NOVAG INDUSTRIES LTD.

CHESS PRINTER

SERVICE MANUAL

CONTENTS

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Date: 30th October, 1981.

1. SPECIFICATION

A) Operating Voltage : 24 Volts AC (through AC to AC Adaptor)

B) Max. Current Consumption : 500 MA (During Print)

C) Print Speed : 1.5 lines/sec.

D) Storage Temperature : -40°C to +70°C
(Excluding thermal paper)

E) Operating Temperature : 0°C to +40°C

F) Thermal Paper Dimension : 53.5 mm X 39.5 mm

G) Dimension : L 247 mm X W 155 mm X H 40 mm

H) Weight : 650 gm

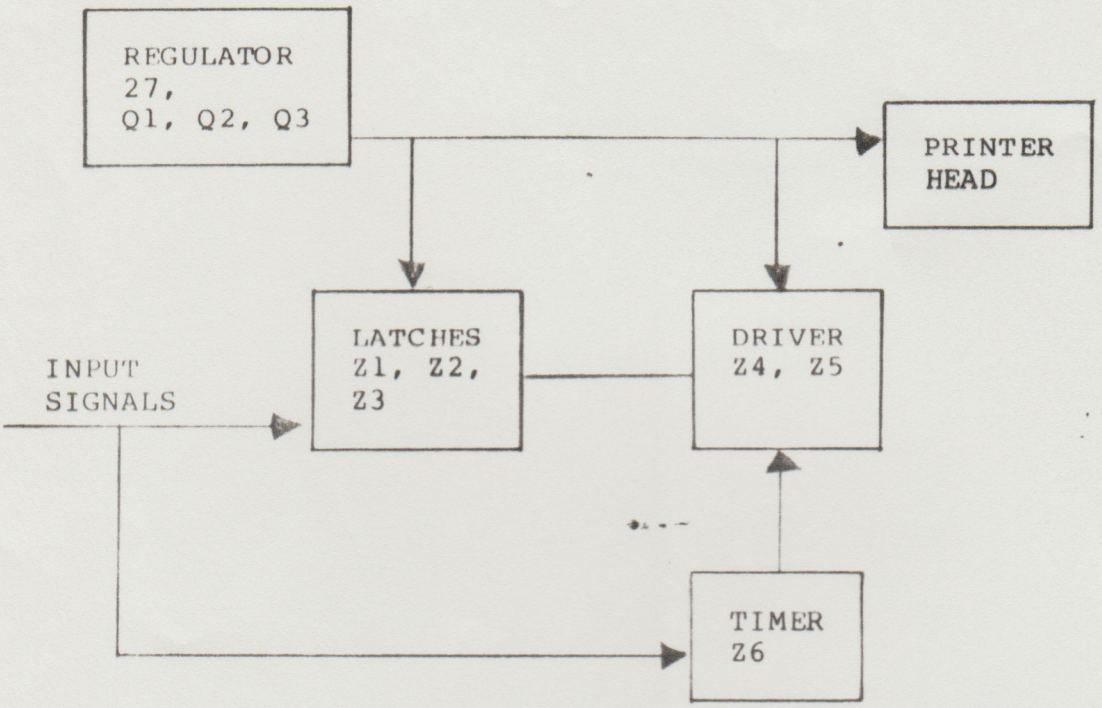
Note: The printer itself has no adaptor jack to accomodate the adaptor. The unit must be coupled to either the Savant, the Super Sensor 4 or the Robot.

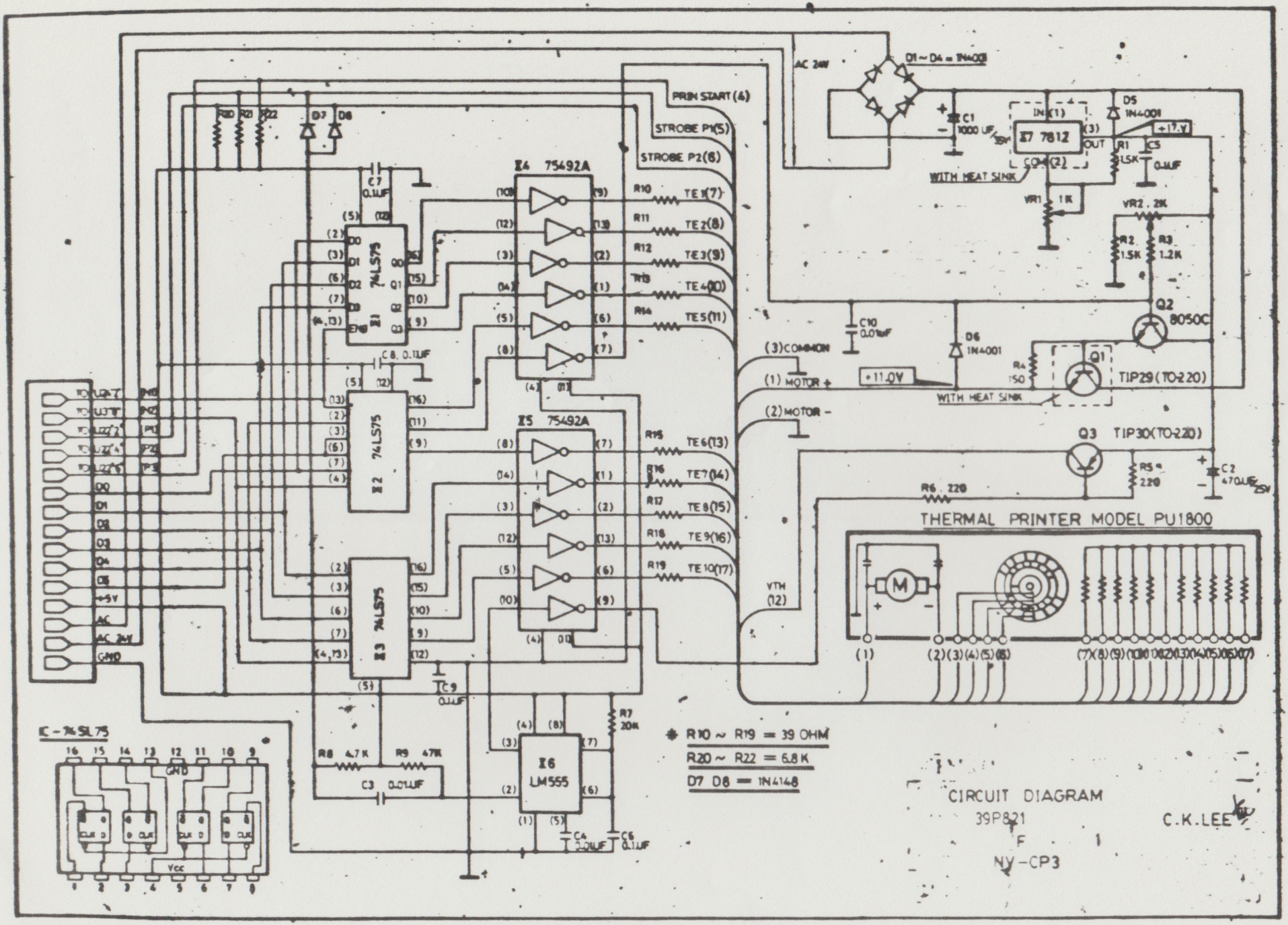
2. CIRCUIT DESCRIPTION

The Printer, by itself, cannot operate and must be coupled to either the Savant, the Super Sensor 4 or the Robot from which the drive signals are derived.

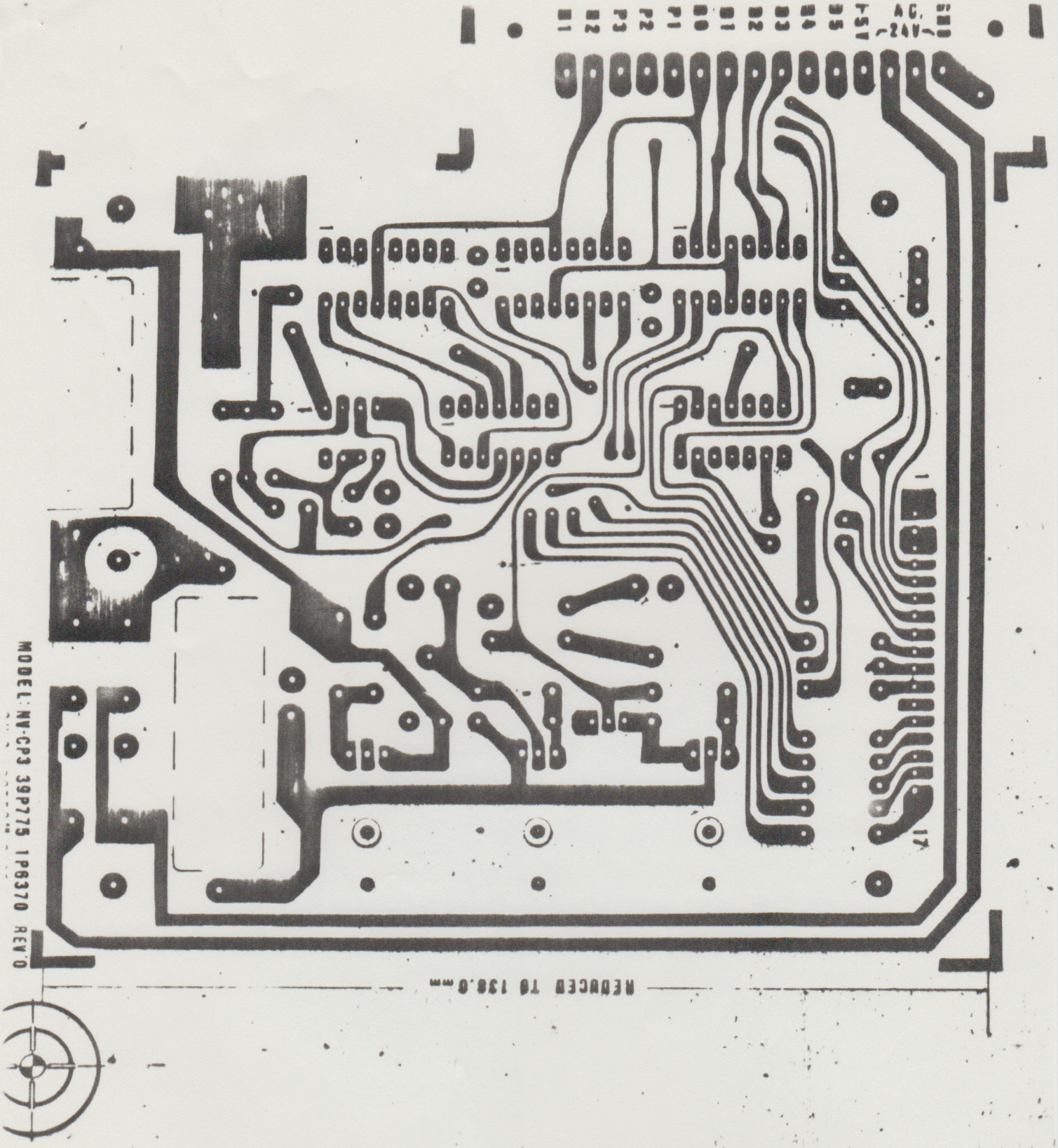
When coupled to any one of the chess computers listed above, drive and print signals are fed into the 74LS75 Latches which in turn drive the hex drivers 75492 and the timer LM555. The motor is switched on and the thermal elements are selected to give the correct print out. The motor control voltage and the thermal element voltage are stabilised so that the motor speed and the thermal power are both constant.

3. BLOCK DIAGRAM

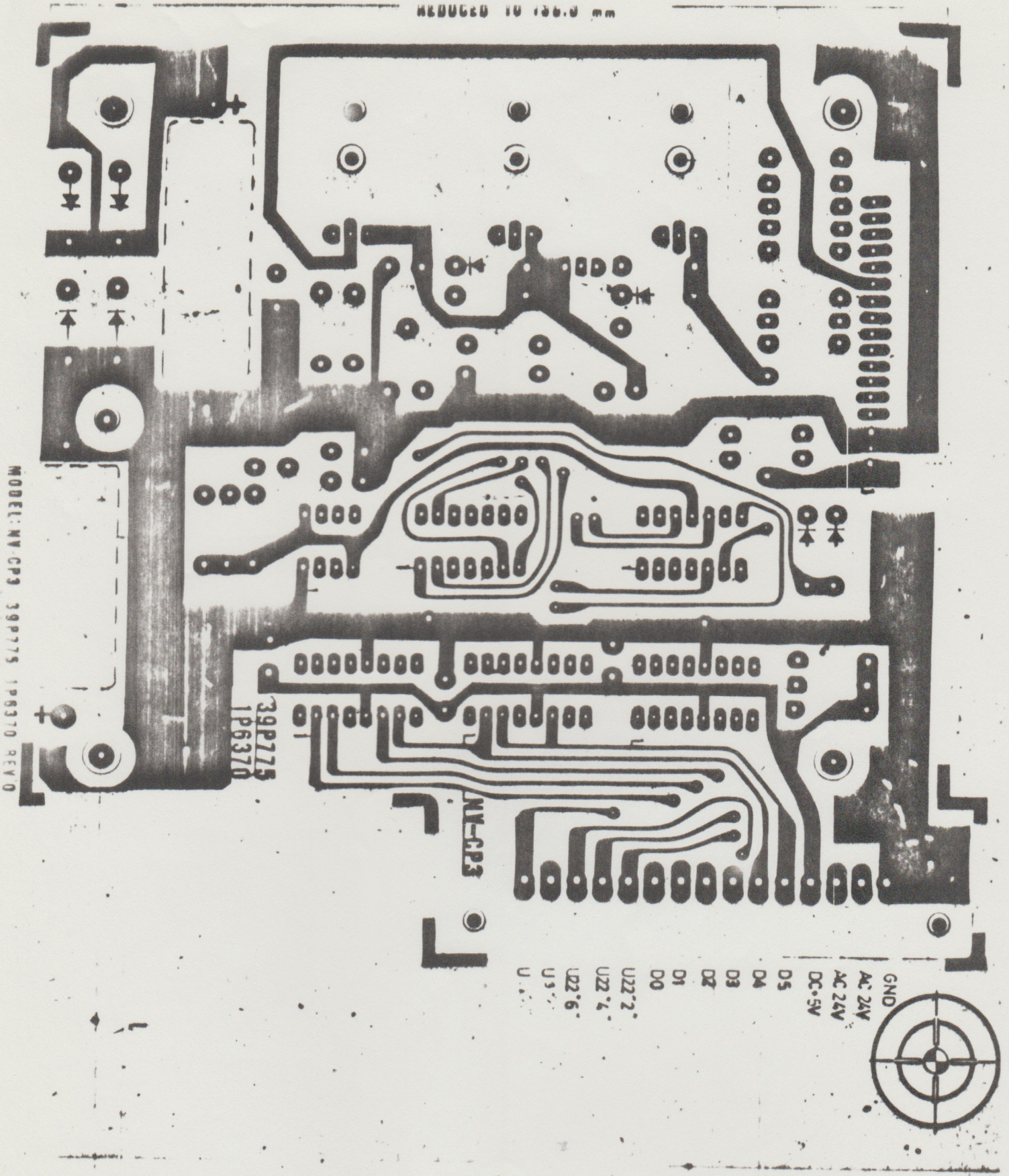




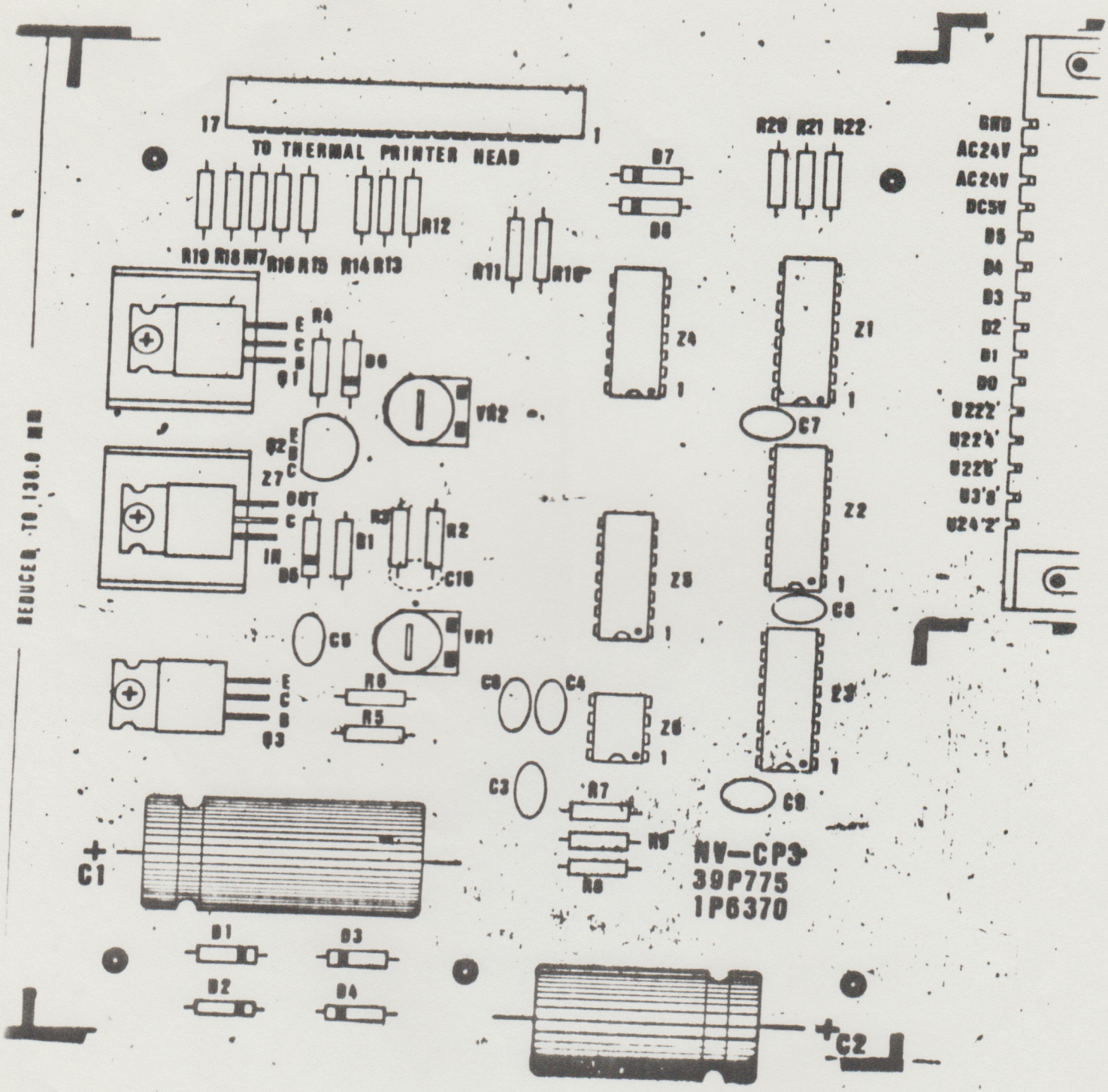
4. SCHEMATIC DIAGRAM



5. PCB TRACK DIAGRAM (COPPER SIDE)



6. PCB TRACK DIAGRAM (COMPONENT SIDE)



7. COMPONENT LAYOUT

8. ALIGNMENT PROCEDURE

ALIGNMENT	EQUIPMENT REQUIRED	PROCEDURE
REGULATOR OUTPUT VOLTTAGE AND THERMAL ELEMENT VOLTAGE	1. AN OPERATING SAVANT, SS4, OR ROBOT 2. 24V AC TO AC ADAPTOR 3. HIGH INPUT IMPEDANCE DC VOLTMETER OF AT LEAST 200Kohm/V	1. COUPLE THE PRINTER TO EITHER THE SAVANT, SS4 OR ROBOT. 2. PLUG IN THE 24V ADAPTOR TO THE CONTROL UNIT USED. 3. SWITCH ON THE UNIT. 4. CONNECT VOLTMETER BETWEEN PIN 3 OF 7812 AND GROUND. 5. ADJUST VR1 UNTIL VOLTAGE IS +17 VOLTS.
MOTOR DRIVE VOLTAGE	AS ABOVE	1. - 3. AS ABOVE. 4. CONNECT VOLTMETER BETWEEN EMITTER OF Q1 AND GROUND. 5. OPERATE THE PRINTER. 6. ADJUST VR2 UNTIL VOLTAGE IS 11.0 VOLTS.
PRINT OUT ALIGNMENT	1. CONTROL UNIT 2. 24V AC TO AC ADAPTOR	1. - 3. AS ABOVE. 4. OPERATE THE PRINTER. 5. ADJUST THE STROBE DISC UNTIL VERTICAL LINES IS STRAIGHT.

9. FUNCTIONAL TEST PROCEDURE

1. Couple Printer to control unit.

2. Plug the 24V adaptor into the control unit.

3. Switch on the control unit.

4. Perform print functions to ensure that the printer prints correctly and with acceptable quality.

10. TROUBLE SHOOTING CHART

PROBLEMS	POSSIBLE CAUSES
UNIT DEAD	1. NO SUPPLY VOLTAGE. 2. PRINT COMMAND SIGNALS NOT AVAILABLE FROM CONTROL UNIT. 3. DEFECTIVE REGULATOR Z7. 4. NO MOTOR DRIVE VOLTAGE. 5. TIMER Z6 DEFECTIVE.
UNEVEN COLOUR OR MISSING SECTION OR VERY LIGHT OR DARK PRINT OUT	1. THERMAL ELEMENT SERIES RESISTOR OPEN OR VALUE INCORRECT. 2. THERMAL ELEMENT RESISTANCE VALUE INCORRECT. 3. BURNT OUT THERMAL ELEMENT. 4. THERMAL ELEMENT VOLTAGE TOO HIGH OR TOO LOW.
PRINT OUT SPEED TOO HIGH OR TOO LOW.	1. MOTOR DRIVE VOLTAGE TOO HIGH OR TOO LOW.

P A R T L I S T

ITEM	DESCRIPTION	PART NO.	QTY	UNIT COST US$
	PCB ASSEMBLY			
1	DOUBLE SIDE PCB	1P6370	1	6.00
2	PNP POWER TX TIP30	3M3210	1	0.50
3	4 BIT LATCH 74LS75	1V2699	3	0.50
4	LED DRIVER 75492A	1V0613	2	0.80
5	12V REGULATOR 7812	1V2536	1	0.80
6	NPN POWER TX TIP29	3M3220	1	0.50
7	NPN G.P. TX	3M3191	1	0.20
8	TIMER NE555	1V1841	1	0.40
9	SILICON RECTIFIER 1N4001	3M1030	6	0.10
10	SIGNAL DIODE 1N4148	3M1051	2	0.05
11	PRINTER CONN SOCKET	2J0132	1	0.50
12	HEATSINK	4T7410	2	0.25
13	15 POSITION RIGHT ANGLE EDGE CONNECTOR	2J0240	1	0.80
	RESISTORS 5% 1/4W			
14	39 OHM	3R0231	10	0.01
15	150 OHM	3R0341	1	0.01
16	220 OHM	3R0381	2	0.01
17	1.5K OHM	3R0531	2	0.01
18	1.2K OHM	3R0521	1	0.01
19	4.7K OHM	3R0641	1	0.01
20	6.8K OHM	3R0681	3	0.01
21	20K OHM	3R0761	1	0.01
22	47 K OHM	3R0861	1	0.01
23	1K OHM POT	3R2042	1	0.20
24	2K OHM POT	3R2150	1	0.20

ITEM	DESCRIPTION	PART NO.	QTY	UNIT COST US$
	CAPACITORS			
25	ELECT. 470UF/25V	3E0174	1	0.10
26	ELECT. 1000UF/35V	3E0186	1	0.25
27	CER. 10% 0.01UF/25V	3C0914	3	0.05
28	CER. 20% 0.1UF/50V	3C0684	5	0.05
	HOUSING ASSEMBLY			
29	TOP HOUSING	4D3900	1	1.00
30	BOTTOM HOUSING	4D3910	1	1.00
31	SIDE CAP RIGHT (B)	4D3920	1	0.20
32	SIDE CAP LEFT (A)	4D3930	1	0.20
33	PRINTER HEAD PU1800	2Y0500	1	25.00
34	AL. FRONT CAP	7X-110	1	0.50
35	PRINTER MTG RUBBER	4D1830	4	0.02
36	RUBBER FEET	4B2200	4	0.01
37	AL. TOP INLAY	7X-108	1	1.00
38	WOODGRAIN PAPER	4F1350/ 70/80	1	0.20
39	PAPER LABEL	7J-771	1	0.01
40	PAPER HOLDER	4T7290	1	0.50
41	PAPER HOLDER LATCH	4T7300	1	0.10
42	PAPER CUTTER	4M0360	1	0.10
43	SCREWS/NUTS/WASHERS	-	A/R	0.10
44	STRANDED WIRES	-	A/R	0.10
	PACKING			
45	24V 0.5A ADAPTOR	1X0361	1 1	UL/CSA 6.00 VDE 8.00
46	GIFT BOX	7B-655	1	1.20
47	INSTRUCTION MANUAL	7G-823	1	0.25
48	WARANTY CARD	7G-822	1	0.05

ITEM	DESCRIPTION	PART NO.	QTY	UNIT COST US$
49	POLYFOAM	7F-101/2	1 set	0.80
50	POLYBAG (UNIT)	6G1161	1	0.10
51	POLYBAG (PAPER)	6G1070	2	0.10
52	60mm PAPER ROLL	0C0090	2	1.00
53	PAD CORK	6G0950	1	0.02
54	CARTON	7T-346	1/6	1.00
55	CORRUGATED BOX	7N-238	1	0.10