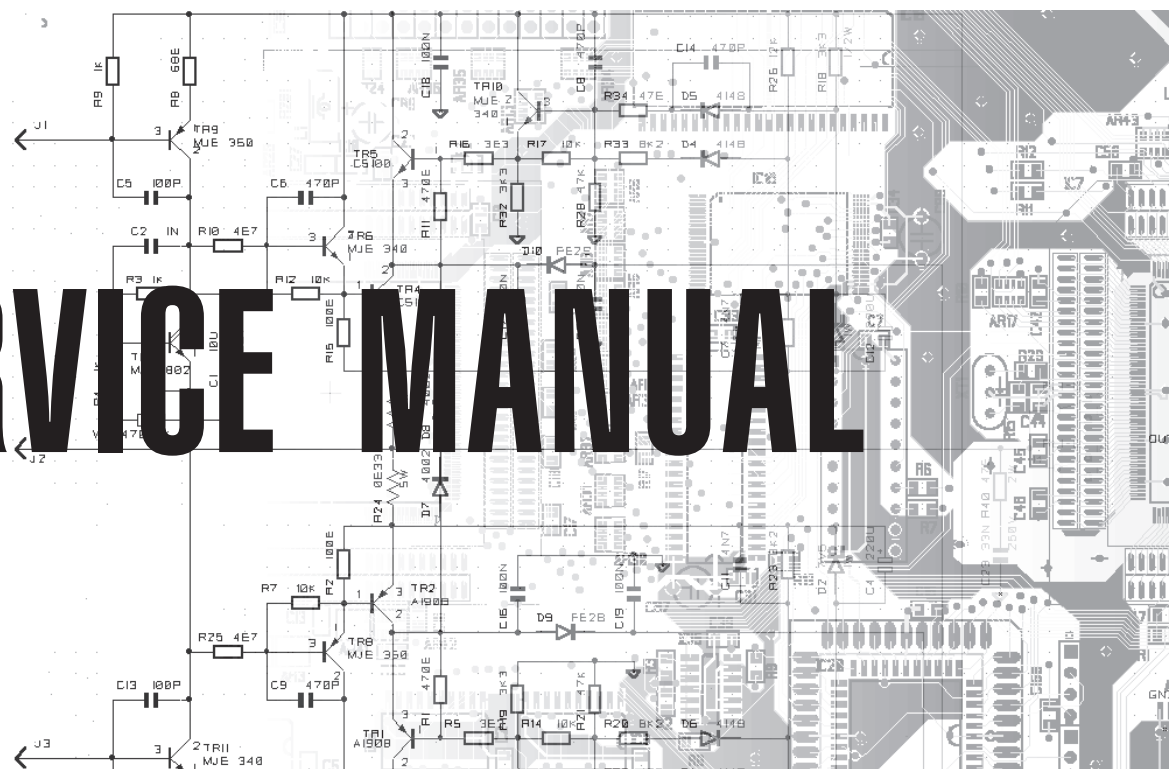




Second Edition

SERVICE MANUAL



Index

- 2 Opening & Keyboard Disassembling Instructions
- 3 Assembly & Wiring Connections
- 4 Block Diagram
- 5 Keyboard Contacts and Controls Panel Boards
- 6 Power Amplifier & Supply, MIDI & Controls I/O, Phones and Hard Disk Interface Boards
- 7 CPU & Sound Generator Board supplies, ROM Expansion Board, Autotest Procedure
- 8 CPU & Sound Generator Board
- 9 Vocal Processor Board
- 10 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 20KOhm/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>



▲ CODE: 270195 ▼

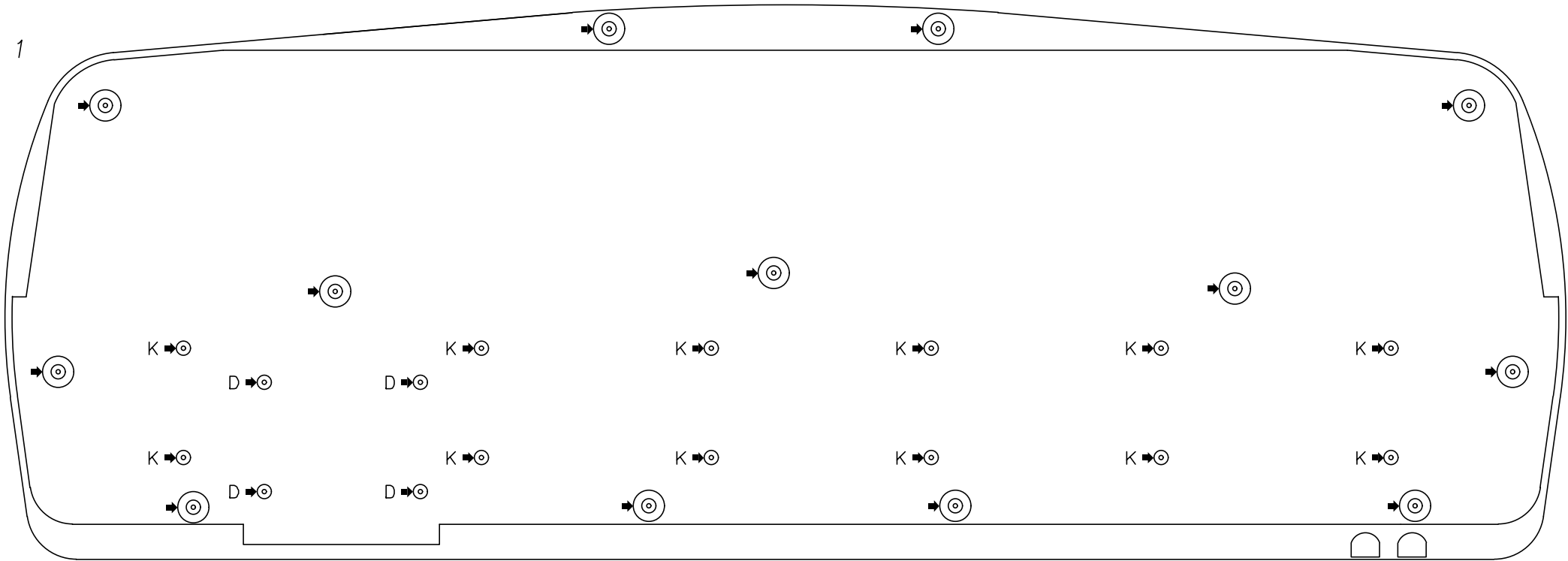
Opening Instructions
refer to fig. 1

To open the instrument remove the screws marked by ➡

To separate the keyboard from chassis remove the screws marked by K ➡ (open the instrument before proceed)

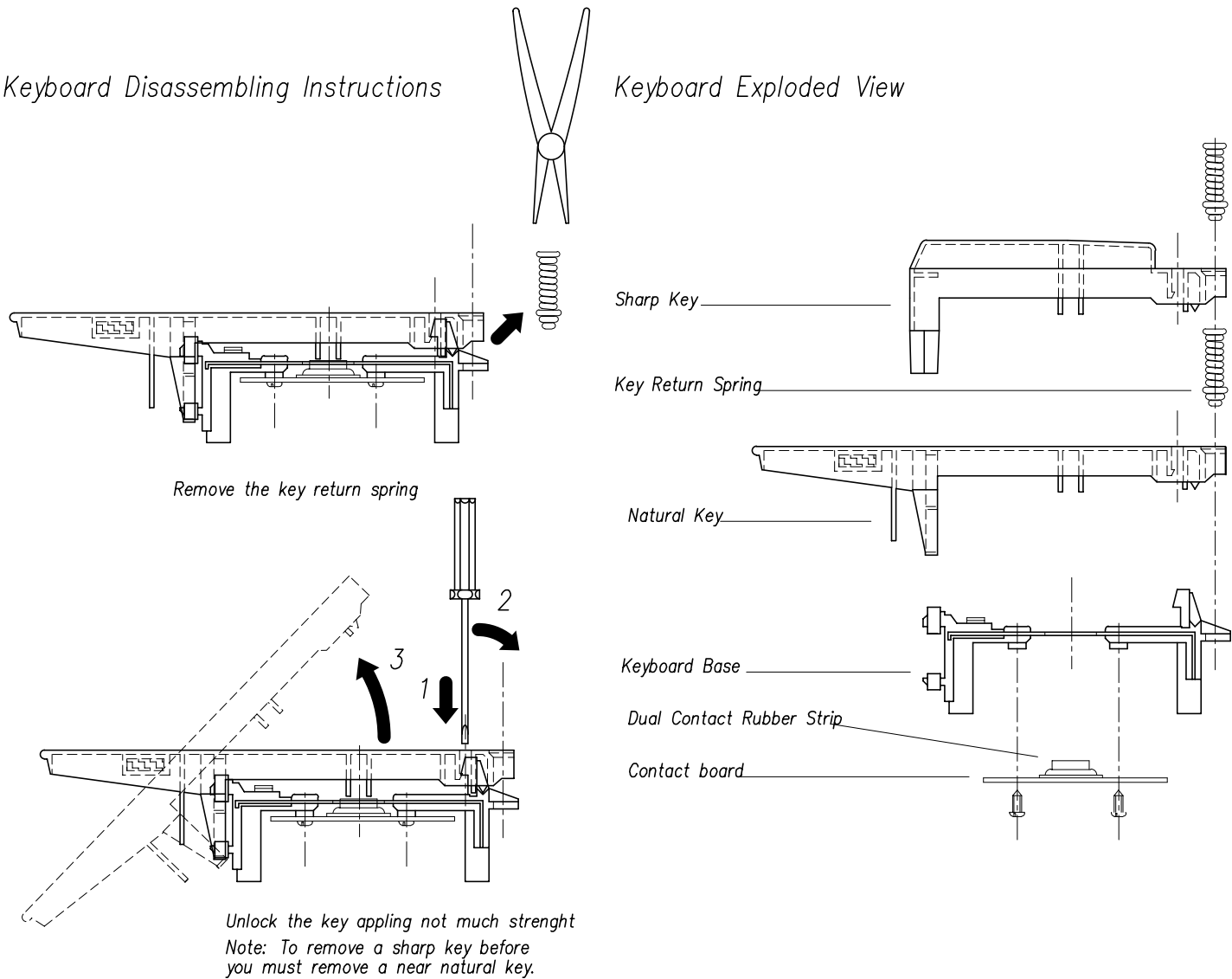
To access to the Disk Drive remove the screws marked by D ➡

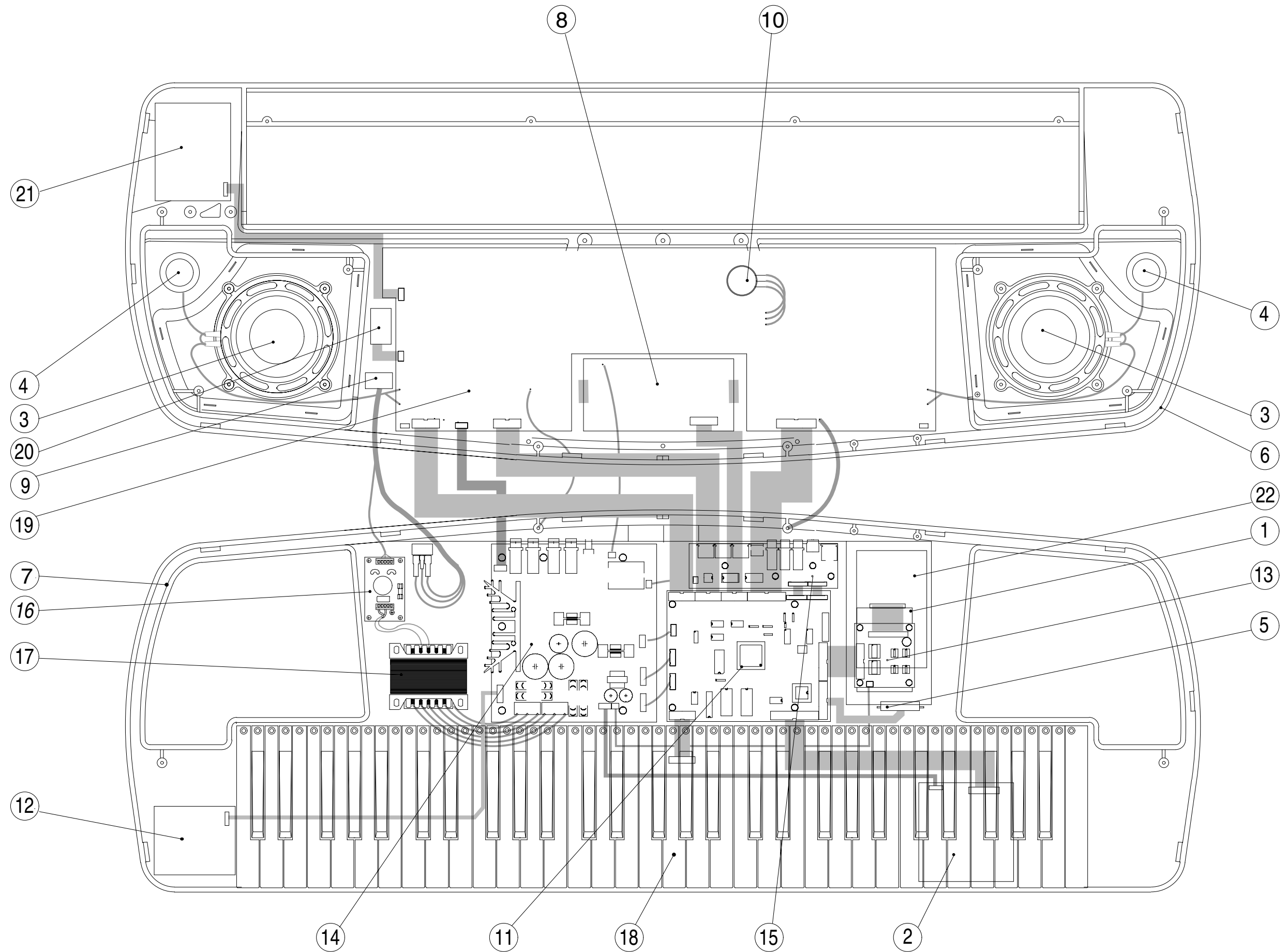
Fig. 1

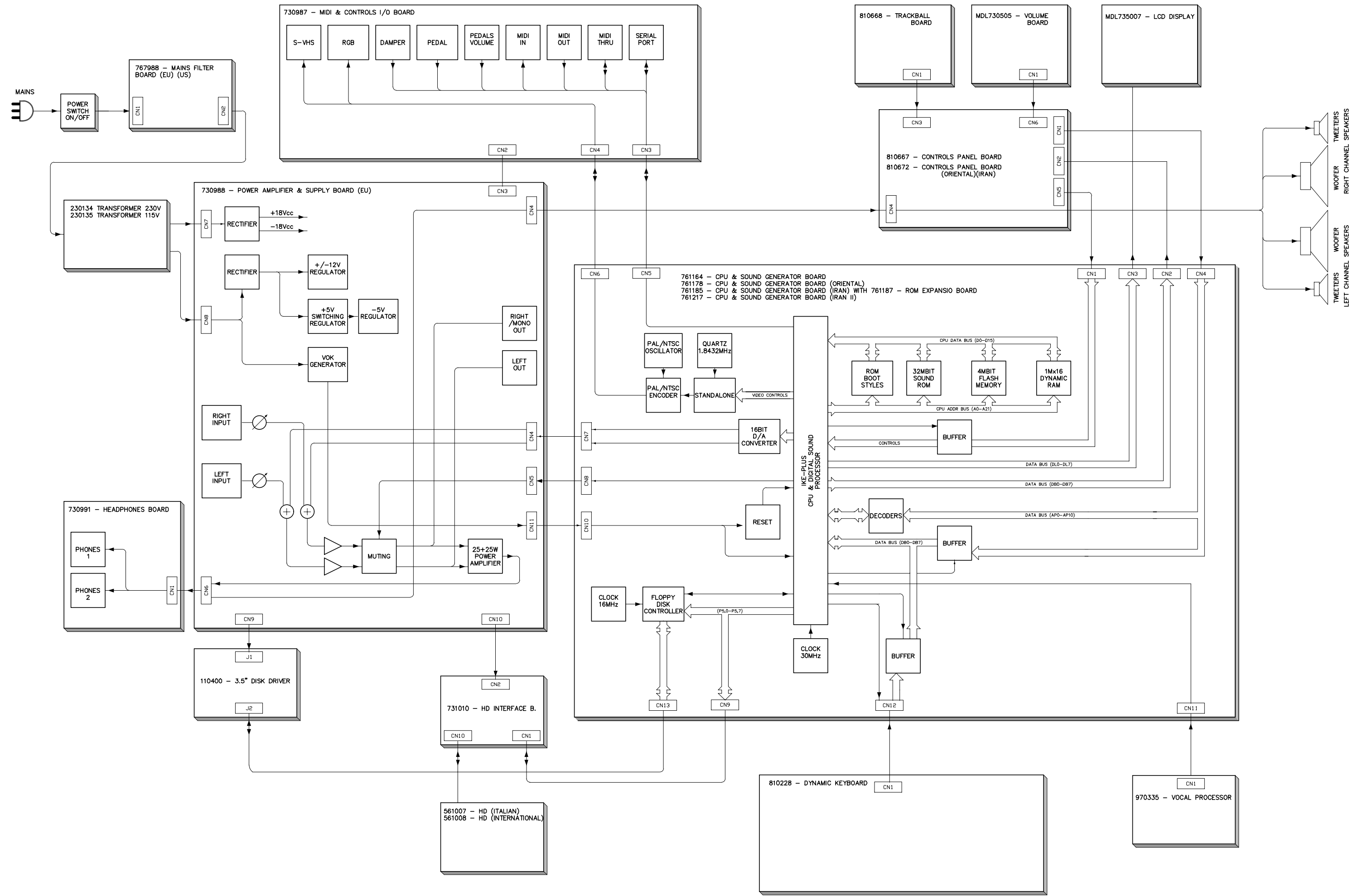


Keyboard Disassembling Instructions

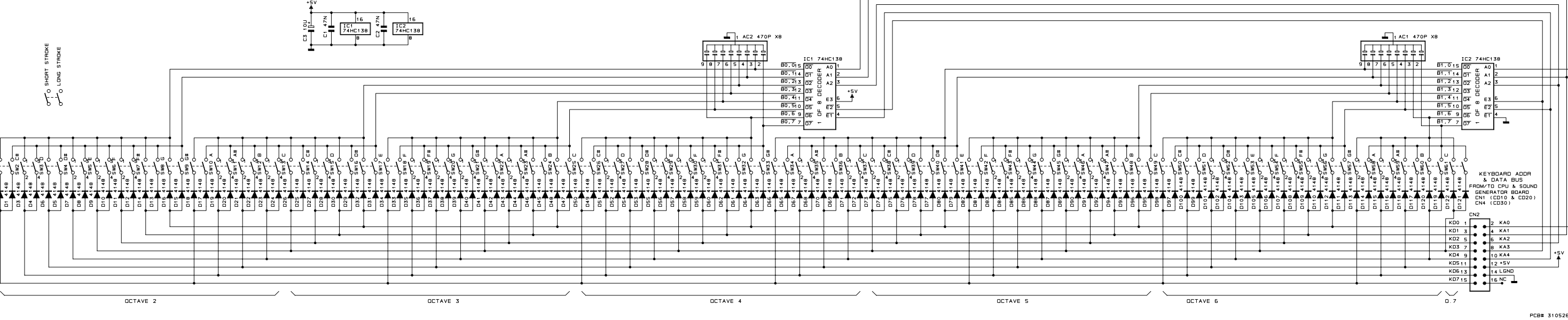
Keyboard Exploded View



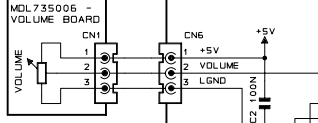
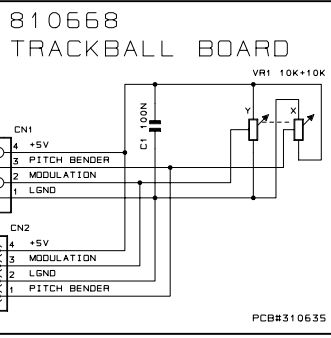
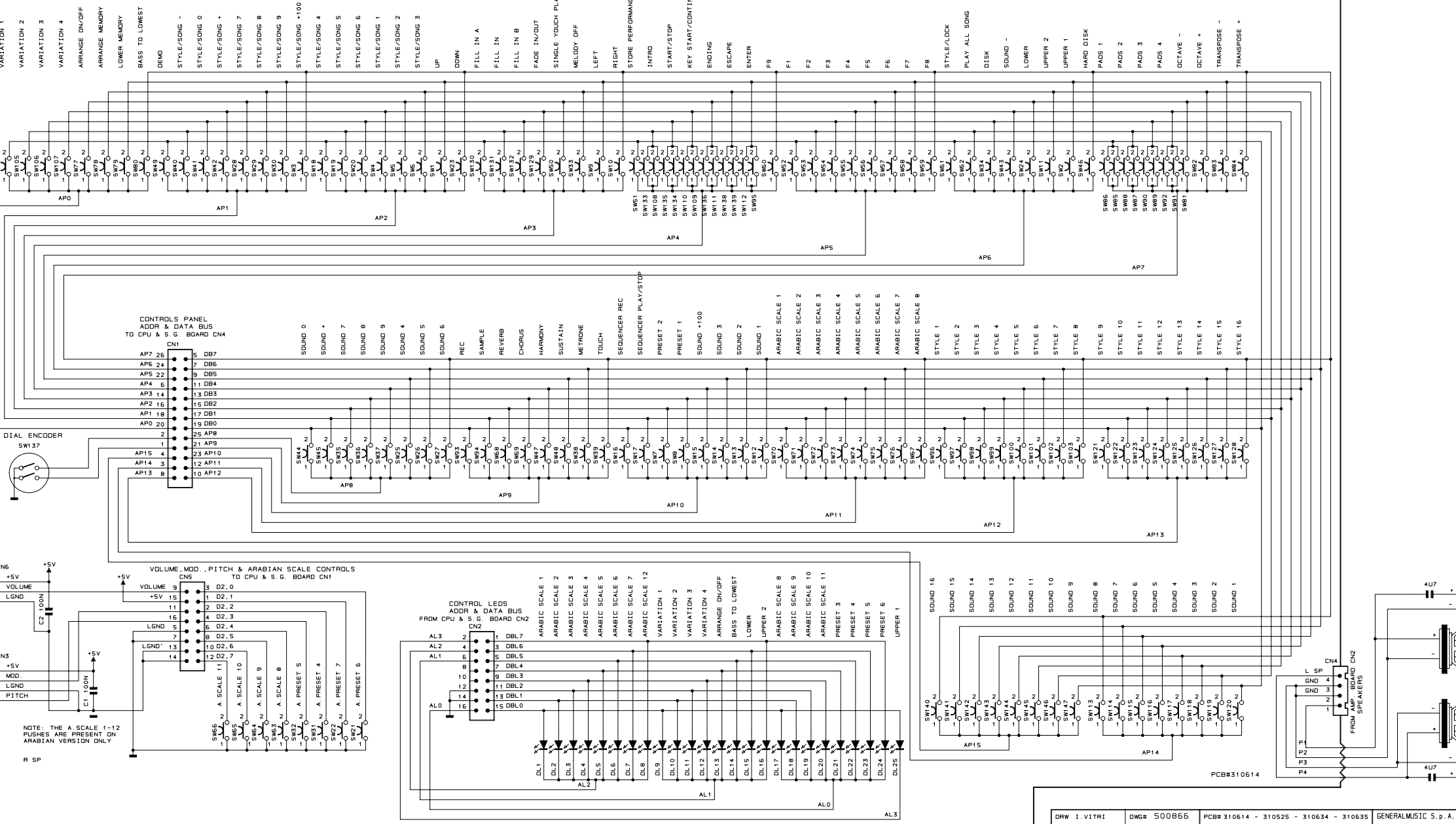


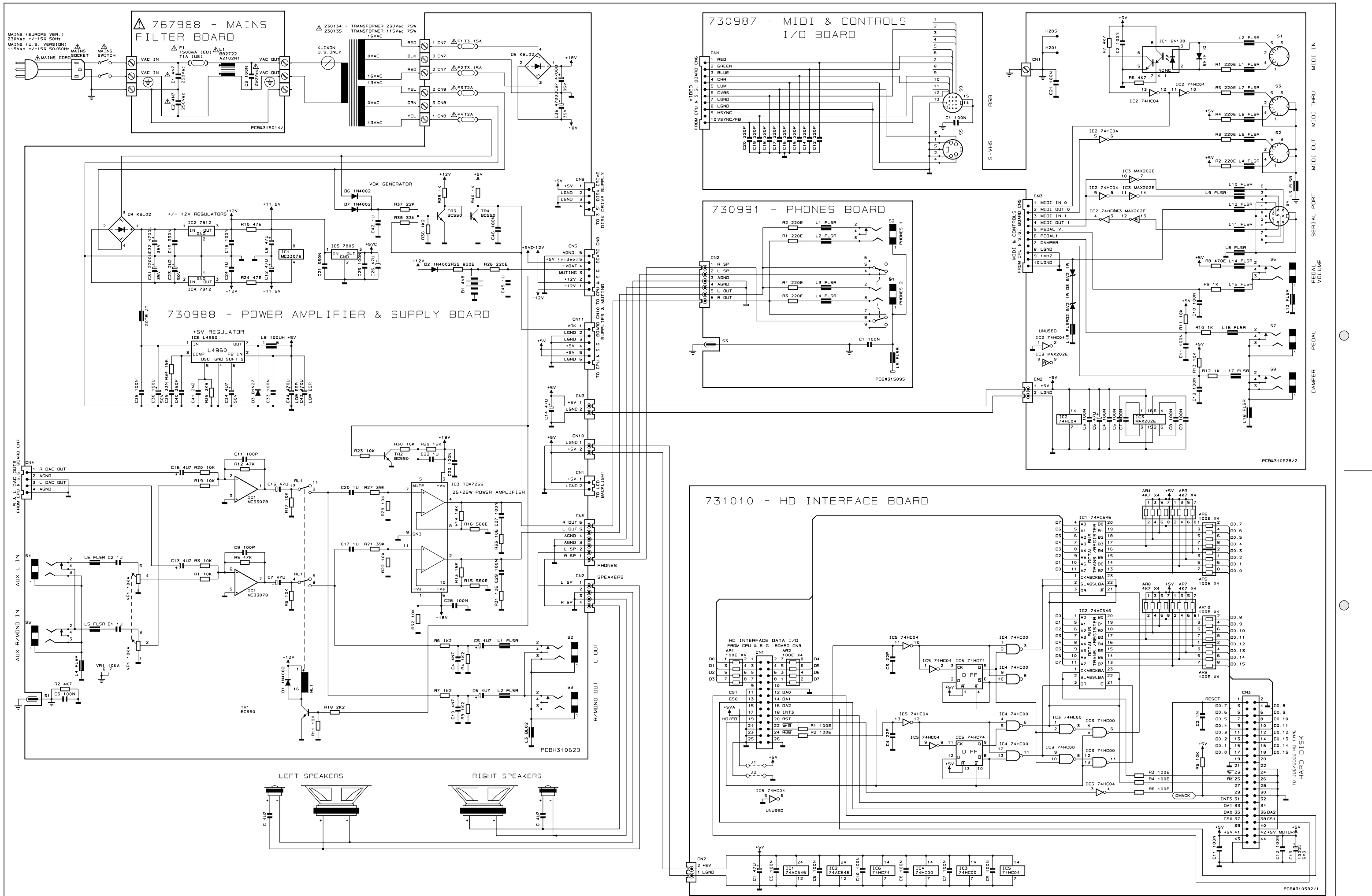


810288 - CONTACT BOARD (DYNAMIC KEYBOARD 61 NOTES)
(ALL MODELS)



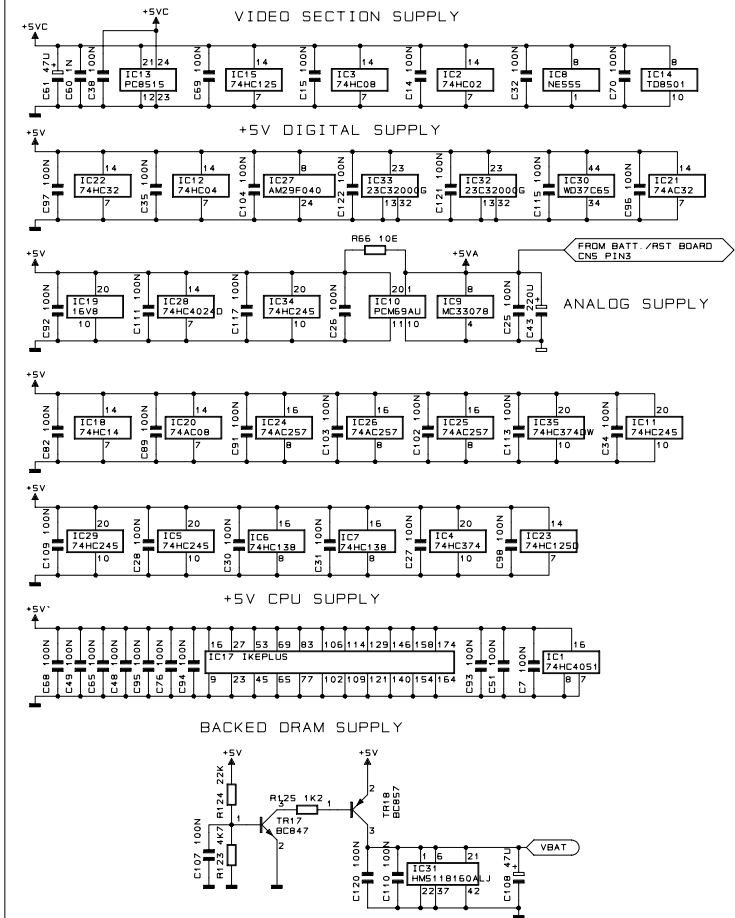
810667 - CONTROLS PANEL BOARD
810672 - CONTROLS PANEL BOARD (ORIENTAL) (IRANIAN)





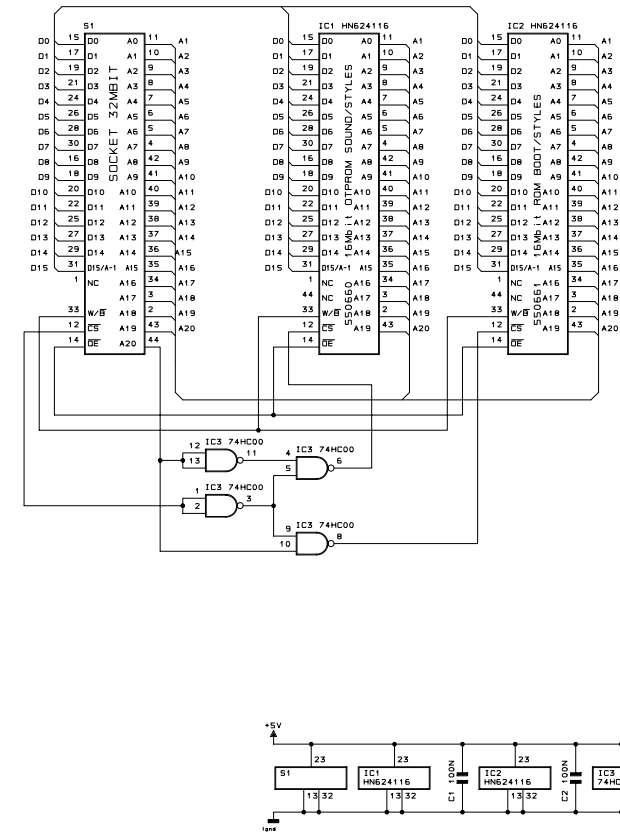
DRW G. BOCCATO	DWG# 500867	PCB# 310629 310628/2 315095 310592/1	GENERALMUSIC S.p.A.
CKD I. VITRÀ	DATE 15-07-99	DESCRIPTION PWR AMP & SUPPLY, MIDI & CTRL I/O HARD DISK INTERFACE AND PHONES BOARDS	ALL RIGHTS ARE RESERVED. NO COPIES OR REPRODUCE THIS DOCUMENT WITHOUT WRITTEN CONSENT BY GENERALMUSIC
APP R. MORBIDI	REV# A		

CPU & SOUND GENERATOR BOARD (PART 2 OF 2)



DRW	VITR1	DWG#	500860B	PCB#	310615/1	GENERALMUSIC S.p.A.
DEPT.	KEYBOARDS	DATE	18/05/98	DESCRIPTION	WK2 - WK2 or ientia	ALL RIGHTS ARE RESERVED, NO COPIES OR REPRODUCE THIS DOCUMENT WITHOUT WRITTEN CONSENT BY GENERALMUSIC
PART#	2 OF 2	REV#	B	CPU & SOUND GENERATOR BOARD		

761187 - ROM EXPANSION BOARD (IRAN)



DRW	G. BOCCATO	DWG#	500857	PCB#	310639	GENERALMUSIC S.p.A.
CKD	I. VITR1	DATE	14/05/98	DESCRIPTION	ROM EXPANSION BOARD	ALL RIGHTS ARE RESERVED, NO COPIES OR REPRODUCE THIS DOCUMENT WITHOUT WRITTEN CONSENT BY GENERALMUSIC
APP	R. MORRISDI	REV#		IRAN VERSION ONLY		

AUTOTEST PROCEDURE

This procedure are not intended to repair a fault but only to check the proper instrument operations after a repairing execution. The procedures that follow must be executed in the order specified.

Instrument and Tools

- 1) Dual trace oscilloscope.
- 2) Midi cable.
- 3) Television with RGB and S-VHS input sockets compatible with PAL and NTSC standards.
- 4) S-VHS cable.
- 5) DIN/SCART cable.
- 6) DIN/RCA cable.
- 7) Volume pedal.
- 8) Latest version of the appropriate Operating System Disk.
- 9) Dynamic microphone to check WK2 with Vocal Processor installed.
- 10) N.1 stereo jack plug.
- 11) N.2 mono jack plug.

Setup

- Connect the television by RGB and S-VHS sockets.
- Connect the dynamic microphone to the Vocal Processor MIC socket if present.
- Connect the stereo jack to the PHONES 2 output.
- Connect the mono jack to the LEFT and RIGHT OUTPUTS.

Operating System Check

- Turn on the instrument.
- The instrument starts with the video output set on PAL mode by default. Set TV input on RGB mode, on the TV screen must appear the welcome message:

GEN WK2 World Keyboard

- Place the cursor on "GENERAL" pressing the cursor DOWN button, press cursor PAGE NEXT button until the release date of the operating system loaded is displayed, it must correspond to the latest release date.
- If an update is required put the Operating System disk into the disk drive and turn on again the keyboard, the display shows "LOAD O.S." then press ENTER to confirm.
- NOTE: After any servicing operation an operating system re-loading is recommended.

Autotest Procedure

- Press UPPER 1, PADS 2 3 and 4 buttons simultaneously to reset the instrument, the display shows "SysRESET" and during the time of "Wait..." message appears press F1 repeatedly and quickly: the instrument re-starts in autotest mode and "AutoTEST" and "TEST (F1)" messages appear.

Ram Autotest

- Press F1 key to start the RAM test, the display shows "RAM TEST" during the procedure and shows "OK! (F1)" when terminate successful.

Controls Panel Autotest

- Press again F1 to start the LEDs test. Each LED lights up sequentially.
- Press F1 to start the button test, press all the buttons except F1, every time you press a button the display shows the corresponding identification code and the instrument plays a note.
- Finally Press F1 and instrument re-start again.

Right & Left Outputs Check

- Check the level from the output sockets as follow:
- Connect the dual trace oscilloscope to the tip and sleeve contacts of the stereo jack plugged into PHONES 2, set it at 2ms/div. 2V/div.
- Select "GENERAL" with UP and DOWN cursor keys at the left of the display.
- Press cursor PAGE> button until the display shows "80:Key Tch".
- Rotate the DIAL clockwise until the display shows "OFF:Key Tch".
- Press 68 on SOUNDS numeric keypad, the display will show "68:OBOE".
- Disable REVERB and CHORUS by pressing their correspondent buttons.
- Set MASTER VOLUME potentiometer to its maximum.
- Play the note key C6 (61 note keyboards normally starts from C2) and verify with the oscilloscope the output levels: their must be 9.6±0.5Vpp.
- Move the oscilloscope probes to the two mono jacks plugged into R & L OUTPUTS, the scope shows two traces with 1.0Vpp ±5% each.

Pedals Check

- Plug in the PEDAL VOLUME to its socket, it vary the level from 0 (no sound) to the level set by MASTER VOLUME potentiometer.
 - Plug in the switch pedal to the DAMPER jack socket, press down the pedal and then press a note key: the instrument plays the note, release the note key and the sound holds on, release the pedal and the sound shuts off.
 - Plug in the switch pedal to the PEDAL jack socket, press down the pedal and a rhythm starts, press again the pedal and the rhythm stops.
- NOTE: the type of pedal (normally closed or normally open) is recognized at the moment of a SysReset or when the instrument is switched on, the instrument assumes that the pedal is normally open if none pedal is plugged into the socket, this is the reason because a pedal normally closed plugged after you have switched on the instrument operates in opposite way.

Midi In/Out Check

- Set on UPPER 1 section only and make a loop between MIDI OUT and IN by means the midi cable.
- Set UPPER 1 to local off following the procedure explained below:
 - Select "MIDI/GENERAL" with cursor UP and DOWN keys.
 - Press PAGE> until display shows "MidiENT".
 - Press ENTER, the display shows ""Channel".
 - Press + on SOUNDS numeric keypad one time and display shows "Local".
 - Press F8, the display shows "On:Track 08".

- Rotate the DIAL until display shows "Off:Track 08".
- Now each keyboard event will be send thru the midi external loop and played by the internal generation.
- Restore the local on rotating the DIAL until display shows "On:Track 08", and then press ESCAPE three times.

Computer Socket Check

- Set the keyboard on COMPUTER MODE pressing the following buttons:
 - Select "GENERAL" with UP and DOWN cursor keys.
 - Press cursor PAGE> until display shows "OFF: Serial".
 - Rotate the DIAL until display shows "MAC: Serial"
 - Connect the CH1 probe of the oscilloscope at PIN 1 of the COMPUTER socket and its ground clip at PIN 4, set it at 200uS/div. 2V/div.: the trace must show a 1MHz signal with 5V of amplitude centred on 0V (±2.5V).
 - Connect the CH2 probe of the oscilloscope at PIN 6 of the COMPUTER socket and its ground clip at PIN 4, set it at 500uS/div. 10V/div.: playing some notes on the keyboard, the CH2 oscilloscope trace must show a sequence of pulses with 24V of amplitude centred on 0V.
- Rotating the DIAL select "PC1" or "PC2" to configure the instrument link for a PC.
- Playing some notes on the keyboard you must see the same previous pulses onto the oscilloscope screen.
- Press ESCAPE.

Outputs Video Check

- **NTSC mode, RGB Selection**
 - Select NTSC mode on the instrument as follow:
 - Select "GENERAL" with UP and DOWN cursor keys at the left of the display.
 - Press PAGE> cursor until display shows "TV=PAL"
 - Rotate the DIAL until display shows "TV=NTSC", on TV screen must appear the following message:

GEN WK2 World Keyboard

- wrote larger than in the previous PAL setting.
- Disconnect or deselect the RGB input and select the S-VHS input (YC3) on TV.
- **NTSC mode, S-VHS Selection**
 - Adjust if necessary the colours and the flicker on TV rotating the C17 capacitor trimmer.
- **PAL mode, S-VHS Selection**
 - Select PAL mode rotating the DIAL until display shows "TV=PAL".
 - Adjust if necessary the colours and flickers on TV rotating the C18 capacitor trimmer.
 - Press ESCAPE button.
 - Reconnect or reselect the RGB input to the TV.

Hard Disk Check (if present)

- Verify Hard Disk "Direct load" operation as follow :
- Eject any 3.5" diskette from its drive if present.
- Press HARD DISK key, display shows the first partition name.
- Press ENTER and the display will show the name of a song.
- Press START/STOP and the song will start to play in "Direct" mode (reading data direct from HD), hear the song for few seconds ad press START/STOP key again.

Vocal Processor Check (if present)

- Press VOCAL P and an arrow will appear on the display.
- Press EQUAL/MIC button, display shows "MIC OFF" .
- Press "+" button on SOUNDS numeric keypad to activate the microphone, the display message change to "MIC ON" and speak some words into the microphone.
- Rotaing the DIAL verify microphone volume changes.
- Press "-" button to de-activate the microphone.

Ram Back Up Check

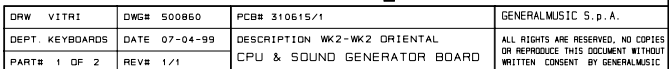
- Press TRANSPOSE "#" and display shows below TRANSPOSE "1".
 - Switch off the instrument and wait at least 20 sec. When you switch on the instrument be sure display shows the same "TRANSPOSE" number.
- NOTE: the instrument have an internal re-chargeable NiCd battery that insures the data backup for a maximum of 30 days, therefore it is recommended to hold switched on the instrument for at least 8-10 hours after a long time of inactivity.

Reset Procedure

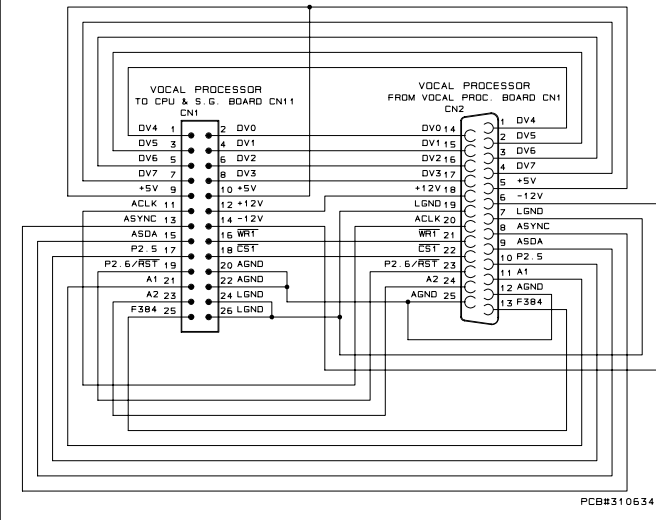
- Press UPPER 1, PADS 2 3 and 4 buttons simultaneously to reset the instrument.

Reliability Check

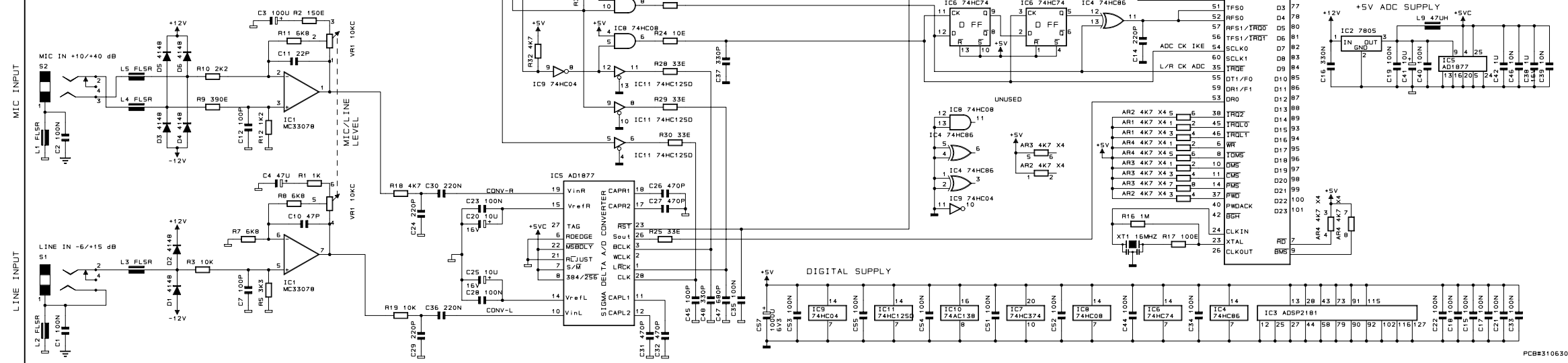
Before reassembling the instrument and before deliver it to the user, it is a goal verify its reliability:
To do that switch it off, or leaving it switched on but operating with greatest caution, carefully shake the boards and connections inside it using an insulated tool (for example the handle of the screwdriver) to find wrong contacts and so on.
Turn on the instrument and verify that it operates correctly.
Finally leave it switched on for a long time verifying its functionality occasionally.



730690 - VOCAL PROCESSOR CONNECTION BOARD



761176 - VOCAL PROCESSOR BOARD



Spare Part List
Legend
EU = Specify European Version (230Vac)
US = Specify United States Version (115Vac)
Oriental = Specify Oriental Version only
Iran = Specify First Iran Version only
Iran II = Specify Second Iran Version only

Ref. Code	Description
Optional Accessories	
970234	Carring Bag
970110	X-Metal Stand
970116	Single Foot Switch
970080	Triple Foot Switch
970134	Piano Single Foot Switch
970107	Volume Pedal

Accessories	
955923	Operating System Disk
955916	Operating System Disk (Oriental)
955930	Operating System Disk (Iran)
955944	Operating System Disk (Iran II)
955910	Demo Disk
955915	Demo Disk (Oriental)
955929	Demo Disk (Iran)(Iran II)
271211	Owner's Manual (All Languages)
271244	Owner's Manual (English-Arabic) (Oriental)
271285	Owner's Manual (English-Iranian) (Iran)(Iran II)
271242	International HD Contents Manual
271239	Italian HD Contents Manual
271275	Owner's Manual Addendum (English-Arabic) (Oriental)
130317	DIN/SCART Video Cable (Pal-EU)
130428	DIN/RCA Video Cable (Ntsc-U.S.)
130297	Mains Cable (EU)
130283	Mains Cable (US)

Cabinet	
	660513 Audio/Video Slot Closer
	660596 Vocal Processor Slot Closer
	660283 Right Speaker Grid
	660282 Left Speaker Grid
	660281 Tweeter Grid
	653424 Display Screen
6	653422 Top Chassis
6	653423 Top Chassis (Oriental)
6	653448 Top Chassis (Iran)(Iran II)
7	653421 Bottom Chassis
1	561008 Hard Disk with International Contents
1	561007 Hard Disk with Italian Contents
	340905 HD Suspension Rubber
8	MDL735007 Coloured LCD Display
9	MDL345020 Mains Switch Actuator
	MDL345018 Diak Knob
	MDL345017 Volume Knob
	MDL345019 Music Stand
	340501 Right Speaker Box Gasket
	340498 Left Speaker Box Gasket
	340078 Insulated Bush
3	220110 4ohm 30W 5" Woofer Speaker
4	220109 4ohm 25W 2" Dome Tweeter Speaker
	210254 Speaker Filler
	210250 5" Speaker Gasket
	210217 Black Sealer (specify mt)
	190015 Adhesive Rubber Foot
	180774 "HARD DISK" Adhesive Plate
	171639 HD and Interface Board Support
	171534 Support for Vocal Processor Cover
5	171378 Support for Vocal Processor Connector
	120960 Dial Steel Sphere
2	110400 3.5" Disk Drive
10	110254 Rotary Encoder With Snap

Mains Filter & Transformer Assembly		
16	730513	Mains Filter & Transformer Assembly (EU)
16	730522	Mains Filter & Transformer Assembly (US)
	767988	* Mains Filter Board (PCB#315014) (EU)(US)
	230568	** 10mH 250Vac 1A AC Line EMI Coil "Siemens"
	140010	** 3 Contacts P=10 Vert Terminal Block
	110119	** Fuse Clip (EU)(US)
	020493	** 100n 250Vac MKP EMI Capacitor "Siemens"

	010545	** 4n7 250V Ceramic Capacitor (Iec-UI-Csa)
17	230134	* Transformer 230Vac 75W (EU)
17	230135	* Transformer 115Vac 75W (US)
	110614	* Mains Socket
	110017	* T500mA Fuse 5x20mm (EU)
	110082	* T1A Fuse 6.3x32mm (US)

Power Amplifier & Supply Board		
	110083	* T2A Fuse 6.3x32mm (US)
	110061	* T3.15A Fuse 6.3x32mm (US)
	110010	* T2A Fuse 5x20mm (EU)
	110003	* T3.15A Fuse 5x20mm (EU)
14	730988	Power Amplifier & Supply Board (PCB#310629)
	230569	* FL5R200PNT EMI Coil For Signal
	230527	* BL02RN2-R62 EMI Coil For Signal
	230524	* 100uH Switching Coil
	140217	* Jack Stereo Slim Horizontal Socket
	140010	* 3 Contacts P=10 Vert Terminal Block
	110305	* Relay 12V / 2 Switch 1A 250V
	110300	* 4.8V 280mAh Nicd Battery
	110119	* Fuse Clip 10A max (EU) (US)
	100958	* TDA7265 Dual 25W Power Amplifier
	100919	* MC33078 Dual LN Operational Amplifier
	100900	* L4960 5-40V 2.5A Switching Regulator
	100059	* 7805 +5V 1A Voltage Regulator
	100045	* 7812 +12V 1A Voltage Regulator
	100043	* 7912 -12V 1A Voltage Regulator
	090183	* BC550 TO92 LN Npn Transistor
	080605	* KBL02 4A 200V Rectifier Diode Bridge
	080170	* BYV27 2A 100V Fast Recovery Diode
	080156	* 1N4002 1A 100V Rectifier Diode
	070611	* 2x10K Log Rotary Potentiometer

Phones Board		
12	730991	Phones Board (PCB#315095)
	230569	* FL5R200PNT EMI Coil For Signal
	140231	* Jack Stereo Horizontal Socket (with dual switch)
	140217	* Jack Stereo Slim Horizontal Socket
	010595	* 100n 50V -20+80% Ceramic Cap. Multilayer

Keyboard Assembly		
18	720552	Keyboard Assembly
	810288	* 61N Contacts Board (PCB#310526)
	340212	** 13 Dual Contact Rubber Strip
	340211	** 12 Dual Contact Rubber Strip
	140854	** 16 Contacts Vert Male Connector
	100606	** 74hc138 1 Of 8 Decoder
	080103	** 1N4148 100mA 75V Signal Diode
	030245	** 10u 50V 20% Vert Electrolytic Capacitor
	010660	** 470p 10% 50V X8 Cap Array
	500073	* Mechanical Assembly
	160215	** Keys Return Spring
	151212	** Sharp Key
	151213	** Last C Key
	151211	** B Key
	151210	** A Key
	151209	** G Key
	151208	** F Key
	151207	** E Key
	151206	** D Key
	151205	** C Key

Controls Panel Board		
19	810667	Control Panel Board (PCB#310614)
19	810672	Control Panel Board (PCB#310614) (Oriental)(Iran)(Iran II)
	MDL145034	* 4 Contacts Vert Male Connector
	MDL145033	* 3 Contacts Vert Male Connector
	140882	* 26 Contacts Vert Male Connector
	140854	* 16 Contacts Vert Male Connector
	080752	* Led 3mm Wide Diffused Red
	653437	* <Track-Vocal Mute> Rubber Pad
	653436	* <Display> Rubber Pad
	653435	* <Style/Song> Rubber Pad
	653434	* <Sequ./Utility> Rubber Pad
	340900	* <Arabic Scale> Rubber Pad (Oriental)(Iran)(Iran II)
	340899	* <Sampling> Rubber Pad
	340897	* <Transpose> Rubber Pad
	340895	* <Arrange/Var.> Rubber Pad
	340890	* <Enter/Escape> Rubber Pad
	340889	* <Start/Stop> Rubber Pad
	340896	* <Style/Sound> Rubber Pad

20	MDL735006	Volume Board
CPU & Sound Generator Board		
11	761164	CPU & Sound Generator Board (PCB#310615)
11	761178	CPU & Sound Generator Board (PCB#310615) (Oriental)
11	761185	CPU & Sound Generator Board (PCB#310615) (Iran)
11	761217	CPU & Sound Generator Board (PCB#310615) (Iran II)
	230582	* LC Delay Line 400ns 0.5MHz
	140925	* 22 Contacts P=1.27mm Female Vert Strip
	140882	* 26 Contacts Vert Male Connector
	140866	* 34 Contacts Vert Male Connector
	140854	* 16 Contacts Vert Male Connector
	106002	* NE555 Timer
	106001	* MC33078P SOIC Dual Low Noise Op. Amp.
	106000	* TDA8501 PAL/NTSC Encoder
	105011	* IKEPLUS PLCC Integrated Cpu and Dsp
	104038	* 16Mbit Rom Boot/Styles
	104048	* 32Mbit Rom Boot/Styles (Iran II)
	104032	* 32Mbit Rom Sound
	104026	* AM29F040-75EC TSOP 4Mbit Flash Memory Ta=70nS
	104009	* HM5118160ALJ 16Mbit Dram Ta=70nS
	103030	* 74HC32D SOIC Quad 2-In Or Gate
	103029	* 74HC4024D SOIC 7-Stage Binary Counter
	103019	* PCA8515 SOIC Standalone OSD
	103017	* 74HC4051DW SOIC 8ch Analog Multiplexer
	103013	* 74HC138D SOIC 1 Of 8 Decoder
	103012	* 74HC125D SOIC Quad Tri-State Buffer
	103010	* 74HC04D SOIC Hex Inverter
	103009	* 74HC02D SOIC Quad 2-In Nor Gate
	103008	* PCM69AU SOIC 2ch 1bit Dac
	103003	* 74HC374DW SOIC Octal D-Type Flip-Flop
	103002	* 74HC245DW SOIC Octal Bus Transceiver
	103001	* 74HC08D SOIC Quad 2-Input And Gate
	103000	* 74HC14D Soic Hex Inverter Schmitt Trigger
	101508	* 74AC32 SOIC Quad 2-Input Or Gate
	101505	* 74AC08 SOIC Quad 2-input And Gate
	101504	* 74AC257 SOIC Quad 2-input Multiplexer
	100591	* GM82C765B Floppy Disk Controller
	100588	* GAL16V8AS-15 GAL Ta=25ns
	091002	* PMBT2369 TO236 Smd Npn Transistor
	091001	* BC857 TO236 Smd Pnp Transistor
	091000	* BC847 TO236 Smd Npn Transistor
	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
	011502	* 470pF x4 10% 100V NP0 Smd Capacitor Array
	011501	* 220pF x4 10% 100V NP0 Smd Capacitor Array
	011500	* 47p x4 10% 100V NP0 Smd Capacitor Array
	010730	* 4.433619MHz Quartz Resonator
	010729	* 3.579545MHz Quartz Resonator
	010721	* 1.8432MHz Quartz Resonator
	010714	* 30MHz Quartz Resonator
	010704	* 16MHz Quartz Resonator
	010602	* 5p2-30pF N750 Ceramic Capacitor Trimmer
	010599	* 1u 50V -20+80% Ceramic Cap. Multilayer
	560018	* Programmed GAL16V8
	761187	Rom Expansion Board (Pcb#310639) (Iran)
	550661	* 16Mbit OTPROM Boot (Iran)
	550660	* 16Mbit OTPROM Styles (Iran)
	140494	* 22 Contacts P=1.27mm Male Strip
	103031	* 74HC00D SOIC Quad 2-In Nand Gate

HD Interface Board		
13	731010	HD Interface Board (PCB#310592)
	140915	* 44 Contacts Vert Male Strip P=2mm
	140882	* 26 Contacts Vert Male Connector
	101507	* 74AC646 SOIC Octal Transceiver Register
	103031	* 74HC00D SOIC Quad 2-In Nand Gate
	103010	* 74HC04D SOIC Hex Inverter
	103007	* 74HC74D SOIC Dual Flip-Flop
	055101	* 4K7 X4 1/16w 5% Smd Resistor Array
	055100	* 100E X4 1/16w 5% Smd Resistor Array

MIDI & Controls I/O Board		
15	730987	Output Board (PCB#310628)
	230569	* FL5R200PNT EMI Coil For Signal
	140248	* 4 Poles Mini Din Female Socket
	140247	* 8 Poles Mini Din Female Socket
	140219	* 13 Poles Din Horizontal Female Socket
	140217	* Jack Stereo Slim Horizontal Socket
	140212	* 5 Poles Din Horizontal Female Socket

	100734	* MAX202E RS232 Drivers/Receiver
	100602	* 74HC04 Hex Inverter
	100035	* 6N138 Optocoupler
	080103	* 1N4148 100mA 75V Signal Diode
	080242	* 6V2 1W 5% Zener Diode

Trackball Board		
21	810668	Trackball Board (PCB#310635)
	340237	* Pitch & Modulation Hemispherical Knob
	070700	* 10K+10K Linear Joystik Potentiometer

Wiring Connections	
841165	44 Wires 5cm Length Flat Cable
840982	6 Wires 45cm Length Crimp Terminal Cable
841167	4 Wires 50cm Length Flat Cable
840974	4 Wires 7.5cm Length Crimp Terminal Cable
840595	16 Wires 12cm Length Flat Cable
840556	16 Wires 17.5cm Length Flat Cable
840979	4 Wires 17.5cm Length Crimp Terminal Cable
840978	2 Wires 10cm Length Crimp Terminal Cable
841168	2 Wires 50cm Length Crimp Terminal Cable
840976	6 Wires 7.5cm Length Crimp Terminal Cable
841169	4 Wires 30cm Length Crimp Terminal Cable
841170	26 Wires 17.5cm Length Flat Cable
840586	34 Wires 30cm Length Flat Cable
840554	16 Wires 40cm Length Flat Cable
840532	16Wires 45cm Length Flat Cable
840983	10 Wires 5cm Length Crimp Terminal Cable
730690	Vocal Processor Flat Cable
770832	Mains Cables Assembly
110320	* Power Switch

Optional Vocal Processor Interface		
22	970335	Vocal Processor Interface Kit
	955923	Operating System Disk
	271256	Vocal Processor Owner's Manual Addendum
	271273	Owner's Manual Addendum (All Languages)
	180777	<Prog/Style> Adhesive Plate
	981141	Vocal Processor Assembly
	653441	* Voc.Proc. Adhesive Plate
	652881	* Voc.Proc. Bottom Box
	652880	* Voc.Proc. Top Box
	340503	* Outward Knob
	340502	* Inner Knob
	761176	* Vocal Processor Board (Pcb#310630)
	140861	** 25 Contacts Hor Male Connector Din41652
	140217	** Jack Stereo Slim Horizontal Socket
	106001	** MC33078P SOIC Dual Low Noise Op. Amp.
	105010	** ADSP2181 Dsp Microcomputer
	103041	** 74HC86 SOIC Quad 2-Input Ex-Or Gate
	103013	** 74HC138D SOIC 1 Of 8 Decoder
	103012	** 74HC125D SOIC Quad Tri-State Buffer
	103011	** AD1877 SOIC Dual Channel 1bit ADC
	103010	** 74HC04D SOIC Hex Inverter
	103007	** 74HC74D SOIC Dual Flip-Flop
	103001	** 74HC08D SOIC Quad 2-Input And Gate
	103003	** 74HC374DW SOIC Octal D-Type Flip-Flop
	101500	** 74AC138D SOIC 1 Of 8 Decoder
	100059	** 7805 +5V 1A Voltage Regulator
	081000	** PMLL4148 Smd 100mA 75V Signal Diode
	071011	** 2x10K Alog Rotary Pot
	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
	010724	** 16MHz Ceramic Resonator With Capacitors

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.