

EM-2000

CREATIVE KEYBOARD

64 VOICE POLYPHONY

SERVICE NOTES

First Edition

Issued by RES

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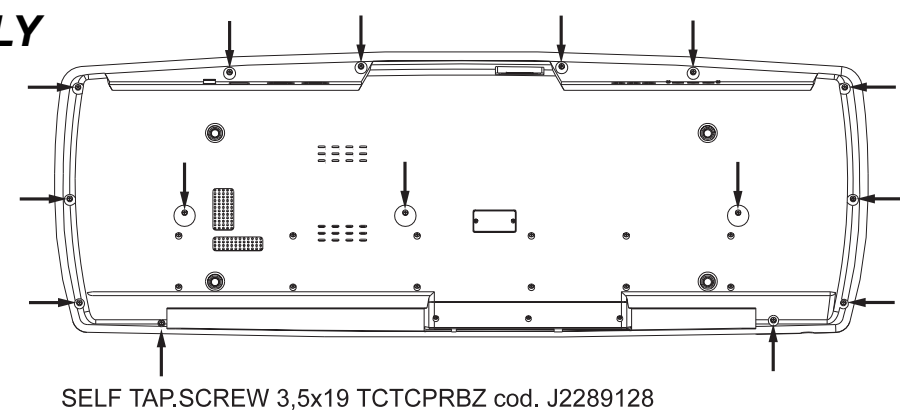
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Specifications

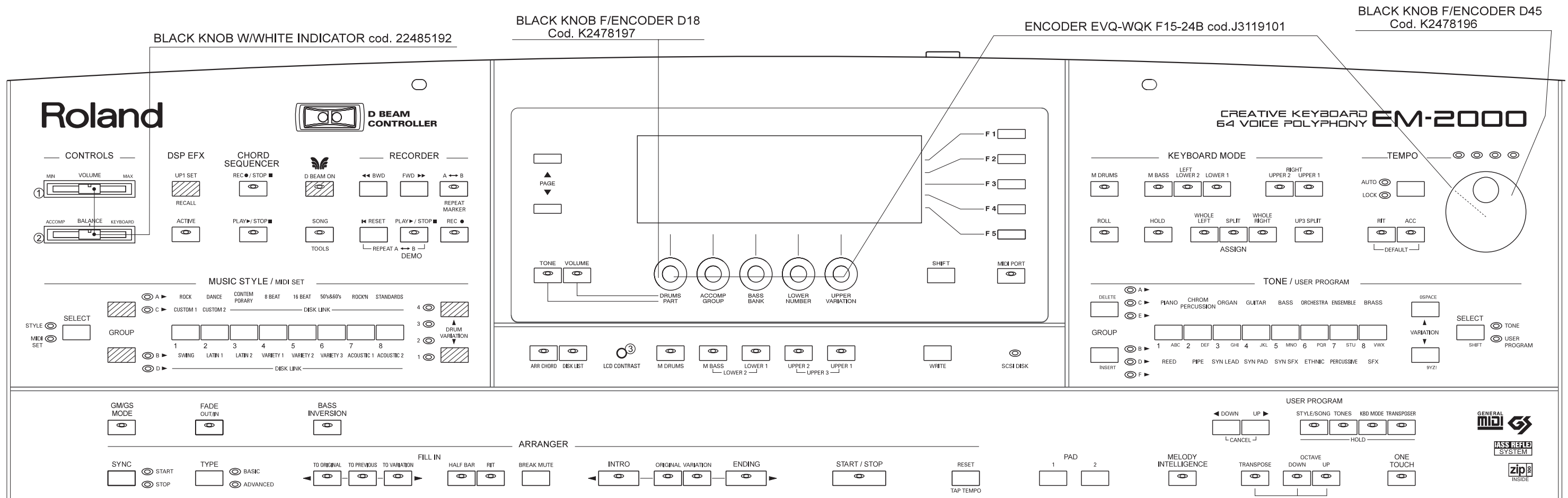
- Keyboard** : 61 Keys, velocity sensitive with Channel Aftertouch.
- Sound Source** : SC-88 Pro Like, 32 Multitimbral Parts.
- Maximum polyphony** : 64 Voices
- Tones** : Enhanced variation tones (1161 Top-notch sounds + 43 drum Kits including Oriental kit) GM-GS compatible
- Wave Memory** : 24MBytes.
- Macro Editing** : Vib Rate, Vib Depth, Vib Delay, Cutoff Freq, Resonance, Attack Time, Decay Time, Release Time.
- Music Styles** : 128 at high definition, Included 16 "Acoustic Styles" on Rom (120 Cpt/quarter note, with Pitch Bender,; Control Change, etc.), 8 polyphonic tracks for each division.
- Custom Styles** : 16 on programmable Flash Eprom (8 tracks for each style). **(Memory Backup at Power -Off)**
- Content of ZIP Disk** : 441 Music Styles + 306 SMF Songs
- Performance Memories** : 192
- Midi Sets** : 8
- 16 Trk song sequencer** : Complete MIDI editing (Quantize, copy, erase, delete, etc...)
- Built-in Effects** : Digital Reverb, Chorus, Delay, Parametric Equalizer, Insert Effects.
- Hard Disk** : Internal ZIP Driver.
- SCSI** : SCSI Socket for any external SCSI Devices.
- Floppy Disk Drive** : HD/DD-type for SMF playback without loading. Load/Save of User Styles, Performance Memories, Midi Set, Chord Sequences.
- Display** : New Wide Graphic 240x64 pixel CCFL backlit LCD with software windows management.
- Power Supply** : Direct AC (Universal Switching Power Supply).
- Jack/connectors** : Stereo Phones, Output L/mono-R, Input L/Mono-R, Sustain Footswitch, Expression Pedal, Programmable Foot Switch, External Multi switch pedal (FC7), MIDI (In, Out, Thru),
- Controls** : Master Volume (Slider), Balance (Slider), LCD Contrast (Rotative), Tempo (Encoder), Part Volume (Encoder 5pcs), Bender & Modulation (Lever).
- Output (L/Mono) Level** : - 6 dBm
Master Volume at maximum
Balance at center
Reverb at zero
Chorus at zero
Select Sine Wave Tone (D31 Var.7)
Play C4 key (Velocity at maximum)
- Output Impedance** : 680 Ohm
- Input (L/Mono) Level** : 0 dBm
Power Amplifier at clipping
1KHz Sine Wave on External Input L/Mono
- Input Impedance** : 22K Ohm
- Phones Output Level** : + 8 dBm
Master Volume at maximum
Balance at center
Reverb at zero
Chorus at zero
Select Sine Wave Tone (D31Var.7)
Play C4 key (Velocity at maximum)
30 Ohm Stereo Phones
- Phones Output Impedance** : 100 Ohm
- Minimum Phones Impedance** : 8 Ohm
- Speakers** : Two way Stereo System, in Bass Reflex boxes (2x10 cm Woofer, 2x3 cm Tweeter)
- Amplification** : 20W + 20W Musical Power.
- Power Consumption** : 70 W (AC 100V; AC 117V; AC 230V; AC240V)
- Dimensions** : 1176 (W) X 412 (D) X 165 (H) mm
- Weight** : 17 Kg
- Option** : PK-5; FC-7; MSA/MSD/MSE; RH-20/80/120; DP-2; DP-6; FS-5U; EV-5; BOSS FV-300L; KC-100/300/500
- Accessories** : See " EM-2000 Parts List " on page 10.



DISASSEMBLY



LOCATION OF CONTROLS



● BUTTON mm 29x8 (BLACK)+DIFF. cod. K247819901

◻ BUTTON GROUP(4) mm 22x8 (BLACK)+DIFF. cod. K247820001

◻ BUTTON GROUP(4) mm 15x8 (BLACK)+DIFF. cod. K247820101
 ◻ BUTTON GROUP(2) mm 15x8 (BLACK)+DIFF. cod. K247820501

◻ BUTTON GROUP(4) mm 15x8 (BLACK) cod. K247820301
 ◻ BUTTON GROUP(2) mm 15x8 (BLACK) cod. K247820601

◻ BUTTON mm 15x5 (BLACK) cod. K247820401

LED DIODE TLHG4401-GREEN cod. 15029320RI

LED DIODE TLHR4401-RED cod. 15029284RI

LED DIODE 3 TLH04400-ORANGE cod. J5029110

▨ BUTTON GROUP(4) mm 15x8 (GREY)+DIFF. cod. K2478263

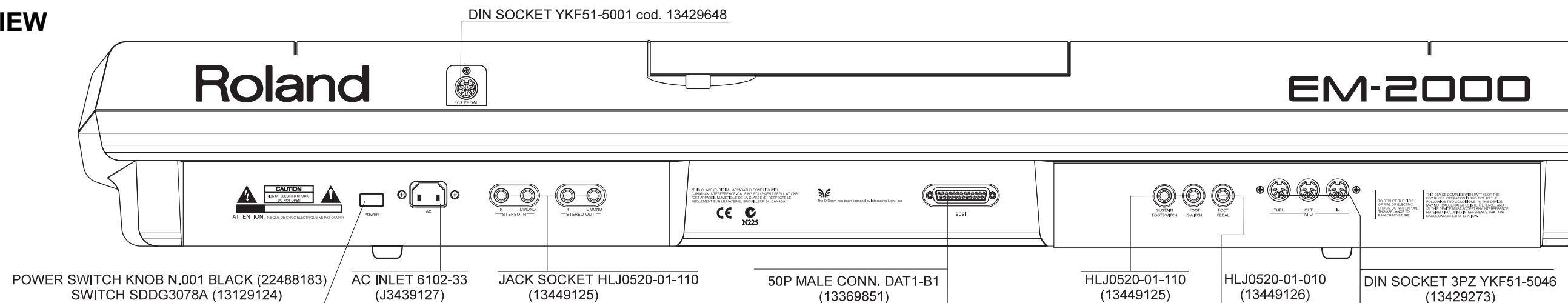
▨ BUTTON GROUP(4) mm 15x8 (GREY) cod. K2478262

① SLIDER POT. NNN-X10-B14 cod. 00671556

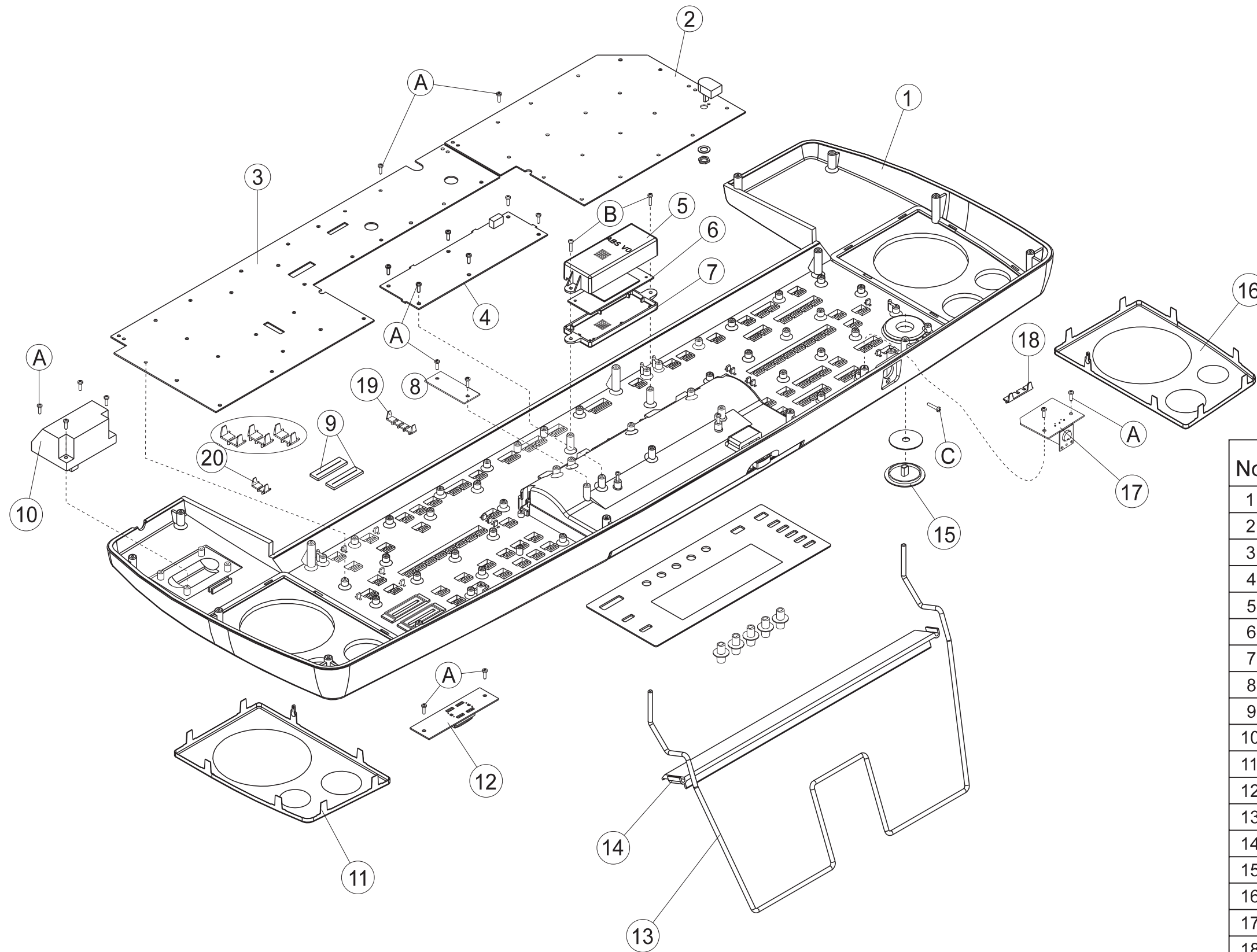
② SLIDER POT. RS30111 cod. 00346178

③ ROT POT. EVUF2AH20B53 cod. J3219107

REAR VIEW



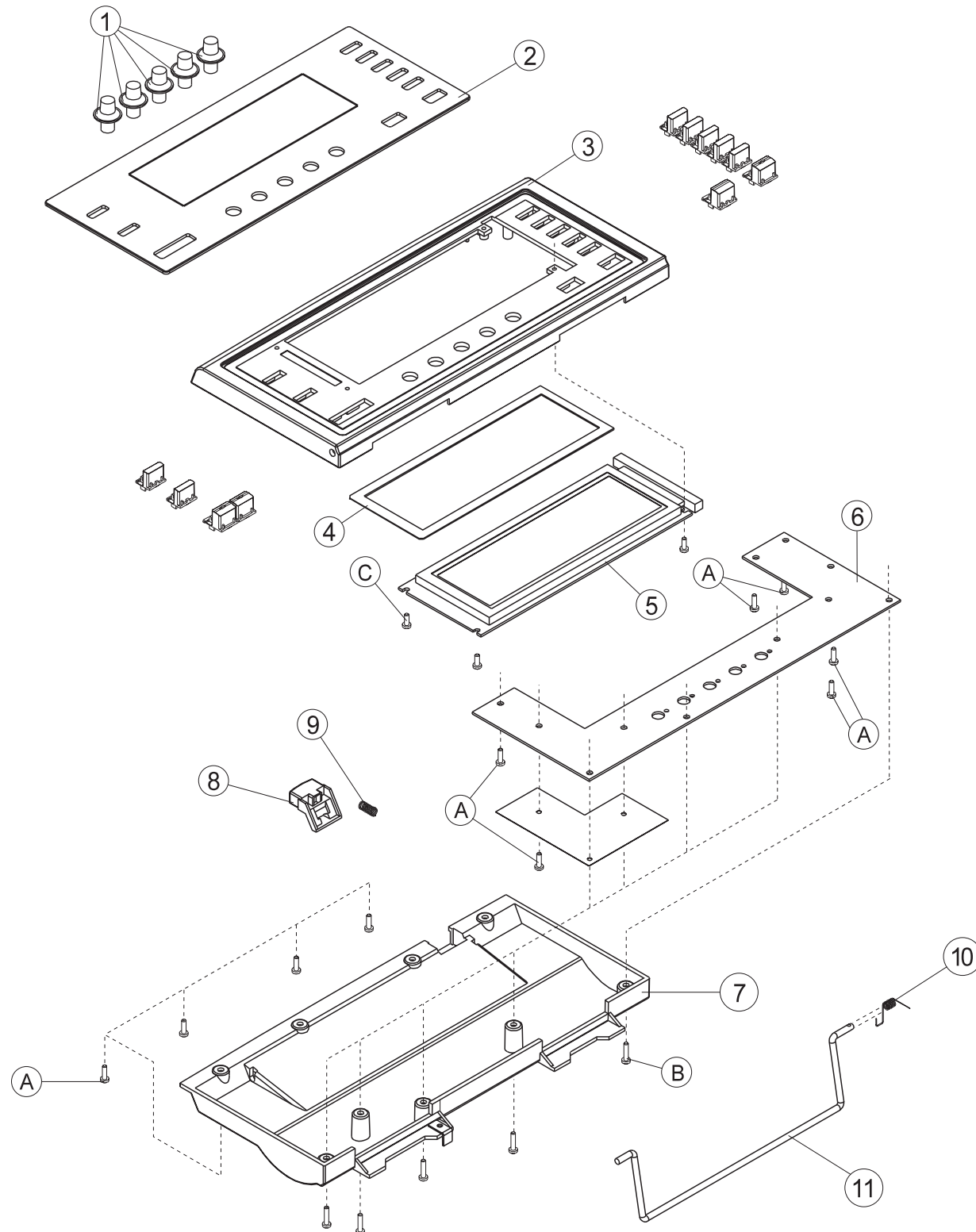
EXPLODED VIEW (TOP 1/2)



No	PART NAMES	PART NUMBERS
1	VARN.+SILK. TOP CABINET	7700414000
2	RIGHT CONTROLS PCB ASSY	7700402000
3	LEFT CONTROLS PCB ASSY	7700403000
4	ANTI-REBOUND ASSY	7700406000
5	PROTECTING BOX COVER F/INVERTER	K2248127
6	INVERTER ASSY	7698708000
7	PROTECTING BOX BASE F/INVERTER	K2248128
8	BOUNCE-TO-LCD ASSY	7700421000
9	ANTIDUST COVER PL30N	K2248129
10	TURBOLESS PITCH BENDER PBH0201	70564101
11	LEFT LOUDSPEAKER GRILL	K2248143
12	D-BEAM CONTROL PCB ASSY	7700410000
13	MUSIC REST	K2198103
14	MUSIC SCORE HOLDER	22208320
15	BLACK KNOB F/ENCODER E.D.45	K2478196
16	RIGHT LOUDSPEAKER GRILL	K2248142
17	FC-7 CONNECTION ASSY	7700419000
18	DIFFUSER F/4 LED (HORIZONTAL)	K2238121
19	DIFFUSER F/4 LED (VERTICAL)	K2238122
20	DIFFUSER F/3 LED (VERTICAL)	K2238123
SCREW		
A	SCREW 2,9x10 TCTCPR TROP	J2289125
B	SCREW 2,9x13 TCTCPR TROP	J2289130
C	SCREW 2,9x16 TCTCPR BR	J2289118

EXPLODED VIEW (TOP 2/2)

No	PART NAMES	PART NUMBERS			
1	BLACK KNOB F/ENCODER E.D.18	K2478197			
2	SILKSCREENED PLEXIGLASS	7700412000	9	SPRING F/UP-DOWN BUTTON	K217810301
3	VARN.COVER F/LCD UNIT	7700411000	10	SPRING	K217810201
4	PL30N LCD	K2248141	11	SHAPED VARN. BAR	K2148109
5	LCD ASSY	7700413000		SCREW	
6	CENTRAL CONTROL PCB ASSY	7700404000	A	SCREW 2,9x10 TCTCPR TROP	J2289125
7	LCD UNIT PLASTIC BOTTOM	K2018117	B	SCREW 2,9x13 TCTCPR TROP	J2289130
8	UP-DOWN BUTTON F/LCD	K2478264	C	SCREW 2,9x8 TCTCPR BR	J2289126



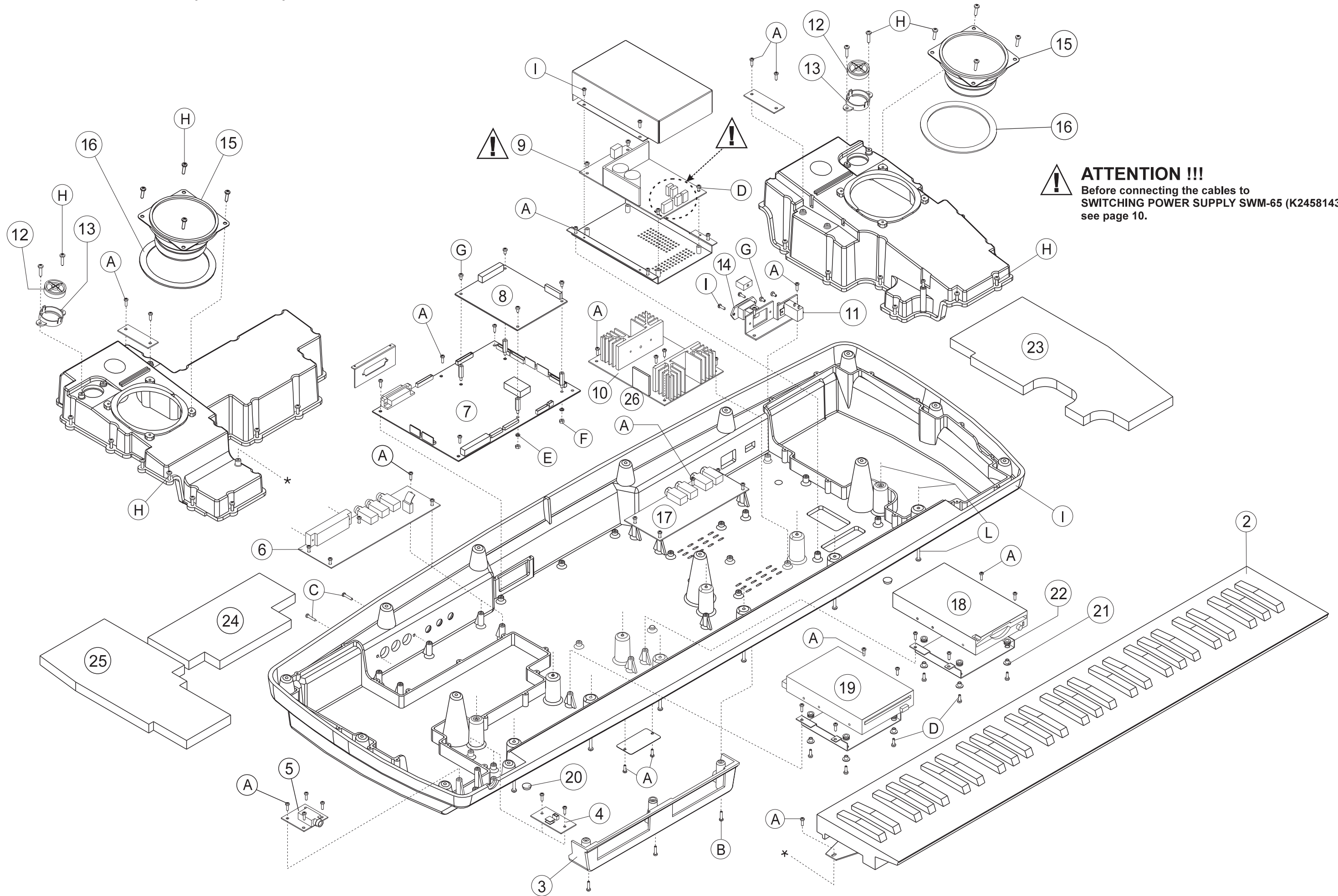
PARTS LIST OF EXPLODED VIEW (BOTTOM)

No	PART NAMES	PART NUMBERS
1	VARN+SILK.BOTTOM CABINET	7700416000
2	61-KEY KEYBOARD ASSY TP9S-AT	7700417000
3	VARN.GUIDE F/FDD+ZIP DRIVER	7700429000
4	BOUNCE-TO-AFTERTOUCH ASSY	7700420000
5	HEADPHONES ASSY	7627109000
6	MIDI ASSY	7700405000
7	CPU PCB ASSY	7700407000
8	XPGS-PRO PCB ASSY	7700102000
9	SWITCHING POWER SUPPLY SWM-65	K2458143
10	AMPLIFIER ASSY	7700401000
11	SWITCH SDDG3078A	13129124
12	TWEETER SPEAKER W/CABLES	K2418118
13	SUPPORT F/TWEETER	K1188130
14	AC INLET 6102-33	J3439127
15	WOOFER SPEAKER D. 90mm	K2418117
16	SPEAKER GASKET 107/88 TH.2	K2228103
17	AUDIO PCB ASSY	7700408000
18	INTERNAL SCSI ZIP DRIVER 100MB	J2409104
19	FLOPPY D.DRIVER JU-257 A786P	J2409102
20	RUBBER 3M ART. SJ5012	J2359101
21	BRASS BUSHING	22165134
22	RUBBER GUIDE BUSHING	22265242
23	RIGHT SOUNDPROOFING FOAM	K2268152
24	L. SOUNDPROOFING FOAM 220X111	K2268154
25	LEFT SOUNDPROOFING FOAM	K2268153
26	EQ BOARD ASSY	7700409000
SCREW		
A	SCREW 2,9x10 TCTCPR TROP	J2289125
B	SCREW 2,9x13 TCTCPR TROP	J2289130
C	SCREW 2,9x16 TCTCPR BR	J2289118
D	SELF LOCK. SCREW M3x10 TCTC H.6	J2289108
E	TOOTHED WASHER I/D 3	J2139102
F	NUT 3MA H.6	J2289113
G	SELF LOCK. SCREW M3x6 TCTC H.6	J2289193
H	SCREW 3,5x16 TCPR TFR H.8 BRUN	J2289186
I	SELF TAP. SCREW 2,9x10 TCTC	J2289102
L	SELF TAP SCREW 3,5x19 TCTCPRBZ	J2289128

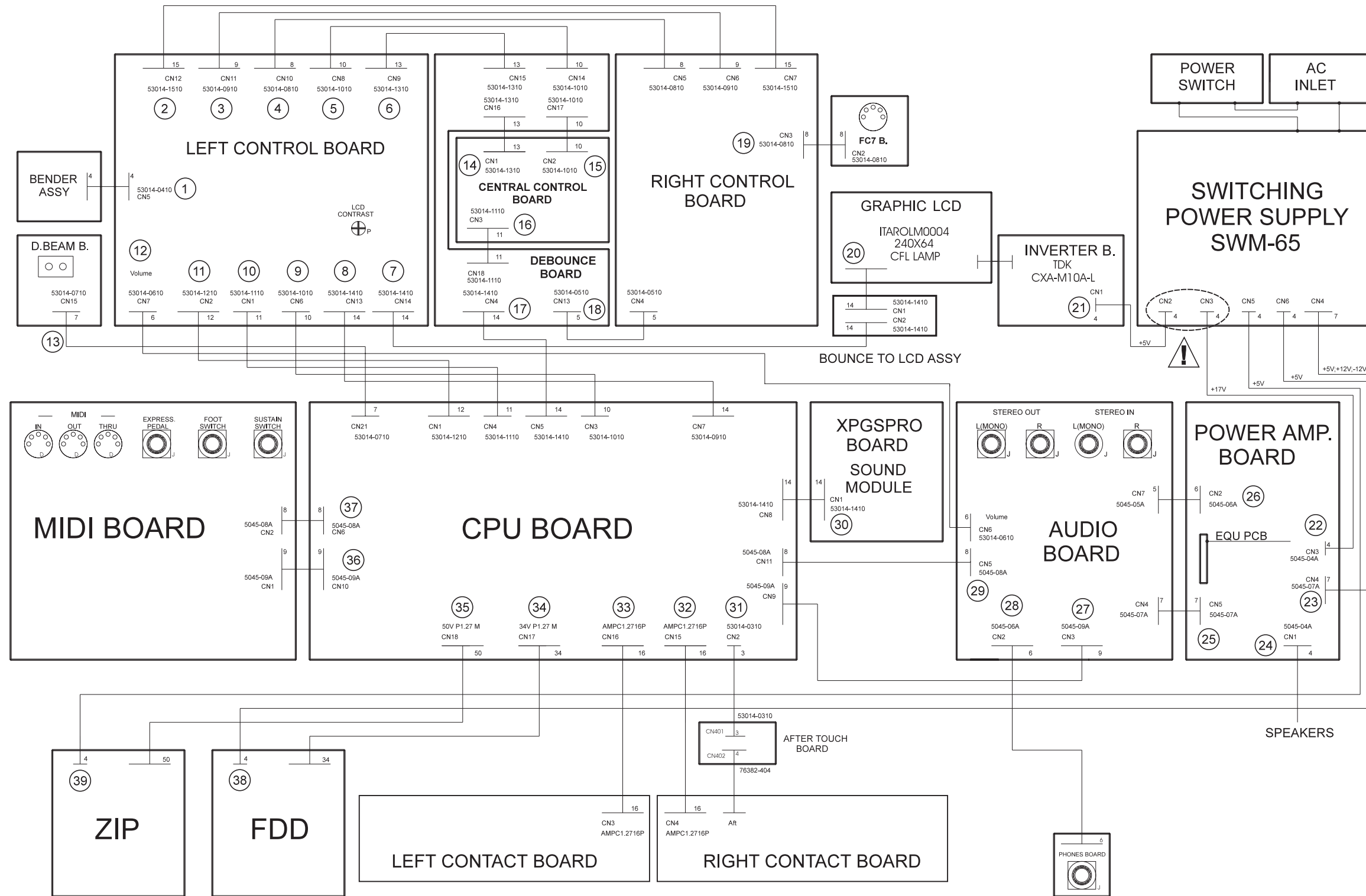
**ATTENTION !!!**

Before connecting the cables to SWITCHING POWER SUPPLY SWM-65 (K2458143) see page 10.

EXPLODED VIEW (BOTTOM)



WIRING DIAGRAM



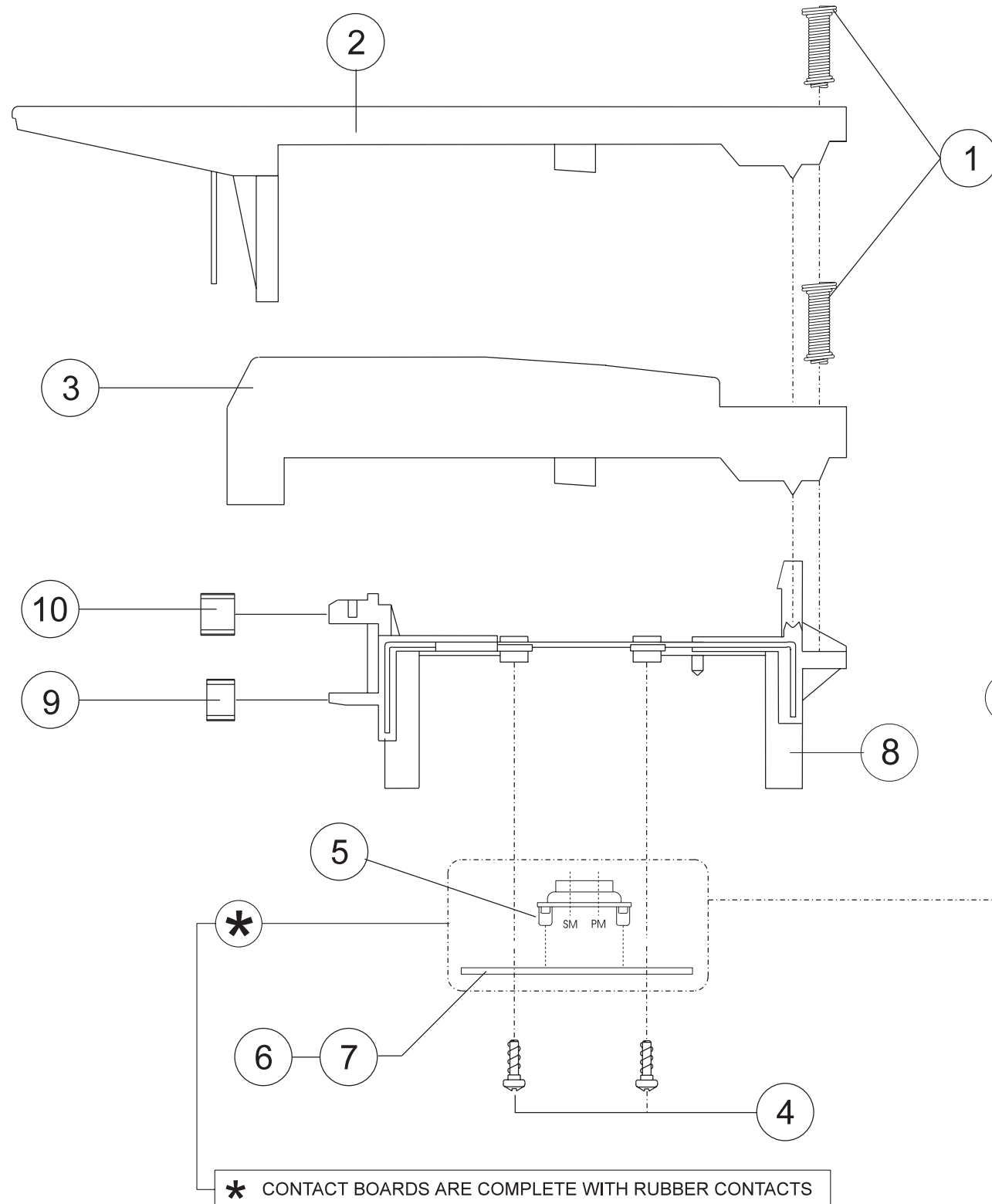
ATTENTION !!!
 Before connecting the cables to SWITCHING POWER SUPPLY SWM-65 (K2458143), see page 10

WIRING PARTS LIST

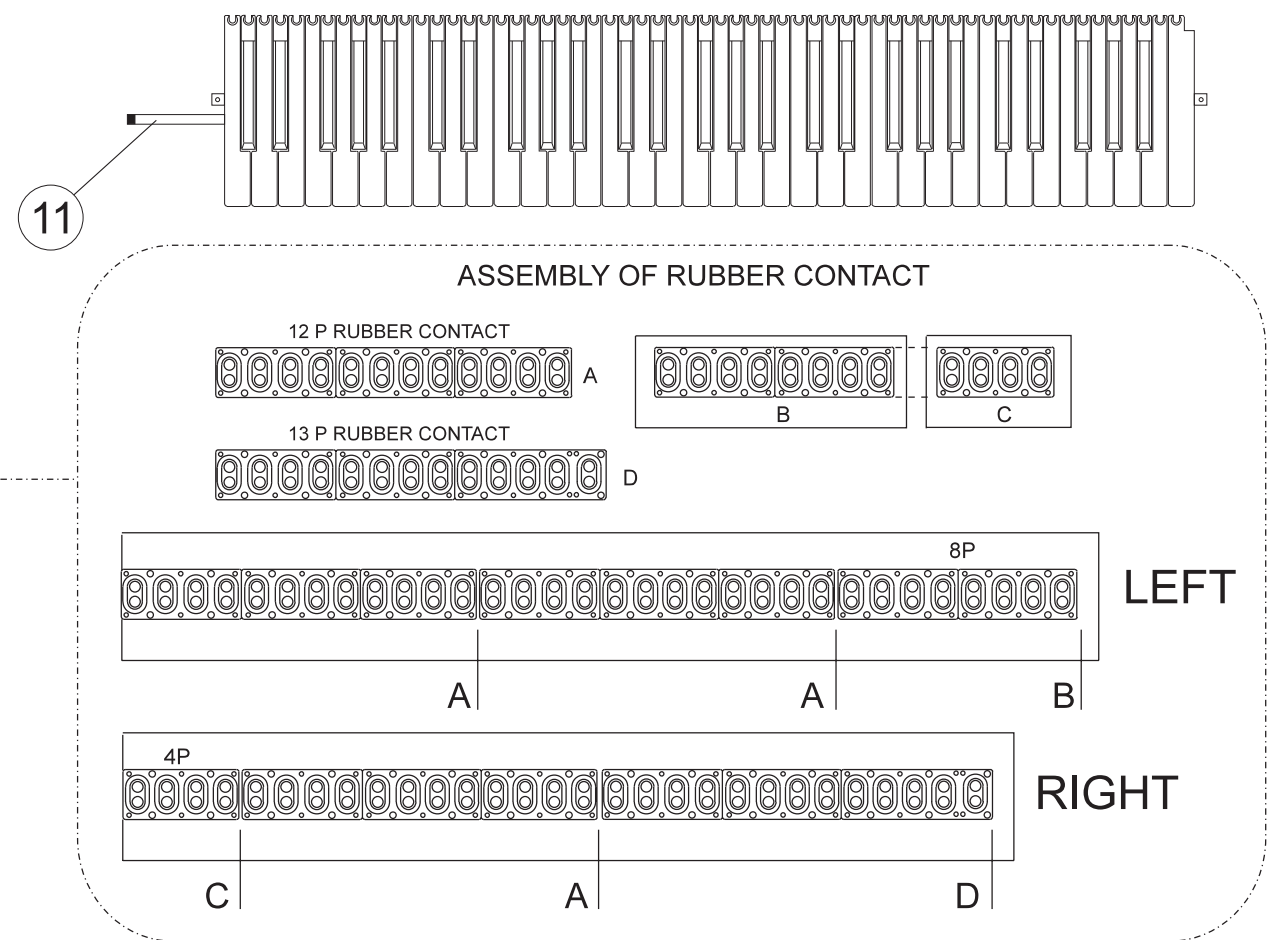
1	00783234	BENDER CABLE	(4)	2C P.2	16	7700424000	11P CABLE ASSY	(12)	2C P.2	30	7700123000	14P CABLE ASSY	(8)	2C P2
2	7700425000	15P CABLE ASSY	(50)	2C P.2	20	7700423000	14P CABLE ASSY	(20)	2C P.2	32	7695008001	16P FLAT CABLE	(26)	2C
3	7700426000	9P CABLE ASSY	(6)	2C P.2	21	K3468156	4P CABLE	(90)	2C D/D	33	K3468186	16P FLAT CABLE	(36)	2C
4	7700427000	8P CABLE ASSY	(6)	2C P.2	22	K3468155	4P CABLE 2N/2V	(28)	2C D/R	34	K3468198	34P FLAT CABLE	(18)	2C
5-6:					23	K3468199	7P CABLE	(28)	2C D/R	35	K3468197	50P FLAT CABLE	(36)	2C
	7700430000	DEBOUNCE WIRING ASSY			24	K3468160	4P CABLE ASSY (28/106)		W/4PC					
7-8-9-10-11-12-13-17-18-19:					25	7697239001	7P CABLE ASSY	(16)	2C D/R					
	7700431000	TOP CBN WIRING ASSY			26-27-28-29-31:									
14	7700422000	13P CABLE ASSY	(12)	2C P.2		7700432000	BOTTOM CBN WIRING ASSY							
15	7699413000	10P CABLE ASSY	(12)	2C P.2										

KEYBOARD PARTS LIST

61-KEY KEYBOARD TP/9S-AT code 7700417000



No.	PARTS NAME	CODE
1	KEY SPRING	22178233
2	NATURAL KEY C5 DO	22578319
	NATURAL KEY D6 RE	22578328
	NATURAL KEY E7 MI	22578329
	NATURAL KEY F1 FA	22578330
	NATURAL KEY G2 SOL	22578331
	NATURAL KEY A3 LA	22578332
	NATURAL KEY B4 SI	22578333
	NATURAL KEY C8 DO (F)	22578334
3	SHARP KEY	22578335
4	SELF TAP SCREW 2.9x8 TCTCPBZ	J2289126
5	12P RUBBER CONTACT	2218523801
	13P RUBBER CONTACT	2218523901
6	LEFT CONTACT PCB ASSY+RUBBER CONTACT	7624505000
7	RIGHT CONTACT PCB ASSY+RUBBER CONTACT	7624504000
8	PLASTIC CHASSIS	22818761
9	GUIDE BUSHING INFERIOR	J2359104
10	GUIDE BUSHING SUPERIOR	22158789
11	SENSOR AFTER TOUCH	J3169109



PARTS LIST EM-2000 (117V/230V/230VE/240VA)

SAFETY PRECAUTIONS :

The parts marked Δ have safety-related characteristics. Use only listed parts for replacement.

CONSIDERATION ON PARTS ORDERING

When ordering any parts listed in the parts list, please specify the following items in the order sheet.

QTY	PART NUMBER	DESCRIPTION	MODEL NUMBER
Ex. 10	2257241	Sharp Key	C-2050
15	2247017300	Knob (orange)	DAC-15D

Failure to completely fill the above items with correct number and description will result in delayed or even undelivered replacement.

NOTE : The parts marked " # " are new (Initial Parts).
The parts marked Δ have Safety - Related characteristics.
Use only listed parts for replacement.

<< EMI >>: Component for EMC.

Note : Replacement should be made on a unit basis. No replacements available for individual parts. Replacement only be a unit.

CASING

#	7700414000	VARN+SILK.TOP CABINET	EM-2000
#	7700416000	V.+SILK.BOTTOM CABINET	EM2000
#	7700411000	VARN.COVER F/LCD UNIT	EM2000
#	7700429000	VARN.GUIDE F/FDD+ZIP DRIVER	EM2000
#	7700412000	SILKSCREENED PLEXIGLASS	EM2000
#	K2018117	LCD UNIT PLASTIC BOTTOM	EM2000
#	K2198103	MUSIC REST	EM-2000
#	22208320	MUSIC SCORE HOLDER	
#	K2248142	RIGHT LOUDSPEAKER GRILL	EM2000
#	K2248143	LEFT LOUDSPEAKER GRILL	EM2000
#	K2148109	SHAPED VARN. BAR	EM-2000

CHASSIS

K2248127	PROTECTING BOX COVER F/INVERTER
K2248128	PROTECTING BOX BASE F/INVERTER

KNOB BUTTON

K2478196	BLACK KNOB F/ENCODER E.D.45	
K2478197	BLACK KNOB F/ENCODER E.D.18	
#	K2478262	4-BUTTON GROUP 15X8 (GREY)
#	K2478263	4-BUTTON GROUP+DIFF 15X8 (GREY)
#	K2478264	UP-DOWN BUTTON F/LCD EM-2000
K247819901	BUTTON W/DIFF 29X8 (BLACK)	
K247820001	4-BUTTON GROUP+DIFF. 22X8 (BLACK)	
K247820101	4-BUTTON GROUP+DIFF. 15X8 (BLACK)	
K247820301	4-BUTTON GROUP 15X8 (BLACK)	
K247820401	BUTTON 15X5 (BLACK)	
K247820501	2-BUTTON GROUP+DIFF. 15X8 (BLACK)	
K247820601	2-BUTTON GROUP 15X8 (BLACK)	
22488183	POWER SWITCH KNOB N.001	BLACK
22485192	BLACK KNOB W/WHITE INDICATOR	

SWITCH

1312975301	SWITCH	EVQ-QSB 05K GR.160	on RCB, CCB, LCB
13129124	SWITCH	SDDG3078A	POWER
13159187	SLIDE SWITCH	SSSS2-22-01	SW2, SW3 on CPU

JACK, SOCKET

13449252	JACK SOCKET	YKB 21-5006	JK1 on PHB
13449125	JACK SOCKET	HLJ0520-01-110	JK2, JK3 on MIB / JK2=>JK5 on AB
13449126	JACK SOCKET	HLJ0520-01-010	JK4 on MIB
13429273	DIN SOCKET	3PZ YKF51-5046	JK5 on MIB
13429648	DIN SOCKET	YKF51-5001	JK1 on FC7B

DISPLAY UNIT

Note # 7700413000 LCD ASSY

DISK DRIVE UNIT

Note E J2409104 INTERNAL SCSI ZIP DRIVER 100MB
Note J2409102 FLOPPY D. DRIVER JU-257 A786P

Note : You can use also the FDD JU-257A 166P (J2409101) but before using it, BE CAREFUL AND SET IT as shown in the E-500 Service Notes (Page 4)

BENDER UNIT

Note 70564101 TURBOLESS PITCH BENDER PBH0201

SPEAKER

K2418117	WOOFER SPEAKER D.90 MM
K2418118	TWEETER SPEAKER W/CABLES

CPU = CPU Board
XPGS = XPGS PRO Board
AB = AUDIO Board
LCB = LEFT CONTROL Board
RCB = RIGHT CONTROL Board
CCB = CENTRAL CONTROL Board
DEB = DEBOUNCE Board
DBB = D.BEAM Board
MIB = MIDI Board
FC7B = FC7 Board
B.LCD B = BOUNCE TO LCD Board
PAB = POWER AMP Board
IB = INVERTER Board
AFT = AFTER TOUCH Board
LB = LEFT CONTACT Board/w Rubber C.
RB = RIGHT CONTACT Board/w Rubber C.
EQB = EQUALIZ. Board

KEYBOARD ASSY

7700417000 61-KEY KEYBOARD ASSY TP9S-AT

NOTE : For details, refer to KEYBOARD PARTS LIST (Pag.7)

POWER SUPPLY UNIT

Note # K2458143 SWITCHING POWER SUPPLY SWM-65

ATTENTION : Before connecting the cables to Switching Power Supply SWM-65 (K2458143), see page 10.

PCB ASSY

#	7700401000	AMPLIFIER ASSY	EM-2000
	7627109000	HEADPHONES ASSY	
	7698708000	INVERTER ASSY	E-500/E-300
#	7700410000	D-BEAM CONTROL PCB ASSY	EM2000
#	7700419000	FC-7 CONNECTION ASSY	EM-2000
#	7700402000	RIGHT CONTROLS PCB ASSY	EM2000
#	7700403000	LEFT CONTROLS PCB ASSY	EM-2000
#	7700404000	CENTRAL CONTROLS PCB ASSY	EM-2000
#	7700405000	MIDI ASSY	EM-2000
#	7700406000	DEBOUNCE PCB ASSY	EM-2000
#	7700420000	BOUNCE-TO-AFTERTOUCH ASSY	EM-2000
#	7700421000	BOUNCE-TO-LCD ASSY	EM-2000
#	E 7700102000	XPGS-PRO PCB ASSY	G1000/EM2000
#	E 7700407000	CPU PCB ASSY	EM-2000
#	7700408000	AUDIO PCB ASSY	EM-2000
#	7700409000	EQ BOARD ASSY	EM-2000
	7624504000	RIGHT CONTACT PCB ASSY W/RUBBER	
	7624505000	LEFT CONTACT PCB ASSY W/RUBBER	

IC

00900901	INVERTER MODULE CXA-M10AL		on IB	
15189210	I.C. BA 5218F	(OP AMP)	IC1, IC4, IC11 on AB	
J5259112	I.C. PCM69AU	DAC (RED LINE)	IC5 on AB	
15289402	I.C. TA 78L05F	(REGUL.+5V)	IC6 on AB	
15199904	I.C. M51953 BL	(STANDING)	IC10, IC12 on AB	
15289105	I.C. UPC 4570G	(OP AMP)	IC3, IC9 on AB / IC1, IC26, IC27 on CPU	
00343823	I.C. M60205-0601FP	(CUSTOM IC)	IC3 on CPU	
K525814513	I.C. HD6437034AF20XX	FLAT	IC4 on CPU (Programmed)	
15219183	I.C. M51953 A STANDING	(RESET IC)	IC5 on CPU	
15259701	I.C. 74 HC 00	FLAT	IC6 on CPU	
15259885	I.C. TC7S32F	CMOS	IC7, IC14 on CPU	
K5258109	I.C. 74 HC 74	FLAT	IC8 on CPU	
7700134000	I.C. ENC6 IC9 CPU	G-1000	IC9 on CPU (Programmed)	
00129278	I.C. SSC1080 FOB	(CUSTOM IC)	IC10 on CPU	
J5259116	I.C. SED1335F0B	(LCD CONTROLLER)	IC11 on CPU	
J5259110	I.C. HM62256LFP-7T	FLAT	IC12 on CPU / IC5, IC8 on XPGS	
00788356	I.C. M38881M2-058FP		IC13 on CPU	
15259884	I.C. TC7S08F	MOS CMOS	IC15 on CPU / IC12 on XPGS	
15199780	I.C. HD63266FP-64A	FDC	IC16 on CPU	
00893356	I.C. NCR53CR92	FLAT	IC17 on CPU	
00893990	I.C. BH9595FP	FLAT	IC18 on CPU	
K525814310	I.C. ROM K525814310		IC19 on CPU	
J5259123	I.C. FLASH E28F016SV-065		IC20 on CPU (Blank)	
J5259120	I.C. HM5118160CJ-6	FLAT	IC21 on CPU	
15259887	I.C. TC7SU04F	FLAT	IC22, IC30 on CPU	
00232645	I.C. TC7W14F	FLAT	IC23 on CPU / IC18 on XPGS	
J5259001	I.C. 74 HC 04	FLAT	IC24 on CPU	
15249111	I.C. TC7WU04 F	FLAT	IC25 on CPU / IC14, IC19 on XPGS	
#	J5259128	I.C. 74 HC 393	FLAT	IC28 on CPU
#	J5259127	I.C. 74 HC 10	FLAT	IC29 on CPU
01233590	I.C. ROM UPD23C32000AGX310		IC1 on XPGS	
01233634	I.C. ROM UPD23C32000AGX312		IC2 on XPGS	
01233667	I.C. ROM UPD23C32000AGX314		IC3 on XPGS	
J5259109	I.C. HD6415108F10	FLAT	IC6 on XPGS	
00897078	I.C. TC170C200AF-005		IC7 on XPGS	
01233612	I.C. ROM UPD23C32000AGX311		IC9 on XPGS	
01233645	I.C. ROM UPD23C32000AGX313		IC10 on XPGS	
00236878	I.C. TC74VHC74F	FLAT	IC11 on XPGS	
15239206	I.C. MB87837PF-G-BND	FLAT	IC13 on XPGS	
J5259111	I.C. MB814800-70PJ		DRAM	
00232667	I.C. M38881M2-150GP	FLAT	IC15, IC17 on XPGS	
15249104	I.C. TC7S04F	FLAT	IC16 on XPGS	
15259753	I.C. TC74HC164AFN	FLAT	IC20, IC22 on XPGS	
K525814110	I.C. ROM K525814110		IC21 on XPGS	
K525814210	I.C. ROM K525814210		IC4 on XPGS	
J5159107	I.C. 74 HC574		IC23 on XPGS	
J5189102	I.C. TD62593AP	DIP	CMOS	
15169550RI	I.C. 74 HC138		IC1 on LCB	
15189250	I.C. M5218 AL		IC2 on LCB	
			DIP CMOS	
			STANDING	
			IC3, IC4, IC5, IC6 on LCB	
			IC7, IC9 on LCB	

#	J5159114	I.C. 74 HC 14	FLAT	IC10, IC11, IC12, IC13 on DEB
	15169334	I.C. 74 LS 05 N		IC1 on MIB
	15229718RI	I.C. 6N 137	PHOTO-COUPLER	IC6 on MIB
	15189186	I.C. UPC 4570C	OP AMP.	IC1, IC2, IC3 on EQB
	15189189	I.C. UPC 4570HA VERT.	OP.AMP.	IC10 on DBB
	J5199101	I.C. TDA 7350	POWER AMP	IC6, IC7 on PWAB

TRANSISTOR

	15119155RI	TRANSISTOR	BC/560-B	Q9 on MIB / Q1 on AB / Q14 on LCB / Q1 on PAB
	15119154RI	TRANSISTOR	BC/549-B	Q1, Q3 on MIB / Q12=>Q25 on RCB / Q2 on PAB
	15129114	TRANSISTOR	2SC-1815GR	Q17 on DBB
	15319101	TRANSISTOR	2SC-2412	Q3, Q4, Q5 on AB
	15309101	TRANSISTOR	2SA-1037KR	CHIP Q7 on CPU
	15129427	TRANSISTOR	2SC-2235Y	Q16 on DBB
	15129164	TRANSISTOR	DTC-114ES	Q12, Q15 on LCB
	15119163	TRANSISTOR	RN2227	Q1=>Q11 on LCB
	15119430	TRANSISTOR	DTA-143 ES	Q13 on LCB
#	15329104	TRANSISTOR	2SK-368GR	FETCHIP Q8 on CPU

DIODE

	15019159RI	DIODE	1N-4148	on LCB / RCB / CCB / D2 on PAB / D1, D2, D3, D4, D7 on MIB
#	15339105	DIODE	DAN-202K	D2 on AB / D13, D14 on CPU
	15339109	DIODE	DAP 202K	CHIP D12, D15 on CPU
	15339108	DIODE	DA-204K	D1=>D8, D16 on CPU
	15039174	DIODE	S2S6M	D11 on CPU
	15029320RI	LED DIODE	TLHG4401	GREEN on LCB / RCB
	15029284RI	LED DIODE	TLHR4401	RED on LCB / RCB / CCB
	J5029110	LED DIODE	3 TLH04400	ORANGE on LCB / RCB
#	01341623	DIODE LED	TLN 201	D216 on DBB
#	01342578	PHOTO DIODE	TPS 708	D215 on DBB
	J5019106	ZENER DIODE	BZX79C 5.1V	D213, D214 on LCB / D10 on CPU
	J5019105	DIODE	1N 4002	D1 on PAB / D1 on AB

RESISTOR

	J3919104	RESISTOR ARRAY	EXB-A10E-103-J	RA1, 2, 6, 7, 8, 9, 10, 15, 16, 27, 28, 29, 30, 31 on CPU
	J3919108	RESISTOR ARRAY	EXB-V8V-103-JV	RA3, 4, 5, 11, 14, 32, 33, 35 on CPU
	J3919107	RESISTOR ARRAY	EXB-V8V-101-JV	RA12, RA13 on CPU
	J3919109	RESISTOR ARRAY	EXB-V8V-470-JV	RA17 => RA26 on CPU
	J3919111	RESISTOR ARRAY	EXB-V8V-391-JV	RA34 on CPU
	13819132RI	UNINFL.RES.	100 OHM 0.6W 5%	R1, 5, 6, 7 on AB / R1=>R8 on LCB
	J3809134	UNINFL.RES.	27 OHM 0.6W 5%	R23 on LCB

POTENTIOMETER

	J3219107	ROT. POTENTIOM.	EVUF2AH20B53	VR5 on LCB
	00671556	SLIDER POT.	NNK-X10-B14	VR4 on LCB
	00346178	SLIDER POT.	RS30111CA	VR3 on LCB
#	13299206	TRIMMER CERMET	20K 5X5 OR	VR1 on CPU
	13299227RI	TRIM.POT.	22KOHM 5X10 H CERMET	VR11, VR12 on PAB

CAPACITOR

	01015912	POL. COND.	0805 2.2N 5%	C93, C95 on AB
	15359779	POL.COND.	0805 2.7N 5%	C92, C94 on AB
	15359776	POL.COND.	0805 390P 5%	C63, C64 on AB
	J3629144	ELECTR.COND.	470UF 16V AX	C14 on LCB
	J3469156	ELECTR. COND.	33U 16V P.5	C1,93,147,148 on CPU / C49,53,54,56,57,58,59,60 on AB
	J3629117	ELECTR.COND.	-V 4700UF 25V	C3, C47 on PAB
	J3629103	ELECTR.COND.	100U 25V P5	C69,70,71 on CPU / C9,10,13,14,15 on AB / C27 on DEB C1 on MIB / C1, C2 on PAB
	J3629147	ELECTR. COND.	220U 25V P.5	C9, 10, 43, 46 on PAB
	J3629133	ELECTROL.COND.	22U 25V P5	C12, C42 on PAB
	J3629135	ELECTR. COND.	470U 35V P5	C2 on IB
	J3629104	ELECTR.COND.	10U 50V P5	C2,15,17,38,74,96, 175, 176 on CPU / C4=>C8,11,12, 96 on AB/ C8 on PAB / C44, 45, 48 on DBB
	J3629105	ELECTR.COND.	47U 50V P5	C118,139,140 on CPU
	J3629151	ELECTR. COND.	2.2U 63V P.5	C5, C13 on EQB
	J3629107	ELECTR.COND.	1UF 100V P5	C43 on DBB
	J5369103	ELECTR. COND.	100U 16V SMD	C40 on XPGS
	J5369104	ELECTR. COND.	10U 16V SMD	C4, C9, C21, C27 on XPGS
	J3629137	ELECTR. COND.	33U 16V H.7	C13, C33, C34, C35, C42 on LCB
	J3629149	ELECTR.COND.	100U 16V H.7	C1 on RCB
	13649103JO	UNPOL.COND.	10U 16V P5	C1, C2, C97, C101 on AB / C60, C75 on PAB

INDUCTOR, COIL, FILTER

<<EMI>>	22448240	NOISE SUP	BL02RN2-R62	L1, L2, L3 on PHB
<<EMI>>	12449370	NOISE SUP.	SBT-0160W	L5, 7, 9, 10, 11 on MIB / L7, 8, 9, 10 on AB
<<EMI>>	12449326	NOISE SUP.	SBT-0460	L6, L12 on MIB / L4 on PHB
<<EMI>>	13529187	NOISE SUP.	ELKTR391CA	FL1=>FL7 on FC7B
<<EMI>>	12449380	NOISE SUP.	EXC-ELDR25V	L3, 4, 5, 6 on AB / L1, 2, 3, 4 on LCB
<<EMI>>	J2399103	NOISE SUP.	ELKS471FA	CHIP FL1=>FL6 on CPU
<<EMI>>	J2399104	NOISE SUP.	EXCCL4532U1	CHIP L2=>L9, L18, 39, 40, 41, 42, 44, 45 on CPU
<<EMI>>	00452034	NOISE SUP.	BK2125HM102	CHIP L21=>L38, L43 on CPU

CRYSTAL, RESONATOR

	00894023	QUARTZ	20 MHZ	MA-406	X1, X3 on CPU / X2 on XPGS
	00894034	QUARTZ	16 MHZ	MA-406	X2 on CPU
	00901912	QUARTZ	24.576 MHZ	MA-406	X1 on XPGS

RELAY

	12439224RI	RELAY	DS2YS-12V	RL1 on AB / RL1 on PAB
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ENCODER

	J3119101	ENCODER	EVQ-WQK F15-24B	ENC1=>ENC5 on CCB / ENC6 on RCB
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CONNECTOR

	13369898	2P MALE CONN.	B2P3-VH	CN2 on IB
	J3429120	3P MALE CONN.	P.2 M	CN2 on CPU / CN401 on AFTB
#	J3439168	4P MALE CONN.	76384-404	CN402 on AFTB
	J3439159	4P MALE CONN.	53254 90° P.2	CN5 on LCBV
	13369688RI	4P MALE CONN.	P.2.5 M	CN1 on IB / CN1, CN3 on PAB
	J3439109	5P MALE CONN.	P.2.5 M	CN7 on AB
	J3439125	5P MALE CONN.	P.2 M	CN4 on RCB / CN13 on DEB
	J3439103	6P MALE CONN.	P.2.5 M	CN2 on AB / CN11 on PHB / CN2 on PAB
	J3439121	6P MALE CONN.	P.2 M	CN7 on LCB / CN6 on AB
	13429325	7P FEMALE CONN.	P.2.5 JST	on EQB
	13369592	7P MALE CONN.	P.2.5 JST	on PAB
	J3439113	7P MALE CONN.	P.2.5 M	CN4 on AB / CN5, CN7 on POWER AMP. B
	J3439148	7P MALE CONN.	P.2 M	CN21 on CPU / CN15 on DBB
	13419676RI	8P MALE CONN.	P.2.5	CN6, CN11 on CPU / CN2 MIB / CN5 on AB
	J3439122	8P MALE CONN.	P.2 M	CN 10 on CPU / CN3, CN5 on RCB / CN2 on FC7B
	J3439106	9P MALE CONN.	P.2.5 M	CN9, CN10 on CPU / CN3 on AB / CN1 on MIB
	J3439151	9P MALE CONN.	P.2 M	CN11 on LCB / CN6 on RCB
	J3439124	10P MALE CONN.	P. 2 M 90°	CN6 on LCB
	J3439141	10P MALE CONN.	P.2 M	CN8 on LCB / CN14, CN17 on DEB / CN2 on CCB / CN3 on CPU
	J3439146	11P MALE CONN.	P.2 M	CN4 on CPU / CN1 on LCB / CN3 on CCB / CN18 on DEB
	J3439126	12P MALE CONN.	P.2 M	CN2 on LCB / CN1 on CPU
	J3439162	13P MALE CONN.	P.2 M	CN9 on LCB / CN15, CN16 on DEB / CN1 on CCB
	J3439147	14P MALE CONN.	P.2 M	CN5, 7, 8 on CPU / CN4 on DEB / CN13, 14 on LCB / CN1 on XPGS, CN1,2 on B.LCD B. / on LCD ASSY
	J3439163	15P MALE CONN.	P.2 M	CN12 on LCB / CN7 on RCB
	13419677RI	16P FEM. CONN.	AMP 1.27	CN15, CN16 on CPU / CN4 on RB / CN3 on LB
	13429314	25P FEM. CONN.	D-SUB. DBLC	CN19 on CPU
	J3439143	34P MALE CONN.	P. 1.27 M	CN17 on CPU
	13369851	50P MALE CONN.	P. 1.27 M	CN18 on CPU

WIRING, CABLE

	00783234	BENDER CABLE	(35)	(W4PC P.2)	(For details refer to WIRING DIAGRAM on page 6)
	K3468155	4P CABLE	(28)	2N/2V 2C D/R	"
	K3468156	4P CABLE	(90)	2C D/D	"
	K3468160	4P CABLE ASSY	(28/106)	(W/4PC)	"
#	K3468199	7P CABLE	(28)	2C D/R	"
	K3468170	8P CABLE	(18)	2C D/R	"
	K3468186	16P FLAT CABLE	(36)	2C	"
#	K3468198	34P FLAT CABLE	(18)	2C	"
#	K3468197	50P FLAT CABLE	(36)	2C	"
	J3469143	1P CONN. AWG18	(10)	YELLOW	"
	7697239001	7P CABLE ASSY	(16)	2C D/R	"
	7697221001	9P CABLE	(32)	2C	"
	7695008001	16P FLAT CABLE	(26)	2C	"
#	7700430000	DEBOUNCE WIRING ASSY			"
#	7700431000	TOP CBN WIRING ASSY			"
#	7700432000	BOTTOM CBN WIRING ASSY			"
	7698713000	3P CABLE ASSY	(78)	(W/4PC+4PC)	"
	7699709000	3P CABLE ASSY	(56)	(W/4PC+4PC)	"
#	7700427000	8P CABLE ASSY	(6)	2C P.2	"
	7699413000	10P CABLE ASSY	(12)	2C P.2	"
#	7700426000	9P CABLE ASSY	(6)	2C P.2	"
#	7700424000	11P CABLE ASSY	(12)	2C P.2	"
	7700123000	14P CABLE ASSY	(8)	2C P.2	"
#	7700422000	13P CABLE ASSY	(12)	2C P.2	"
#	7700423000	14P CABLE ASSY	(20)	2C P.2	"
#	7700425000	15P CABLE ASSY	(4)	2C P.2	"

AC INLET

	J3439127	AC INLET	6102-33
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SCREW

	J2289102	SELF TAP.SCREW	2.9X10 TC TC
	J2289126	SELF TAP.SCREW	2.9X 8 TCTCPRBZ
	J2289125	SCREW	2.9X10 TC TC PR TROP
	J2289130	SCREW	2.9X13 TC TC PR TROP
#	J2289220	SCREW	2.9X16 TC TC PR BZ TROP
	J2289128	SELF TAP.SCREW	3.5X19 TCTCPRBZ
	J2289118	SCREW	2.9X16 TC TC PR BRUN

J2289108	SELF LOCK.SCREW	M3X10 TCTC H.6
J2289147	SELF LOCK.SCREW	M3X12 TCTC H.6
J2289193	SELF LOCK.SCREW	M3X6 TC TC H.6
J2289149	SCREW	3X20 TC TFR H.7
J2289186	SCREW	3.5X16 TCPR TFR H.8 BRUN
J2289113	NUT 3MA	H.3
J2139102	TOOTHED WASHER	I/D 3

PACKING

#	K2638202	LEFT LDPE PROTECTION	EM-2000
#	K2638201	RIGHT LDPE PROTECTION	EM-2000
#	K2638203	CENTRAL LDPE PROTECTION	EM-2000
	K2678119	CARTENE ENVELOPE HD CM.170X56	
	K2678106	POLYETH.ENVELOPE 40X55	
#	K2618202	OUTER PACKING	EM-2000

MISCELLANEOUS

#	K2168102	SPACER FOR LED H.2.8 D.E. 5.5	
#	00453223	LED SPACER H. 7 E.D. 5	
	K2238121	DIFFUSER F/4 LED (HORIZONTAL)	
	K2238122	DIFFUSER F/4 LED (VERTICAL)	
	K2238123	DIFFUSER F/3 LED (VERTICAL)	
#	K2238124	2-LED DIFFUSER (STANDING)	EM2000
	22265242	RUBBER GUIDE BUSHING	
	22165134	BRASS BUSHING	
	K3468131	COPPER ELASTIC STRIP	
	K2248129	ANTIDUST COVER PL30N	
#	K2248141	ANTIDUST COVER PL30N F/LCD	EM-2000
#	01343089	D-BEAM CONTROLLER ESCT BLK	EM-2000
#	K2228103	SPEAKER GASKET 107/88 TH.2	EM-2000
#	K2268152	RIGHT SOUNDPROOFING FOAM	EM-2000
#	K2268153	LEFT SOUNDPROOFING FOAM	EM-2000
#	K2268154	L. SOUNDPROOFING FOAM 220X111	EM-2000
#	K1188130	SUPPORT F/TWEETER	EM-2000
#	K2148110	LCD UNIT PIVOT	EM-2000
#	K217810201	SPRING	EM-2000
#	K217810301	SPRING F/UP-DOWN BUTTON	EM-2000
	12199584	FIXING SUPPORT M1698	
	J2359101	SPACER 3M ART. SJ5012	
	K253810302	FUSE WARNING LABEL	

ACCESSORIES

#	K6018109	MIDI GUIDE	
#	K6018318	OWNER'S MANUAL (E)	EM-2000
#	K6018337	OWNER'S MANUAL (D)	EM-2000
#	K6018338	OWNER'S MANUAL (F)	EM-2000
#	K6018339	OWNER'S MANUAL (I)	EM-2000
#	K6018336	MIDI IMPLEMENTAT.	G1000/EM2000
#	7700428000	ZIP DISK	G-1000/EM-2000
▲	J3439150	MAINS CABLE H05VV+POL.SOCKET	(230V)
▲	J3439128	CABLE 498/3SJT 2X18 AWG-C17	(117V)
▲	13499152R1	CABLE BS/13/H05VV-F3G0.75-V	(230VE)
▲	J3439167	MAINS CABLE SAA/2-H05VV5 2X1-C17	(240VA)

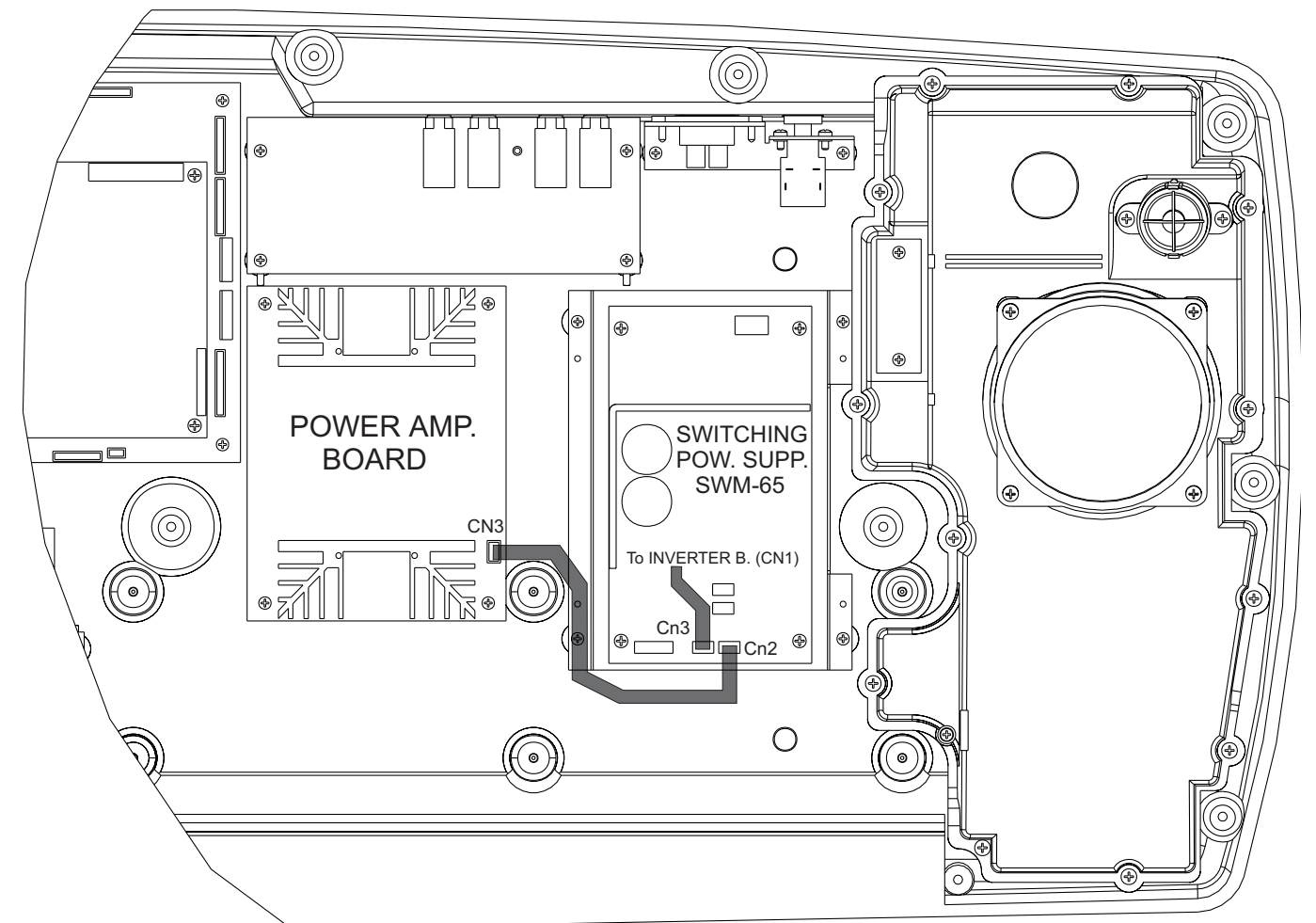
Attention:**when you have to connect the Switching Power Supply SWM-65 (K2458143)**

When you have to connect the Switching Power Supply SWM-65 again (you may have disconnected it either to replace it or for any other reason), make sure you have restored the following connections between:

A) SWM-65 (CN3) and the POWER AMP. BOARD (CN3) [+17V]

B) SWM-65 (CN2) and the INVERTER BOARD (CN1) [+5V]
(see fig.1)

This is essential to avoid that the connections and, consequently, their voltages are mixed up, thus causing the SWM-65 Switching Power Supply to break down.

**Fig.1**

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

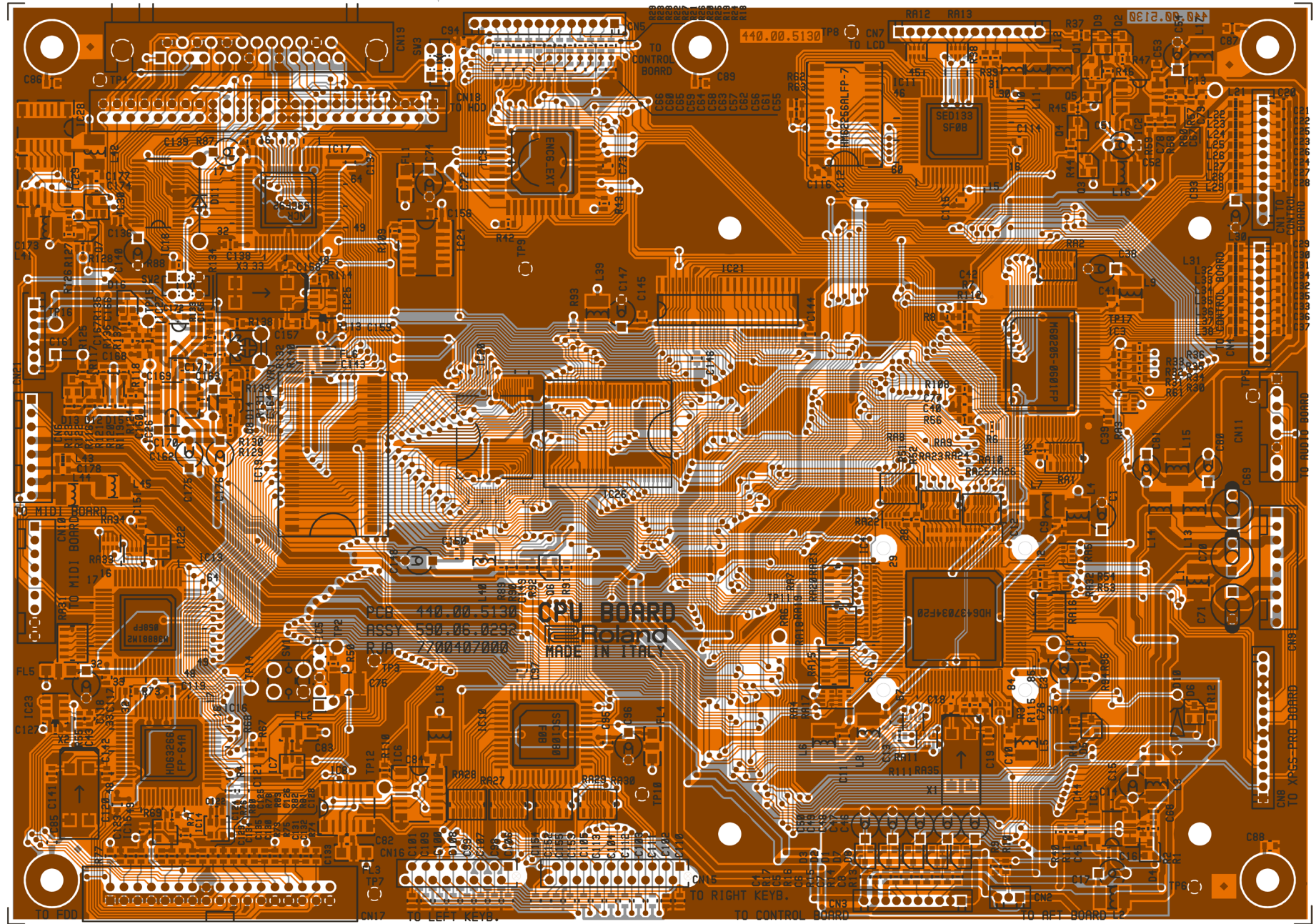
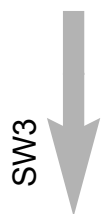
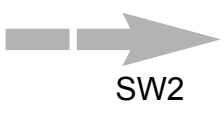
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E CPU PCB ASSY ASSY 7700407000

Set the following switches on the Main Board as shown:

SW2 [|] (TERM ON/OFF)

SW3 [|] (TERM POWER)

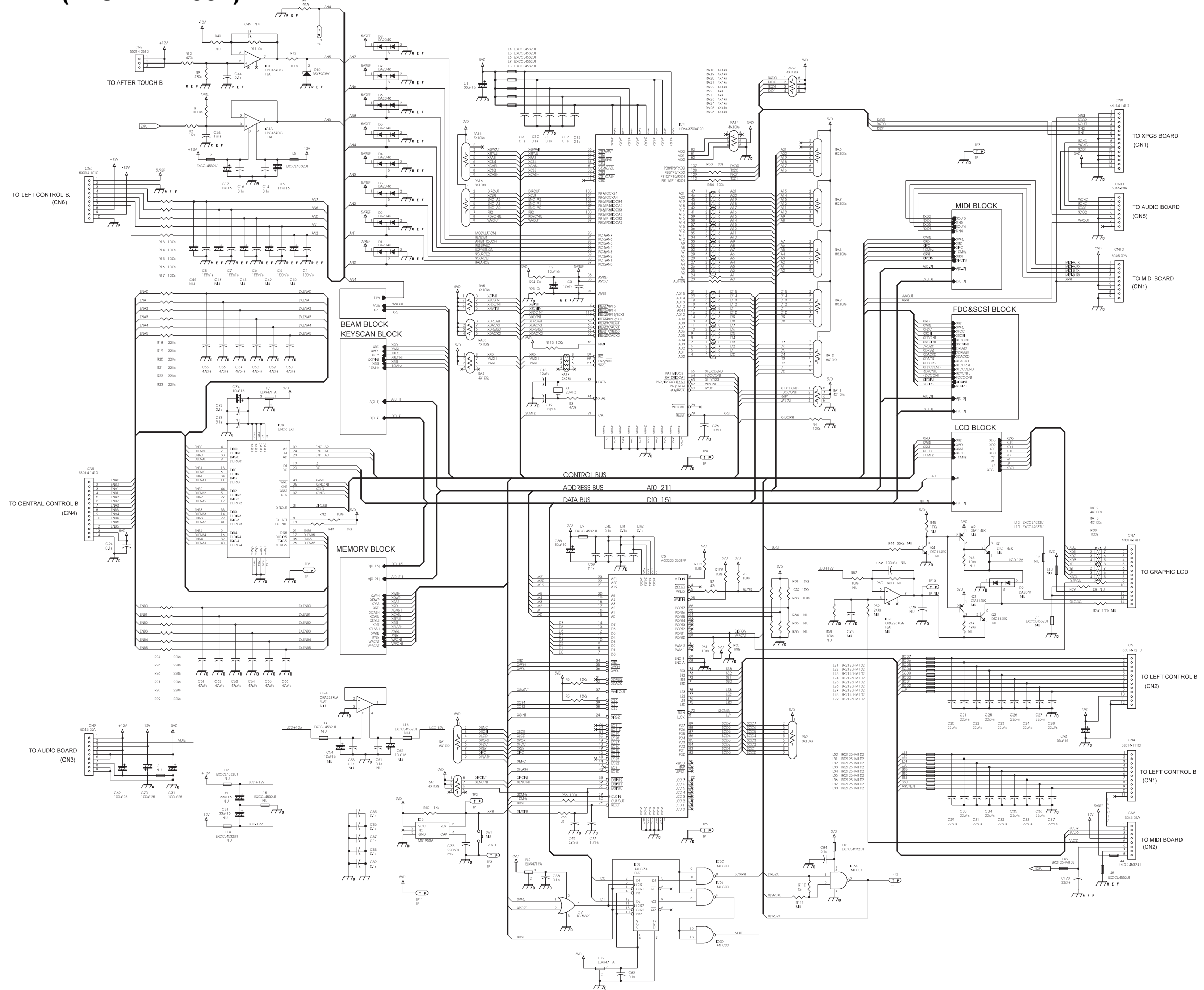


View from component side

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

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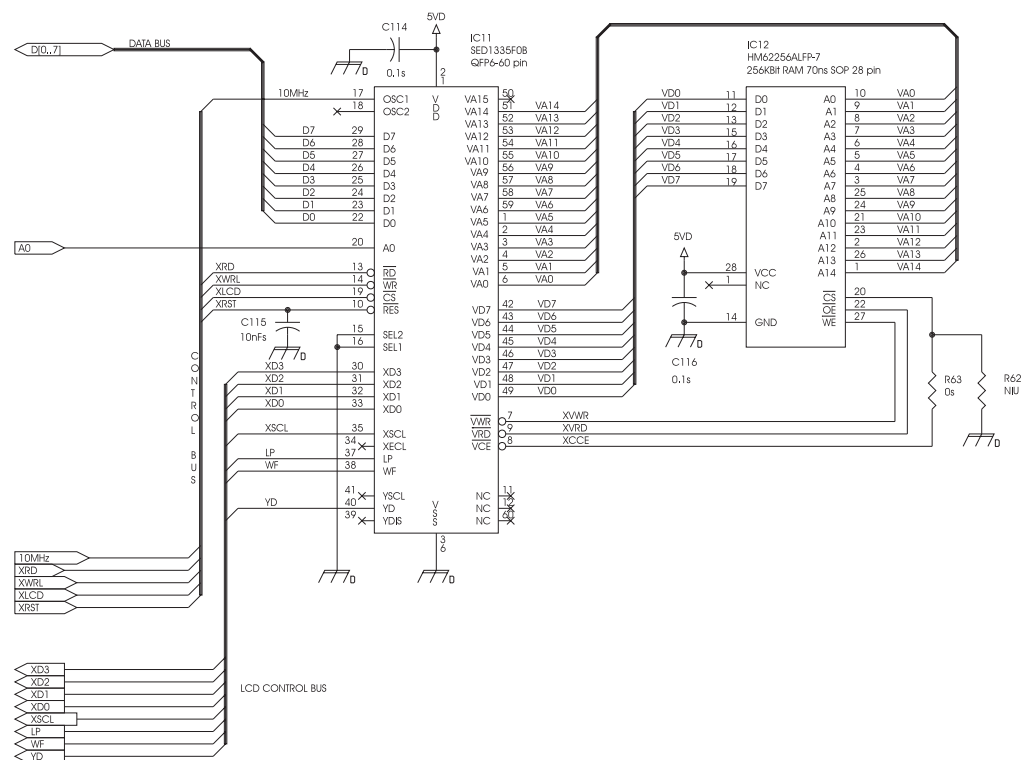
CIRCUIT DIAGRAM (CPU PCB ASSY)



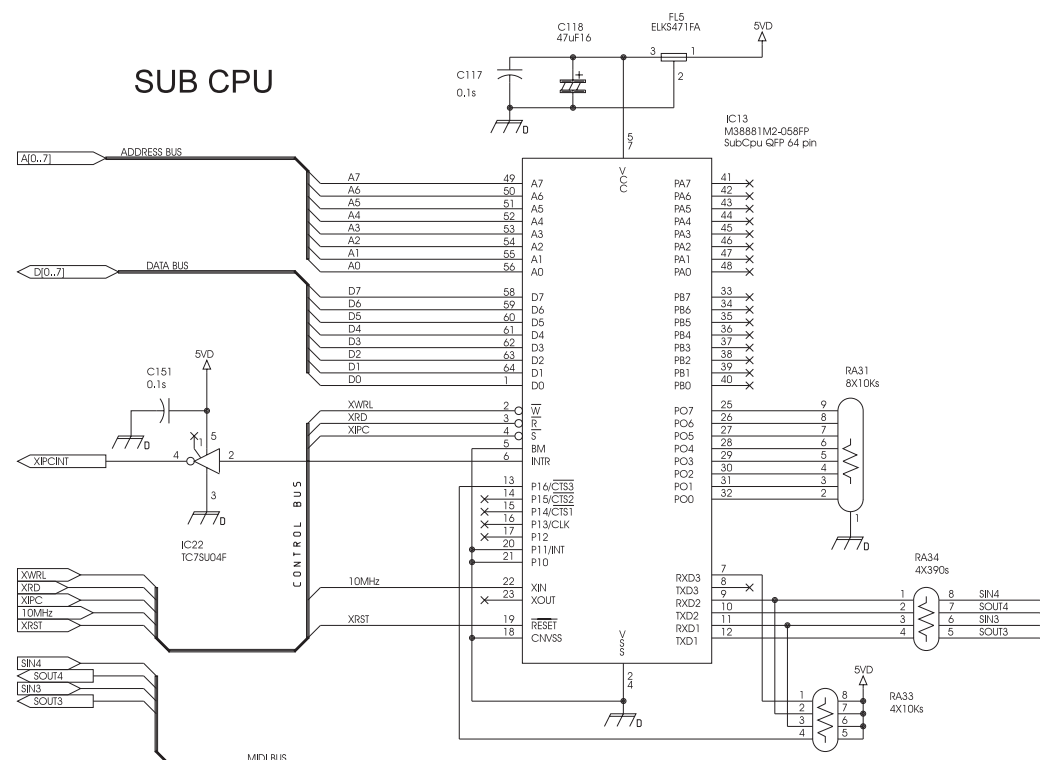
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

A B C D E F G H I J K L M N O P Q R S T U

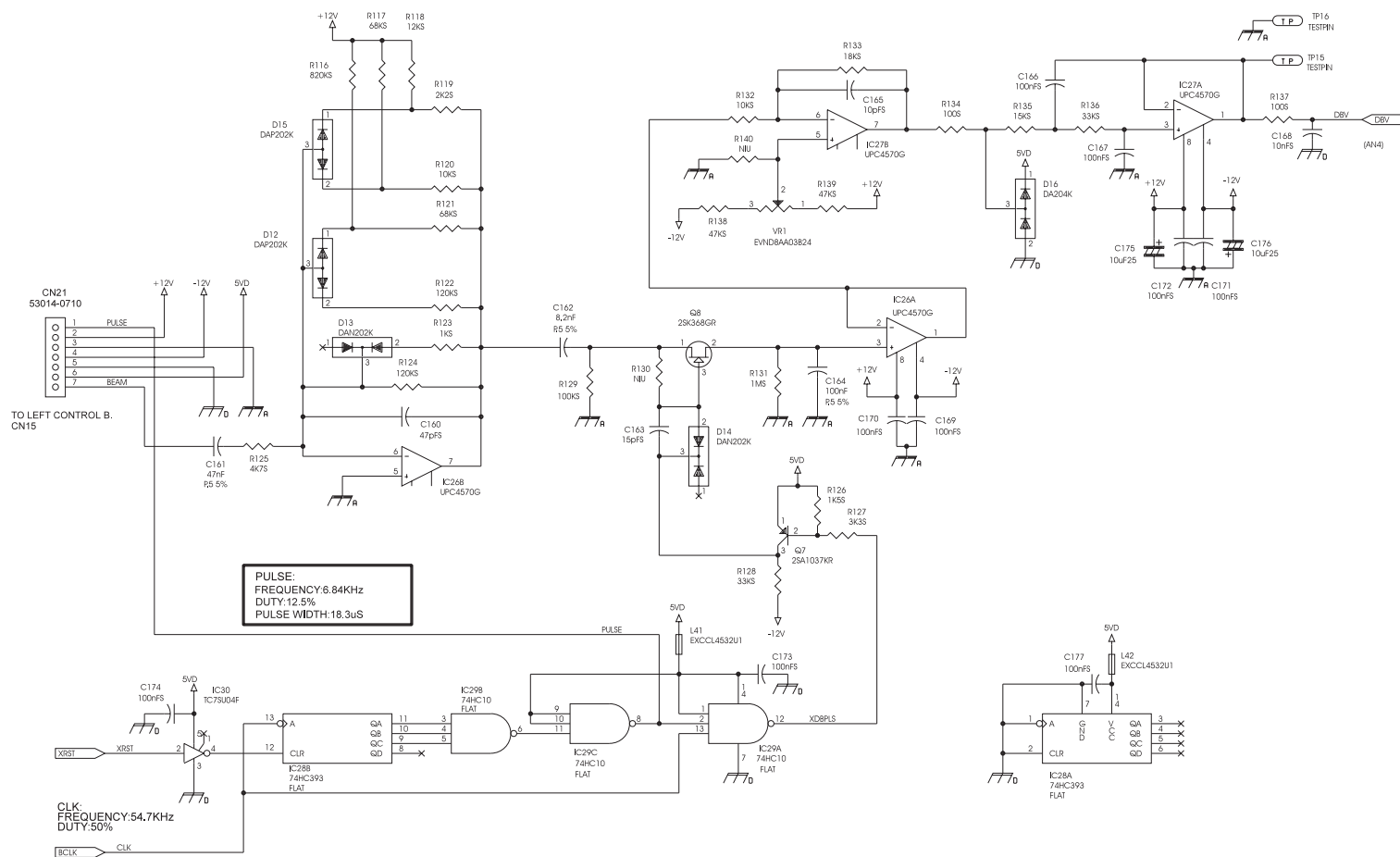
CIRCUIT DIAGRAM LCD BLOCK/MAIN PCB ASSY



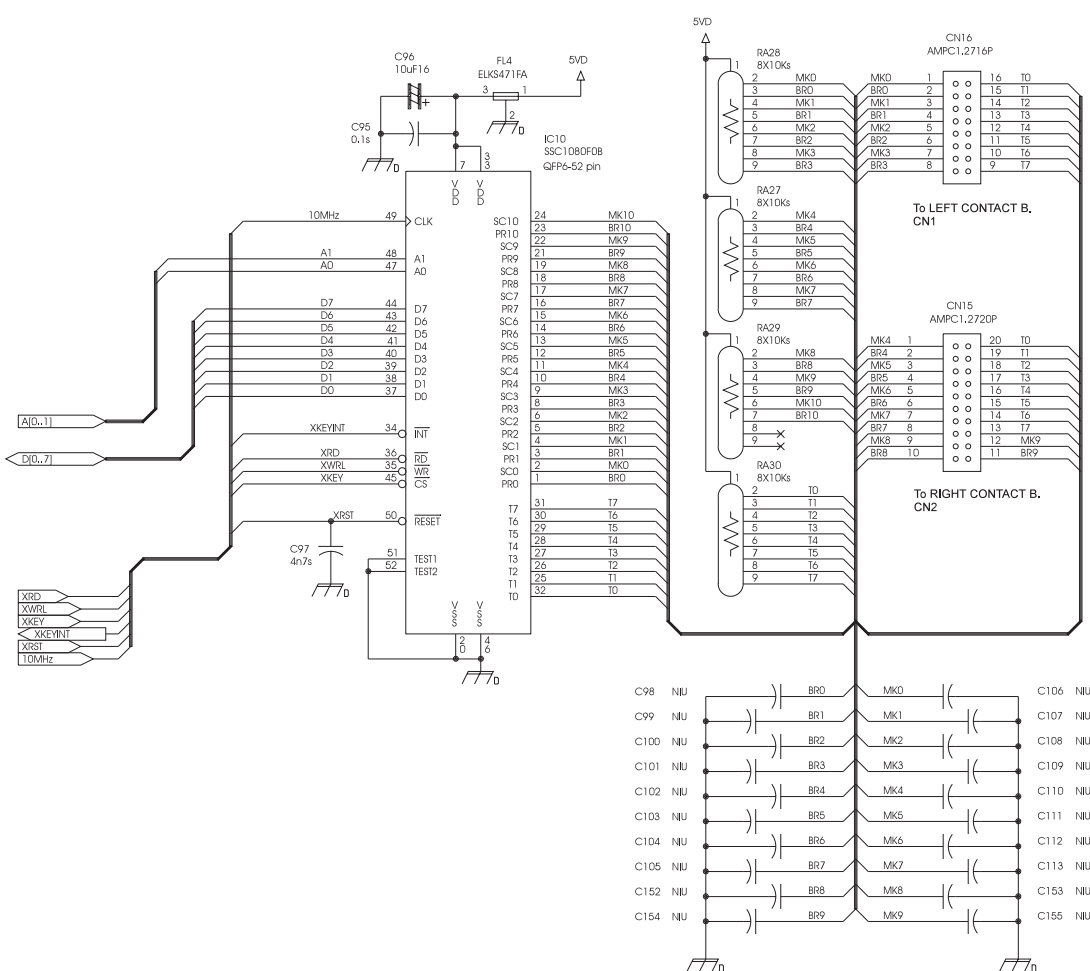
CIRCUIT DIAGRAM 2ND UART CONTR./MAIN PCB ASSY



CIRCUIT DIAGRAM D. BEAM BLOCK/MAIN PCB ASSY



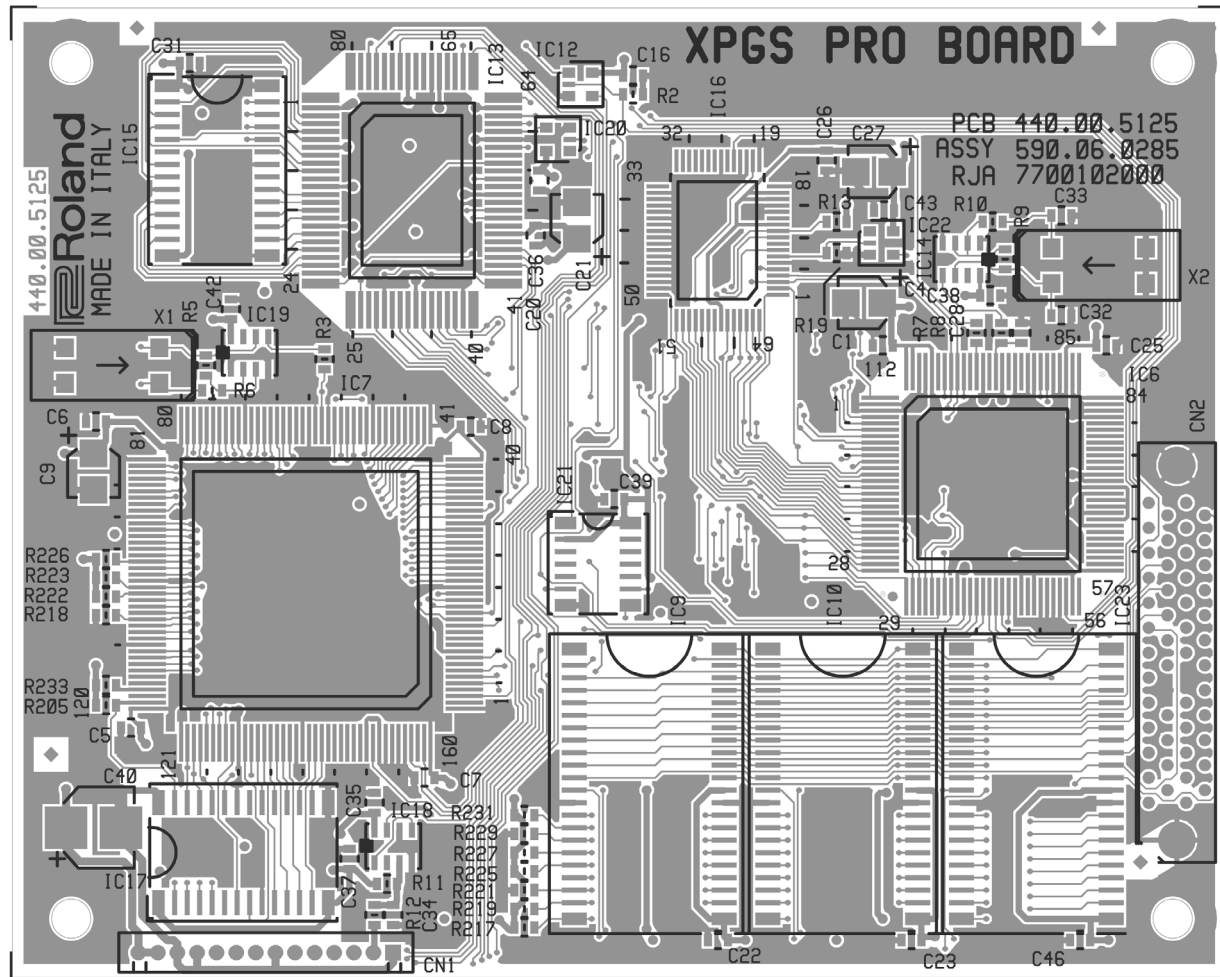
CIRCUIT DIAGRAM KEYSKAN BLOCK/MAIN PCB ASSY



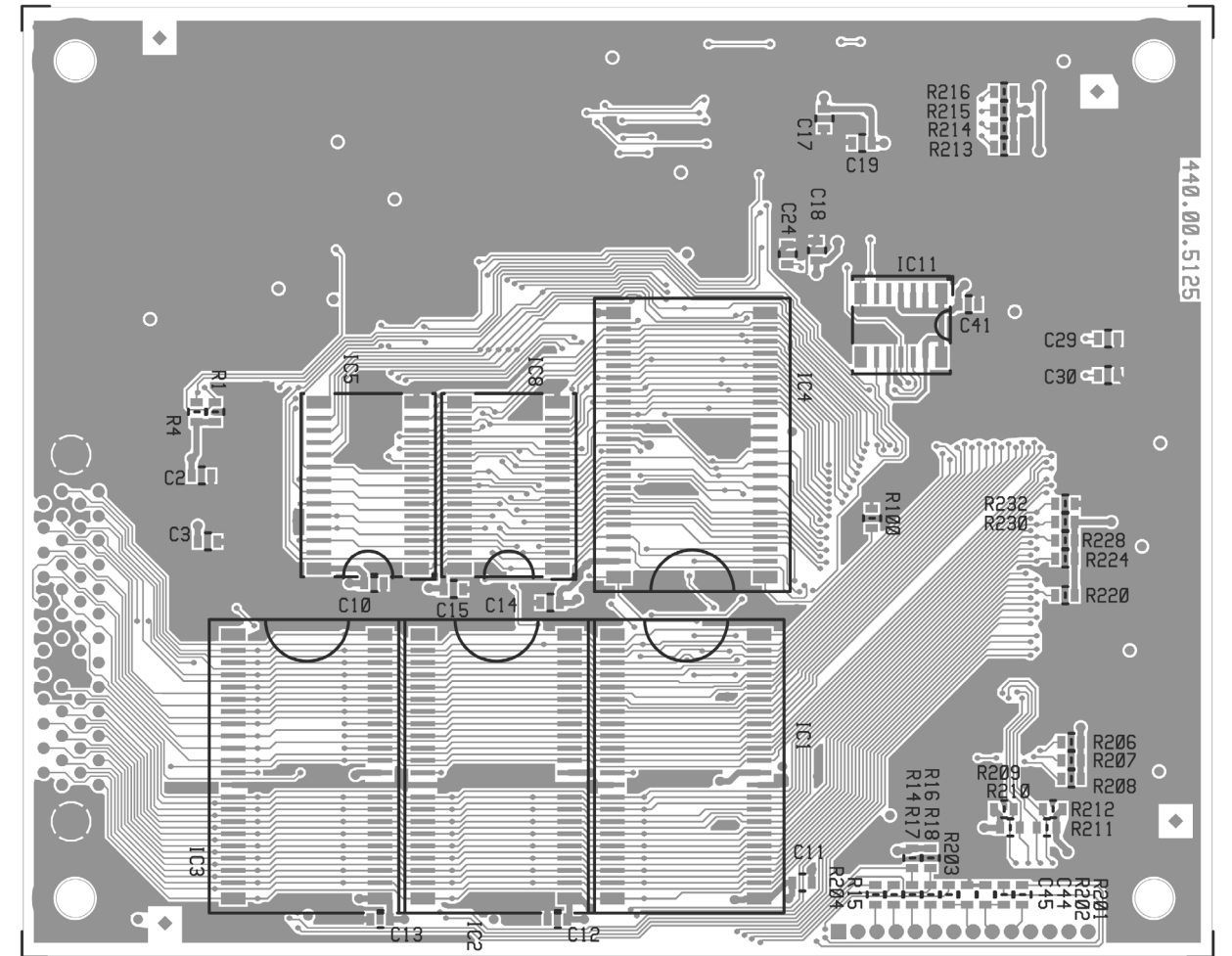
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View from component side

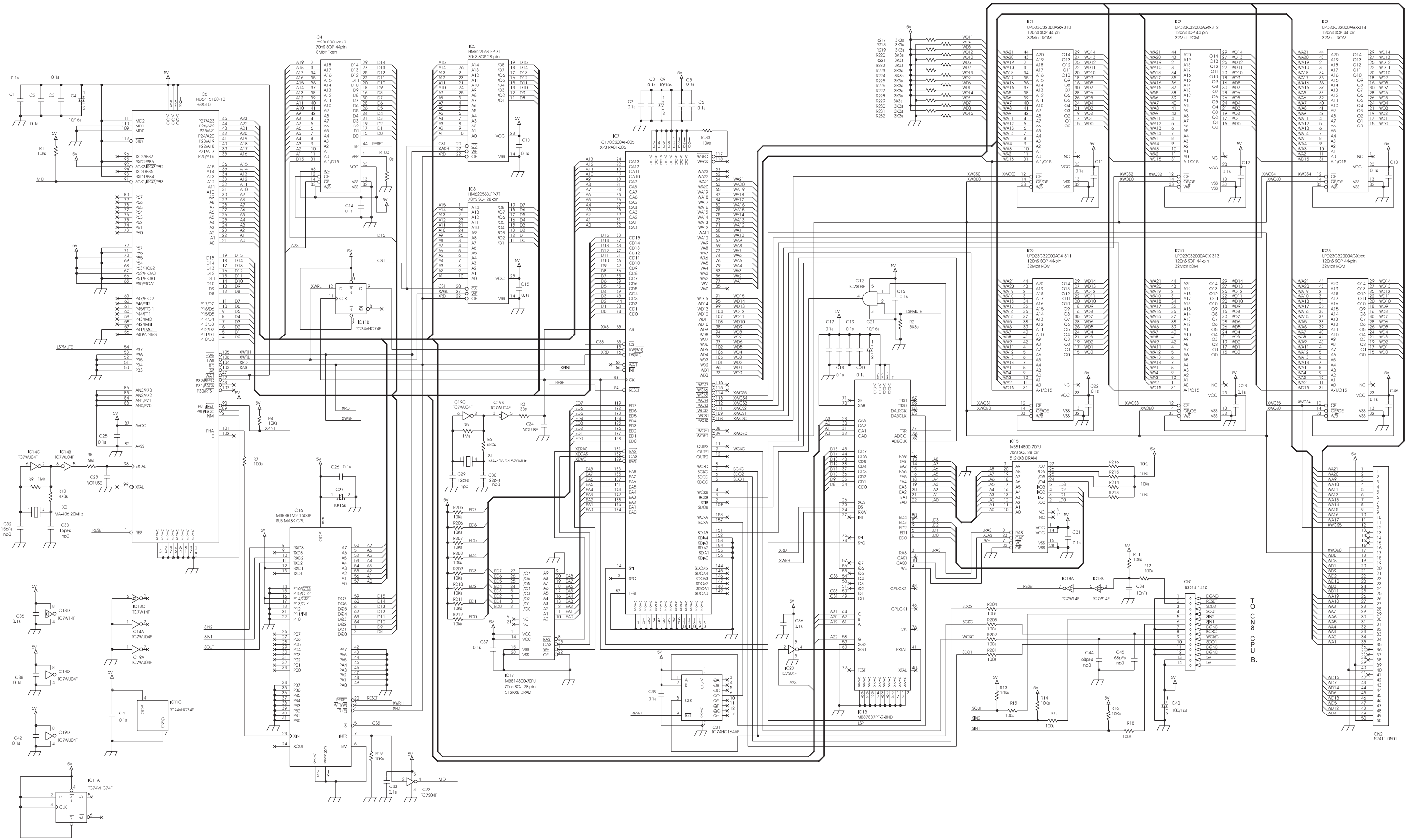


View from solder side

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CIRCUIT DIAGRAM (XPGS PRO PCB ASSY)

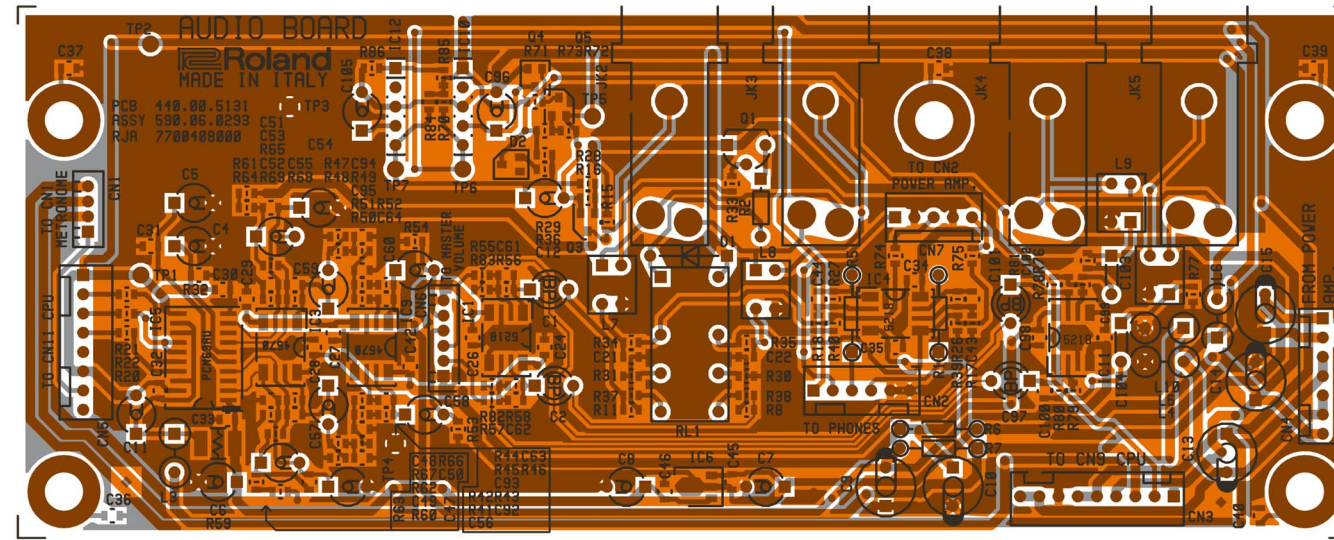


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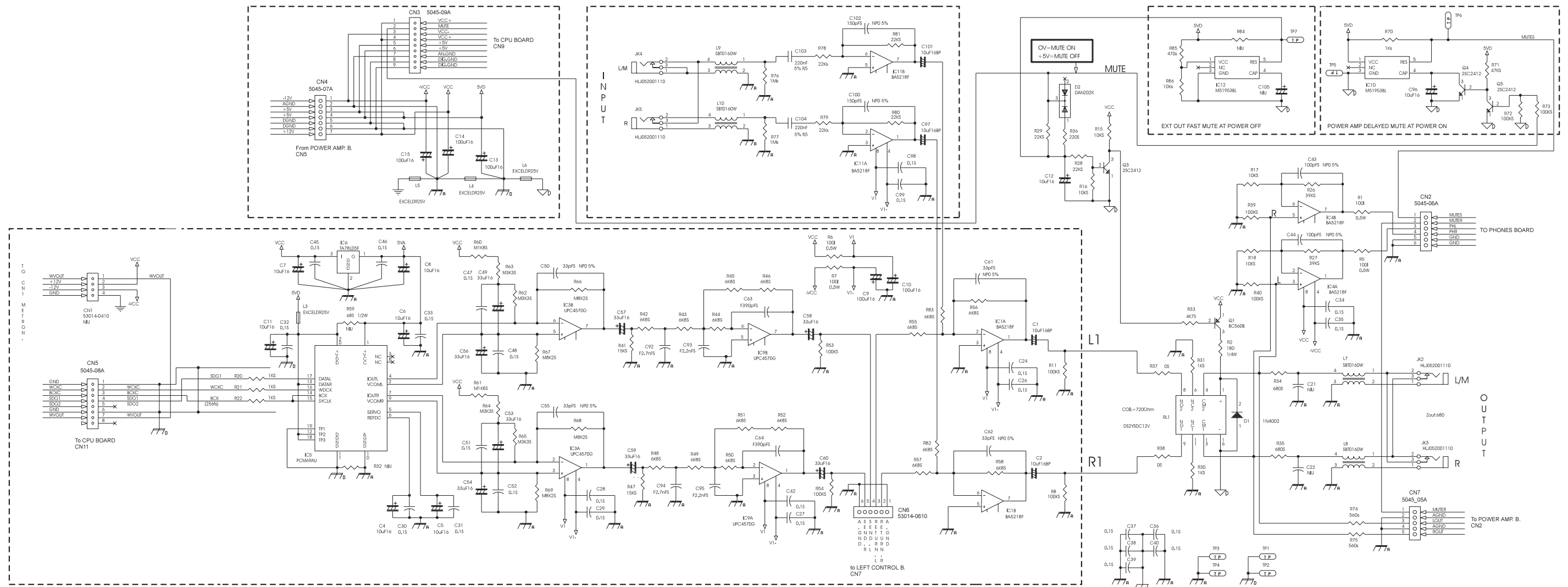
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AUDIO PCB ASSY & CIRCUIT DIAGRAM

ASSY 7700408000



View from component side

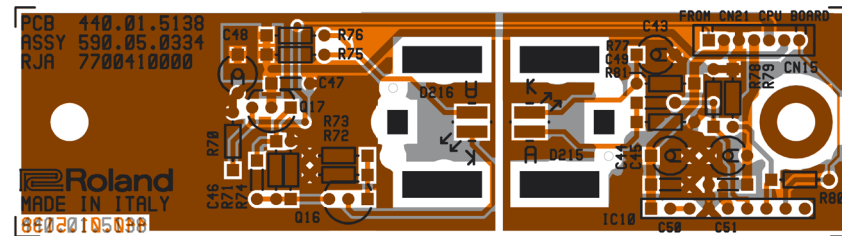


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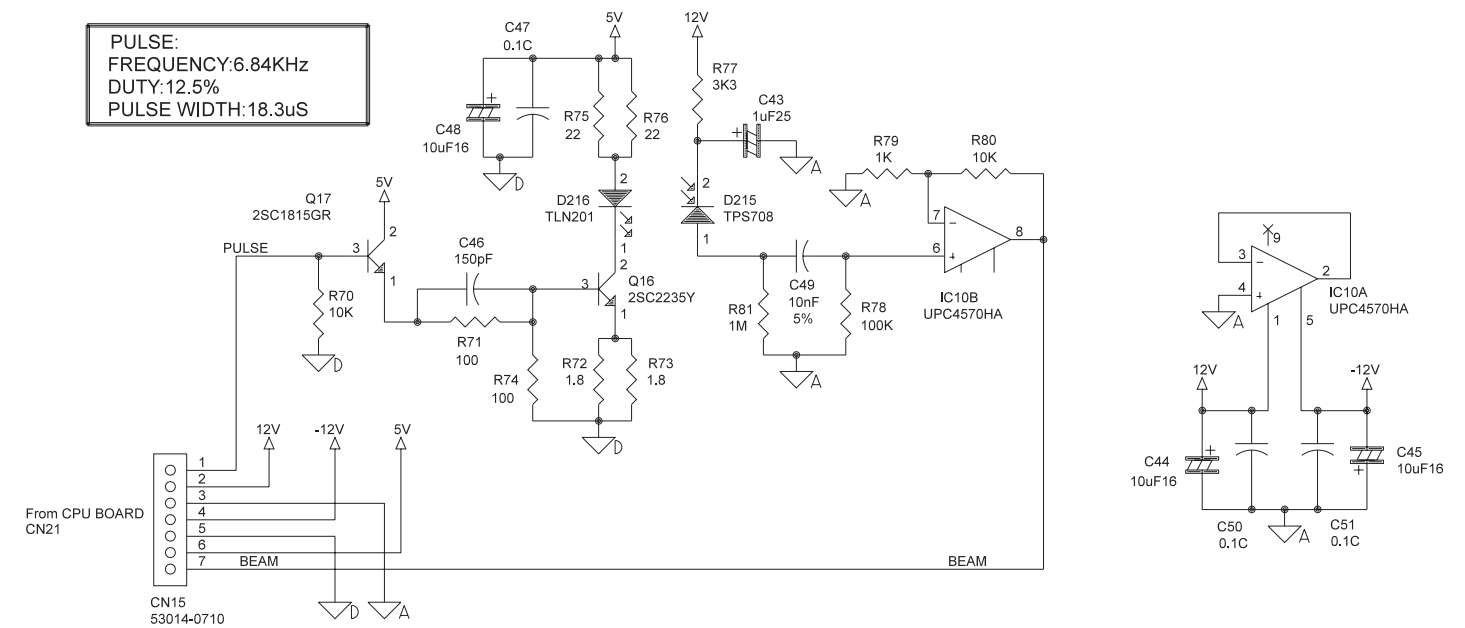
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D-BEAM CONTROL PCB ASSY & CIRCUIT DIAGRAM

ASSY 7700410000

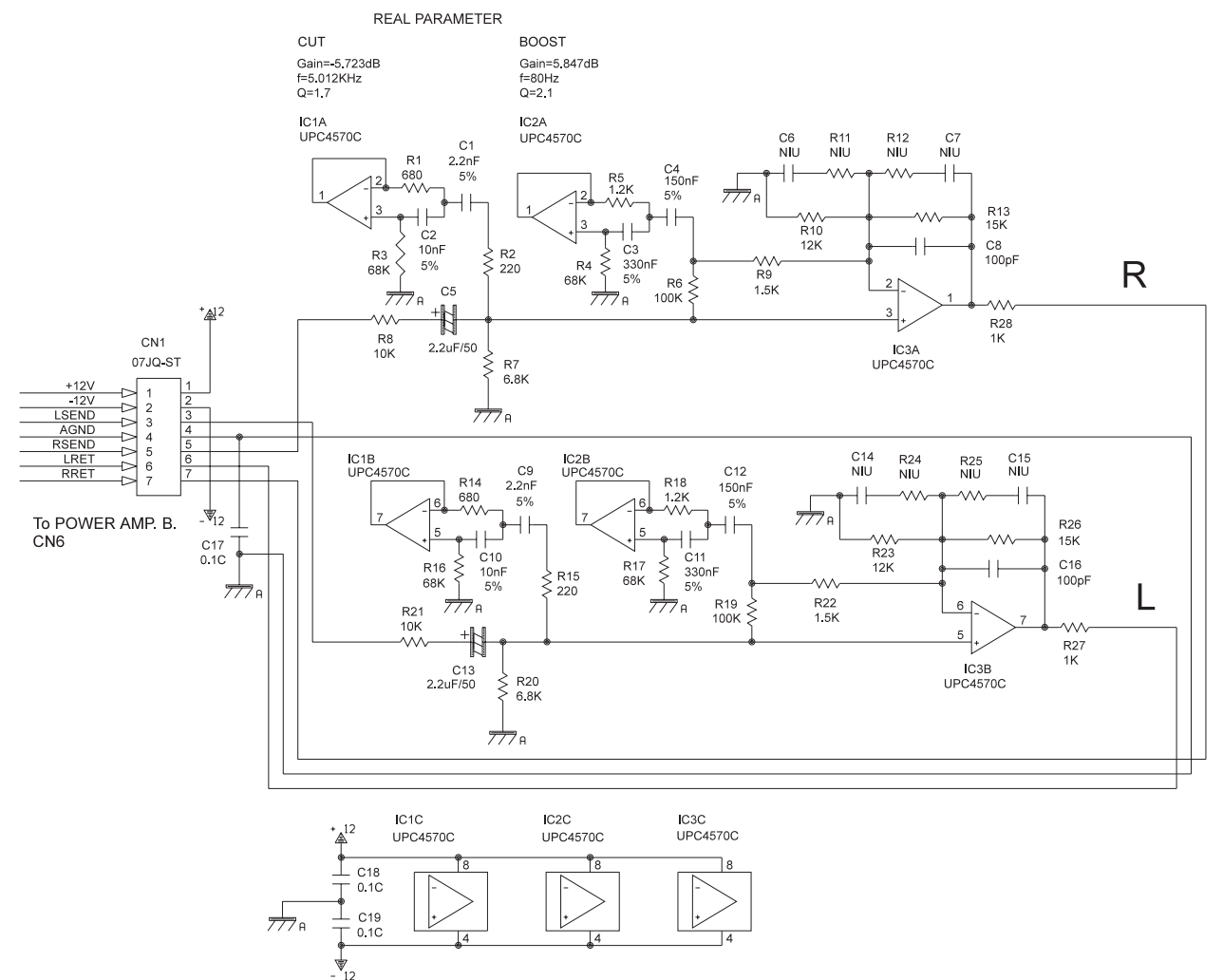


View from component side



EQ PCB ASSY & CIRCUIT DIAGRAM

ASSY 7700409000

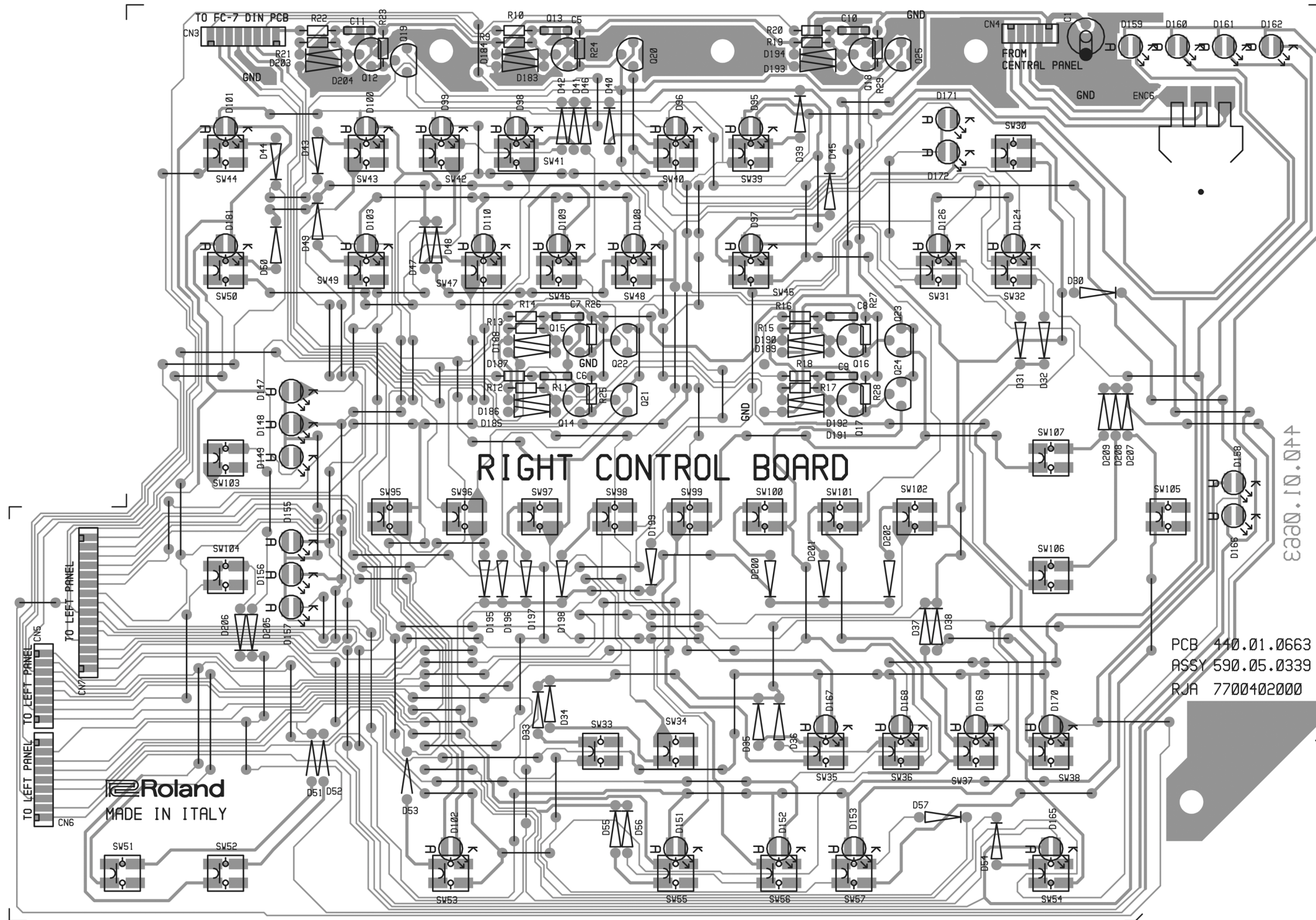


View from component side

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

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RIGHT CONTROL PCB ASSY ASSY 7700402000

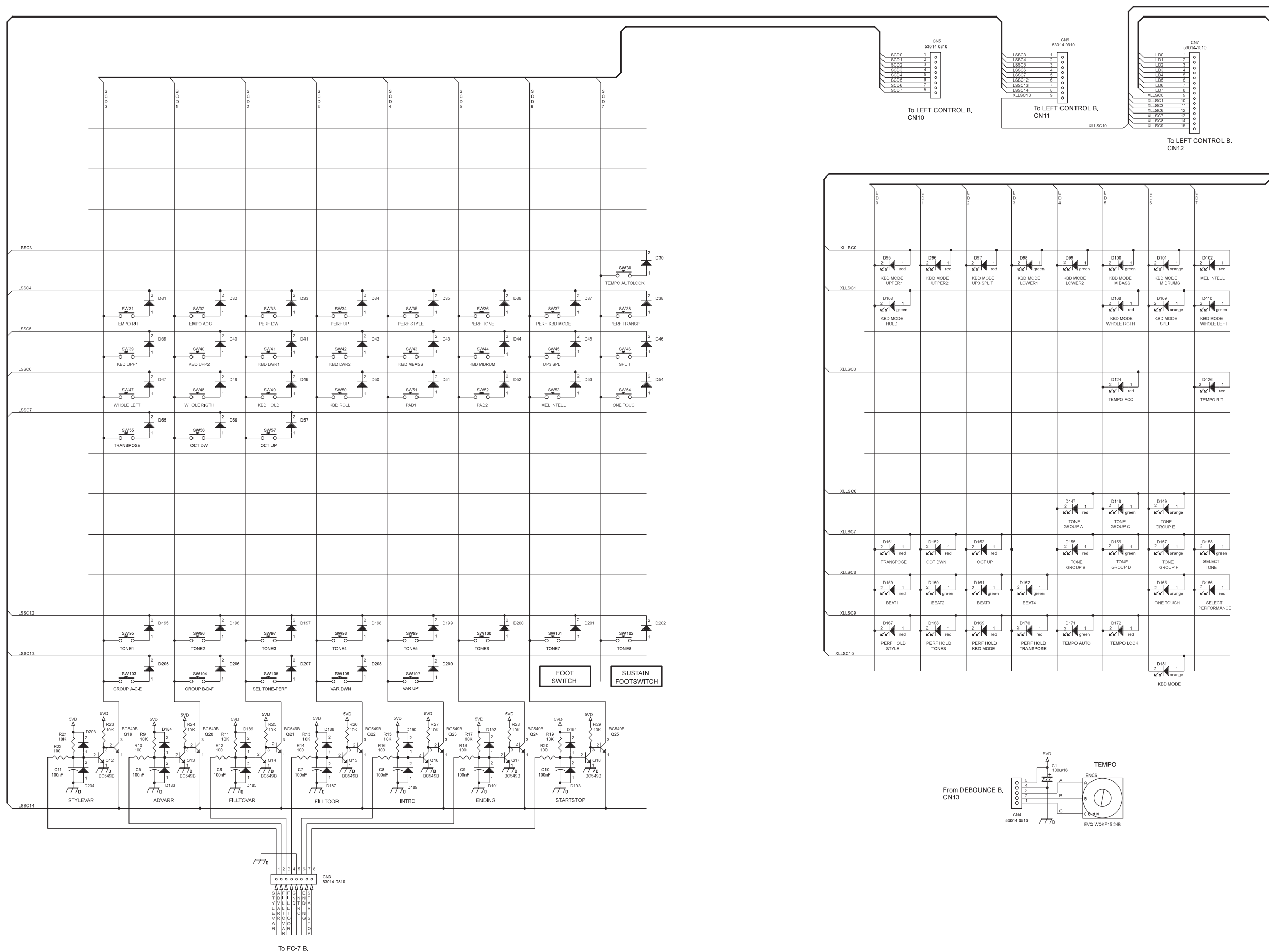


View from component side

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

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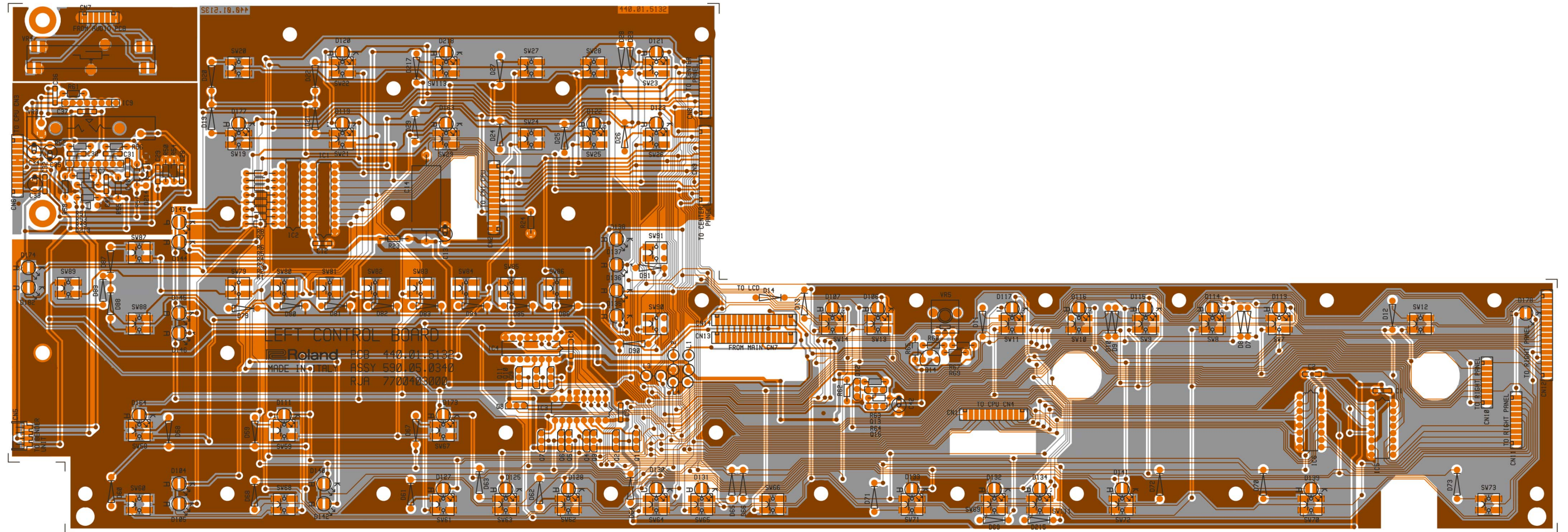
CIRCUIT DIAGRAM (RIGHT CONTROL PCB ASSY)



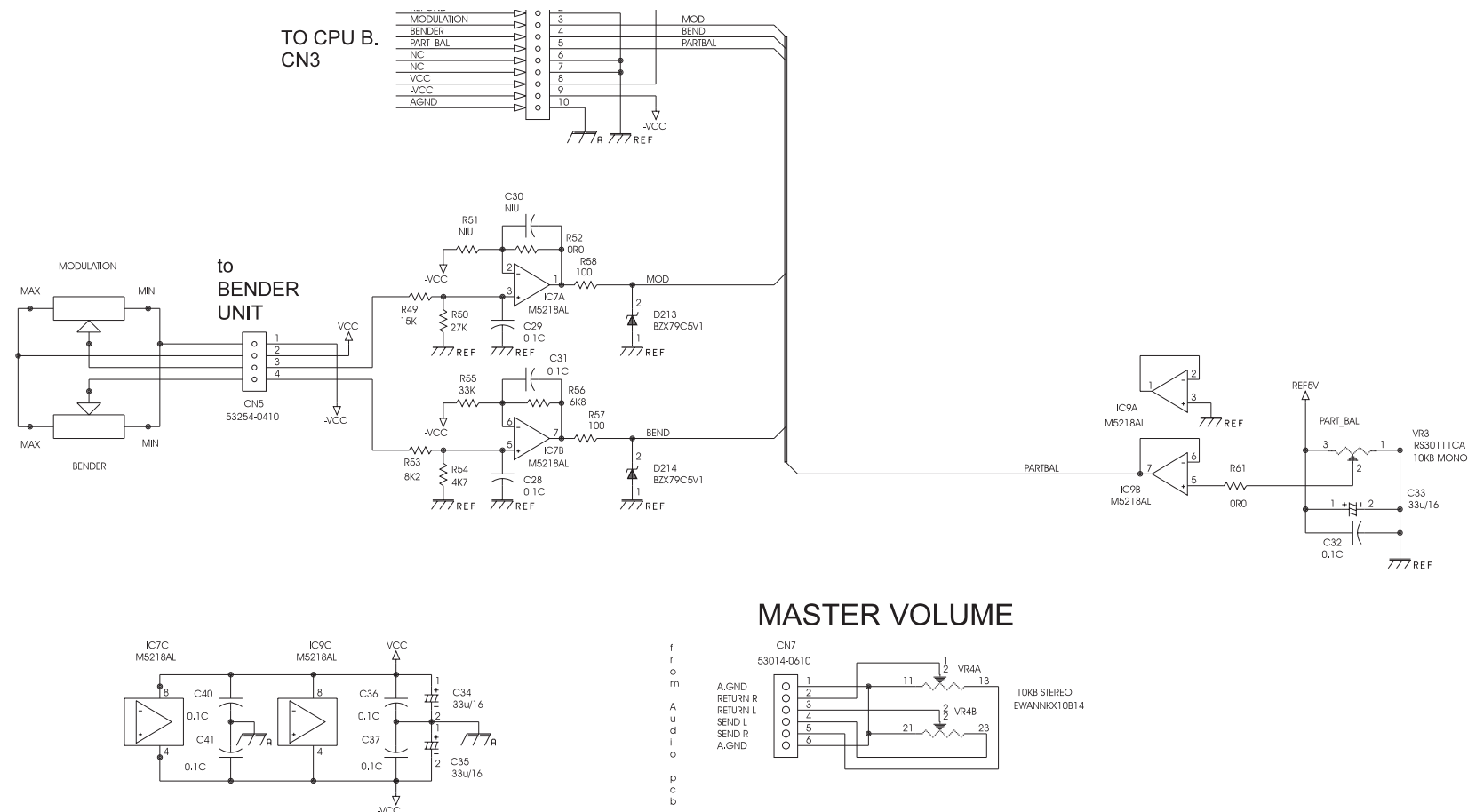
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

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LEFT CONTROL PCB ASSY ASSY 7700403000



CIRCUIT DIAGRAM 1/2 (LEFT CONTROL PCB ASSY)

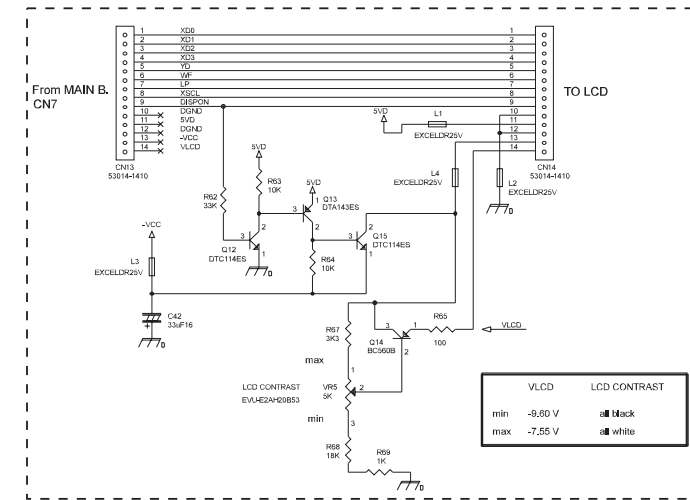


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

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CIRCUIT DIAGRAM 2/2 (LEFT CONTROL PCB ASSY)

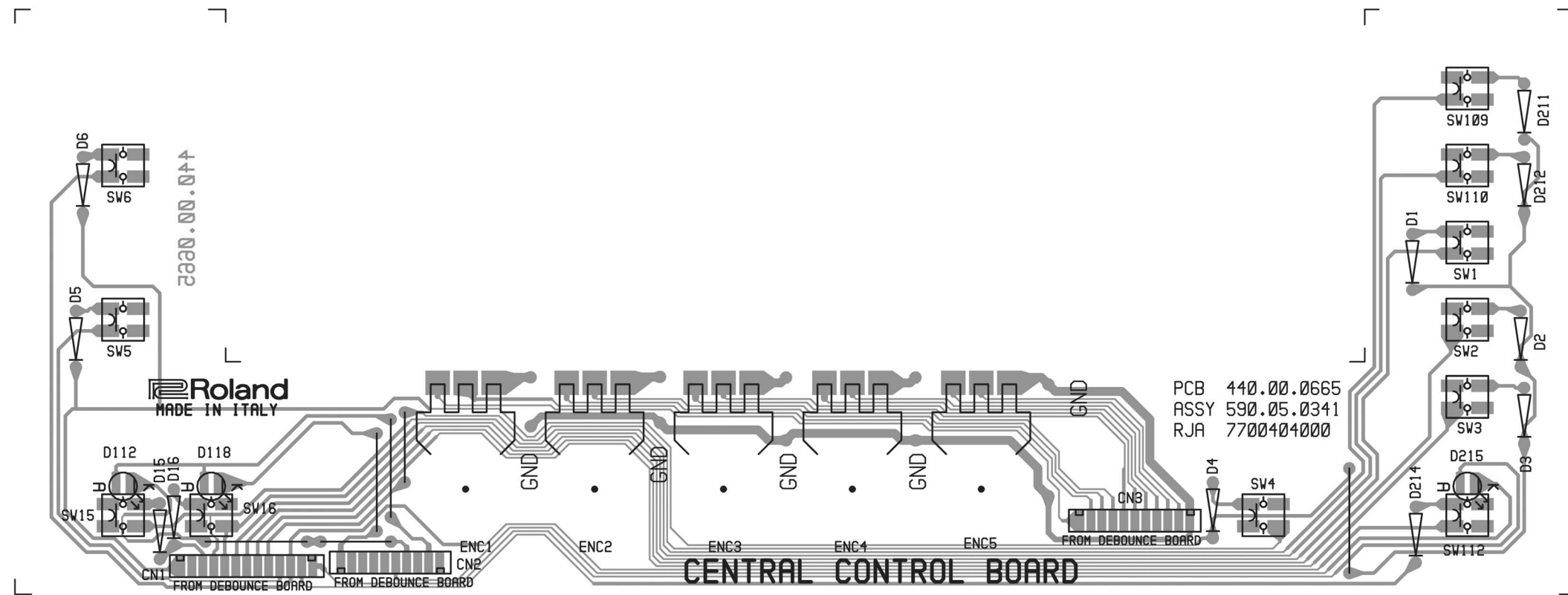
ALL TACTS SW IN THIS SHEET ARE EVQ-QSB-05K
 ALL RED LEDs IN THIS SHEET ARE TLHR_4401
 ALL GREEN LEDs IN THIS SHEET ARE TLHG_4401
 ALL ORANGE LEDs IN THIS SHEET ARE TLHO_4400
 ALL DIODES IN THIS SHEET ARE 1N4148



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

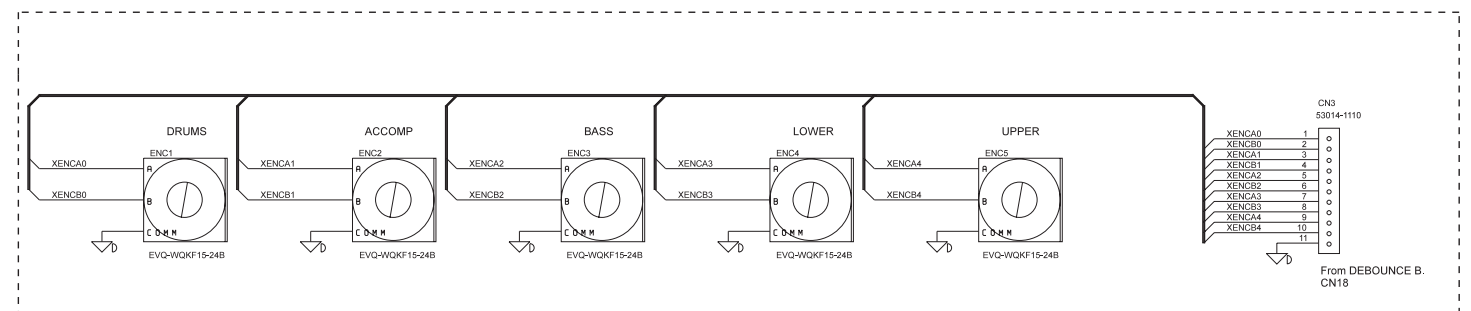
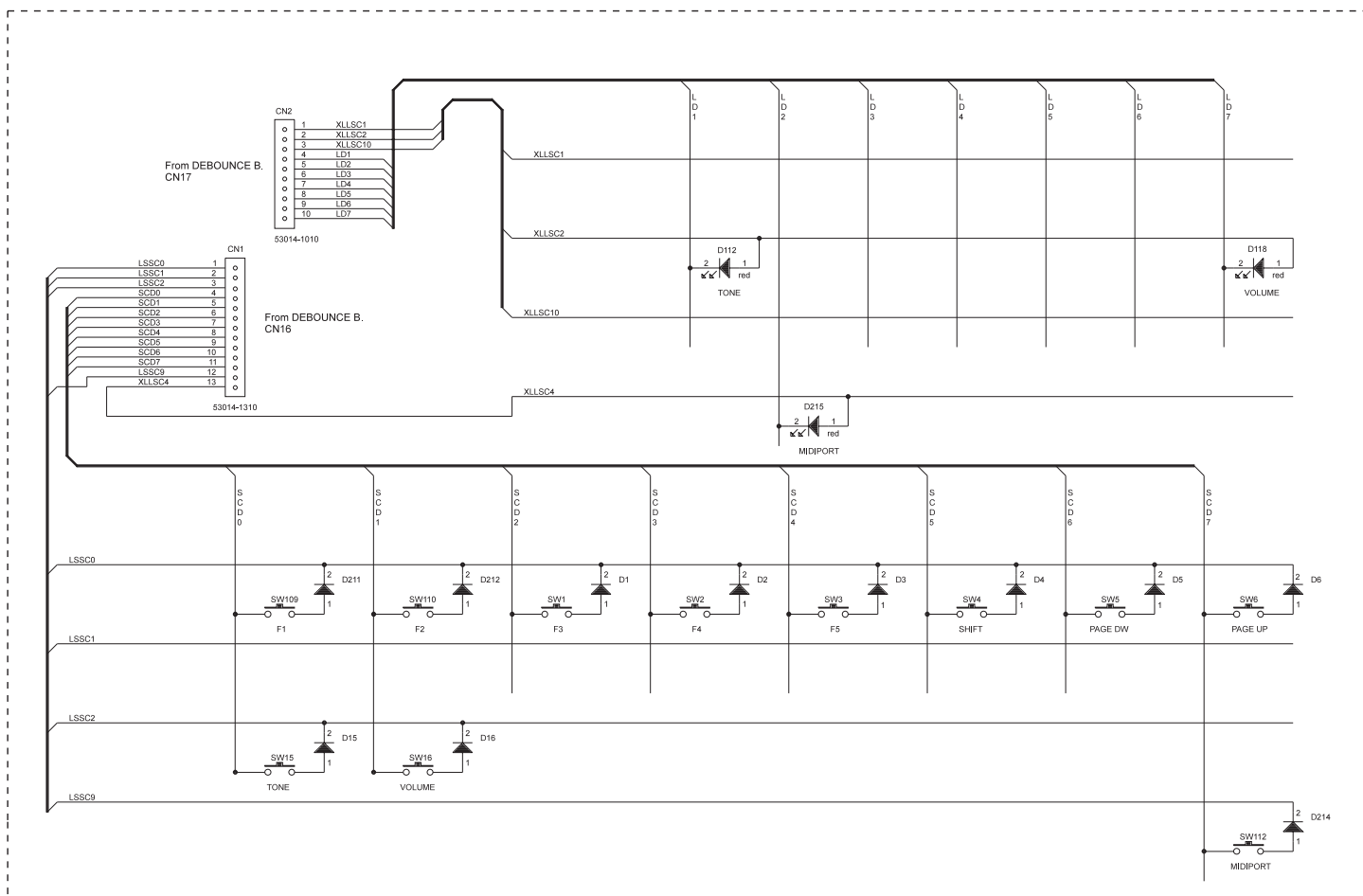
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CENTRAL CONTROL PCB ASSY ASSY 7700404000



View from component side

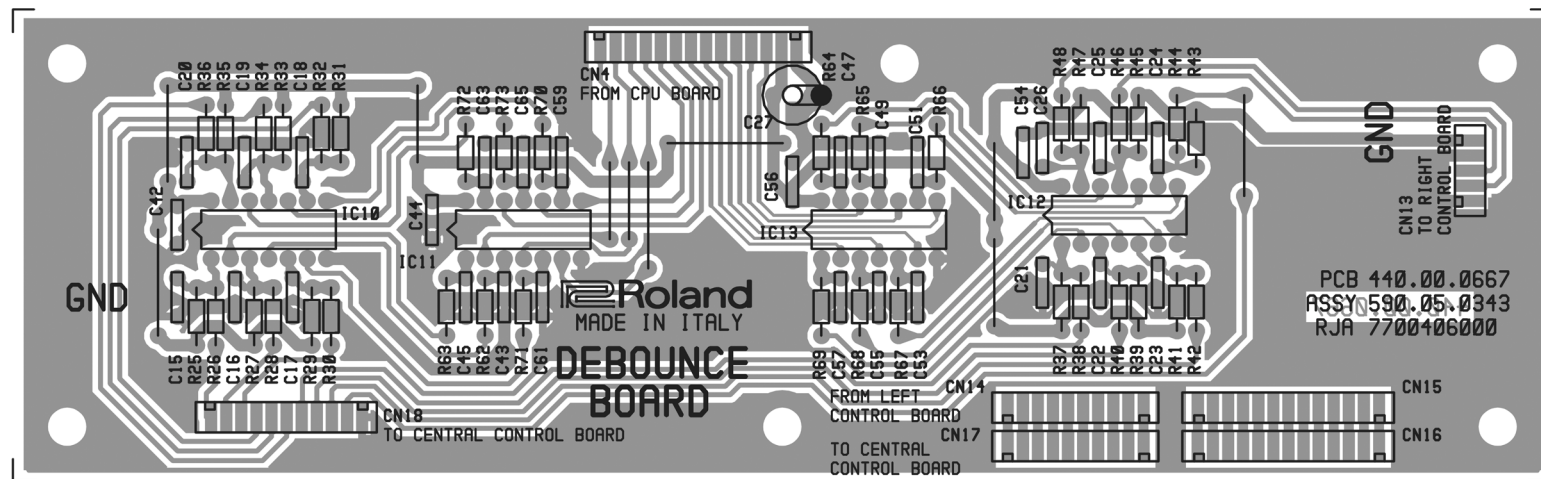
CIRCUIT DIAGRAM (CENTRAL CONTROL PCB ASSY)



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

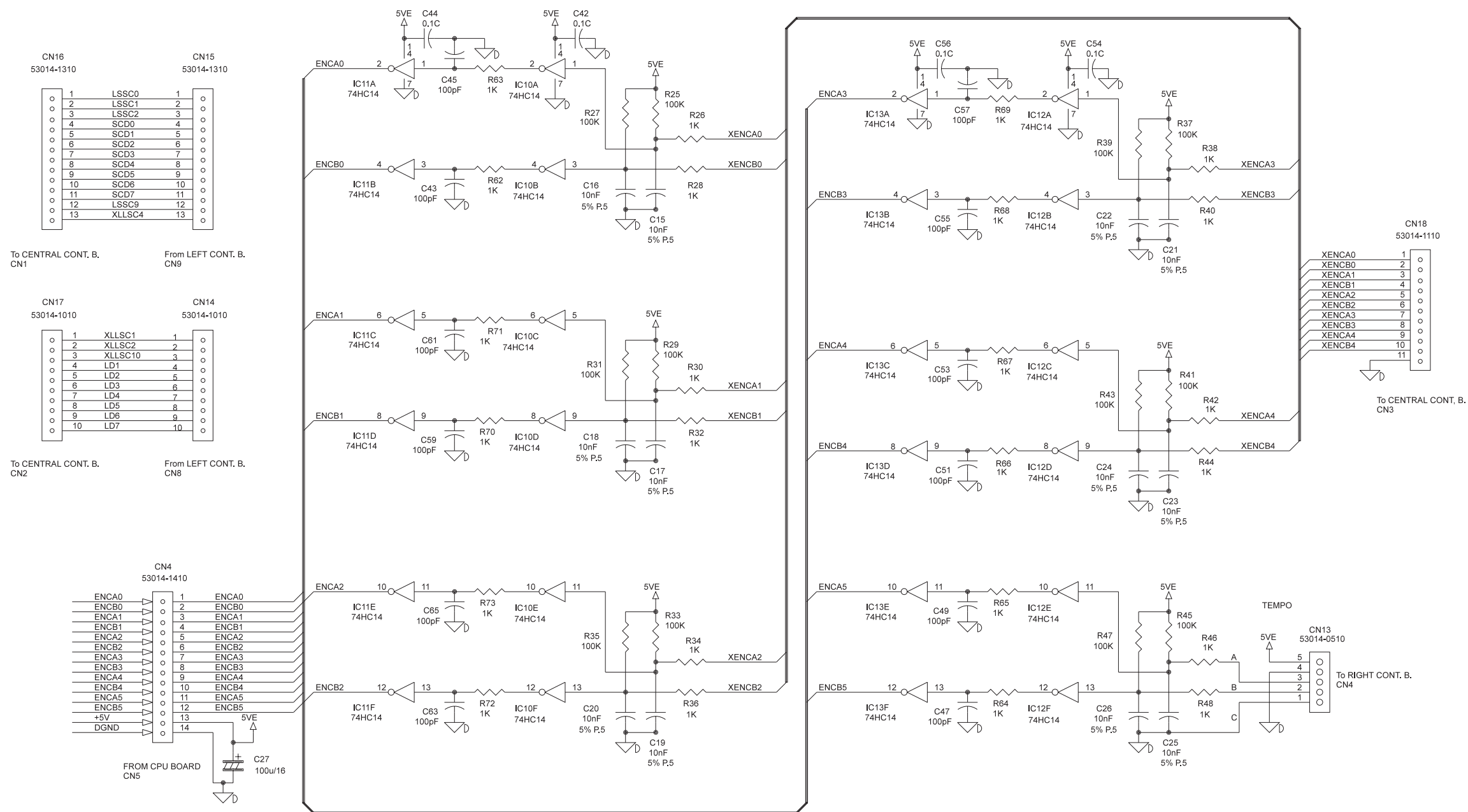
DEBOUNCE PCB ASSY ASSY 7700406000

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View from component side

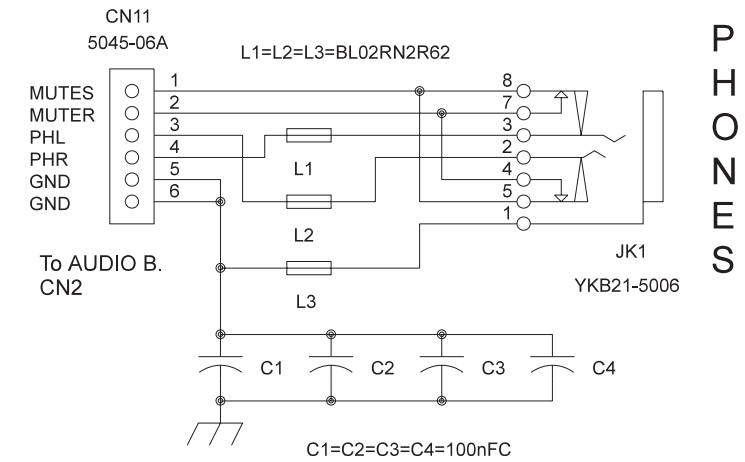
CIRCUIT DIAGRAM (DEBOUNCE PCB ASSY)



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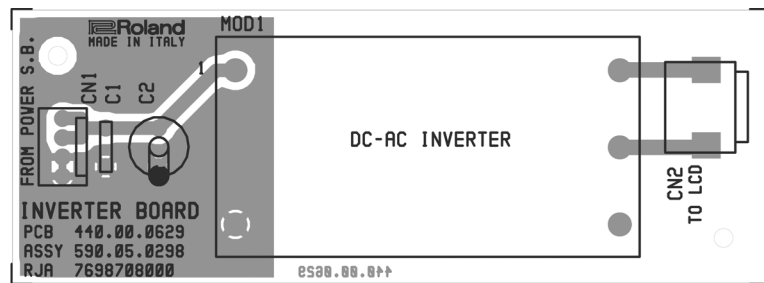
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PHONES PCB ASSY & CIRCUIT DIAGRAM ASSY 7627109000

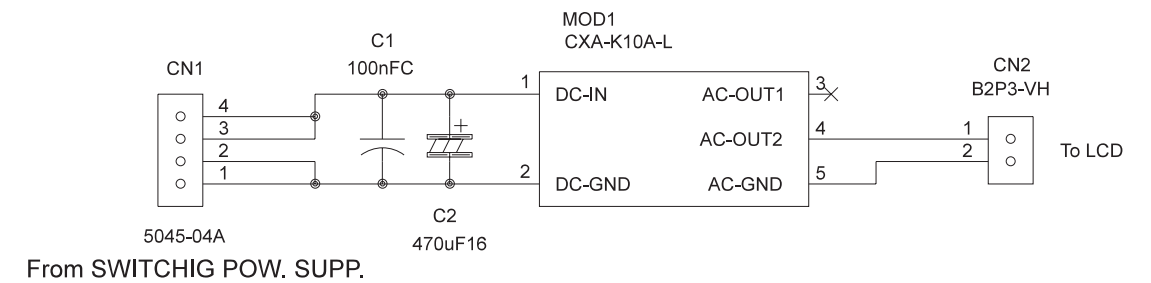


View from component side

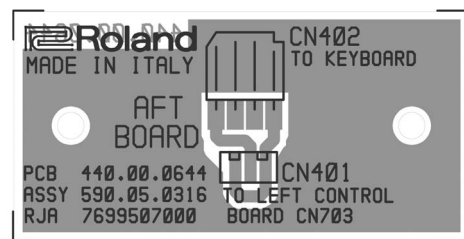
INVERTER PCB ASSY & CIRCUIT DIAGRAM ASSY 7698708000



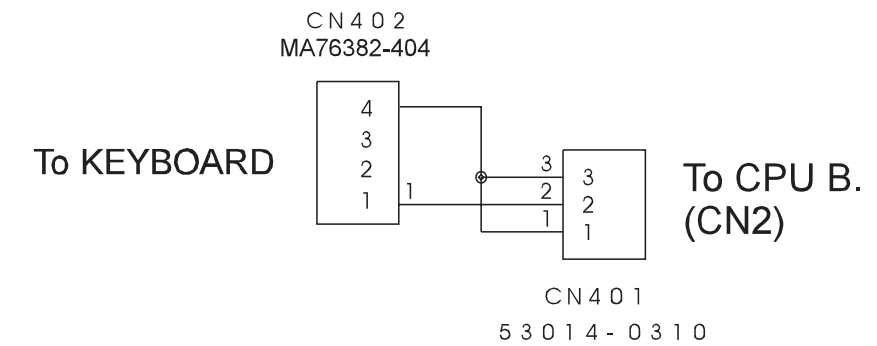
View from component side



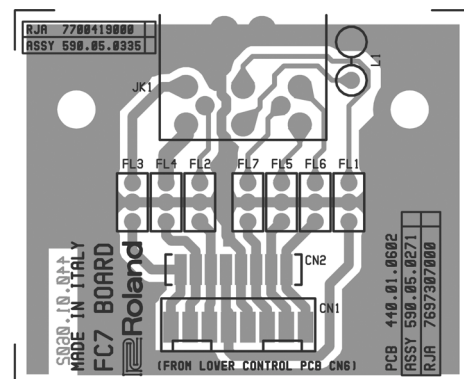
AFT PCB ASSY & CIRCUIT DIAGRAM ASSY 7700420000



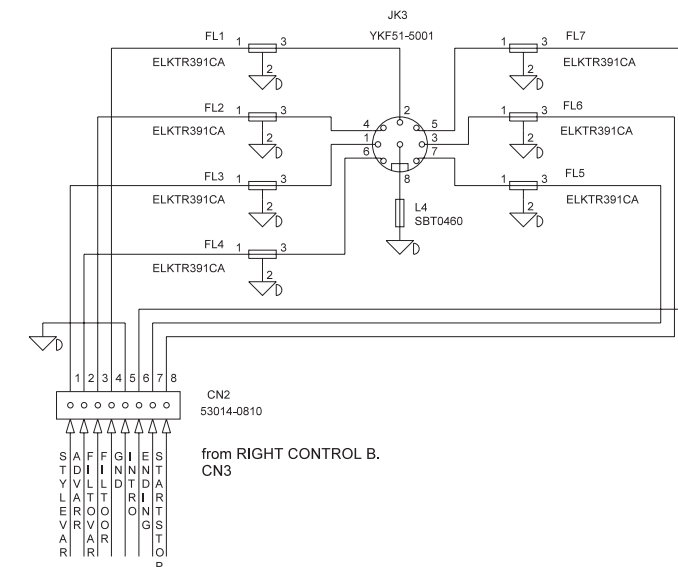
View from component side



FC7 PCB ASSY & CIRCUIT DIAGRAM ASSY 7700419000



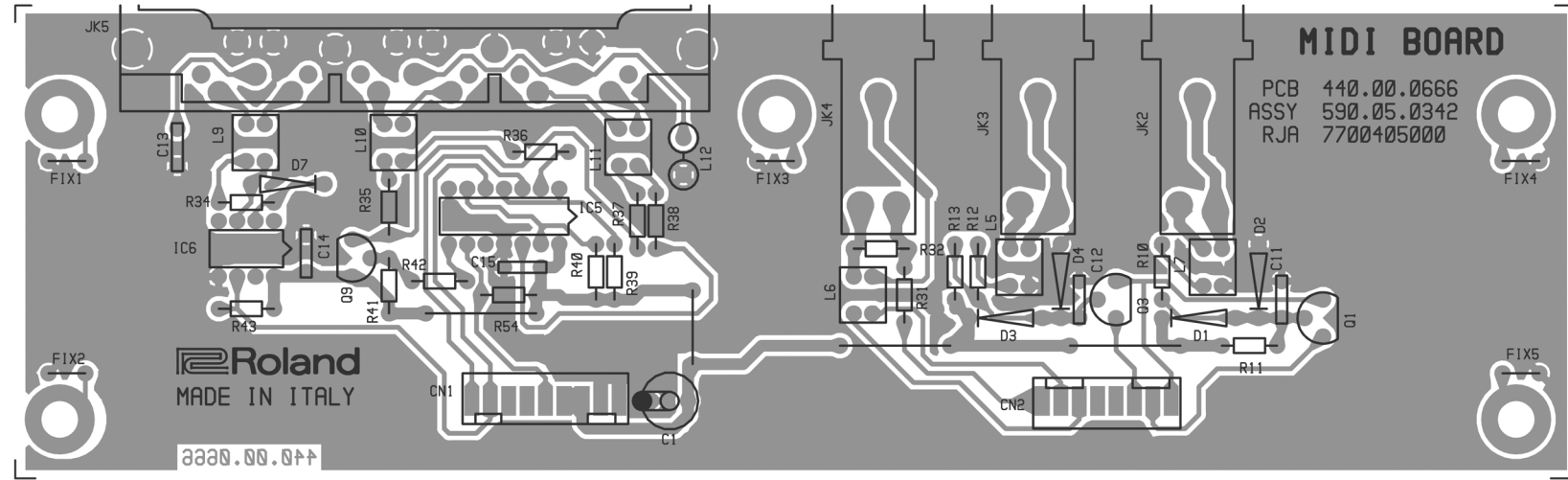
View from component side



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

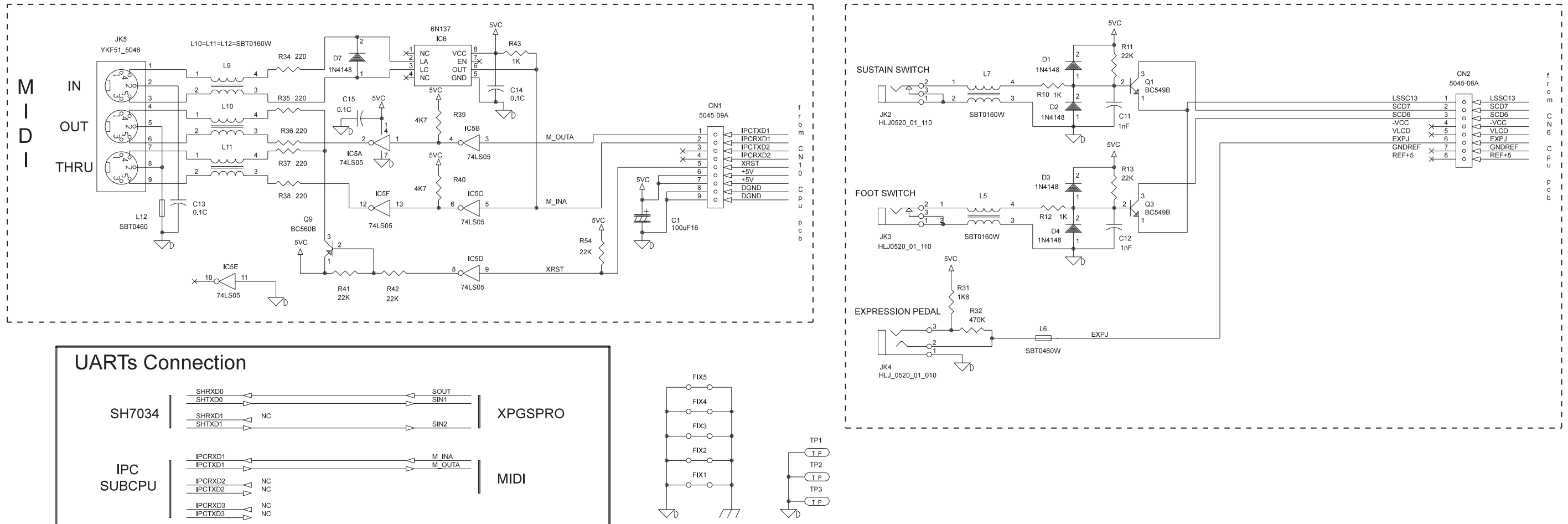
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MIDI PCB ASSY ASSY 7700405000



View from component side

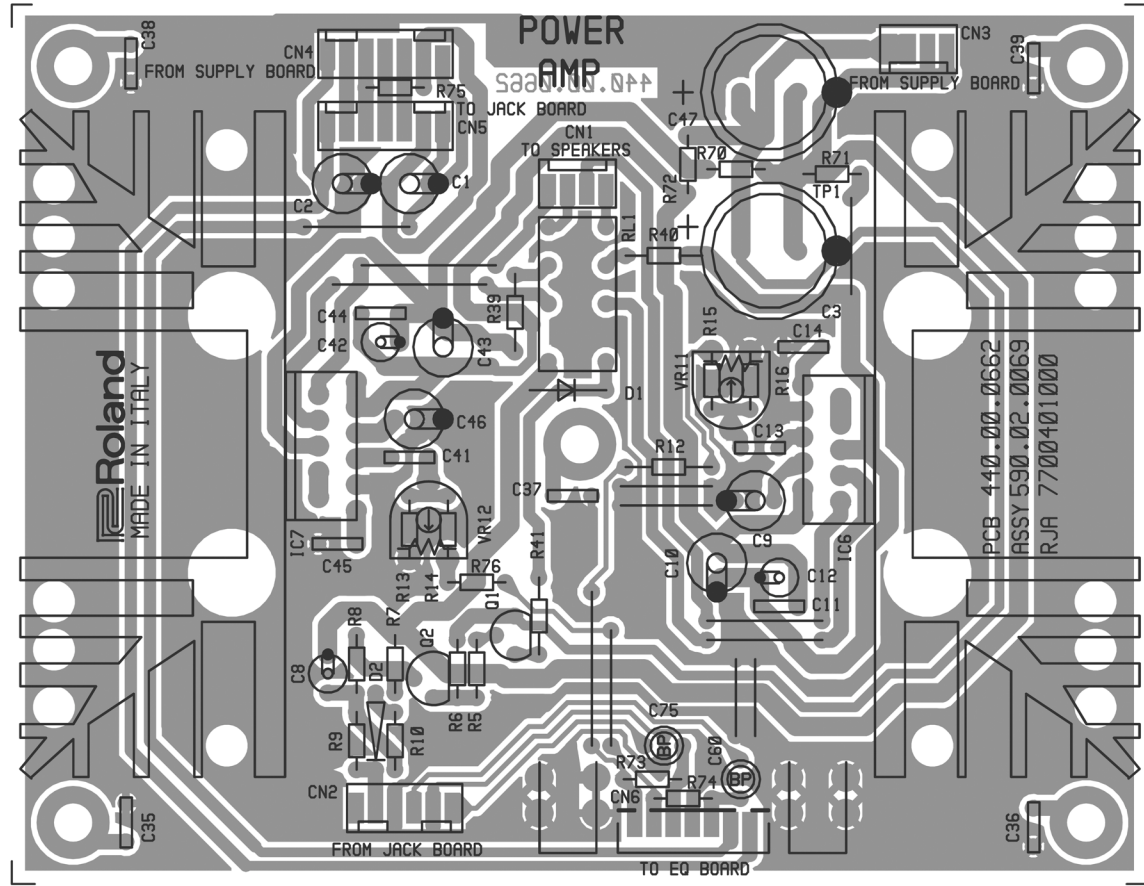
CIRCUIT DIAGRAM (MIDI PCB ASSY)



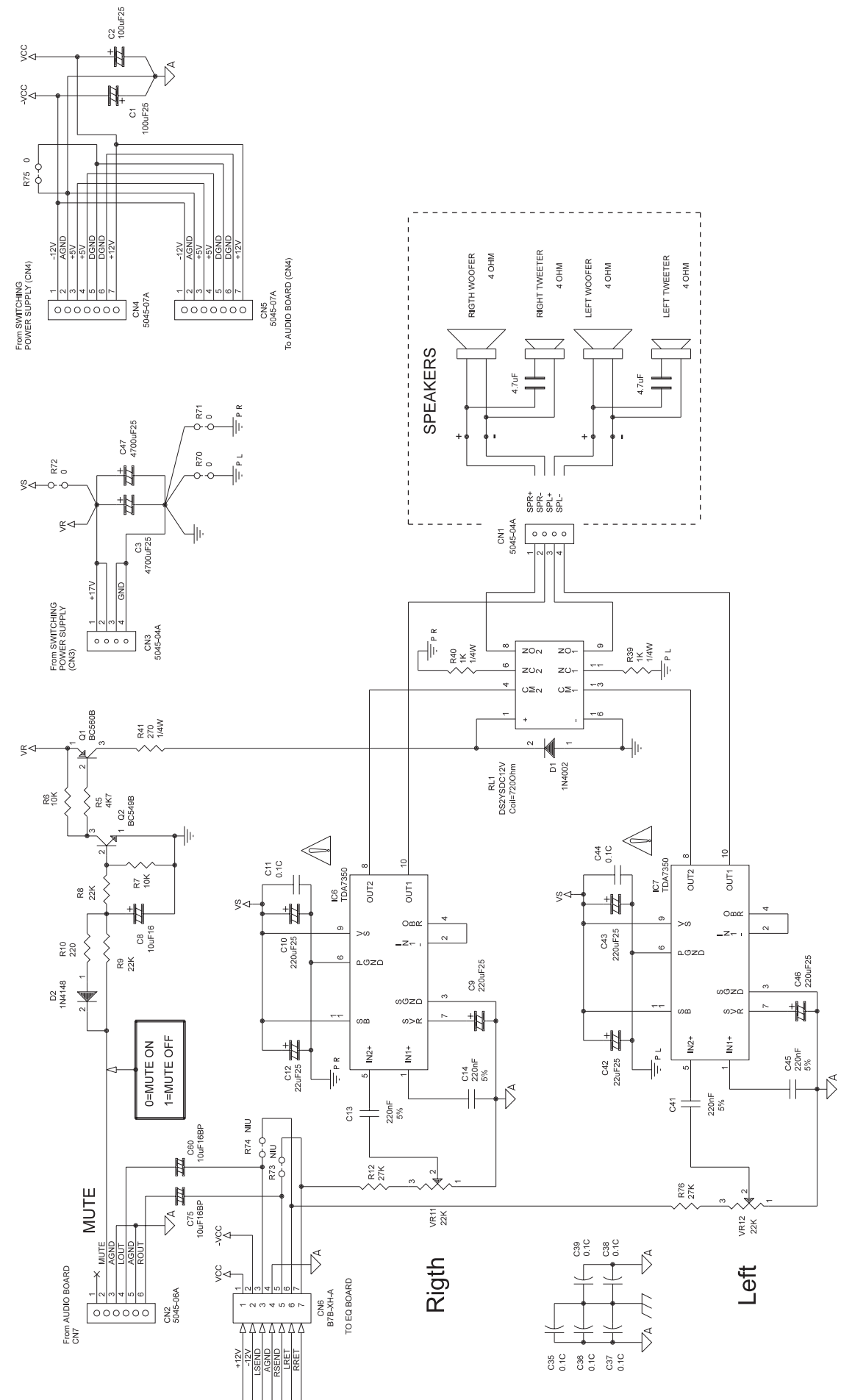
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AMPLIFIER PCB ASSY & CIRCUIT DIAGRAM
ASSY 7700401000



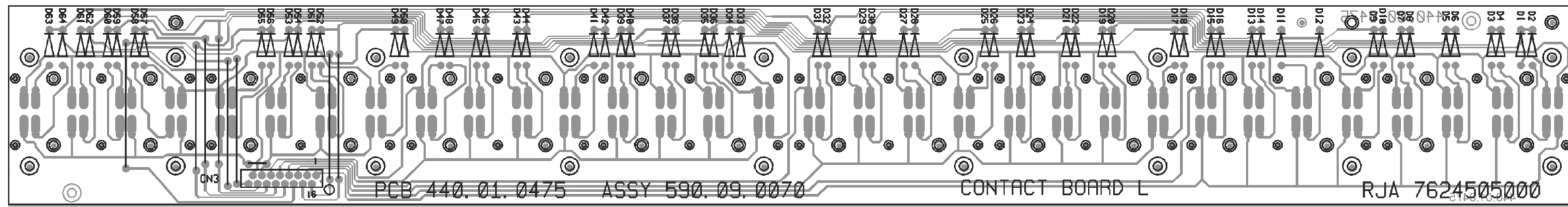
View from component side



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

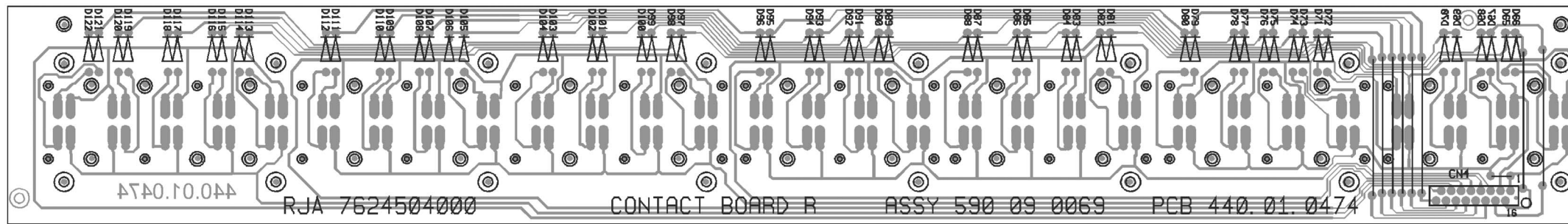
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LEFT CONTACT PCB ASSY w/RUBBER ASSY 7695005000



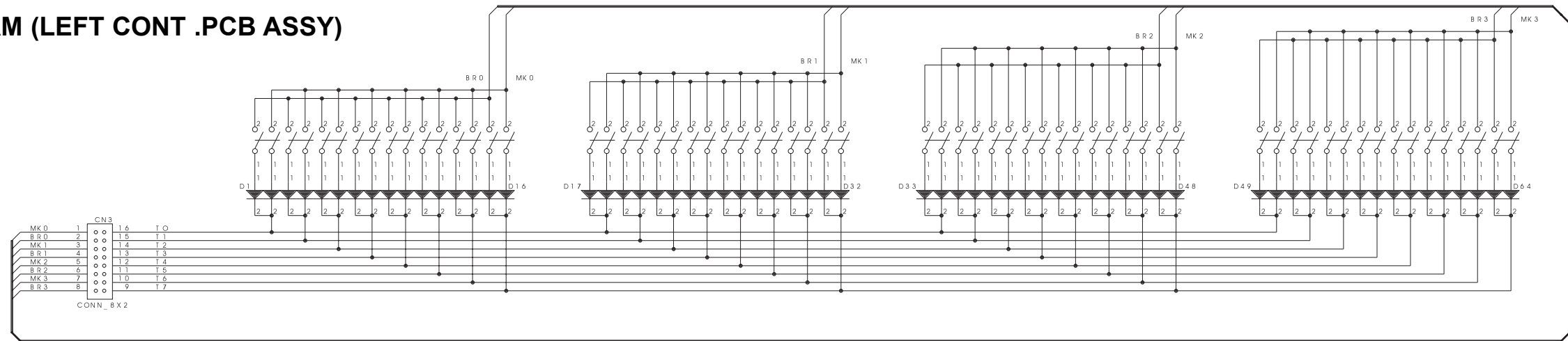
View from component side

RIGHT CONTACT PCB ASSY w/RUBBER ASSY 7695004000

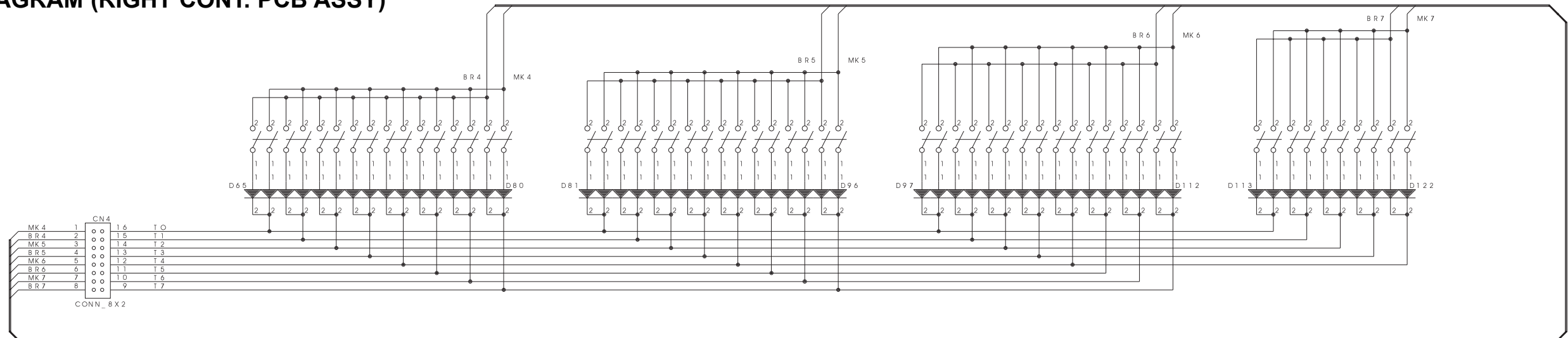


View from component side

CIRCUIT DIAGRAM (LEFT CONT. PCB ASSY)



CIRCUIT DIAGRAM (RIGHT CONT. PCB ASSY)



How to save / How to version up

Since EM-2000 has a flash memory for the main program registration, you can update the software version or the test program by floppy disks.

Item Required

EM-2000 Version up disk (code: 7700433000)
EM-2000 Test program (code: 7700434000)

ATTENTION:

The Test Program was not installed in this instrument (otherwise it would have occupied too much memory space). If you want to install it, you have to load the Test Program from the "Test Program EM-2000" floppy disk you've been provided with.

Warning:

Loading the Test Program causes the Software Program of your EM-2000 to be lost. Therefore every time you want to carry out some checks in your EM-2000 and consequently have to install the related Test Program, **we strongly recommend** you to make a back-up copy of your EM-2000 current software program, according to the procedure described in the << How to save the "Software Version" or the "Test Program" by Floppy disk >> paragraph.

Of course, once you've completed your checks, you'll have to reload the Software Program (that had been erased when installing the Test Program), as described in the << How to update the software version or the "Test Program" paragraph.

How to save the "Software Version" or the "Test Program" onto Floppy Disk.

Insert a Floppy Disk in which you'll save either the "Software Program" or the "Test Program"
 Turn the instrument on while keeping the "TRANSPOSER" + "ONE / TOUCH" + OCTAVE "UP" buttons pressed.

The display shows:

```

          SYSTEM SAVE

STYLE 1 to EXIT   STYLE 2 to CONTINUE
  
```

If you press the "Style 1" button, you'll exit the Flash saving mode and the instrument will go back to the initial program.
 If you press "Style 2" you'll go on and save the program.

The display shows:

```

          SYSTEM SAVE

          Initialising . . .

ATTENTION !! Do not turn instrument off
  
```

Then after a few seconds the display will show:

```

          SYSTEM SAVE

Sistem size [ BYTE ]      XXX
Checksum Calculation ..... DONE
Sistem saving ....      COMPLETED

<< TURN INSTRUMENT ON AGAIN >>
  
```

When the program saving operation has been completed it will be confirmed by the "System saving Completed" message appearing on the display.

To go back to the initial program, after a few seconds you have to turn the instrument off and then on again.

How to update the Software Version or the Test Program by Floppy Disk

Insert the floppy disk containing either the Software program or the Test program into the FDD.
 Then turn the instrument on while keeping the "Select" (Style /Midi Set) + "Gm/Gs mode" + "Bass Inversion" buttons pressed.

The display shows:

```

          FLASH UPDATE

STYLE 1 to EXIT   STYLE 2 to CONTINUE
  
```

By pressing the "Style 1" button you will exit the Flash loading mode and the instrument will get back to the old program.

By pressing the "Style 2" button you'll start loading the Flash EPROM.

The display shows:

```

          FLASH UPDATE

          Initialising . . .

ATTENTION !! Do not turn instrument off
  
```

After a few seconds, the display shows:

```

          FLASH UPDATE

Program loading ..... -----
Program checking ..... -----
Flash updating ..... -----

<< TURN INSTRUMENT ON AGAIN >>
  
```

If the loading operation of the Flash EPROM has been completed, you'll have the confirmation if the message "COMPLETED" is displayed. After a few seconds, you have to turn the instrument off and then on again.

TEST MODE

Main Test Menu

After loading the Test Program, turn the instrument on.
The Main Test Menu will be displayed, which is divided into two major groups: MUSIC STYLE and TONE.

EM-2000 test Ver. x . x x	
Style	Tone
1 Switch	1 Flash
2 Encoder	2 Scsi
3 Adc	3 Rom Style
4 Lcd	4 Midi
5 Led	5 FDD
6 Keyscan	6 Audio Test
	7 Ram

To exit the Test Mode, turn the instrument off.

1. SWITCH test

Press the Music Style 1 button.
The display shows:

EM-2000 SWITCH TEST	
Nome	XXXXX
	O N /OFF

Next.	XXXXX
Press Tone 8 and F5 to exit	

Action: every button, when pressed, will generate a sound. The LCD will consequently show the button name on the top of the left side as well as its ON/OFF status. On the bottom of the left side the name of the following button to be pressed will be shown. Every time a button has been checked, the asterisks disappear from the display.

Once all buttons have been subsequently pressed, you will automatically exit the Switch Test and get back to the Main Menu.

If you want to stop and exit the Switch Test, you can do it by pressing the "Tone 8" and "F5" buttons.

2. ENCODER check

Press the "music style 2" button

The display shows:

EM-2000 TEST ENCODER	
Drums Part __ > 0 - 255	Lower Num __ > 0 - 255
Accomp Gr __ > 0 - 255	Upper _Var __ > 0 - 255
Bass Bank __ > 0 - 255	Tempo __ > 0 - 255
Press F5 to exit	

To exit, press F5.

3. ADC Check

Press the "music style 3" button.

The display shows:

EM-2000 ADC TEST	
Foot switch= (On /Off)	Sust Foot switch = (On/Off)
Balance = (0 +/- 127)	After touch = (0-127)
D.Beam C. = (0 - 127) **	Modulation = (0 - 127)
Express = (0 - 127)	
Bender = (0 +/- 127)	
Press F5 to exit	

** = When passing your hand over the DBeam controller, the value appears on LCD.
Raise or lower your hand. Check that the value changes 0 from 127.

To exit, press F5.

4. LCD Check

Press the "music style 4" button.

The display shows:

EM-2000 LCD TEST		
Press F1	blue	Test
Press F2	white	Test
Press F3	normal	Test
Press F5 to exit		

Action:

If you press the "F1" button, the display will be blue
If you press the "F2" button, the display will be white;
If you press the "F3" button, the display will show the numbers from '0' to '9';

To exit, press F5.

5. LED Check

Press the "music style 5" button.

The display shows:

```

EM-2000 LED TEST ...

```

Note: Each LED will light subsequently, one after another; at the end of the sequence they will all be on.

The display shows:

```

EM-2000 LED TEST ...
Press F1 to orange leds
Press F2 to green leds
Press F3 to red leds

Press F5 to exit

```

When you press "F1", all orange LEDs light;
 When you press "F2", all green LEDs light;
 When you press "F3", all red LEDs light;
 Make sure that all LEDs work properly and have the right colour.

To exit, press F5.

6. KEYSCAN Check

Press the "music style 6" button.

The display shows:

```

EM-2000 KEY SCAN TEST
Key = XX          Velocity = 0 - 127
After Touch      [ 0 - 127 ]

** Press F5 to exit **

```

Action: a piano sound will be heard every time a key is pressed; you'll hear the aftertouch effect if you press a key till the end of its stroke. The LCD shows the key name, the velocity value and the aftertouch value

To exit, press F5.

Second group of checks**1. Flash EPROM**

Press the "tone 1" button

The display shows:

```

EM-2000 FLASH TEST

Writing .....
Verifying .....
Block .....
Flash ..... OK or Error

Press F5 to exit

```

To exit, press F5.

Note: if there is an asterisk (*) beside the "Flash Test" item within the Main Menu, this means that this kind of check has already been carried out.

2. SCSI Test

Press the "tone 2" button

The display shows:

```

EM-2000 TEST Scsi

Setup Scsi      : OK or Error

Scanning Drive : - - - - - 5 - X

Press F5 to exit

```

Note: To test the external SCSI input of EM-2000, you have to connect it with an external peripheral. Please notice the identifier number, which will appear on the display in place of the corresponding dash beside "Scanning Drive". The identifier number cannot be either 5 or 7, because they are already used by EM-2000.

To exit, press F5.

3. Style Rom

Press the "tone 3" button.

The display shows:

```

EM-2000 ROM STYLE TEST

OK or Error

Press F5 to exit

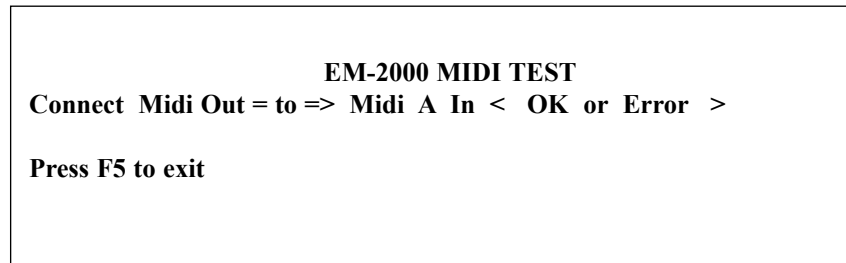
```

To exit, press F5.

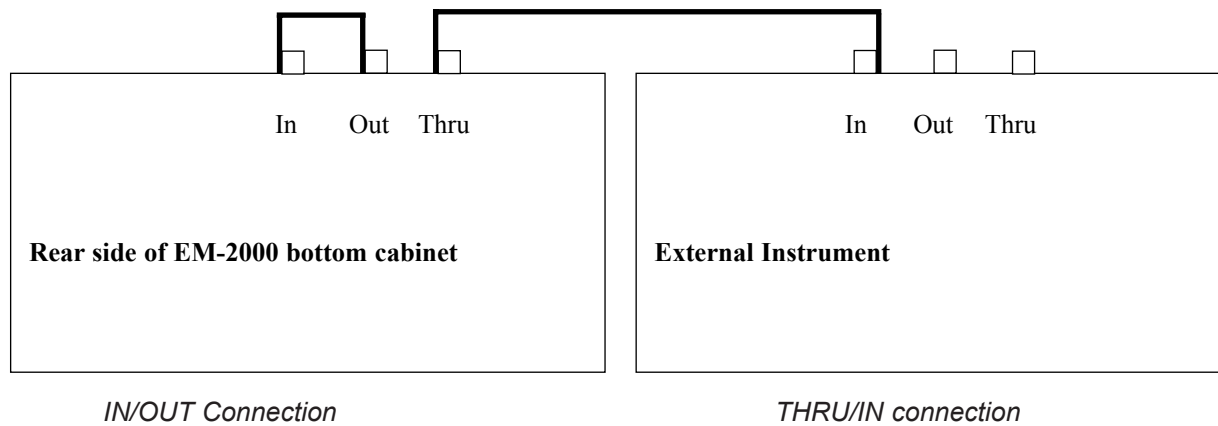
4. Midi TEST

Press the "tone 4" button.

The display shows:



Cable connections to check the MIDI outputs:



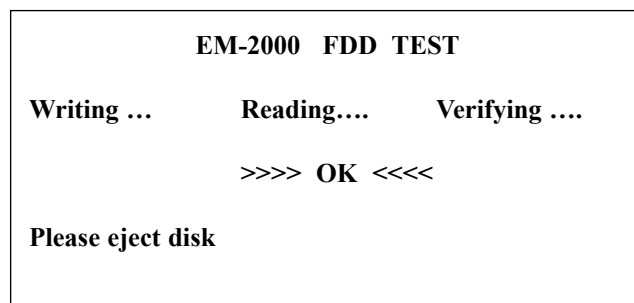
While the "EM-2000 MIDI TEST" screen display is shown, connect the Midi Cables between EM-2000 and an external instrument as shown in the above diagram. Make sure that either the "OK" or the "ERROR" message appear on the display. Then keep the cable connection between the IN and OUT sockets of EM-2000 and connect EM-2000 with another external instrument by using its "Midi Thru" output and the second Midi Cable. If the result of this Midi Test is "OK", you'll hear an intermittent sound coming from the second external instrument.

To exit, press the F5.

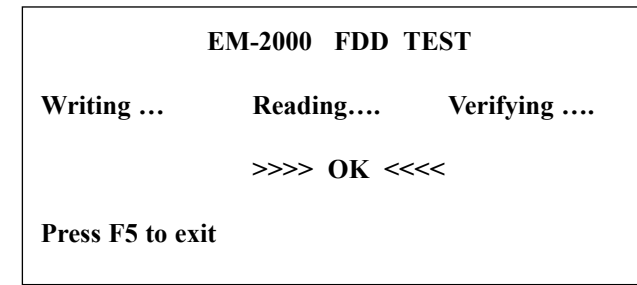
5. FDD Test

Press the "tone 5" button.

The display shows:



After a few seconds, the display will show:



If the result isn't OK, one of the following errors will appear on the display:

- Read Error
- Write Error
- Verify Error

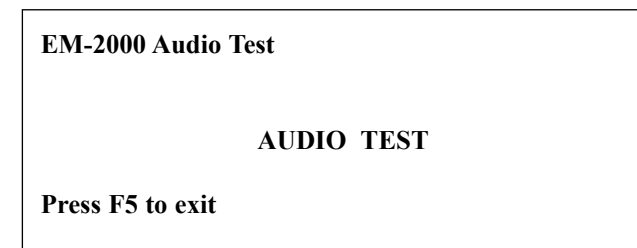
CAUTION: To check the FDD, use only a formatted disk, either DD or HD type.

To exit, press the "F5" button.

6. Audio Test

Press the "tone 6" button. You've entered the "Audio Test" mode and:

the display shows:

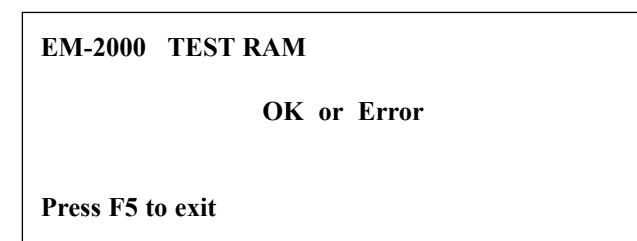


Now, some sine wave sounds will come out from the Right and Left speakers. Before calibrating the amplifier, move the "volume" potentiometer to the "Max" position then adjust the trimmers of the amplifier channels (P1: right Channel; P2: left Channel) so that the oscilloscope will show a value of 17 Vpp across the speakers. The sounds coming from the R/L Mono channels on the "OUT" output will be mixed and can be adjusted by the "Controls Volume" slider potentiometer. The sine wave sound on the right channel will have a 415 Hz frequency and a 2Vpp amplitude. The sine wave sound on the left channel will have a 220 Hz frequency and a 2Vpp amplitude. To exit, press "F5".

7. Dynamic Ram

Press the "tone 7" button.

The display shows:



To exit, press "F5".

Calibration procedure to replace the Pitch Bender.

Load the "Software Program" into the instrument. Turn EM-2000 on while keeping the "F2" button pressed.

After a few seconds, the display will show:

PITCH BENDER CALIBRATION

CENTER POSITION

Then Press Upper 1 Key

Put the Bender lever in the middle while pressing the "Upper 1" button at the same time.

The display shows:

PITCH BENDER CALIBRATION

ALL LEFT POSITION

Then Press Upper 1 Key

Move the Bender lever completely towards left while pressing the "Upper 1" button at the same time.

The display shows:

PITCH BENDER CALIBRATION

ALL RIGHT POSITION

Then Press Upper 1 Key

Move the Bender lever completely towards right while pressing the "Upper 1" button at the same time.
When the calibration has been completed, the instrument will automatically reset and go back to the initial screen display of the "Software Program".

How to visualize the "Software Program" version

Turn the instrument on while keeping the "WRITE" + "SHIFT" + RESET/TAP TEMPO buttons pressed.

After a few seconds the display shows:

EM-2000 Arranger Keyboard

Ver. XX . XX

Date Version : Day __ Month __ Year __

CPU Bios Version: Ver. XX . XX

To exit from this screen display, turn the instrument off.

NOTICE**Adjusting DBeam controller**

When you replace CPU PCB ASSY, DBeam controller adjustment is necessary.

- 1-1. Remove the bottom cover.
- 1-2. Connect the test probe of the oscilloscope to the Tap Point of the CPU PCB ASSY.
TP 15: + TP 16: -(GND)
- 1-3. Adjust the voltage output from TP 15 to 0V by using VR1.

NOTE: When you adjust the voltage, be sure to keep EM-2000 in a horizontal position, and keep any object and strong light (fluorescent lamp etc.) away from around the photoreceiver.