

Service
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41 826 A12

Service Manual

TECHNICAL SPECIFICATION

Print method	: Impact dot matrix Bi-directional Logic Seeking	Paper transport	: Friction feed Pin-feed
Print head	: 9 pins	Line feed pitch	: Minimum 1/216 inch
Characters & symbols	: 254 (including graphic symbols)	Line feed speed	: 6.7 lines/second (6 lines/inch)
Graphic printing	: 8 categories: • 8 dots vertically • Horizontal density (dots/inch): 60, 72, 80, 90, 120, 136, 160 and 240* *Adjoining dots cannot be printed	Paper width	: Minimum width: 4 inches (102 mm) Maximum width: 10 inches (254 mm)
Print modes:		Paper weight	: 50 to 80 g/m ²
Standard quality	: Pica (10 cpi) Elite (12 cpi) Condensed (17 cpi) Proportional	Number of copies	: Max. original +2 copies, using paper with a combined thickness of max. 0.2 mm
Letter quality	: Pica (10 cpi) Elite (12 cpi) Proportional	Ribbon	: Single colour (black) in cassette
Mixing the above modes within a single line is possible. Printing of the present data is performed prior to mode change.		Ribbon life	: Approx. 2.5 million characters (standard quality)
Print enhancements	: Bold Double strike Double width Superscript Subscript Italic	Ribbon cassette	: SBC436
		Operating temperature	: 5° to 35°C
		Storage temperature	: -30° to +60°C
		Power supply	: 220/240 V AC (± 10%) 50 Hz (± 3%)
		Power consumption	: During operation: approx. 30 W While idling: approx. 15 W
		Dimensions (WxHxD)	: 403x119x278 mm (without paper shelf)
		Weight	: 4.8 kg

Safety regulations require that the set be restored to its original condition and that parts which are identical with those specified be used.

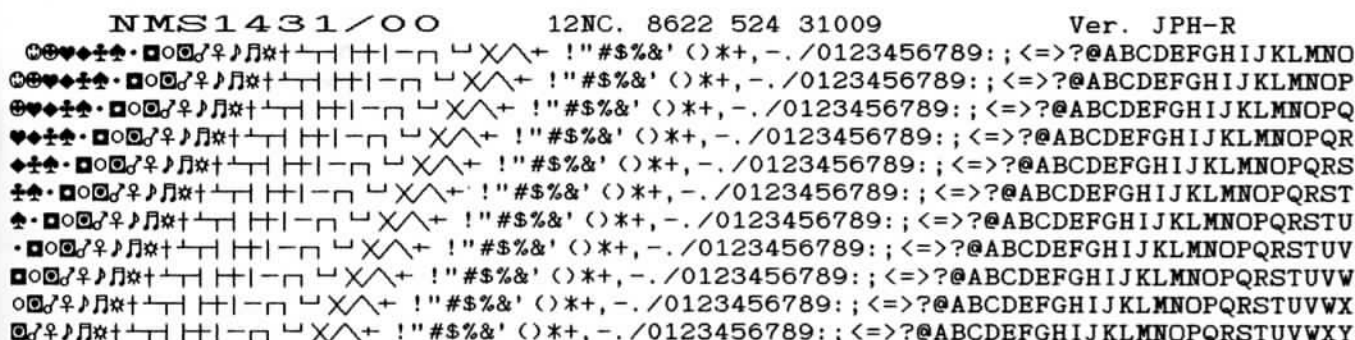


- Remove the mains voltage from the apparatus before removing the upper case.
- When the upper case is removed, you can easily touch the parts on the AC Board Unit which carry the mains voltage. Be careful not to touch these parts when you switch the printer on or off with the power switch.
- Most screws are fixed in plastic holes. In order to prevent damage of the threaded holes, fixing screws shall not be overtightened.
- Do not apply undue force to the print head.
- To prevent damage of print head and platen, do not print without ink ribbon and paper installed.
- The roller springs (EV-31 and EV-88)* located near the shaft of the platen may spring off to injure your face during replacement.
Be especially careful when assembling these springs.
- Do not touch the print head immediately after printing because it can get hot during operation.
- Wait at least two seconds after turning the power off before turning it back on again. If not the initialization process may not be performed properly.
- Do not exchange the CR motor and the LF motor since the positions of the motor gears are different (see figure 1). The connector housing for the LF motor is being marked with red.

Diagram illustrating the gear position for the LF and CR motors. The LF motor is shown on the left, and the CR motor is shown on the right. Both motors have a gear in the 'GEAR POSITION' indicated by an arrow.

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1. Insert a sheet of paper into the printer.
2. Turn the printer off.
3. Press the FF-key while turning on the printer again.
All data offered to the printer will be printed in hexadecimal form now. (16 groups of 2 characters each per line). See figure 4.
4. Switch off the printer again or input an INITIAL-signal to terminate the hexadecimal dump facility.

[illegible]

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74 68 65 20 71 75 69 63 6B 20 62 72 6F 77 6E 20
66 6F 78 20 6A 75 6D 70 73 20 6F 76 65 72 20 74
68 65 20 6C 61 7A 79 20 6A 6F 67 20 31 32 33 34
35 36 37 38 39 30 20 54 48 45 20 51 55 49 43 48
20 42 52 4F 57 4E 20 46 4F 58 20 4A 55 4D 50 53
20 4F 56 45 52 20 54 48 45 20 4C 41 5A 59 20 44
4F 47 0D 0A 74 68 65 20 71 75 69 63 6B 20 62 72
6F 77 6E 20 66 6F 78 20 6A 75 6D 70 73 20 6F 76
65 72 20 74 68 65 20 6C 61 7A 79 20 6A 6F 67 20
31 32 33 34 35 36 37 38 39 30 20 54 48 45 20 51
55 49 43 4B 20 42 52 4F 57 4E 20 46 4F 58 20 4A
55 4D 50 53 20 4F 56 45 52 20 54 48 45 20 4C 41
5A 59 20 44 4F 47 0D 0A 74 68 65 20 71 75 69 63
6B 20 62 72 6F 77 6E 20 66 6F 78 20 6A 75 6D 70
73 20 6F 76 65 72 20 74 68 65 20 6C 61 7A 79 20

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Fig. 4

Error detection

When the Paper-Out lamp flickers and the buzzer sounds, a printer error has been detected by the Error Detection function. There are two possibilities:

A. Home Sense error

This occurs when the Home Sense function does not operate correctly during the Home Sensing process. Probably the carrier did not leave the Home position within a certain time after the CR motor has been turned on or the carrier did not return to the Home position after the printer has been switched On Line.

To indicate a Home Sense error the Paper Out lamp is turned on and off according to the pattern in figure 5a.

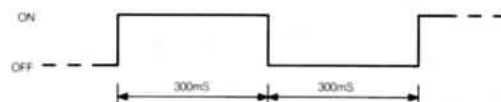


Fig. 5a



Fig. 5b

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B. Internal RAM error

An internal RAM error occurs when a read/write function of the internal RAM is not performed correctly.

To indicate an internal RAM error the Paper Out lamp is turned on and off according to the pattern in figure 5b.

DIP SWITCH SETTING

The following functions can be selected by using the DIP-switches, located at the back of the printer. The DIP-switches are read after an initialization process. This is done either by putting the power switch on or by an ESC, @ command.

DIP SWITCH NUMBER								FUNCTION
1	2	3	4	5	6	7	8	
0	0							Page length= 12 inch
0	1							Page length= 8 inch
1	0							Page length= 11 inch
1	1							Page length= 14 inch
		0						Normal characters
		1						Italic characters
			0	0				Pica (10 char. per inch)
			0	1				Elite (12 char. per inch)
			1	0				Condensed (17 char. per inch)
			1	1				Proportional
					0			Zero= 0
					1			Zero= Ø
						0		No function
						1		No function
							0	Continuous printing
							1	Skipping page perforation 1 inch

0= switch off
1= switch on

Fig. 6

CONTROL CODES

	SYMBOL	CODE IN BASIC	FUNCTION
1	CR	CHR\$(13)	Carriage return after printing.
2	LF	CHR\$(10)	Carriage return and line feed after printing.
3	VT	CHR\$(11)	Same as LF.
4	FF	CHR\$(12)	Form feed after printing.
The four commands above are print commands			
5	ESC,N	CHR\$(27);"N"	10 cpi (pica) printing on.
6	ESC,E	CHR\$(27);"E"	12 cpi (elite) printing on.
7	ESC,Q	CHR\$(27);"Q"	17 cpi (condensed) printing on.
8	ESC,P	CHR\$(27);"P"	Proportional printing on.
9	SO	CHR\$(14)	Double width mode on.
10	SI	CHR\$(15)	Double width mode off.
11	ESC,!	CHR\$(27);"! "	Letter Quality printing on.
12	ESC," "	CHR\$(27);CHR\$(34)	Letter Quality printing off.
13	ESC,C,S	CHR\$(27);"CS"	Superscript printing on.
14	ESC,C,s	CHR\$(27);"Cs"	Superscript printing off.
15	ESC,C,U	CHR\$(27);"CU"	Subscript printing on.
16	ESC,C,u	CHR\$(27);"Cu"	Subscript printing off.
17	ESC,C,I	CHR\$(27);"CI"	Italic printing on.
18	ESC,C,i	CHR\$(27);"Ci"	Italic printing off.
19	ESC,C,B	CHR\$(27);"CB"	Bold printing on.
20	ESC,C,b	CHR\$(27);"Cb"	Bold printing off.
21	ESC,C,D	CHR\$(27);"CD"	Double strike printing on.
22	ESC,C,d	CHR\$(27);"Cd"	Double strike printing off.
23	HT	CHR\$(9)	Move to next horizontal tab position.
24	ESC,(	CHR\$(27);"("	Horizontal tab position setting.
25	ESC,)	CHR\$(27);")"	Clears part of horizontal tabs.
26	ESC,2	CHR\$(27);"2"	Clears all horizontal tabs.
27	ESC,O,"nnn"	CHR\$(27);"Onnn"	Page length setting in line units.
28	ESC,O,I,"nn"	CHR\$(27);"OInn"	Page length setting in inches.
29	ESC,O,S,"nn"	CHR\$(27);"OSnn"	Perforation skip line setting.
30	ESC,O,S,00	CHR\$(27);"OS00"	Perforation skip off.
31	ESC,/,"nnn"	CHR\$(27);"/nnn"	Right margin setting.
32	ESC,L,"nnn"	CHR\$(27);"Lnnn"	Left margin setting.
33	ESC,A	CHR\$(27);"A"	Selects 1/6" line feed.
34	ESC,B	CHR\$(27);"B"	Selects 1/8" line feed.
35	ESC,T,"nn"	CHR\$(27);"Tnn"	Selects "nn"/144" line feed.
36	ESC,Z,"nn"	CHR\$(27);"Znn"	Selects "nn"/216" line feed.
37	ESC,[	CHR\$(27);"["	Selects uni-directional printing.
38	ESC,]	CHR\$(27);"]"	Selects bi-directional printing.
39	ESC,p	CHR\$(27);"p"	Paper-out detection on.
40	ESC,q	CHR\$(27);"q"	Paper-out detection off.
41	ESC,CR	CHR\$(27);CHR(13)	Moves print head to home position.
42	ESC,@	CHR\$(27);"@"	Resets printer.
43	BEL	CHR\$(7)	Sounds buzzer (0.3 sec).
44	CAN	CHR\$(24)	Clears buffer.
45	ESC,G,"nnn"	CHR\$(27);"Gnnn"	"nnn" dots/inch graphic printing density.
46	ESC,S	CHR\$(27);"S"	Graphics printing dots/inch depending on print mode.
47	SOH	CHR\$(1)	Code to precede special symbol code
48	ESC,X	CHR\$(27);"X"	Underline printing on.
49	ESC,Y	CHR\$(27);"Y"	Underline printing off.
50	BS	CHR\$(8)	Back space (1 character).

Note:

"n" in the above symbols and BASIC codes corresponds with the numbers 0-9 in the ASCII code table.

CHARACTER SET

DEC	HEX	CHAR	DEC	HEX	CHAR	DEC	HEX	CHAR	DEC	HEX	CHAR	DEC	HEX	CHAR	DEC	HEX	CHAR	DEC	HEX	CHAR
32	20		64	40	@	96	60		128	80	Ç	160	A0	À	192	C0		224	E0	
33	21	!	65	41	A	97	61	a	129	81	Ù	161	A1		193	C1		225	E1	
34	22	"	66	42	B	98	62	b	130	82	Ú	162	A2		194	C2		226	E2	
35	23	#	67	43	C	99	63	c	131	83	Û	163	A3		195	C3		227	E3	
36	24	\$	68	44	D	100	64	d	132	84	Ü	164	A4		196	C4		228	E4	
37	25	%	69	45	E	101	65	e	133	85	Ý	165	A5		197	C5		229	E5	
38	26	&	70	46	F	102	66	f	134	86	Þ	166	A6		198	C6		230	E6	
39	27	'	71	47	G	103	67	g	135	87	ß	167	A7		199	C7		231	E7	
40	28	(	72	48	H	104	68	h	136	88	ä	168	A8		200	C8		232	E8	
41	29	)	73	49	I	105	69	i	137	89	å	169	A9		201	C9		233	E9	
42	2A	*	74	4A	J	106	6A	j	138	8A	æ	170	AA		202	CA		234	EA	
43	2B	+	75	4B	K	107	6B	k	139	8B	ç	171	AB		203	CB		235	EB	
44	2C	,	76	4C	L	108	6C	l	140	8C		172	AC		204	CC		236	EC	
45	2D	-	77	4D	M	109	6D	m	141	8D		173	AD		205	CD		237	ED	
46	2E	.	78	4E	N	110	6E	n	142	8E		174	AE		206	CE		238	EE	
47	2F	/	79	4F	O	111	6F	o	143	8F		175	AF		207	CF		239	EF	
48	30	0	80	50	P	112	70	p	144	90		176	B0		208	D0		240	F0	
49	31	1	81	51	Q	113	71	q	145	91		177	B1		209	D1		241	F1	
50	32	2	82	52	R	114	72	r	146	92		178	B2		210	D2		242	F2	
51	33	3	83	53	S	115	73	s	147	93		179	B3		211	D3		243	F3	
52	34	4	84	54	T	116	74	t	148	94		180	B4		212	D4		244	F4	
53	35	5	85	55	U	117	75	u	149	95		181	B5		213	D5		245	F5	
54	36	6	86	56	V	118	76	v	150	96		182	B6		214	D6		246	F6	
55	37	7	87	57	W	119	77	w	151	97		183	B7		215	D7		247	F7	
56	38	8	88	58	X	120	78	x	152	98		184	B8		216	D8		248	F8	
57	39	9	89	59	Y	121	79	y	153	99		185	B9		217	D9		249	F9	
58	3A	:	90	5A	Z	122	7A	z	154	9A		186	BA		218	DA		250	FA	
59	3B	;	91	5B	[	123	7B	{	155	9B		187	BB		219	DB		251	FB	
60	3C	<	92	5C	\	124	7C	|	156	9C		188	BC		220	DC		252	FC	
61	3D	=	93	5D	]	125	7D	}	157	9D		189	BD		221	DD		253	FD	
62	3E	>	94	5E	^	126	7E	~	158	9E		190	BE		222	DE		254	FE	
63	3F	?	95	5F	_	127	7F		159	9F		191	BF		223	DF		255	FF	

PARALLEL INTERFACE SPECIFICATIONS

PIN	SIGNAL	IN/OUT	PIN	SIGNAL	IN/OUT
1	STROBE	IN	19	GND	
2	DATA 1	IN	20	GND	
3	DATA 2	IN	21	GND	
4	DATA 3	IN	22	GND	
5	DATA 4	IN	23	GND	
6	DATA 5	IN	24	GND	
7	DATA 6	IN	25	GND	
8	DATA 7	IN	26	GND	
9	DATA 8	IN	27	GND	
10	ACK	OUT	28	GND	
11	BUSY	OUT	29	GND	
12	PE	OUT	30	GND	
13	HIGH		31	INITIAL	IN
14	GND	IN	32	ERROR	OUT
15	N.C.		33	GND	
16	GND		34	N.C.	
17	F.GND		35	HIGH	
18	N.C.		36	N.C.	

N.C.= not connected

Input signals to the printer

DATA 1 - DATA 8 8 bit parallel data input signals. DATA 1 corresponds to the Least Significant Bit (LSB) and DATA 8 corresponds to the Most Significant Bit (MSB).

STROBE The STROBE signal is used to read 8 bits of data. Data is read when the signal is LOW.

INITIAL This signal is used to put the printer into its initial state (same state as power-on). The signal is usually HIGH. The printer is initialized when the signal goes LOW and then HIGH again.

Output signals from the printer

BUSY

This signal indicates whether the printer is BUSY or READY. When the BUSY signal is HIGH, data cannot be received.

The following conditions make the BUSY signal HIGH.

1. When performing the initialization process;
2. When data is being input using the STROBE process;
3. During Self Test Printing;
4. When the printer is in the OFF-LINE state (ON-LINE lamp is off);
5. During margin setting.

ACK

This Acknowledge signal is output when the BUSY signal goes LOW.

This signal, however, is not output under conditions 4 and 5 of the BUSY signal.

ERROR

This signal indicates printer error. During an error condition, the ERROR signal is LOW. The following conditions make the ERROR signal LOW:

1. When an internal RAM error is detected during the initialization process;
2. When the Home Position was not detected during the home detection process;
3. When a paper out condition is detected.

In case 1 and 2, the paper out lamp flickers to indicate an error. To terminate the error states 1 and 2:

- Turn the power off and on again
- Input an INITIAL signal

To terminate the error state 3, paper has to be inserted.

PE

This signal indicates the paper empty state with a HIGH level.

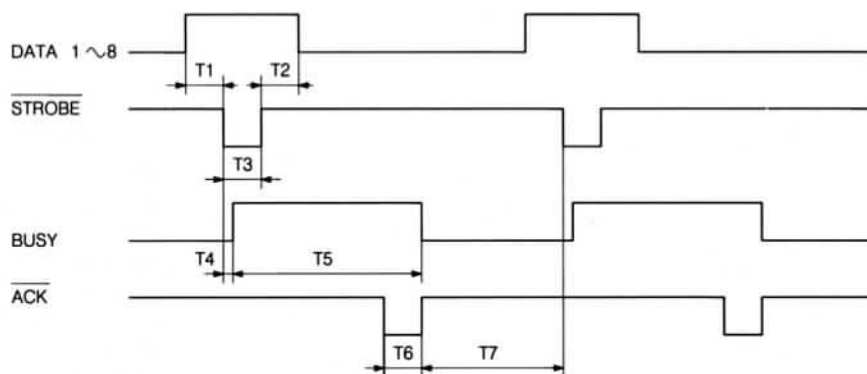
Print parameters

Character category			Character structure (H x V + space)	Maximum column number	Character spacing (CPI)	Print speed (CPS)
Standard character	Standard	Pica	12" x 9	80	10	120
		Elite	12" x 9	96	12	120
		Condensed	14" x 9	137	17	85
	L.Q.	Pica	24" x 18	80	10	25
		Elite	24" x 18	96	12	30
		Condensed	18" x 9	137	17	85
Italic character	Standard	Pica	16" x 9	80	10	100
		Elite	16" x 9	96	12	60
		Condensed	18" x 9	137	17	85
	L.Q.	Pica	32" x 18	80	10	25
		Elite	32" x 18	96	12	30
		Condensed	18" x 9	137	17	85

* Includes half dot

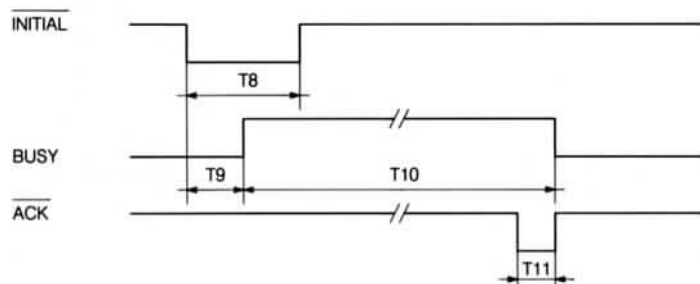
INTERFACE TIMING CHART

DURING DATE INPUT



T1, T2 ~ 1μs
 T3 1 ~ 50μs
 T4 ≤ 0.5μs
 T5 VARIES ACCORDING TO THE DATE
 T1 1 ≤ 10μs
 T2 ≥ 0μs

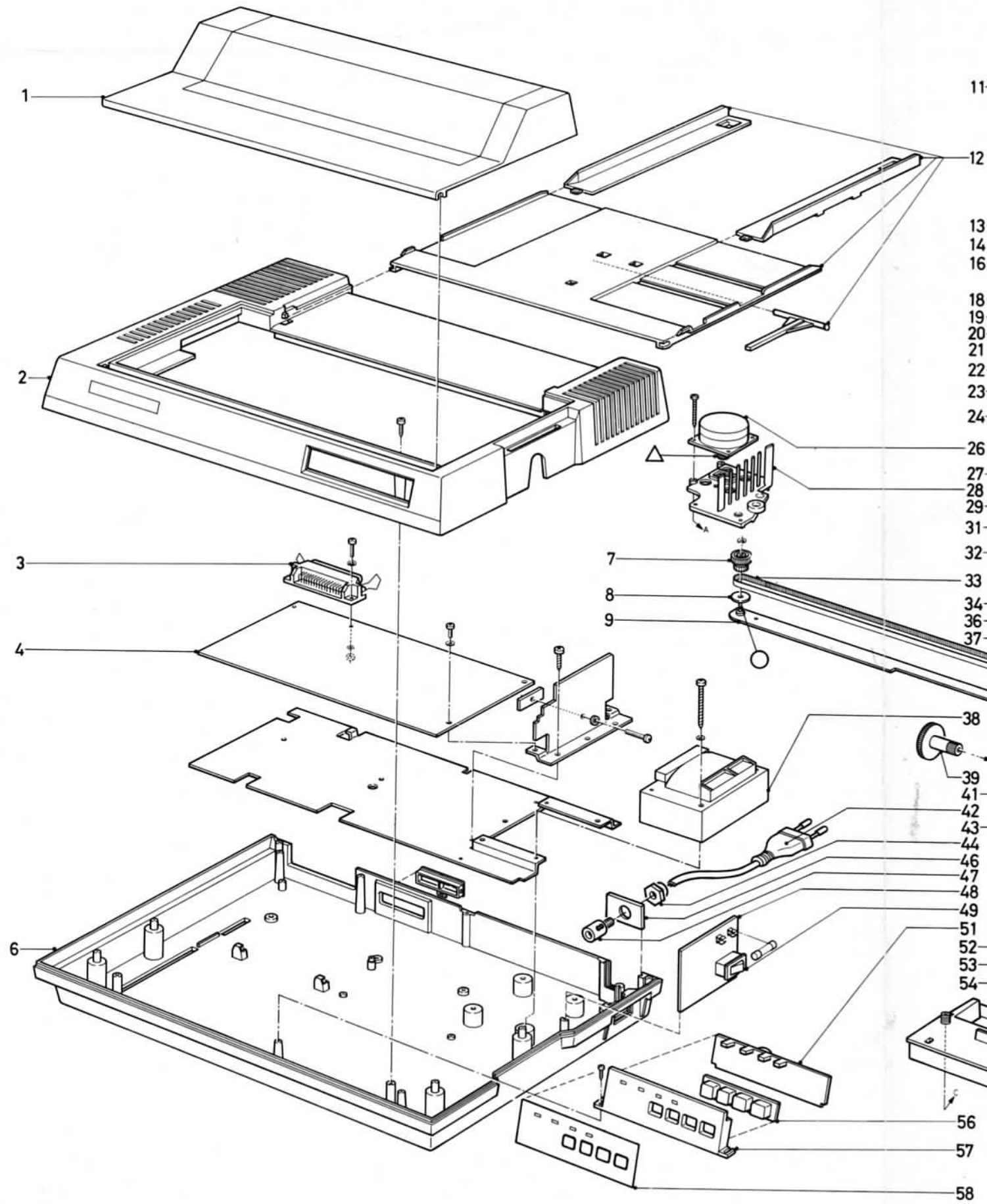
DURING INITIALISATION PROCESS

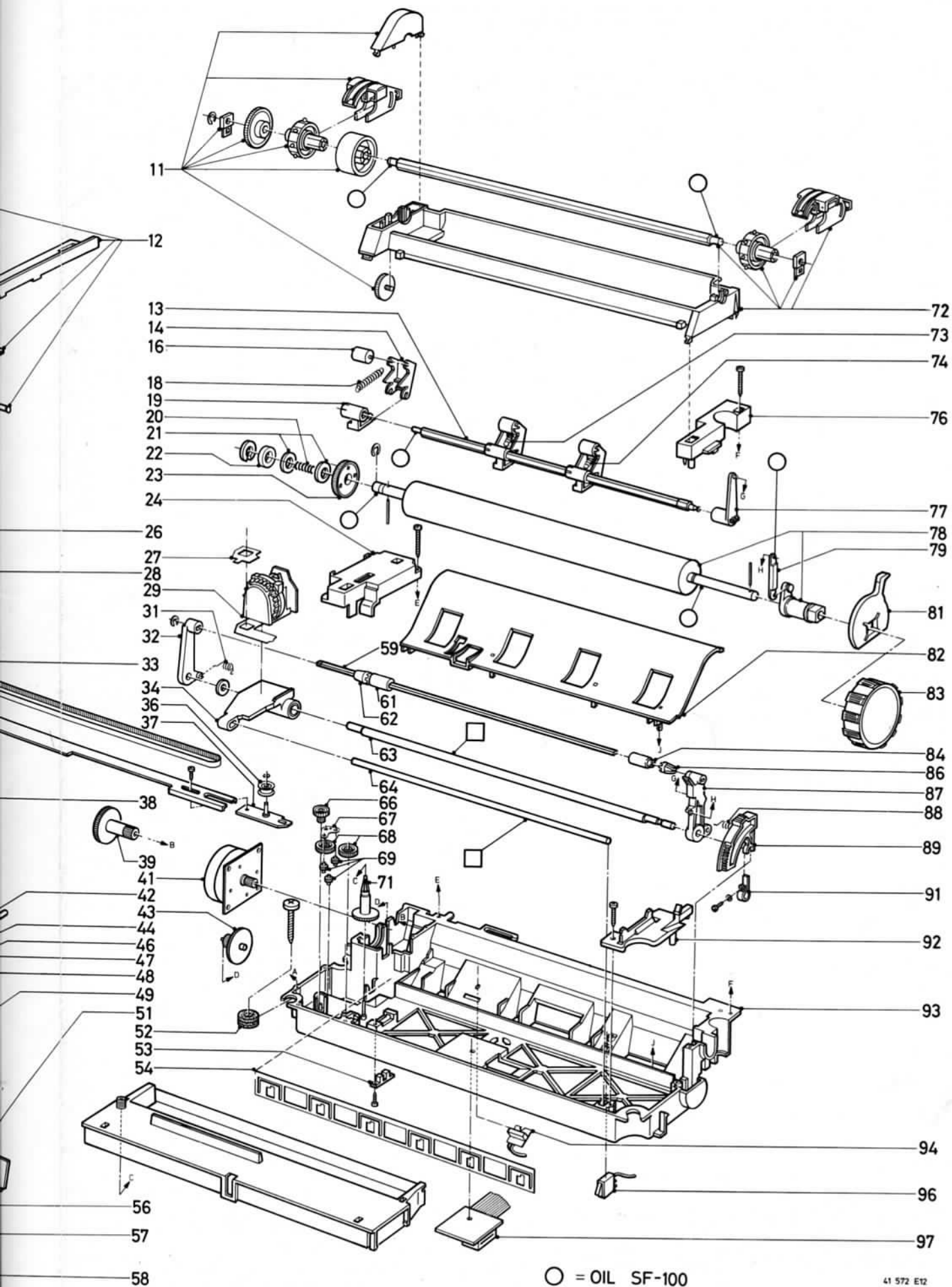


T8 ≥ 50μs
 T9 ≤ 30μs
 T10 VARIES ACCORDING TO THE HEAD POSITION
 T11 5 ~ 10μs

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EXPLODED VIEW





MECHANICAL PARTSLIST

1	4822 432 92116	Transparent cover	51	4822 212 22395	Lamp PCB unit
2	4822 432 92115	Upper case unit	52	4822 462 40837	Rubber foot
3	4822 265 51119	Connector 36 p.	53	4822 219 81046	Sensor board C assy
4	4822 216 93853	Control PCB complete	54	4822 466 81659	Paper pressure board
6	4822 432 92117	Lower case unit	56	4822 410 90097	Switch rubber
7	4822 522 32311	Drive pulley	57	4822 459 80399	Indicator house
8	4822 532 11589	Pulley step	58	4822 459 80398	Indicator plate
9	4822 404 60368	Pulley board assy	59	4822 535 92339	Paper bail
11	4822 693 91111	Tractor unit	61	4822 528 90648	Roller
12	4822 432 92118	Paper rack unit	62	4822 528 30332	Roller step
13	4822 535 92341	Friction shaft	63	4822 535 92342	Guide pillar
14	4822 404 60372	Friction roller step	64	4822 535 92338	Guide pillar B
16	4822 528 70502	Friction roller	66	4822 522 32313	Ribbon reduction gear 1
18	4822 492 63729	Sprint white 414 gr	67	4822 404 60374	Gear guide
19	4822 528 20592	Friction board	68	4822 522 32314	Ribbon reduction gear 2
20	4822 492 51916	Shaft press spring	69	4822 522 32312	Ribbon gear
21	4822 532 11591	Shaft press lock washer	71	4822 535 71225	Ribbon drive shaft
22	4822 520 20494	Platen bearing	72	4822 693 91111	Tractor unit
23	4822 522 32316	Platen gear	73	4822 492 32728	Spring black 856 gr
24	4822 432 91823	Top case back/left	74	4822 492 32728	Spring black 856 gr
26	4822 361 30234	CR motor	76	4822 432 91822	Top case back/right
27	4822 466 81661	Metal clip	77	4822 404 60219	Friction lever R
28	4822 432 91821	Top case front/left	78	4822 693 91123	Platen unit
29	4822 218 20532	Print head unit	79	4822 535 40092	Crank
31	4822 492 41365	Roller spring	81	4822 413 41293	Paper loading knob
32	4822 404 60375	Paper press board L	82	4822 432 91818	Paper guide
33	4822 358 20248	Timing belt	83	4822 413 41292	Paper feed knob
34	4822 404 60376	Carrier	84	4822 528 90648	Roller
36	4822 528 81169	Idler pulley	86	4822 528 30332	Roller step
37	4822 404 60369	Slide assembly	87	4822 404 60377	Paper press board R
38	4822 146 40394	Transformer	88	4822 492 41365	Roller spring
39	4822 522 32315	Reduction gear	89	4822 404 60371	Head adjust lever
41	4822 361 30235	LF motor	91	4822 404 60373	Clip
42	4822 321 22368	AC cord set	92	4822 432 91819	Top case front/right
43	4822 522 32317	Reduction gear B	93	4822 464 90245	Frame
44	4822 401 11116	Cord bush assy	94	4822 219 81043	Sensor board assy
46	4822 459 80397	Power cord plate	96	4822 219 81044	Sensor B assy
47	4822 401 11116	Cord bush assy	97	4822 219 81045	Head board assy
48	4822 216 93852	AC board unit			
49	4822 276 11584	AC switch			

REPLACEMENT AND ADJUSTMENT

Print Head Replacement

The print head is mounted on a carrier and can be replaced without removing the top cover of the printer cabinet. See figure 1.

A. Removal

1. Remove the ribbon cassette.
2. Remove the metal clip with the aid of a screwdriver.
3. Disconnect the flexible cable of the print head from the connector in the printer frame.
4. Pull the print head backwards (i.e. from the platen).
5. Take the print head from the carrier.

B. Installing

1. Position a new print head on the top of the carrier.
2. Push it towards the platen until it clicks in place.
3. Insert the rear part of the metal clip into the hole of the carrier and push down the front part of the metal clip.
4. Connect the flexible cable to the connector in the printer frame.
5. Install the ink ribbon and insert a sheet of paper.
6. Perform the self-test printing in standard character mode and check that the print quality is correct at all click-in positions of the head adjustment lever.

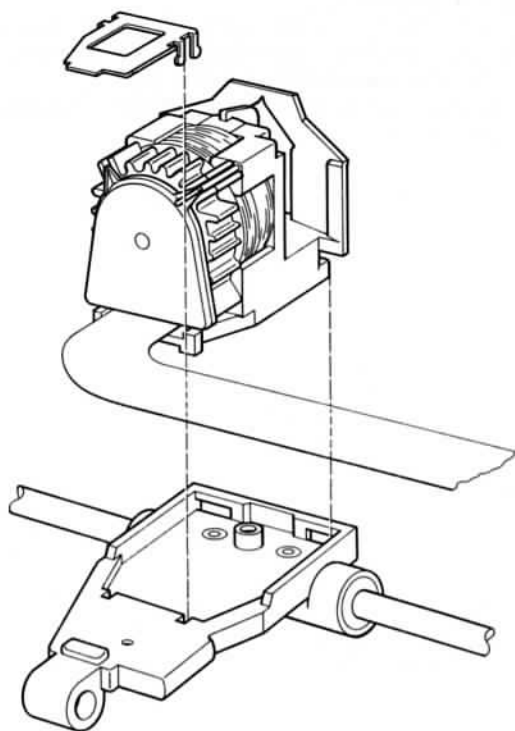


Fig. 1

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Adjustment of the Head Adjustment Lever

The Head Adjustment Lever (see figure 2) is situated on the right hand side in the printer. The lever is meant to increase or decrease the print force by changing the space between the print head and the platen.

When smudging occurs or when certain dots are not being printed at any click-in position of the lever, the lever must be readjusted to the position of the front guide pillar of the print head (see figure 3). As this guide pillar is borne eccentrically, rotating the pillar will change the position of the print head.

Adjustment can be realized as follows:

1. Push the lever towards the platen (position A see figure 2).
2. Loosen the screw which fixes the head adjustment lever to the guide pillar.
3. Rotate the guide pillar in such a manner that part P of the pillar is facing up. Part P is the part which protrudes the most (see figure 3).

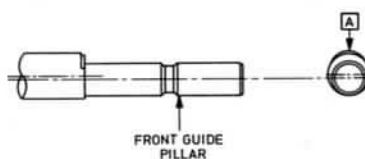
Caution: The surface of the guide pillar shall not be damaged.

When rotating the guide pillar, only the rightmost end of it shall be grasped with pliers.

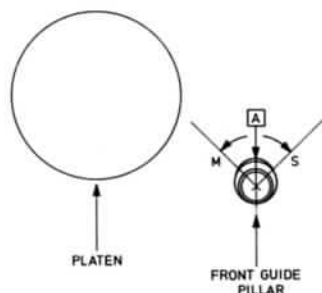


Fig. 2

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FRONT GUIDE
PILLAR



PLATEN

FRONT GUIDE
PILLAR

Fig. 3

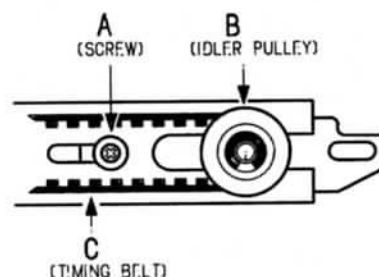
38 794 A12

4. Tighten the screw while the lever is in position A (see Fig. 2).
5. Install the ink ribbon and insert a sheet of paper.
6. Perform the self-test printing in standard character mode and check the print quality at all the click-in positions of the head adjustment lever.
7. Continue with step 8 if smudging occurs when the lever is in position A.
Continue with step 9 if dots are missing when the lever is in position B.
Adjustment is completed when the print quality is correct at all click-in positions of the lever. Put the head adjustment lever in position C for normal printing (medium print force).
8. Smudging occurs when the distance between the print head and the platen is too small. The ink ribbon is continuously in contact with the paper.
 - a. Push the lever towards the platen (position A).
 - b. Loosen the screw.
 - c. Hold the rightmost end of the guide pillar with pliers and rotate it from the platen slightly while the lever remains in position A. As a result the protruding part P of the guide pillar shall be rotated in direction S (Smudge). See figure 3.
 - d. Tighten the screw.
 - e. Go back to step 5.
9. Dots are not printed on the paper when the distance between the print head and the platen is too large. The print head needles can not press the ribbon against the paper.
 - a. Push the lever towards the platen (position A).
 - b. Loosen the screw.
 - c. Hold the rightmost end of the guide pillar with pliers and rotate it towards the platen slightly while the lever remains in position A. As a result the protruding part of the guide pillar shall be rotated in direction M (Missing) see figure 3.
 - d. Tighten the screw.
 - e. Continue with step 5.

Adjustment of the Timing Belt Tension

The tension of the timing belt can be adjusted by changing the position of the idler pulley plate block (see figure 4).

1. Loosen the fixing screw (A).
2. Press the idler pulley (B) outward manually to put tension on the timing belt (C).
3. Tighten the screw (A) to fix the position of the idler pulley plate block.
4. Install the ink ribbon and insert a sheet of paper.
5. Switch on the self-test printing in standard character mode for several lines.
6. Check the width of the printed characters at the first and second character columns. If the character width is not equal for all character columns, readjust the tension of the timing belt (go back to step 1).



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Fig. 4

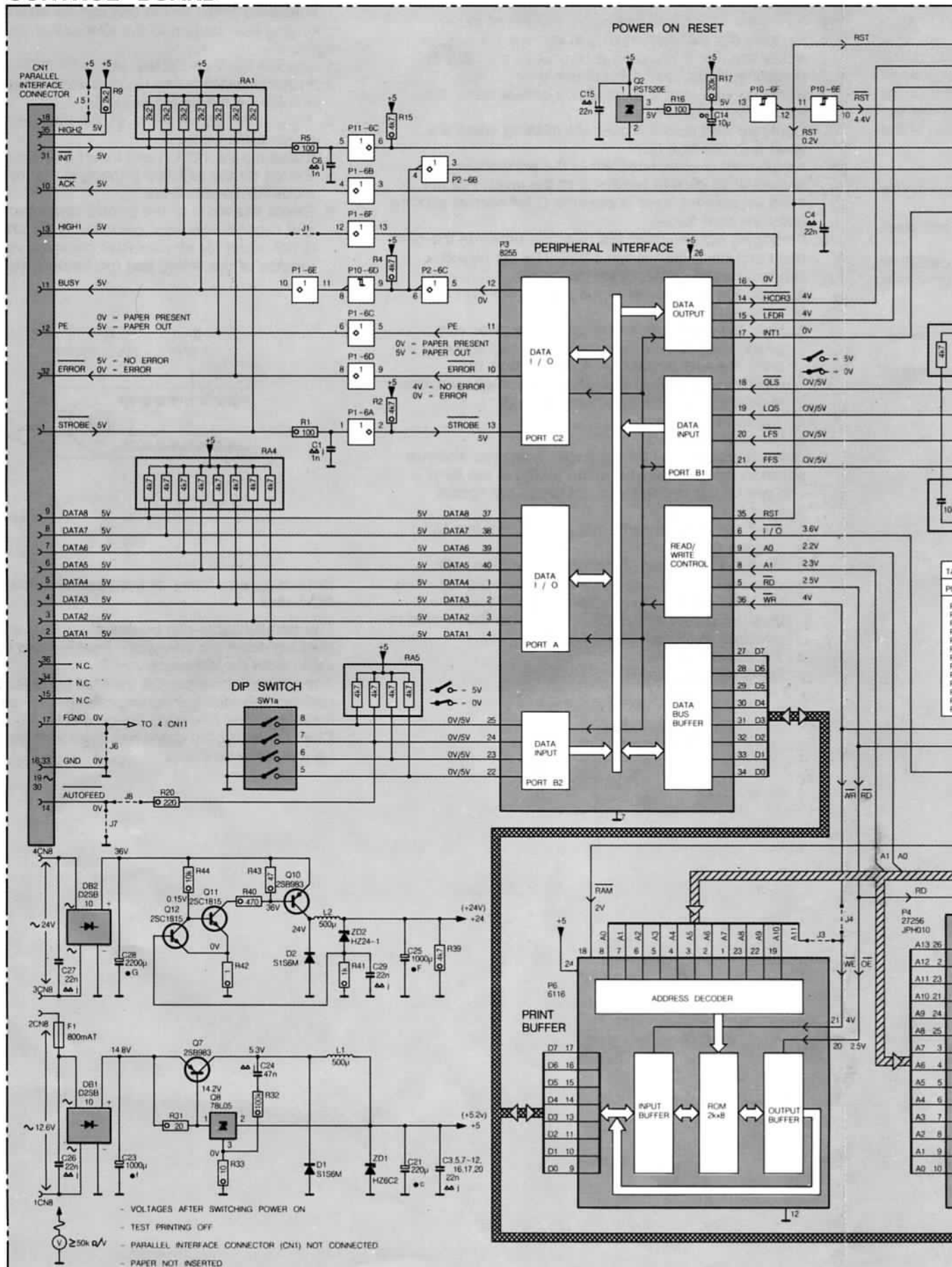
Detaching and fixing of the parallel cables from the PC-board

The parallel cable can be detached from the PC-board by pushing down the connector housing and taking the cable from the connector.

The parallel cable can be secured by pressing down the connector housing, inserting the parallel cable into the connector and releasing the connector housing. Check whether the cable has been well fixed by pulling up the cable carefully.

CONTROL BOARD

CONTROL BOARD



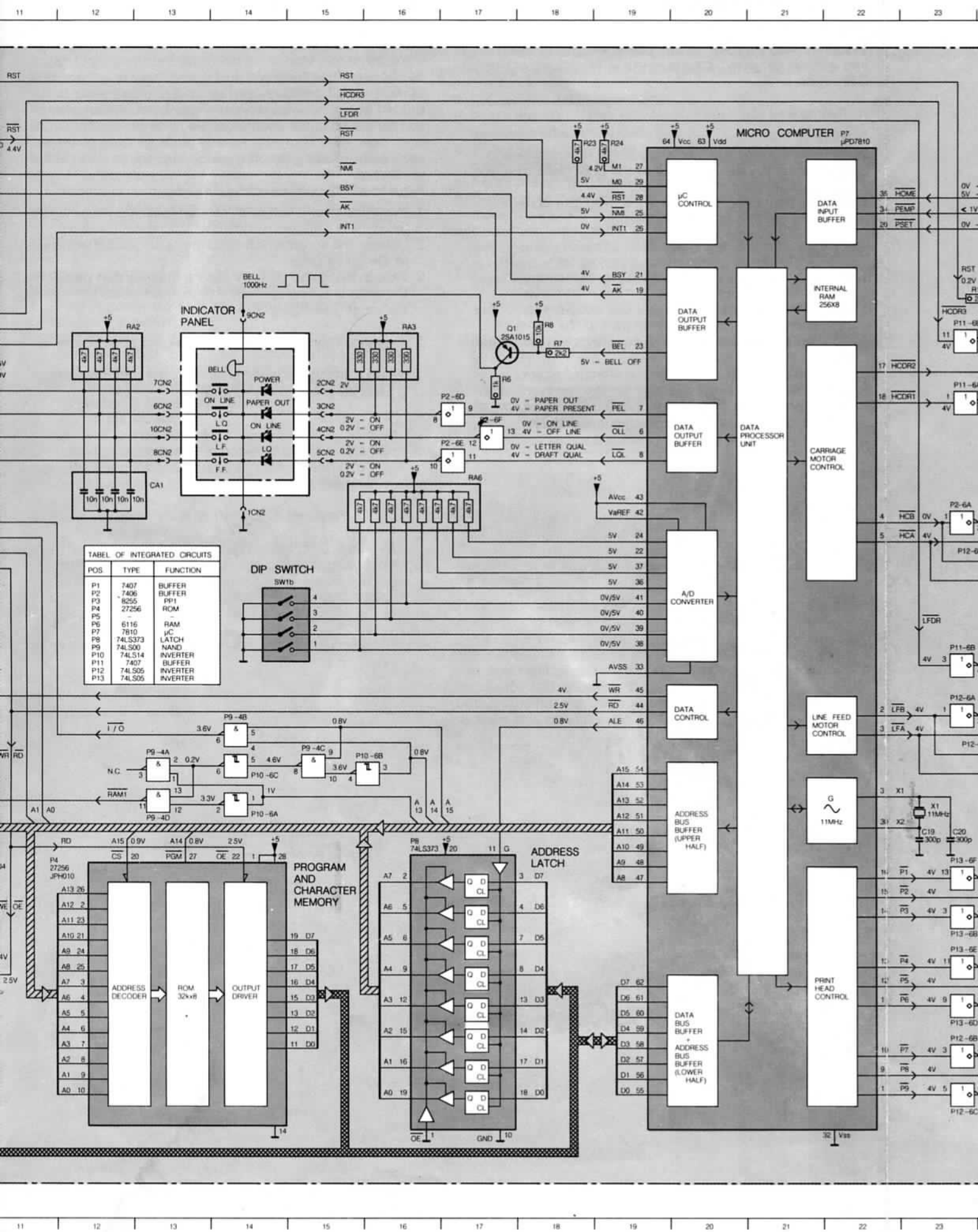
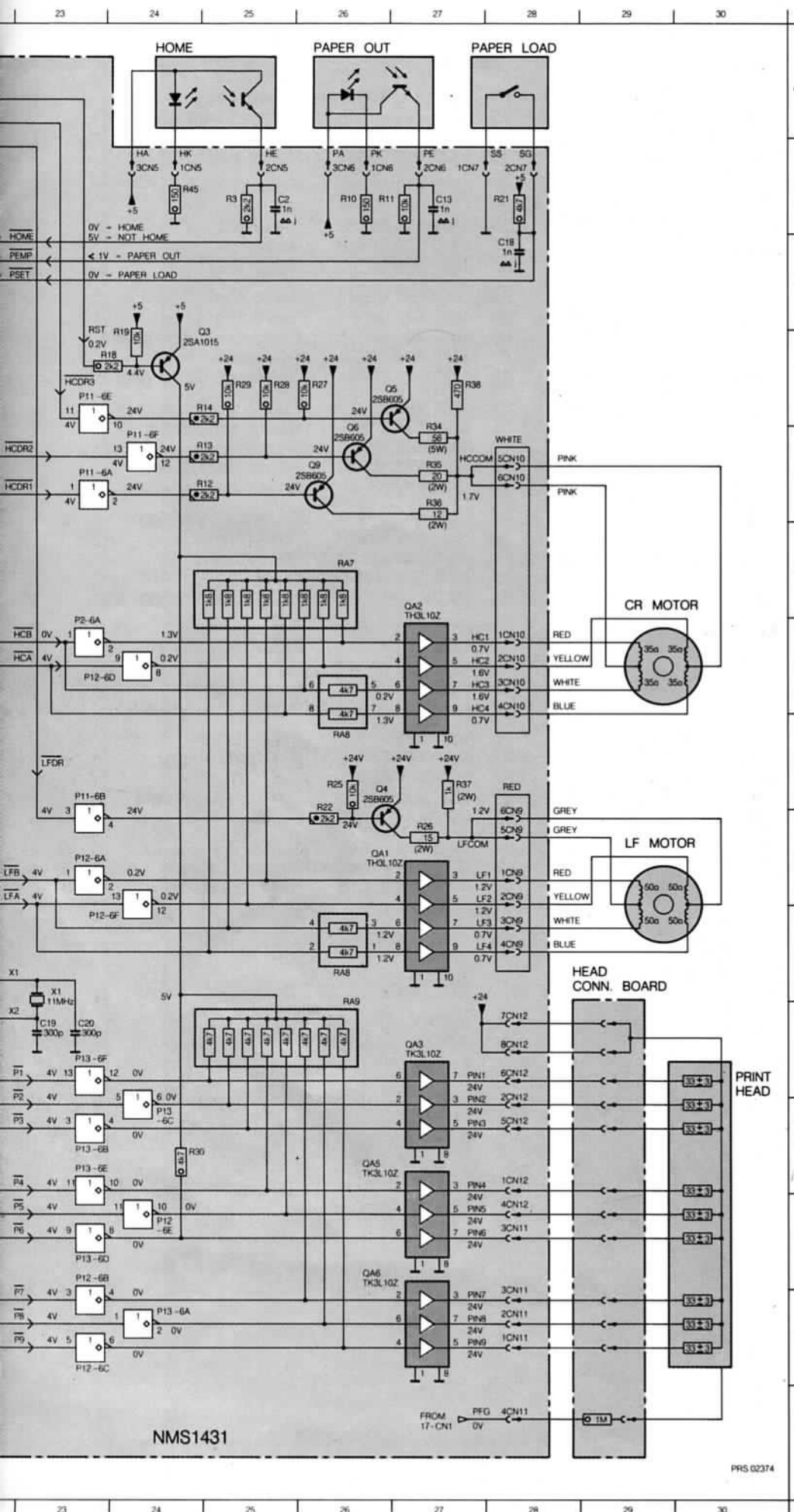
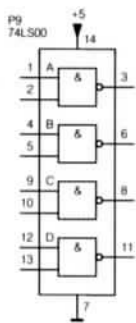
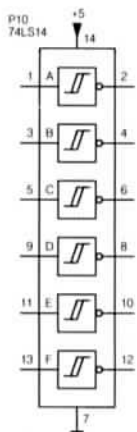
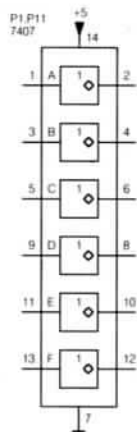
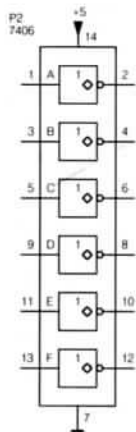
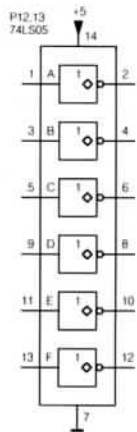
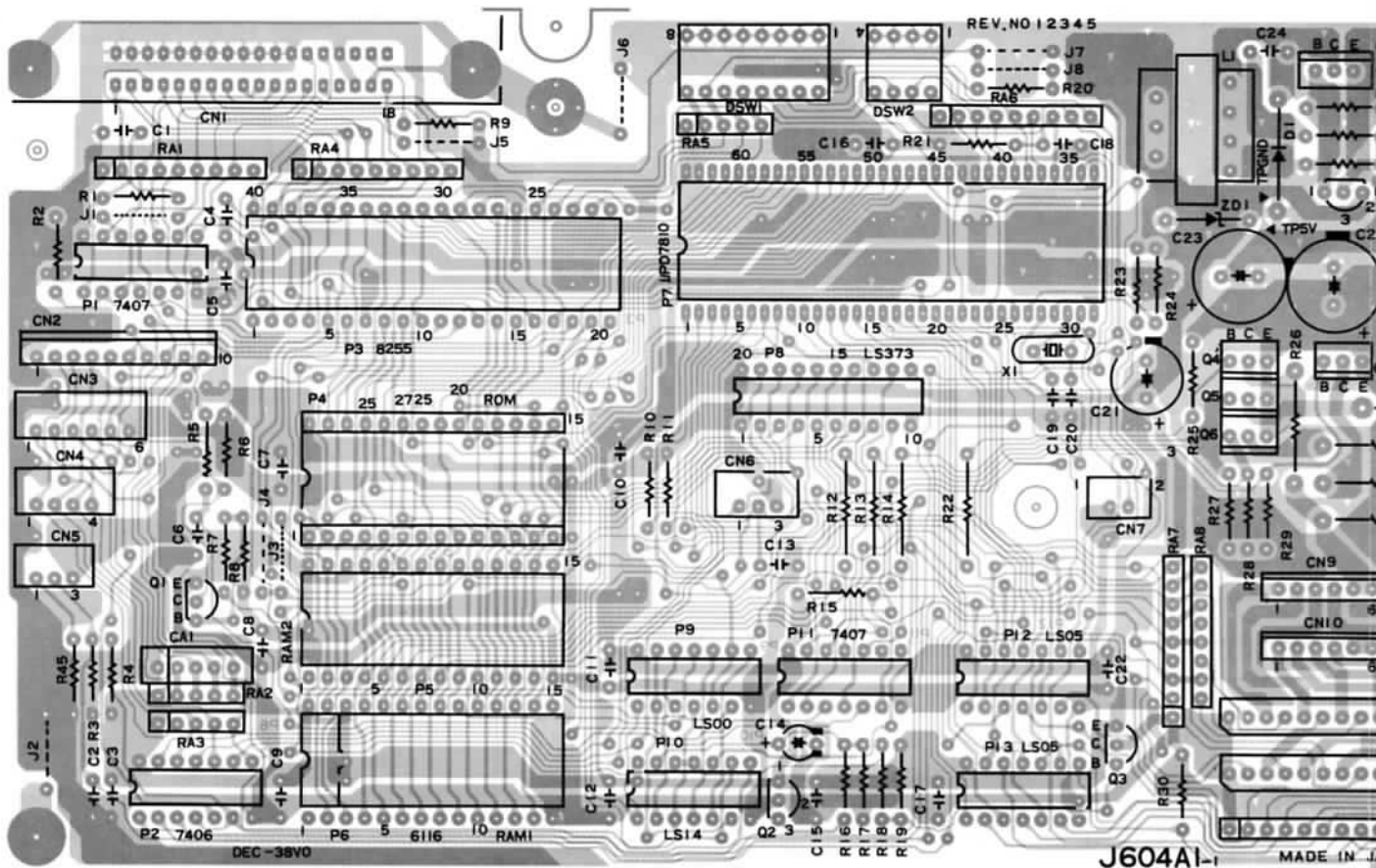


TABLE OF INTEGRATED CIRCUITS		
POS	TYPE	FUNCTION
P1	7407	BUFFER
P2	7406	BUFFER
P3	8255	PP1
P4	27256	ROM
P5	6116	RAM
P6	7810	µC
P7	74LS373	LATCH
P8	74LS373	NAND
P9	74LS14	INVERTER
P10	7407	BUFFER
P11	7407	BUFFER
P12	74LS05	INVERTER
P13	74LS05	INVERTER

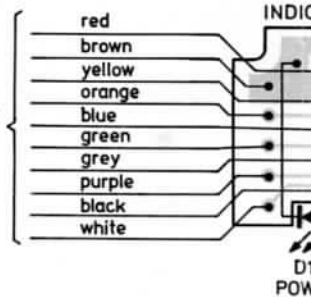


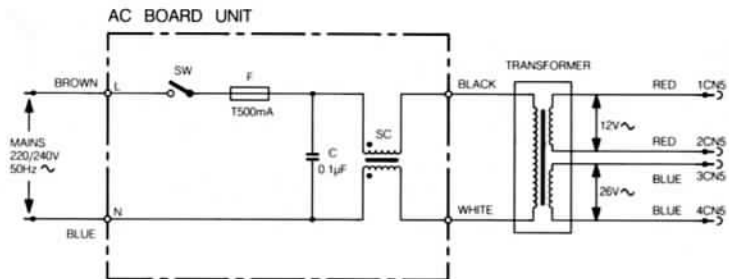
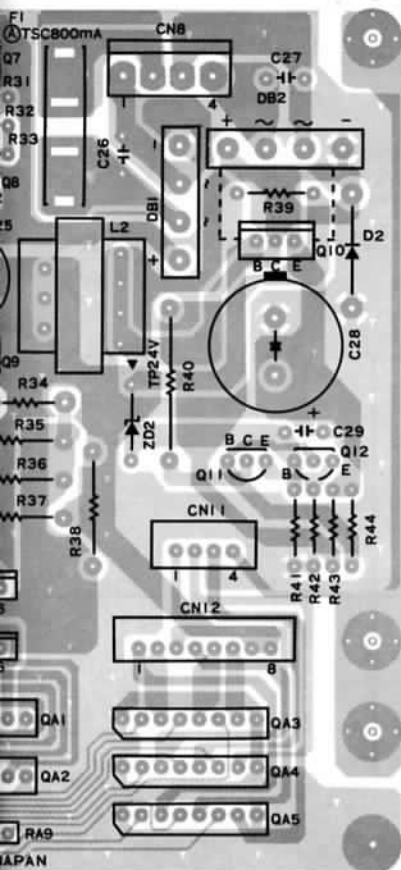
C1	F 5	RA7	F26
C13	B27	RA8	H26
C14	B 9	RA8	J26
C15	B 8	RA9	J26
C18	C28	SWa	I 4
C19	K23	SWb	H14
C2	B25	X1	J23
C20	K23	ZD1	N 5
C21	N 6	ZD2	K 5
C23	N 2		
C24	M 4		
C25	L 6		
C26	N 2		
C27	L 2		
C28	L 2		
C29	L 5		
C3	N 6		
C4	C10		
C6	B 5		
CA1	F13		
CN1	A 1		
D1	N 5		
D2	L 4		
DB1	M 2		
DB2	K 2		
F1	L 2		
J1	C 4		
J3	K10		
J4	K11		
J5	B 2		
J6	I 2		
J7	J 2		
J8	J 2		
L1	M 5		
L2	K 5		
P1	C 5		
P1	C 5		
P1	D 5		
P1	E 5		
P1	E 5		
P1	D 4		
P10	D 5		
P10	B10		
P10	B10		
P10	J16		
P10	J14		
P10	J14		
P11	B 5		
P11	D23		
P11	E24		
P11	E23		
P11	H23		
P12	G23		
P12	I 23		
P12	J23		
P12	M24		
P12	M23		
P12	N23		
P13	K23		
P13	L23		
P13	L23		
P13	M24		
P13	M23		
P13	M23		
P13	N24		
P2	C 6		
P2	D 6		
P2	E17		
P2	E17		
P2	F17		
P2	G23		
P3	C 7		
P4	K12		
P6	L 7		
P7	B22		
P8	K16		
P9	J13		
P9	K13		
P9	J14		
P9	J15		
Q1	D17		
Q10	K 4		
Q11	K 3		
Q12	K 3		
Q2	B 8		
Q3	D25		
Q4	H26		
Q5	D27		
Q6	E26		
Q7	M 3		
Q8	M 3		
Q9	E26		
QA1	I 26		
QA2	F27		
QA3	K27		
QA5	L26		
QA6	M26		
R1	E 4		
R10	B26		
R11	B27		
R12	E25		
R13	E25		
R14	D25		
R15	B 6		
R16	B 9		
R17	A 9		
R18	D24		
R19	D24		
R2	E 5		
R20	J 3		
R21	B28		
R22	H26		
R23	B19		
R24	B19		
R25	H26		
R26	I 27		
R27	D26		
R28	D25		
R29	D25		
R3	B25		
R30	L24		
R31	M 3		
R32	M 4		
R33	N 4		
R34	E27		
R35	E27		
R36	E27		
R37	H27		
R38	D27		
R39	L 6		
R4	D 5		
R40	K 4		
R41	L 5		
R42	L 4		
R43	K 4		
R44	K 3		
R45	B24		
R5	B 4		
R6	E17		
R7	D18		
R8	D18		
R9	B 2		
RA1	B 4		
RA2	D13		
RA3	D16		
RA4	F 4		
RA5	H 6		
RA6	F17		

CONTROL PCB LAYOUT

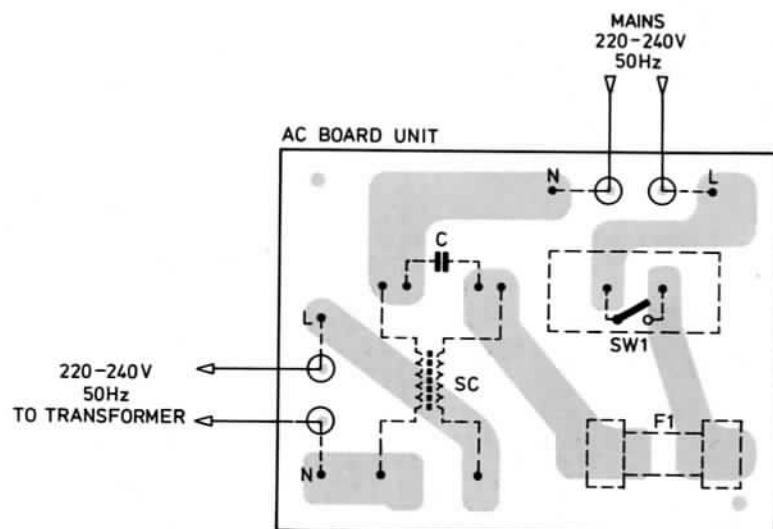


TO CONTROL PCB
CN3

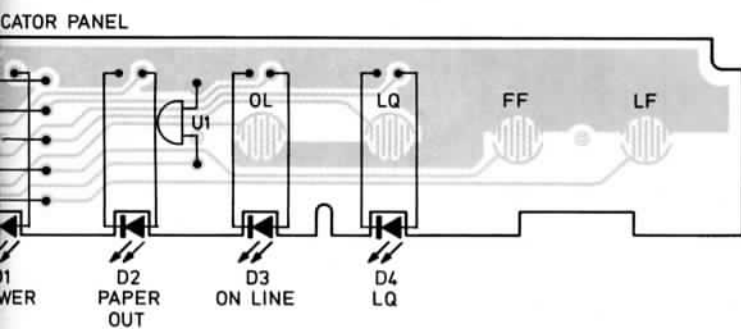




PRS 02519



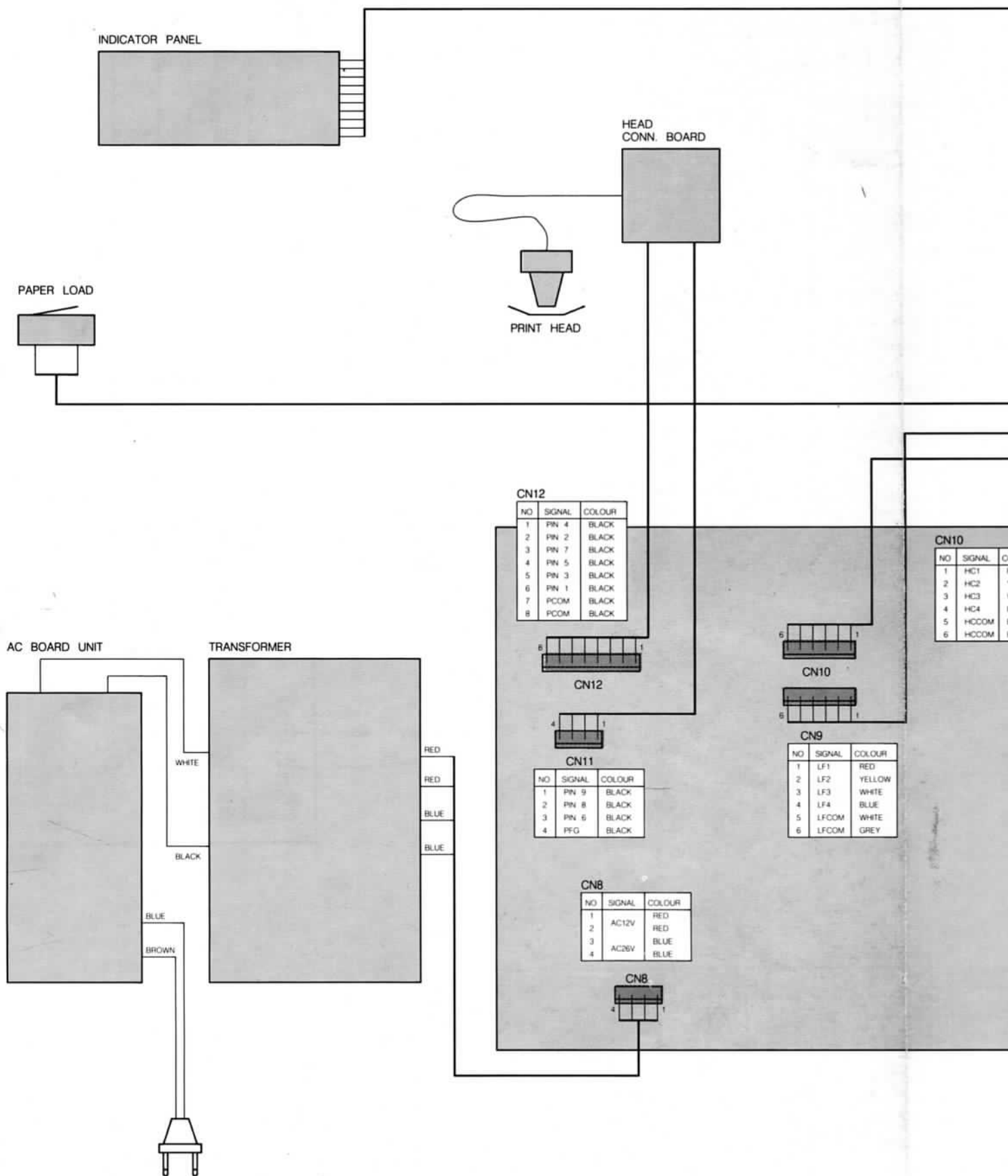
38 520 A12

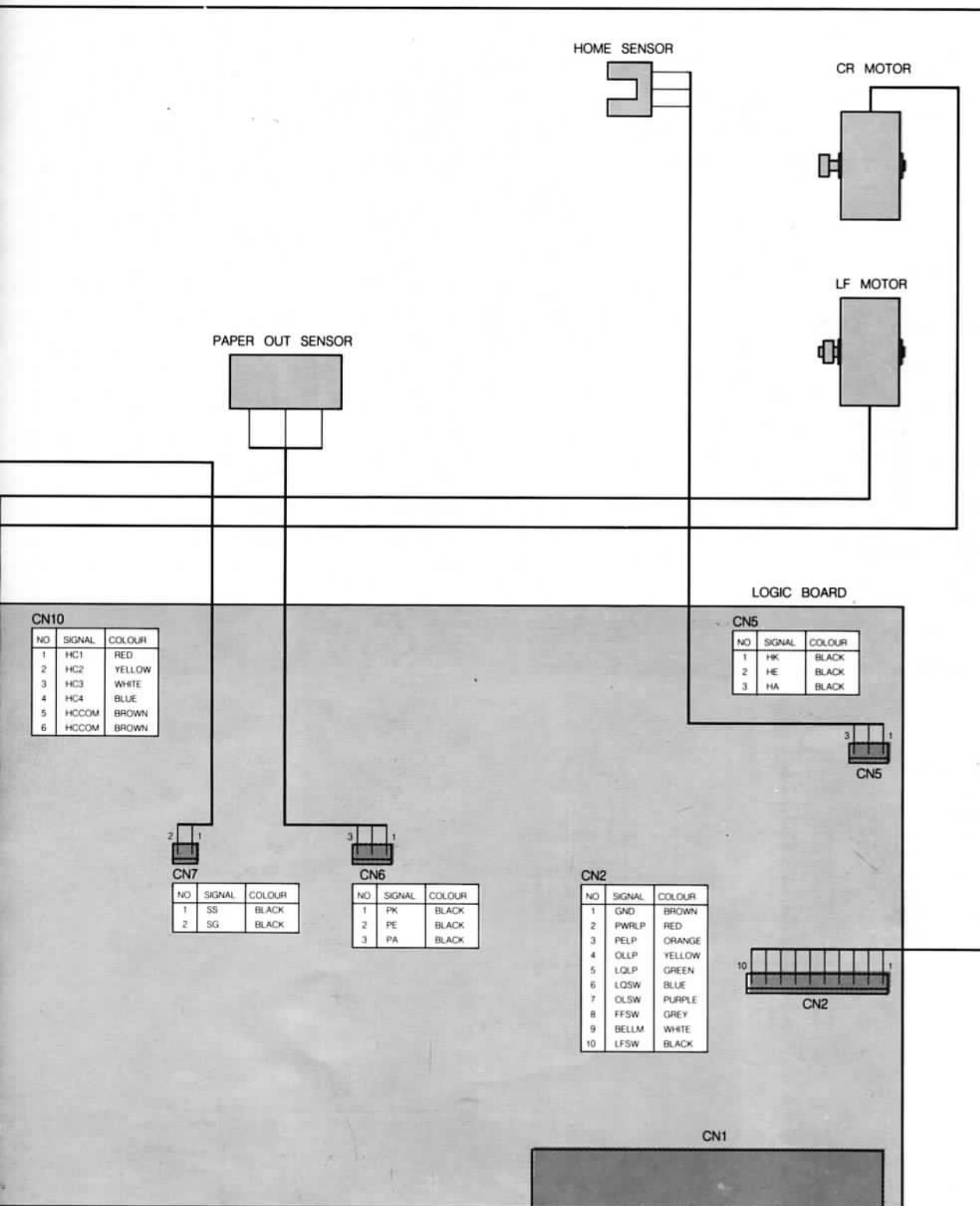


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CS 8 352

INTERCONNECTIONS DIAGRAM













CN1

NO	SIGNAL	NO	SIGNAL	NO	SIGNAL	NO	SIGNAL
1	STROBE	10	ACK	19	GND	28	GND
2	DATA 1	11	BUSY	20	GND	29	GND
3	DATA 2	12	PE	21	GND	30	GND
4	DATA 3	13	HIGH	22	GND	31	INITIAL
5	DATA 4	14	GND	23	GND	32	ERROR
6	DATA 5	15	NC	24	GND	33	GND
7	DATA 6	16	GND	25	GND	34	NC
8	DATA 7	17	F GND	26	GND	35	HIGH
9	DATA 8	18	NC	27	GND	36	NC

ELECTRICAL PARTS LIST

CONTROL BOARD

					
C19	4822 122 32713	30 pF 50 V ceramic	P1	5322 209 84761	7407
C20	4822 122 32713	30 pF 50 V ceramic	P2	5322 209 86327	7406
CA1	4822 122 90042	10 nF 25 V ceram. array	P3	4822 209 83419	8255 PIO
			P4	4822 209 51278	27256 ROM
R26	4822 116 80284	15E 2 W metal film	P6	5322 209 83156	HM6116P-4 RAM
R34	4822 113 80428	23E 5 W cement resistor	P7	4822 209 11499	UPD7810 CPU
R35	4822 113 90222	20E 2 W fusible resistor	P8	5322 209 86062	74LS373
R36	4822 113 90221	12E 2 W fusible resistor	P9	5322 209 81623	74LS00
R37	4822 116 80285	1K 2 W metal film	P10	5322 209 85199	74LS14
R38	4822 116 80285	1K 2 W metal film	P11	5322 209 84761	7407
R40	4822 116 80286	470E 2 W metal film	P12	5322 209 84994	74LS05
RA1	4822 111 91375	8x 2k2 $\frac{1}{10}$ W array	P13	5322 209 84994	74LS05
RA2	4822 111 91377	8x 4k7 $\frac{1}{10}$ W array			
RA3	4822 111 91376	4x 330 $\frac{1}{10}$ W array	DB1	4822 130 80295	D2SB10 bridge
RA4	4822 111 91379	8x 4k7 $\frac{1}{10}$ W array	DB2	4822 130 80295	D2SB10 bridge
RA5	4822 111 91377	4x 4k7 $\frac{1}{10}$ W array	D1	4822 130 80296	S1S6M
RA6	4822 111 91379	8x 4k7 $\frac{1}{10}$ W array	D2	4822 130 80296	S1S6M
RA7	4822 111 91378	8x 1k8 $\frac{1}{10}$ W array	ZD1	4822 130 32698	HZ6C2 zener
RA8	4822 111 91381	7x 4k7 $\frac{1}{10}$ W array	ZD2	4822 130 80297	HZ24-1
RA9	4822 111 91379	8x 4k7 $\frac{1}{10}$ W array			
					
Q1	4822 130 41505	2SA1015Y	X1	4822 242 71337	CSA11. OMT ceram. osc.
Q2	4822 209 71738	PST520E reset IC			
Q3	4822 130 41505	2SA1015Y			
Q4	4822 130 42528	2SB605	CN1	4822 265 51119	Interface conn. 36 p.
Q5	4822 130 42528	2SB605	CN2	4822 265 40492	Connector 10 p.
Q6	4822 130 42528	2SB605	CN5	4822 265 30538	Connector 3 p.
Q7	4822 130 60677	2SB983	CN6	4822 265 30538	Connector 3 p.
Q8	4822 209 71373	78L05 Volt. reg.	CN7	4822 265 30537	Connector 2 p.
Q9	4822 130 42528	2SB605	CN8	4822 265 30412	Connector 4 p. power
Q10	4822 130 60677	2SB983	CN9	4822 265 30413	Connector 6 p. red
Q11	4822 130 43197	2SC1815	CN10	4822 265 40397	Connector 6 p. white
Q12	4822 130 43197	2SC1815	CN11	4822 265 30539	Connector 4 p.
QA1	4822 130 42753	TH3L10Z trans. array	CN12	4822 265 40649	Connector 8 p.
QA2	4822 130 42753	TH3L10Z trans. array			
QA4	4822 130 42752	TK3L10Z trans. array			
QA5	4822 130 42752	TK3L10Z trans. array			
			POWER SUPPLY		
L1	4822 157 53058	500 μ H coil			
L2	4822 157 53058	500 μ H coil	F1	4822 216 93852	AC board unit
				4822 253 30019	Fuse TSC 0.5A 250 V
				4822 276 11584	AC switch
				4822 146 40394	Mains Transformer
DSW1	4822 276 40354	DIP switch 8 fold	VARIOUS		
			SBC1060	4822 321 21603	MSX interface cable
			SBC436	4822 015 50032	Inkribbon cassette