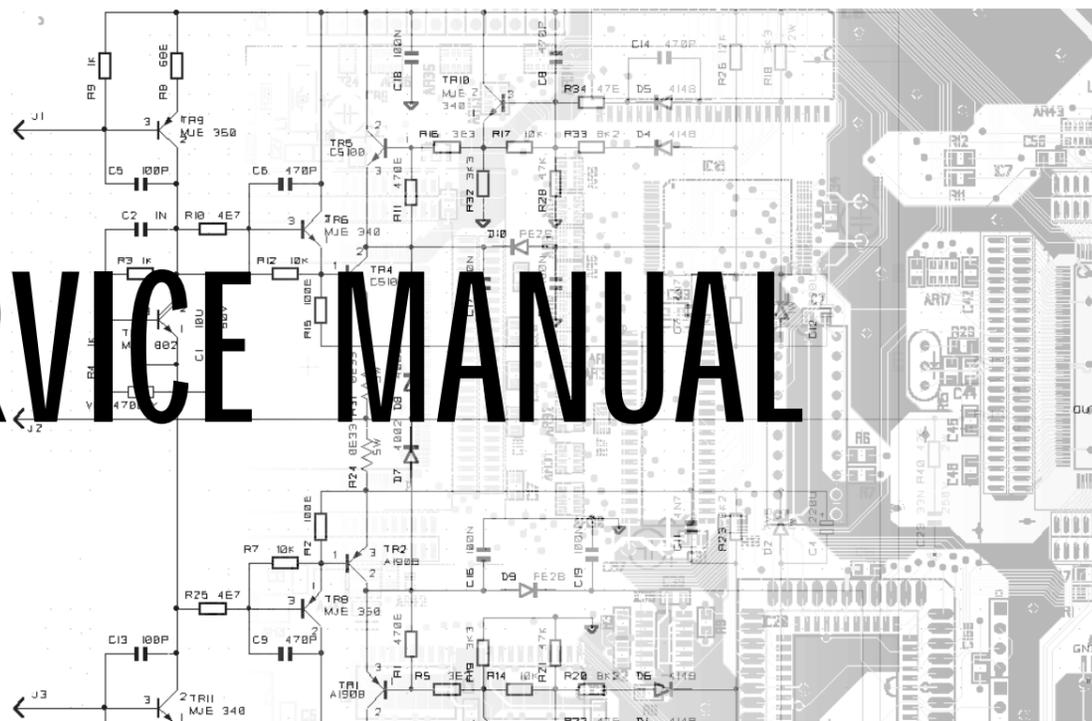




EQUINOX

SERVICE MANUAL



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5	Assembly & Wiring Connections 2nd version
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10	Mixer Board Schematic and Pcb Layout 2nd Version
11	61 and 76 Notes L/R Contact Boards, Keyboard Interface Board Schematics
12	Controls Interface & Controls Panel Board Schematics
13	Controls Panel Pcb Reverse Layout, Controls Interface and Keyboard Interface Pcb Layout
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19	Test & Adjustment Procedure, Spare Part List

Warnings



Notice

Service must be carried out by qualified personnel only. Any tampering carried out by unqualified personnel during the guarantee period will forfeit the right to guarantee.

For a correct operation of the instrument, after having switched off, be careful to wait at least 3 seconds before switching on again. To improve the device's specifications, the schematic diagrams may be subject to change without prior notice.

All components marked by this symbol have special safety characteristics, when replacing any of these components use only manufacturer's specified parts.

The (μ) micro symbol of capacitance value is substituted by U.

The (Ω) omega symbol of resistance value is substituted by E.

The electrolytic capacitors are 25Vdc rated voltage unless otherwise specified.

All resistors are 1/8 Ω unless otherwise specified.

All switches shown in the "OFF" position. All DC voltages measured to ground with a voltmeter 20K Ω m/V.

← Soldering point.

↑ Supply voltage.

⊥ Logic supply ground.

• Male connector.

□ Test point.

⊥ Analog supply ground.

○ Female connector.

◊ Flag joined with one or more flags

⊥ Chassis ground.

⊔ M/F faston connector.

with the same signal name inscribed.

⊕ Earth ground.

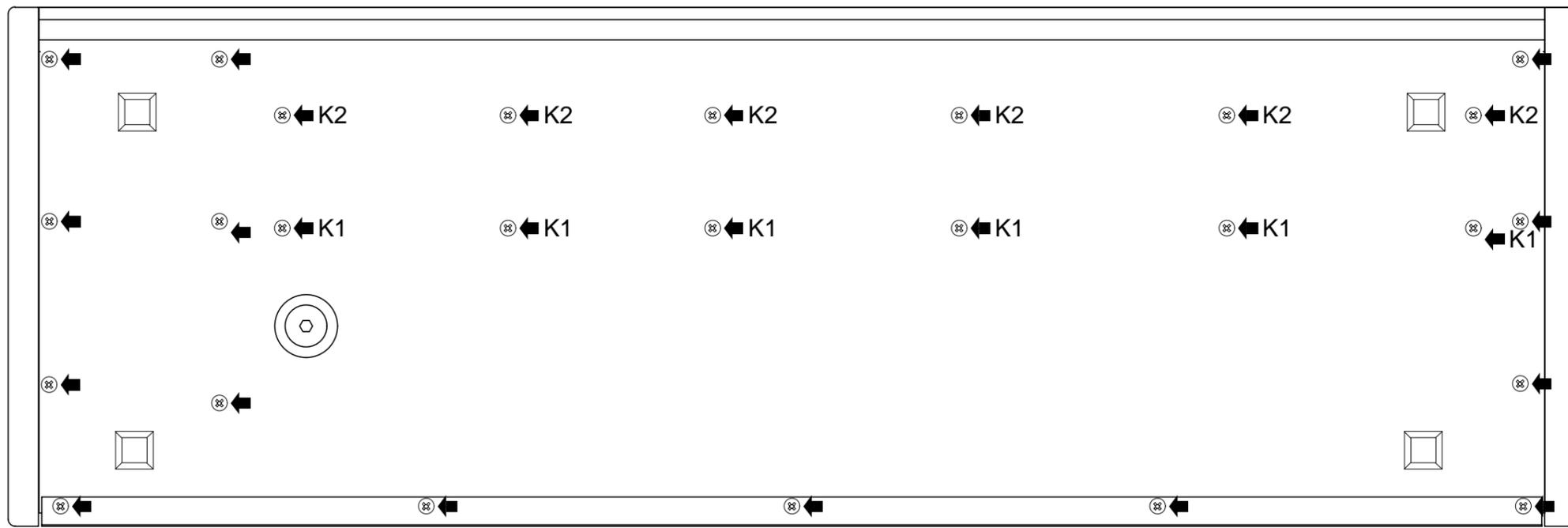


ATTENTION

Observe precautions when handling electrostatic sensitive devices.

Address

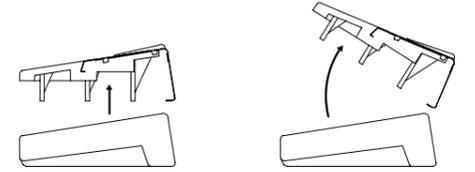
GENERALMUSIC S.p.A. Sales Division: 47842 S.Giovanni in Marignano (RN) ITALY - Via delle Rose, 12 - tel. 0541/959511 - fax 0541/957404
GENERALMUSIC on the NET: <http://www.generalmusic.com>



61 Notes

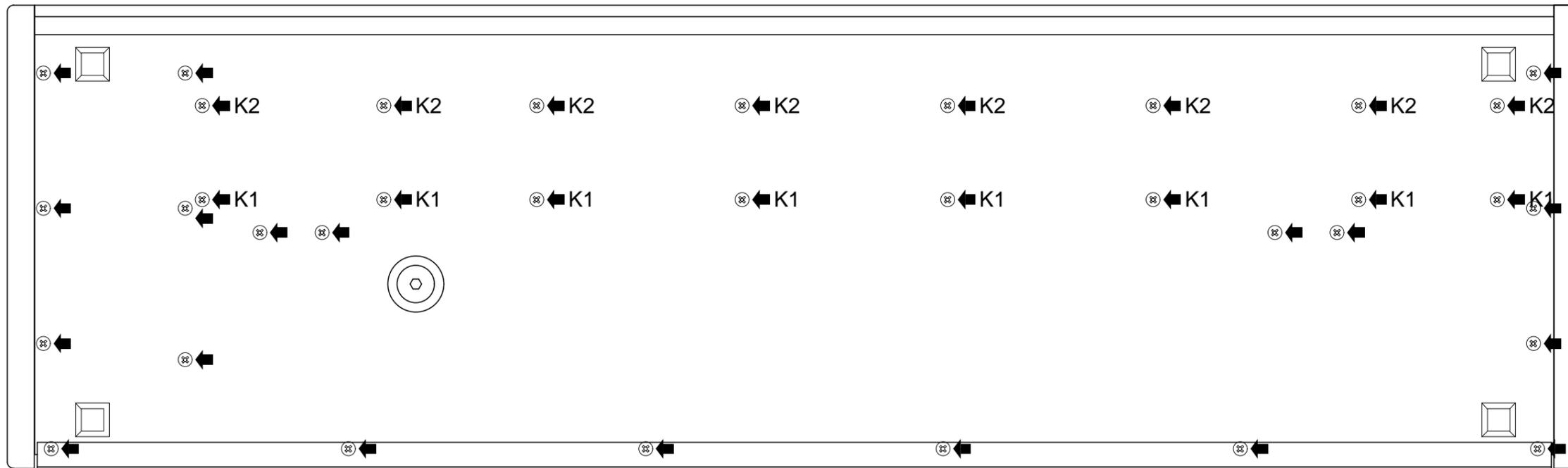
Opening Instructions

Disconnect the instrument from the mains.
Carefully turn the instrument over and unscrew the screws marked with the arrows. Hold the chassis (top & bottom) tightly and turn the instrument the right way up, lift off the top chassis as shown below with care without forcing or disconnecting the cables.



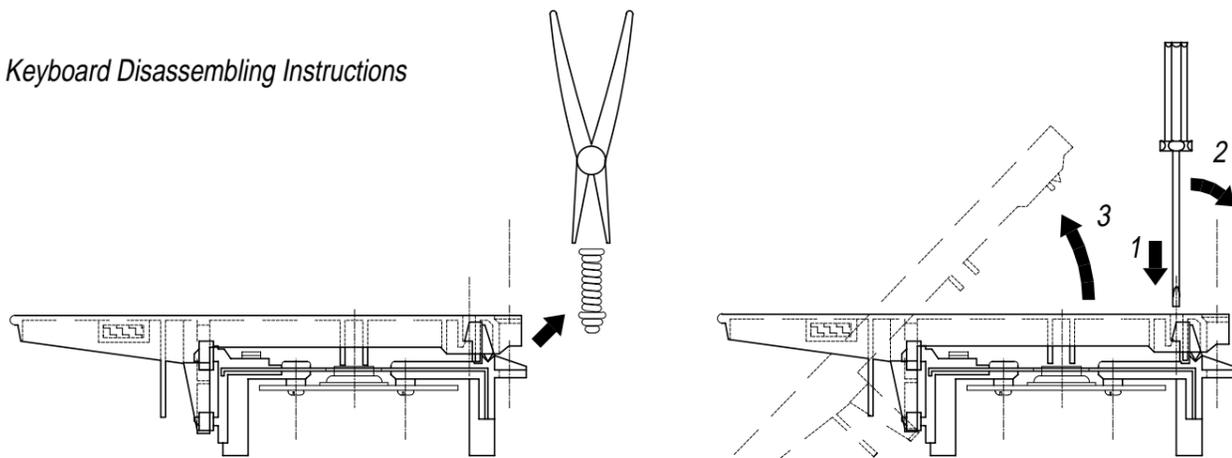
Keyboard Separation

(open the instrument before proceed)
To separate the keyboard from chassis, carefully turn the bottom chassis from horizontal to vertical, remove the screws marked by K1, put it back horizontal, holding top & bottom chassis move these tightly to the end of your job table, now unscrew the screws marked with K2 to reassemble the keyboard & the chassis follow the instructions in reverse order.



76 Notes

Keyboard Disassembling Instructions



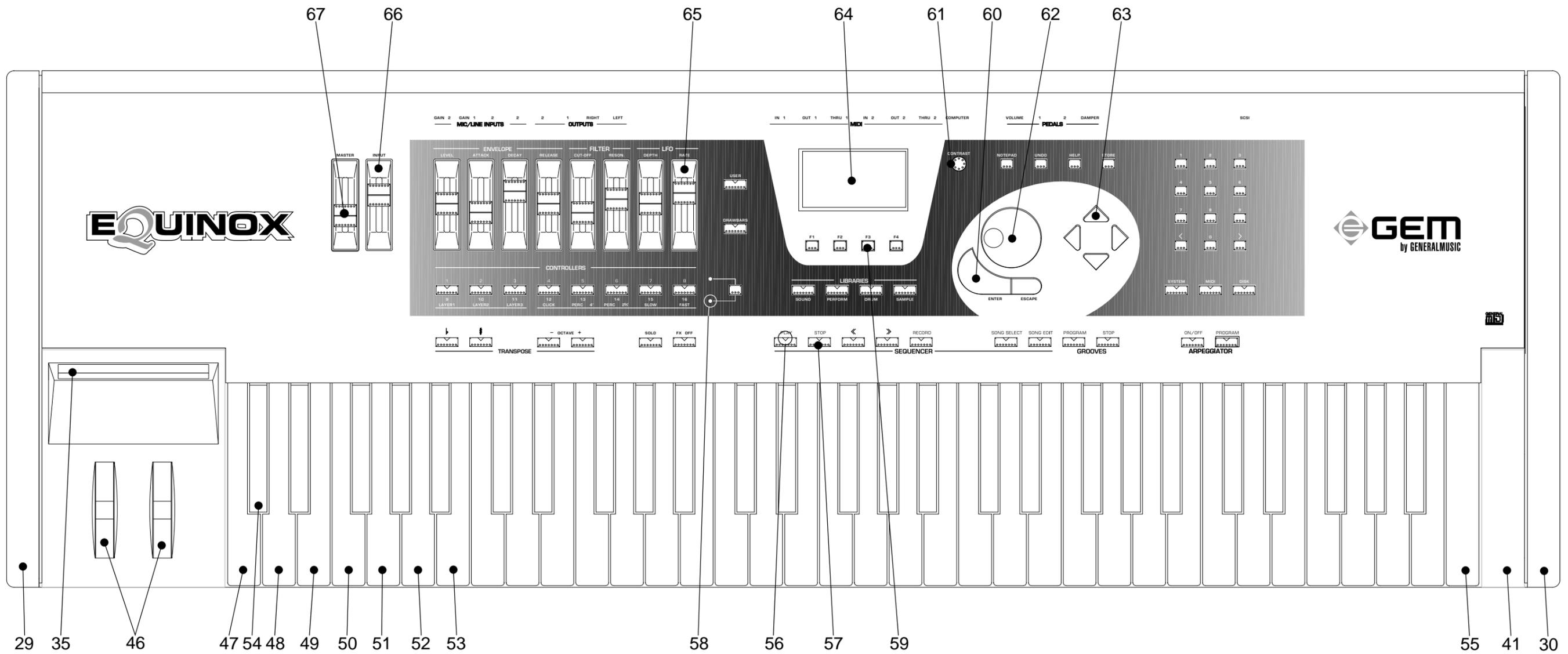
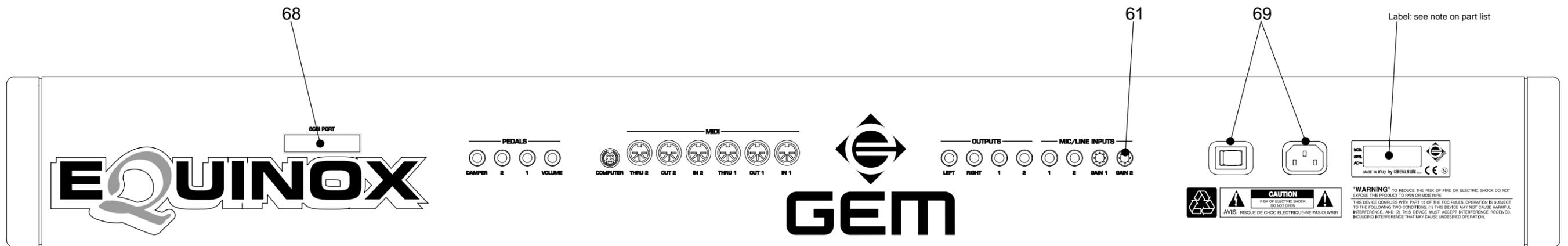
Remove the key return spring

Unlock the key applying not much strenght
Note: To remove a sharp key before you must remove a near natural key.

NOTICE

The EQUINOX keyboard has manufactured in two versions:
The 1st version has a traditional supply (transformer and power supply board with mixer),
The 2nd version has a switching supply (SWT unit and mixer board).
All the keyboard specifications remain the same, unless the mains voltage:
the 1st version has two nominal mains voltages 115Vac-60Hz for U.S.A. or 230Vac-50Hz for CEE & other countries.
the 2nd version accept all mains voltages into the range of 100-230Vac and 50-60Hz.
All the other boards and s.o. software are unchanged between all these versions.
To recognize the models refer to the code imprinted on the rear label:
995155 - 995156 - 995157 - 995158 are the 1st versions,
995167 - 995168 - 995169 - 995170 are the 2nd versions.

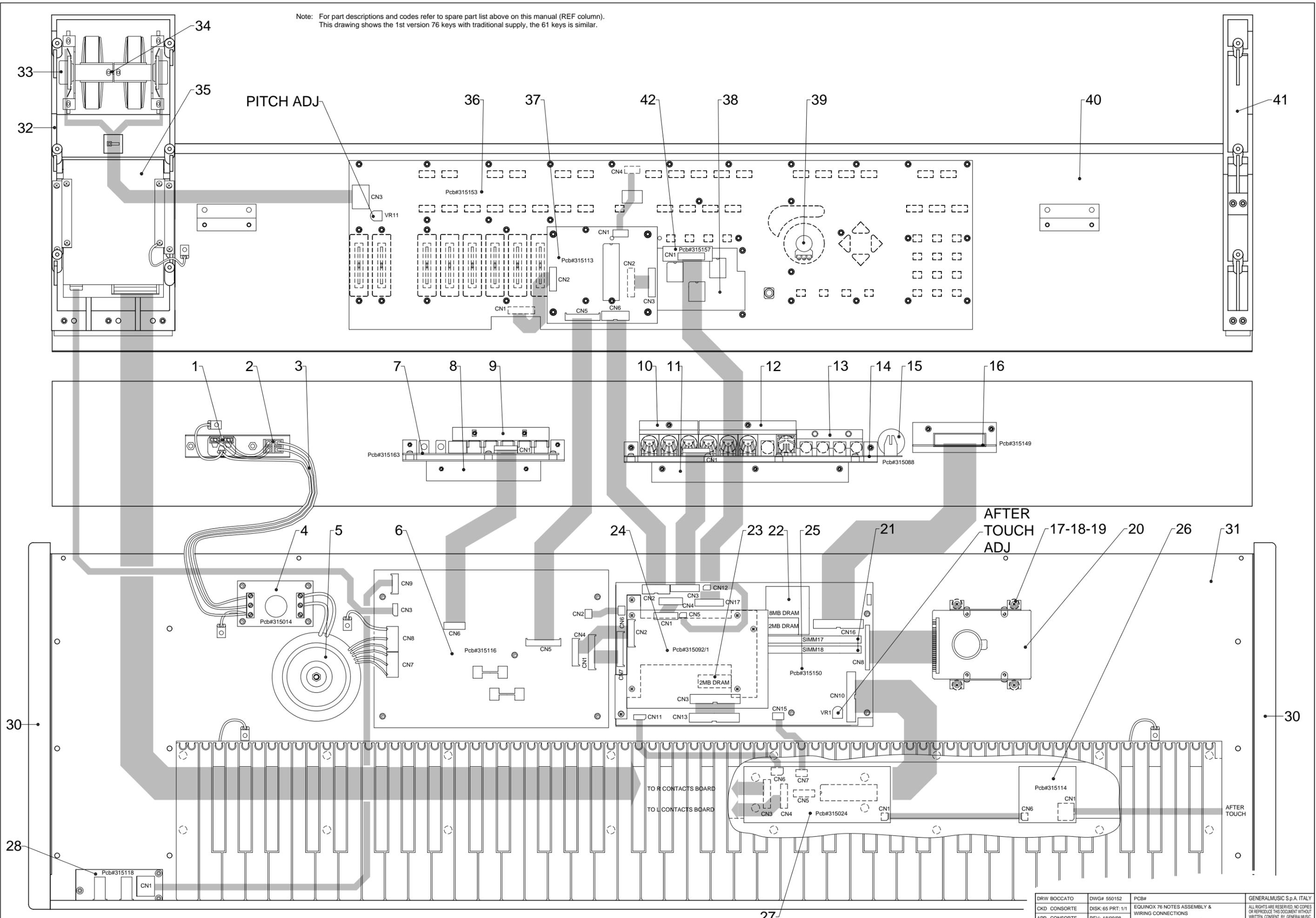
DRW Boccato	DWG# 550151	PCB#	GENERALMUSIC S.p.A. ITALY
CKD Consorte	DISK: 65 PRT: 1/1	Opening Instructions	ALL RIGHTS ARE RESERVED. NO COPIES OR REPRODUCE THIS DOCUMENT WITHOUT WRITTEN CONSENT BY GENERALMUSIC
APP. Orsetti	REV: 30/09/98	Keyboard Disassembling Instructions	



Note: for descriptions and codes refer to Ref column on spare part list above on this manual.

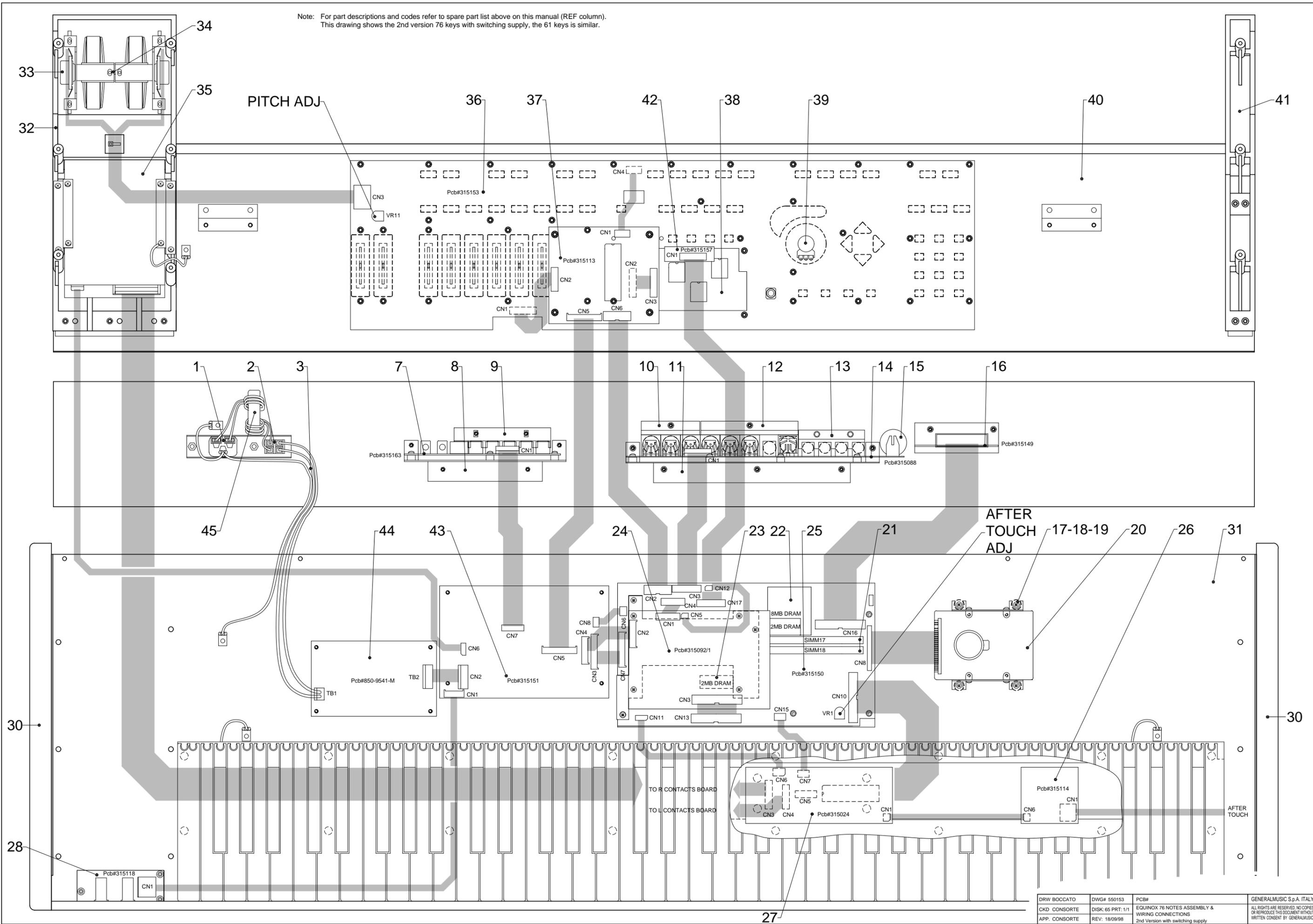
DRW: Bocato	DWG#: 550154	PCB:	GENERALMUSIC SpA ITALY
CKD: Consorte	DISK: 65 PART: 1/1	Layout	ALL RIGHTS ARE RESERVED. NO COPIES OR REPRODUCE THIS DOCUMENT WITHOUT WRITTEN CONSENT BY GENERALMUSIC
APP: Consorte	REV: 23/09/98		

Note: For part descriptions and codes refer to spare part list above on this manual (REF column).
This drawing shows the 1st version 76 keys with traditional supply, the 61 keys is similar.

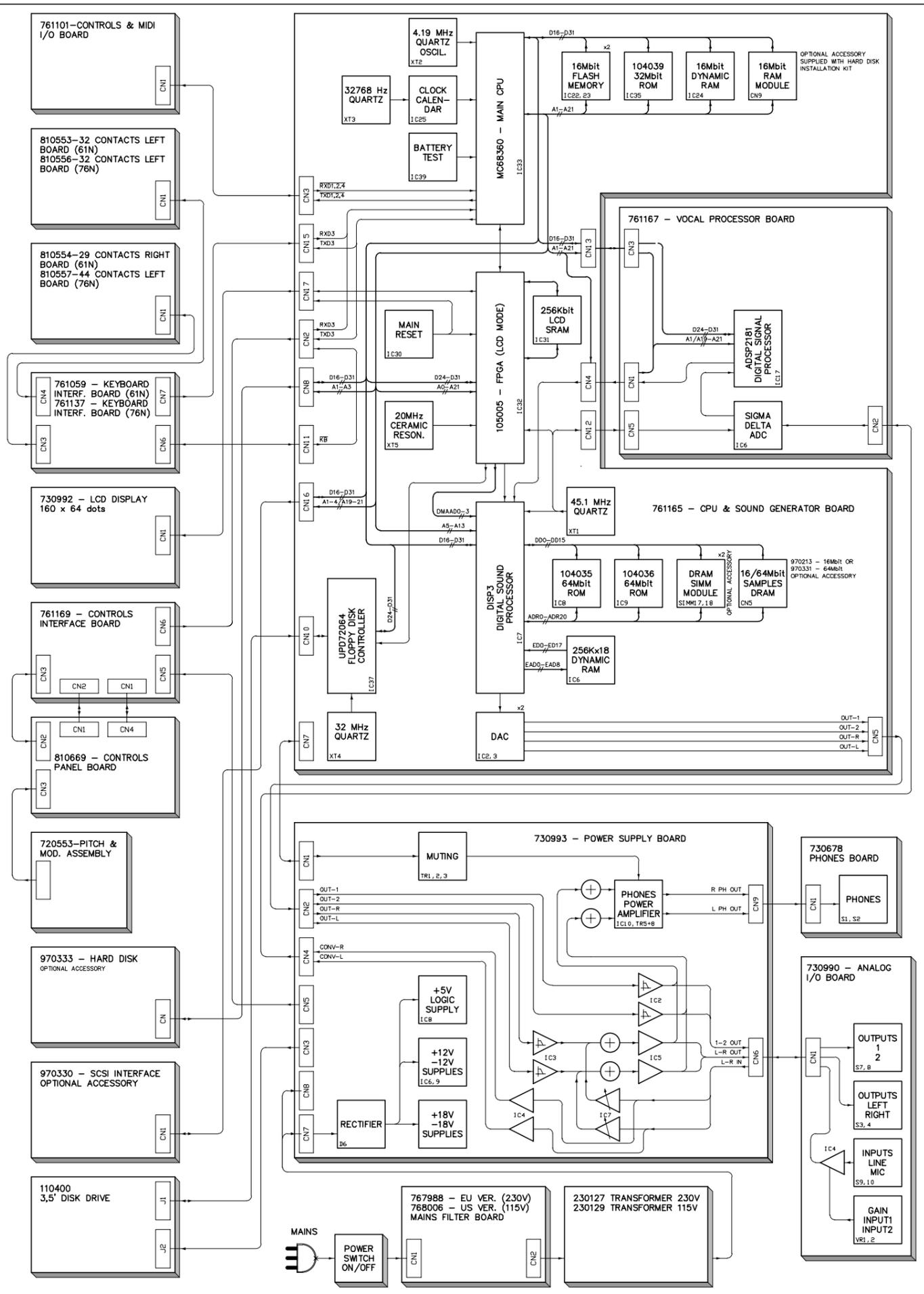


DRW BOCCATO	DWG# 550152	PCB#	GENERALMUSIC S.p.A. ITALY
CKD CONSORTE	DISK: 65 PRT: 1/1	EQUINOX 76 NOTES ASSEMBLY & WIRING CONNECTIONS	ALL RIGHTS ARE RESERVED. NO COPIES OR REPRODUCE THIS DOCUMENT WITHOUT WRITTEN CONSENT BY GENERALMUSIC
APP. CONSORTE	REV: 18/09/98	1st Version with traditional supply	

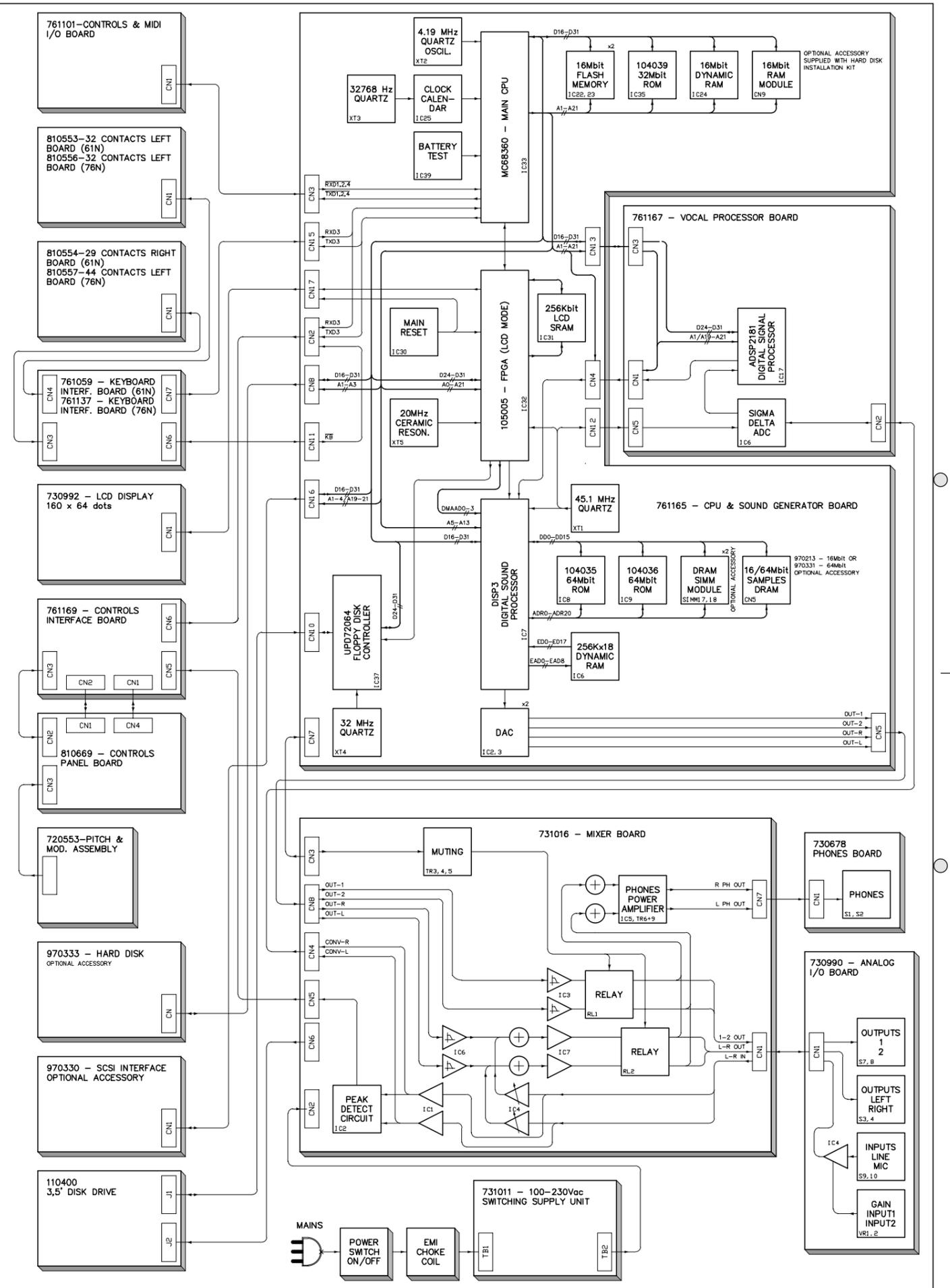
Note: For part descriptions and codes refer to spare part list above on this manual (REF column).
This drawing shows the 2nd version 76 keys with switching supply, the 61 keys is similar.



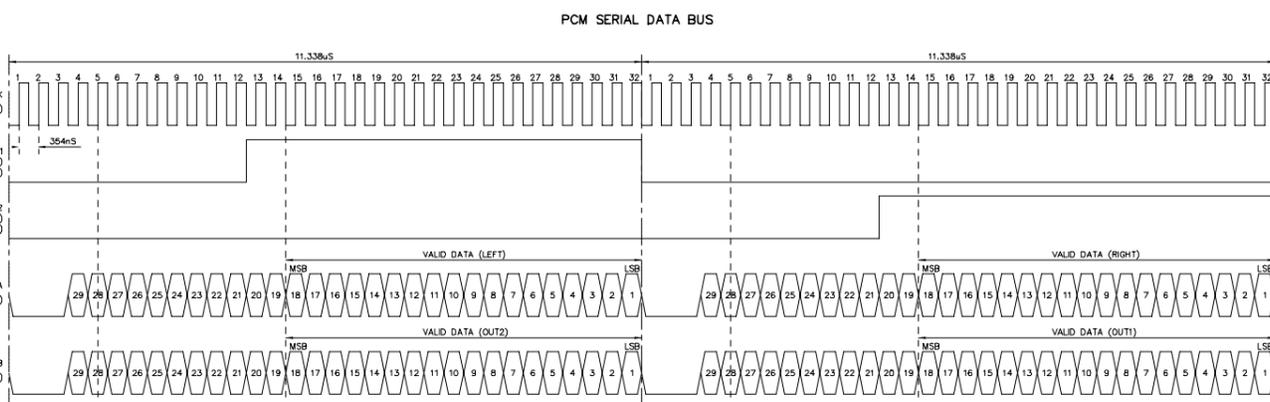
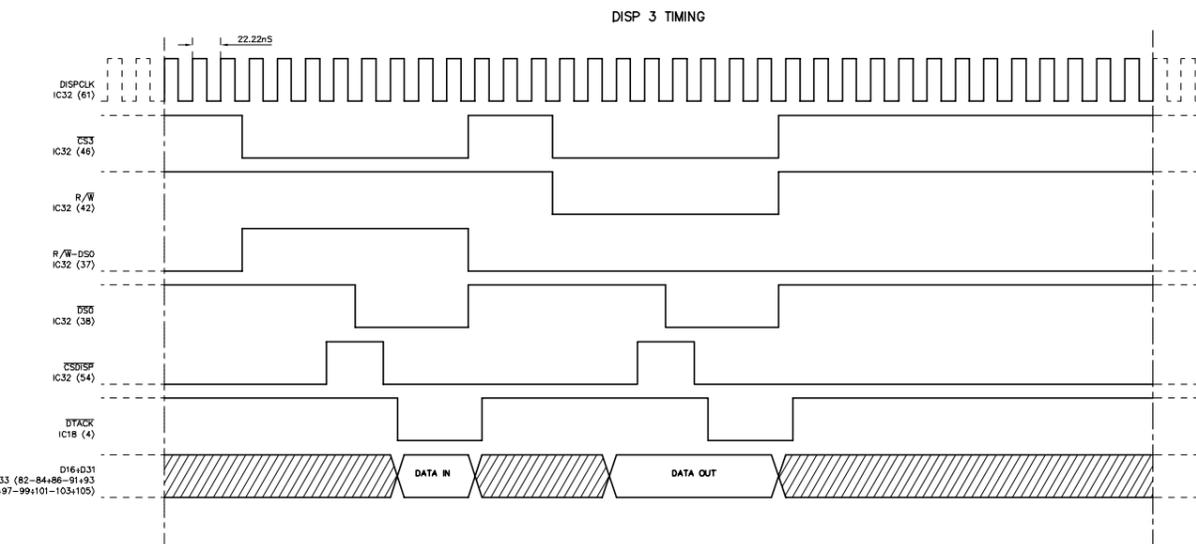
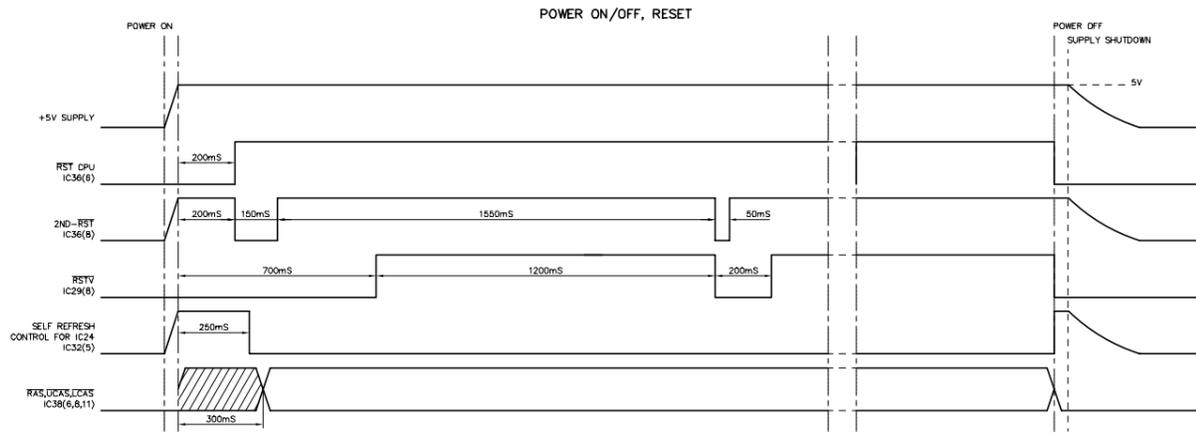
DRW BOCCATO	DWG# 550153	PCB#	GENERALMUSIC S.p.A. ITALY
CKD CONSORTE	DISK: 65 PRT: 1/1	EQUINOX 76 NOTES ASSEMBLY & WIRING CONNECTIONS	ALL RIGHTS ARE RESERVED. NO COPIES OR REPRODUCE THIS DOCUMENT WITHOUT WRITTEN CONSENT BY GENERALMUSIC.
APP. CONSORTE	REV: 18/09/98	2nd Version with switching supply	



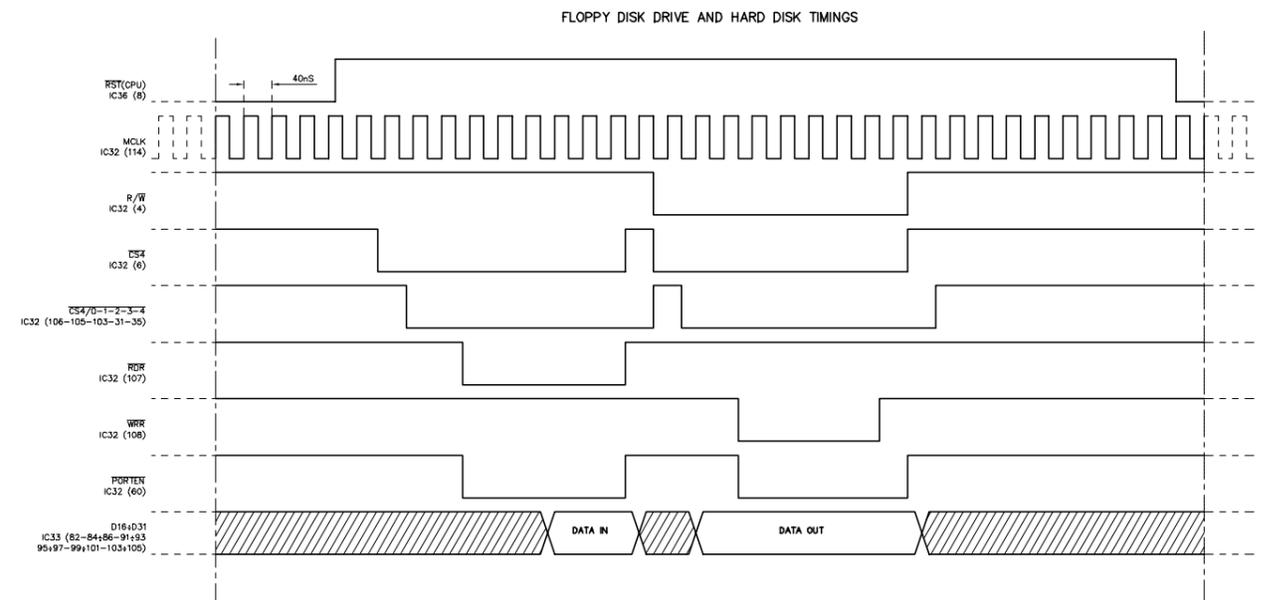
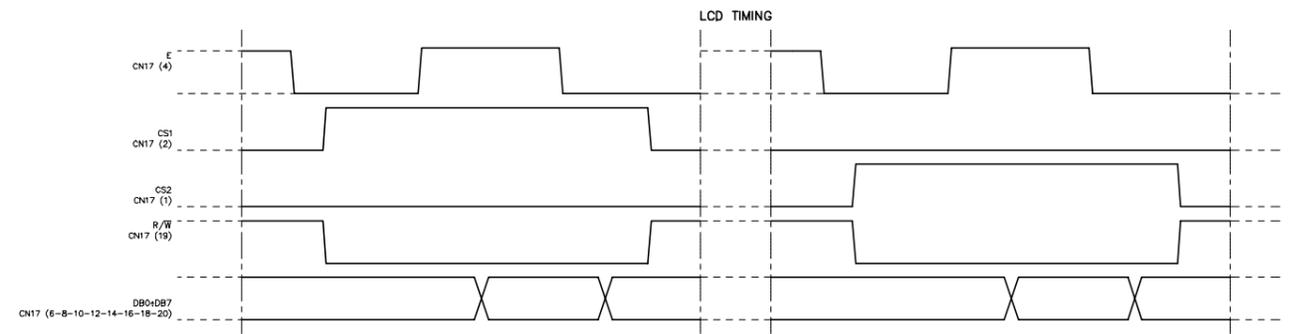
DRW Boccato DWG# 550155 PCB# GENERALMUSIC S.p.A. ITALY
 CKD Consorte DISK: 65 PRT: 1/1 Block Diagram ALL RIGHTS ARE RESERVED. NO COPIES OR REPRODUCE THIS DOCUMENT WITHOUT WRITTEN CONSENT BY GENERALMUSIC.
 APP. Consorte REV: 25/09/98 1st Version with traditional supply

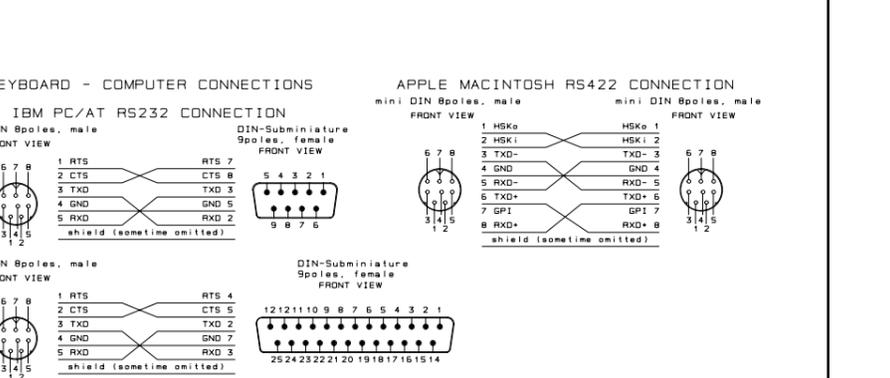
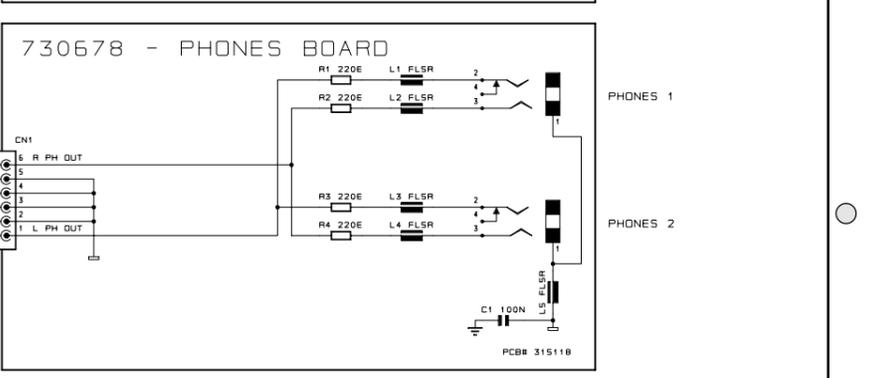
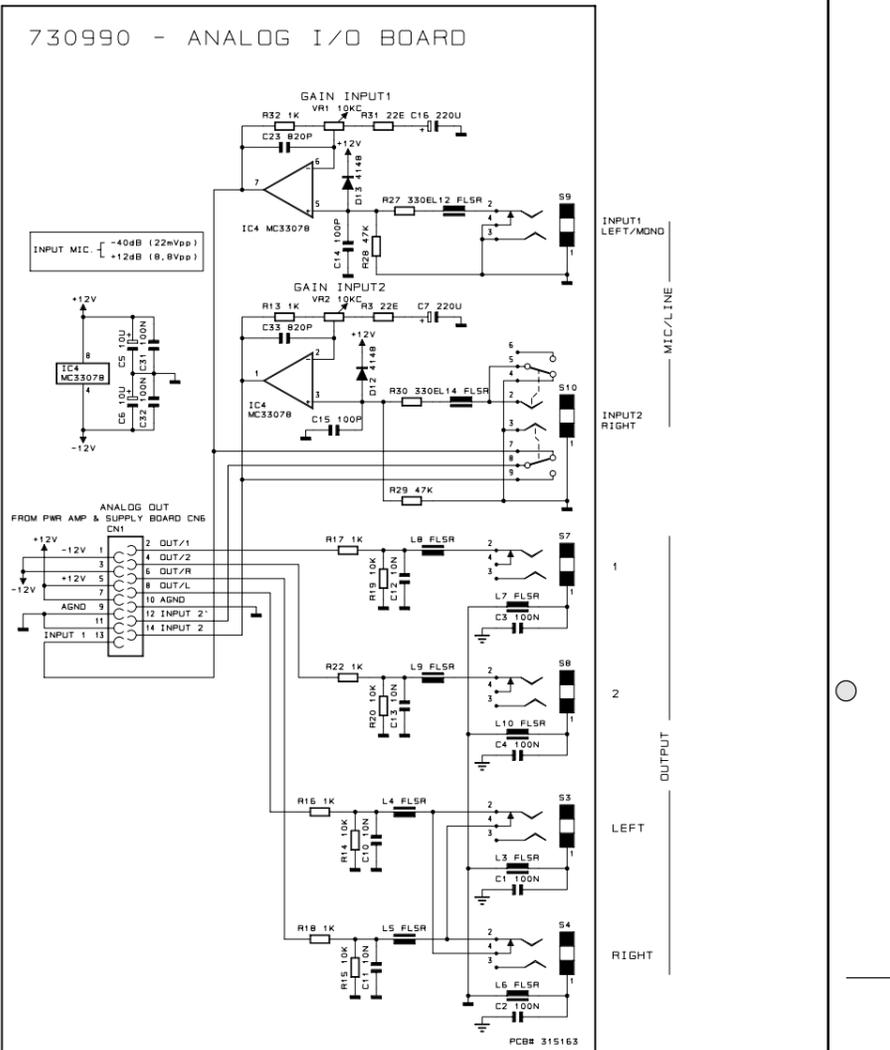
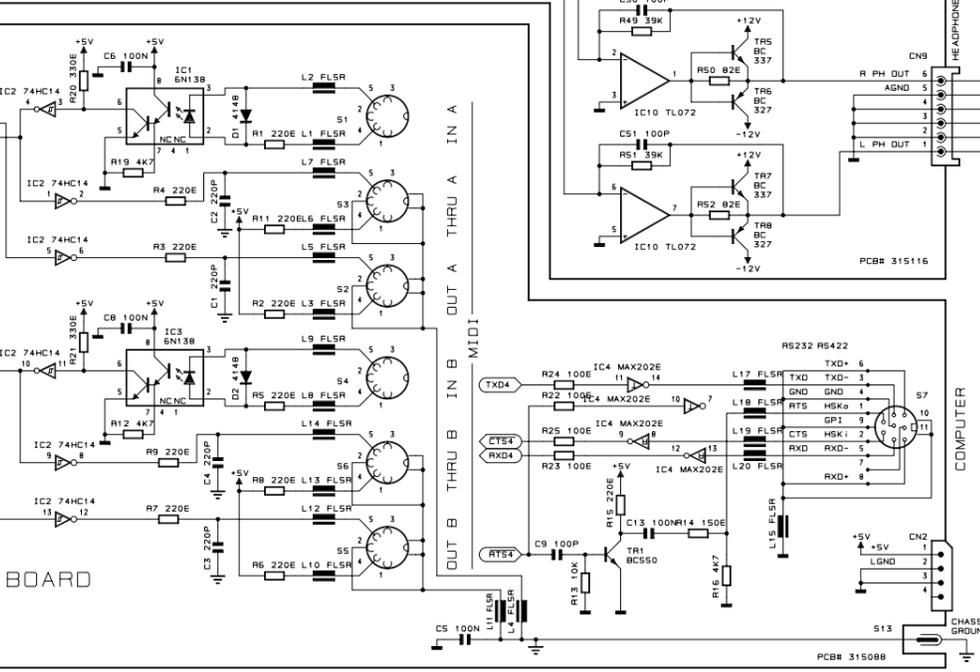
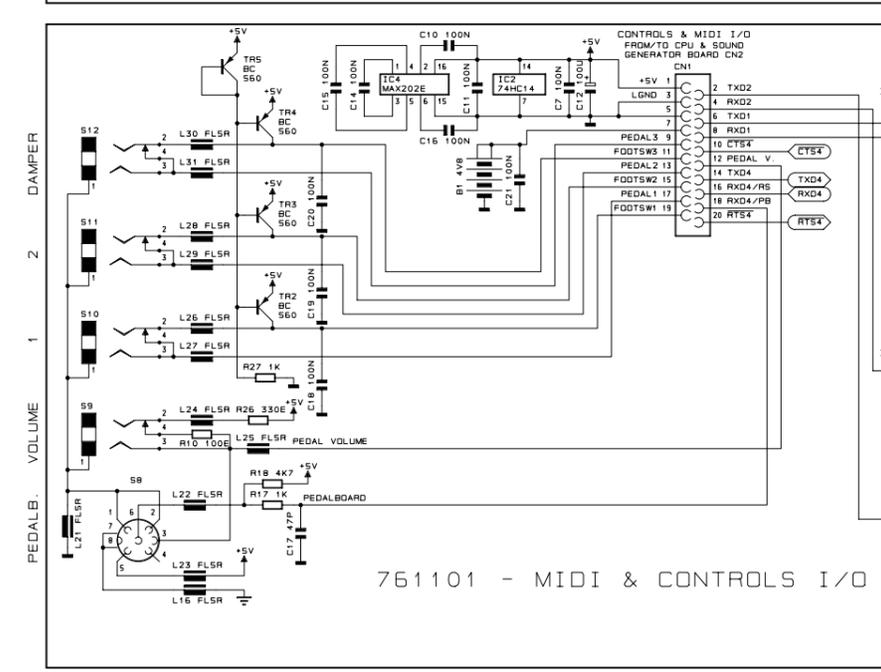
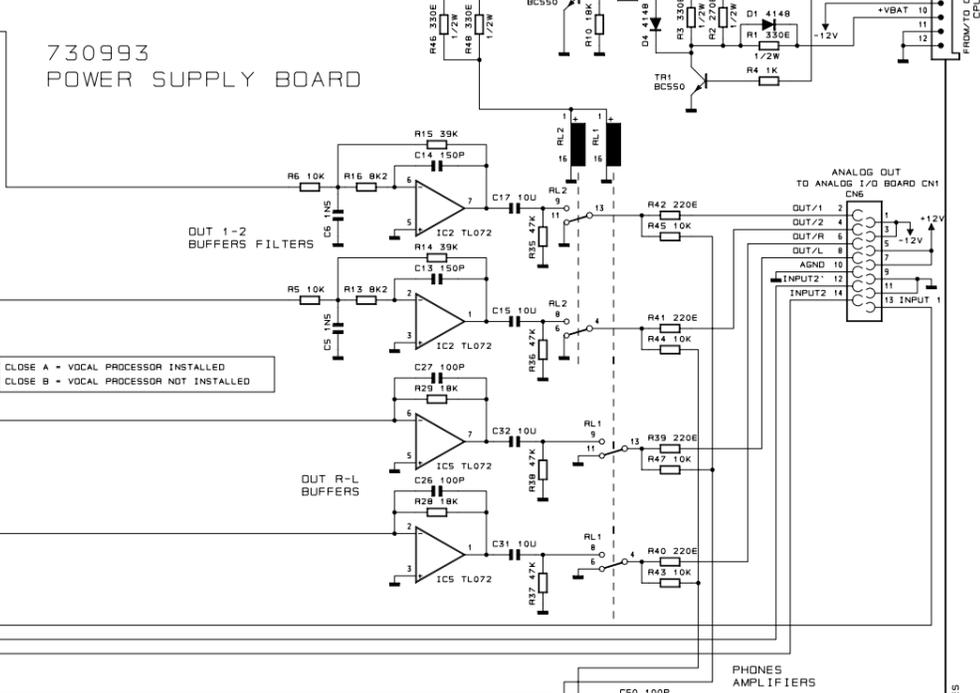
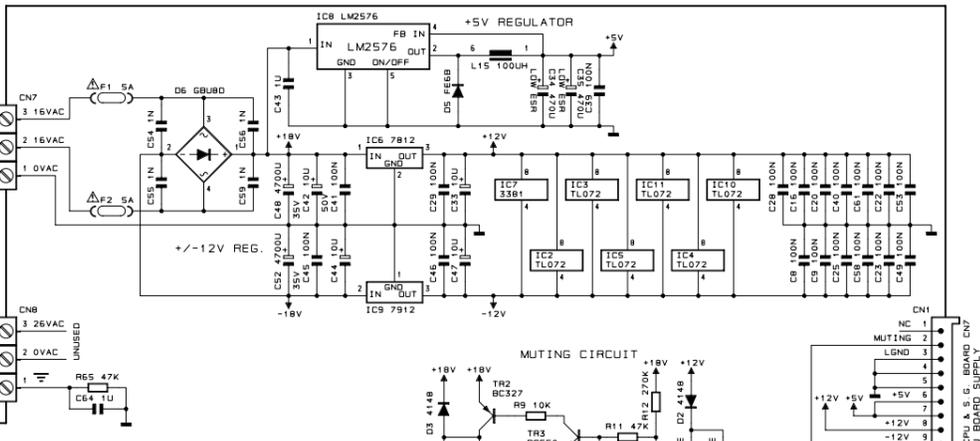
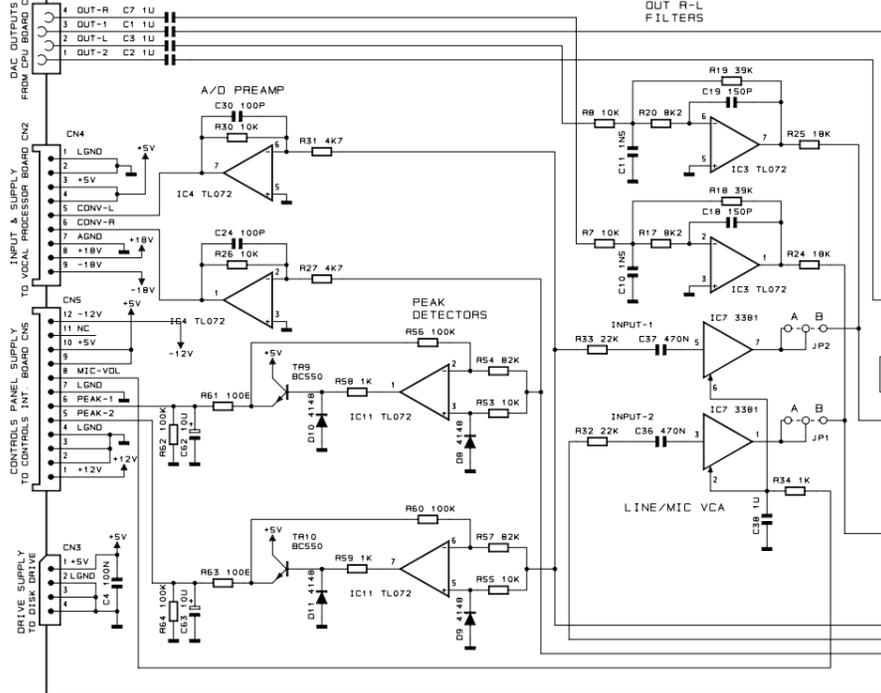
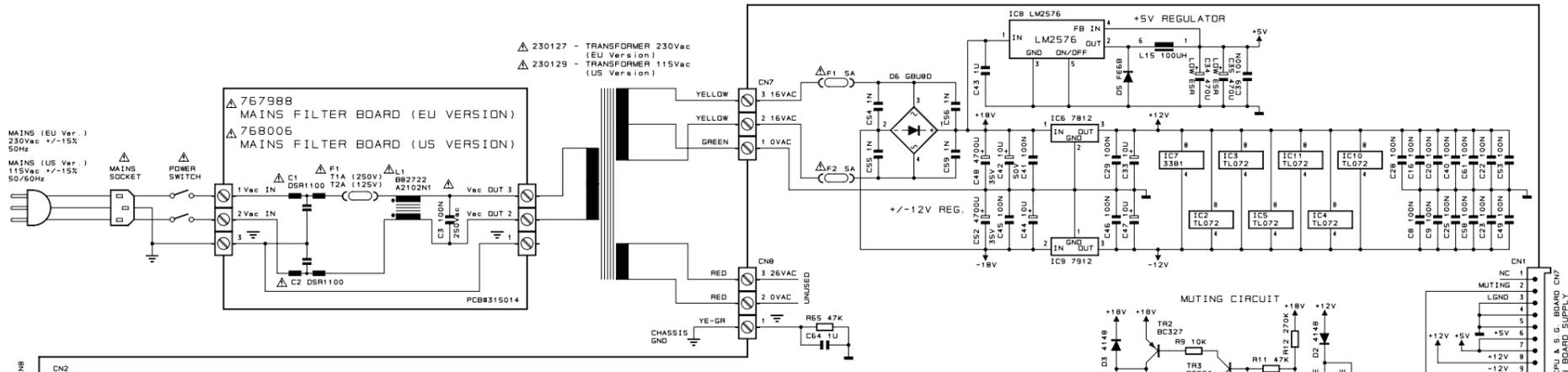


DRW Boccato DWG# 550165 PCB# GENERALMUSIC S.p.A. ITALY
 CKD Consorte DISK: 65 PRT: 1/1 Block Diagram ALL RIGHTS ARE RESERVED. NO COPIES OR REPRODUCE THIS DOCUMENT WITHOUT WRITTEN CONSENT BY GENERALMUSIC.
 APP. Consorte REV: 25/09/98 2nd Version with switching supply

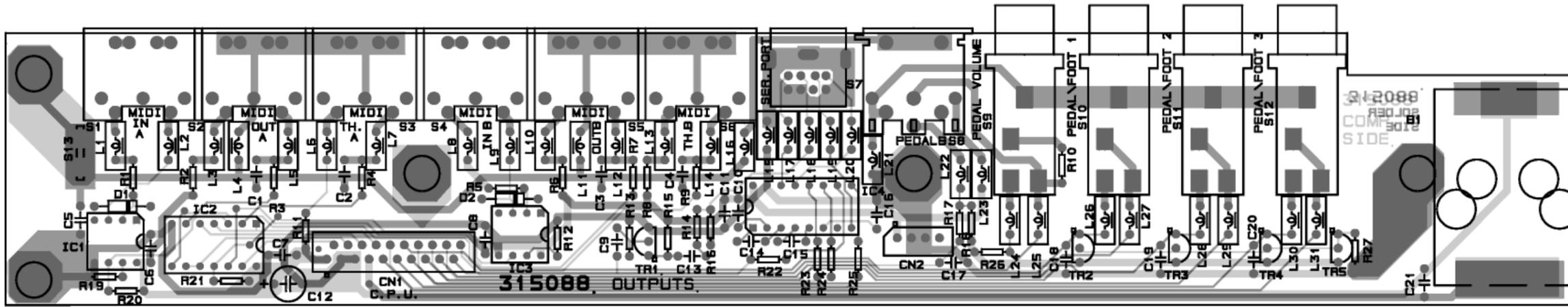


NOTE: ALL COMPONENTS PIN REFERENCE ARE LOCATED ON "CPU & SOUND GENERATOR BOARD" UNLESS OTHERWISE SPECIFIED.

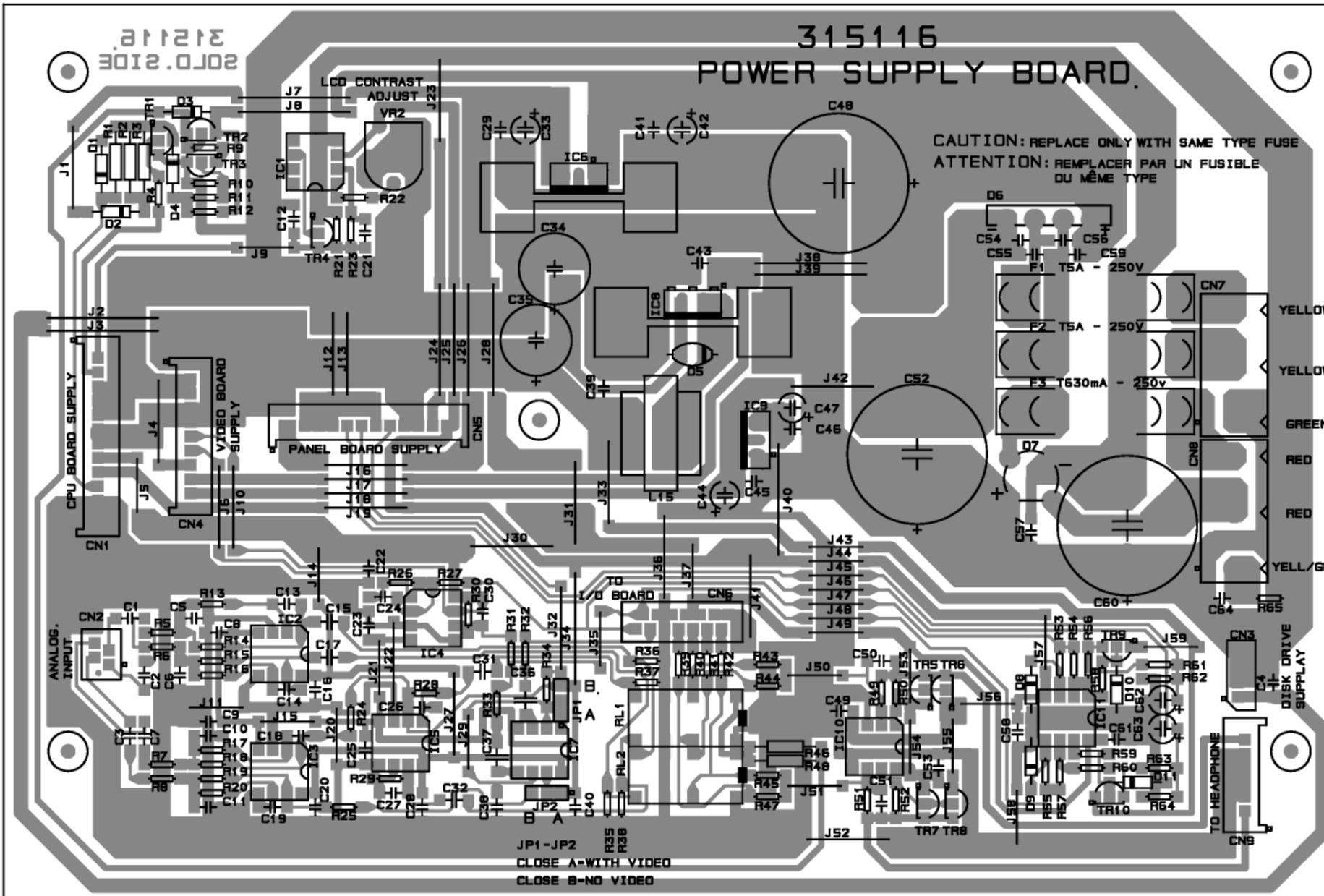




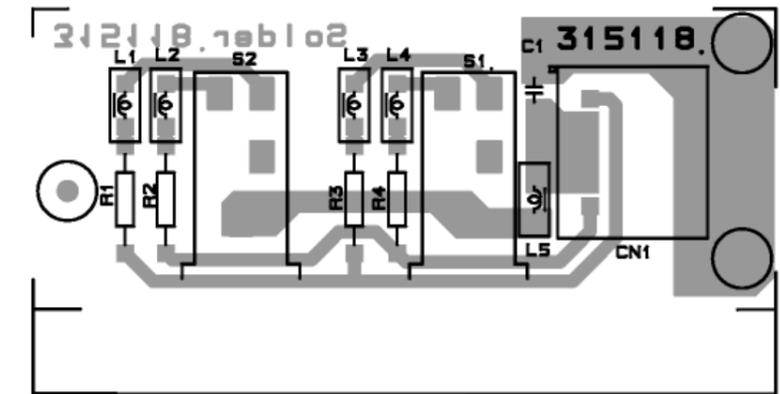
ADJUSTMENT TABLE						
N.	ADJUSTMENT TYPE	TEST POINT	KEY PRESSED	OPERATION POINT	READING VALUE	NOTE:
1	AFTERTOUCH ADJ	VR1 SIDE CN15	ANY KEY	VR1	-2Vcc	APPLY A 700 grams WEIGHT ON THE KEY FRONT END, TO OBTAIN A VALID MEASURE PRESS THE KEY NOTE TWO OR THREE TIMES WITH MORE PRESSURE, TURN THE TRIMMER TO HAVE THE VALUE SPECIFIED.
2	PITCH CENTRE ADJ	R1 SIDE C1 CONTROLS PANEL BOARD	WHEEL AT CENTRE	VR11 CONTROLS PANEL BOARD	2.5Vcc	SET THE OSCILLOSCOPE ON D.C. AT 1V/div, 1ms/div. VERIFY THAT THE VOLTAGE VALUE SWING FROM 0 TO 5V WHEN YOU ROTATE THE WHEEL FROM MINIMUM TO MAXIMUM POSITION.



MIDI & CONTROLS I/O BOARD (PCB#315088)

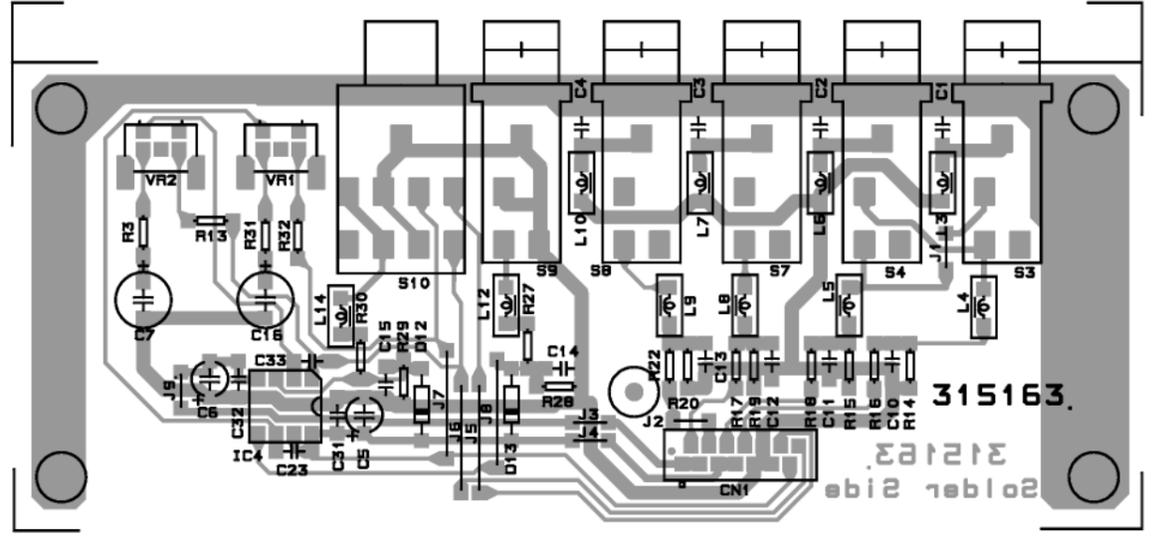
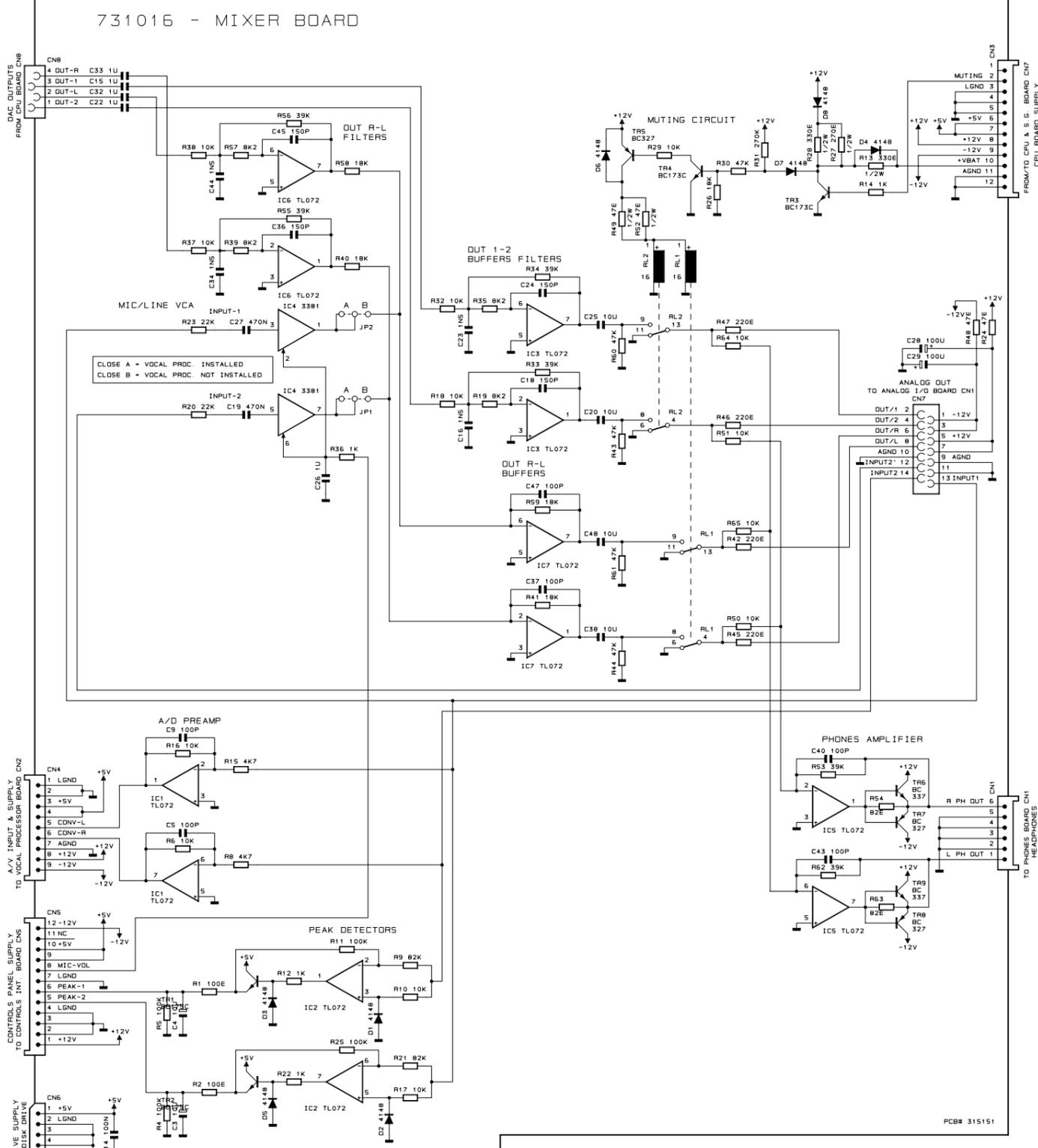
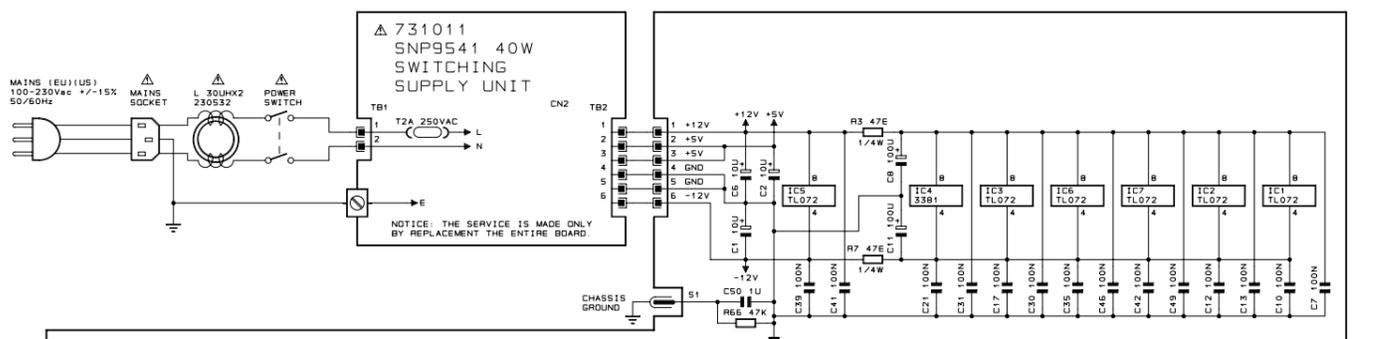


POWER SUPPLY BOARD (PCB#315116)

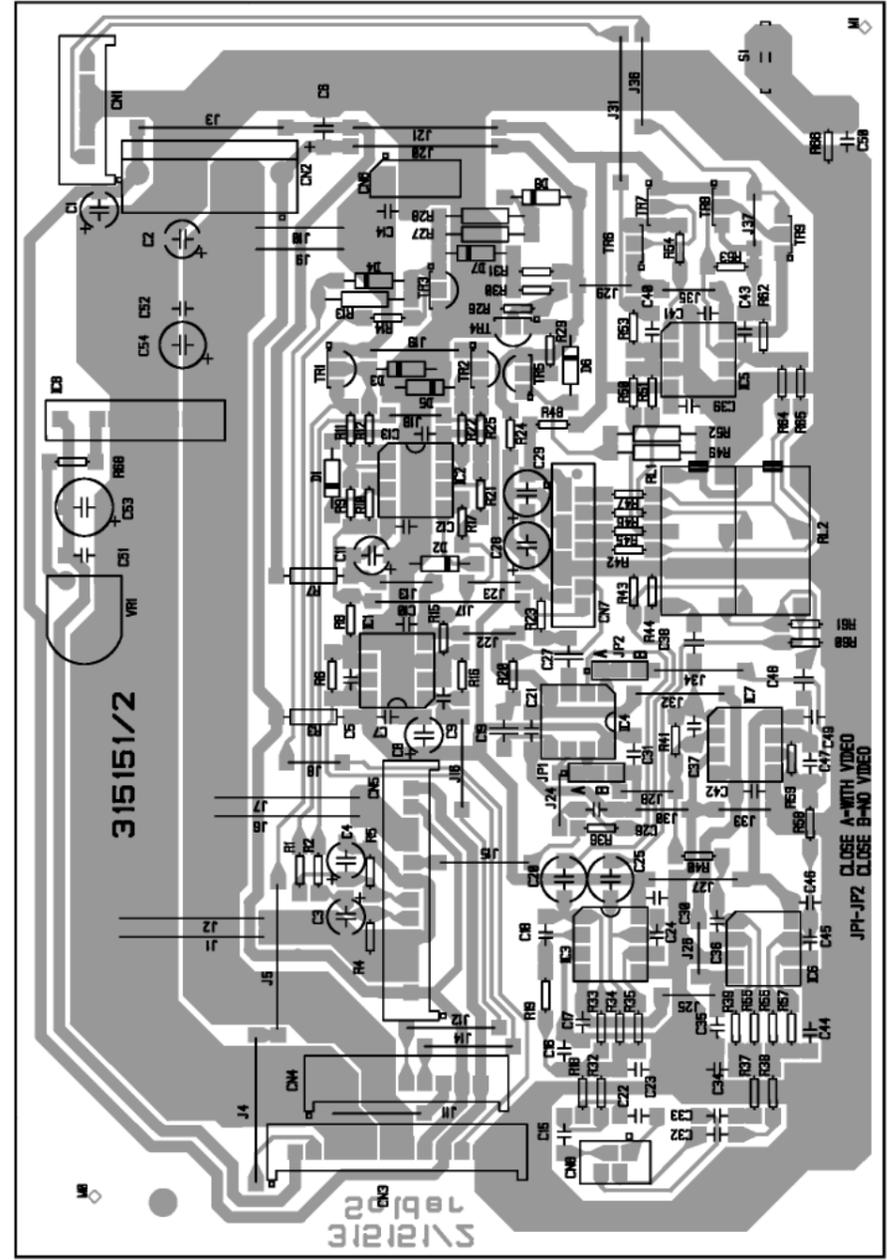


PHONES BOARD (PCB#315118)

DRW: BOCCATO	DWG: 315088/116	SCHEMATIC DIAGRAM EQUINOX	GENERALMUSIC S.p.A. Italy
CKD: RICCOBELLI	DISK: 65 PART: 1/1	Power Supply, Midi & Controls and Phones Board Pcb Layout	ALL RIGHTS ARE RESERVED. NO COPIES OR REPRODUCE THIS DOCUMENT WITHOUT WRITTEN CONSENT BY GENERALMUSIC.
APP: PANNELLI	REV: 06-10-98		



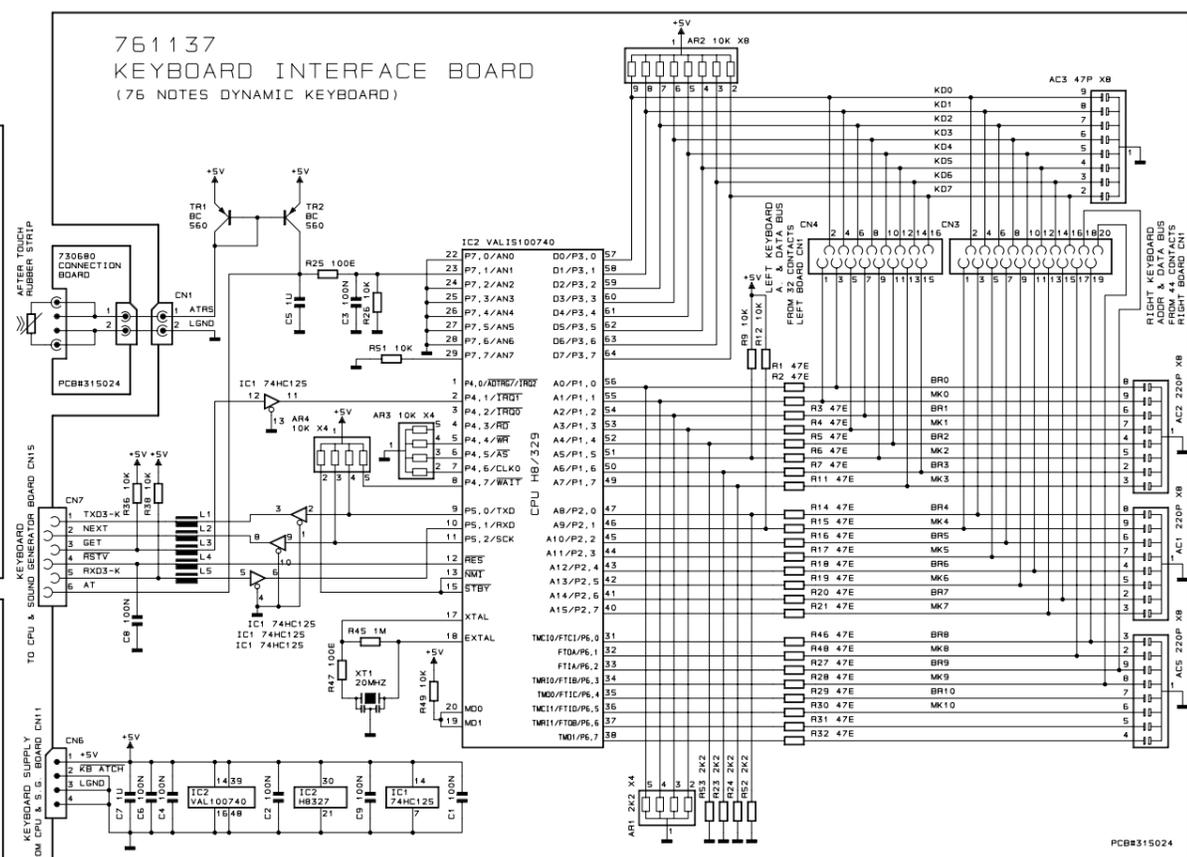
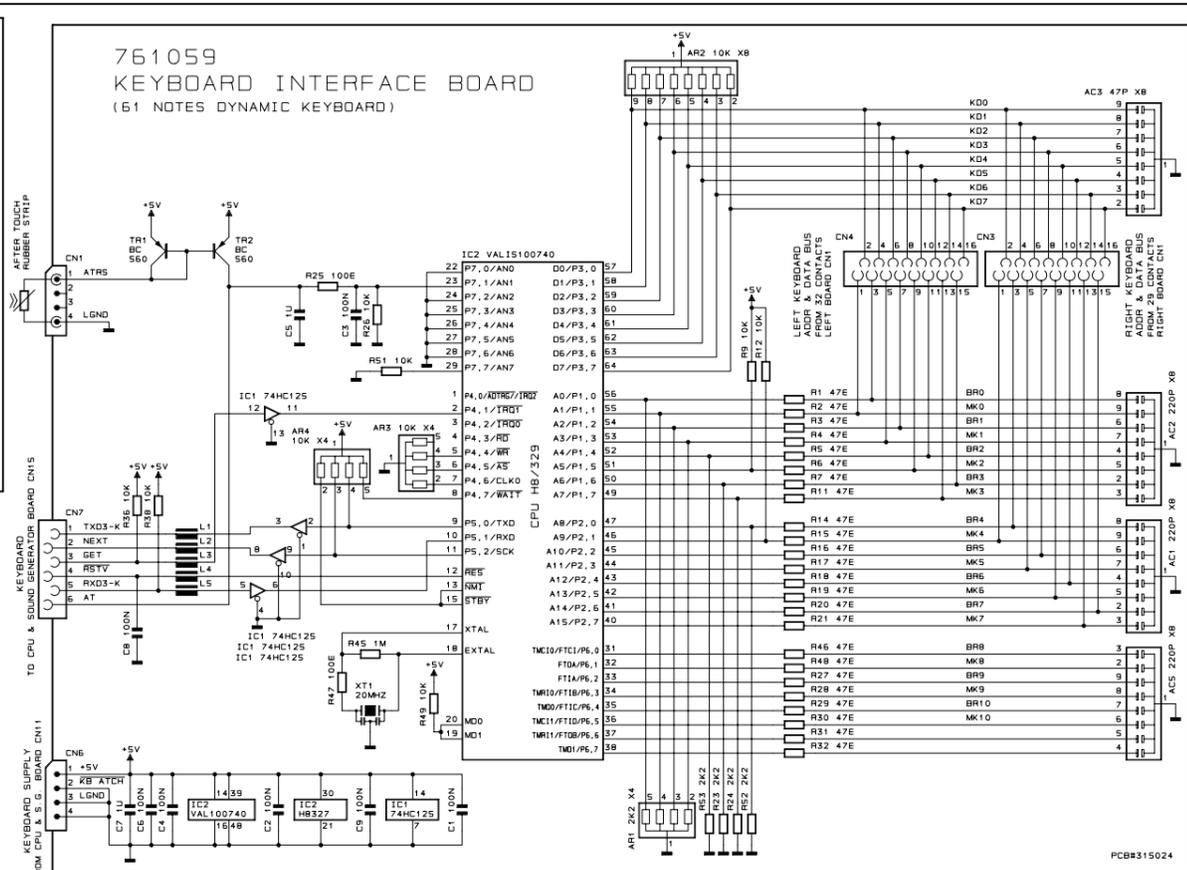
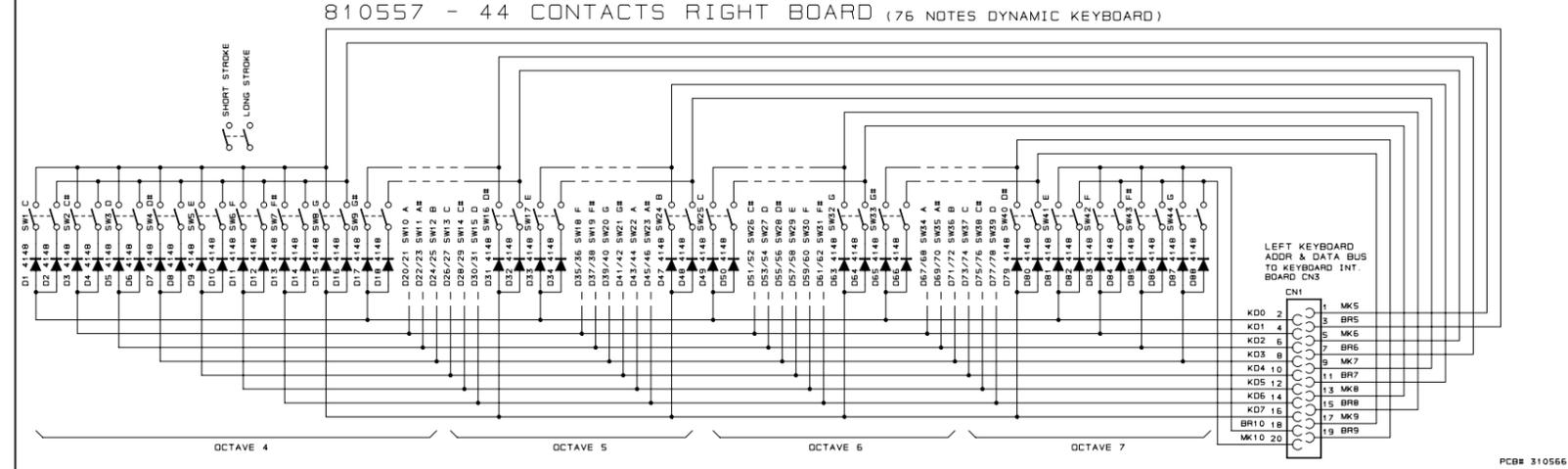
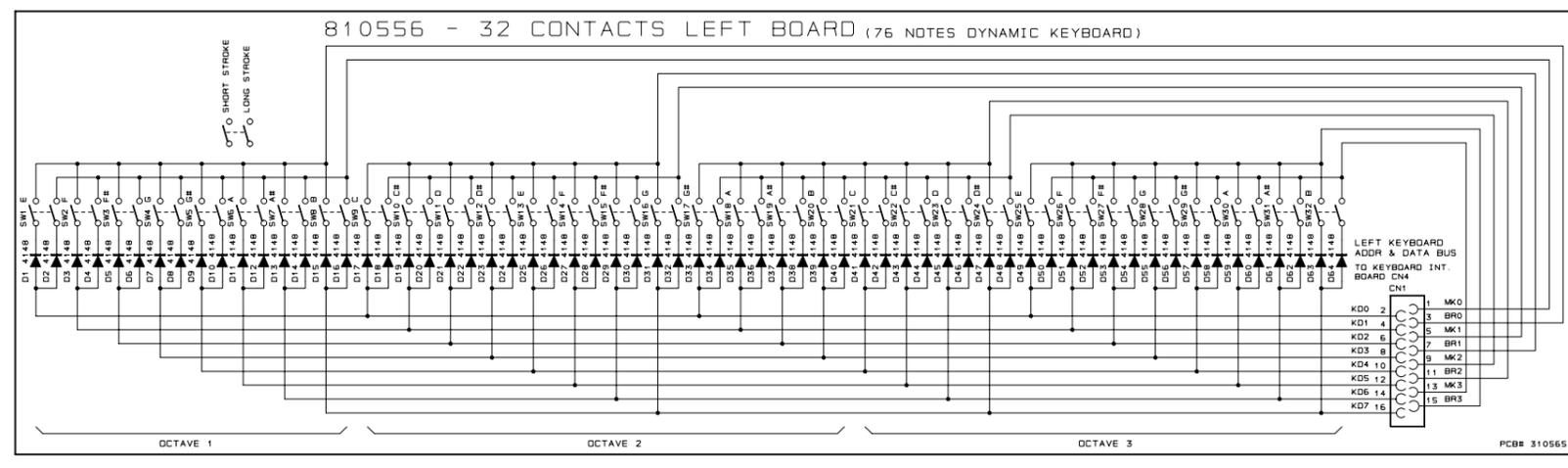
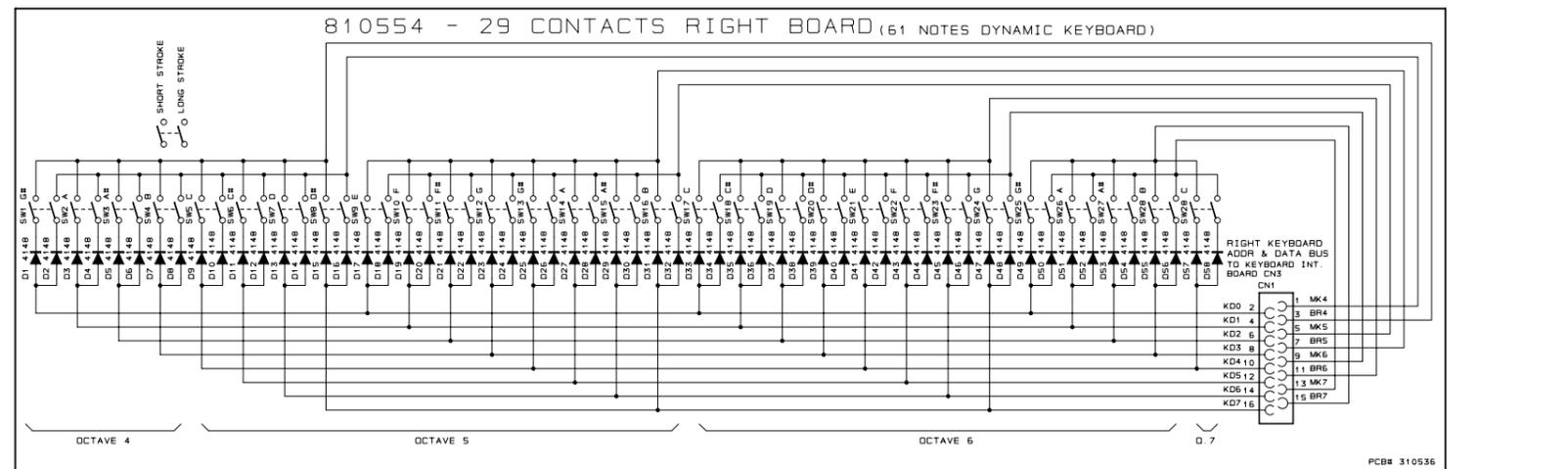
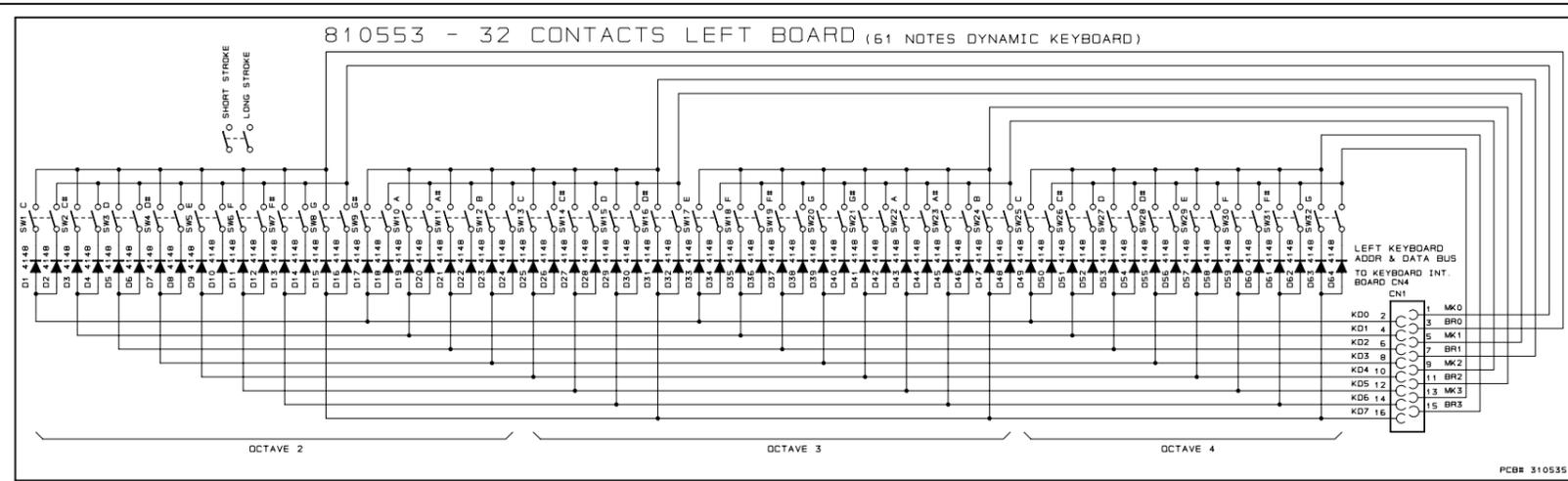
ANALOG I/O BOARD (PCB#315163)



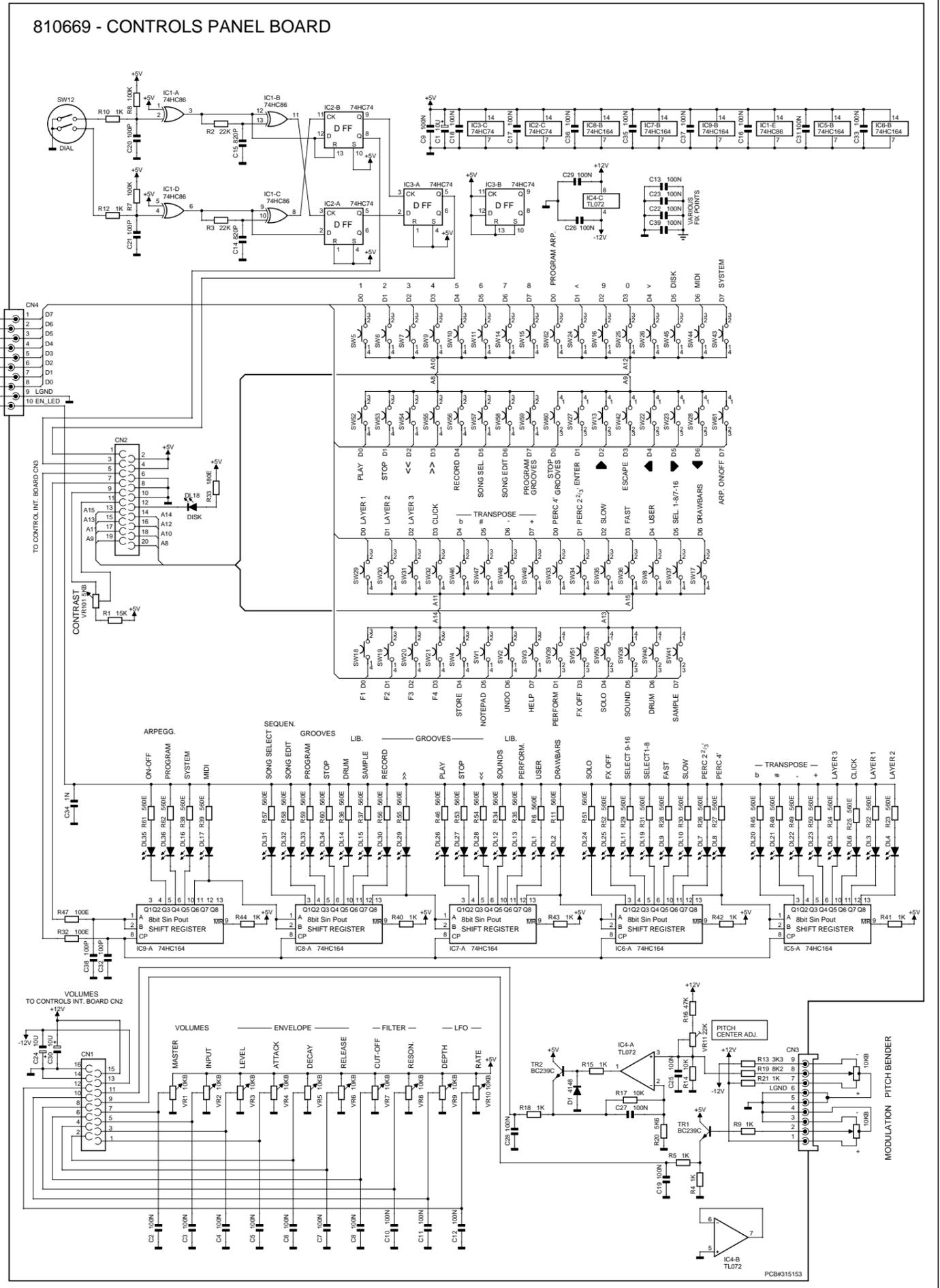
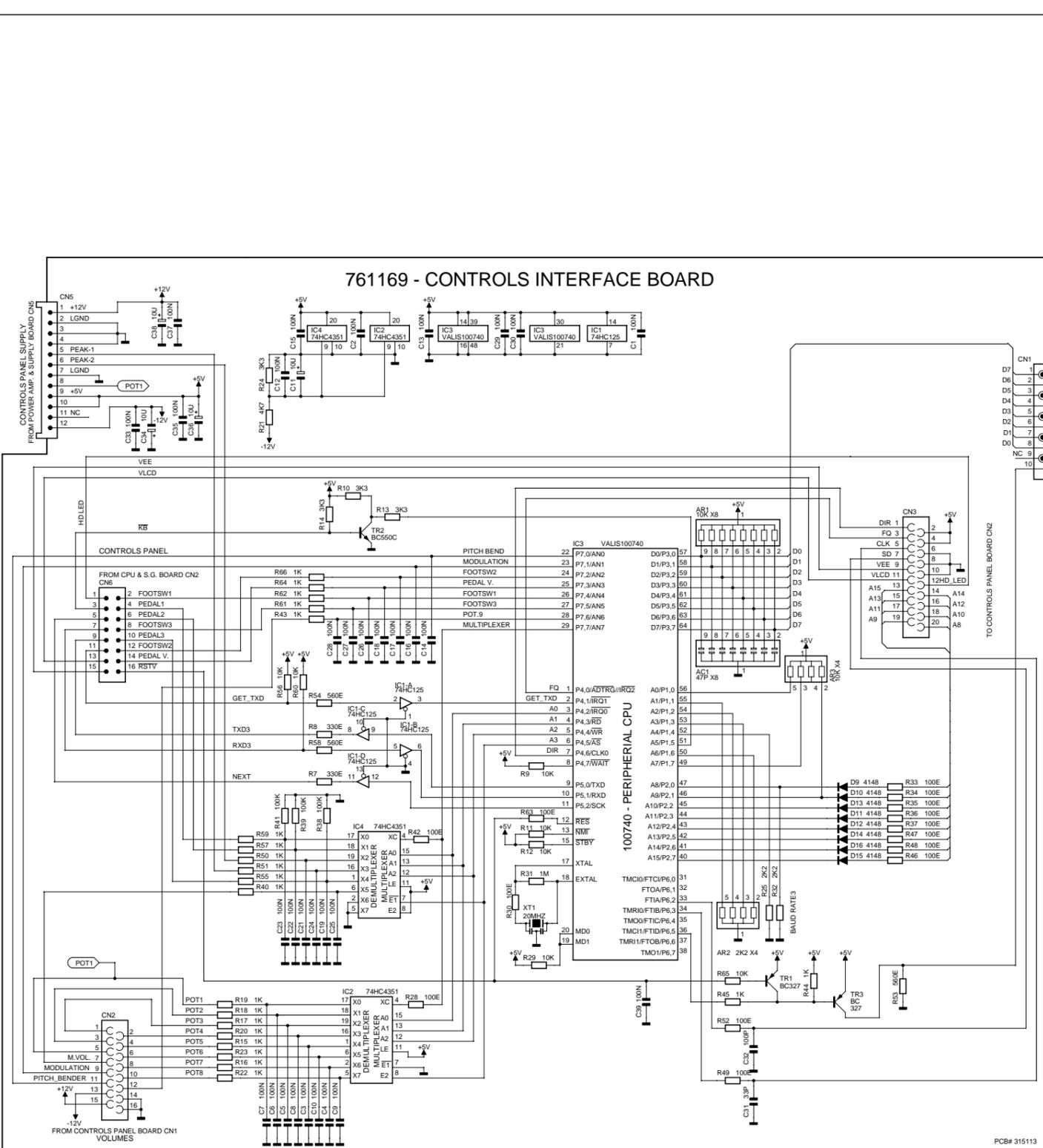
MIXER BOARD (PCB#315151/2)

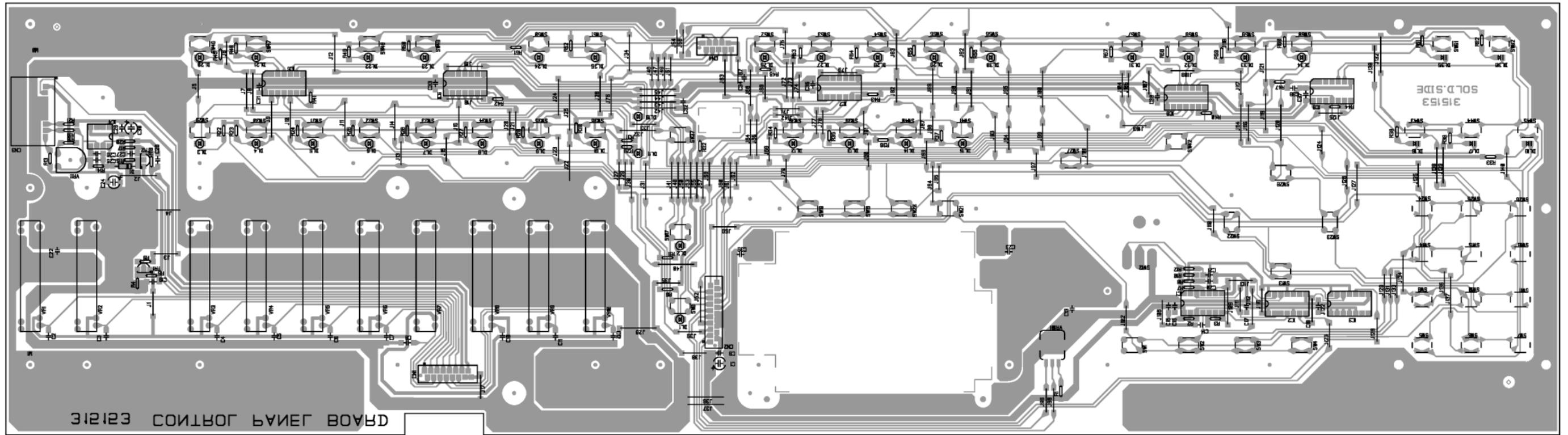
DRW BOCCATO	DWG 550157	PCB# 315151	GENERALMUSIC S.p.A. ITALY
CKD CONSORTE	DSK# 65 PART: 1/1	SCHEMATIC DIAGRAM	ALL RIGHTS ARE RESERVED. NO COPIES OR REPRODUCE THIS DOCUMENT WITHOUT WRITTEN CONSENT BY GENERALMUSIC.
APP. CONSORTE	REV: 28-09-98	MIXER BOARD 2nd VERSION	

DRW: BOCCATO	DWG: 315151/163	SCHEMATIC DIAGRAM EQUINOX	GENERALMUSIC S.p.A. Italy
CKD: RICCOBELLU	DISK: 65 PART: 1/1	Mixer Board and Analog I/O Board Pcb	ALL RIGHTS ARE RESERVED. NO COPIES OR REPRODUCE THIS DOCUMENT WITHOUT WRITTEN CONSENT BY GENERALMUSIC.
APP: PANNELLI	REV: 09-10-98	Layouts	

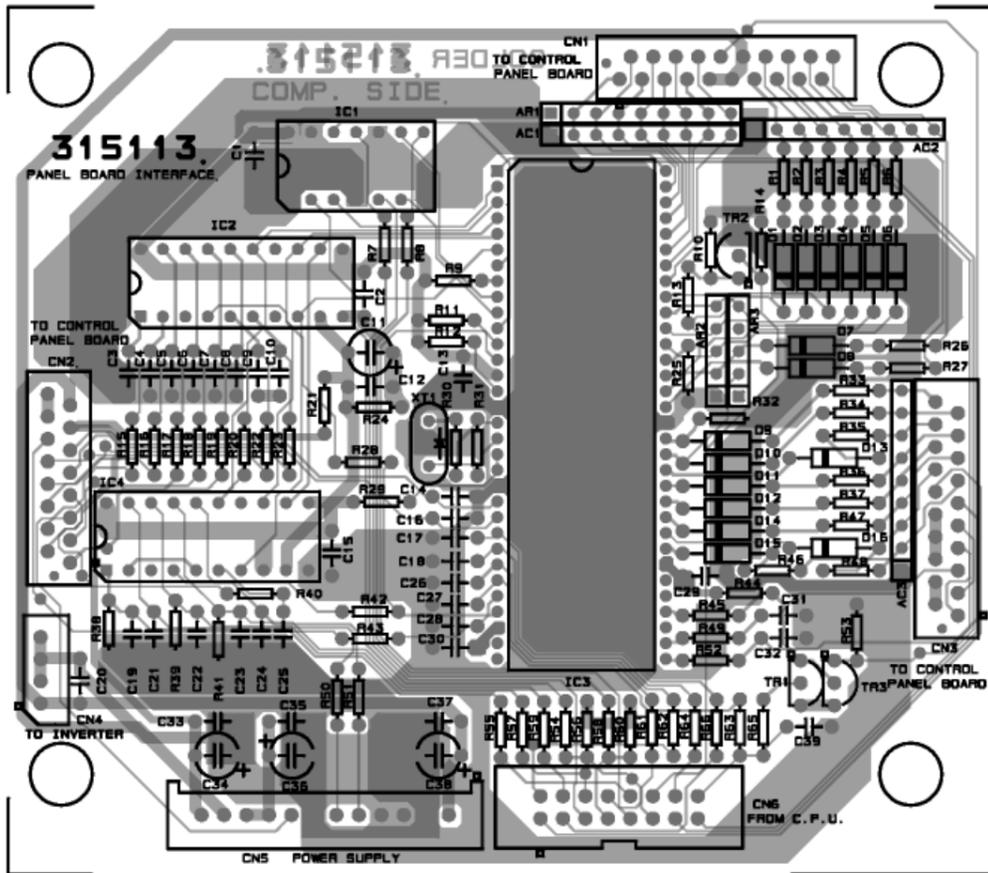


DRW BOCCATO	DWG# 550158	PCB# 310555, 310556, 315024, 310558, 310555	GENERALMUSIC S.p.A. ITALY
CKO RICCIBELLI	DSK# 65 PART: 1/1	SCHMATIC DIAGRAM	ALL RIGHTS ARE RESERVED. NO COPIES
APP. CONSORTE	REV: 01/10/98	61NOTES & 76 NOTES KEYBOARD INTERFACE & L/R CONTACT BOARDS	OR REPRODUCE THIS DOCUMENT WITHOUT WRITTEN CONSENT BY GENERALMUSIC.

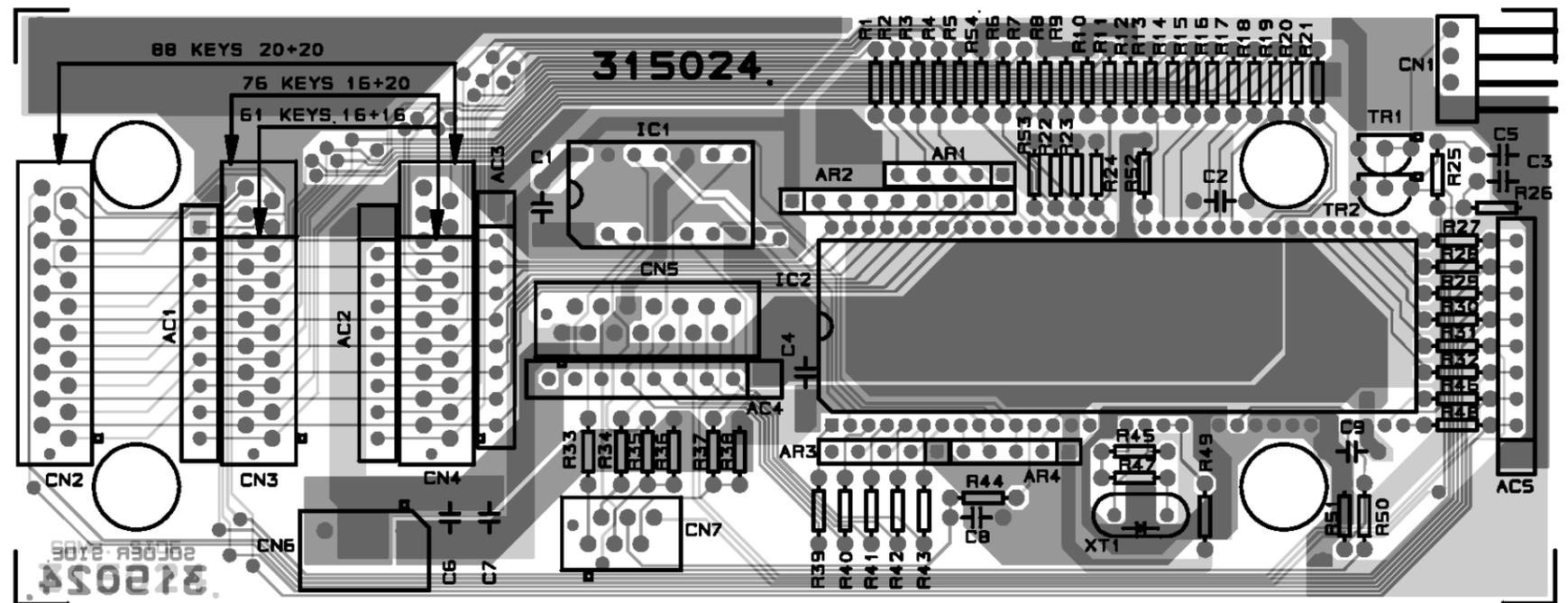




CONTROLS PANEL BOARD reverse layout (PCB#315153)



CONTROLS INTERFACE BOARD (PCB#315113)

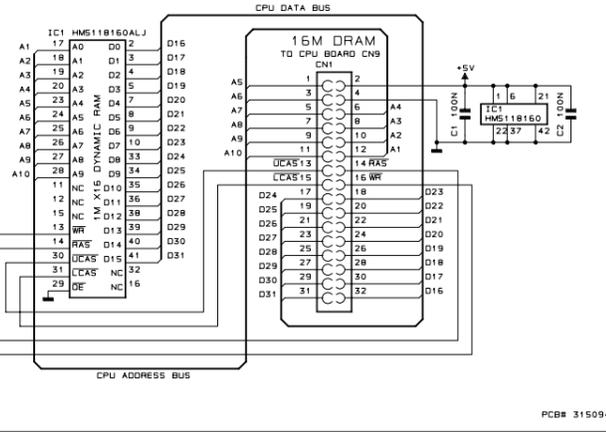


KEYBOARD INTERFACE BOARD (PCB#315024)

DRW: BOCCATO	DWG: 315024 315113-153	SCHEMATIC DIAGRAM EQUINOX	GENERALMUSIC S.p.A. Italy
CKD: RICCABELLI	DISK 65 PART: 1/1	Controls Panel, Controls Interface and Keyboard Interface Board Pcb Layouts	ALL RIGHTS ARE RESERVED. NO COPIES OR REPRODUCE THIS DOCUMENT WITHOUT WRITTEN CONSENT BY GENERALMUSIC.
APP: PANNELLI	REV: 25-05-98		

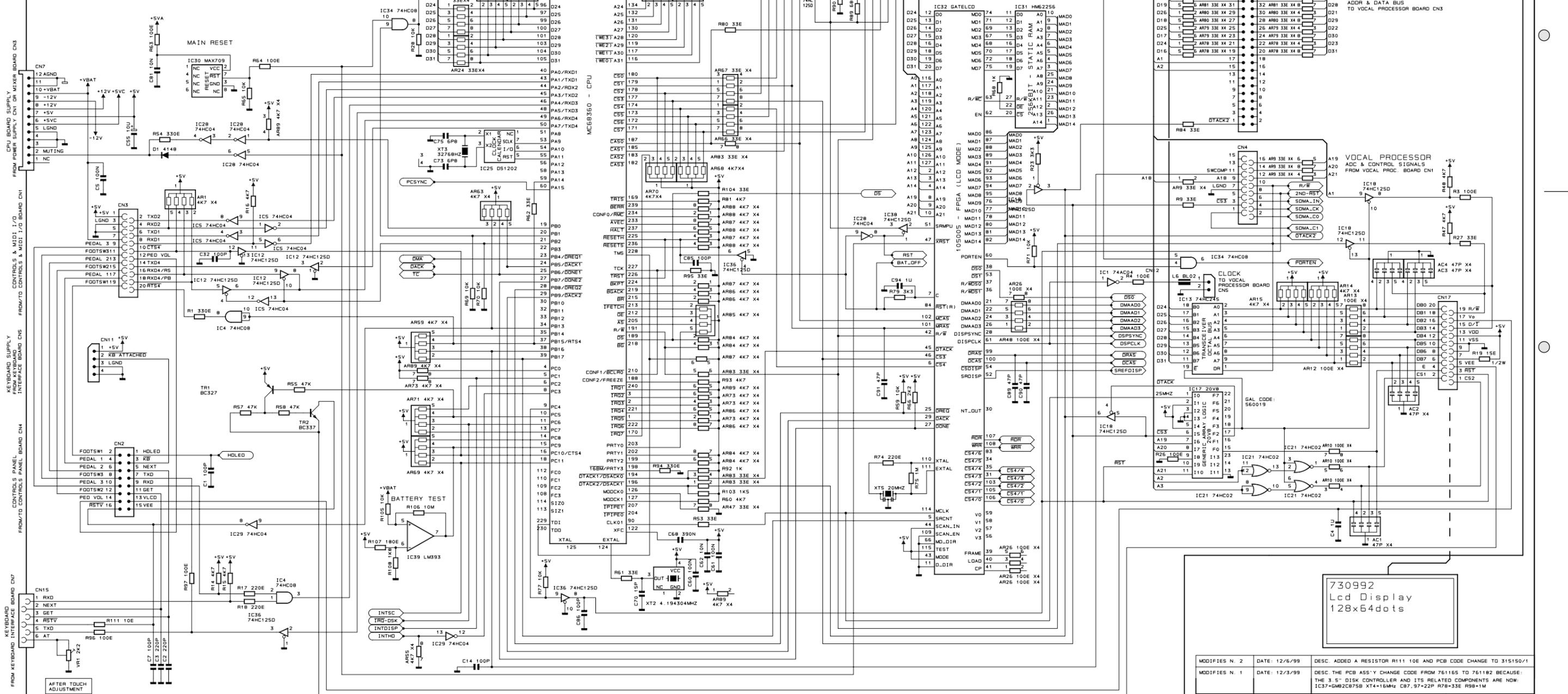
761094 - 2Mbyte DRAM MODULE

SUPPLIED WITH THE HARD DISK
OR AS OPTIONAL "2MBYTE BACKED SAMPLE DRAM KIT"



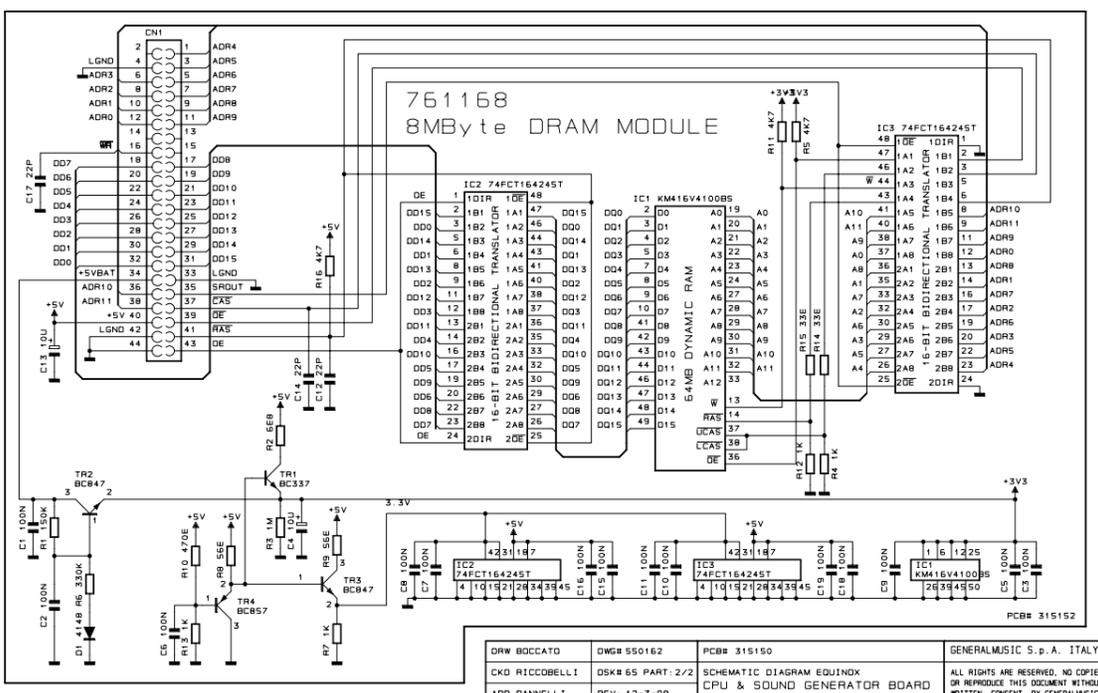
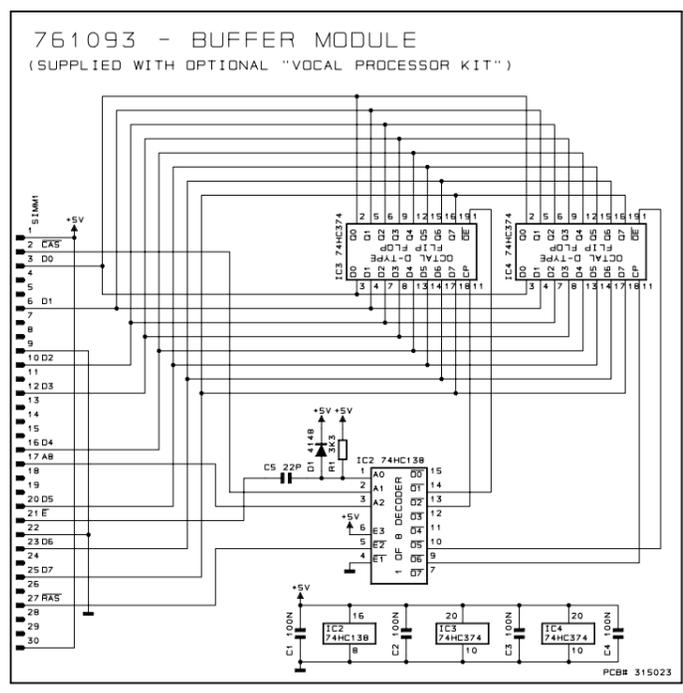
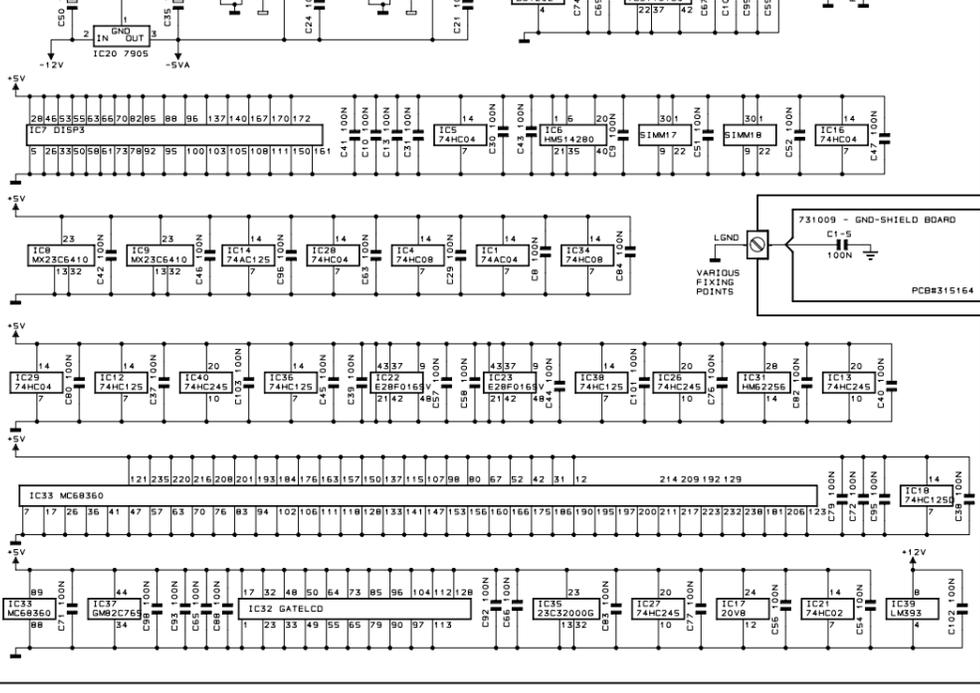
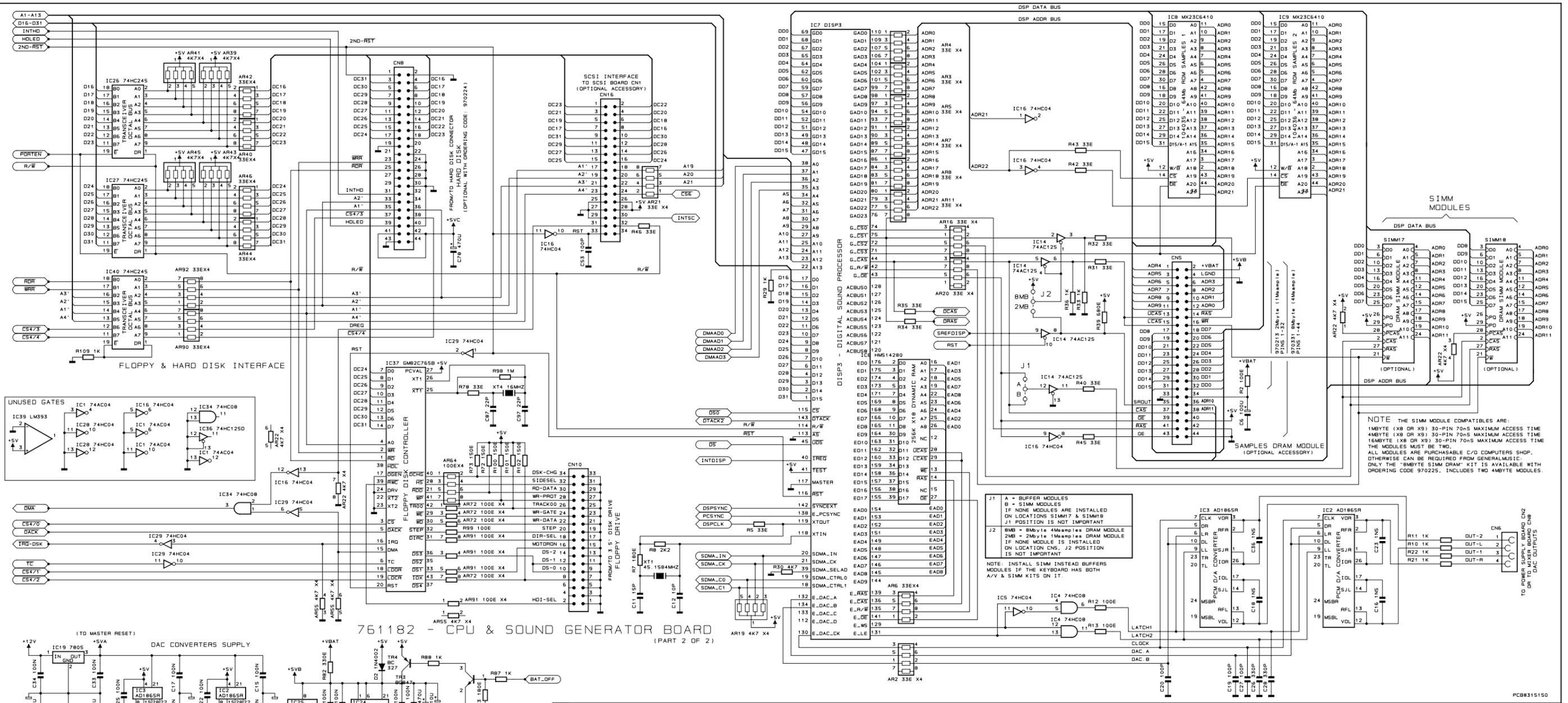
PCB# 315094

761182 - CPU & SOUND GENERATOR BOARD (PART 1 OF 2)



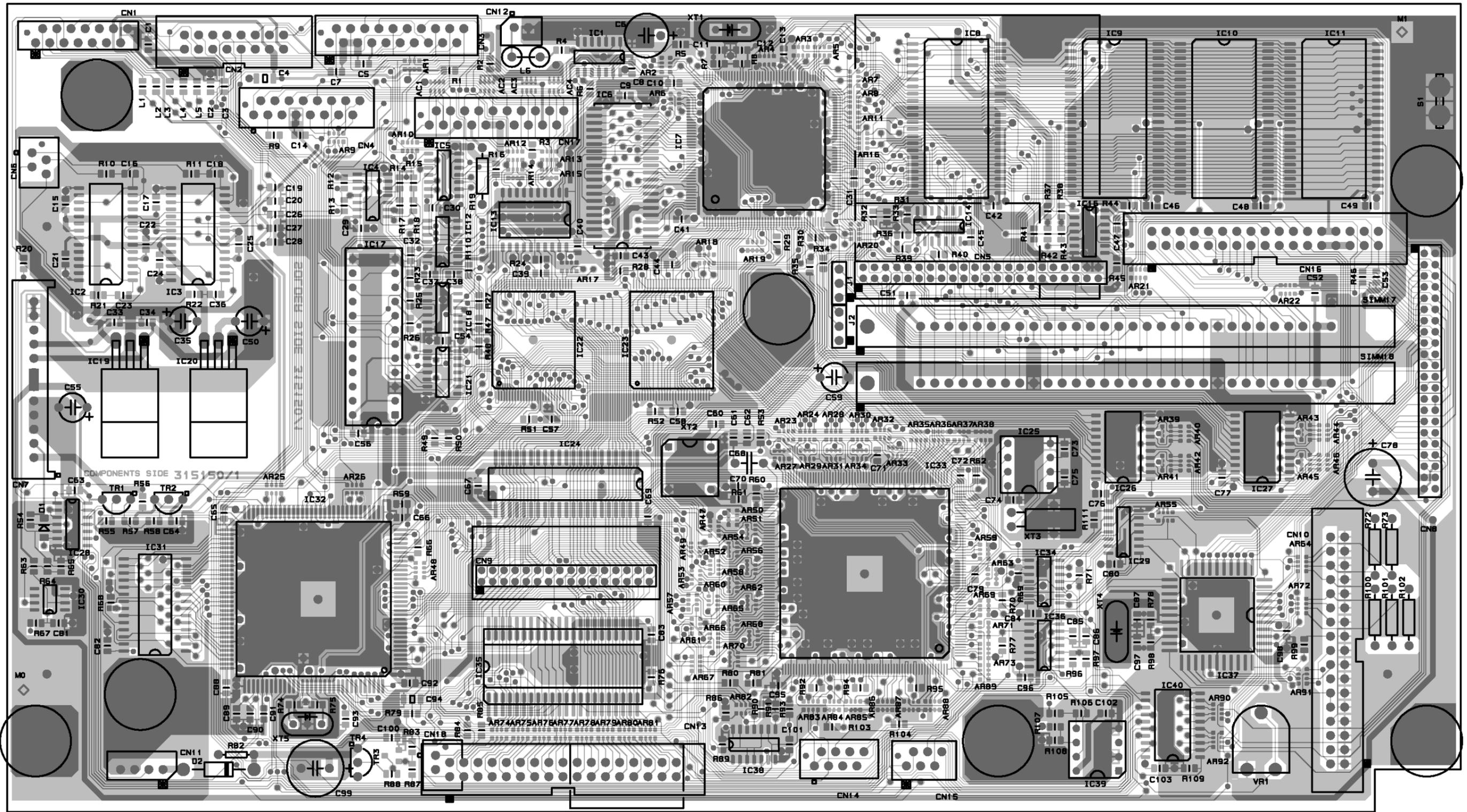
730992
Lcd Display
128x64dots

MODIFIES N. 2	DATE: 12/6/99	DESC: ADDED A RESISTOR R111 10K AND PCB CODE CHANGE TO 315150/1
MODIFIES N. 1	DATE: 12/3/99	DESC: THE PCB ASSY CHANGE CODE FROM 761165 TO 761182 BECAUSE THE 3.5" DISK CONTROLLER AND ITS RELATED COMPONENTS ARE NOW IC37-GMB2C875B X14-16MHz C87-92P R7B-33E R9B-1M
DRW BOCCATO	DWG# 550161	PCB# 315150/1
CKD RICCOCCELLI	DSK# 6 PART:1/2	GENERALMUSIC S.p.A. ITALY
APP. CONSORTE	REV: 24-6-99	ALL RIGHTS ARE RESERVED. NO COPIES OR REPRODUCE THIS DOCUMENT WITHOUT WRITTEN CONSENT BY GENERALMUSIC



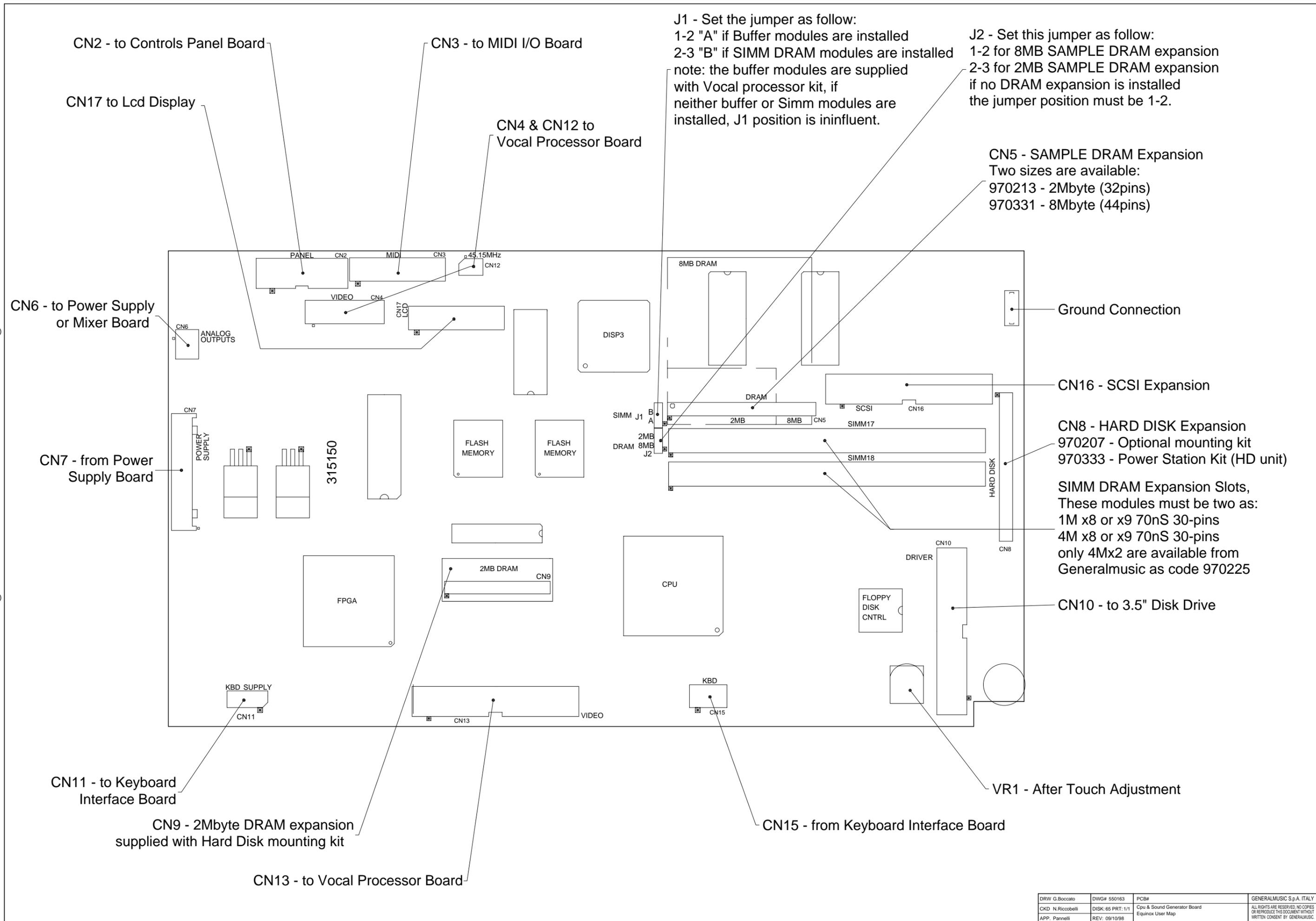
NOTE: THE SIMM MODULE COMPATIBLES ARE:
 1MBYTE (X8 OR X9) 30-PIN 70ns MAXIMUM ACCESS TIME
 4MBYTE (X8 OR X9) 30-PIN 70ns MAXIMUM ACCESS TIME
 16MBYTE (X8 OR X9) 30-PIN 70ns MAXIMUM ACCESS TIME
 OTHERWISE CAN BE PURCHASED FROM GENERALMUSIC.
 ONLY THE "8MBYTE SIMM DRAM" KIT IS AVAILABLE WITH
 ORDERING CODE 970225. INCLUDES TWO 4MBYTE MODULES.

J1 A = BUFFER MODULES
 B = SIMM MODULES
 IF NONE MODULES ARE INSTALLED
 ON LOCATIONS SIMM17 & SIMM18
 J1 POSITION IS NOT IMPORTANT
 J2 2MB = 2Mbyte 4M = 4Mbyte 8M = 8Mbyte
 IF NONE MODULES ARE INSTALLED
 ON LOCATION CENS, J2 POSITION
 IS NOT IMPORTANT
 NOTE: INSTALL SIMM INSTEAD BUFFER
 MODULES IF THE KEYBOARD HAS BOTH
 A/V & SIMM KITS ON IT.



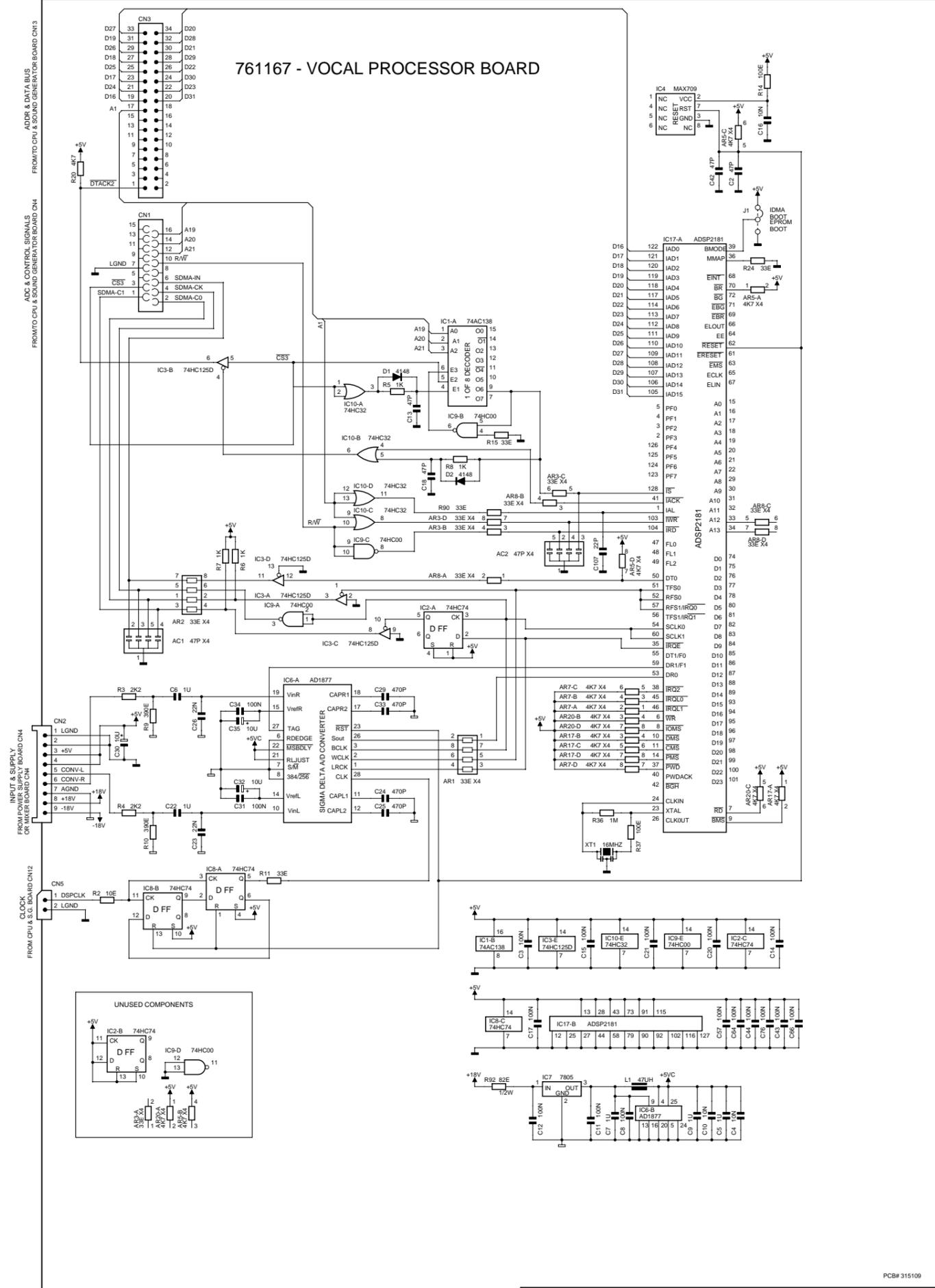
CPU & SOUND GENERATOR BOARD (PCB#315150)

DRW: BOCCATO	DWG: 315150	SCHEMATIC DIAGRAM EQUINOX	GENERALMUSIC S.p.A. Italy
CKD: RICCABELLI	DISK: 65 PART: 1/1	Cpu & Sound Generator Board Pcb	ALL RIGHTS ARE RESERVED, NO COPIES
APP: PANNELLI	REV: 07-10-98	Layout	OR REPRODUCE THIS DOCUMENT WITHOUT
			WRITTEN CONSENT BY GENERALMUSIC.



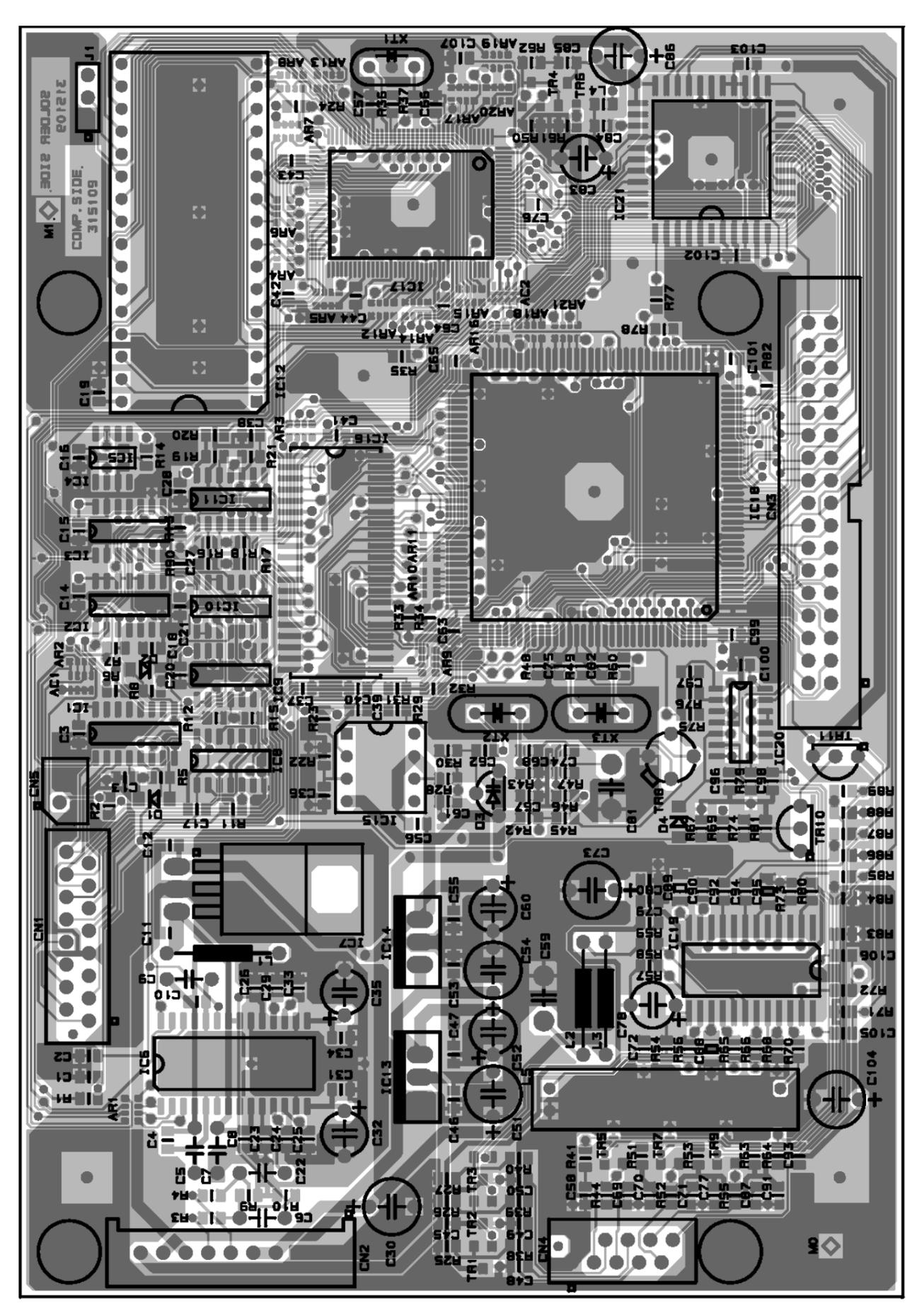
DRW G.Boccato	DWG# 550163	PCB#	GENERALMUSIC S.p.A. ITALY
CKD N.Riccobelli	DISK: 65 PRT: 1/1	Cpu & Sound Generator Board	ALL RIGHTS ARE RESERVED. NO COPIES OR REPRODUCE THIS DOCUMENT WITHOUT WRITTEN CONSENT BY GENERALMUSIC.
APP. Pannelli	REV: 09/10/98	Equinox User Map	

761167 - VOCAL PROCESSOR BOARD



PCB# 315109

DRW BOCCATO	DWG# 550164	PCB# 315109	GENERALMUSIC S.p.A. ITALY
CKD RICCABELLI	DSK# 65 PART: 1/1	SCHMATIC DIAGRAM	ALL RIGHTS ARE RESERVED. NO COPIES OR REPRODUCE THIS DOCUMENT WITHOUT WRITTEN CONSENT BY GENERALMUSIC.
APP. PANNELLI	REV: 06-10-98	VOCAL PROCESSOR BOARD	



VOCAL PROCESSOR BOARD (PCB#315109)

DRW: BOCCATO	DWG: 315109	SCHMATIC DIAGRAM EQUINOX	GENERALMUSIC S.p.A. Italy
CKD: RICCABELLI	DISK: 65 PART: 1/1	Vocal Processor Board Pcb Layout	ALL RIGHTS ARE RESERVED. NO COPIES OR REPRODUCE THIS DOCUMENT WITHOUT WRITTEN CONSENT BY GENERALMUSIC.
APP: PANNELLI	REV: 25-05-98		

Test Procedure and Adjustment

The procedures that follow must be executed subsequently in the order specified.

These procedures are not intended to repair a fault but only to check the correct instrument operations after a repairing execution.

Test Instruments

- Dual trace oscilloscope
- Digital Multimeter

Accessories

- 8Mbyte DRAM module
- 2Mbyte DRAM module
- 2 x 4Mbyte SIMM DRAM modules
- 1 Hard Disk Kit
- 1 Vocal Processor Kit
- 1 3.5inch Diskette
- 1 SCSI Kit
- Read/write JOMEGA ZIP SCSI device
- RS232 loopback (terminal 1-2 and 3-5 shorted)
- 2 jack-jack cables with a resistor divider inside plugs (10K/82ohm).

To check completely the keyboard are necessities all the optional accessories installed, normally this keyboard have installed from the manufacturer the 2Mbyte DRAM module only.

Setup

Install all the optional accessories: Hard disk and its 2Mbyte module (CN9), 8Mbyte module instead the pre-installed 2Mbyte module on Sample Dram connector CN5, the 2 SIMM modules, the SCSI and the Vocal processor kits, insert the diskette into 3.5" disk drive.

Set the jumpers on CPU board as follow: J1 at position B and J2 at position 8MB.

Set the JP1 and JP2 jumpers on Supply or Mixer board at position A.

Connect the R and L outputs to the MIC/LINE inputs using the appropriate cable.

Connect the external JOMEGA ZIP SCSI device to the SCSI socket.

Plug the RS232 loopback into the socket.

Checks and Adjustments

Aftertouch

To adjust the keyboard aftertouch locate the VR1 trimmer on CPU board, connect the scope CH1 probe tip to its center terminal, probe clip connected at ground, adjust VR1 to obtain an excursion from 0 to 5V every time a note key is pressed with different pressure, or to obtain a better adjustment follow the instructions on ADJUSTMENT TABLE (page 8).

MIDI, RS232 and RS422 mode

Press MIDI, MASTER (F3), PC I/O (F3), set PC1 with DIAL and press ENTER, set LOCAL to OFF (F1), verify that the keyboard plays thru RS232 by unplugging and re-inserting the RS232 loopback into the socket.

Press MIDI and F3 twice, rotate the DIAL to set "MACINTOSH", check the 1MHz clock appear on pin 1 of COMPUTER socket (use the second probe tip to do that).

Panel Key and Led

Press SYSTEM, OTHER (F4), INFO (F1) and F4 the display show a warning message: press ENTER and PANEL (F3) and then press all the panel buttons checking their operation on display, at the same time every led of pressed button must light up, except DISK led.

Pitch Bend and Modulation Wheels

Rotate the Modulation wheel verifying the excursion displayed, it ranges from 0 to 127.

Rotate the Pitch Bender wheel verifying the excursion displayed, it ranges from 0 to 127 with 64 on center position, a slightly difference may be adjusted by VR11 on Controls panel board, major differences may be adjusted repositioning the knob or the

potentiometer.

Press ENTER and ESCAPE simultaneously to return to HARDWARE test menu.

Memories and Optional Accessories

Press DEVICE (F1), the instrument self-test check subsequently the follow devices: SIMM modules (VDRAM), 8Mbyte sample dram (BDRAM), 3.5" disk drive (FD), SCSI interface (SCSI) and hard disk (HD) marking with "pass" all devices checked successfully, with "np" all devices not present, with "fault" all device defective. Theoretically all test must be passed, if you have a mistake on a device re-check its installation. Press ENTER if necessary.

Inputs, Dsp and Vocal Processor

Put MASTER - INPUT - LEVEL sliders to maximum position and rotate full clockwise GAIN1 and GAIN2 potentiometer located on the rear side.

Measure a sinusoidal signal at 4Vpp on OUT 1 and OUT 2 outputs sockets (the 1KHz tone gets out OUT R and L, re-input thru MIC 1 and 2 by the appropriate cable, pass thru DSPs and finally get out from OUT 1 and 2).

Turn off the signal by means SIGNAL (F4).

Noise level

Turn off the instrument, disconnect the signal cable, wait at least 30 seconds, turn on again the keyboard and check the noise level is acceptable (if not verify the insulation between electrical and chassis ground is at least 40Kohms).

Data Hold

Press SYSTEM, OTHER (F4), INFO (F1), F4 , ENTER and DHOLD (F2) and then wait until the display show PASS.

Turn off the keyboard and then remove not included optional kits (the EQUINOX base version is equipped with 2Mbyte SAMPLE DRAM only), restore the jumpers positions: J1 to A, J2 to 2MB, JP1 & 2 to B. Turn on again the instrument and verify, repeating the test, that only BDRAM pass.

Final

Verify the keyboard correct operation playing something on it, and finally launch the Sounds sequence pressing PROGRAM, SHUFFLE (F4), MAKE (F1). When it is finished you have tested the keyboard.

Reliability Check

Before reassembling the instrument and before deliver it to the user, it is a goal verify its reliability:

To do that switch it off, or leaving it switched on but operating with greatest caution, carefully shake the boards and connections inside it using an insulated tool (for example the handle of the screwdriver) to find wrong contacts and so on.

Turn on the instrument and verify that it operates correctly repeating the Final Check.

Disconnect the instrument from the mains, reassemble it and shake it carefully without causing aesthetics damages, re-connect it to the mains, turn on and re-check its functionality, finally leave it switched on for a long time verifying its functionality occasionally.

Spare Part List

Legend	
EU	=Specify European Version (230Vac)
US	=Specify U.S. Version (115Vac)
61N	=only for model with 61 Notes
76N	=only for model with 76 Notes
GEM	=Specify GEM Brand Version
GM	=Specify Generalmusic Brand Version
1	=1st Version with Traditional supply circuit
2	=2nd Version with Switching supply circuit
The 1st and 2nd versions differ only by supply unit and its related circuits, these are also recognizable by the code imprinted on the rear label, where 1st versions are:	
995155	Equinox 61N GEM Brand 230Vac (EU)
995156	Equinox 61N Generalmusic Brand 115Vac (US)
995157	Equinox 76N GEM Brand 230Vac (EU)
995158	Equinox 76N Generalmusic Brand 115Vac (US)
and 2nd versions are:	
995167	Equinox 61N GEM Brand 115-230Vac
995168	Equinox 61N Generalmusic Brand 115-230Vac
995169	Equinox 76N GEM Brand 115-230Vac
995170	Equinox 76N Generalmusic Brand 115-230Vac

Ref Code	Description
Accessories	
970329	Owner's Manual (English Version)
970328	Owner's Manual (Italian Version)
955913	Operating System Disk
955912	Demo Disk
300617	Owner's Manual Folder
130276	Mains Cable (US)
130274	Mains Cable (EU)
Optional Accessories	
970124	Carring Bag (61N)
970125	Carring Bag (76N)
970110	X-Metal Stand
970300	50+50W Amplified Stand (EU)
970311	50+50W Amplified Stand (US)
970116	Single Foot Switch
970080	Triple Foot Switch
970134	Piano Single Foot Switch
970107	Volume Pedal
970084	Dynamic Pedalboard
130301	2mt Midi Cable
970310	Multimedia Kit
130429	* 3mt RS232 Cable (MiniDin 8 To D-Sub 9)
970207	Hard Disk Installation Kit
20 970333	Power Station Kit (970207 included)
761094	* 2Mbyte Backed Dram Module
561006	* 2Gbyte Equinox Hard Disk Unit with Various Contents
17 340905	* Rubber Suspension
18 120029	* M3x6mm Screw
19 120451	* M3 Washer
22 970213	2Mbyte Backed Samples Dram
23 970331	8Mbyte Backed Samples Dram
16 970330	SCSI Interface Kit
21 970225	Volatile SIMM Dram
100742	* 4MByte SIMM Module
24 970334	Vocal Processor Kit
841152	* 34 Wires 5cm Length Flat Cable
841030	* 16 Wires 5cm Length Flat Cable
840202	* 9 Wires 10cm Length Flat Cable
841025	* 2 Wires 10cm Length Screened Cable
761093	* Buffer Module Board (Pcb# 315023)
103013	** 74HC138D SOIC 1 Of 8 Decoder
103003	** 74HC374DW SOIC Octal D-Type Flip-Flop
761167	* Vocal Processor Board (Pcb# 315109)
230561	** 47uH 10% 100mA RF-Coil
141016	** 16 Contacts Vert Female Connector
140917	** 2 Contacts Vert Male Connector
140866	** 34 Contacts Vert Male Connector
140324	** 9 Contacts Vert Male Connector
106003	** MAX709 Power Monitor With Reset
105010	** ADSP2181 Dsp Microcomputer
103031	** 74HC00D SOIC Quad Nand Gate
103030	** 74HC32D SOIC Or Nand Gate
103012	** 74HC125D SOIC Quad Tri-State Buffer
103011	** AD1877 SOIC Dual Channel 1bit ADC
103007	** 74HC74D SOIC Dual Flip-Flop
101500	** 74AC138D SOIC 1 Of 8 Decoder
100059	** 7805 +5V 1A Voltage Regulator
081000	** PMLL4148 Smd 100mA 75V Signal Diode
271230	* Vocal Processor Owner's Manual Addendum

120003	* M3x8mm Screw
Cabinet Assembly	
Bottom Assembly	
731009	Gnd-Shield Board (Pcb#315164)
31 660455	Bottom Chassis (61N)(1)
31 660459	Bottom Chassis (76N)(1)
31 660463	Bottom Chassis (61N)(2)
31 660464	Bottom Chassis (76N)(2)
29 652734	Left Side
30 652733	Right Side
340357	Spacer For Left & Right Side
340435	Adhesive Foot
Top Assembly	
40 660454	Top Chassis with "GEM" Logo (61N)(1)
40 660456	Top Chassis with "GM" Logo (61N)(1)
40 660458	Top Chassis with "GEM" Logo (76N)(1)
40 660460	Top Chassis with "GM" Logo (76N)(1)
40 660465	Top Chassis with "GEM" Logo (61N)(2)
40 660466	Top Chassis with "GM" Logo (61N)(2)
40 660467	Top Chassis with "GEM" Logo (76N)(2)
40 660468	Top Chassis with "GM" Logo (76N)(2)
68 660453	SCSI Slot Closer
66 652749	Dual Slider Potentiometer Support
65 652748	Octal Slider Potentiometer Support
64 652735	Display Screen
32 652732	Left-Top Plastic Chassis
41 652731	Right-Top Plastic Chassis
340586	Insulant Spacer
58 340572	Led Light Diffuser
63 340570	Arrow Actuator
340566	Back-plate for Controls Panel
340556	Polycarbonate Washer for Dial
340542	Controls Lower Spacer
340521	Dial Support
62 340493	Dial Knob
56 340372	Led Light Diffuser for Actuator
61 340370	Contrast Knob
57 340369	6x15mm Push Cap
59 340368	6x8mm Push Cap
67 340367	Slider Knob
60 340365	"Enter/Escape" Push Cap
340186	Adhesive Cable Fixing
340092	5mm Board Spacer
10 171583	3 Din Sockets Reinforcement
8 171472	Analog I/O Board Support
11 171454	Controls Interface Board Support
13 171451	4 Jack Sockets Reinforcement
9 171450	6 Jack Sockets Reinforcement
171444	"Enter/Escape" Reinforcement
171438	Controls Panel Spacer
12 171424	4 Din Sockets Reinforcement
171397	Spacer For R-Top Plastic Chassis
171396	Spacer For L-Top Plastic Chassis
171004	Right Disk Drive Support
171003	Left Disk Drive Support
120960	Dial Steel Sphere
35 110400	3.5" Disk Drive
39 110254	Rotary Encoder With Snap

Mains Filter & Transformer Assembly (1)	
730681	Mains Switch Assembly
69 340359	** Power Switch Frame
171008	** Mains Socket & Power Switch Support
1 110614	** Mains Socket
2 110285	** Power Switch
4 767988	Mains Filter Board (Pcb#315014) (EU) (1)
4 768006	Mains Filter Board (Pcb#315014) (US) (1)
230568	* 10mH 250Vac 1A AC Line EMI Coil "Siemens"
140010	* 3 Contacts P=10 Vert Terminal Block
110113	* Fuse Clip 5x20mm 6A max (EU)
110114	* Fuse Clip 6.3x32mm 10A Max (US)
020493	* 100n 250Vac MKP EMI Capacitor "Siemens"
010545	* 4n7 250V Ceramic Capacitor (Iec-UI-Csa)
5 230127	Transformer 230Vac 120W (EU) (1)
5 230129	Transformer 115Vac 120W (US) (1)
110011	T1A Fuse 5x20mm (EU) (1)
110083	T2A Fuse 6.3x32mm (US) (1)
Power Supply Board (1)	
6 730993	Power Supply Board (Pcb#315116) (1)
230524	* 100uH Switching Coil
141015	* 14 Contacts Vert Female Connector
141010	* 4 Contacts Vert Female Connector
140874	* Single In Line Vert Male Strip (specify contacts)

140873	*	4	Contacts Vert Male Connector
140325	*	12	Contacts Vert Male Connector
140324	*	9	Contacts Vert Male Connector
140323	*	6	Contacts Vert Male Connector
140010	*	3	Contacts P=10 Vert Terminal Block
110305	*	Relay 12V / 2	Switch 1A 250V
110119	*	Fuse Clip 10A max (EU)	(US)
100955	*	LM2576 5V 3A	Switching Regulator
100906	*	CEM3381 Dual V.C.A.	
100061	*	TL072 Dual J-Fet	Operational Amplifier
100045	*	7812 +12V 1A	Voltage Regulator
100043	*	7912 -12V 1A	Voltage Regulator
090183	*	BC550 TO92 LN	Npn Transistor
090153	*	BC327 TO92 Pnp	Transistor
090152	*	BC337 TO92 Npn	Transistor
080606	*	GBU8D 8A	Rectifier Diodes Bridge
080171	*	FE6B 6A 100V	Fast Recovery Diode
080103	*	1N4148 100mA 75V	Signal Diode
030950	*	470u 16V 20%	Low Esr Vert Electrolytic Capacitor
030554	*	4700u 35v 20%	Snap-In Electrolytic Capacitor
110021	T5A	Fuse 6.3x32mm	(US)
110020	T5A	Fuse 5x20mm	(EU)

Mains Filter & Switching Supply Assembly (2)

730681	Mains Switch Assembly
69 340359	** Power Switch Frame
171008	** Mains Socket & Power Switch Support
1 110614	** Mains Socket
2 110285	** Power Switch
45 230532	EMI Choke Coil (2)
44 731011	SNP9541M 40W Switching Supply Unit (2)
110010	T2A Fuse 5x20mm (EU) (US) (2)

Mixer Board (2)

43 731016	Mixer Board (Pcb#315151) (2)
141102	* 6 Contacts Vert Male Connector
141015	* 14 Contacts Vert Female Connector
141010	* 4 Contacts Vert Female Connector
140877	* Jumper For Contacts Strip (p=2.54mm)
140874	* Single In Line Vert Male Strip (specify contacts)
140873	* 4 Contacts Vert Male Connector
140325	* 12 Contacts Vert Male Connector
140324	* 9 Contacts Vert Male Connector
140323	* 6 Contacts Vert Male Connector
110305	* Relay 12V / 2 Switch 1A 250V
100906	* CEM3381 Dual V.C.A.
100061	* TL072 Dual J-Fet Operational Amplifier
090183	* BC550 TO92 LN Npn Transistor
090153	* BC327 TO92 Pnp Transistor
090152	* BC337 TO92 Npn Transistor
080103	* 1N4148 100mA 75V Signal Diode

Phones Board

28 730678	Phones Board (Pcb#315118)
230569	* FL5R200PNT EMI Coil For Signal
140361	* 6 Contacts Vert Male Pass-Thru Connector
140217	* Jack Stereo Slim Horizontal Socket

Keyboard Assembly

720554	61N Keyboard Assembly with Interface
720555	76N Keyboard Assembly with Interface
840808	* 16 Wires 30cm Length Flat Cable
840807	* 16 Wires 20cm Length Flat Cable (61N)
841064	* 2 Wires 17cm Length Crimp Terminal Cable (76N)
840838	* 20 Wires 15cm Length Flat Cable (76N)
27 761059	* Keyboard Interface Board (Pcb#315024) (61N)
27 761137	* Keyboard Interface Board (Pcb#315024) (76N)
230569	** FL5R200PNT EMI Coil For Signal
141018	** 20 Contacts Vert Female Connector
141016	** 16 Contacts Vert Female Connector
141011	** 6 Contacts Vert Female Connector
140890	** 4 Contacts Hor Male Single-Strip
140872	** 4 Contacrs Hor Male Connector
140918	** 2 Contacts Hor Male Connector
100740	** HD6433278 Cpu F=20MHz
100605	** 74HC125 Quad 3-State Buffer
090194	** BC560 TO92 LN Pnp Transistor
010725	** 20MHz Ceramic Resonator With Capacitors
26 730680	* Connection Board (Pcb#315114) (76N)
140918	** 2 Contacts Hor Male Connector
140890	** 4 Contacts Hor Male Single-Strip
720556	* Keyboard Assembly (61N)
720557	* Keyboard Assembly (76N)
810554	** 29 Contacts Right Board (Pcb#310536) (61N)
810557	** 44 Contacts Right Board (Pcb#310566) (76N)

340211	***	12	Dual Contact Rubber Strip
141018	***	20	Contacts Vert Female Connector
141016	***	16	Contacts Vert Female Connector
080103	***	1N4148 100mA 75V	Signal Diode
810553	**	32 Contacts Left Board (Pcb#310535) (61N)	
810556	**	32 Contacts Left Board (Pcb#310565) (76N)	
340211	***	12	Dual Contact Rubber Strip
141016	***	16	Contacts Vert Female Connector
080103	***	1N4148 100mA 75V	Signal Diode
500073	**	Mechanical Parts (61N)	
500076	**	Mechanical Parts (76N)	
160215	***	Key Return Spring	
151216	***	First E Key (76N)	
151215	***	Last G Key (76N)	
55 151213	***	Last C Key (61N)	
54 151212	***	Sharp Key	
53 151211	***	B Key	
52 151210	***	A Key	
51 151209	***	G Key	
50 151208	***	F Key	
49 151207	***	E Key	
48 151206	***	D Key	
47 151205	***	C Key	

Pitch & Modulation Assembly

34 720553	Pitch & Modulation Assembly
840726	* 9 Wires 40cm Length Flat Cable
46 340568	* Wheel
340331	* Sheath For Spring
210264	* Black Felt
171460	* Wheel Support
160166	* Return Spring
120554	* Lock Washer
33 074700	* 4K7 Linear Rotative Potentiometer

Controls Panel Board

36 810669	Controls Panel Board (Pcb#315153)
141018	** 20 Contacts Vert Female Connector
141016	** 16 Contacts Vert Female Connector
141013	** 10 Contacts Vert Female Connector
140529	** Microswitch 12V 50mA 0.25mm
140328	** 9 Contacts Hor Male Connector
100620	** 74HC86 Quad 2-Input Exor Gate
100614	** 74HC74 Dual Flip-Flop
100607	** 74HC164 8bit S To P Shift Register
100061	** TL072 Dual J-Fet Operational Amplifier
090183	** BC550 TO92 LN Npn Transistor
080711	** 3mm High Efficiency Red Led
080103	** 1N4148 100mA 75V Signal Diode
070702	** 5K Linear Rotary Potentiometer
070554	** 10K Lin. Slider Potentiometer

Controls Interface Board

37 761169	Controls Interface Board (Pcb#315113)
141018	* 20 Contacts Vert Female Connector
141016	* 16 Contacts Vert Female Connector
141013	* 10 Contacts Vert Female Connector
140854	* 16 Contacts Vert Male Connector
140325	* 12 Contacts Vert Male Connector
100740	* HD6433278 Cpu F=20MHz
100645	* 74HC4351 8ch Analog Multiplexer
100605	* 74HC125 Quad 3-State Buffer
090183	* BC550 TO92 LN Npn Transistor
090153	* BC327 TO92 Pnp Transistor
080103	* 1N4148 100mA 75V Signal Diode
010725	* 20MHz Ceramic Resonator With Capacitors

Lcd Display Assembly

38 730992	Lcd Display Assembly
340456	* Led Spacer
315157	* Lcd Adapter Printed Circuit Board
141018	* 20 Contacts Vert Female Connector
140874	* Single In Line Vert Male Strip (specify contacts)
080754	* LMC97S005A Lcd Display 128X64 dots

Controls & Midi I/O Board

14 761101	Controls & Midi I/O Board with Battery
751101	* Controls & Midi I/O Board (Pcb# 315088)
230569	** FL5R200PNT EMI Coil For Signal
141018	** 20 Contacts Vert Female Connector
140247	** 8 Poles Mini Din Female Socket
140217	** Jack Stereo Slim Horizontal Socket
140216	** 6 Poles Din Horizontal Female Socket
140212	** 5 Poles Din Horizontal Female Socket
100734	** MAX202E RS232 Drivers/Receiver

100618	** 74HC14 Hex Inverter Schmitt Trigger
100035	** 6N138 Optocoupler
090194	** BC560 TO92 LN Pnp Transistor
090183	** BC550 TO92 LN Npn Transistor
080103	** 1N4148 100mA 75V Signal Diode
15 110300	* 4.8V 280mAh Nicd Battery

Analog I/O Board

7 730990	Analog I/O Board (Pcb#315163)
230569	* FL5R200PNT EMI Coil For Signal
141015	* 14 Contacts Vert Female Connector
140217	* Jack Stereo Slim Horizontal Socket
140207	* Jack Horizontal Female Socket
100919	* MC33078 Dual LN Operational Amplifier
080103	* 1N4148 100mA 75V Signal Diode
070613	* 2X10KC Potentiometer

Cpu & Sound Generator Board

25 761182	Cpu & Sound Generator Board (Pcb#315150)
230527	* BL02RN2-R62 EMI Coil For Signal
141018	* 20 Contacts Vert Female Connector
141016	* 16 Contacts Vert Female Connector
141011	* 6 Contacts Vert Female Connector
141010	* 4 Contacts Vert Female Connector
140922	* 32 Contacts Vert Male Strip P=2mm
140917	* 2 Contacts Vert Male Connector
140915	* 44 Contacts Vert Male Strip P=2mm
140913	* Simm Socket 30 Pin
140877	* Jumper For Contacts Strip (p=2.54mm)
140874	* Single In Line Vert Male Strip (specify contacts)
140873	* 4 Contacts Vert Male Connector
140866	* 34 Contacts Vert Male Connector
140854	* 16 Contacts Vert Male Connector
140325	* 12 Contacts Vert Male Connector
106003	* MAX709 Power Monitor With Reset
105009	* DISP3 QFP Digital Sound Processor (Hitachi)
105005	* FPGA - Video/Lcd Controller
105004	* MC68360EM25 QFP Cpu
104039	* KM23C64000G 64Mbit Rom "System"
104036	* MX23C6410 64Mbit Rom "Samples2"
104035	* MX23C6410 64Mbit Rom "Samples1"
104020	* KM62256CLG SOP 256Kbit SRam Ta=55nS
104010	* HM514280AJ 4M5bit Dram Ta=70nS
104009	* HM5118160ALJ 16Mbit Dram Ta=70nS
104007	* E28F016SV-70 1Mbit Flash Memory Ta=70nS
103012	* 74HC125D SOIC Quad Tri-State Buffer
103010	* 74HC04D SOIC Hex Inverter
103009	* 74HC02D SOIC Quad 2-In Nor Gate
103004	* AD1865R SOP 18bit D/A Converter
103002	* 74HC245DW SOIC Octal Bus Transceiver
103001	* 74HC08D SOIC Quad 2-Input And Gate
101506	* 74AC04D SOIC Hex Inverter Gate
101502	* 74AC125D SOIC Quad Tri-State Buffer
100904	* LM393 Dual Comparator
100733	* uPD72064 Floppy Disk Controller
100731	* DS1202 Clock Calendar
100059	* 7805 +5V 1A Voltage Regulator
100058	* 7905 -5V 1A Voltage Regulator
091000	* BC847 TO236 Smd Npn Transistor
090153	* BC327 TO92 Pnp Transistor
090152	* BC337 TO92 Npn Transistor
081000	* PMLL4148 Smd 100mA 75V Signal Diode
080156	* 1N4002 1A 100V Rectifier Diode
010732	* 4.194304MHz Quartz Oscillator
010727	* 45.1584MHz Quartz Resonator
010725	* 20MHz Ceramic Resonator With Capacitors
010718	* 32MHz Quartz Resonator
010710	* 32768Hz Quartz Resonator
560019	* 20V8AS-15HB1 Programmed GAL

Wiring Connections

841187	20 Wires 20cm Length Flat Cable with Ferrite
841150	14 Wires 17.5cm Length Flat Cable
841079	16 Wires 12.5cm Length Flat Cable
841070	34 Wires 80cm Length Flat Cable
840848	3 (of 4) Wires 30cm Length Crimp Terminal Cable (61N)
840707	3 (of 4) Wires 50cm Length Crimp Terminal Cable (76N)
840838	20 Wires 15cm Length Flat Cable
840828	20 Wires 7.5cm Length Flat Cable
840823	10 Wires 10cm Length Flat Cable
840806	12 Wires 5cm Length Crimp Terminal Cable
840775	6 Wires 20cm Length Flat Cable (61N)
841164	6 Wires 7.5cm Length Flat Cable (76N)
840738	4 Wires 5cm Length Flat Cable
840587	3 (of 4) Wires 40cm Length Crimp Terminal Cable (61N)(1)

840707	3 (of 4) Wires 50cm Length Crimp Terminal Cable (61N)(2)
840607	3 (of 4) Wires 15cm Length Crimp Terminal Cable (76N)(1)
840676	3 (of 4) Wires 60cm Length Crimp Terminal Cable (76N)(2)
840529	16 Wires 20cm Length Flat Cable
840256	12 Wires 20cm Length Flat Cable
840162	6 Wires 50cm Length Flat Cable (61N)(1)
840160	6 Wires 40cm Length Flat Cable (61N)(2)
840164	6 Wires 60cm Length Flat Cable (76N)
841198	6 Wires 7.5cm Length Crimp Terminal Cable (2)
3 770775	Mains Cables Assembly (1)
3 770852	Mains Cables Assembly (2)

Note:

Each spare part is single quantity unless otherwise specified.
Asterisk prefix explanation:
Omitted = First level spare part.
One asterisk = Second level, part of previous listed first level part.
Two asterisk = Third level, part of previous listed second level part.
Three asterisk =
Any request for not above mentioned part must encompass specific description including:
1) Model name,
2) Section name,
3) Module code,
4) Reference name,
5) Quantity number.