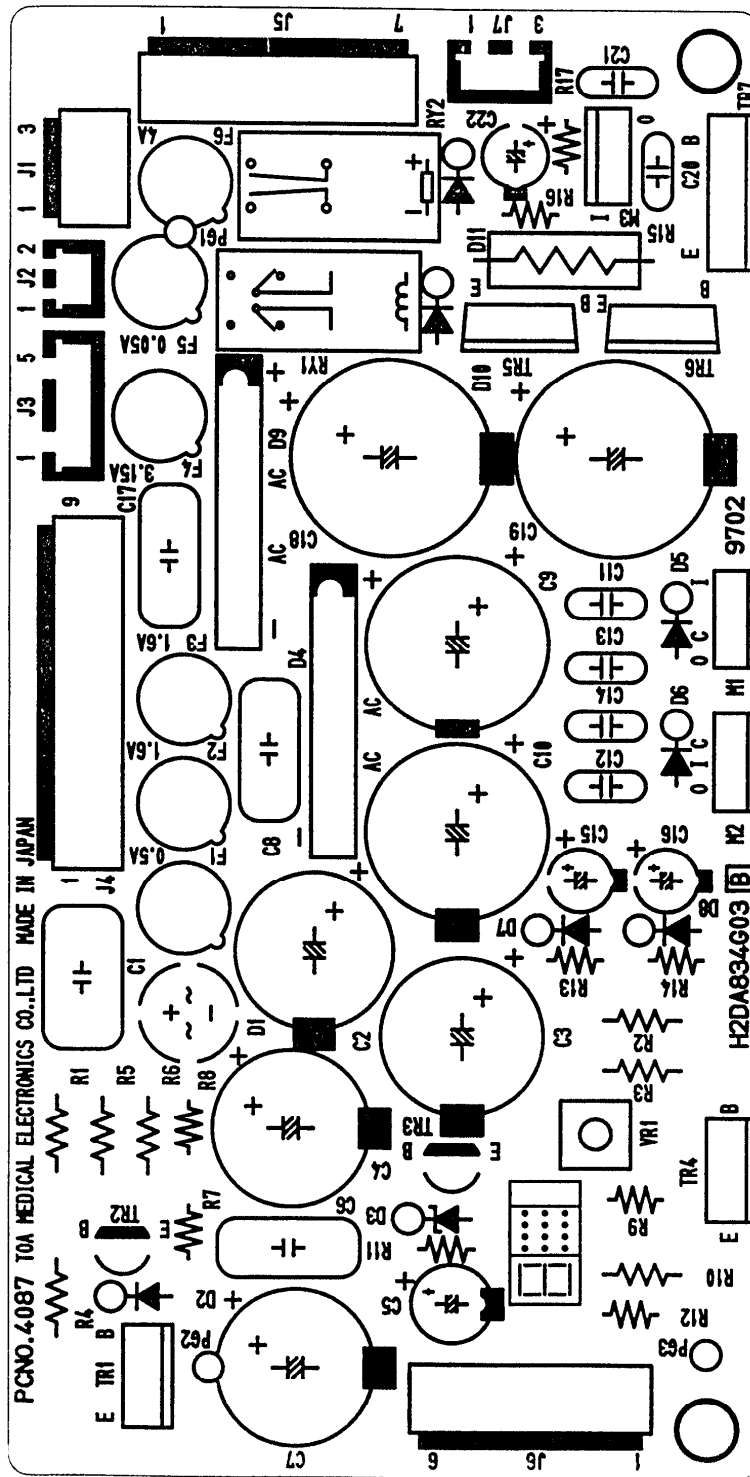


Figure 3-14: PCB No. 4087 Assembly Drawing