NOTTURNO

SCHULZ POLLMANN®

SERVICE MANUAL

Schematic Diagrams

CODE : 270199

Index & Warnings

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

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.

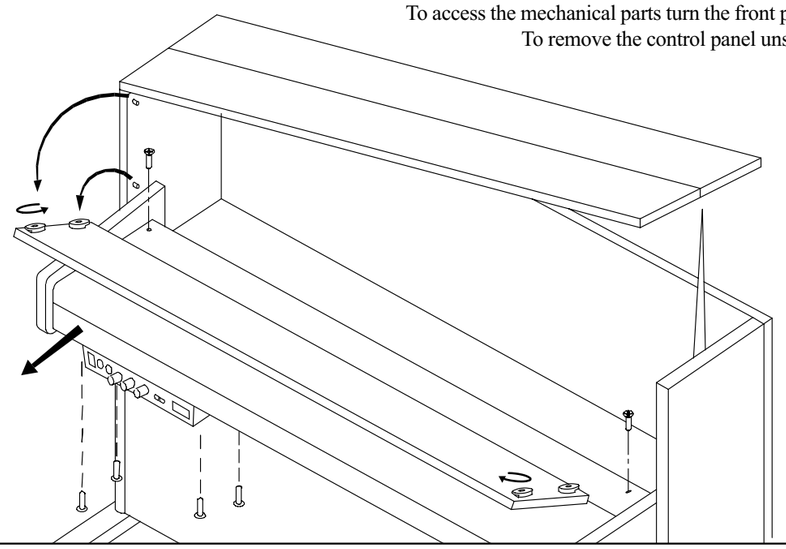
Schematic Notes

⚠ 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 1/4W unless otherwise specified.
All switches shown in the "OFF" position. All DC voltages measured to ground with a voltmeter 20KOhm/V.

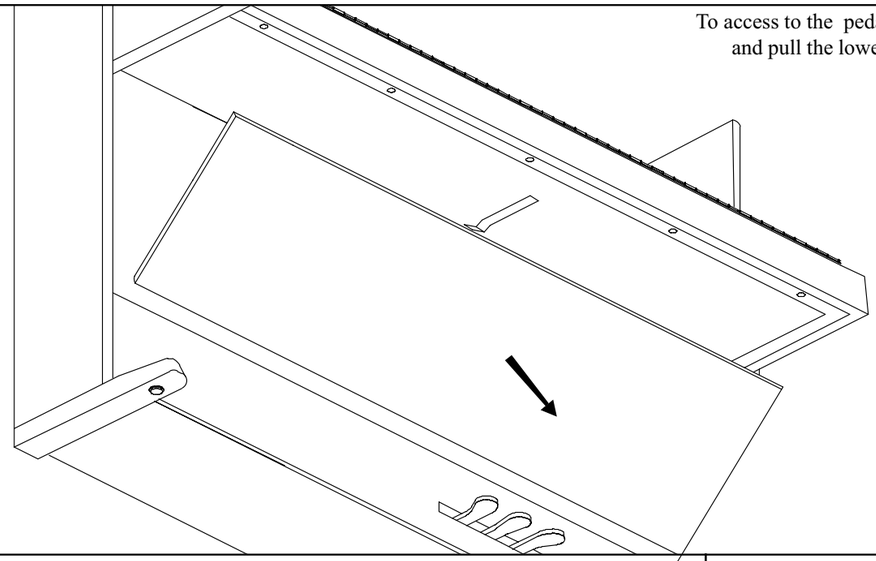
- Soldering point.
- Male connector.
- Female connector.
- M/F faston connector.
- Test point.
- Supply voltage.
- Logic supply ground.
- Analog supply ground.
- Signal ground.
- Chassis ground.
- Flag joined with one or more flags with the same signal name inscribed.

ATTENTION
Observe precautions when handling
electrostatic sensitive devices

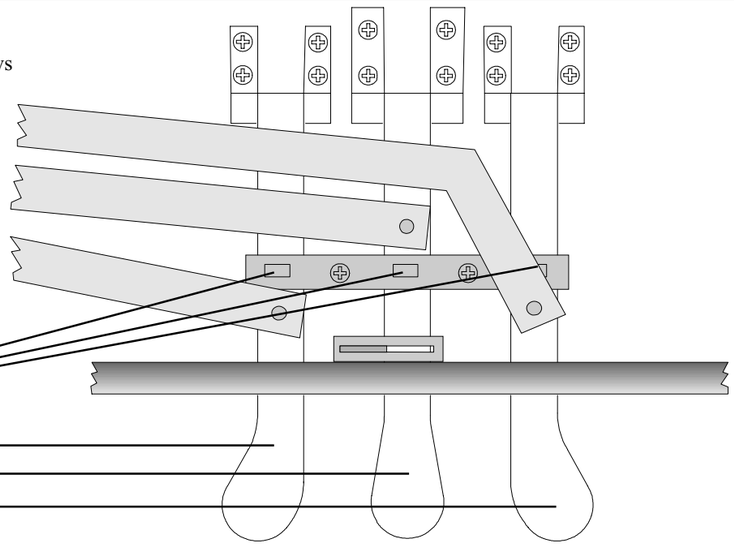
To access the mechanical parts turn the front panel locks and pull the panel towards you.
To remove the control panel unscrew the four screw from the bottom side.



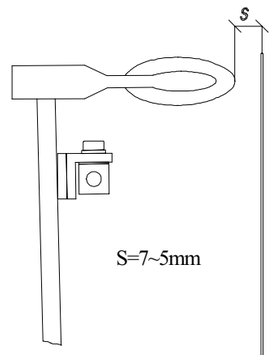
To access to the pedals board you must unlock and pull the lower front panel towards you.



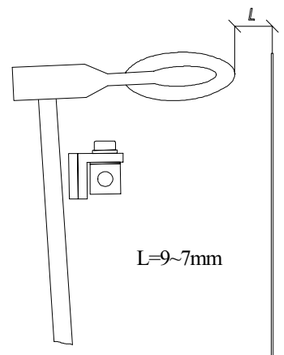
To access the optical sensor on the pedals board unscrew the two screws and turn it up.



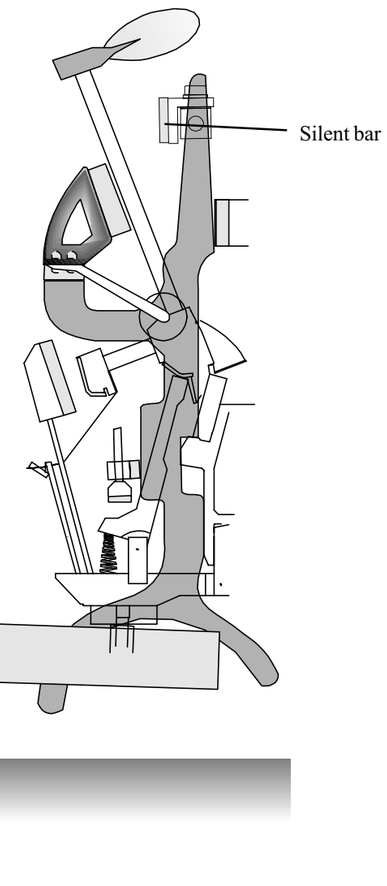
Shank stop with silencer on



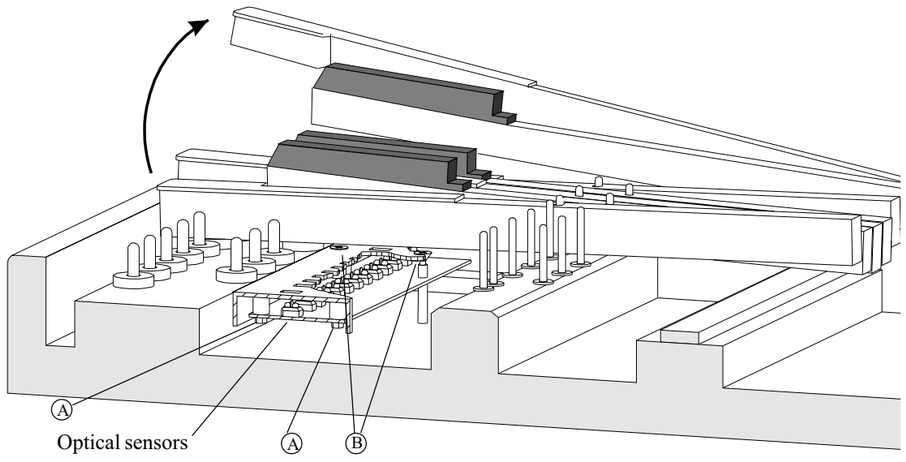
Let-off



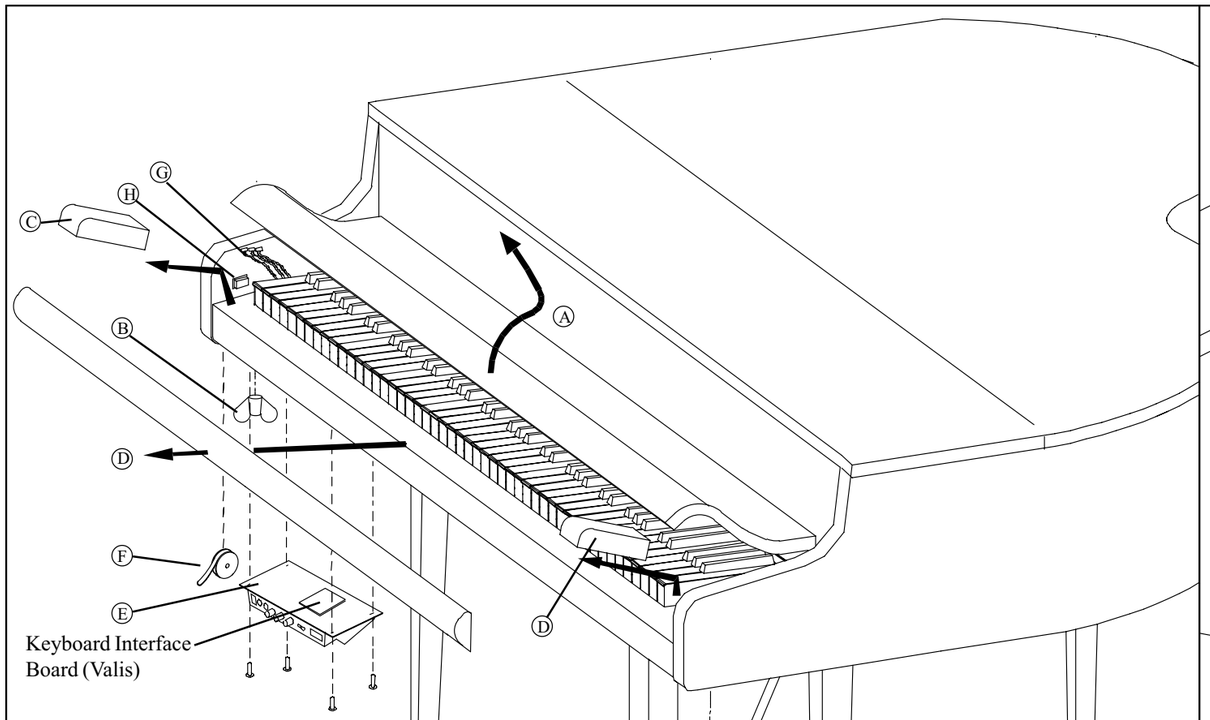
Once removed the keys unscrew the five screws (B) from the front panel of the contacts board and unscrew the fourty-eight nuts (A) from the bottom.



Remove all sharp and natural keys to access to the optical sensors, we recommend to dispose the keys in order

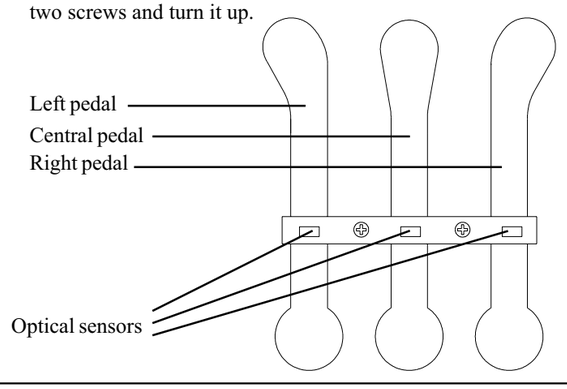


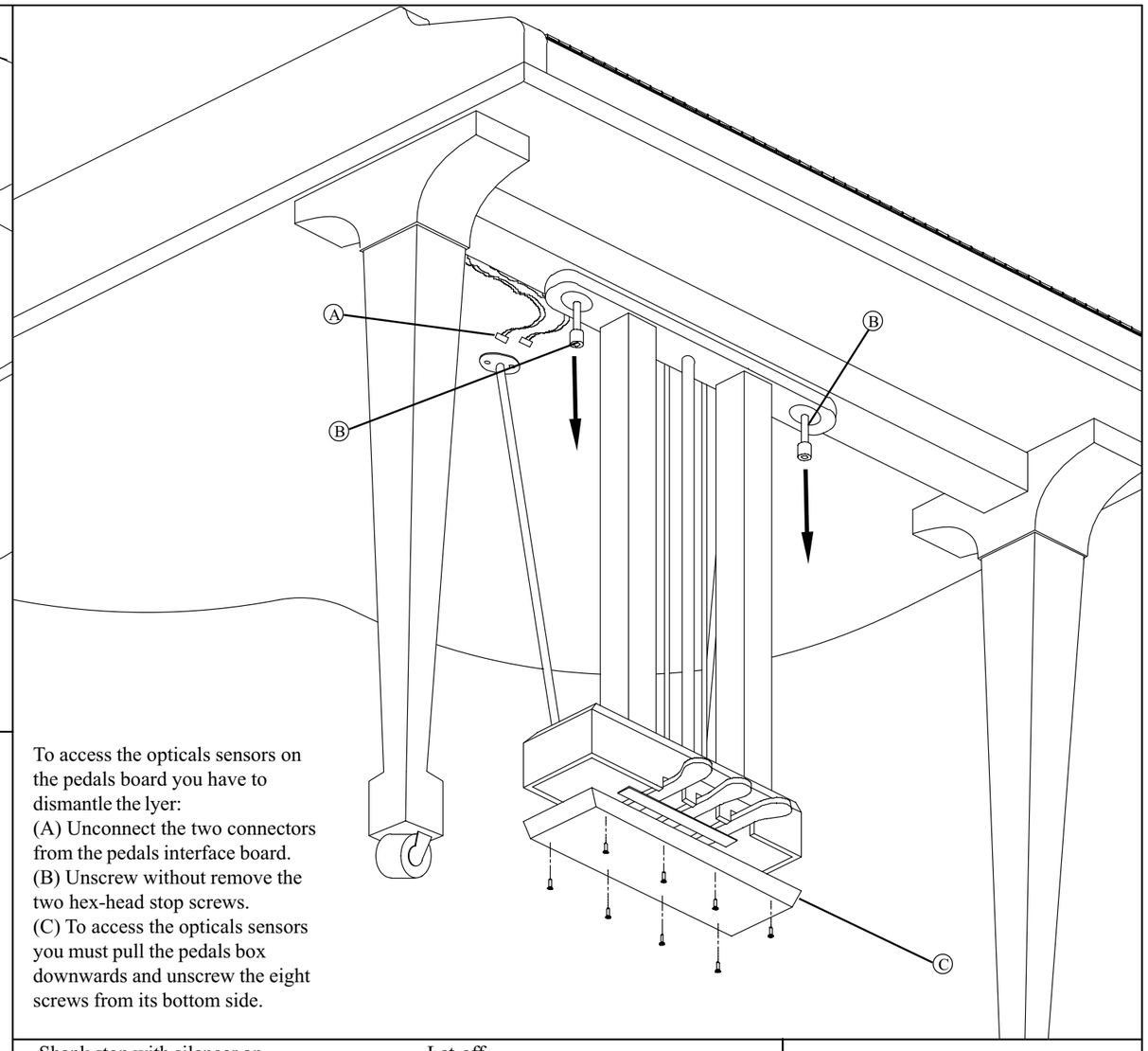
DRW M.PALANGH	DWG# 500814		GENERALMUSIC S.p.A. ITALY
CKD R.GIORGI	DISK: 60 PART:1/1	NOTTURNO DISASSEMBLING INSTRUCTIONS	
APP. M.GALANTI	REV: 23/10/97		



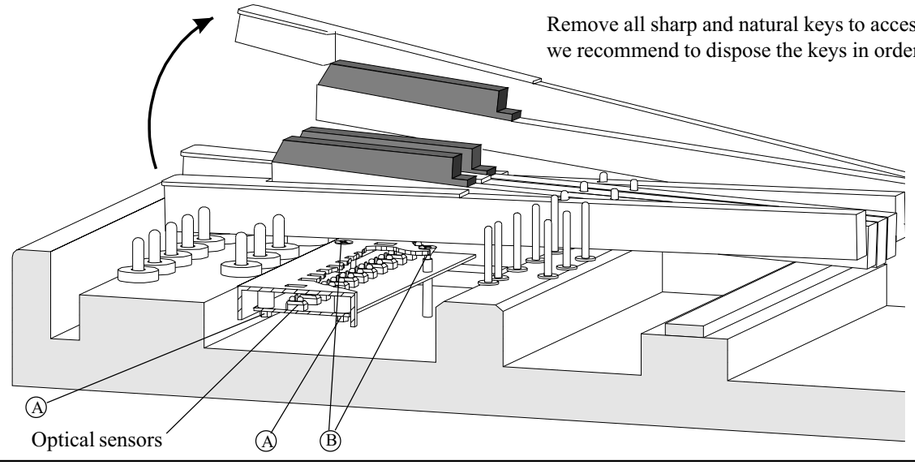
To access the keyboard's mechanicals part you have to:
(A) Lift and take away the keyboard's cover.
(B) Unscrew the two wings-nuts from the bottom.
(C) Take away the two wooden parts from the right and the left side of the keyboard.
(D) Pull towards you the front keyboard bar.
Now you can access to the Keyboard Intreface Board on the left side too.
(E) To access to the electronics parts of the control panel unscrew its four screws.
WARNING: before to take away the keyboard group mechanicals parts you must:
(F) push the silent bar lever;
(G) unconnect the three connectors from the Valis Interface Board;
(H) push the safety button on the left side.
Now you can pull towards you the keyboard group and access its machanicals parts.

To access the optical sensor on the pedals board unscrew the two screws and turn it up.



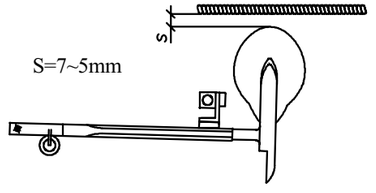


To access the opticals sensors on the pedals board you have to dismantle the lyer:
(A) Unconnect the two connectors from the pedals interface board.
(B) Unscrew without remove the two hex-head stop screws.
(C) To access the opticals sensors you must pull the pedals box downwards and unscrew the eight screws from its bottom side.

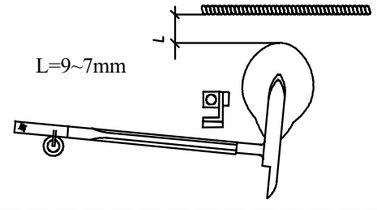


Remove all sharp and natural keys to access to the optical sensors, we recommend to dispose the keys in order

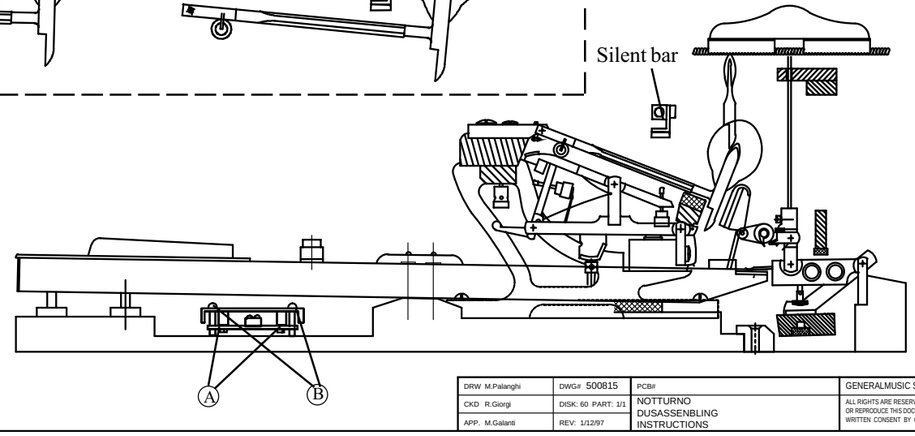
Shank stop with silencer on.



Let-off



Once removed the keys unscrew the five screws (B) from the front panel of the contacts board and unscrew the fourty-eight nuts (A) from the bottom.



DRW M.Palanghi	DWG# 500815	PCB#	GENERALMUSIC S.p.A. ITALY
CKD R.Giorgi	DISK: 60 PART: 1/1	NOTTURNO DUSASSENBLING INSTRUCTIONS	
APP. M.Galanti	REV: 1/12/97		

NOTTURNO INITIAL CHECK

Operations Description	Display
The following procedures must be executed subsequently in the specified order.	
Before turning on the instrument, check the jumpers setting on CPU & SOUND GENERATOR BOARD to be corresponding to the model accordingly the following table: MODEL J1 J2 J3 J4 GRPT140 NO YES YES 2-3 RPT115 NO YES YES 2-3 RP-PRO1 NO NO NO 1-2 RP-EXPANDER NO NO YES 1-2 NOTTURNO 126,117,113 YES NO NO 1-2 NOTTURNO 190 YES NO YES 1-2	
Turn on the instrument.	
Check the supply DC voltages on CPU & SOUND GENERATOR BOARD: (CN4) between pin9 and pin6 = +5±0,25Vdc (CN4) between pin1 and pin4 = +5±0,25Vdc (CN4) between pin1 and pin5 = -5±0,25Vdc	

NOTTURNO AUTOTEST PROCEDURE

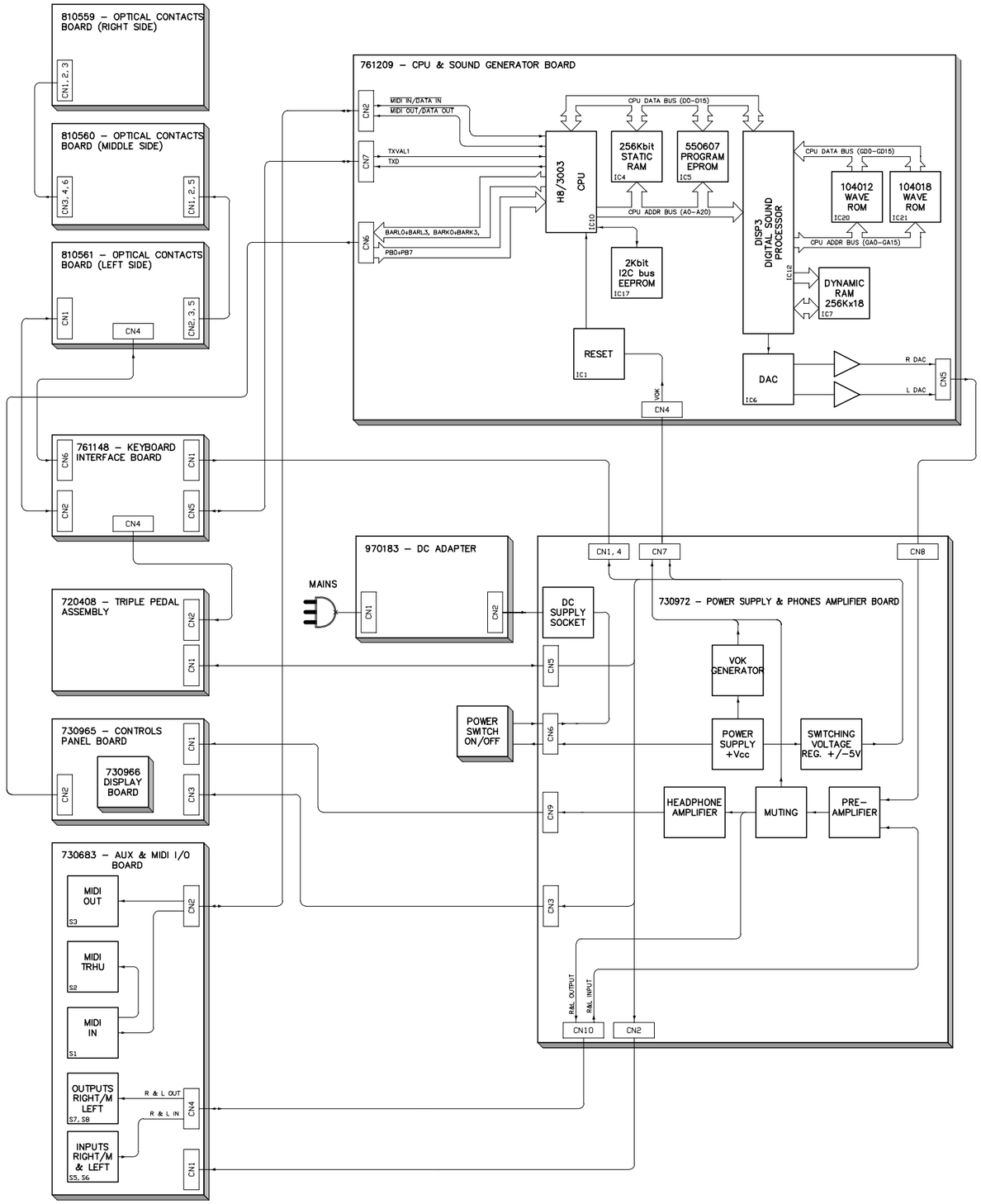
Operations Description	Display
The instrument starts in AUTOTEST mode turning on the instrument while pressing down the data "▲" and "▼" buttons. NOTE: Each time you press the data "▲", button the autotest procedure skips to the next step. During the autotest and auto-calibration procedures the instrument does not respond at any keyboard action.	AUT
The display shows "rot"; rotating the "SOUND" and "EDIT" knobs the first and last digit show their position in the range from 0 to 5 each.	ROT 5-0
The display shows "pot"; rotating the "VOLUME" knob the three digits show its position in the range from 0 to 127.	POT 064
The display shows "ped"; this test must be skipped.	PED
The instrument generates a 1KHz sinusoidal signal in both audio channels, verify with an oscilloscope the signal at the outputs. Phones output without load = 3.0±0.5Vpp AUX output = 1.7±0.3Vpp	
The display shows "mid"; connecting MIDI OUT and MIDI IN sockets with a Midi Cable, the instrument checks the loop showing "LLL" on the display if it is working correctly or "---" if not.	MID LLL
The display shows "STP" to confirm the end of Autotest procedure. Now turn off the instrument if you do not want to calibrate the keyboard.	STP

NOTTURNO Keyboard Automatic Calibration

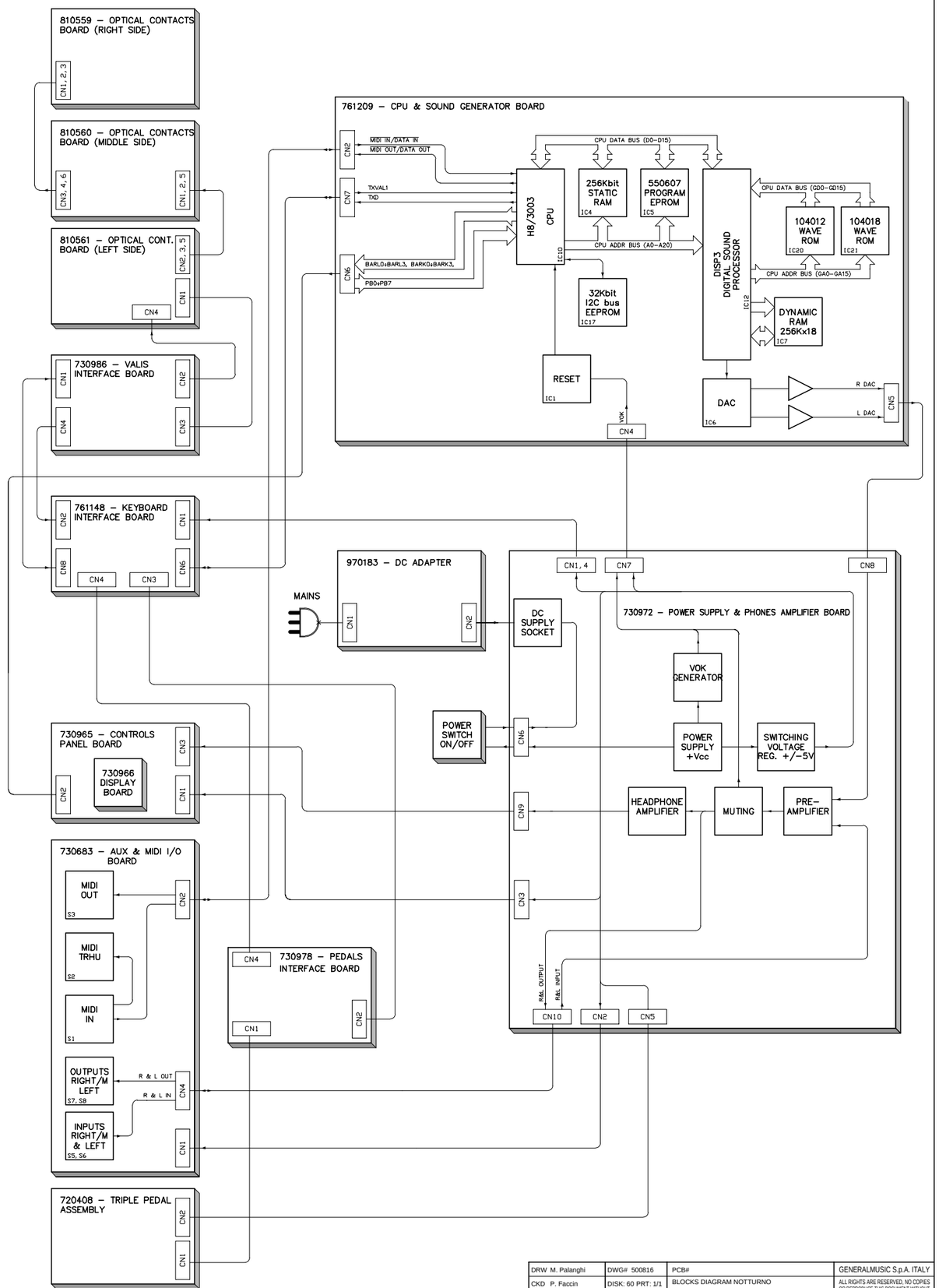
Operations Description	Display
Start with the instrument in AUTOTEST mode as described above and press data "▲" button until the display shows "ADJ".	ADJ
Press all the natural and sharp keys respecting the following precautions: 1) One or more keys at the same time is not important but each key once at least. 2) Play the keys slowly with PPP (pianissimo) action as uniform as possible for whole keyboard extension. 3) Release the keys slowly to avoid any oscillation or vibration. 4) Be sure that all keys are pressed at their end stroke, without apply extra pressure. 5) Press the three pedals also.	ADJ
Pressing "▲" and wait since the instrument memorizes the new calibration. If you do not hear a note your keyboard is successful calibrated. Press again "▲" and the instrument will restart in standard operation.	
If the instrument play some notes the calibration is not done properly, the keys not calibrated are notified in order from higher to lower tones, you may hear: 1 tone for each key note that has upper threshold value too high, 2 tones for each key note that has lower threshold value too low, 3 tones for each key note that has not enough threshold range. The most frequent reasons are the following, check these in the order specified below: 1) You have not activated one or more keys during the auto-calibration procedure. Solution: repeat the auto-calibration procedure from beginning. 2) The optical sensors are dirty. Solution: check these disassembling the keyboard, clean the optical sensors with a cotton flock slightly soaked with denaturated alcool, reassemble the keyboard and finally repeat the auto-calibration procedure. 3) The optical sensor are out of the tolerance range. Solution: disassemble the keyboard and replace on the contacts board the optical sensor that does not work properly, reassemble the keyboard and check it repeating the auto-calibration procedure.	

Note: Execute a calibration everytime the boards 810559,810560,810451 and 761148 are repaired or replaced and each time you consider it may be required, such as: keys replacement, keys re-alignament, climatic temperature very hot or very cold respect the ambient standard temperature of 25°c.

NOTTURNO BLOCK DIAGRAM (Up–right version)



NOTTURNO BLOCK DIAGRAM (Grand Piano version)



DRW M. Palanghi	DWG# 500816	PCB#	GENERALMUSIC S.p.A. ITALY
CKD P. Faccin	DISK: 60 PRT: 1/1	BLOCKS DIAGRAM NOTTURNO	
APP. M. Galanti	REV: 24-10-97		

730972 - POWER SUPPLY & ANALOGIC I/O BOARD

730683 - AUX & MIDI I/O BOARD

730965 - CONTROLS & PHONES BOARD

730966 - DISPLAY BOARD

810563 - PEDALS OPTICAL CONTACTS BOARD

730986 - PEDAL INTERFACE BOARD (GRAND PIANO VER. ONLY)

970103 - AD/DC ADAPTER (230V)

230V +/-15% 50-60Hz

ON/OFF MAIN SWITCH

+15V DC IN

POWER SUPPLY TO CPU & SOUND GENERATOR BOARD CN7

POWER SUPPLY TO KEYBOARD INTERFACE BOARD CN4

OUT DAC TO CPU & SOUND GENERATOR BOARD CN8

MIDI I/O TO CPU & S.G. BOARD CN2

UNUSED PEDAL SWITCH

IN MIDI THRU OUT

LEFT OUTPUTS RIGHT /MONO

LEFT INPUTS RIGHT /MONO

PEDAL SIGNAL TO KEYBOARD INTERFACE BOARD CN4 CN1

VERTICAL VER.: TO KEYBOARD INTERFACE BOARD CN1
GRAND PIANO VER.: TO PEDAL INTERFACE BOARD CN1

PCB#310586

PCB#310551

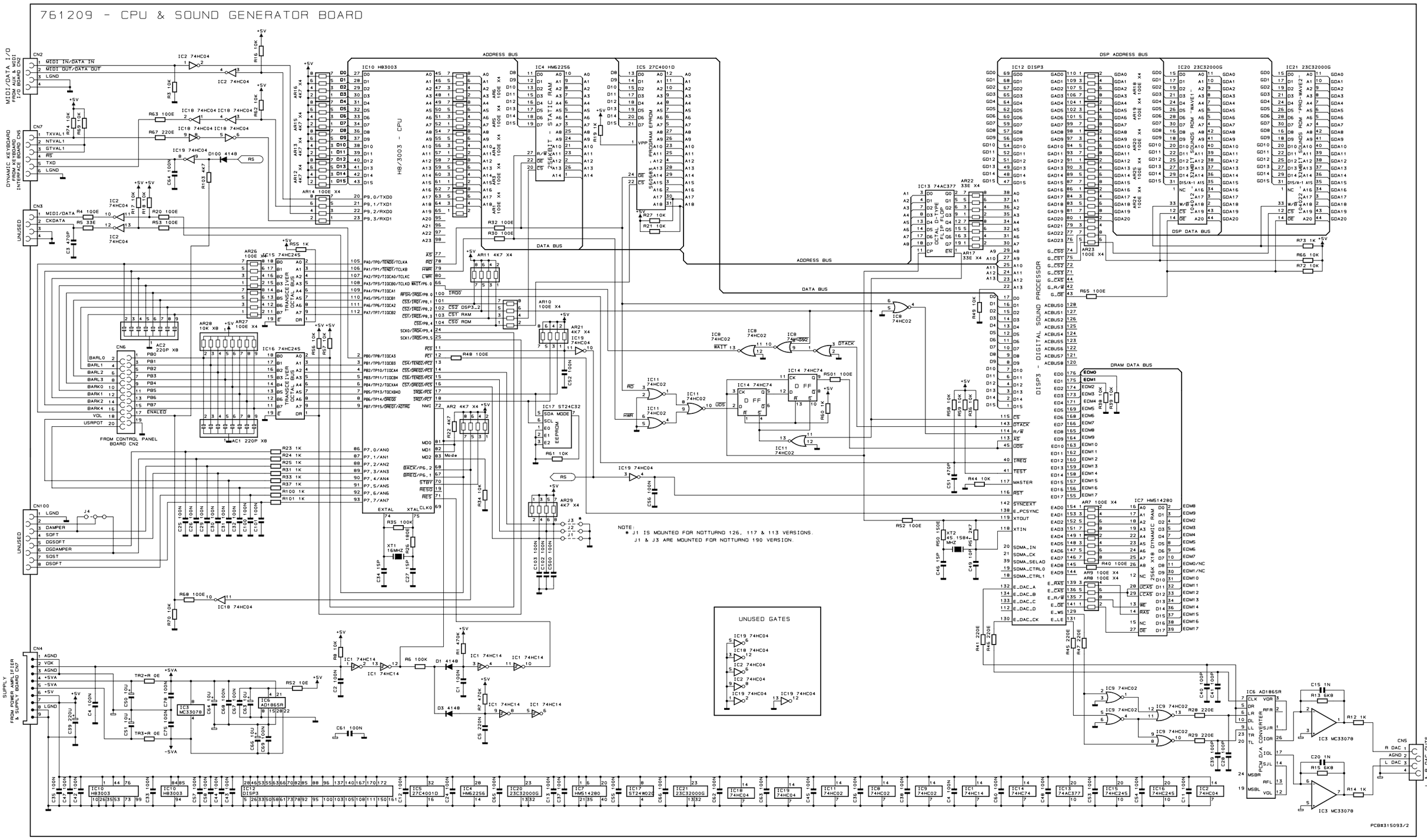
PCB#310584

PCB#310585

PCB#310583

DRW M.PALANGHI	DWG# 500817	PCB# 310551 - 310584 - 310583 - 310518	GENERALMUSIC S.p.A. ITALY
CKD R.GIORGI	DSK# 60 PART: 1/1	SCHEMATIC DIAGRAM RPT115 CONTROLS PANEL, PWR AMP & SUPPLY, AUX & MIDI I/O BOARD, DISPLAY B.	ALL RIGHTS ARE RESERVED. NO COPIES OR REPRODUCE THIS DOCUMENT WITHOUT WRITTEN CONSENT BY GENERALMUSIC.
APP. M.GALANTI	REV: 20/09/95		

761209 - CPU & SOUND GENERATOR BOARD



MODIFIES N. 29	DATE: 09-03-00	DESC. TO ELIMINATE BLINKING DURING POWER ON THE COMPONENT FOLLOWING HAVE BEEN ADDED: R103, D100 AND THE BOARD ASSEMBLY CHANGES THE CODE IN 761209.	
DRW P. FACCIN	DWG# 500818	PCB# 315093/2	GENERALMUSIC S.p.A.
CKD P. FACCIN	DATE 60 1/1	DESCRIPTION NOTTURNO	ALL RIGHTS ARE RESERVED. NO COPIES OR REPRODUCE THIS DOCUMENT WITHOUT WRITTEN CONSENT BY GENERALMUSIC
APP M. GALANTI	REV# 03-03-97	CPU & SOUND GENERATOR BOARD	

761148 - KEYBOARD
INTERFACE BOARD

730986 - VALIS INTERFACE BOARD
(GRAND PIANO ONLY)

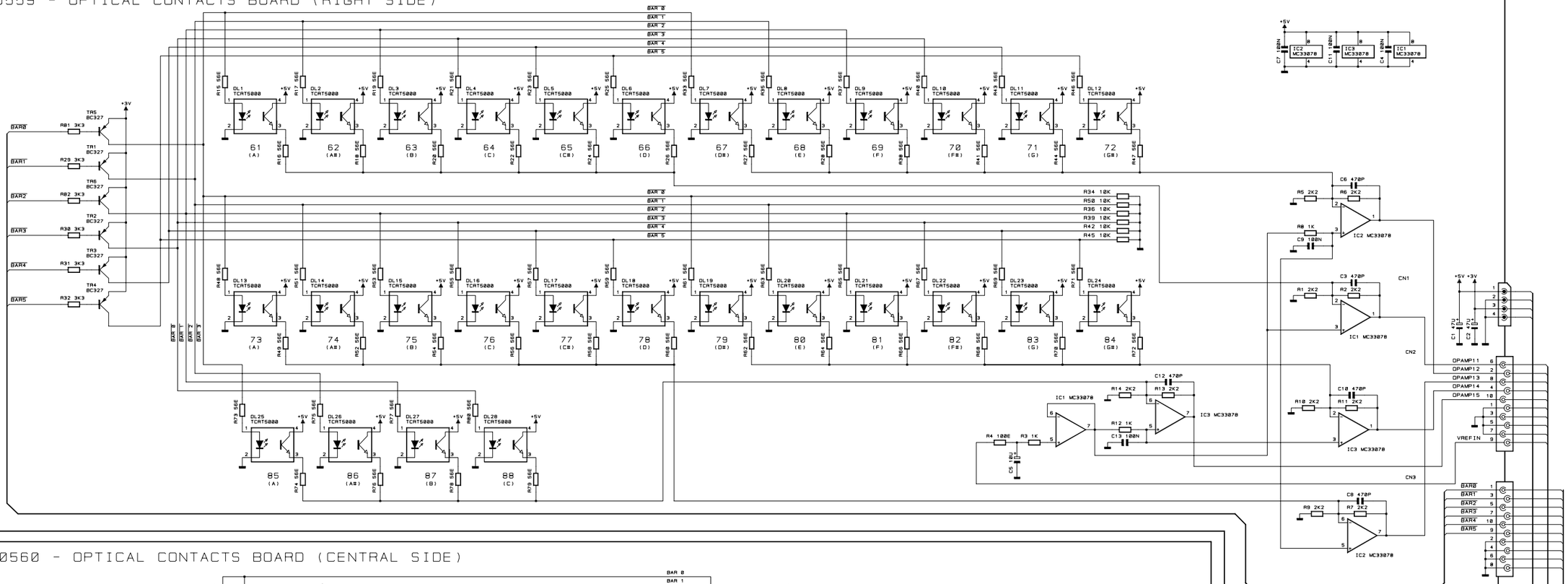
810561 - OPTICAL
CONTACTS BOARD
(LEFT SIDE)

KEYBOARD SIGNALS
VERT. ver.: FROM/TO OPTICAL
CONTACTS BOARD CN4
GRAND PIANO ver.: FROM/TO
VALIS INTERFACE BOARD CN2

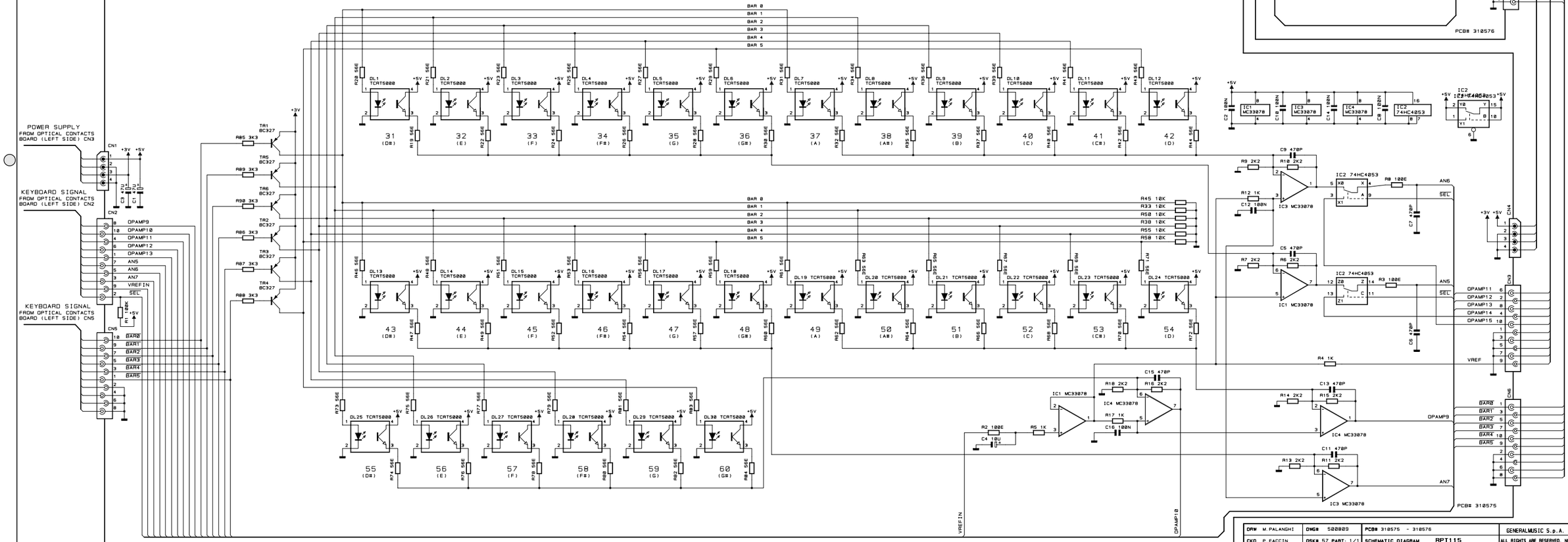
KEYBOARD SIGNALS
VERTICAL ver.: FROM/TO KEYBOARD
INTERFACE BOARD CN5
GRAND PIANO ver.:FROM/TO
VALIS INTERFACE BOARD CN1

DRW M.PALANGHI	DWG# 580819	PCB# 310577 - 310574	GENERALMUSIC S.p.A. ITALY
CKD R.GIORGI	DSK# 68 PART: 1/1	SCHEMATIC DIAGRAM RETTUBNO	
APP. G.GALANTI	REV: 22-10-97	OPTICAL CONTACTS BOARD (LEFT SIDE) KEYBOARD INTERFACE BOARD	

810559 - OPTICAL CONTACTS BOARD (RIGHT SIDE)



810560 - OPTICAL CONTACTS BOARD (CENTRAL SIDE)



DRW M.PALANGHI	DWG# 500889	PCB# 310575 - 310576	GENERALMUSIC S.p.A. ITALY
CKD P.FACCIN	DSK# 57 PART: 1/1	SCHEMATIC DIAGRAM RPT115 OPTICAL CONTACTS BOARDS (MID & RIGHT SIDE)	
APP. M.GALANTI	REV: 22-10-97		

Spare Parts List

Accessories

970183		230V AC/DC ADAPTER
271204		User's Manual

Various

660557		Control Box Chassis
653386		AUX & MIDI I\O Box
652238		2 Keys <+ -> Rubber Pad
347360		Gray/Black Knob
110285		Power Switch
660558		Cover
150021		Cord Lock
140036		Screw Block (specify contacts)
170975		Button to release the Keyboard Mechanicals Parts

Pedals Optical Contacts Board

810563		**Pedals Optical Contacts Board (PCB#310585)**
141011	*	6 Contacts Vert Female Connector
140918	*	2 Contacts Hor Male Connector
080900	*	Optoelectronic Reflex Sensor TCRT5000

CPU & Soumd Generator Board

761209		**CPU & Soumd Generator Board (PCB#315093)**
550638		Program EPROM
141018	*	20 Contacts Vert Female Connector
141012	*	Con V F 8 C P=1.27 Mmatch Amp
141011	*	6 Contacts Vert Female Connector
141010	*	4 Contacts Vert Female Connector
140929	*	9 Contacts Vert Male Connector
140889	*	Dual In Line Vert Male Strip (specify contacts)
106001	*	MC33078P Smd Dual LN J-Fet Operational Amplifier
105006	*	HD6413003F16 Cpu Smd F=16MHz
105002	*	DISP3 Digital Sound Processor
104022	*	32Mbit Sounds Rom Pro-Wave2
104021	*	CMOS SERIAL ACCESS 32KBIT (4096X8)
104020	*	HM62256AFP-7T SOP Sram 256K Ta=70nS
104012	*	32Mbit Sounds Rom Wave1
104010	*	HM514280AJ SOJ Dram 4M5bit Ta=70nS
103010	*	74HC04D SOIC Hex Inverter
103009	*	74HC02D SOIC Quad 2-In Nor Gate
103007	*	74HC74D SOIC Dual Flip-Flop
103004	*	AD1865R SOP 18bit D/A Converter
103002	*	74HC245DW Soic Octal Bus Transceiver
103000	*	74HC14D Soic Hex Inverter Schmitt Trigger
101501	*	74AC377DW SOIC Octal Dtype Flip Flop
081000	*	PMLL4148 Smd 100mA 75V Signal Diode
055102	*	33E X4 1/16w 5% Smd Resistor Array
055101	*	4K7 X4 1/16w 5% Smd Resistor Array
055100	*	100E X4 1/16w 5% Smd Resistor Array
050492	*	10Kx8 1/8w 5% Resistor Array
030565	*	220u 25V 20% Vert Electrolytic Capacitor
030245	*	10u 50V 20% Vert Electrolytic Capacitor
010727	*	45.1584MHz Quartz Resonator
010704	*	16MHz Quartz Resonator
010662	*	220p 10% 50V X8 Cap Array
010599	*	1u 50V -20+80% Ceramic Cap. Multilayer
140877		Jumper For Contacts Strip (p=2.54mm)

Power Supply & Phones Amplifier Board

730972		**Power Supply & Phones Amplifier Board (PCB#310586)**
141010	*	4 Contacts Vert Female Connector
140929	*	9 Contacts Vert Male Connector
140917	*	2 Contacts Vert Male Connector
140873	*	4 Contacts Vert Male Connector
140351	*	6 Contacts Hor Male Connector
140211	*	Horizontal Male Dc Socket
110305	*	Relay 12V / 2 Switch 1A 250V
100962	*	TDA 8542 2X1W BTL AUDIO AMPLIFIER
100919	*	MC33078 Dual LN J-Fet Operational Amplifier
100901	*	L4962 5-40V 1.5A Switching Regulator
090183	*	Bc550 To92 Ln Npn Transistor
090153	*	BC327 TO92 Pnp Transistor
090152	*	BC337 TO92 Npn Transistor
080241	*	5V6 1W 5% Zener Diode
080170	*	BYV27 2A 100V Fast Recovery Diode
080156	*	1N4002 1A 100V Rectifier Diode
080103	*	1N4148 100mA 75V Signal Diode
030805	*	2200u 25V 20% Vert Electrolytic Capacitor

Controls & Phones Board

730965		**Controls & Phones Board (PCB#310584)**
730966	*	**Display Boad (PCB#310583)**
140890	**	4 Contacts Hor Male Single-Strip
140529	**	Microswitch 12V 50mA 0.25mm
080717	**	HDN1105 7 Segments Display
080103	**	1N4148 100mA 75V Signal Diode
230569	*	FL5R200PNT EMI Coil For Signal
141018	*	20 Contacts Vert Female Connector
140917	*	2 Contacts Vert Male Connector
140877	*	Jumper For Contacts Strip (p=2.54mm)
140874	*	Single In Line Vert Male Strip (specify contacts)
140873	*	4 Contacts Vert Male Connector
140217	*	Horizontal Jack Stereo Slim Socket
140207	*	Horizontal Female Jack Socket
110321	*	2ways 6contacts Rotary Switch
090194	*	BC560 TO92 LN Pnp Transistor
080103	*	1N4148 100mA 75V Signal Diode
074699	*	50Kb C.C. 11mm Horr. Rotary Po

AUX & MIDI I\O Board

730683		**AUX & MIDI I\O Board (PCB#310551)**
230569	*	FL5R200PNT EMI Coil For Signal
230527	*	BL02RN2-R62 EMI Coil For Signal
141010	*	4 Contacts Vert Female Connector
140917	*	2 Contacts Vert Male Connector
140351	*	6 Contacts Hor Male Connector
140217	*	Horizontal Jack Stereo Slim Socket
140216	*	Horizontal Female 6 Poles Din Socket
140212	*	Horizontal Female 5 Poles Din Socket
100602	*	74HC04 Hex Inverter
100035	*	6N138 Optocoupler
090194	*	BC560 TO92 LN Pnp Transistor
080103	*	1N4148 100mA 75V Signal Diode

Optical Contacts Assembly

720525		Optical Contacts Assembly
810561		**Optical Contacts Board (Left Side) (PCB#310574)**
141018	*	20 Contacts Vert Female Connector
141013	*	Con V F 10c P=1.27 Mmatch Amp
140872	*	4 Contatcs Hor Male Connector
100919	*	MC33078 Dual LN J-Fet Operational Amplifier
100626	*	74HC4053 3x2ch Analog Multiplexer
090153	*	BC327 TO92 Pnp Transistor
080900	*	OPTOELECTRONIC REFLEX SENSOR TCRT5000
810560		**Optical Contacts Board (Middle Side) (PCB#310575)**
141013	*	Con V F 10c P=1.27 Mmatch Amp
140872	*	4 Contatcs Hor Male Connector
100919	*	MC33078 Dual LN J-Fet Operational Amplifier
100626	*	74HC4053 3x2ch Analog Multiplexer
090153	*	BC327 TO92 Pnp Transistor
080900	*	OPTOELECTRONIC REFLEX SENSOR TCRT5000
810559		**Optical Contacts Board (Right Side) (PCB#310576)**
141013	*	Con V F 10c P=1.27 Mmatch Amp
140872	*	4 Contatcs Hor Male Connector
100919	*	MC33078 Dual LN J-Fet Operational Amplifier
090153	*	BC327 TO92 Pnp Transistor
080900	*	OPTOELECTRONIC REFLEX SENSOR TCRT5000
660579		Optical Contacts Board Support

Keyboard Interface Board

761148		**Keyboard Interface Board (PCB#310577)**
141018	*	20 Contacts Vert Female Connector
141011	*	6 Contacts Vert Female Connector
140918	*	2 Contacts Hor Male Connector
140874	*	Single In Line Vert Male Strip (specify contacts)
140872	*	4 Contatcs Hor Male Connector
104019	*	ST24W02 Smd 2Kbit Serial Access EEprom
100626	*	74HC4053 3x2ch Analog Multiplexer
100619	*	74HC32 Quad 2-Input Or Gate
100610	*	74HC245 Octal Bus Transceiver
100066	*	LM317 1.2-37V 1.5A Adjustable Regulator
010726	*	19.2MHz Ceramic Resonator With Capacitors
010662	*	220p 10% 50V X8 Cap Array
550645		IC MICRO H8/329 PROG.<VALIS-O RPT 115> 100746
140877		Jumper For Contacts Strip (p=2.54mm)

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.