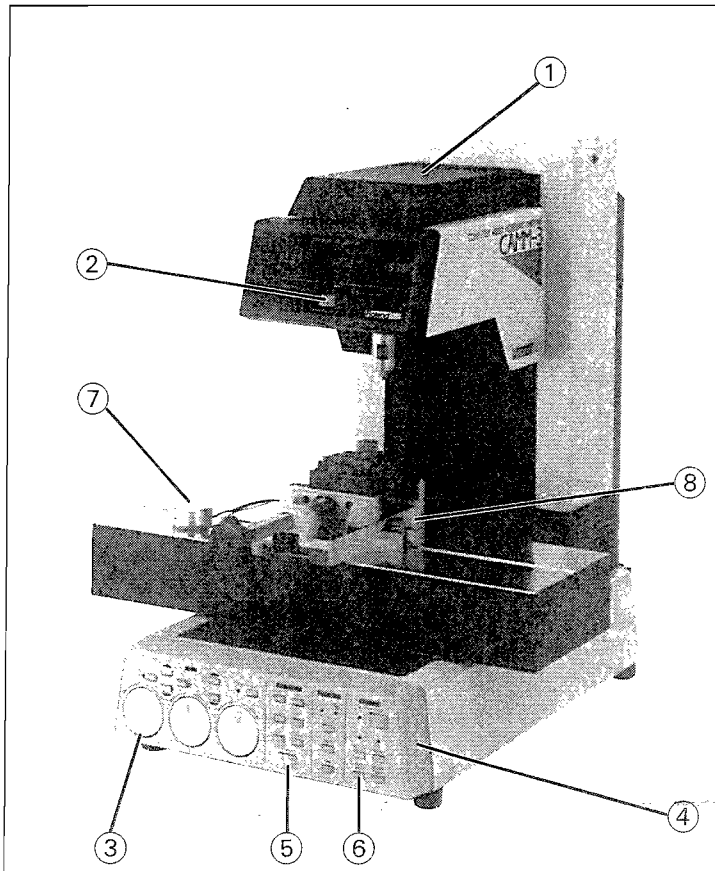
COMPUTER AIDED MODELING MACHINE

SERVICE NOTES CAMM-3 PNC-3000

— SPECIFICATIONS —

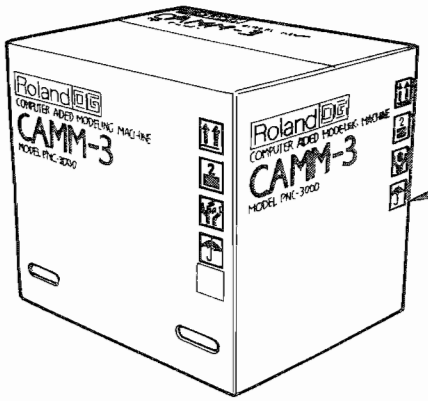
XY TABLE SIZE	500mm × 170mm (19-11/16'' × 6-11/16'')
AXIS TRAVEL (X·Y·Z)	180mm × 150mm × 150mm (7-1/16'' × 5-7/8'' × 5-7/8'')
TOOL CHUCK	Collet Type (drill chuck optional)
PRECISION	0.01mm/step Internal Processing at 0.005mm/step
MAX.FEED RATE (SPEED)	1.2M/min. (set either manually or by programming)
SPINDLE MOTOR	100W, AC Commutator Motor
WEIGHT	55kg. (121.3 lbs.)
SIZE (W·H·D) (DIMENSIONS)	500mm × 580mm × 580mm 19-11/16'' × 22-3/4'' × 22-3/4''
SPINDLE RPM	3,000 ~ 8,000 rpm (with manual control)
INTERFACE	Parallel (Centronics)/Serial (RS-232C)
DISPLAYS	X, Y and Z Axis Digital Coordinate Displays (unit-0.01mm)
	Table Feed Rate
	Spindle RPM
	Error Indicator

CONTROLS	Control—PAUSE, MOTOR ON/OFF, DISPLAY RESET, SENSOR, FEED RATE
	Data Input—ON/OFF, WRITE, START
	Positioning—Z0, Z1, Z2, P1, P2, HOME, ENTER
	JOG—Fast Feed Keys (X, Y, Z), Fine Adjust Dials (X, Y, Z), MANUAL ON/OFF
	Emergency Stop; Spindle Motor Control; Power Switch
CONTROL COMMANDS	CAMM-GL1 (CAMM Graphic Language 1)
STANDARD ACCESSORIES	ϕ6 Collet Chuck
	Tool Set (1)
	AC Cord
	Carrying Bolts (4)
	Sensor Switch
	Fuses (2)
	AC Motor Brushes (4)
	T Nut Sets (2)
	User's Manual
	CAMM-GL1 Command Reference Manual

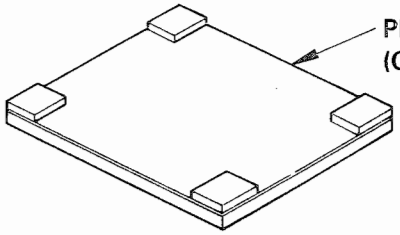


①	22025746	PULLEY COVER
②	22485114	BUTTON FOR EMERGENCY STOP
③	22485101	JOG DIAL KNOB
④	7582120000	CONTROLLER UNIT
⑤	22485115	BUTTON (Large)
⑥	22485116	BUTTON (Small)
⑦	7582121000	SENSER SWITCH
⑧		ZV-1 VISE (OPTION)

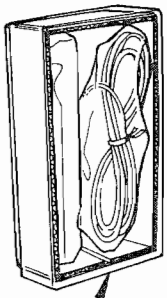
— PACKAGING INSTRUCTION —



CARTON BOX

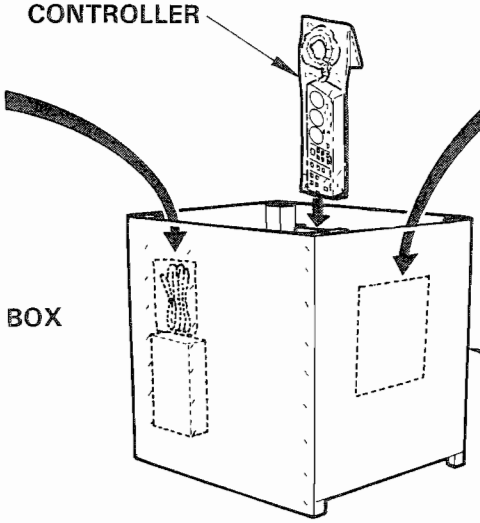


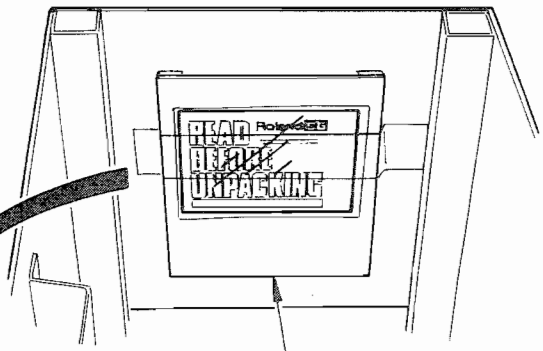
PROTECTIVE TOP
(CARD BOARD/STYROFOAM)



ACCESSORIES BOX

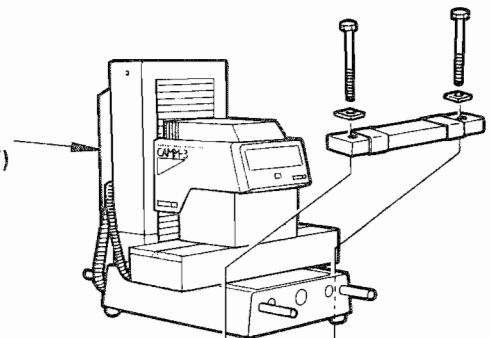
CONTROLLER



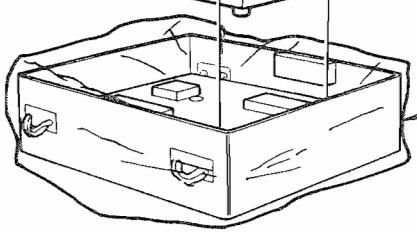


USER'S MANUAL
COMMAND REFERENCE MANUAL

PROTECTIVE ENCASEMENT
(CARTON BOARD/STYROFOAM)



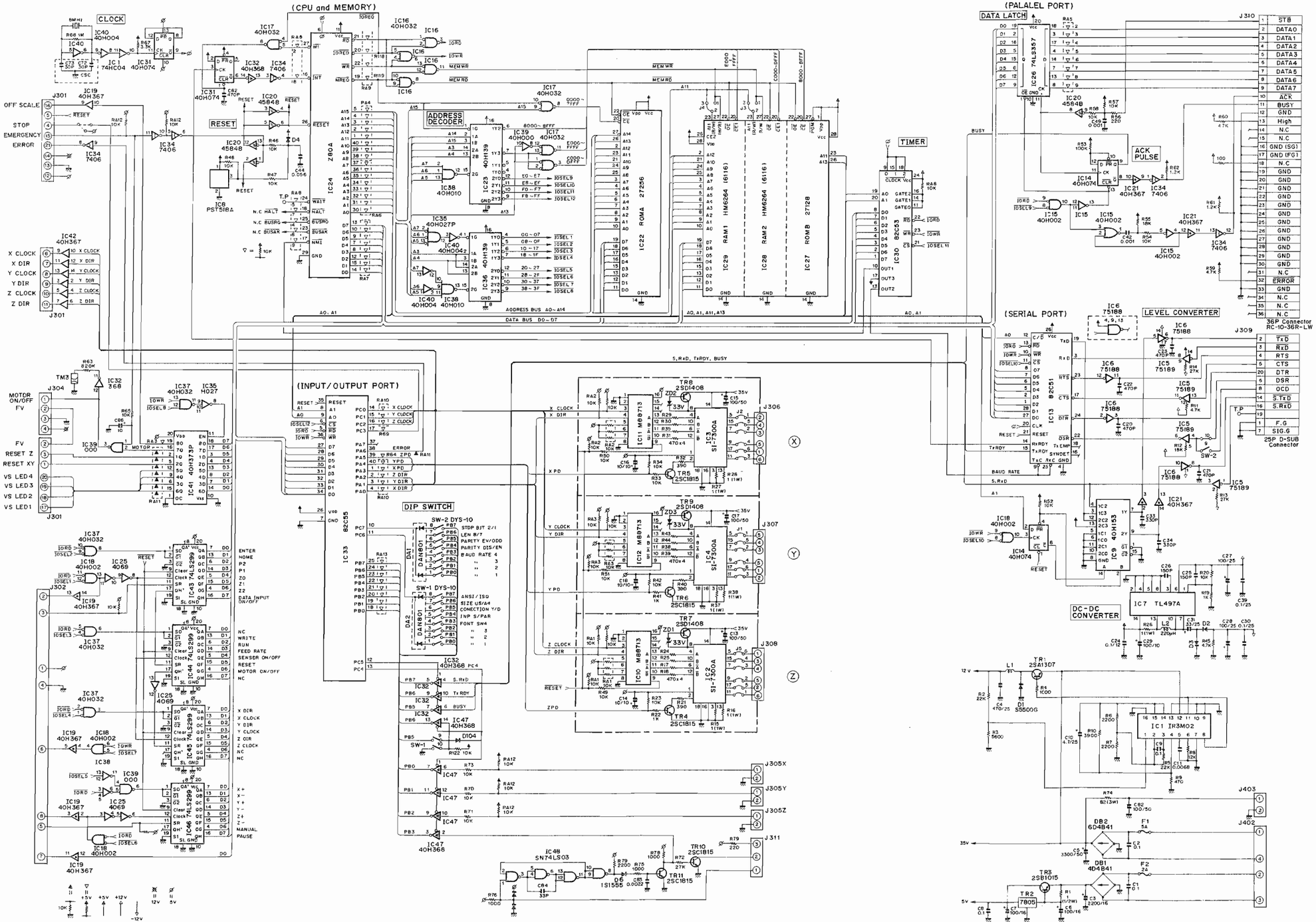
PNC-3000
(CAMM-3 UNIT)



CARTON BOX (BOTTOM)

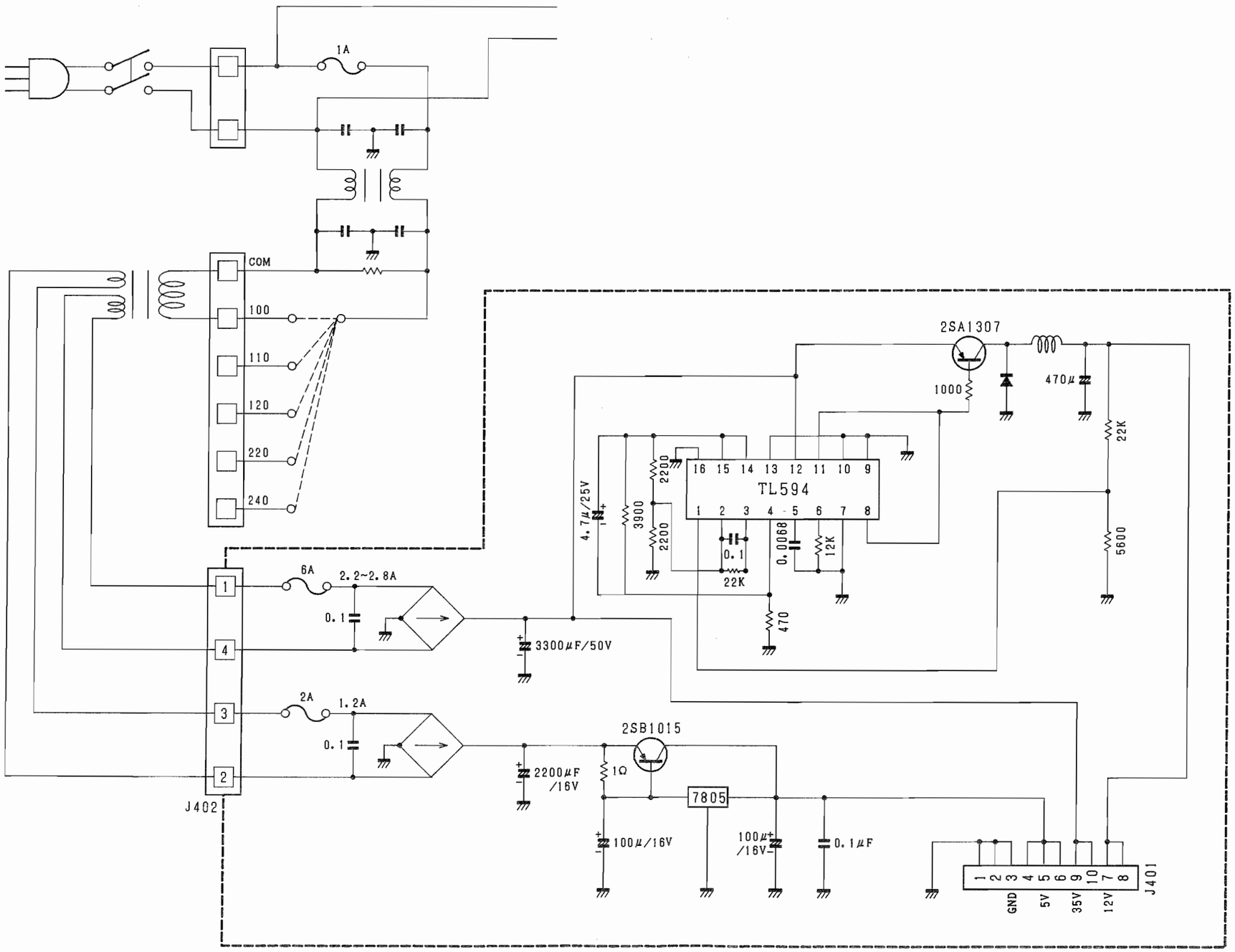
— SCHEMATIC DIAGRAM —

MAIN BOARD



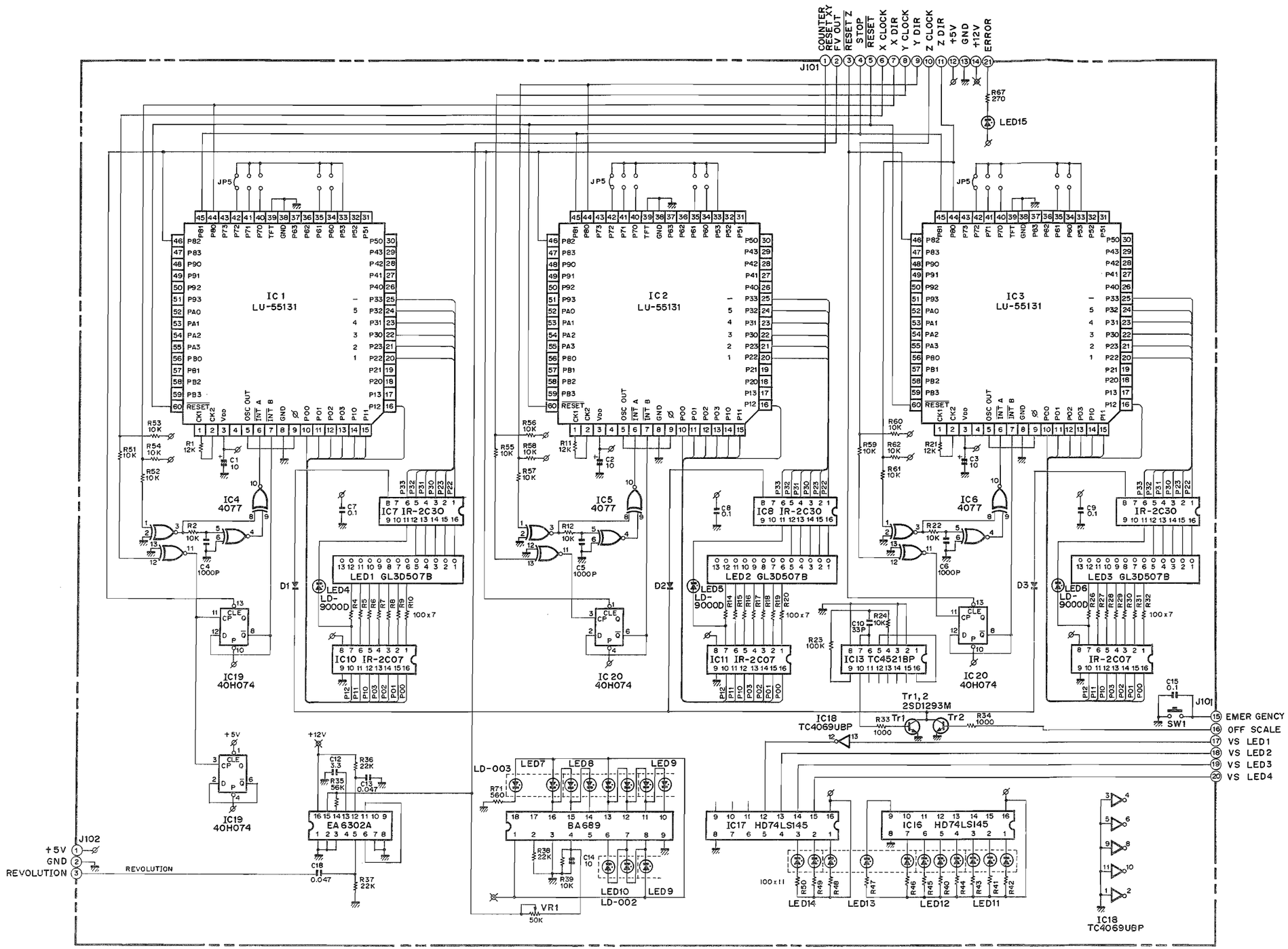
— SCHEMATIC DIAGRAM —

POWER BOARD (PROTO TYPE ONLY)



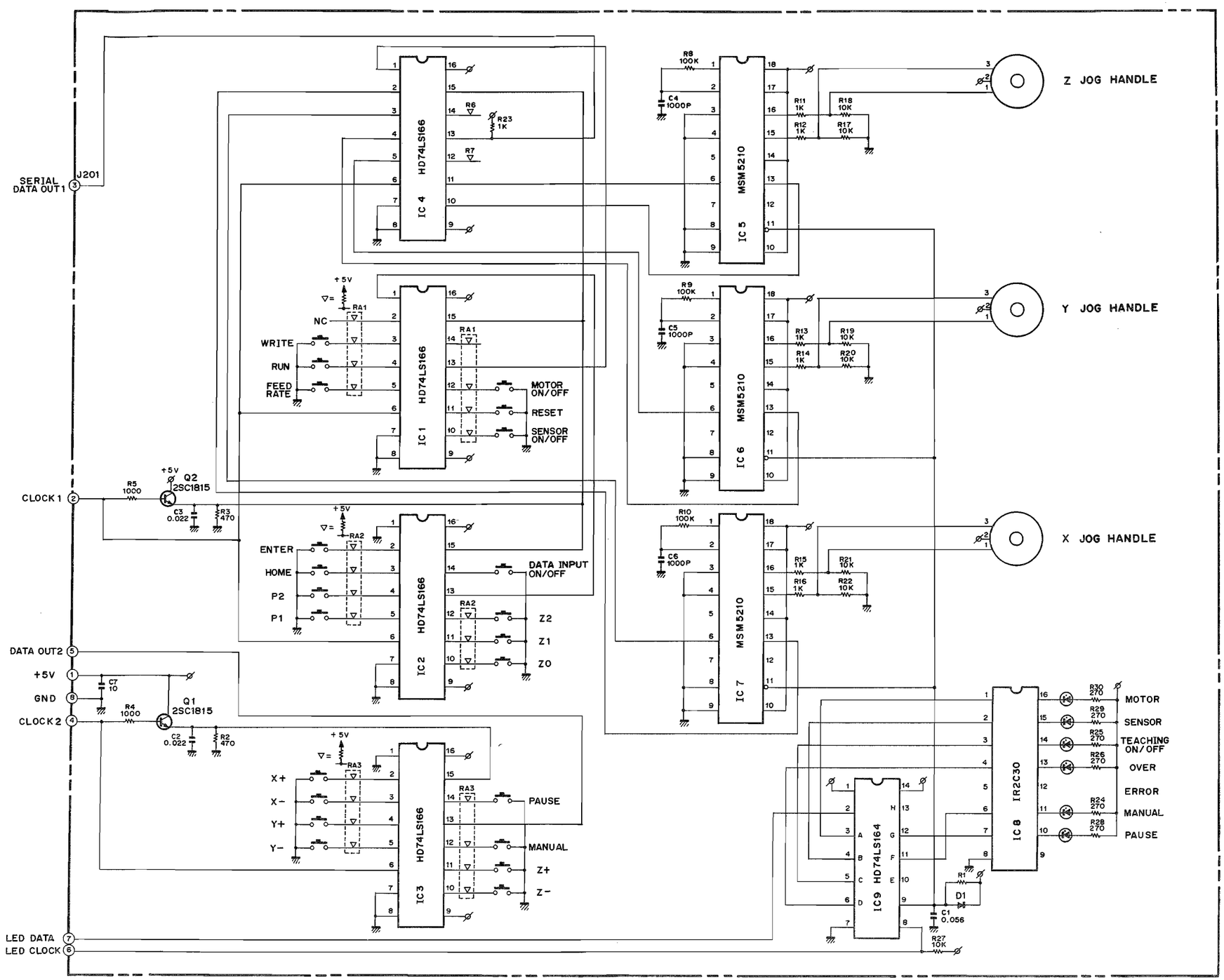
— SCHEMATIC DIAGRAM —

COUNTER BOARD



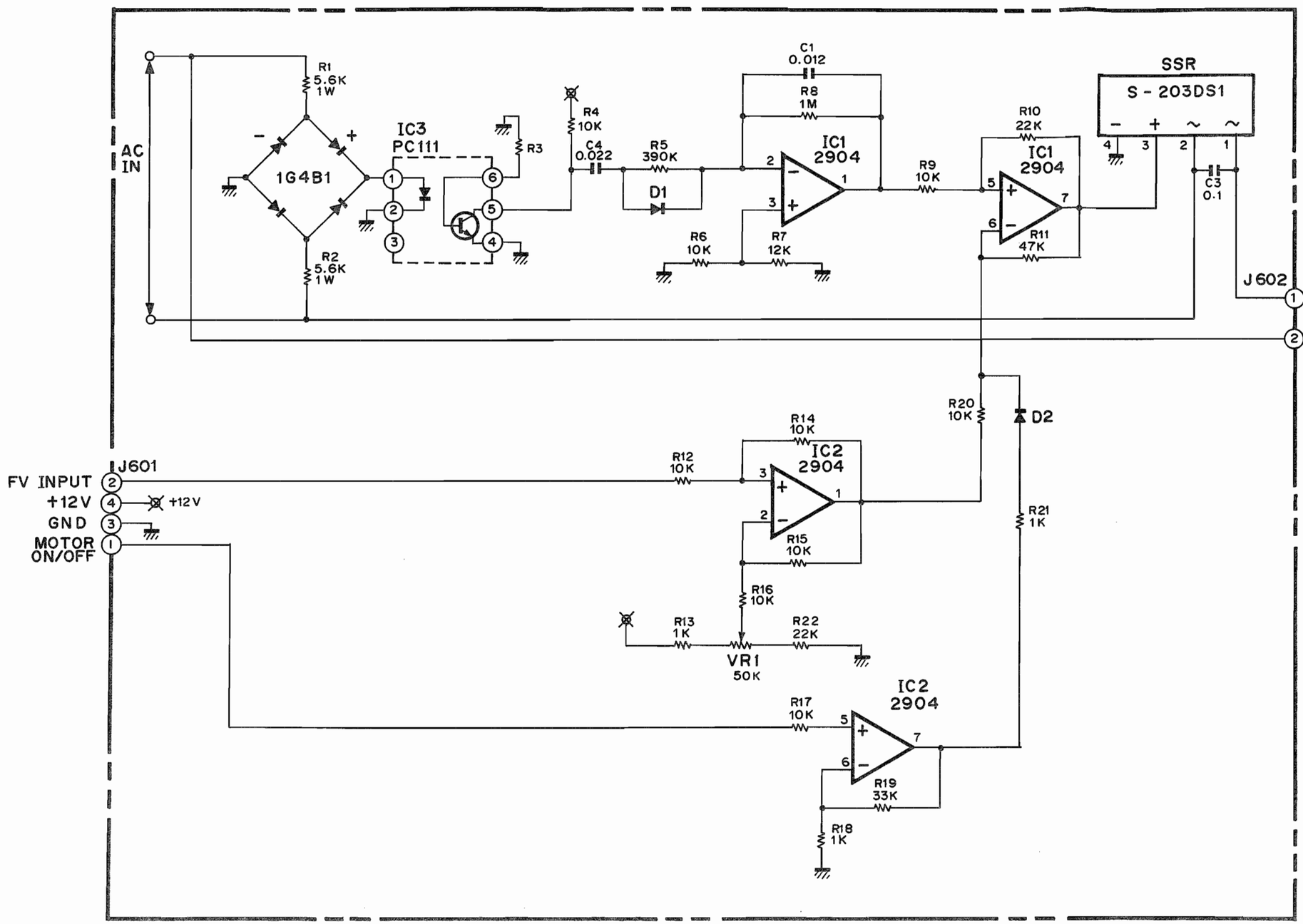
— SCHEMATIC DIAGRAM —

CONTROL BOARD



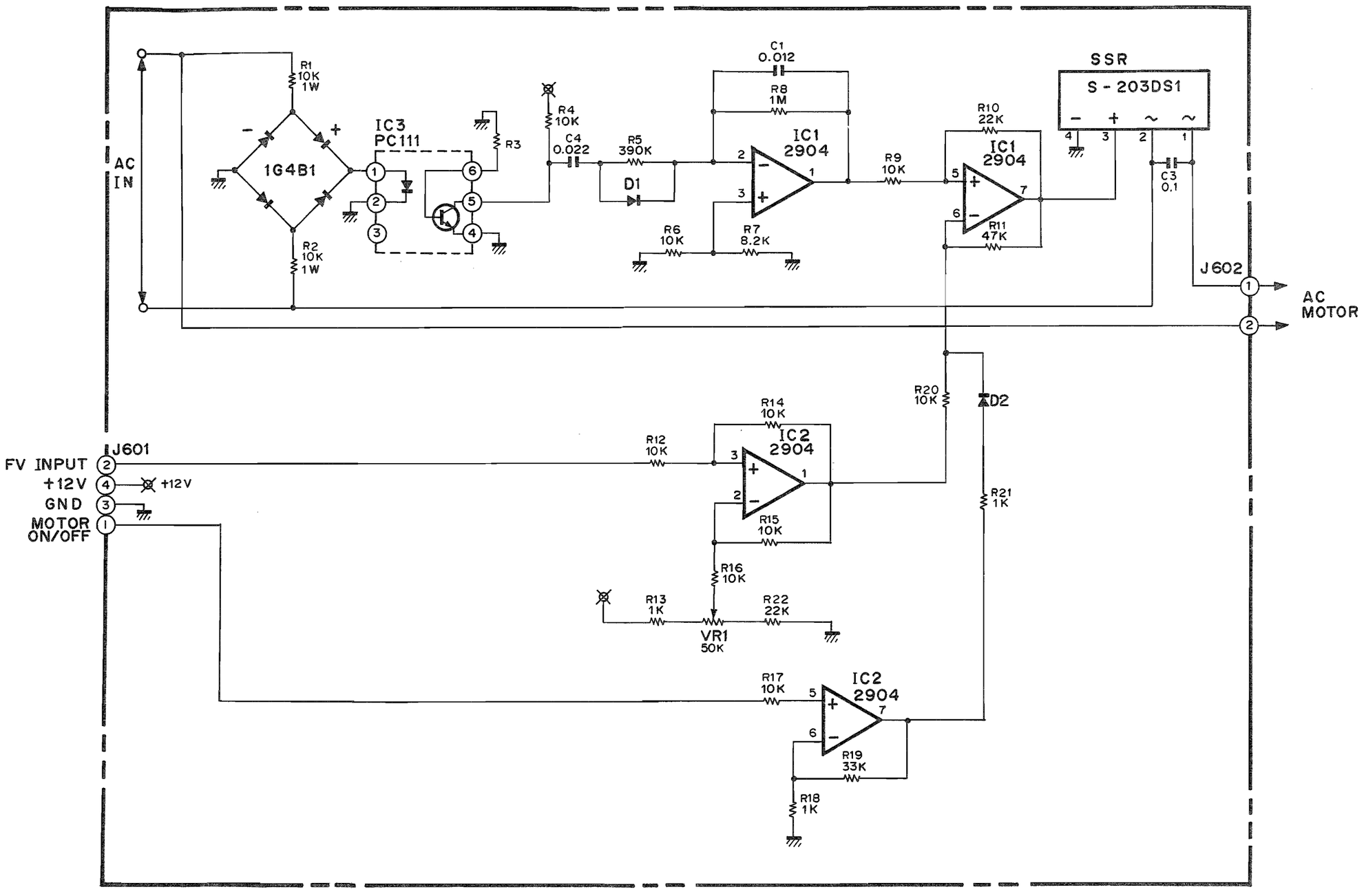
— SCHEMATIC DIAGRAM —

MOTOR P.C.B 100/117

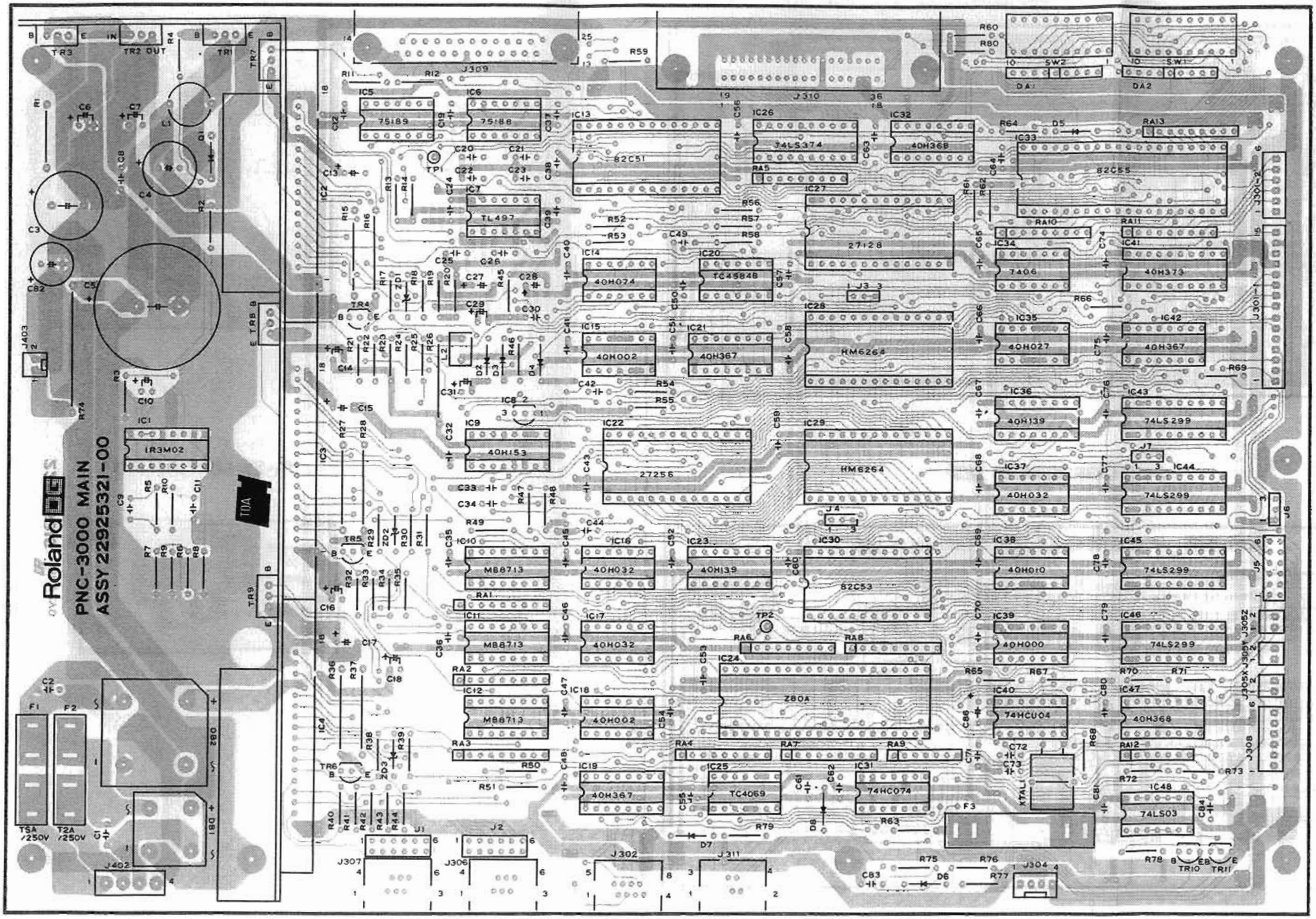


— SCHEMATIC DIAGRAM —

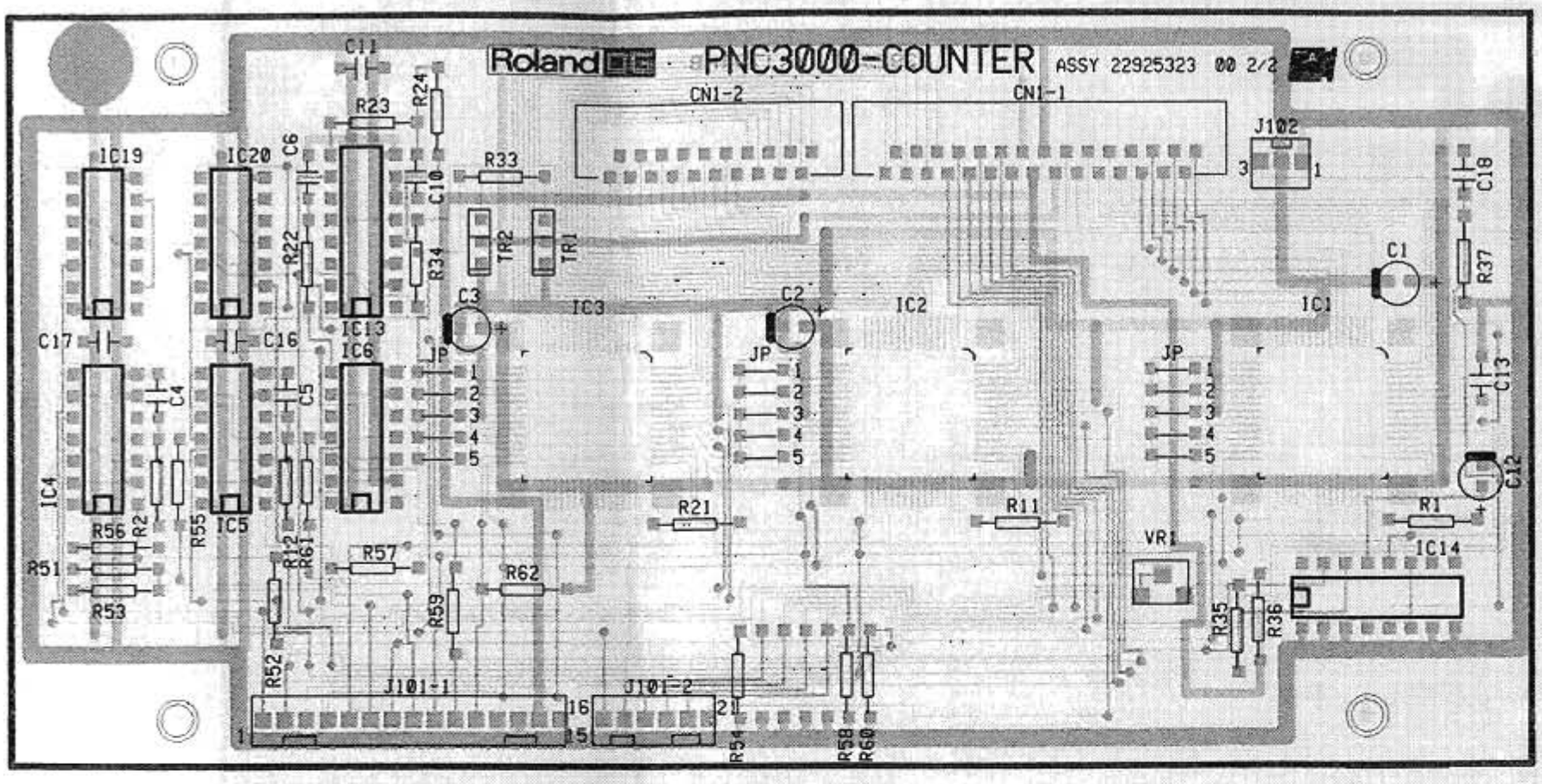
MOTOR P.C.B 220/240



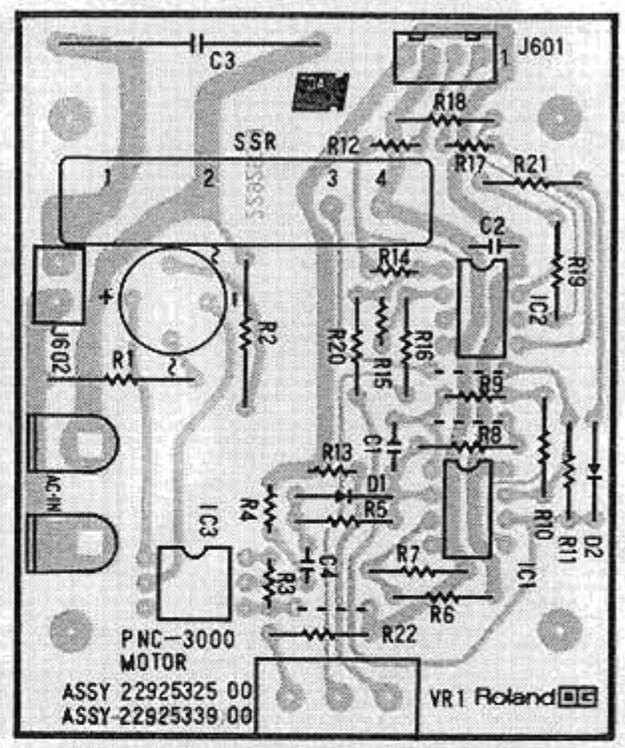
MAIN BOARD


PNC-3000 MAIN
ASSY 22925321-00
Roland
TR3
TR2 OUT
TR1
TR7
TR8
TR9
J309
J310
J301-1
J301-2
J305X
J305Y
J306Z
J308
J403
J402
J307
J306
J302
J311
J1
J2
J3
J4
J5
J6
J7
SW1
SW2
DA1
DA2
IC1 IR3M02
IC2 75189
IC3 75188
IC4 TL497
IC5 82C51
IC6 74LS374
IC7 40H074
IC8 40H153
IC9 27256
IC10 MB8713
IC11 MB8713
IC12 MB8713
IC13 40H002
IC14 40H367
IC15 40H032
IC16 40H139
IC17 40H032
IC18 40H002
IC19 40H367
IC20 TC4584B
IC21 40H367
IC22 HM6264
IC23 40H139
IC24 Z80A
IC25 TC4069
IC26 40H368
IC27 27128
IC28 HM6264
IC29 HM6264
IC30 82C53
IC31 74HC074
IC32 40H368
IC33 82C55
IC34 7406
IC35 40H027
IC36 40H139
IC37 40H032
IC38 40H010
IC39 40H000
IC40 74HCU04
IC41 40H373
IC42 40H367
IC43 74LS299
IC44 74LS299
IC45 74LS299
IC46 74LS299
IC47 40H368
IC48 74LS03
RA0
RA1
RA2
RA3
RA4
RA5
RA6
RA7
RA8
RA9
RA10
RA11
RA12
RA13
TP1
TP2
XTAL1
F1
F2
F3
TSA /250V
T2A /250V
TRIO
TRII

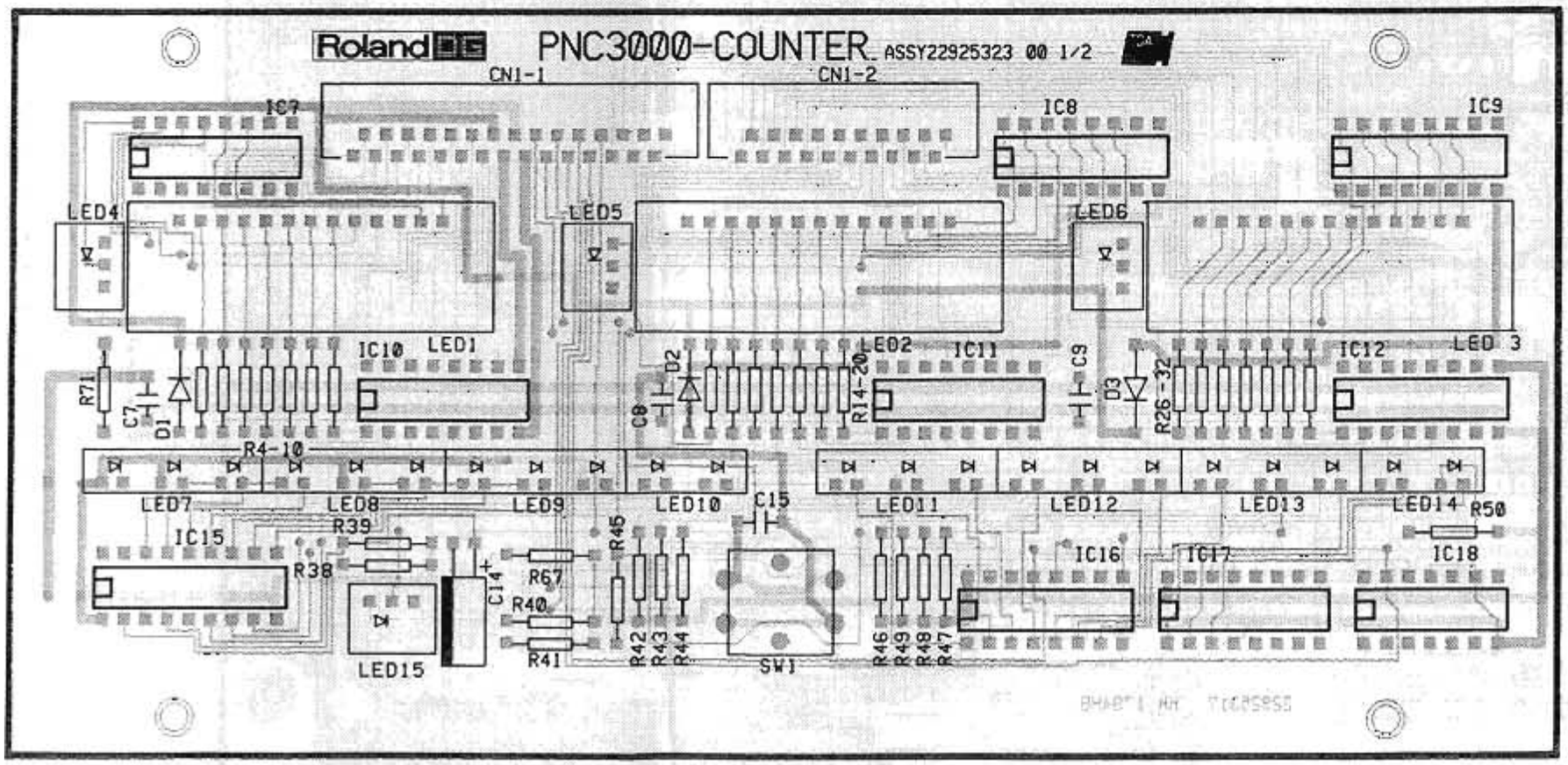
COUNTER BOARD 1/2



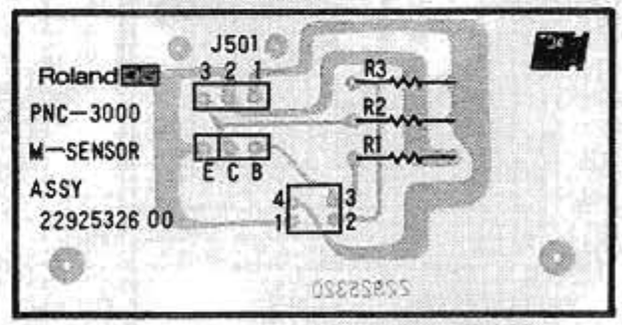
MOTOR BOARD



COUNTER BOARD 2/2

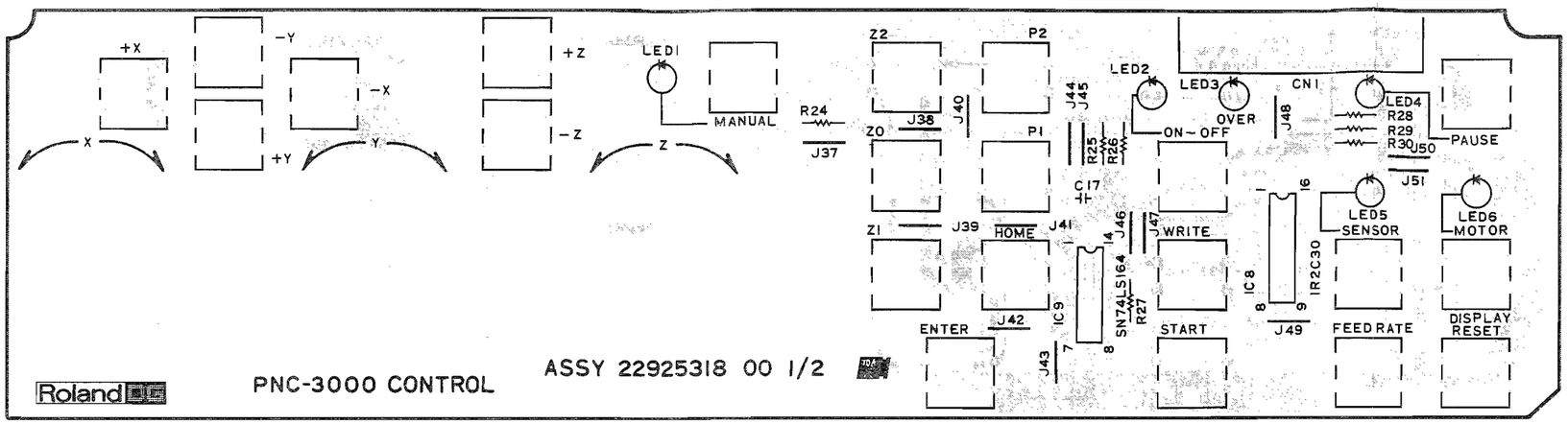


M-SENSOR BOARD

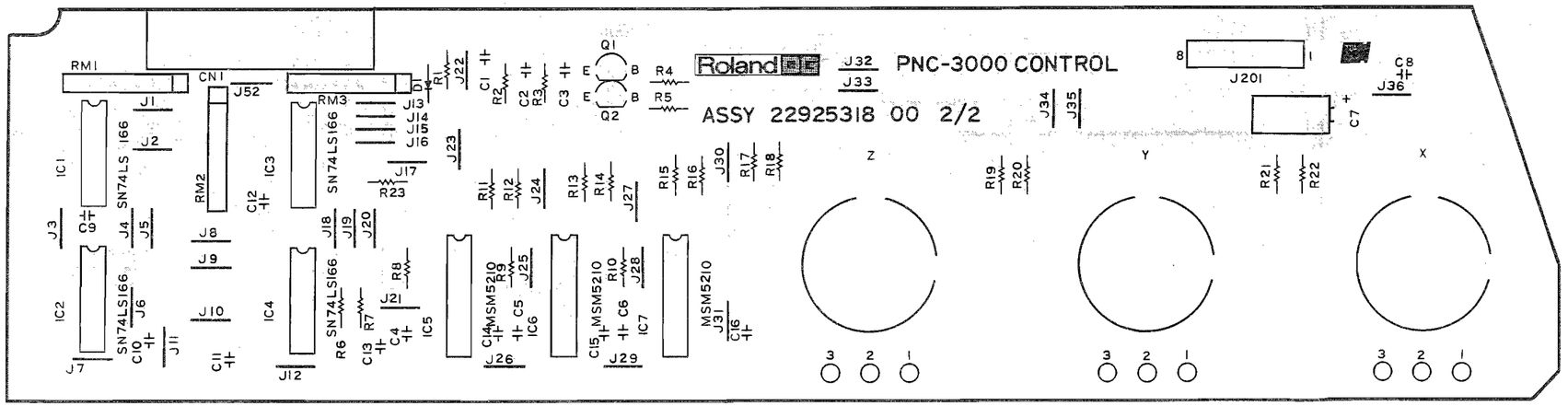


— CIRCUIT BOARD —

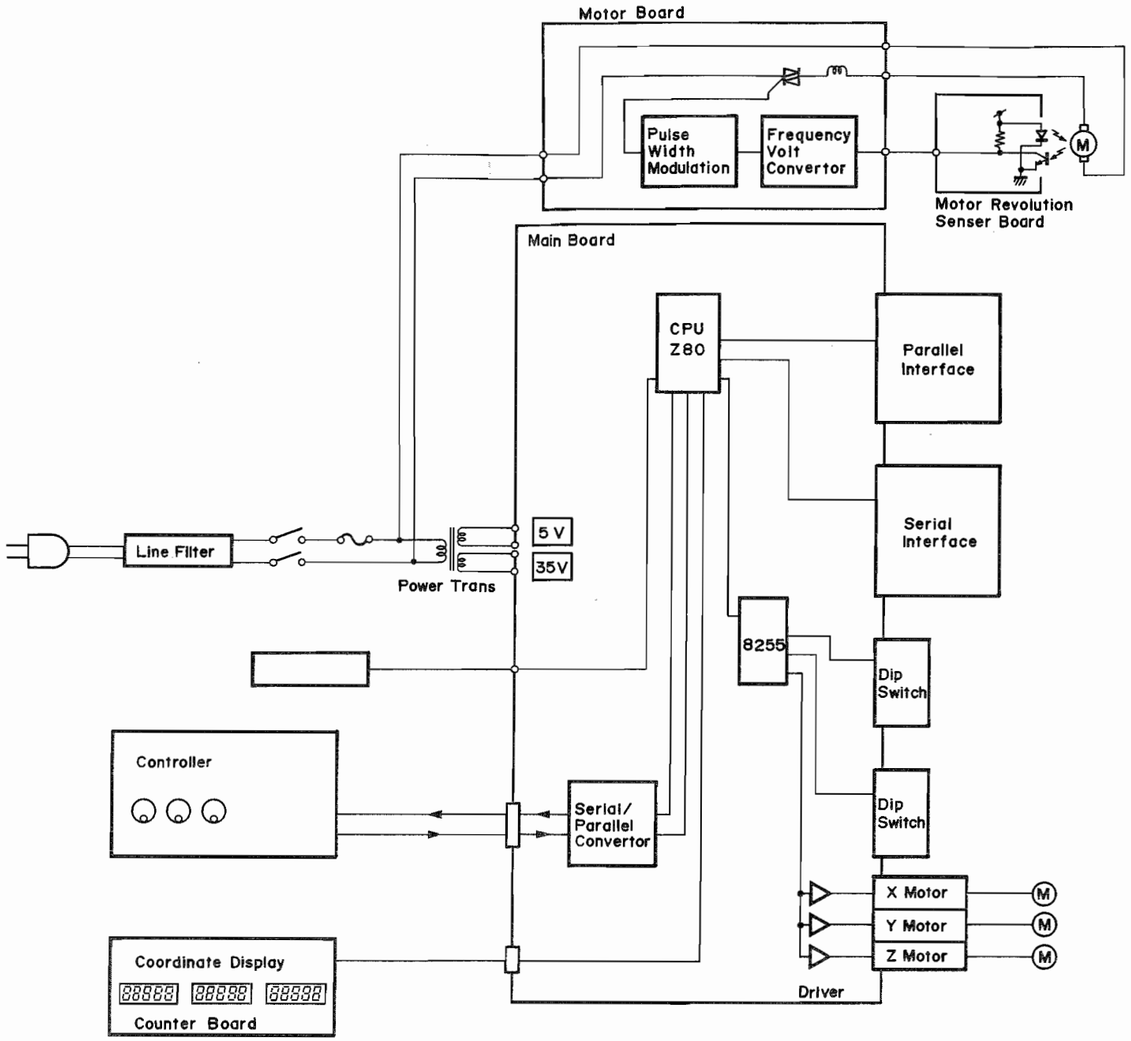
CONTROL BOARD 1/2



CONTROL BOARD 2/2



— BLOCK DIAGRAM —



— ELECTRICAL PARTS LIST —

Ref. No.	Parts No.	Description
MAIN BOARD		
	22925321	*Main Board Ass'y*
IC		
IC24	15179219	TMPZ84C00P (Z80 CMOS CPU)
IC22	15179818	ROM A
IC27	15179819	ROM B
IC28, 29	15179335 or (15179336)	HM624P-15 (64K RAM) or (TC5565PL-15)
IC33	15179195	MSM82C55A-5RS OR TMP82C55AP-5
IC13	15179337	MSM82C51ARS OR TMP82C51AP-2
IC30	15179185	MSM82C53-5 OR TMP82C53P-2
IC25	15159116T0	TC4096UBP
IC20	15159303T0	TC4584BP
IC39	15159503	TC40H000P
IC15, 18	15159504	TC40H002P
IC38	15159517	TC40H010P
IC35	15159518	TC40H027P
IC16, 17, 37	15159514	TC40H032P
IC14	15159510	TC40H074P
IC23, 36	15159525	TC40H139P
IC9	15159526	TC40H153P
IC19, 21, 42	15159530	TC40H367P
IC32, 47	15159533	TC40H368P
IC41	15159508	TC40H373P
IC40	15169512T0	TC74HCU04P
IC31	15169513	TC74HC74
IC34	15169102H0	HD7406P
IC48	15169346X0	SN74LS03N
IC43—46	15169372	M74LS299P
IC26	15169340	SN74LS374N
IC6	15219144H0	HD75188P (Line Driver)
IC5	15219145H0	HD75189P (Line Receiver)
IC7	15199519	TL497ACN
IC8	15219139	PST518A
TR2	15199106T0	TA78005AP 3-terminal Regulator
IC1	15199131P0	IR3M02
IC2—4	15219169	SI7300A (Motor Driver)
IC10—12	15219170 or 15219170SN	MB8713M-G (Motor Controller) or PMM8713
TRANSISTOR		
TR1	15119412	2SA1307Y
TR3	15119814	2SB1015-0
TR4—6, 10, 11	15129115	2SC1815Y
TR7—9	1529834	2SD1408-0

— ELECTRICAL PARTS LIST —

Ref. No.	Parts No.	Description
DIODE		
D2—6	15019101	1S1555
D1	15019209T0	S-5500G
D7, 8	15019265	ERB44-06
DA1, 2	15019142	DAN801 Diode Array
ZD1—3	15019511	05AZ33 Zener Diode
DB2	15019248	6D4B41 Diode Bridge
DB1	15019257	4D4B41 Diode Bridge
	150196200X	05Z-16X Zener Diode
RESISTOR ARRAY		
RA9, 12	13910106	RMLS6-103K (10 Kohm × 6)
RA1—8, 10, 11, 13	13919140	RGLD8-103K (10 Kohm × 8)
RESISTOR		
R74	13829302	82 ohm 3W Metal film
R15, 16, 26—28, 36, 37	13829158	1 ohm 1W Metal film
R1	13819125	1 ohm 1/2W Solid
CAPACITOR		
C3	13639155S0	2200 MF/16V
C5	13659248M0	3300 MF/65V
FUSE		
F2	12559514	Fuse CEE-2AT (2 Ampere)
F1	12559518	Fuse CEE-5AT (5 Ampere)
OTHERS		
L2	12449242	RC855-221K Coil 220μH
L1	12449274	Coil MC-DRUM
XTAL1	12389744	X'tal 8MHz
	13429527	IC socker (28 Pin)
SW1, 2	13169660	DYS-10 Dip switch
J309	13429167	Connector 25 Pin Serial port
J310	13429622	Connector 36 Pin Parallel port
J403	13439118	MOLEX 5045-2A (2 Pin)
J305X, Y, Z	13439129	MOLEX 5046-2A (2 Pin)
	23435294	MOLEX 5273-04A (4 Pin)
J304	13439120	MOLEX 5045-4A (4 Pin)
J308, J301-2	13439133	MOLEX 5046-6A (6 Pin)
J301-1	13439163	MOLEX 5046-15A (15 Pin)
J311	13449714	Jack TM5RC-44
J306, 307	13449715	Jack TM5RC-66
J302	13449716	Jack TM5RC-88
	22465143	Heat sink
	22195865	Holder for jack
F3	12439512	Timer
	12199550	Fuse holder H0446
	12199567	Fuse holder F204

— ELECTRICAL PARTS LIST —

Ref. No.	Parts No.	Description
MOTOR BOARD		
	22925325	*Motor Board Ass'y (100V/117V)*
	22925339	*Motor Board Ass'y (220V/240V)*
SEMICONDOCTOR		
IC3	15229716	Photocoupler PC-111
SSR	12439215	SSR S203DS1
	15019277	Diode bridge 1D4B1 (100V/177V)
	15019278	Diode bridge 1G4B1 (220V/240V)
D1, 2	15019101	Diode 1S1555
IC1, 2	15189134X0	OP Amp. LM2904 or TA75358
POTENTIOMETER		
VR1	13219130	EVHCCAK15B54 50 Kohm (B)
RESISTOR		
R1, 2	13829102	5.6 Kohm 1W (100V/117V)
R1, 2	13829103	10 Kohm 1W (220V/240V)
R7	13719223T0	12 Kohm 1/4W (100V/117V)
R7	13719219T0	8.2 Kohm 1/4W (220V/240V)
MISCELLANEOUS		
J602	13439324	Connector (2 Pin)
J601	13439120	Connector (4 Pin)
	12159734	Bushing TA-307
	12159715	Bushing TB-300
MOTOR REVOLUTION SENSOR BOARD		
	22925326	*Motor Revolution Sensor Board Ass'y*
	15229717	Photo-interrupter GP2S05
	15129121	Transistor 2SC2021R
	23495419	Wiring

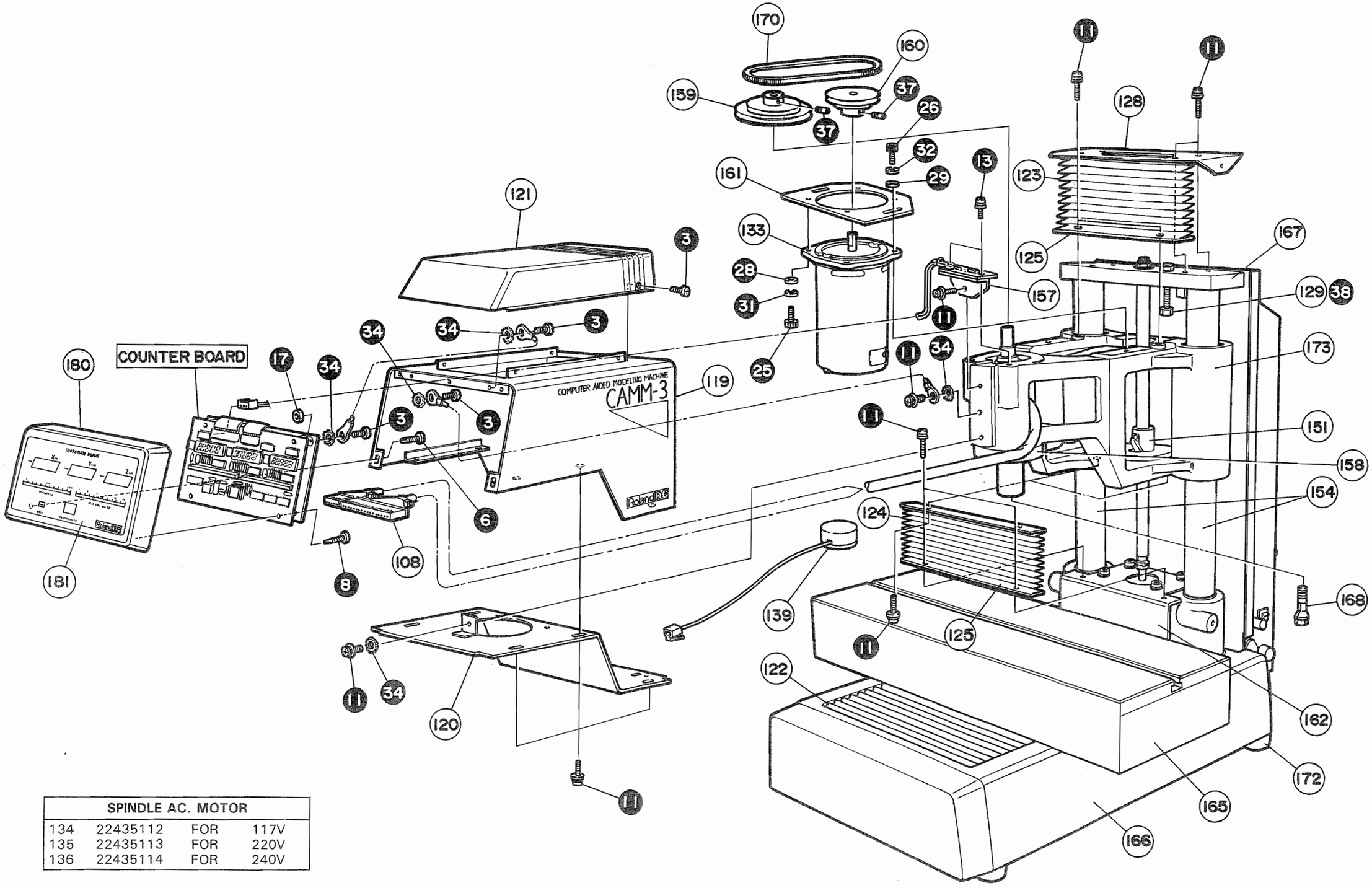
— ELECTRICAL PARTS LIST —

Ref. No.	Parts No.	Description
COUNTER BOARD		
	22925323	*Conter Board Ass'y*
IC		
IC10—12	15149125	IR-2C07
IC7—9	15149120	IR-2C30
IC13	15159320	TC4521BP
IC18	15159116	TC4069UBP
IC4—6	15159151	TC4077BP
IC19, 20	15159510	TC40H074P
IC16, 17	15169353H0	HD74LS145P
IC1—3	15179238	LU-55131
IC15	15219166	BA689
IC14	15219167	BA6302A
LED		
LED1—3	15029184	GL3D507B
LED4—6, 15	15029221	LT9000D
LED7—9	15029218	LD003MB
LED11—13	15029220	LD003YB
LED14	15029219	LD002YB
LED10	15029217	LD002MB
TRANSISTOR		
TR1, 2	15129615	2SD1293Q
DIODE		
D1—3	15019101	1S1555
SEMI-FIXED RESISTOR		
VR1	13299200	EVN-D1AA00B54
COUNTER PANEL ASSEMBLY		
	22485114	Button for Emergency Stop
	22115309	LED Housing
	22025745	LED Cover
MISCELLANEOUS		
SW1	13129715	Switch SKHCAA110A
	12159734	Bushing TA-307
	12159715	Bushing TB-300
J102	13439119	Connector 5045-03A (3 Pin)
J101-1	13439122	Connector 5045-06A (6 Pin)
J101-1	13439323	Connector 5045-15A (15 Pin)
	13479187	Sumi card (20 Pin)
	13479188	Sumi card (30 Pin)
	13429179	Connector (20 Pin)
	13429180	Connector (30 Pin)

— ELECTRICAL PARTS LIST —

Ref. No.	Parts No.	Description
CONTROLLER UNIT		
	7582120000	*Controller Unit*
	22485115	Button (large)
	22485116	Button (small)
	22485101	JOG Dial Knob
	22215767	Controller Panel
	22025308	Controller Bottom Cover
	12369502	Bushing
	22925324	*CONTROLLER BOARD ASS'Y*
IC		
IC1—4	15169371	M74LS166AP
IC9	15169361	HD74LS164
IC5—7	15219168	MSM5210RS
IC8	15149120	IR-2C30
TRANSISTOR & DIODE		
Q1, 2	15129114	Transistor 2SC1815GR
D1	15019101	Diode 1S1555
LED1—6	15029103	LED TLR124
OTHERS		
RM1—3	13919310	Resistor Array RMLS8-103J
	13279796	Rotary encoder (JOG dial)
CN1	13429180	Connector (30 Pin)
	13479188	Sumi card (30 Pin)
	13129715	Switch SKHCAA110A
	12159734	Bushing TA-307
	12159715	Bushing TB-300
	23485195	Controller Cable

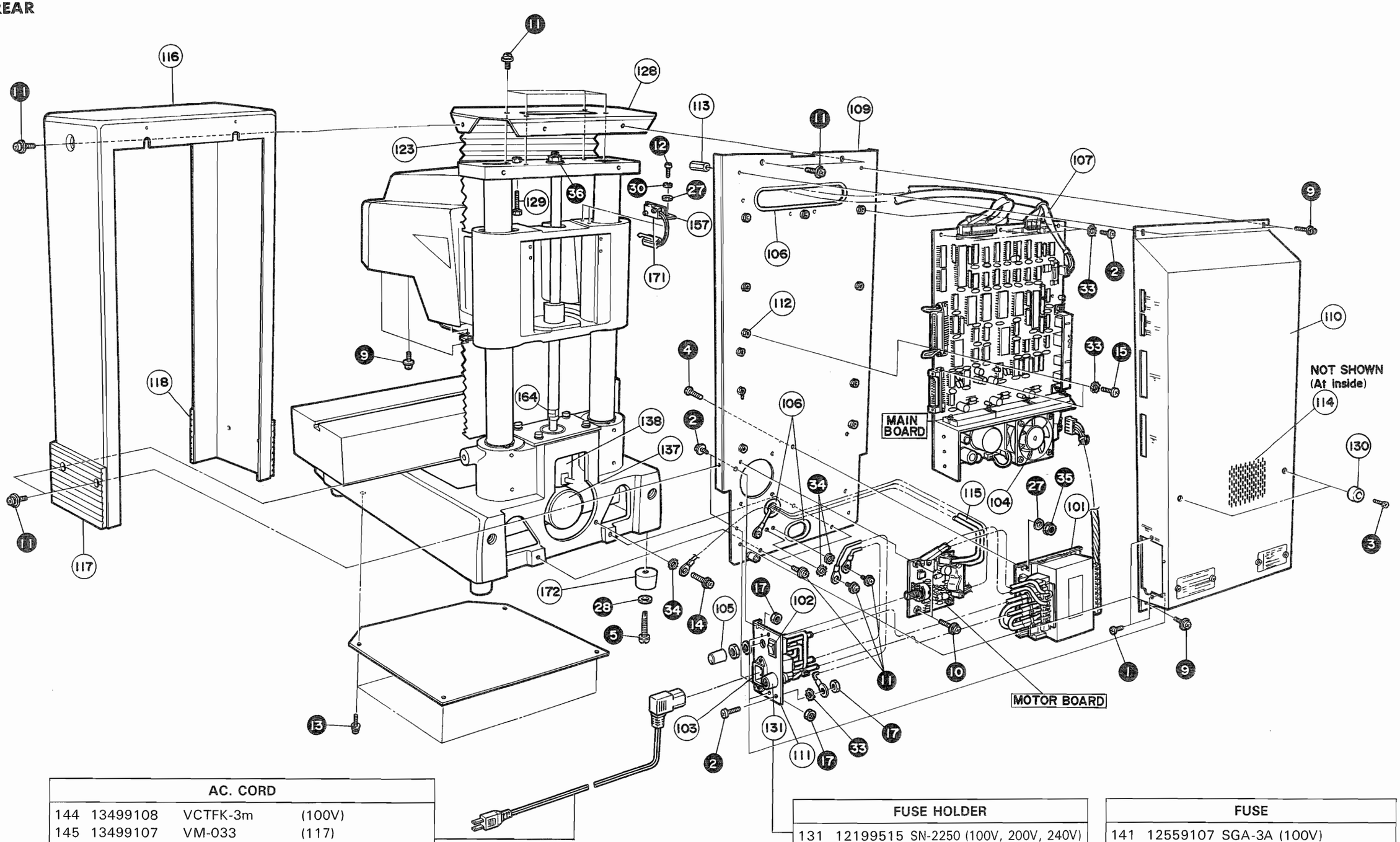
— EXPLODED VIEW —



SPINDLE AC. MOTOR			
134	22435112	FOR	117V
135	22435113	FOR	220V
136	22435114	FOR	240V

— EXPLODED VIEW —

REAR



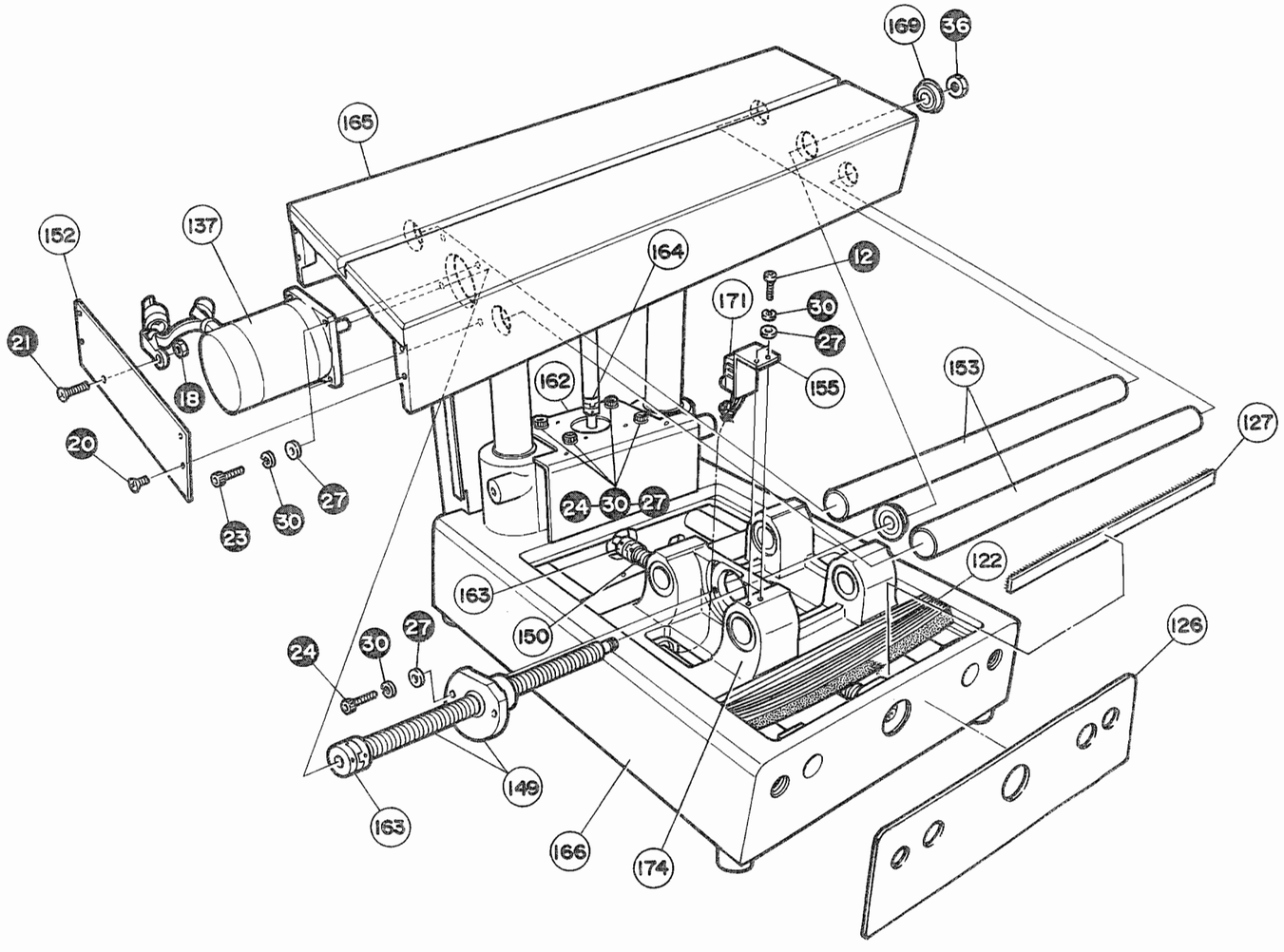
AC. CORD			
144	13499108	VCTFK-3m	(100V)
145	13499107	VM-033	(117)
146	13439817F0	EC-702-J05	(220V)
147	23495110	BB6742-BB6791	(240V ENGLAND)
148	13439814F0	SC415-J06	(240V AUSTRALIA)

FUSE HOLDER			
131	12199515	SN-2250	(100V, 200V, 240V)
132	12199551	345601	(117V)

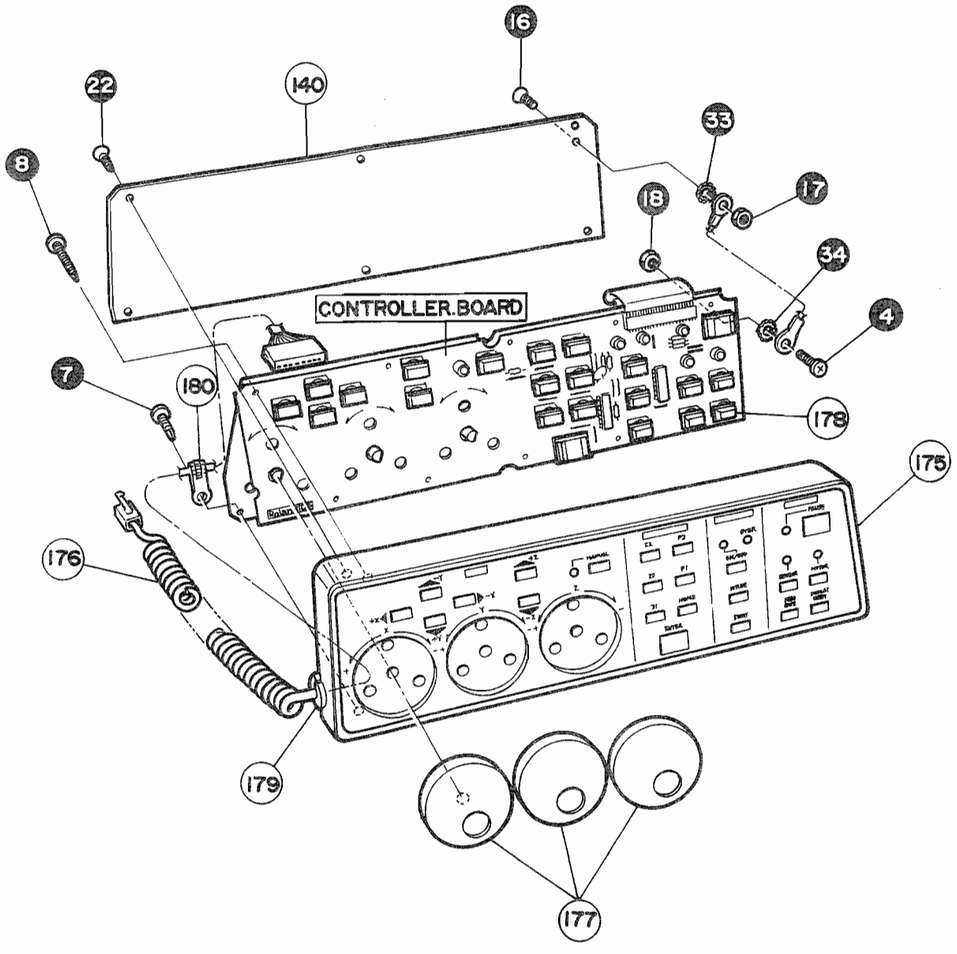
FUSE			
141	12559107	SGA-3A	(100V)
142	12559348	MGC-UL3A	(117V)
143	12559521	CEE 1.6A	(220/240V)

— EXPLODED VIEW —

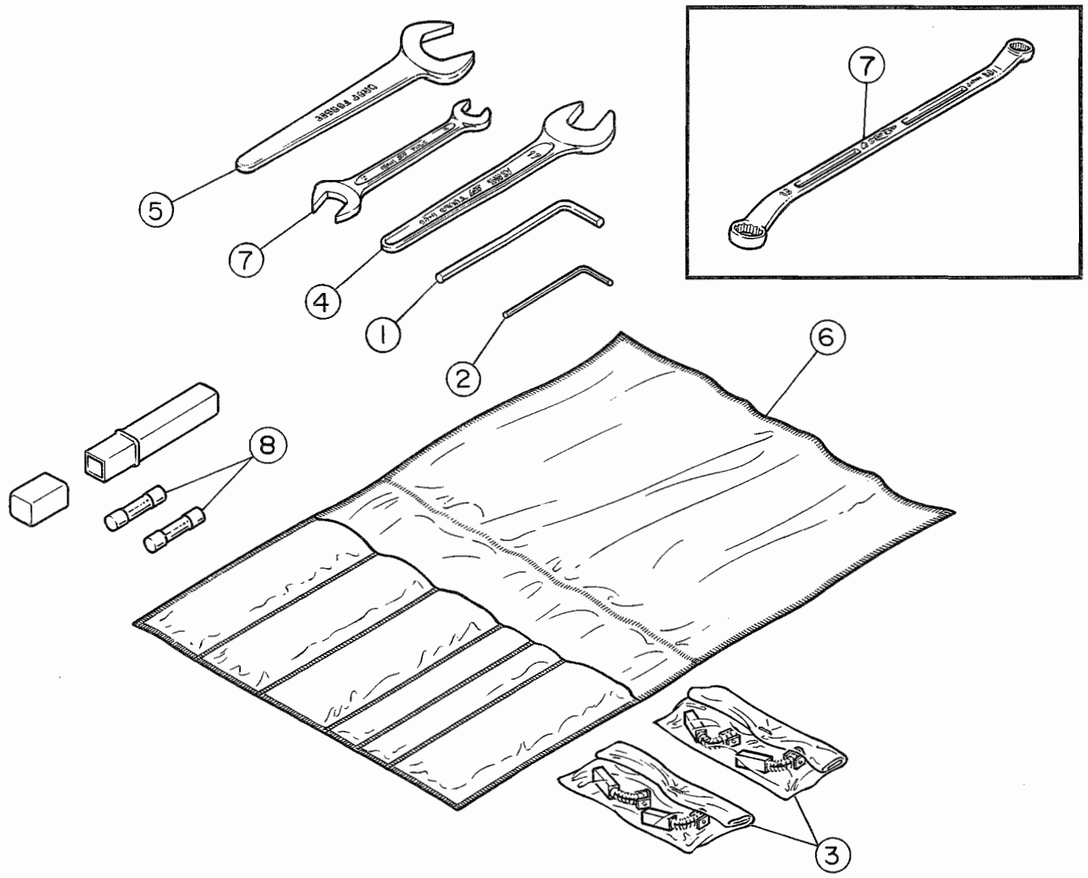
TABLE



CONTROLLER UNIT

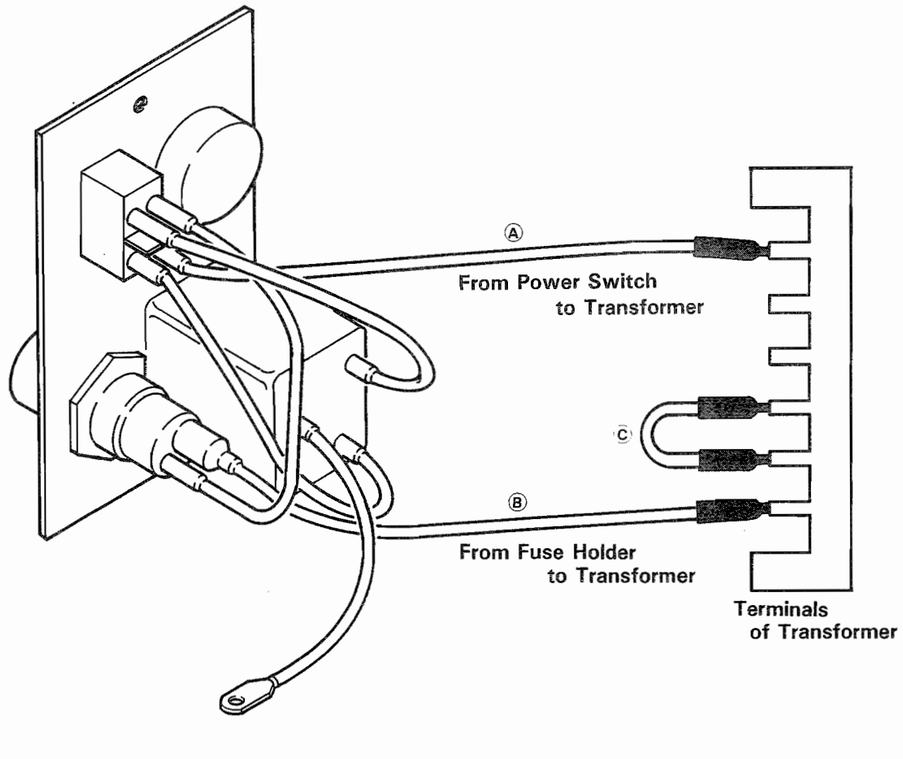


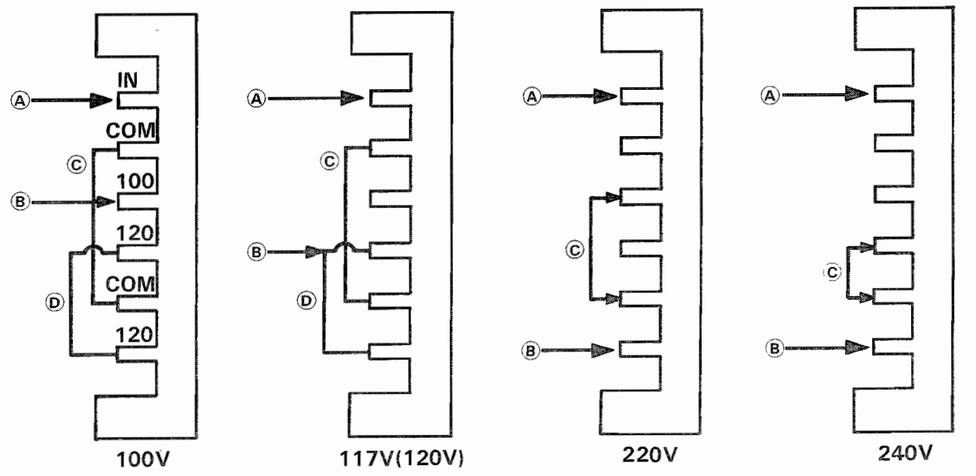
— ACCESSORY TOOL SET —



Ref. No.	7582106000	Accessory tool set
①	12569251	Hexagonal Wrench M5 × 80
②	12569302	Hexagonal Wrench M2.5 × 60
③	12439513	AC Motor Brush
④	12569304	Spanner 17mm
⑤	12569312	Spanner 22mm
⑥	22015712	Soft Tool Case
⑦	12569303	Double Head Spanner 10 × 13
	or	
	12569323	Double Socket Wrench 10 × 13
⑧	12559107	Fuse SGA-3A (100V)
	12559348	Fuse MGC-UL3A (117V)
	12559521	Fuse CEE 1.6A (220/240V)

— COLOR OF LEADS —





COLOR OF LEADS

Ⓐ : RED
Ⓑ : RED
Ⓒ : BLUE
Ⓓ : BLUE

— MECHANICAL PARTS LIST —

Ref. No.	Parts No.	Description

(On this list, One part, electrical parts are included.)

101	2245542801	Power Transformer
102	13149116	Power Switch
103	13429715	AC Inlet
104	12439109	Fan
105	2247026200	Knob (blue)
106	12159749	Edge Protector
107	23495420	Wiring (Main PCB↔Motor PCB)
108	23485194	Wiring (Main PCB↔Counter PCB)
109	22815546	Chassis
110	22025843	Cover for Main PCB
111	22215507	Panel for AC Inlet
112	2215051200	Hexagonal Spacer L = 6mm
113	2215050500	Hexagonal Spacer L = 28.2 mm
114	22245149	Mask of Fan for Dust
115	23495426	Wiring (Motor PCB↔AC Motor)
116	22025310	Cover of Z-axis Column
117	22215769	Side Protector (right)
118	22215768	Side Protector (left)
119	22025309	Head Cover
120	22355353	Base of Head Cover
121	22025746	Pulley Cover
122	22565260	Bellows Cover of Y-axis
123	22565261	Bellows Cover of Z-axis #1
124	22565325	Bellows Cover of Z-axis #2
125	22565263	Holder for Bellows Cover of Z-axis
126	22395120	Magnet
127	22565262	Magic Tape
128	22565276	Bracket for installing Chassis
129		Hexagonal Head Bolt M6 x 50m CM
130	12359112	Rubber Foot
131	12199515	Fuse Holder SN-2250 (100V, 200V, 240V)
132	12199551	Fuse Holder 345601 (117V)

MOTOR

133	22435111	Spindle AC Motor for 100V
134	22435112	Spindle AC Motor for 117V
135	22435113	Spindle AC Motor for 220V
136	22435114	Spindle AC Motor for 240V
137	22435115	X or Y-axis Stepping Motor
138	22435116	Z-axis Stepping Motor

— MECHANICAL PARTS LIST —

Ref. No.	Parts No.	Description

(On this list, One part, electrical parts are included.)

ACCESSORY		
139	7582121000	Senser Switch
140	22675203	Dust Cover for Controller
FUSE		
141	12559107	SGA-3A (100V)
142	12559348	MGC-UL3A (117V)
143	12559521	CEE 1.6A (220/240V)
AC CORD		
144	13499108	VCTFK-3m (100V)
145	13499107	VM-0033 (117V)
146	13439817F0	EC-702-J05 (220V)
147	23495110	BB6742-BB6791 (240V England)
148	13439814F0	SC415-J06 (240V Australia)
FLAME UNIT		
149	12289345	X-axis Ball Thread
150	12289346	Y-axis Ball Thread
151	12289347	Z-axis Ball Thread
152	22025312	Cover of X-Y Table
153	22145320	Slide Bar for X or Y-axis
154	22145321	Slide Bar for Z-axis
155	22145109	Limit SW. Bracket for X-axis
156	22145110	Limit SW. Bracket for Y-axis
157	22145111	Limit SW. Bracket for Z-axis
158	22565269	Spindle Unit
159	22565272	Pulley for Spindle
160	22565273	Pulley for AC Motor
161	22125208	Plate for installing AC Motor
162	22195868	Plate for installing Z-axis Motor
163	12569326	Coupling of X or Y-axis
164	12569266	Coupling of Z-axis
165	22355355	X-Y Table
166	22355354	Base
167	22125209	Bracket
168	22565268	Collet 6mm
169	12179720	Bearing FL608ZZ
170	12569275	Belt
171	13169669	Limit Switch
172	12359131	Rubber Foot
173	22565270	Head
174	22355356	Cross Table
175	22215767	Controller Panel
176	23485195	Controller Cable
177	22485101	Jog Dial Knob
178	22485116	Button (Small)
179	12369502	Bushing
180	22115309	LED. HOUSING
181	22025745	LED. COVER

— SCREWS, WASHERS AND NUTS LIST —

No.	DESCRIPTION	
1	BINDHEAD SCREW	3 × 4mm BC
2	BINDHEAD SCREW	3 × 6mm BC
3	BINDHEAD SCREW	3 × 8mm BC
4	BINDHEAD SCREW	4 × 10mm BC
5	BINDHEAD SCREW	5 × 20mm BC
6	BINDHEAD TAPPINGSCREW	3 × 8mm BC
7	BINDHEAD TAPPINGSCREW	3 × 16mm A¹BC
8	BINDHEAD TAPPINGSCREW	3 × 20mm B¹BC
9	PANHEAD SCREW (DOUBLE SEMS TIPE)	3 × 6mm BC
10	PANHEAD SCREW (DOUBLE SEMS TIPE)	3 × 20mm BC
11	PANHEAD SCREW (DOUBLE SEMS TIPE)	4 × 8mm BC
12	PANHEAD SCREW (DOUBLE SEMS TIPE)	4 × 10mm BC
13	PANHEAD SCREW (DOUBLE SEMS TIPE)	4 × 12mm BC
14	PANHEAD SCREW (DOUBLE SEMS TIPE)	4 × 30mm BC
15	PANHEAD SCREW	3 × 8mm CM
16	FLATHEAD SCREW	3 × 6mm CM
17	HEXAGONAL NUT	M3 CM
18	HEXAGONAL NUT	M4 CM

No.	DESCRIPTION	
19	HEXAGONAL NUT (LONG)	M3 × 6mm CM
20	OVALHEAD SCREW	4 × 8mm BC
21	OVALHEAD SCREW	4 × 12mm BC
22	FLATHEAD TAPPING SCREW	3 × 12mm B¹BC
23	SOKET CAPSCREW	M4 × 12mm BC
24	SOKET CAPSCREW	M4 × 20mm BC
25	SOKET CAPSCREW	M5 × 12mm BC
26	SOKET CAPSCREW	M6 × 15mm BC
27	PLAIN WASHER	M4 CM
28	PLAIN WASHER	M5 CM
29	PLAIN WASHER	M6 CM
30	SPRING LOCKWASHER	M4 CM
31	SPRING LOCKWASHER	M5 CM
32	SPRING LOCKWASHER	M6 CM
33	TOOTHED LOCKWASHER	M3 CM
34	TOOTHED LOCKWASHER	M4 CM
35	HEXAGONAL NUT WITH SPRING LOCKWASHER	M4 CM
36	NUT, U	M8 CM
37	SOKET SET SCREW (DOUBLE POINTS,)	M5 × 5mm BC
38	HEXAGON HEAD BOLT	M6 × 50mm CM

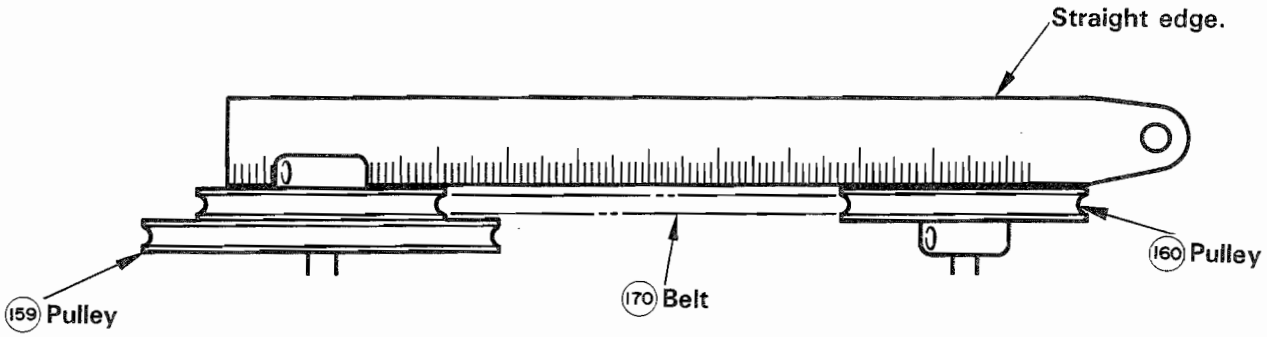
— ADJUSTMENT & MAINTENANCE —

GENERAL:

PARTS construction of PNC-3000 is practically performed with SCREWS or NUTS. It is necessary on the occasion of exchange of PARTS to firm, tighten and add SCREWS or NUTS.
In this section, it is explained about adjustment after exchange of special PARTS and check and maintenance.

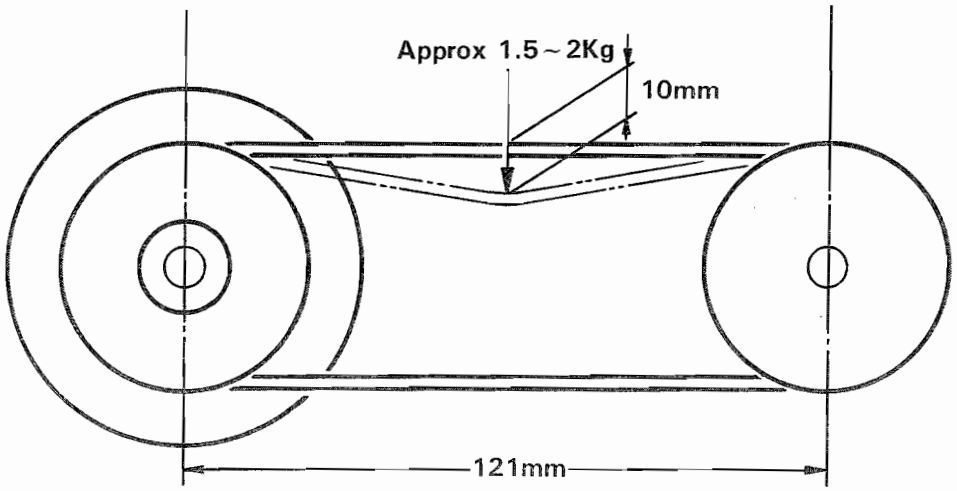
1. ADJUSTMENT OF PULLEYS LEVEL:

Ref. No. (158) Spindle Unit, Ref. No. (133)~(136) Spindle AC Motor, Ref. No. (159) Pulley, Ref. No. (160) Pulley
In case of exchanging these, height LEVEL between PULLEY needs to be adjusted to a state of next manner on the occasion of installation of PULLEY.



2. ADJUSTMENT OF TENSION FOR BELT.

STEP1: In adjusting a tense condition of a belt, the Ref. No. (26) Socket Cap Screws M6 × 15mm BC which have exacted spindle motor is slackened.
STEP2: Distance between CENTER of PULLEY FOR SPINDLE UNIT and PULLEY FOR SPINDLE MOTOR are set on 121mm, and Ref. No. (26) Socket Cap Screws is secured.
STEP3: Ref. No. (170) Belt is set on PULLEYS, measured to a state as follows.



Concerning this plan, distance between PULLEY, TENSION of BELT are generally values.

An aim of adjustment
- Do not slip in terms of BELT.
- When it is performed on over TENSION, since heavy LOAD depends on spindle, please be careful enough.

— ADJUSTMENT & MAINTENANCE —

3. ADJUSTMENT OF PLAY FOR BALLTHREADS.

X, Y axis: Trying to move a table to all directions by hand, please confirm whether there is not play.
About a case with play, please tighten ㊱ U nut lightly.
(It is in need of attention on over tighten.)

Z axis: And a spindle head tries to be moved to top and bottom by hand, please confirm whether and there is not play.
About a case with play, please tighten ㊱ U nut lightly.
Please lock on each ㊱ U nut of X, Y, Z with paint lock (THREEBOND 1401B.)

4. CHECK MODE

PNC-3000 has the "CHECK MODE" which is a test program with a built-in the EPROMs for service engineers. You can try a simple test without the host computer.

[SETTING]

- Connect the AC cord to the AC Line and turn the power switch in position "ON".
- Press "EMERGENCY STOP" button of display panel while press "PAUSE" button and "START" button of controller together.
- Set the origin with pressing "HOME" button of controller.
- At Right side of main unit, set all dip switches in "OFF" position.

CHECK ITEM	OPERATION	DISPLAY & MOTION
DIP Switch 1 Checking	• Turn the X-axis JOG dial knob, until X-axis coordinate display indicate 0.01 , then press "ENTER" button.	X-axis Y-axis 0.01 0.00 "ON" LED of DATA INPUT on controller lights.
	• Set all switches of DIP-SW-1 in "ON" position, then press "ENTER" button.	"OVER" LED of DATA INPUT on controller lights.
	For next step, set all switches of DIP-SW-1 in "OFF" position and press "ENTER" button.	When "ON" LED and "OVER" LED light, all switches are normally. When "ON" LED and "ERROR" light, some switch is wrong. At the same time, Y-axis coordinate display indicate wron switch's number.

— ADJUSTMENT & MAINTENANCE —

4. CHECK MODE

CHECK ITEM	OPERATION	DISPLAY & MOTION
DIP Switch 2 Checking	• Turn the X-axis JOG dial knob, until X-axis coordinate display indicate [0.02], then press "ENTER" button.	X-axis Y-axis 0.02 0.00 "ON" LED of DATA INPUT on controller lights.
	• Set all switches of DIP-SW-2 in "ON" position, then press "ENTER" button.	"OVER" LED of DATA INPUT on controller lights. Same as DIP-SW-1.
	For next step, set all switches of DIP-SW-2 in "OFF" position and reset by pressing "ENTER" button.	
ROM version number Checking	• Turn the X-axis JOG dial knob, until X-axis coordinate display indicate [0.03], then press "ENTER" button.	X-axis Y-axis 111 202
	For next step, press "ENTER" button.	ROM.A version is indicated on X-axis coordinate display and ROM.B version is indicated on Y-axis coordinate display.
Moving check	• Turn the X-axis JOG dial knob, until X-axis coordinate display indicate [0.05], then press "ENTER" button.	X-axis Y-axis Z-axis 000.00 000.00 000.00 180.00 150.00 150.00 At the same time, X-Y Table and spindle head are traveling between 0. and max. distance.
	• With keeping above sutiation, press "PAUSE" button.	Traveling of X-Y Table and spindle head stop.
	• Turn the spindle control knob in Max. position, and then press "PAUSE" button (PAUSE OFF).	Spindle Unit revolve with max. speed and X-Y Table and spindle head travel again.

— ADJUSTMENT & MAINTENANCE —

5. CHECK & MAINTENANCE for MOTOR BRUSH

Attrition of Motor Brush cause trouble of Spindle motor.
And it is greatly affected by revolution speed of spindle Motor and power supply voltage that is supplied to spindle Motor.
It is mentioned by USER'S MANUAL of CAMM-3 with "The CAMM-3 should be serviced after every 250 hours of use to prevent the gradual attrition of part ...".
But, attrition of Motor Brush was about 1 or 2mm by 250/h in the example that we actually checked.

An occasion of MAINTENANCE of CAMM-3

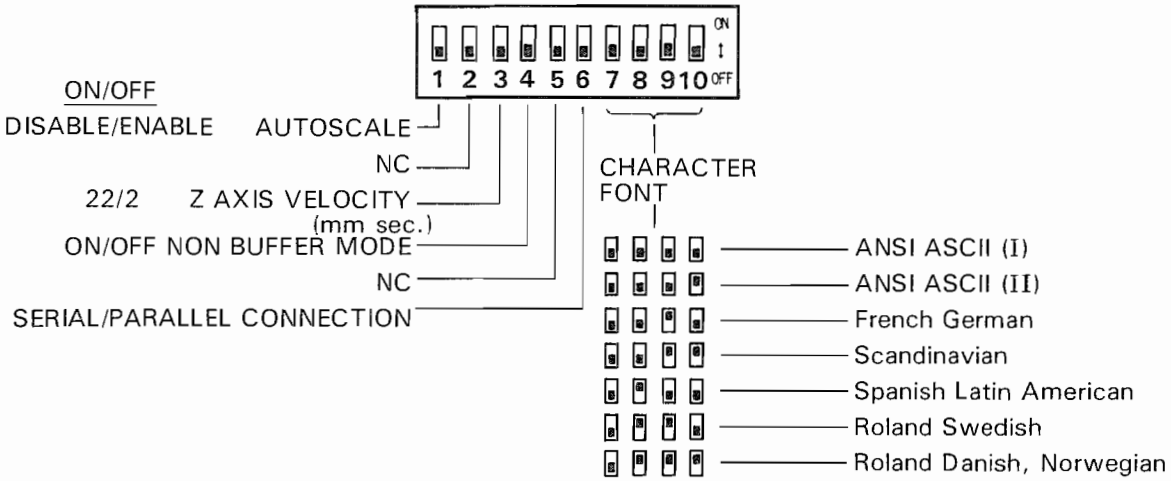
- Please check at attrition degree of Motor Brush on the right of spindle motor at first.
- If attrition degree is large, please exchange Motor Brush of right and left side at the same time.
- When Motor Brush of the left side is exchanged, loosen the Ref. No. 25 socket cap screws which secure spindle motor, then change the direction of Motor.
  Please do not forget readjusting tension of a belt after Motor Brush exchange.

6. CHECK of TIMER

Timer has been attached in the position of F-3 on Main Board.
Mark of this part moves graduation 0 to 10 by the current which is supplied to spindle motor.
It shows Motor being used for 1000 hours when Mark moved to graduation 10.
In doing and furnishing the contrary with upper and lower, it can be used again for 1000 hours.
Please utilize on the check of Motor Brush, other Maintenance and so on efficiently.

— DIP SWITCH SETTING LIST —

SW-1



SW-2