GEM
DIGITAL KEYBOARDS

SERVICE MANUAL promega 2

GENERALMUSIC

code 270285

Index

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 1/8W 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.
- Supply voltage.
- Test point.
- Flag joined with one or more flags with the same signal name inscribed.
- Logic supply ground.
- Analog supply ground.
- Chassis ground.
- Earth ground.

ATTENTION Observe precautions when handling electrostatic sensitive devices.

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INTRODUCTION

The Promega 2 is a complex instrument and to be repaired requires a detailed knowledge especially on digital boards as CPU & SOUND GENERATOR BOARD and 256+256Mb DUAL DRAKE SOUND BOARD.
If a fault is located on these parts we suggest to replace them entirely, otherwise the following information can be useful to locate a specific problem.

FUNCTIONAL DESCRIPTION

The new 2000 keyboard series, of which PROMEGA 2 is one, are designed around the new processor DRAKE (Dsp Risc Advanced Keyboard Engine).
Inside PROMEGA 2 three DRAKE have assembled on, the first one on the main board and the others are mounted on the sound board.
The first DRAKE controls the general management, all the I/Os and the sound processing (mixer and digital effects) while the others are used for sounds generation.
All sounds and operating system are stored inside NAND FLASH memories, their contents is decompressed and transferred in the SDRAM memories to allow fast elaboration, the decompression task requires about 1 minute.
The numbers between parentheses are referred to the same points reported on the schematic diagrams.

[1] MASTER RESET

Starting from the switch ON event the keyboard remains in reset condition; when the 5V supply rail reaches about 4.75V IC35 (MAX709) set high the VOK after 200mS, which enters in the DRAKE pin 209; the RST is delayed of further 100uS respect VOK and it goes in the DRAKE pin 161, it is synchronized to the PLL internally, goes out through pin 213 and enters in pin 206 of the same DRAKE; besides it is also sent to the same pins of each DRAKE connected by the SLOT BUS, in this way all DSP are synchronized.
The RST is also sent to other ICs to initialize the I/O circuitry, see also the schematics and timing table.

[2] MASTER CLOCK

The Master clock (MCLK) produced by the oscillator XT1 (11.2896MHz) is sent through IC31 and IC26 (DS90 LVDS Low voltage differential signaling) to each DRAKE, DAC, ADC and expansion SLOT. The LVDS receivers placed at each termination of the balanced signal (REFCLK) are used to get a perfect synchronism between all the devices.
By means of IC25 (74lvc74) also the sample frequency FS (44.1KHz), deriving from IC54 (ADCL/RCLK) or from a SLOT (EX_FS), is synchronized with MCLK.

[3] START UP SETTING

During the rising slope of RST, DRAKE configure itself reading the state of address pins between AD0...AD30-A and A0...A2-D, if the configuration doesn't match to a valid one, a malfunction could happen.
Check these in the CPU and SOUND BOARD schematics.

Bit	Bus Signal	Resistor	Initial State
0	D16	R39	1
1	D17	R45	0
2	A2	R23	0
3	A3	R28	0
4	A4	R24	0
5	A5	R25	0
6	A6	R26	0
7	A7	R27	0
8	A8	R35	1
9	A9	R40	1
10	A10	AR22	0
11	A11	AR22	1
12	A12	AR22	0
13	A13	AR22	0
14	D18	R37	1
15	D19	R78	1
16	D20	R38	0
17	D21	AR45	0
18	D22	AR45	0
19	D23	AR45	0
20	D24	R52	0
21	D25	R59	0
22	D26	R51	1
23	D27	R65	0
24	D28	R67	0
25	D29	R68	0
26	D30	AR45	0
27	DD16	AR37	0
28	DD17	AR37	1
29	DSPA2	AR37	0
30	DSPA3	AR37	0

* this chart is referred to 761257 only,
for 761229 refer to schematic only.

[4] BOOTSTRAP

The jumper J1 set the bootstrap as follows:
UART = The DRAKE starts from the COMPUTER serial port.
E² = The DRAKE starts from the eeprom device (IC15).
Initially, when the eeprom is empty, this jumper must be set on UART, after the bootstrap is uploaded into eeprom, the jumper J1 must be set to E².
N.B. The CPU board spare parts already have the bootstrap installed into eeprom.

[5] OPERATING SYSTEM & WAVE MEMORY

Often it happens that a malfunction of the instrument is to investigate between the software rather than the hardware.
Consequently it is necessary to know which Operating System (OS) version is loaded in the instrument and eventually upgrade it with the last one available; if the malfunction persists even if the instrument is upgraded, please send a detailed report to GM Italy.
The OS is contained in the NAND FLASH (IC7) and NAND FLASH MODULE (CN1) devices; these memories are managed in similar way of a hard disk, for this reason GM supplies them as unique spare part.
As discussed above to speed up the instrument, OS and Waves are transferred on SDRAM memory at the startup.
To load for the first time or to upgrade with the last OS release, you must have a PC (Windows 95 or more), a suitable serial cable (GM code 130429) and the 'O.S.UPGRADE CD-ROM' that is sent from GM upon request.
When you ask it please note your instrument serial number (SN#), it is written on the label applied on the instrument backside, please also check the OS version and notify both these information with the request.
To check the OS version proceed as follows:
Press the SPLIT P. button and, holding it down, press the "+" key at the side of the LCD: on display appears the OS version number and date. Pressing again the "+" button the display will show the filenames loaded into the instrument.
The OS version contained in the CD is specified by suffix in the filename (e.g. UpgradePROMEGA2v100.exe); obviously, if the version installed on the instrument is the same, the upgrade is not required.
IMPORTANT: When an instrument OS is upgraded, or when you want to restore the initial manufacturer OS from NAND FLASH into SDRAM memories, **you have to turn off and turn on the PROMEGA 2 from the backside switch to force the decompression,** do not use the STANDBY button.

[7] SOUND BOARD (SLOT), PEDALS, AUDIO, PANEL checks using TESTMON tool.

To perform these tests you must have a PC (Windows 95 or more) and the TESTMON program with the follows precautions:
- A suitable serial cable (GM code 130429) is required.
- A suitable hardware (not provided) is necessary, see schematic figures 1 and 2.
- A complete re-loading of OS is necessary after using this program.
- The TESTMON program can be request to GM Italy only.
- The TESTMON program must be used only in the form specified here, other functional test without the suitable hardware (not provided) could compromise the CPU BOARD.

Proceed as follows:
1) Connect the PC serial port COMx to the instrument COMPUTER port by means of the suitable cable. Both apparatus must be switched OFF.
2) Turn on the PC install and run the TESTMOM program, the following window appears on PC screen:
3) Set the right COMx through the "Test/ Serial port" menu.
4) Turn on the instrument and the test will start automatically visualizing:

Fig. 1 - Audio connections

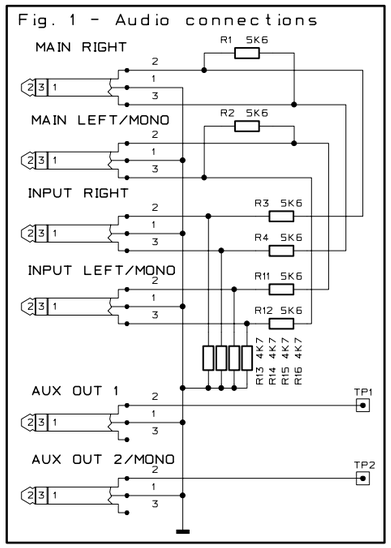
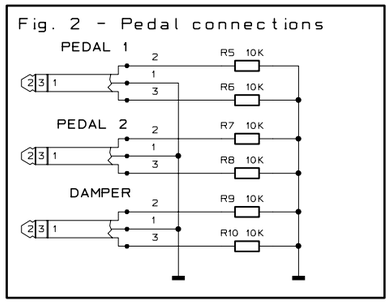


Fig. 2 - Pedal connections



Name of test and current date:

_____ **Test 4, today, time** _____

The sound modules first test will start:

```
- [9] Testing Ext. Modules (CN2, 6, 7, 8) :

Test result:

------------- SCREENING -------------

                  Chip_0 (IC4)    Chip_1 (IC19)
Slot_0 (CN8)      No              No
Slot_1 (CN7)      Yes             Yes
Slot_2 (CN6)      No              No
Slot_3 (CN2)      No              No

Testing VOK -> OK

Testing BID -> OK

- Pass!
```

The pedal inputs second test will start:

```
- [11] Testing Pedal Inputs                :
```

Test result:

```
- Pass!
```

The audio I/O third test will start:

```
- [12] Testing Audio Loop                  :

Verify that AUX OUT signals respect the specifications.
```

Verify, using an oscilloscope, that a sinusoidal signal of about 9Vpp (2Vpp in some older boards) is present on every TP output.
The controls panel fourth test will start:

```
- [20] Testing Panel                       :

Use the controls on the instrument to perform the test
and verify on the display the reading values.

The panel test doesn't send messages on this window, with
the exception of last test that signals the end of all
test.
```

Press STAND-BY to advance the test step by step:
- Step 1/15 lights on all the leds on the panel.
- Step 2/15 lights off all the leds on the panel.
- Steps 3/15 to 12/15 the digits vary from 0 to 9 and a led couple of each encoder flows.
- Step 13/15 the digits return to 0 and the display shows:

"Pi =... Mo =... Vo =... In =..."
Operating the Pitch, Modulation, Volume and Input controls from minimum to maximum excursion verify that the reading values vary accordingly from 0 to 127. Pressing each button on the panel the correspondent led lights on or causes a variation on the nearest digits and finally that rotating the encoders, the leds of the corresponding wheel light on in the same sense of rotation.
- Step 14/15 the display shows:

"Ct=... PC=...";
Operating the contrast control from minimum to maximum excursion verify that the reading value vary accordingly from 0 to 127. Operating the Computer switch the display shows respectively 127 for MAC, 64 for PC1 and 0 for PC2.
- Step 15/15 simulates the encoder rotation.

```
- ********** TEST PASSED **********
```

End of the test, switch off and on again the instrument.

[8] Pitch and Modulation Adjustment procedure:

If, during point 7 test, one of the Pitch or Modulation wheels doesn't sweep its entire range from 0 to 127, or with the Pitch centered it doesn't position between 63 and 65, you must execute again the Pitch and Modulation adjustments as follows:
a) Make sure that the potentiometer is positioned as in figure and well fastened to the plastic loom.
b) Connect a good stabilized continuous voltage of 5V (±5mV) between 1 and 3 or 4 and 6 pins of connector, connect the multimeter at pin 2 or 5 according to the wheel that you are regulating.
c) Extract the wheel, rotate the potentiometer shaft up to read around 2.5V on the multimeter, re-insert the wheel centered as in figure.
d) Keeping still the wheel centered and using a spanner on nuts R or S each potentiometer will rotate jointly with the respective nut; rotate it till to have a voltage of 2.5V±25mV at pin 2 and 5 of connector.
e) Rotating the PITCH wheel all along its excursion, verify that the voltage starts from a minimum less than 250mV to a maximum higher than 4.75V.
f) Rotating the MODULATION wheel all along its excursion, verify that the voltage starts from a minimum less than 25mV to a maximum higher than 4.75V.
g) If the point "e" or "f" is not verified repeat the adjustment.

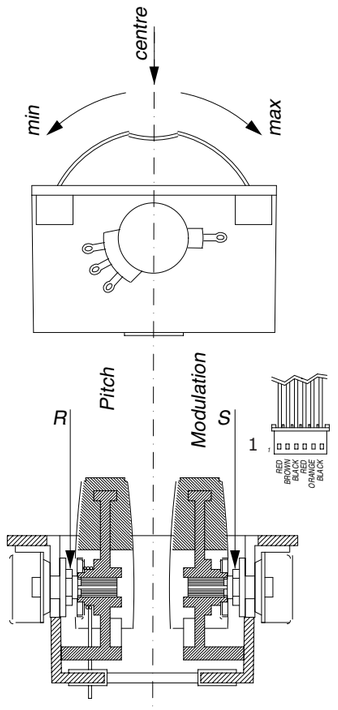
[9] MIDI and Computer ports check

Press LOCAL OFF, the keyboard doesn't play anymore but continues to send the MIDI signal through channel 1, connecting with a suitable cable MIDI IN and MIDI OUT ports, the keyboard plays (section PIANO=CH1); disconnecting the cable the keyboard doesn't play again, inserting an RS232 loopback plug (pin 1-2 and 3-5 shorted) in the

Computer port the keyboard plays again.
Check that it works well also setting PC1 or PC2 modes and when in MAC mode goes out from pin 1 a 1MHz signal.

[10] Pedals check

Even if in the point 7 the pedal inputs have been already checked, due to their particular effects it's a good idea to give an ulterior explanation about them:
All three inputs are analog and they accept pedals normally closed as such normally open, as well as potentiometer pedals.
The kind of pedal is recognized at the power on or when it is plugged in.



In the PROMEGA 3 the pedals by default are assigned in Grand Piano mode:

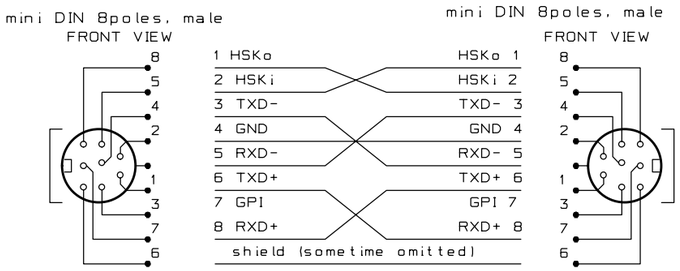
- **PEDAL1 (left) = SOFT,**
- **PEDAL2 (central) = SUSTAIN,**
- **DAMPER (right) = DAMPER.**

In practice they act in the following way:
SOFT = it attenuates the notes simulating the moving away of all hammers,
SUSTAIN = it holds up the dampers of the notes pressed simultaneously to the pedal, if it remains pressed the notes previously pressed maintain the sustained effect, when the pedal is released the notes are not sustained anymore.
DAMPER = it holds up the dampers of the whole keyboard and activates the sympathetic resonance of strings near to the pressed notes, in practice an enrichment of the sound on the decadence of the pressed notes is the audible effect.
If a potentiometer pedal is inserted it is possible to simulate also the intermediary damper positions.
Simulating the sympathetic resonance like a real Grand Piano, the notes upper to MI6 (E6) have the effect always audible due to these have not the dampers, at the same time the pedal effect is more audible in the highest notes, to check it press a note close to MI6 (E6).

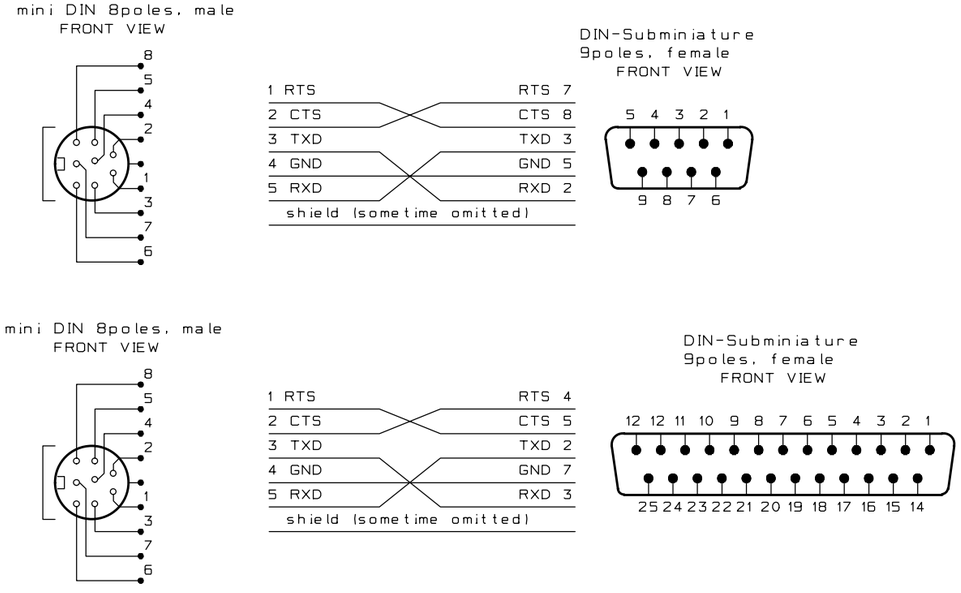
KEYBOARD - COMPUTER CONNECTIONS

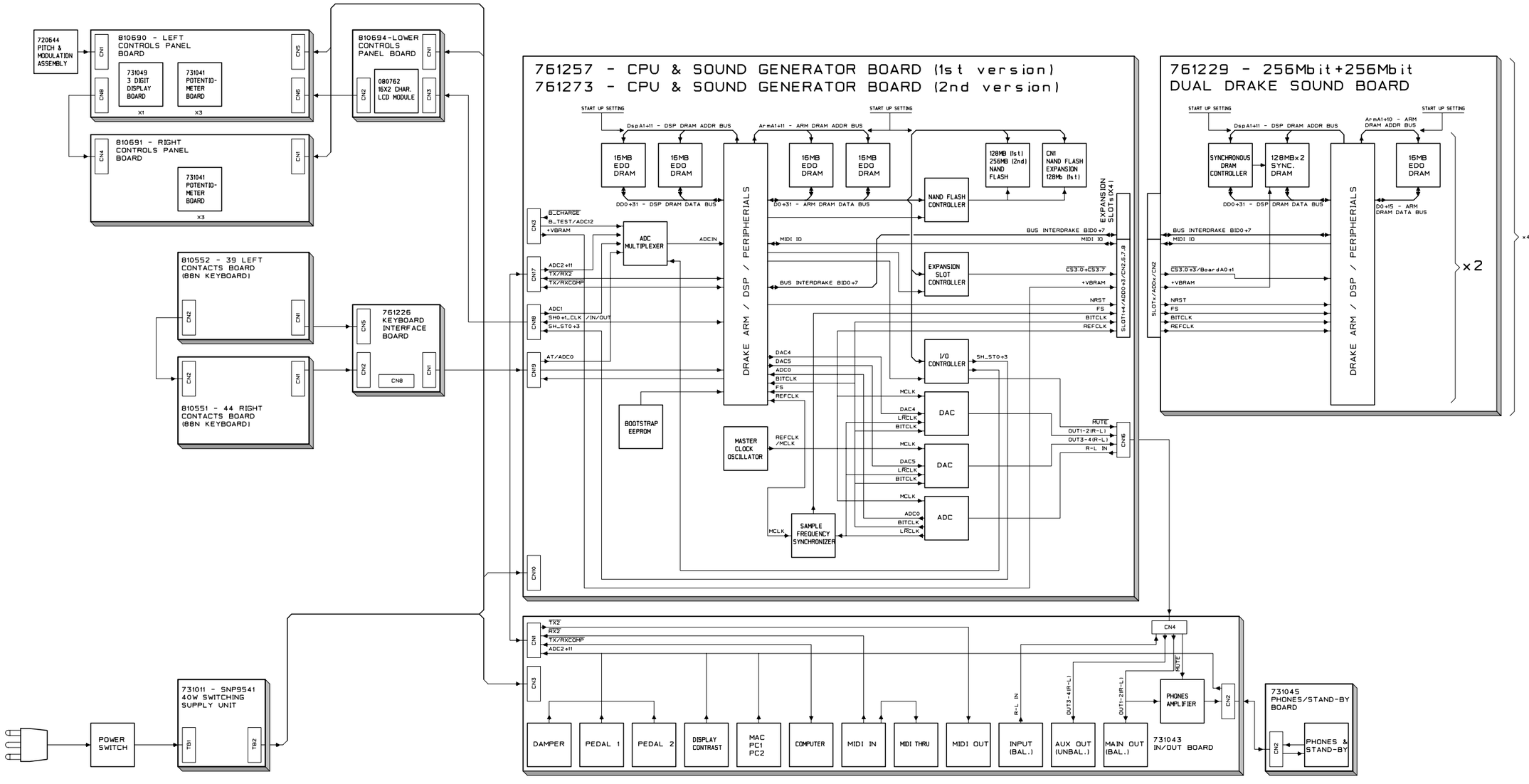
KEYBOARD SIDE ⟷ COMPUTER SIDE

APPLE MACINTOSH RS422 CONNECTION

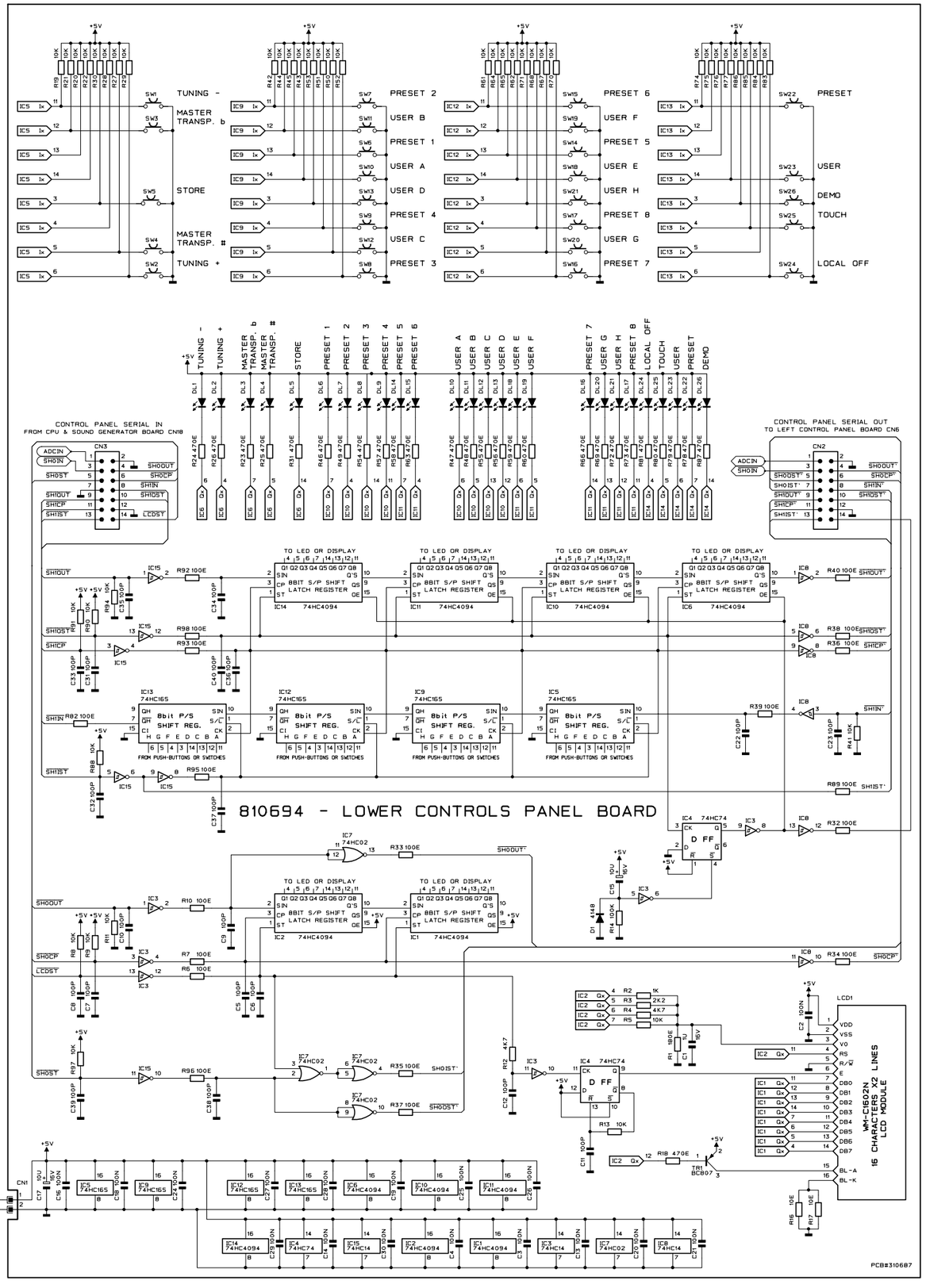


IBM PC/AT RS232 CONNECTION (GM code 130429)





DRW G.BOCCATO	DWG# 500978	PCB#	GENERALMUSIC S.p.A. ITALY
CKD M.GALANTI	DATE 30/04/2003	SCHEMATIC DIAGRAM PROMEGA 2	
APP. M.GALANTI	REV: A	BLOCK DIAGRAM	



DRW I.BATTELLI	DWG# 500981	PCB# 310687	GENERALMUSIC S.p.A. ITALY
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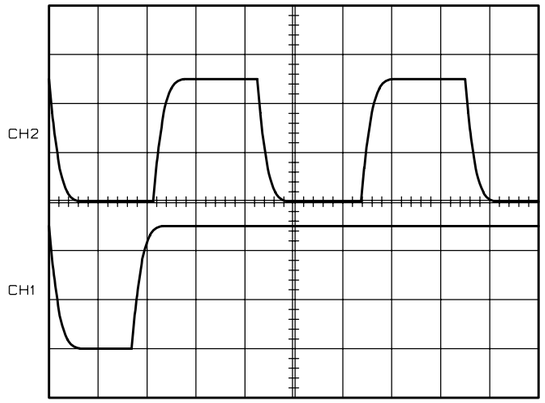
APP. M.GALANTI	REV: A	LOWER CONTROLS PANEL BOARD	

CONTROL PANEL TIMINGS

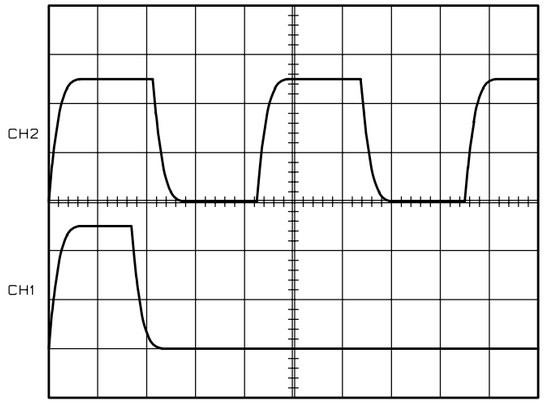
FIG.1



CH1 TRACE setting:
TIMEBASE: 1µS/div.
AMPLITUDE: 2V/div.
SIGNAL NAME: SH1IST
(PIN1 ICx 74HC165)

CH2 TRACE setting:
TIMEBASE: 1µS/div.
AMPLITUDE: 2V/div.
SIGNAL NAME: SH1CP
(PIN2 ICx 74HC165)

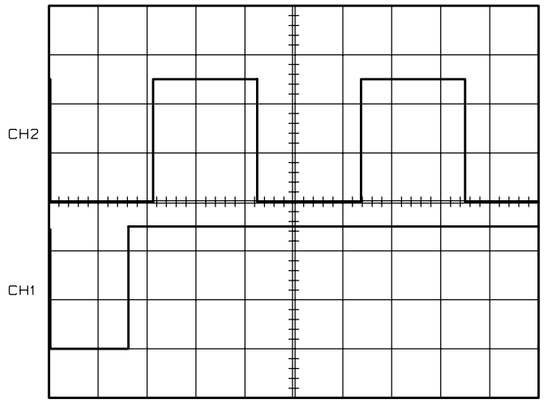
FIG.2



CH1 TRACE setting:
TIMEBASE: 1µS/div.
AMPLITUDE: 2V/div.
SIGNAL NAME: SH1OST
(PIN1 ICx 74HC4094)

CH2 TRACE setting:
TIMEBASE: 1µS/div.
AMPLITUDE: 2V/div.
SIGNAL NAME: SH1CP
(PIN3 ICx 74HC4094)

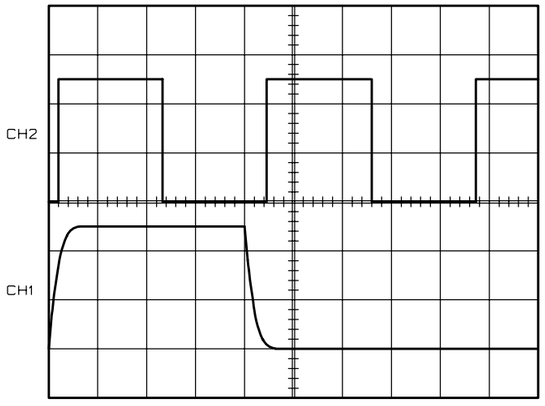
FIG.3



CH1 TRACE setting:
TIMEBASE: 1µS/div.
AMPLITUDE: 2V/div.
SIGNAL NAME: SH0ST
(PIN10 IC10 74HC02)

CH2 TRACE setting:
TIMEBASE: 1µS/div.
AMPLITUDE: 2V/div.
SIGNAL NAME: SH0CP
(PIN4 IC3 74HC14)

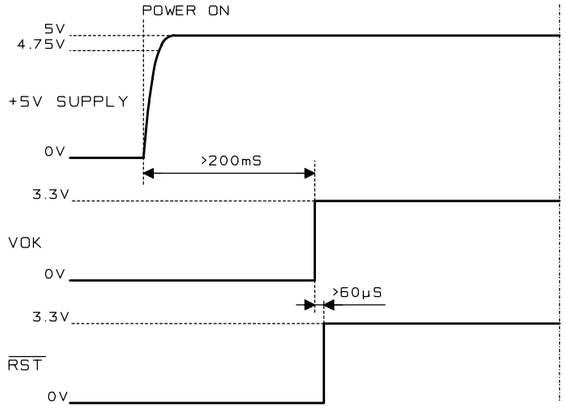
FIG.4

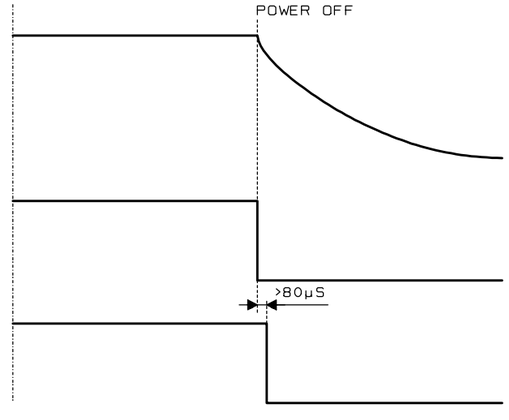


CH1 TRACE setting:
TIMEBASE: 1µS/div.
AMPLITUDE: 2V/div.
SIGNAL NAME: SH0IST
(PIN4 IC10 74HC02)

CH2 TRACE setting:
TIMEBASE: 1µS/div.
AMPLITUDE: 2V/div.
SIGNAL NAME: SH0CP
(PIN4 IC3 74HC14)

POWER ON/OFF, VOK, RESET TIMINGS





DRW G.BOCCATO	DWG# 500960	PCB#	GENERALMUSIC S.p.A. ITALY
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APP. M.GALANTI	REV: A	TIMING TABLE	

720644 - PITCH & MODULATION ASS'Y (8)

MASTER

EDIT & CONTROLS

EFFECTS

MASTER

INPUT

731049 - 3 DIGIT DISPLAY BOARD PART 1 OF 3

731041-POT. BOARD (PCB#310689)

PCB#310698

REVERB

PARAMETERS

SOUNDS

MIDI

CONTROLS

SPLIT P.

PROEFX

LEVEL

DEPTH

PARAM.1

PARAM.2

SEND

PIANOS

EFFECTS

OCTAVE

TO LEFT

ON/OFF

REVERB

PRO EFX

731049 - 3 DIGIT DISPLAY BOARD PART 2 OF 3

810690 - LEFT CONTROL PANEL BOARD

731049 - 3 DIGIT DISPLAY BOARD PART 3 OF 3

CONTROL PANEL SERIAL OUT TO RIGHT CONTROL PANEL CN4

FROM LOWER CONTROL PANEL CN2 CONTROL PANEL SERIAL IN

778922 - SUPPLY CABLES ASSEMBLY

PCB#310682

DRW G.BOCCATO	DWG# 580979	PCB# 310682, 310698	GENERALMUSIC S.p.A. ITALY
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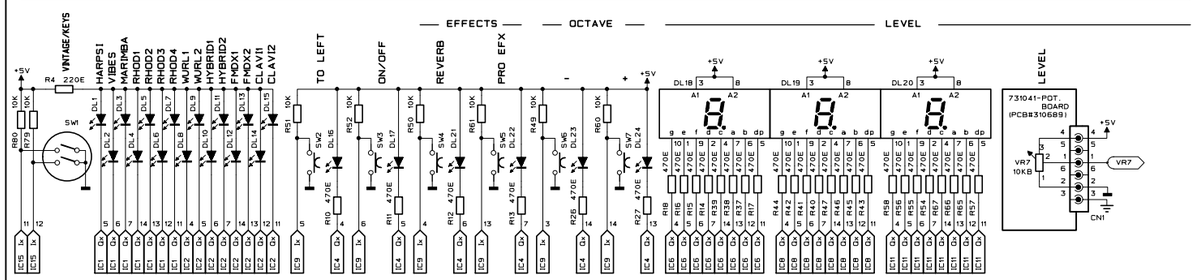
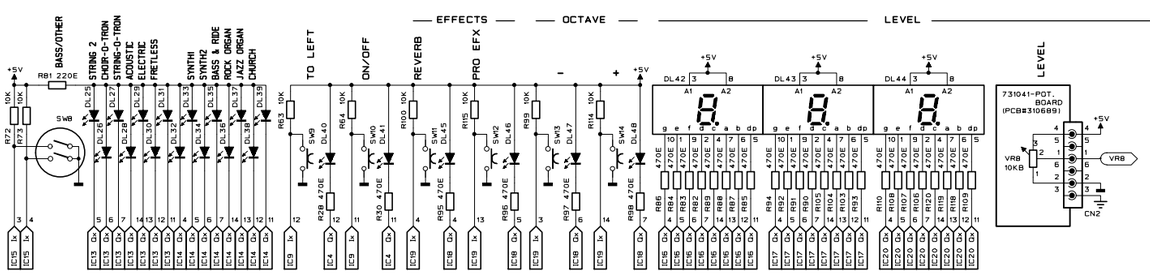
APP. A.FALCONI	REV: A	LEFT CONTROLS PANEL BOARD	

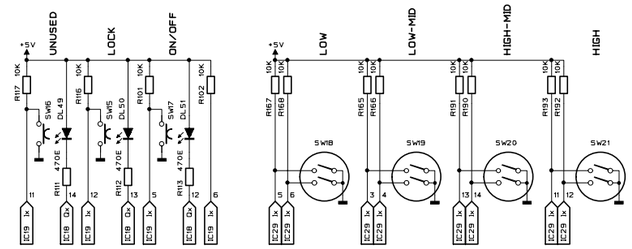
VINTAGE KEYS

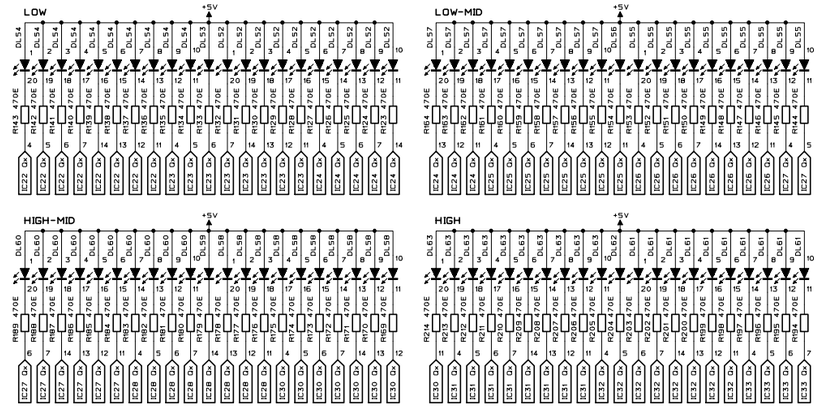


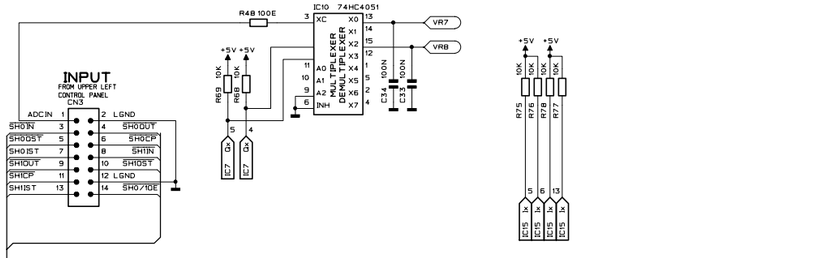
BASS/OTHER

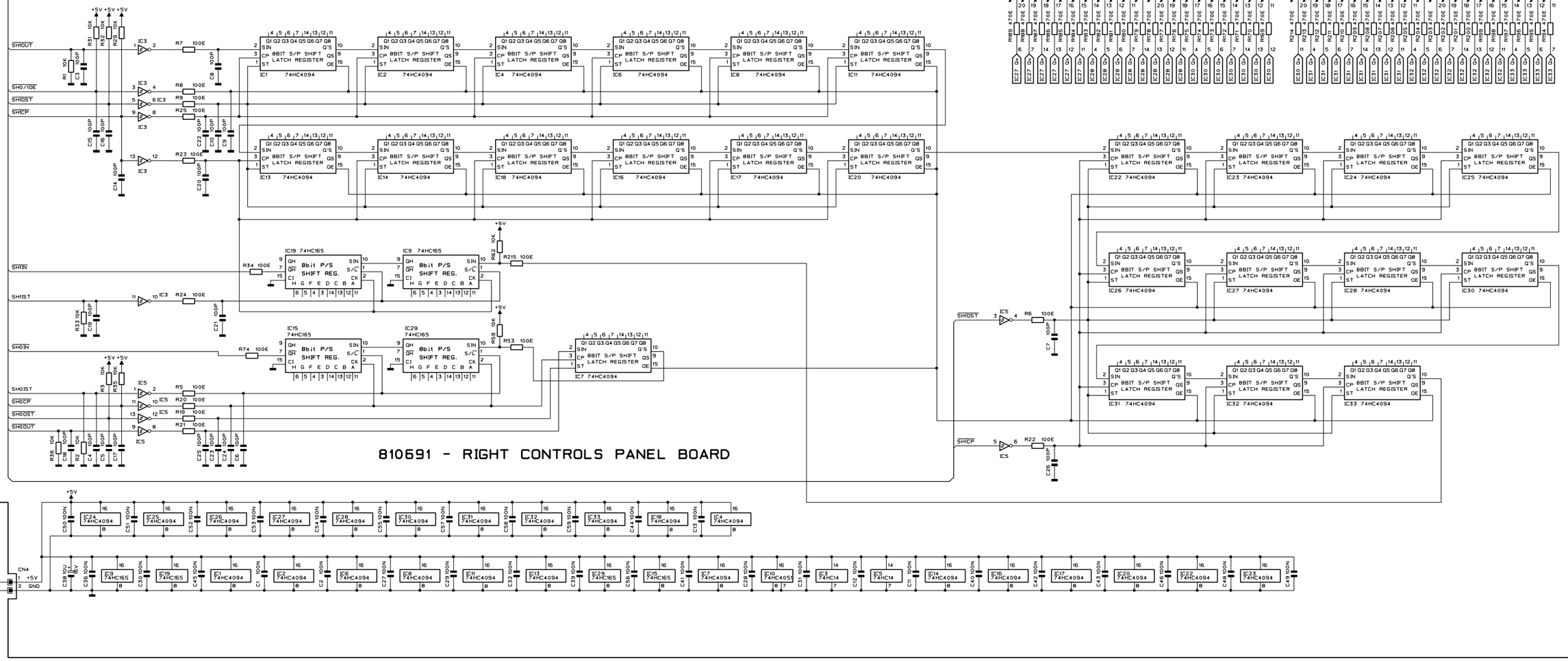


GRAPHIC-EQ









810691 - RIGHT CONTROLS PANEL BOARD

770922 - SUPPLY CABLES ASSEMBLY

PCB#310684

DRW M. DI CARLO	DWG# 500980	PCB# 310684	GENERALMUSIC S.p.A. ITALY
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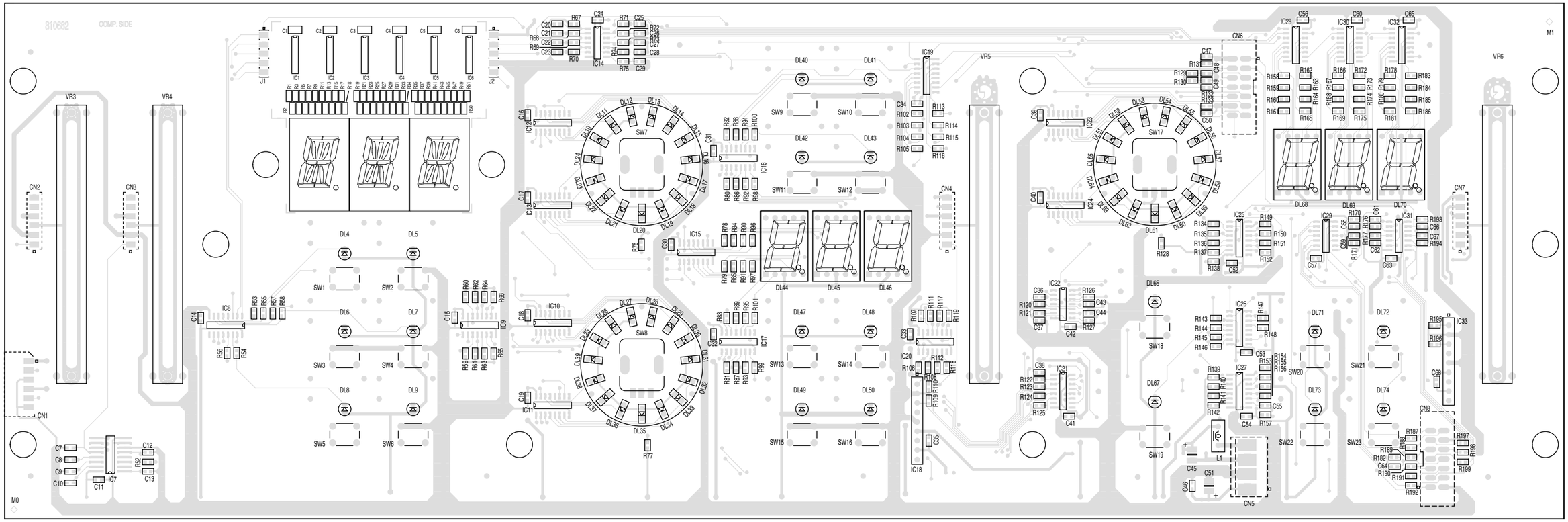
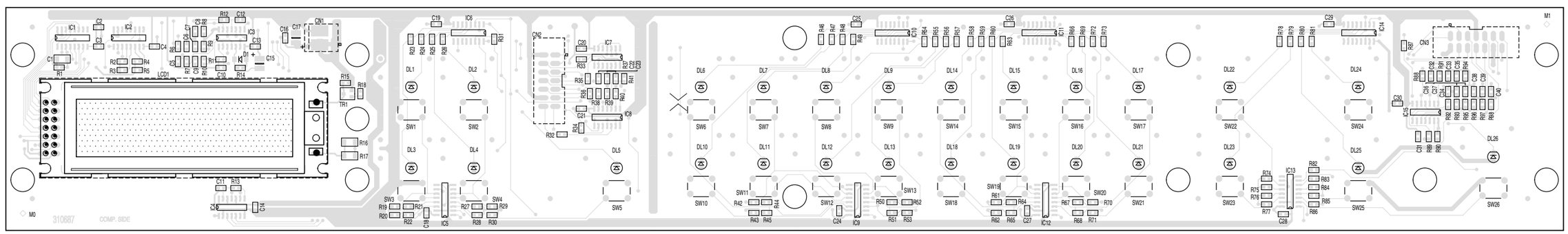
APP. M. GALANTI	REV: A	RIGHT CONTROL PANEL BOARD	

810688 - LEFT CONTROLS PANEL BOARD

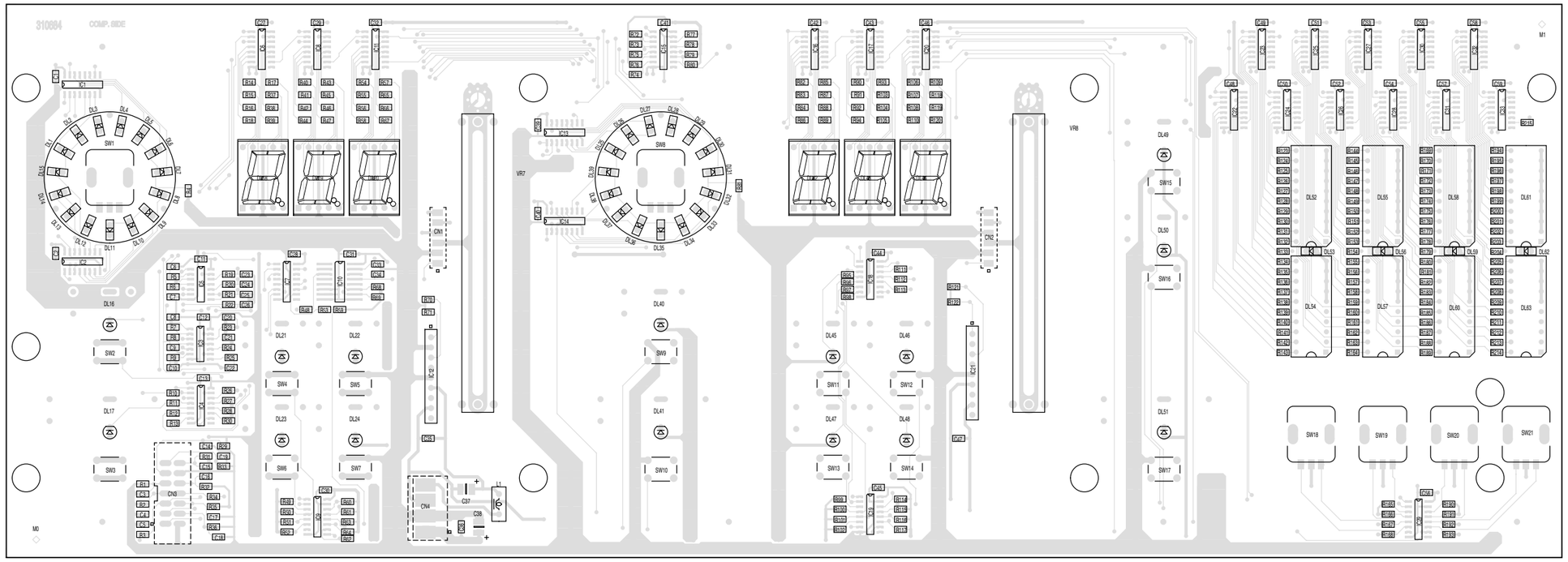


810694 - LOWER CONTROLS PANEL BOARD

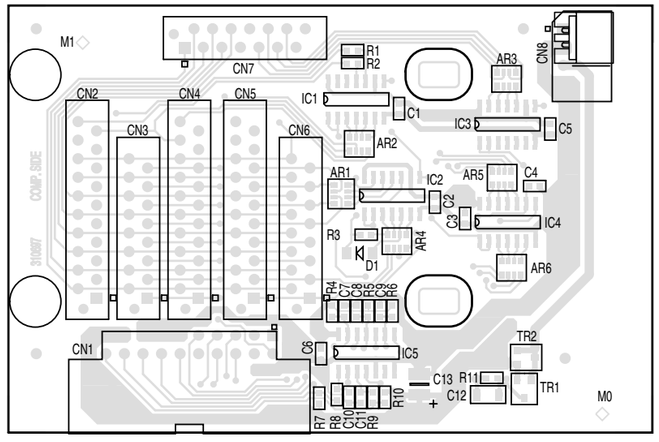


DRW G.BOCCATO	DWG# 500965	PCB# 310682 / 310698 / 310687	GENERALMUSIC S.p.A. ITALY
CKD M.GALANTI	DATE: 24/04/02	PCB Silkscreens of: LEFT CONTROLS PANEL BOARD LOWER CONTROLS PANEL BOARD	
APP. M.GALANTI	REV: A		

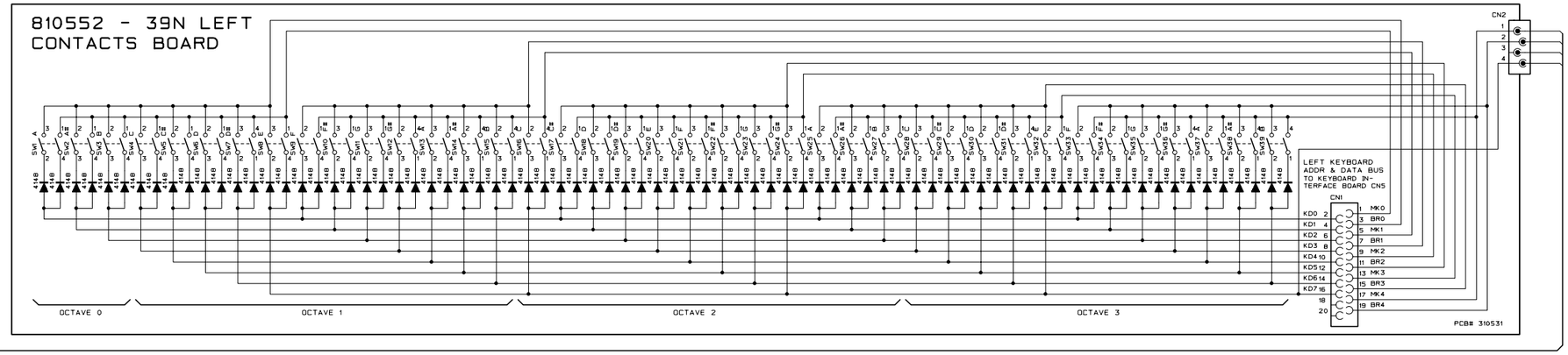
810691 - RIGHT CONTROLS PANEL BOARD

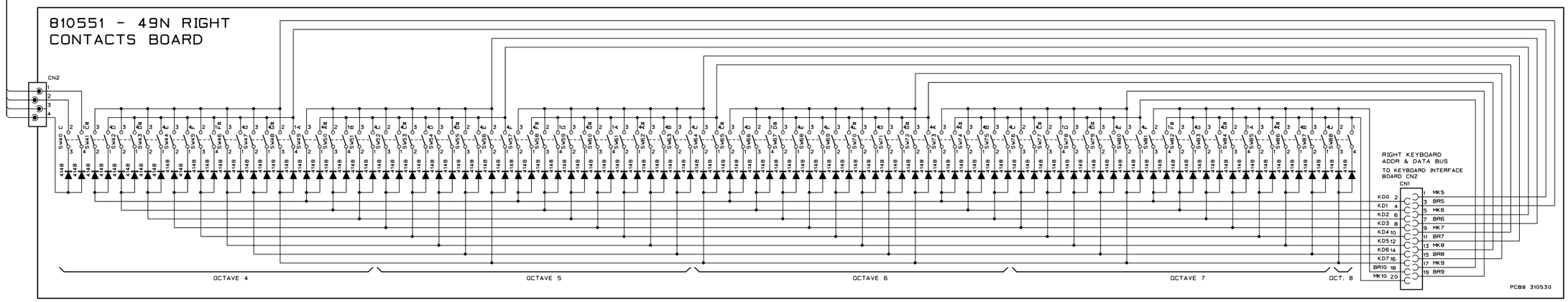


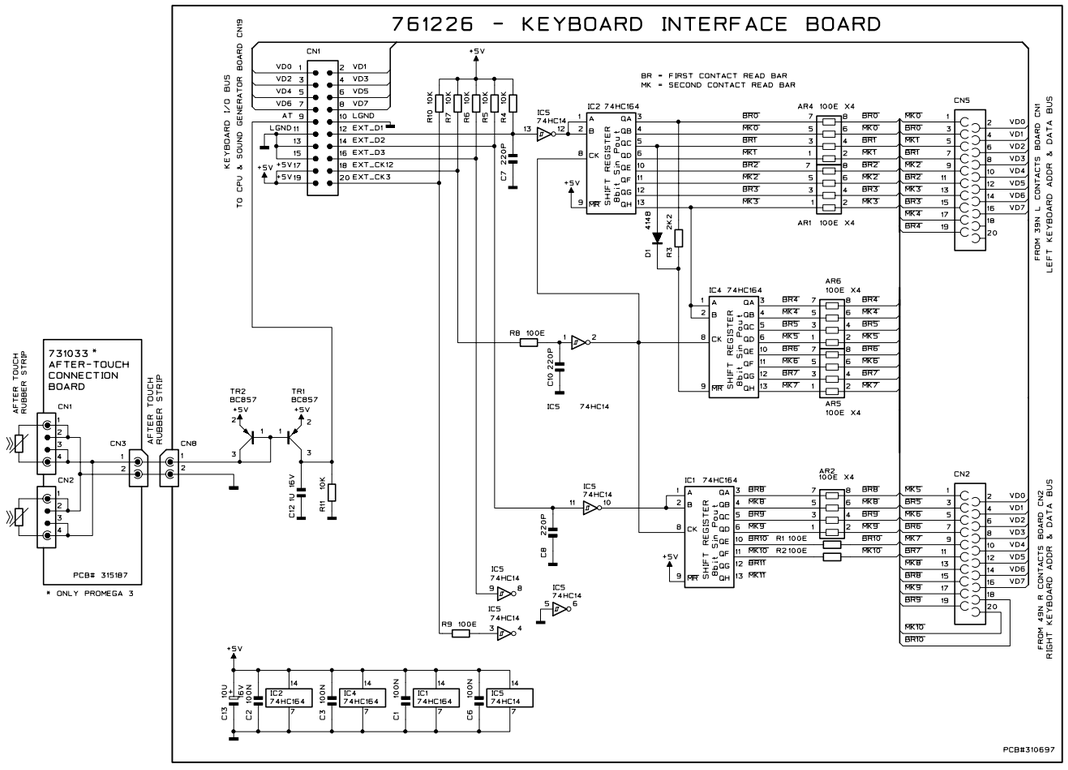
761226 - KEYBOARD INTERFACE BOARD



DRW G.BOCCATO	DWG# 500986	PCB# 310697 / 310684	GENERALMUSIC S.p.A. ITALY
CKD M.GALANTI	DATE: 15/05/03	PCB Silkscreens of: RIGHT CONTROLS PANEL BOARD; KEYBOARD INTERFACE BOARD.	
APP. M.GALANTI	REV: A		







DRW BOCCATO	DWG# 500955	PCB# 310531 310530 310697	GENERALMUSIC S.p.A. ITALY
CKD FRATERNALI	DATE 29/01/021	SCHEMATIC DIAGRAM	
APP. GALANTI	REV: A	CONTACTS BOARD & KEYBOARD INTERFACE BOARD	

761257 - CPU & SOUND GENERATOR BOARD

PART 1/2 VERSION 1

GM SUPPLY ONLY 761257 AS SPARE PART.
IT INCLUDES ALWAYS 761228 (CPU BOARD) AND 761235 (FLASH MEMORY MODULE).

DSP 32Mbit EDO-DRAM

ARM 32Mbit EDO-DRAM

[5] OP.SYSTEM & WAVE MEMORY

761235 - 128Mb FLASH MEMORY MODULE

[6] RAM BACKUP SUPPLY

[3] START UP SETTING

ADC MULTIPLEXER

ADC VOLTAGE TRANSLATOR

[4] BOOTSTRAP

[1] MASTER RESET

[4] BOOT EEPROM

[2] MASTER CLOCK

KEYBOARD I/O BUS
FROM KEYBOARD INTERFACE BOARD CN1

AFTERTOUCH ADJUST

MIDI I/O & CONTROLS FROM IN/OUT BOARD CN1

CONTROL PANEL SERIAL OUT TO LOWER CONTROL PANEL BOARD CN3

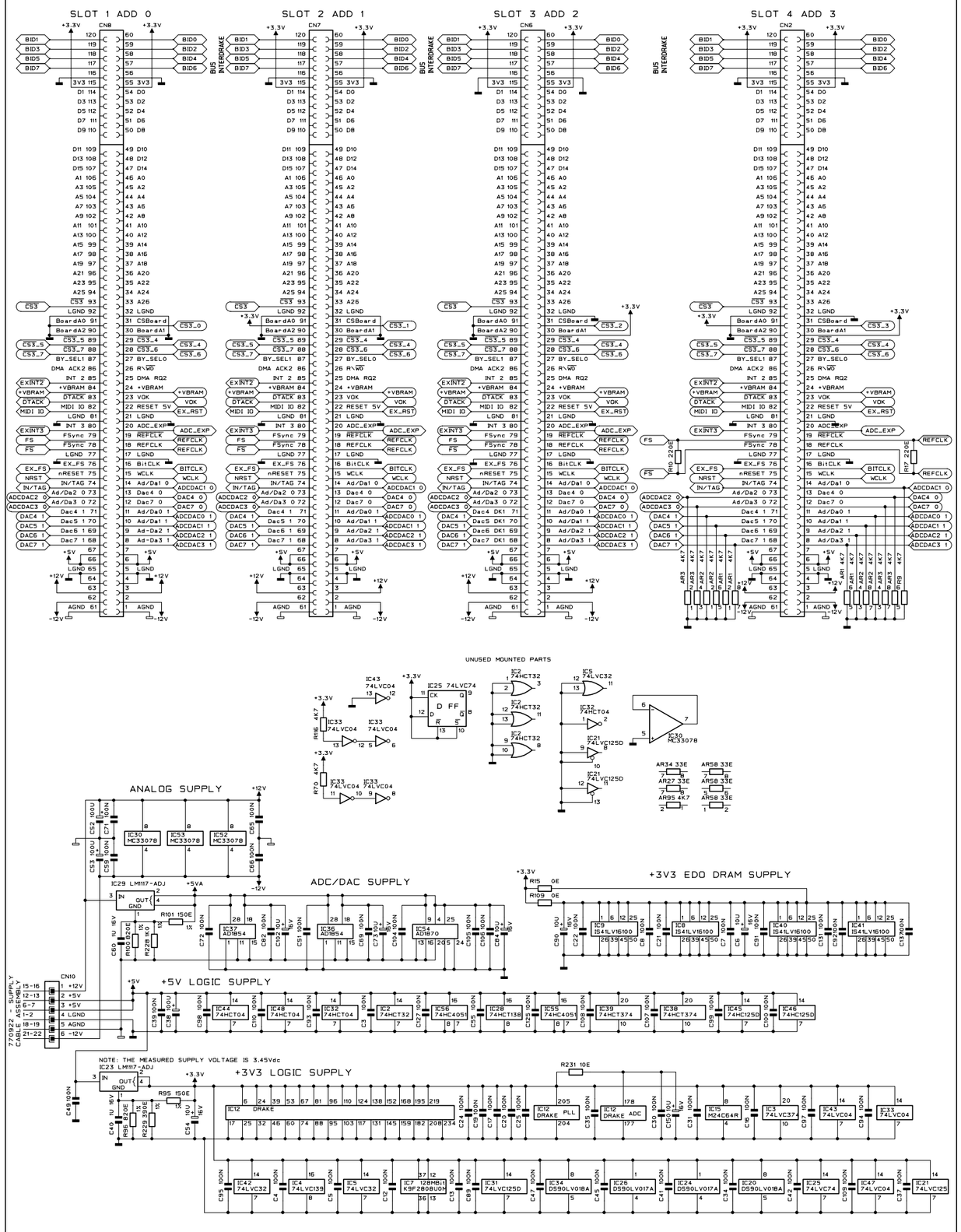
RAM SUPPLY FROM POT.HOT SUPPLY & STAND-BY BOARD CN2

DRAKE ARM & DSP

DRAKE PERIPHERALS

315171A PARTS 2/2

DRW G.BOCCATO	DWG# 500982	PCB# 315171	GENERALMUSIC S.p.A. ITALY
CKD M.FRATERNALI	DATE 7/3/2002	SCHEMATIC DIAGRAM PROMEGA 2 CPU & SOUND GENERATOR BOARD PART 1 OF 2	ALL RIGHTS ARE RESERVED, NO COPIES OR REPRODUCE THIS DOCUMENT WITHOUT WRITTEN CONSENT BY GENERALMUSIC.
APP. M.GALANTI	REV: A		

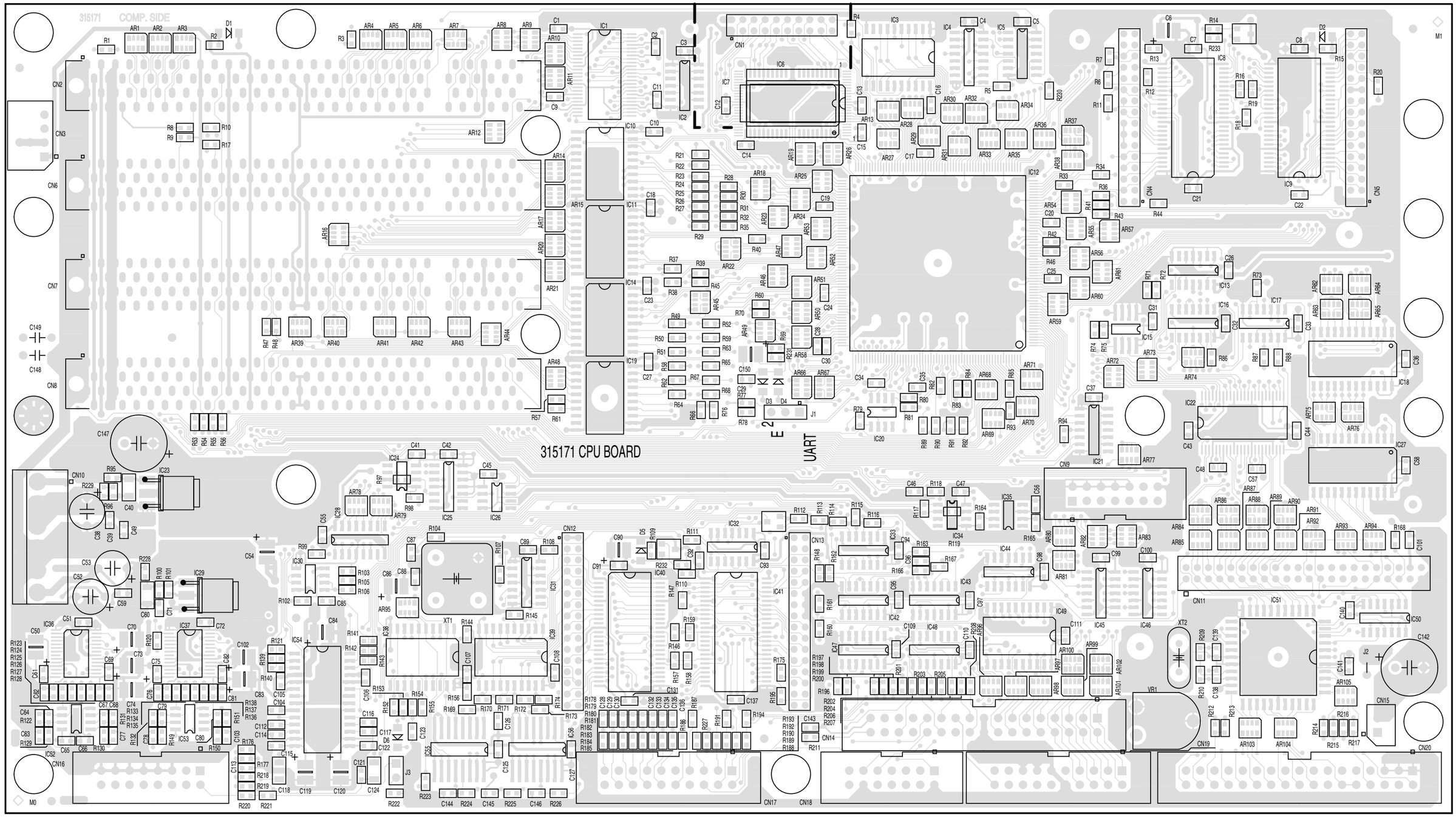


761257 - CPU & SOUND GENERATOR BOARD VERSION 1

PART 2/2

GM SUPPLY ONLY 761257 AS SPARE PART.
IT INCLUDES ALWAYS 761228 (CPU BOARD) AND 761235 (FLASH MEMORY MODULE).

DRW G.BOCCATO	DWG# 500982	PCB# 315171	GENERALMUSIC S.p.A. ITALY
CKD M.FRATERNALI	DATE 7/3/2002	SCHEMATIC DIAGRAM PROMEGA 2 CPU & SOUND GENERATOR BOARD PART 2 OF 2	
APP. M.GALANTI	REV: A		



DRW G.BOCCATO	DWG# 500967	PCB# 310171	GENERALMUSIC S.p.A. ITALY
CKD M.GALANTI	DATE: 23/04/02	PCB Silkscreens of: CPU & SOUND GENERATOR BOARD VERSION 1	
APP. M.GALANTI	REV: A		

PART 2 OF 2

DSP 32Mbit EDO-DRAM

ARM 32Mbit EDO-DRAM

DRAKE ARM & DSP

DRAKE PERIPHERALS

[6] RAM BACKUP SUPPLY

[3] START UP SETTING

ADC MULTIPLEXER

ADC VOLTAGE TRANSLATOR

[4] BOOTSTRAP

[1] MASTER RESET

[4] BOOT EEPROM

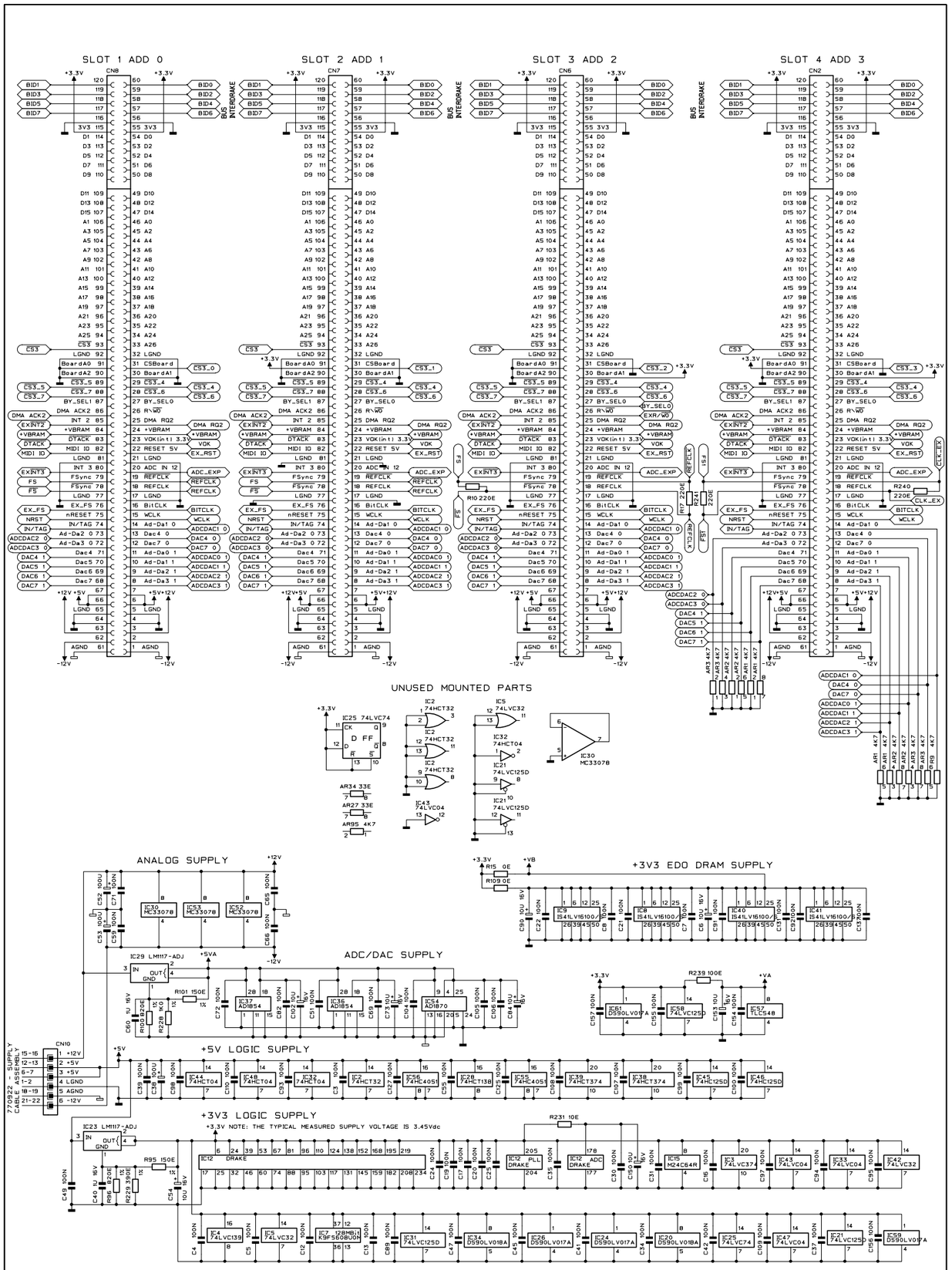
[2] MASTER CLOCK

[3] START UP SETTING

761273 - CPU & SOUND GENERATOR BOARD
PART 1/2

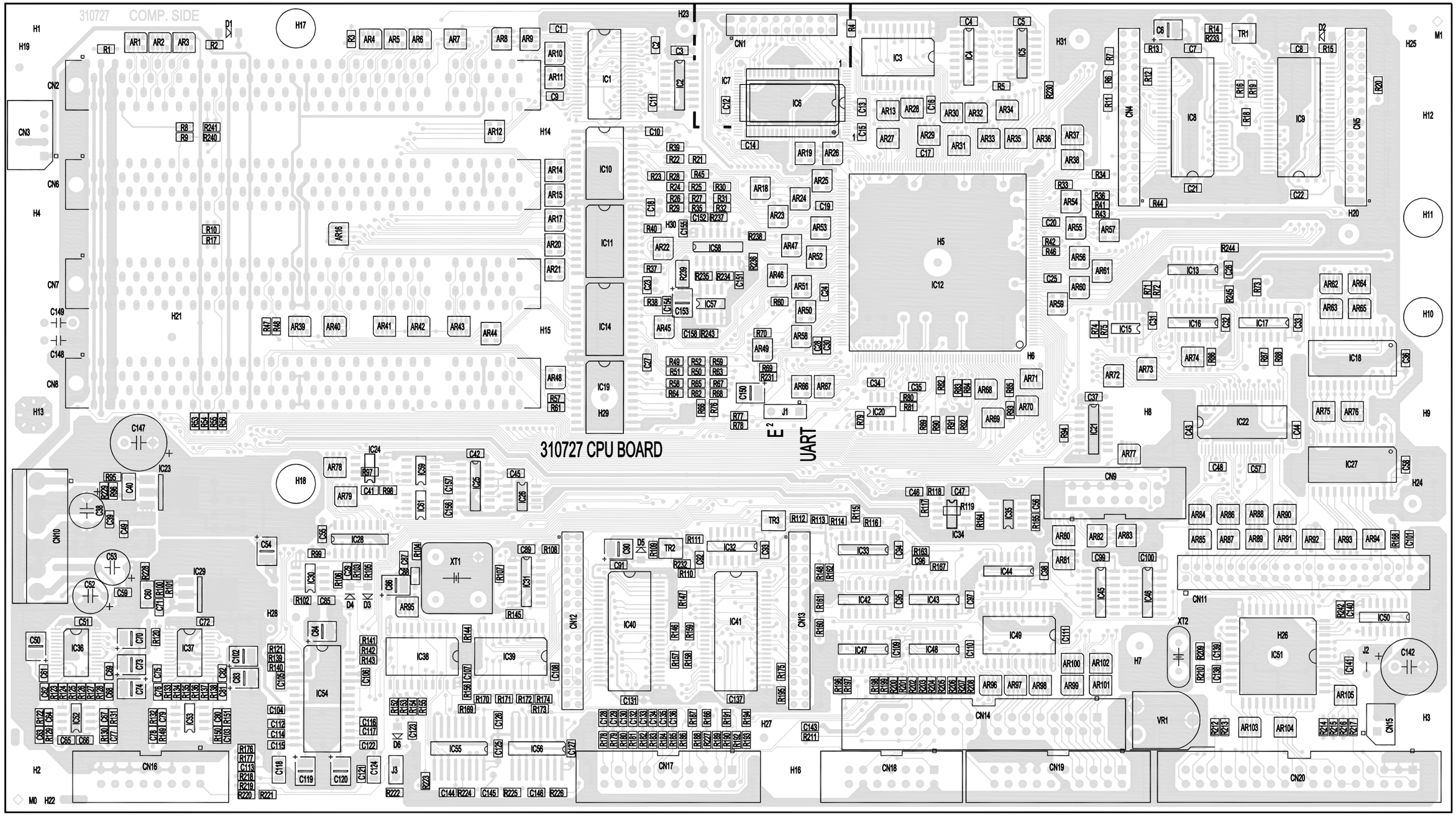
VERSION 2

DRW G.BOCCATO	DWG# 500983	PCB# 315727	GENERALMUSIC S.p.A. ITALY
CKD J.VITRI	DATE 14-05-2003	SCHEMATIC DIAGRAM PROMEGA 2	ALL RIGHTS ARE RESERVED. NO COPIES OR REPRODUCE THIS DOCUMENT WITHOUT WRITTEN CONSENT BY GENERALMUSIC.
APP.M.GALANTI	REV: A	CPU & SOUND GENERATOR BOARD PART 1 OF 2	



DRW G.BOCCATO	DWG# 500983	PCB# 315727	GENERALMUSIC S.p.A. ITALY
CKD J.VITRI	DATE 14-05-2003	SCHEMATIC DIAGRAM PROMEGA 2	ALL RIGHTS ARE RESERVED. NO COPIES OR REPRODUCE THIS DOCUMENT WITHOUT WRITTEN CONSENT BY GENERALMUSIC.
APP. M.GALANTI	REV: A	CPU & SOUND GENERATOR BOARD PART 2 OF 2	

761273 - CPU & SOUND GENERATOR BOARD (VERSION 2)



DRW G.Boccato	DWG# 500987	PCB# 310727	GENERALMUSIC S.p.A. ITA
CKD J.Vitri	DISK: PRT: 1/1	PCB Silkscreen of: CPU & SOUND GENERATOR BOARD Version 2	ALL RIGHTS ARE RESERVED, NO COI OR REPRODUCE THIS DOCUMENT WITH WRITTEN CONSENT BY GENERALMU
APP. M.Galanti	REV: 15/05/03		

761229 - 256+256Mbit DUAL DRAKE SOUND BOARD[7]

PART 1 OF 2

SLOT BUS CN2

ALTERA EPM3064A PLCC 44 Pin

ICS EPM 3064A IPLCC44

12M SINCR. DINAMIC RAM 16MB EDO DYNAMIC RAM

ARM & DSP DRAKE

DRAKE PERIPHERALS

[3] START UP SETTING

CLOCK SRAM 73MHz

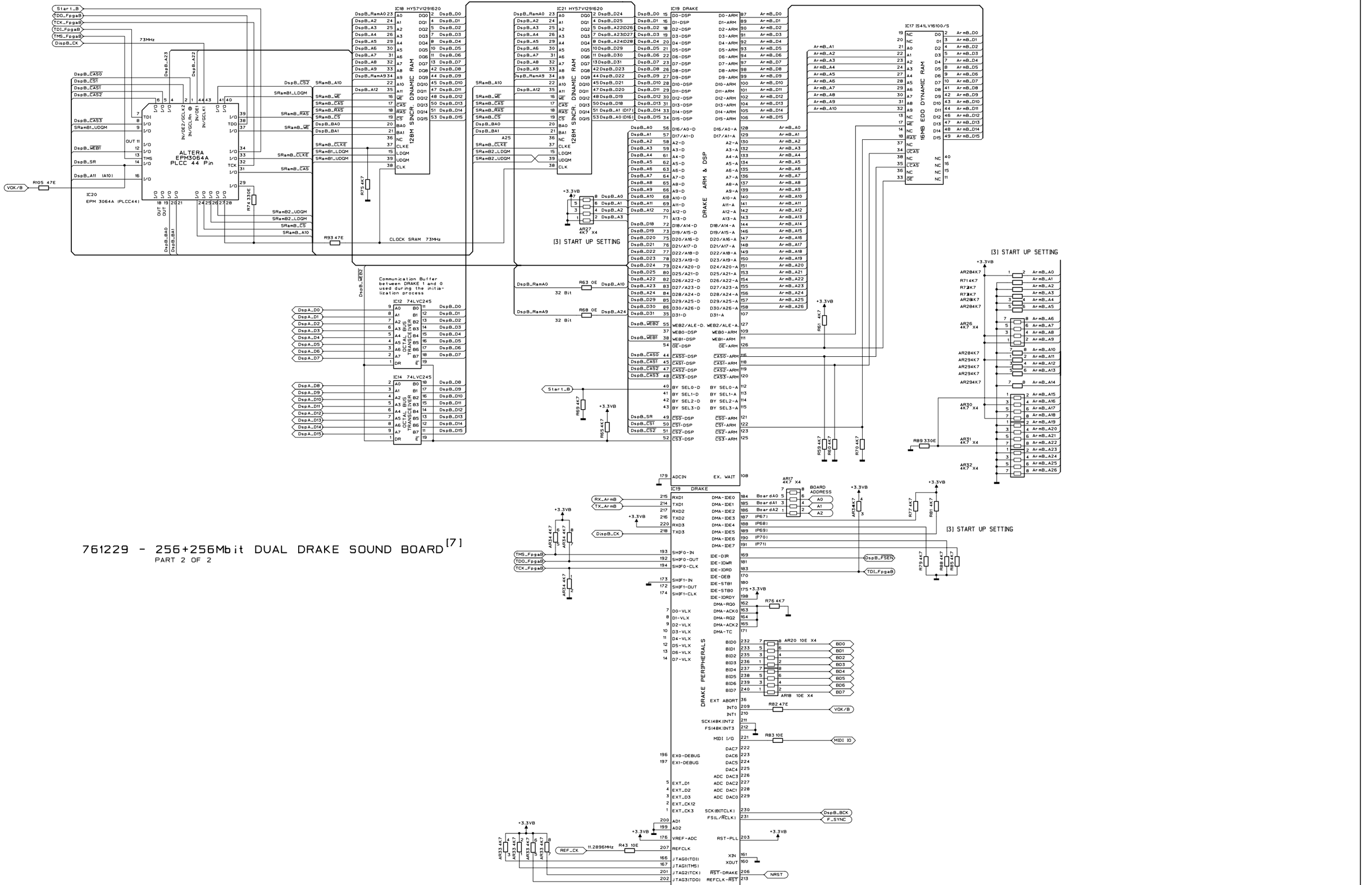
NOTE: THE MEASURED SUPPLY VOLTAGE IS 3.45Vdc

315179 PARTS 2/2

DRW G.BOCCATO	DWG# 500962	PCB# 315179	GENERALMUSIC S.p.A. ITALY
CKD M.FRATERNALI	DATE 7/3/2002	SCHEMATIC DIAGRAM PROMEGA 2 & 3	ALL RIGHTS ARE RESERVED. NO COPIES OR REPRODUCE THIS DOCUMENT WITHOUT WRITTEN CONSENT BY GENERALMUSIC.
APP. M.GALANTI	REV: A	256+256Mb DUAL DRAKE SOUND BOARD PART 1 OF 2	

761229 - 256+256Mbit DUAL DRAKE SOUND BOARD[7]

PART 2 OF 2



DRW G.BOCCATO	DWG# 500962	PCB# 315179	GENERALMUSIC S.p.A. ITALY
CKD M.FRATERNALI	DATE 7/3/2002	SCHEMATIC DIAGRAM PROMEGA 2 & 3	ALL RIGHTS ARE RESERVED. NO COPIES OR REPRODUCE THIS DOCUMENT WITHOUT WRITTEN CONSENT BY GENERALMUSIC.
APP. M.GALANTI	REV: A	256+256Mb DUAL DRAKE SOUND BOARD PART 2 OF 2	

MAINS
100÷230Vac +/-15%
50/60Hz

MAINS CABLE

MAINS SOCKET

POWER SWITCH

TB1
1
2
F T2A 250VAC
L
N

731011
SNP9541 40W
SWITCHING SUPPLY
UNIT THE SERVICE IS MADE BY REPLACEMENT THE ENTIRE BOARD ONLY.

TB2
+12V 1 — 16-17
+5V 2 — 13-14
+5V 3 — 7-8
GND 4 — 2-3
GND 5 — 19-20
-12V 6 — 22

770922 - SUPPLY CABLES ASSEMBLY
TO OTHER BOARDS

17
14
8-9
20
STAND-BY SUPPLY (FUTURE EXP.)

770922 - SUPPLY CABLES ASSEMBLY

731043 - IN/OUT BOARD

AUDIO IN/OUT
FROM CPU & SOUND GENERATOR BOARD CN6

CN4
1 — 2 PH_SENSE
3 — 4 MUTE
5 — 6 L IN
7 — 8 R IN
9 — 10 OUT4 (L)
11 — 12 OUT3 (R)
13 — 14 OUT2 (L)
15 — 16 OUT1 (R)

MIDI OUT
MIDI THRU [9]
MIDI IN
COMPUTER [9]
DISPLAY CONTRAST
DAMPER
PEDAL 1 [10]
PEDAL 2

MIDI I/O & CONTROLS
TO CPU & SOUND GENERATOR BOARD CN7

CN1
TXCOMP 1 — 2 RXCOMP
TX2 3 — 4 RX2
MIDI/COMP/TX3 5 — 6 SH2_ST
LED_SB 7 — 8 1MHzEN
9 — 10 (INT3)
ADC2 11 — 12 ADC3
ADC4 13 — 14 ADC5
ADC6 15 — 16 ADC7
ADC8 17 — 18 ADC9
ADC10/RX3 19 — 20 ADC11

CN3
15 12 9 6 3 18 21

SW1 6
SW1 1
MAC (APPLE TALK)
PC1 (SLOW)
PC2 (FAST)

[7] INPUT
LEFT /MONO
RIGHT

[7] AUX OUT
LEFT /MONO
RIGHT

[7] MAIN OUT
LEFT /MONO
RIGHT
CHASSIS

TO PHONES/STAND-BY BOARD CN2
L PHONES
R PHONES
STAND-BY

(PCB#310688)

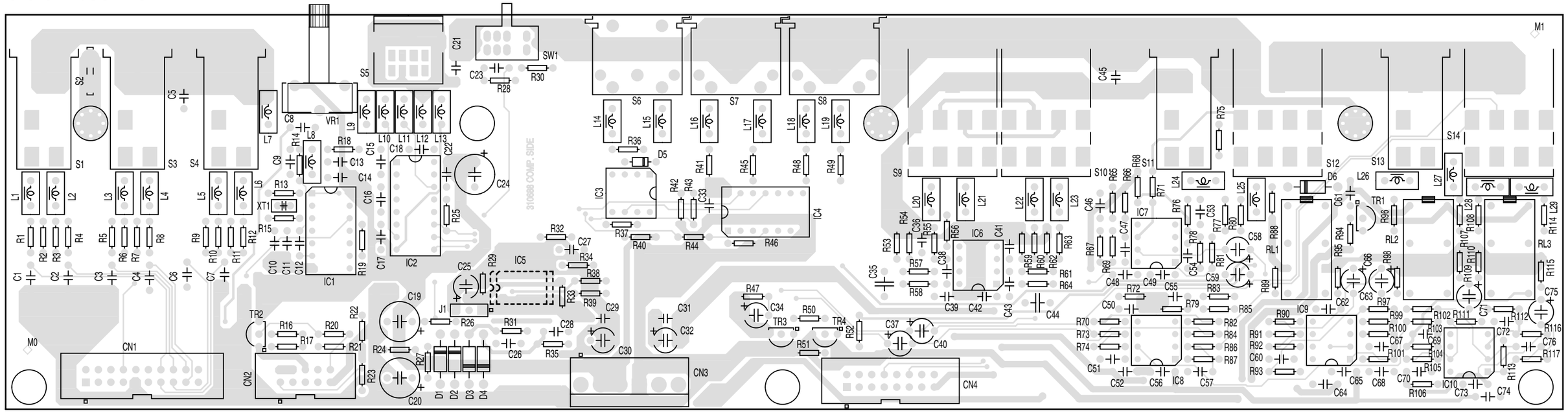
731045-PHONES/STAND-BY BOARD

PHONES1
PHONES2
CHASSIS
CN2
DL1
R
GY
STANDBY ON
SW1
STANDBY ON

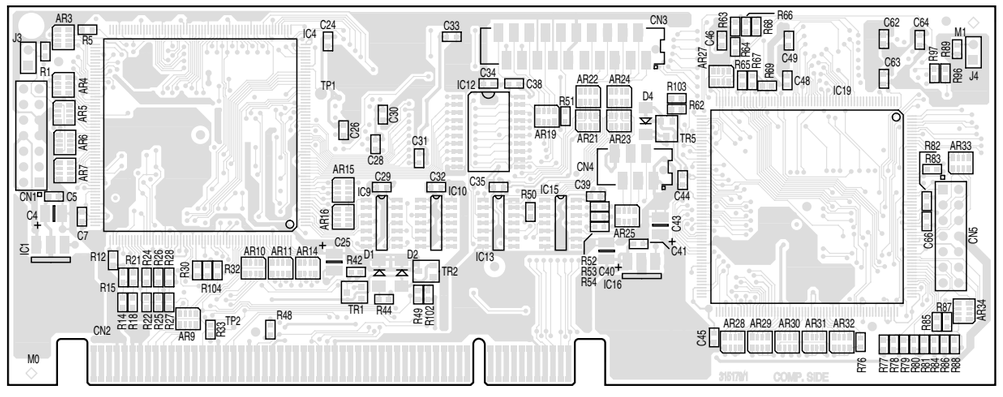
(PCB#310702)

DRW G.BOCCATO	DWG# 500959	PCB# 310688, 310702	GENERALMUSIC S.p.A. ITALY
CKD I.BATTELLI	DATE 04/02/02	SCHEMATIC DIAGRAM PROMEGA3	ALL RIGHTS ARE RESERVED. NO COPIES OR REPRODUCE THIS DOCUMENT WITHOUT WRITTEN CONSENT BY GENERALMUSIC.
APP. M.GALANTI	REV: A	IN/OUT, PHONES/STAND-BY BOARDS	

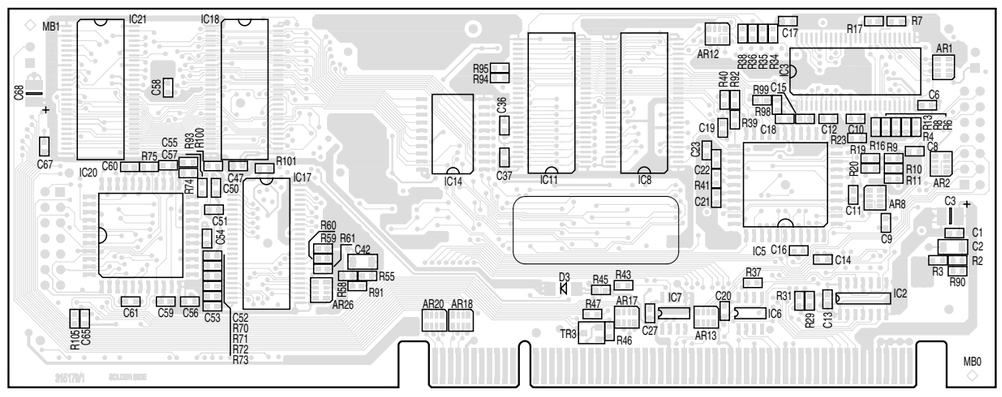
731043 - IN/OUT BOARD



761229 - 256+256Mbit DUAL DRAKE SOUND BOARD (SIDE A)



761229 - 256+256Mbit DUAL DRAKE SOUND BOARD (SIDE B)



DRW G.BOCCATO	DWG# 500985	PCB# 310688 / 315179	GENERALMUSIC S.p.A. ITALY
CKD M.GALANTI	DATE: 15/05/03	PCB Silkscreens of: 256+256Mbit DUAL DRAKE SOUND BOARD, IN/OUT BOARD.	ALL RIGHTS ARE RESERVED, NO COPIES OR REPRODUCE THIS DOCUMENT WITHOUT WRITTEN CONSENT BY GENERALMUSIC.
APP. M.GALANTI	REV: A		

Spare Part List

Legend

US = Specify US Version
EU = Specify EU Version

Optional Accessories

970418 Piano Triple Pedal (Dual Foot Switch + Damper)

Accessories

970134 Piano Single Foot Switch
271373 Owner's Manual (All Languages)
130283 Mains Cable (US)
130274 Mains Cable (EU)

Top Assembly

660743 PROMEGA 2 Front Panel
653636 "CONTR." Single Actuator
653635 "B-#" Dual Actuator
653634 "SOUNDS-MIDI" Dual Actuator
653633 "ON/OFF" Single Actuator
653632 "SPLIT P." Single Actuator
653631 "< >" Dual Actuator
653630 "TOUCH" Single Actuator
653629 "LOCAL OFF" Single Actuator
653628 "PRESET" Single Actuator
653627 "STORE" Single Actuator
653626 "LOCK" Single Actuator
653625 "TO LEFT" Single Actuator
653624 "5-6-7-8" Quad Actuator
653623 "1-2-3-4" Quad Actuator
653622 "- +" Dual Actuator
653621 "REV-PRO EFX" Dual Actuator
653620 "PARAM2-SEND" Dual Actuator
653619 "DEPTH-PARAM1" Dual Actuator
653618 "TIME-SEND" Dual Actuator
653617 "DEPTH-DELAY" Dual Actuator
653615 "DEMO" Single Actuator
653614 "USER" Single Actuator
653613 "E-F-G-H" Quad Actuator
653612 "A-B-C-D" Quad Actuator
651927 Plexiglass Bargraph Screen
651648 Plexiglass Lcd Display Screen
341037 Light Gray with Black Gauge Slider Knob
341036 11X15mm Anodized Aluminium Rotary Knob
340986 D=3.3mm H=9mm Spacer for Metal Panel
340984 Slider Antidust Cover
340982 Plexiglass Green Display Screen
340978 Slider Frame
340976 Plexiglass Red Display Screen
340973 Plexiglass Encoder Led Screen
340426 D=7.5 H=13 Plastic Ferrule
340186 Adhesive Cable Fixing
340115 Adhesive Flat Cable Fixing
210020 1.5x12mm Adhesive Red Felt (specify mt)
210016 1x10mm Adhesive Black Felt (specify mt)
120581 M3 Black Self-Locking Nut

Right Control Assembly

810700 Right Controls Panel Assembly
810691 * Right Controls Panel Board (Pcb#310684)
340971 ** Encoder Led Support
340091 ** 4mm Led Spacer
141100 ** 2 Contacts Vert Male Connector
140953 ** 6 Contacts P=2.54mm Female Vert Strip
140910 ** 14 Contacts Vert Male Connector
140529 ** Microswitch 12V 50mA 0.25mm
110262 ** Dial Encoder with 15 Snap H=20mm Alps
103032 ** 74HC165D SOIC 8bit P To S Shift Register
103028 ** 74HC4094M1R SOIC 8bit Shift/Latch Register
103017 ** 74HC4051DW SOIC 8ch Analog Multiplexer
103000 ** 74HC14D Soic Hex Inverter Schmitt Trigger
080760 ** SA05-11EWA Kingb. 7 Segments Red Display
080759 ** 2x5mm Rect Diffused Green Led
080758 ** 2x5mm Rect Diffused Red Led
080736 ** DC-10EWA Kingb. 10 Elements Red Led Bar
080723 ** 3mm 40deg High Eff Red Led
055048 ** 10K 1/16w 5% Smd Resistor 0603
055032 ** 470E 1/16w 5% Smd Resistor 0603
055024 ** 100E 1/16w 5% Smd Resistor 0603
031007 ** 10u 16V 20% Smd Electrolytic Tantalium Capacitor
011260 ** 100n 16V 10% Cer. Cap. Smd CL2 X7R 0603
011224 ** 100p 16V 10% Cer. Cap. Smd CL2 X7R 0603
731041 * Potentiometer Board (Pcb#310689)
140955 ** 40 Contacts P=2.54mm H=7mm Male Vert Strip
072002 ** 10KB 60mm Vertical Slim Slider Pot. Shaft H=10mm
340981 * Spacer for Potentiometer
120021 * M2x6tc Screw

Left Control Assembly

810699 Left Controls Panel Assembly
810690 * Left Controls Panel Board (Pcb#310682)
731049 ** 3 Digit Display Board (Pcb#310698)
103028 *** 74HC4094M1R SOIC 8bit Shift/Latch Register
080761 *** PSA05-12GWA Kingb. 16 Segments Green Display
055032 *** 470E 1/16w 5% Smd Resistor 0603
011060 *** 100n 50V 10% Cer. Cap. Smd CL2 Y5V 0805
340971 ** Encoder Led Support
340091 ** 4mm Led Spacer
141100 ** 2 Contacts Vert Male Connector
140953 ** 6 Contacts P=2.54mm Female Vert Strip
140935 ** 6 Contacts Hor Male Connector
140910 ** 14 Contacts Vert Male Connector
140874 ** Single In Line Vert Male Strip (specify contacts)
140529 ** Microswitch 12V 50mA 0.25mm
110262 ** Dial Encoder with 15 Snap H=20mm Alps
103032 ** 74HC165D SOIC 8bit P To S Shift Register
103028 ** 74HC4094M1R SOIC 8bit Shift/Latch Register
103017 ** 74HC4051DW SOIC 8ch Analog Multiplexer
103000 ** 74HC14D Soic Hex Inverter Schmitt Trigger
080764 ** 3mm High Eff Green Led
080760 ** SA05-11EWA Kingb. 7 Segments Red Display
080758 ** 2x5mm Rect Diffused Red Led
080723 ** 3mm 40deg High Eff Red Led
055048 ** 10K 1/16w 5% Smd Resistor 0603
055032 ** 470E 1/16w 5% Smd Resistor 0603
055028 ** 220E 1/16w 5% Smd Resistor 0603
055024 ** 100E 1/16w 5% Smd Resistor 0603
031007 ** 10u 16V 20% Smd Electrolytic Tantalium Capacitor
011260 ** 100n 16V 10% Cer. Cap. Smd CL2 X7R 0603
011224 ** 100p 16V 10% Cer. Cap. Smd CL2 X7R 0603
731041 * Potentiometer Board (Pcb#310689)
140955 ** 40 Contacts P=2.54mm H=7mm Male Vert Strip
072002 ** 10KB 60mm Vertical Slim Slider Pot. Shaft H=10mm
340981 * Spacer for Potentiometer
120021 * M2x6tc Screw

Lower Controls Panel Board

810694 Lower Controls Panel Board (Pcb#310687)
340091 * 4mm Led Spacer
141100 * 2 Contacts Vert Male Connector
140956 * 40 Contacts P=2.54mm H=8.5mm Male Vert Strip
140910 * 14 Contacts Vert Male Connector
140874 * Single In Line Vert Male Strip (specify contacts)
140860 * 14 Contacts Vert Male Dual In Line Strip
140529 * Microswitch 12V 50mA 0.25mm
103032 * 74HC165D SOIC 8bit P To S Shift Register
103028 * 74HC4094M1R SOIC 8bit Shift/Latch Register
103009 * 74HC02D SOIC Quad 2-In Nor Gate
103007 * 74HC74D SOIC Dual Flip-Flop
103000 * 74HC14D Soic Hex Inverter Schmitt Trigger
091004 * BC807-25L TO236 Smd Pnp Transistor (9FB/G5B)
081000 * PMLL4148 Smd 100mA 75V Signal Diode
080764 * 3mm High Eff Green Led
080762 * WM-C1602N-1GLY Wintek 2x16 Characters Lcd Display
080723 * 3mm 40deg High Eff Red Led
055060 * 100K 1/16w 5% Smd Resistor 0603
055048 * 10K 1/16w 5% Smd Resistor 0603
055044 * 4K7 1/16w 5% Smd Resistor 0603
055040 * 2K2 1/16w 5% Smd Resistor 0603
055036 * 1K 1/16w 5% Smd Resistor 0603
055032 * 470E 1/16w 5% Smd Resistor 0603
055027 * 180E 1/16w 5% Smd Resistor 0603
055024 * 100E 1/16w 5% Smd Resistor 0603
053012 * 10E 1/8w 5% Smd Resistor 1206
031007 * 10u 16V 20% Smd Electrolytic Tantalium Capacitor
011260 * 100n 16V 10% Cer. Cap. Smd CL2 X7R 0603
011224 * 100p 16V 10% Cer. Cap. Smd CL2 X7R 0603
011103 * 1u 16V 10% Cer. Cap. Smd CL2 X7R 1206

Pitch & Modulation Assembly

720644 Pitch & Modulation Assembly
770923 * Pitch & Modulation Cables Assembly
720647 * Fatar 41918180 Pitch & Modulation Kit (This part is replaced entirely only)
150298 * 100x2.5mm Nylon Cable Tie

Bottom Assembly

660758 Option Slot Cover
660757 Bottom Cabinet
653616 "STANDBY" Single Actuator
340435 Adhesive Foot
340370 Contrast Knob
340186 Adhesive Cable Fixing
340115 Adhesive Flat Cable Fixing
340093 Board Spacer
210216 Adhesive Rubber Foam 20x5mm (Specify mt)
171887 Hinge
171860 Slot Board Holder
150298 100x2.5mm Nylon Cable Tie
120825 6.2mm Spacer Screw
120581 M3 Black Self-Locking Nut
120483 5mm Black Shakeproof Washer
120120 M5x10tc Black Screw
120028 M3x6tc Black Screw
262321 Right Side
262320 Left Side
180643 Phones Adhesive Plate
180587 Model Data & Code Adhesive Label
171845 Right Fixing Angular
171844 Left Fixing Angular
150298 100x2.5mm Nylon Cable Tie
120581 M3 Black Self-Locking Nut
120467 4.2x10x0.5 Nylon Washer
120147 M4x10tt Black Screw
120034 M4x12tc Black Screw

Supply Assembly

110614 Mains Socket
110285 4A 250Vac Bipolar Power Switch
731011 SNP9541M 40W Switching Supply Unit

Wiring Connections

841323 20 Wires 50cm Latch Flat Cable
841320 14 Wires 50cm Latch Flat Cable
841289 Single 7.5cm AWG18 White Faston/Faston Wire
841288 2 Wires 12.5cm Faston/Crimp Terminal Cable
841287 20 Wires 55cm Latch Flat Cable
841286 14 Wires 90cm Latch Flat Cable
841285 10 Wires 115cm Latch Flat Cable
841121 20cm Yel/Grn Faston/Faston Wire
841096 4 Wires 7,5cm Flat Cable
841006 10cm Yel/Grn Faston/Faston AWG18 Wire
840616 20 Wires 25cm Latch Flat Cable
840600 16 Wires 85cm Latch Flat Cable
840564 14 Wires 10cm Latch Flat Cable
840560 14 Wires 20cm Latch Flat Cable
840535 16 Wires 80cm Latch Flat Cable
770922 Supply Cables Assembly

Keyboard Assembly

720643 TP30 Keyboard Assembly with Interface Board
841084 * 20 Wires 35cm Flat Cable
840838 * 20 Wires 15cm Flat Cable
761226 * Keyboard Interface Board (Pcb#310697)
141018 ** 20 Contacts Vert Female Connector
140918 ** 2 Contacts Hor Male Connector
140852 ** 20 Contacts Hor Male Connector Din41651
103015 ** 74HC164D SOIC 8bit S To P Shift Register
103000 ** 74HC14D Soic Hex Inverter Schmitt Trigger
091001 ** BC857B/C TO236 Smd Pnp Transistor (9BB/C-3F/G)
081000 ** PMLL4148 Smd 100mA 75V Signal Diode
055100 ** 100E X4 1/16w 5% Smd Resistor Array
055048 ** 10K 1/16w 5% Smd Resistor 0603
055040 ** 2K2 1/16w 5% Smd Resistor 0603
055024 ** 100E 1/16w 5% Smd Resistor 0603
031007 ** 10u 16V 20% Smd Electrolytic Tantalium Capacitor
011260 ** 100n 16V 10% Cer. Cap. Smd CL2 X7R 0603
011228 ** 220p 16V 10% Cer. Cap. Smd CL2 X7R 0603
011103 ** 1u 16V 10% Cer. Cap. Smd CL2 X7R 1206
720642 * TP30 Keyboard Assembly
810552 ** 39N Left Contacts Board (Pcb#310531)
340764 *** 3 Dual Contacts Rubber Strip
340211 *** 12 Dual Contact Rubber Strip
141018 *** 20 Contacts Vert Female Connector
141010 *** 4 Contacts Vert Female Connector
080103 *** 1N4148 100mA 75V Signal Diode
810551 ** 49N Right Contacts Board (Pcb#310530)
340212 *** 13 Dual Contact Rubber Strip
340211 *** 12 Dual Contact Rubber Strip
141018 *** 20 Contacts Vert Female Connector
141010 *** 4 Contacts Vert Female Connector
080103 *** 1N4148 100mA 75V Signal Diode
160221 ** Key Return Spring (TP30)
151272 ** First A Key (TP30)
151271 ** Sharp Key (TP30)
151270 ** B Key (TP30)
151269 ** A Key (TP30)
151268 ** G Key (TP30)
151267 ** F Key (TP30)
151266 ** E Key (TP30)
151265 ** D Key (TP30)
151264 ** C Key (TP30)
340092 * 5mm Board Spacer
120281 * WL3x15tt Black Screw

Cpu & Sound Generator Board (1st Version)

Note 1st and 2nd Cpu Board versions are fully inter-changeable.

761257 Cpu & Sound Generator Board (Pcb#315171) (1st version)
761235 * 128Mbit Flash Memory Expansion Board (Pcb#310693)
340435 ** Adhesive Foot
142000 ** 20 Contacts P=2mm SMD Female Vert Strip
104064 ** K9F2808U0M-YCB0 128Mbitx8 Nand Flash
031007 ** 10u 16V 20% Smd Electrolytic Tantalium Capacitor
011260 ** 100n 16V 10% Cer. Cap. Smd CL2 X7R 0603
761228 * Cpu & Sound Generator Board (Pcb#315171) Not available as spare part
141102 ** 6 Contacts Vert Male Connector
140957 ** 20 Contacts P=2mm Male Vert Strip
140950 ** 120 Contacts Female PCI Edge Connector
140910 ** 14 Contacts Vert Male Connector
140877 ** Jumper For Contacts Strip (p=2.54mm)
140874 ** Single In Line Vert Male Strip (specify contacts)
140872 ** 4 Contatcs Hor Male Connector
140854 ** 16 Contacts Vert Male Connector Din41651
140851 ** 20 Contacts Vert Male Connector Din41651
106009 ** LM1117DTX-ADJ Voltage Reg.0,8A TO252
106003 ** MAX709 Power Monitor With Reset
106001 ** MC33078P SOIC Dual Low Noise Op. Amp.
105019 ** GVS99372 DRAKE (White Dot)
104065 ** IS41LV16100/S50T 16Mbitx16 Edo Dram
104064 ** K9F2808U0M-YCB0 128Mbitx8 Nand Flash
104052 ** AT24C64 64Kbit Serial Access EEProm
103507 ** 74HCT374 SOIC Octal D-Type Flip-Flop
103505 ** 74HCT138 SOIC 1 Of 8 Decoder
103502 ** 74HCT32 SOIC Quad 2-In Or Gate
103501 ** 74HCT04 SOIC Hex Inverter
103055 ** DS90LV018ATM SOIC LVDS Dif.line Receiver
103054 ** DS90LV017ATM SOIC LVDS Dif.line Driver
103053 ** AD1870 Single-supply 16bit Stereo Adc
103052 ** AD1854 Stereo 24bit Dac
103051 ** 74LVC374 SOIC Octal 3-state D Flip-flop
103050 ** 74LVC139 SOIC Dual 2 To 4 Line Decoder
103049 ** 74LVC74 SOIC Dual D Flip-flop
103048 ** 74LVC32D SOIC Quad 2-input Or Gate
103047 ** 74LVC04 SOIC Hex Inverter
103046 ** 74LVC125AD SOIC Quad Buffer/line Driver
103017 ** 74HC4051DW SOIC 8ch Analog Multiplexer
103012 ** 74HC125D SOIC Quad Tri-State Buffer
081000 ** PMLL4148 Smd 100mA 75V Signal Diode
070160 ** 2K2 20% Horizontal Linear Trimmer
055576 ** 1K5 1/16w 1% Smd Resistor 0603
055572 ** 1K0 1/16w 1% Smd Resistor 0603
055570 ** 820E 1/16w 1% Smd Resistor 0603
055562 ** 390E 1/16w 1% Smd Resistor 0603
055552 ** 150E 1/16w 1% Smd Resistor 0603
055105 ** 10E X4 1/16w 5% Smd Resistor Array
055102 ** 33E X4 1/16w 5% Smd Resistor Array
055101 ** 4K7 X4 1/16w 5% Smd Resistor Array
055099 ** 0E 1/16w 5% Smd Resistor 0603
055072 ** 1M 1/16w 5% Smd Resistor 0603
055060 ** 100K 1/16w 5% Smd Resistor 0603
055044 ** 4K7 1/16w 5% Smd Resistor 0603
055032 ** 470E 1/16w 5% Smd Resistor 0603
055028 ** 220E 1/16w 5% Smd Resistor 0603
055024 ** 100E 1/16w 5% Smd Resistor 0603
055018 ** 33E 1/16w 5% Smd Resistor 0603
055012 ** 10E 1/16w 5% Smd Resistor 0603
031007 ** 10u 16V 20% Smd Electrolytic Tantalium Capacitor
030485 ** 100u 25V 20% Vert Electrolytic Capacitor
011260 ** 100n 16V 10% Cer. Cap. Smd CL2 X7R 0603
011248 ** 10n 16V 10% Cer. Cap. Smd CL2 X7R 0603
011238 ** 1n5 16V 10% Cer. Cap. Smd CL2 X7R 0603
011236 ** 1n 16V 10% Cer. Cap. Smd CL2 X7R 0603
011232 ** 470p 16V 10% Cer. Cap. Smd CL2 X7R 0603
011103 ** 1u 16V 10% Cer. Cap. Smd CL2 X7R 1206
010741 ** 11.2896MHz Quartz

Cpu & Sound Generator Board (2nd Version)

761273 Cpu & Sound Generator Board (Pcb#310727) (2nd version)

141102	*	6 Contacts Vert Male Connector
140950	*	120 Contacts Female PCI Edge Connector
140910	*	14 Contacts Vert Male Connector
140877	*	Jumper For Contacts Strip (p=2.54mm)
140874	*	Single In Line Vert Male Strip (specify contacts)
140872	*	4 Contatcs Hor Male Connector
140854	*	16 Contacts Vert Male Connector Din41651
140851	*	20 Contacts Vert Male Connector Din41651
106009	*	LM1117DTX-ADJ Voltage Reg.0,8A TO252
106003	*	MAX709 Power Monitor With Reset
106001	*	MC33078P SOIC Dual Low Noise Op. Amp.
105012	*	DRAKE - Cpu & Dsp Processor
104072	*	TC58256AFT 3v3 TSOP 256MBit Nand Flash
104065	*	IS41LV16100/S50T 16Mbitx16 Edo Dram
104052	*	AT24C64 64Kbit Serial Access EEProm
103507	*	74HCT374 SOIC Octal D-Type Flip-Flop
103505	*	74HCT138 SOIC 1 Of 8 Decoder
103502	*	74HCT32 SOIC Quad 2-In Or Gate
103501	*	74HCT04 SOIC Hex Inverter
103066	*	TLC548CD SOIC 8-bit A/D Converter
103055	*	DS90LV018ATM SOIC LVDS Dif.line Receiver
103054	*	DS90LV017ATM SOIC LVDS Dif.line Driver
103053	*	AD1870 Single-supply 16bit Stereo Adc
103052	*	AD1854 Stereo 24bit Dac
103051	*	74LVC374 SOIC Octal 3-state D Flip-flop
103050	*	74LVC139 SOIC Dual 2 To 4 Line Decoder
103049	*	74LVC74 SOIC Dual D Flip-flop
103048	*	74LVC32D SOIC Quad 2-input Or Gate
103047	*	74LVC04 SOIC Hex Inverter
103046	*	74LVC125AD SOIC Quad Buffer/line Driver
103017	*	74HC4051DW SOIC 8ch Analog Multiplexer
103012	*	74HC125D SOIC Quad Tri-State Buffer
081000	*	PMLL4148 Smd 100mA 75V Signal Diode
070160	*	2K2 20% Horizontal Linear Trimmer
055576	*	1K5 1/16w 1% Smd Resistor 0603
055572	*	1K0 1/16w 1% Smd Resistor 0603
055570	*	820E 1/16w 1% Smd Resistor 0603
055562	*	390E 1/16w 1% Smd Resistor 0603
055552	*	150E 1/16w 1% Smd Resistor 0603
055105	*	10E X4 1/16w 5% Smd Resistor Array
055102	*	33E X4 1/16w 5% Smd Resistor Array
055101	*	4K7 X4 1/16w 5% Smd Resistor Array
055099	*	0E 1/16w 5% Smd Resistor 0603
055072	*	1M 1/16w 5% Smd Resistor 0603
055060	*	100K 1/16w 5% Smd Resistor 0603
055044	*	4K7 1/16w 5% Smd Resistor 0603
055036	*	1K 1/16w 5% Smd Resistor 0603
055032	*	470E 1/16w 5% Smd Resistor 0603
055028	*	220E 1/16w 5% Smd Resistor 0603
055024	*	100E 1/16w 5% Smd Resistor 0603
055018	*	33E 1/16w 5% Smd Resistor 0603
055012	*	10E 1/16w 5% Smd Resistor 0603
053024	*	100E 1/8w 5% Smd Resistor 1206
031007	*	10u 16V 20% Smd Electrolytic Tantalium Capacitor
030485	*	100u 25V 20% Vert Electrolytic Capacitor
011260	*	100n 16V 10% Cer. Cap. Smd CL2 X7R 0603
011248	*	10n 16V 10% Cer. Cap. Smd CL2 X7R 0603
011238	*	1n5 16V 10% Cer. Cap. Smd CL2 X7R 0603
011236	*	1n 16V 10% Cer. Cap. Smd CL2 X7R 0603
011232	*	470p 16V 10% Cer. Cap. Smd CL2 X7R 0603
011224	*	100p 16V 10% Cer. Cap. Smd CL2 X7R 0603
011103	*	1u 16V 10% Cer. Cap. Smd CL2 X7R 1206
010741	*	11.2896MHz Quartz

Dual Drake Sound Board

761229 256+256Mbit Dual Drake Sound Board (Pcb#315179)

560023	*	EPM3064ALC 44-4 EE Fpga “DRAKE PM3 PRG”
106009	*	LM1117DTX-ADJ Voltage Reg.0,8A TO252
105020	*	GVS99372 DRAKE (Red Dot)
104066	*	K4S281632C-TC1L 128Mbitx16 Sync Dram 100MHz
104065	*	IS41LV16100/S50T 16Mbitx16 Edo Dram
103056	*	74LVC245DW SOIC Octal Bus Transceiver
103055	*	DS90LV018ATM SOIC LVDS Dif.line Receiver
103046	*	74LVC125AD SOIC Quad Buffer/line Driver
091004	*	BC807-25L TO236 Smd Pnp Transistor (9FB/G5B)
091000	*	BC847B/C TO236 Smd Npn Transistor (8BB/C-1F/G)
081100	*	PRLL5817 SOD87 1A 20V Schottky Rect. Diode
055570	*	820E 1/16w 1% Smd Resistor 0603
055562	*	390E 1/16w 1% Smd Resistor 0603
055552	*	150E 1/16w 1% Smd Resistor 0603
055105	*	10E X4 1/16w 5% Smd Resistor Array
055102	*	33E X4 1/16w 5% Smd Resistor Array
055101	*	4K7 X4 1/16w 5% Smd Resistor Array
055099	*	0E 1/16w 5% Smd Resistor 0603
055044	*	4K7 1/16w 5% Smd Resistor 0603
055036	*	1K 1/16w 5% Smd Resistor 0603
055030	*	330E 1/16w 5% Smd Resistor 0603
055020	*	47E 1/16w 5% Smd Resistor 0603
055018	*	33E 1/16w 5% Smd Resistor 0603
055012	*	10E 1/16w 5% Smd Resistor 0603
031007	*	10u 16V 20% Smd Electrolytic Tantalium Capacitor
011260	*	100n 16V 10% Cer. Cap. Smd CL2 X7R 0603
011103	*	1u 16V 10% Cer. Cap. Smd CL2 X7R 1206

Phones/Stand-by Board

731045 Phones/Stand-by Board (Pcb#310702)

340091	*	4mm Led Spacer
230569	*	FL5R200PNT EMI Coil For Signal
140954	*	10 Contacts Hor Male Connector Din41651
140890	*	4 Contacts Hor Male Single-Strip
140529	*	Microswitch 12V 50mA 0.25mm
140217	*	Jack Stereo Slim Horizontal Socket
080742	*	3mm Wide Diffused Red-Grn Led
050191	*	33E 1/4W 5% Resistor
010595	*	100n 50V -20+80% Ceramic Cap. Multilayer

In/Out Board

731043 In/Out Board (Pcb#310688)

230569	*	FL5R200PNT EMI Coil For Signal
141102	*	6 Contacts Vert Male Connector
140944	*	10 Contacts Vert Male Connector Din41651
140854	*	16 Contacts Vert Male Connector Din41651
140851	*	20 Contacts Vert Male Connector Din41651
140247	*	8 Poles Mini Din Female Socket
140217	*	Jack Stereo Slim Horizontal Socket
140212	*	5 Poles Din Horizontal Female Socket
140207	*	Jack Horizontal F Socket (with dual switch)
110322	*	2sw 3pos Slide Switch
110305	*	Relay 12V / 2 Switch 1A 250Vac
106007	*	TDA8542AT SOIC 2X1.5W BTL Audio Amplifier
100919	*	MC33078 Dual LN Operational Amplifier
100734	*	MAX202E RS232 Drivers/Receiver
100602	*	74HC04 Hex Inverter
100600	*	74HC00 Quad 2-Input Nand Gate
100035	*	6N138 Optocoupler
090194	*	BC560C TO92 LN Pnp Transistor
090152	*	BC337 TO92 Npn Transistor
080156	*	1N4002 1A 100V Rectifier Diode
080103	*	1N4148 100mA 75V Signal Diode
070231	*	47K 20% Ver Linear Trimmer +Knob
052072	*	1M 1/8w 5% Resistor
052060	*	100K 1/8w 5% Resistor
052050	*	15K 1/8w 5% Resistor
052048	*	10K 1/8w 5% Resistor
052047	*	8K2 1/8w 5% Resistor
052044	*	4K7 1/8w 5% Resistor
052040	*	2K2 1/8w 5% Resistor
052030	*	330E 1/8w 5% Resistor
052028	*	220E 1/8w 5% Resistor
052020	*	47E 1/8w 5% Resistor
052006	*	3E3 1/8w 5% Resistor
043480	*	10K0 1/8w 1% Resistor
030565	*	220u 25V 20% Vert Electrolytic Capacitor
030403	*	47u 25V 20% Vert Electrolytic Capacitor
030245	*	10u 50V 20% Vert Electrolytic Capacitor
030170	*	4u7 50V 20% Vert Electrolytic Capacitor
021028	*	220n 63V 10% MKT Polyester Capacitor
010740	*	1MHz Ceramic Resonator
010595	*	100n 50V -20+80% Ceramic Cap. Multilayer
010462	*	1n 50V 10% CL2 Ceramic Capacitor
010345	*	100p 50V 10% CL2 Ceramic Capacitor
010271	*	22p 50V 10% CL2 Ceramic Capacitor

Note:

- All dimensions are in mm unless otherwise specified.
- The screw description is defined as follows:
  type of screw + diameter + X + length + type of head
  where type of screw is one of these:
  M = Metric thread
  B = Self-tapping screw for metal
  WL = Self-tapping screw for wood
  and type of head is one of these:
  tc = cylinder Phillips head
  ts = flared Phillips head
  tt = rounded Phillips head
  te = hexagonal nut head
  tsp = flat flared Phillips head
  tce = cylinder Allen hexagonal head
- The washer description is defined as follow:
  hole diameter + X + external diameter + X + thick
- 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.