



**d400** *Dsp powered loudspeaker system*

**x300** *Lightweight passive loudspeaker*

**SERVICE MANUAL**



**code 270292**

**Index**

- 2 **Technical Specifications.**
- 3 **Test Preocedures & Adjustments.**
- 4 **Schematic Diagrams.**
- 5 **PCB Layouts.**
- 6 **Passive Version Schematic Diagrams.**
- 7 **Spare Part List.**



**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 ( $\mu$ ) micro symbol of capacitance value is substituted by U.

The ( $\Omega$ ) 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.	↑ Supply voltage.	⏏ Logic supply ground.
• Male connector.	▣ Test point.	⏏ Analog supply ground.
⌋ Female connector.	⏏ Flag joined with one or more flags with the same signal name inscribed.	⏏ Chassis ground.
⏏ M/F faston connector.		⏏ Earth ground.



**ATTENTION**

Observe precautions when handling electrostatic sensitive devices.



**GENERALMUSIC S.p.A. Sales Division: 47842 S.Giovanni in Marignano (RN) ITALY - Via delle Rose, 12**  
**Phone +39(0)541/959511 - Fax +39(0)541/957404 - Internet: [www.generalmusic.com](http://www.generalmusic.com)**

d400 - Technical Specification

Loudspeaker Specifications		
Components	High Low	1" compression driver with titanium diaphragm 12" woofer with neodimuim magnet
Construction	Cabinet Finish Protection Flying hardware	Reinforced polypropilene Metal grid Aluminium handle 4 M10 flying points
Weight	kg	19,2
Dimensions	mm (WxHxD)	400x620x375

Dsp Processor / Amplifier Specifications		
Inputs / Outputs	sensitivity impedance	+4 dB (nominal) / -40dB (max) 20 kOhms (balanced)
A/D converter	bit	24
D/A converter	bit Dynamic range Sampling Rate	24 100 dB 48 kHz
Crossover	Type Frequency Slope	Bessel, Butterworth or Linkwitz-Riley Variable from 15.6 Hz to 16 kHz 6, 12, 18, 24, or 48dB per octave
EQ	Number Type Gain Bandwidth Freq	5 parametric bands on each input and output Peak, 6dB Lo-Shelf, 12dB Lo-Shelf, 6dB Hi-Shelf, 12dB Lo-Shelf, Notch +/-15dB, variable in 0.5dB steps 0.05 to 3.00 octaves, variable in 0.05 steps 15.6 Hz to 16 kHz
Alignment delay	max delay	189 ms
Plugins		Noise Gate, Anti-feedback, Multiband compressor
Protections		Independent peak limiter for each output Long-term power protection LFC - Low Frequency Control
Output power EIA (1kHz, THD 1%)	High Low	100W, AB class 300W, H class
Distortion	%	<0.02
Controls		Volume PRESETS selector
Connectors		1 x COMBO (LINE + MIC input) 1 x XLR-M (link) Power supply socket
Power supply		see label on the apparatus

System Specifications		
Frequency response	Hz	45 - 20000 (-10dB)
Sensitivity	MAX SPL Continuous	123 dB
Dispersion	°	100x60

x300 - Technical Specifications

Loudspeaker Specifications		
Components	High Low	1" compression driver with titanium diaphragm 12" woofer with neodimuim magnet
Power handling (EIA RS-426A)	W continuous W peak	300 600
Impedance	Ohms	4 / 8
Passive crossover	Hz	LP: 12dB/oct. @ 2.5kHz HP: 18dB/oct. @ 2.5kHz
Connections		1/2 x SPEAKON
Construction	Cabinet Protection Transport Flying hardware	Reinforced polypropilene Metal grid Aluminium handle 4 M10 flying points
Weight	kg	13
Dimensions	mm (WxHxD)	400x620x375

System Specifications		
Frequency response	Hz	50 - 20000 (-10dB)
Sensitivity	MAX SPL Continuous	123 dB
Dispersion	°	100x60

D400 - TEST PROCEDURES & ADJUSTMENTS

PRECAUTION

- To prevent short circuit during any test, the oscilloscope must be EARTH insulated, this occurs because some test require to connect its probe to the amplifier output, non-compliance may cause damages to oscilloscope inputs circuitry.
- Before removing or installing any modules and connectors, disconnect the amplifier from AC MAINS and measure the DC supply voltages across each of the power supply capacitors. If your measurement on any of the caps is greater than 10Vdc, connect a 100ohm 50W resistor across the applicable caps to discharge them for your safety. Remember to remove the discharge resistor immediately after discharging caps. Do not power up the amplifier with the discharge resistor connected.
- Read these notes entirely before proceeding to any operation. These notes are not comprehensive of all damages that possibly occur, but includes some specifically advices, checks and adjustments relative to this amplified speaker.
- Do not check the amplifier with the speakers connected use the appropriate load resistors only.
- BE CAREFUL increasing the Variac you must not exceed the nominal mains voltage plus its tolerance (see specifications) any upper voltage can be cause of damage.

REMARKS

- This loudspeaker system is processed by a RED 40bit DSP (Digital Signal Processor), the processor supervise all louspeaker operation such as crossover filters, equalization, phase, delay, peak limiters, long term power protection, LFC low frequency control, anti-feedback, multicomp and noise gate. These functions are recalled with the 16 PRESET encoder on the system panel, which include different settings suitable for the use of the system in different configurations. Follow a brief explapanation of each preset:

PRESET	Description
1) LEM INDOOR	Typical indoor equalization (default preset)
2) LEM OUTDOOR	Typical outdoor equalization (more mids)
3) FLAT	Without equalization
4) ENTERTAIN	Typical entertainer/piano bar equalization
5) MAX LOUD	Typical loudness contour equalization for low level listening
6) CD PLAYER	Typical DJ, DISCO PUB eq for high level listening (with multicomp)
7) WALL MOUNT	Typical wall mount equalization taking in count the 6 dB low boost
8) STAGE MONITOR	Typical stage monitor equalization (without anti-feedback)
9) LEM INDOOR SW	Same as above with 100Hz HP Filter to use it with Sub Woofer
10) LEM OUTDOOR SW	Same as above with 100Hz HP Filter to use it with Sub Woofer
11) FLAT SW	Same as above with 100Hz HP Filter to use it with Sub Woofer
12) ENTERTAIN SW	Same as above with 100Hz HP Filter to use it with Sub Woofer
13) MAX LOUD SW	Same as above with 100Hz HP Filter to use it with Sub Woofer
14) CD PLAYER SW	Same as above with 100Hz HP Filter to use it with Sub Woofer
15) WALL MOUNT SW	Same as above with 100Hz HP Filter to use it with Sub Woofer
16) MIC PLUG & PLAY	Typical voice/mic amplification (with anti-feedback)

IMPORTANT NOTE

- Shorting the internal jumper between pin 1 and 3 of CN1 located on CPU/DSP Board, the amplifier is set for testing the amplifier module alone with a flat response on each output, without eq, filters, limiters and protections.
- BE SURE THAT IS INSERTED WHEN YOU CHECK THE AMPLIFIER ALONE AND REMOVED WHEN THE SPEAKERS ARE CONNECTED.**
- The amplifier module is designed with two amplifiers: a 300W amplifier for the LF speaker builded with discrete devices and operating in class H, and a 100W amplifier for the HF driver builded with integrated device and operating in class AB.

VISUAL CHECK

- Check the speakers for any damaging (cone-breaking, interruption or further).
- Before proceed to supply the amplifier check visually the internal assembly, if appears an evident damage find the most possible reasons that cause it.
- Check the wiring cables for possible interruptions or shorts.
- If the damage has burnt a printed circuit board don't try to repair it, replace with a new one.

TEST INSTRUMENTS

- Audio Generator
- Dual Trace Oscilloscope
- Digital Multimeter
- Temperature Meter
- 4ohm 500W, 8ohm 150W, 100ohm 50W resistors
- Variac (0÷250Vac)

TECHNICAL SPECIFICATIONS

Power Requirements:	(230Vac±10% 50Hz)	400VA
or	(115Vac±10% 50/60Hz)	400VA
Max Low Out Power*:	(4ohm)	290W
Max High Out Power*:	(8ohm)	64W
Low Out*:	(4ohm)	96Vpp
High Out*:	(8ohm)	64Vpp

Frequency Response:	(-10dB)	45Hz ÷ 20KHz
Frequency X-Over	(Low/High)	2.2KHz
Nominal Input Sensitivity:	(+4dBu)	1.229V <sub>RMS</sub>
Mic Max Input Sensitivity:	(-40dBu)	7.75mV <sub>RMS</sub>
Input Impedance:	(balanced)	30Kohm
	(unbalanced)	15Kohm

Voltage Gain:	(nominal)	29±1dB
IMD:	(SMPTE 60Hz/7KHz 4:1)	<0.1%
THD:	(THD+N)	<0.1%
S/N Ratio:	(unweighted)	>100dB

\* Note: measured with the IHF standard method and without limiters.

SETUP

- Connect the Variac between the mains and the amplifier and set it at zero voltage.
- Disconnect all the Speakers.
- Turn at centre (nominal level) the VOLUME potentiometer.
- Insert the jumper between pin1 and pin3 of CN1.
- Set the ENCODER rotary switch on preset LEM INDOOR.
- Connect the audio generator to the input and set it to 1000Hz -10dBu (245mV<sub>RMS</sub>) sinusoidal signal.
- Connect the oscilloscope probe CH1 to the LOW OUT, clip to - (S3) and tip to + before RL1 (R15 side RL1), set it to 5V/div. 200µS/div.
- Connect the oscilloscope probe CH2 to the HIGH OUT, clip to - (S2) and tip to + (S1), set it to 5V/div. 200µS/div.
- The load resistors are disconnected.
- The procedures that follow must be executed subsequently in the order specified.

SUPPLY CHECK

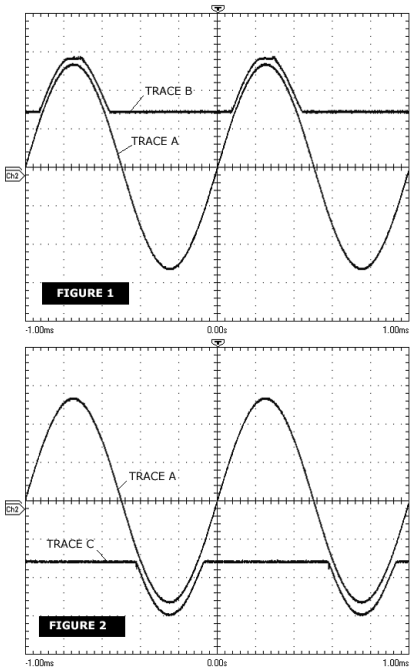
- Verify with the Multimeter the insulation between the heatsink and all device packages (TR1,2,3,4,6,8,14,15,20, IC1,2,3,4).
- Verify with the Multimeter the PTC resistor value, it must be between 50 and 200ohm.
- Remove the transformer secondary fuses, set the Variac to the nominal mains voltage, check with the Multimeter the AC supply voltages:  
F1-F2=93±2Vac.  
F3-F4=50±1.5Vac.
- Re-set the Variac at zero voltage, turn off the amplifier and put the fuses back on its holders.
- Set up the Variac slowly monitoring the oscilloscope screen, starts from 2/3 of nominal mains voltage it should display the sinusoidal signal amplified without distortions and without any DC voltage, if a distortion occur or the protection trips check the amplifier as suggested in the ADVICES section.
- When the Variac ac voltage reaches the nominal voltage verify the DC supplies as follow:  
TR8 collector pin 3 (+Vcc2) =+63±2Vdc  
TR14 collector pin 3 (-Vcc2) =-63±2Vdc  
TR2 collector pin 2 (+Vcc1) =+32±2Vdc  
TR3 collector pin 2 (-Vcc1) =-32±2Vdc  
IC4 pin 3 =+15±1Vdc  
IC3 pin 3 =-15±1Vdc
- If one or more voltages don't correspond, check the rectifiers, capacitors and transformers disconnecting them from circuitry, refer to schematics.

INITIAL CHECK (LOW AMPLIFIER)

- Set both channels of the oscilloscope to 10V/div. 200µS/div.
- Increase the input level to -6dBu (0.388V<sub>RMS</sub>) sinusoidal signal.
- The channel output signals must be symmetrical respect the GND with an amplitude of about 25V<sub>PEAK</sub> and without visible distortion or oscilation as shown in Fig.1 Trace A (note: the figure is representative don't refer to its level). If there is a distortion read the section ADVICES.

HIGH RAIL CHECK (LOW AMPLIFIER)

- Connect the CH2 probe tip to D2 cathode and set the sensitivity of both channels at 20V/div.
- Increasing the input signal two things should to happen: till the output signal (Positive half-wave) is less than 25V<sub>PEAK</sub> the voltage on D2 cathode have to remain constant at 32V, when the output signal exceeds 25V<sub>PEAK</sub> the voltage on D2 cathode will have to follow the output signal with 7V offset (see Fig.1 Trace B).
- Check the negative high rail connecting the probe to D3 anode (see Fig.2 Trace C).
- Increase further the input signal till it reaches about +2dBu (0.976V<sub>RMS</sub>), the amplifier output have to reach its maximum output before clipping at about 60V<sub>PEAK</sub> (48V<sub>PEAK</sub> with load attached for an input signal of about +0dBu).
- Connect the 4ohm 500W load on the output and repeat the INITIAL and HIGH RAIL checks.



PTC TEMPERATURE SENSOR CHECK (LOW AMPLIFIER)

- Heat the PTC sensor with a welder tip, in touch with its body, to verify if this protection works properly reducing the output signal to few volts with time.

BIAS ADJUSTMENT (LOW AMPLIFIER):

- Set the generator level at zero, connect the Multimeter across the R13 resistor, then adjust VR1 trimmer to read 5±0.5mVdc.
- Verify the same voltage across R15.

BANDWIDTH CHECK (LOW AMPLIFIER)

- Switch the generator frequency to 100Hz and 10KHz, no level changes respect to 1KHz must be detectable.

AMPLIFIER CHECK (HIGH AMPLIFIER)

- Set up the generator to 1KHz 0dBu (775mV<sub>RMS</sub>) sinusoidal signal.
- Connect the oscilloscope probe CH2 to the HIGH OUT, clip to - (S2) and tip to + (S1), set it to 10V/div. 200µS/div.
- The channel output signal must be symmetrical without visible distortion and oscillation as shown in fig.1 trace A (note: the figure is representative don't refer to its level). If there is a distortion check IC1 circuitry.
- Increase the input signal, when the input signal reaches about +2dBu (0.976V<sub>RMS</sub>) the amplifier output reaches its maximum output before clipping at about 30±2V<sub>PEAK</sub> (27±2V<sub>PEAK</sub> with load attached and an input signal of about +1dBu).
- Switch the generator frequency to 100Hz and 10KHz, no level changes respect to 1KHz must be detectable.
- Connect the 8ohm 150W load on output and repeat the check.

MIC INPUT CHECK

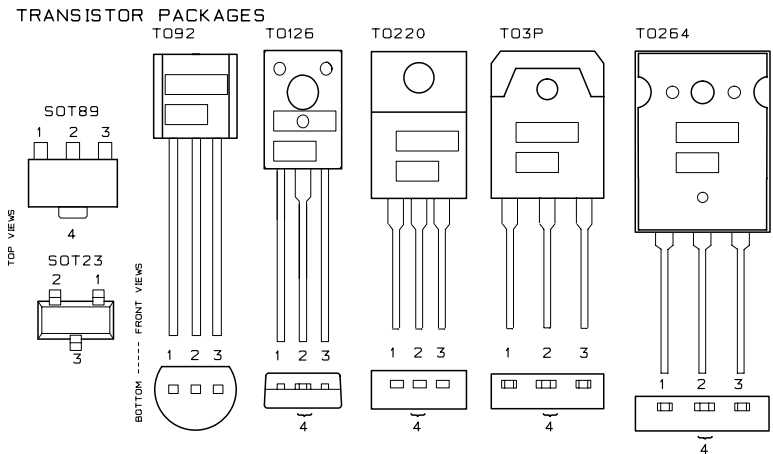
- Set up the generator to 1KHz -40dBu (7.75mV<sub>RMS</sub>) sinusoidal signal.
- Rotate full clockwise (max level) the VOLUME potentiometer.
- The CH1 oscilloscope trace attached to LOW output amplifier must be equal to 60±5V<sub>PEAK</sub> (without load attached).

ENCODER & SIGNAL/LIMIT CHECK

- Switch off, wait some seconds and then switch on the amplifier, a testing loop will start.
- The SIGNAL/LIMIT led lights green for three sec. and red for another three sec.
- Waiting six sec. the led starts to flash in green colour, rotate the PRESET encoder on CD PLAYER SW position, the green led remains lighted for three sec. the CPU/DSP confirms the right encoder reading.
- Waiting another three sec. the led starts again to flash in green colour, rotate the PRESET encoder on FLAT position, the red led remains lighted for three sec. to confirm the right encoder reading.
- Waiting another three sec. the led starts again to flash in green colour, the check is end.
- If you want to start it again, you have to select LEM INDOOR SW, the led switch off for three sec. and then it flashes again, the check it is ready start.

ADVICES

- If the input sinewave appears to be distorted during the negative cycle, you can assume that the problem is located somewhere in the circuitry of the positive rail.
- If the positive cycle appears distorted, you can assume that the problem is in the circuitry of the negative low rail. Refer to the schematics.
- If you have determinate that the problem is a short on a supply rail, you must check the output transistors to determine which transistor devices are bad.
- Use a soldering iron to lift one leg of each emitter pin and measure the emitter-collector resistance on each device.
- Unsolder and lift one leg of each base pin and check the base-collector resistance of each transistor and replace any that measure as a short.
- If all the transistors are OK, unsolder and lift one leg of each diode and check them.
- Check the circuit board for open foil traces.
- Use the Multimeter as Ohm-meter to check the resistors, particularly the base and emitter resistors of damaged transistor.

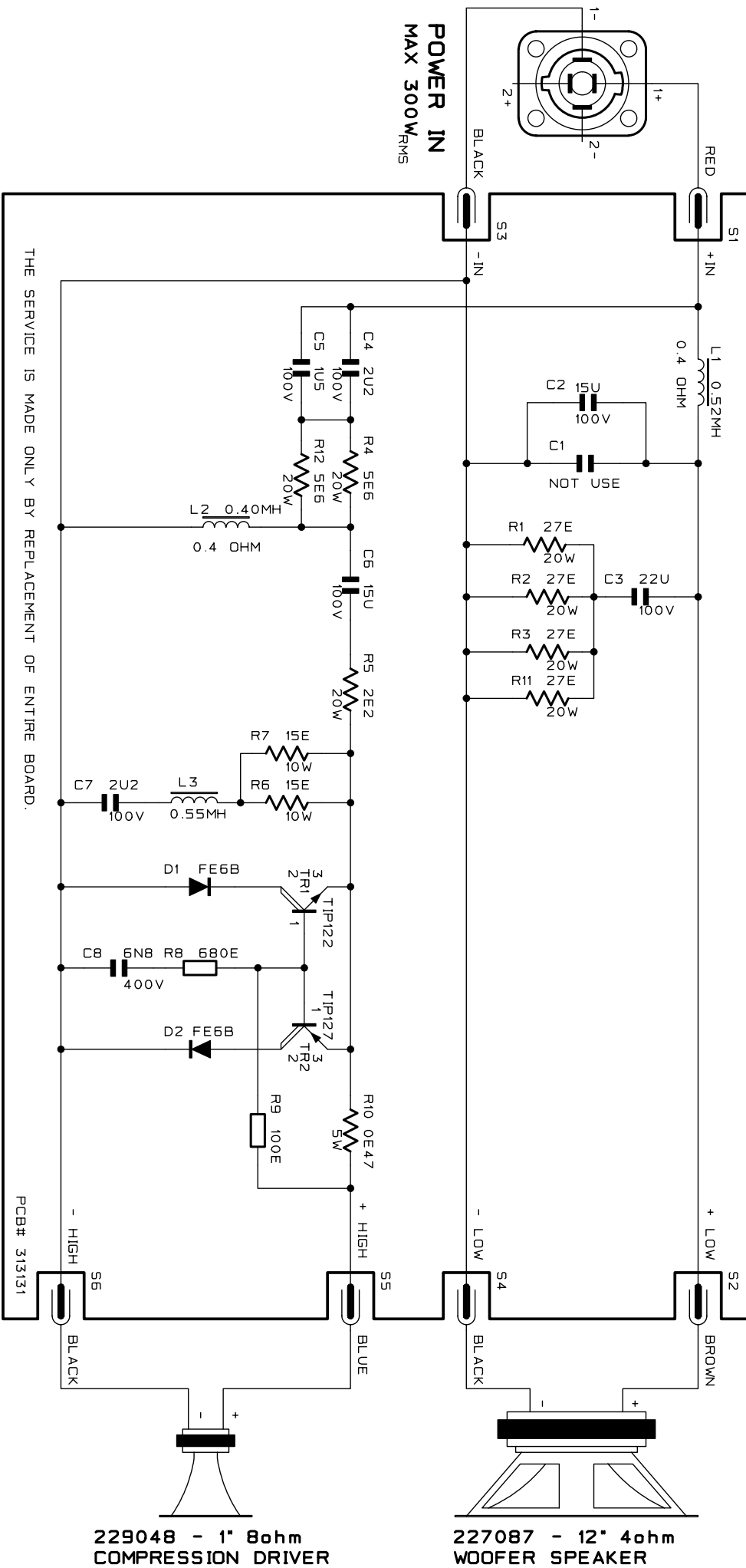






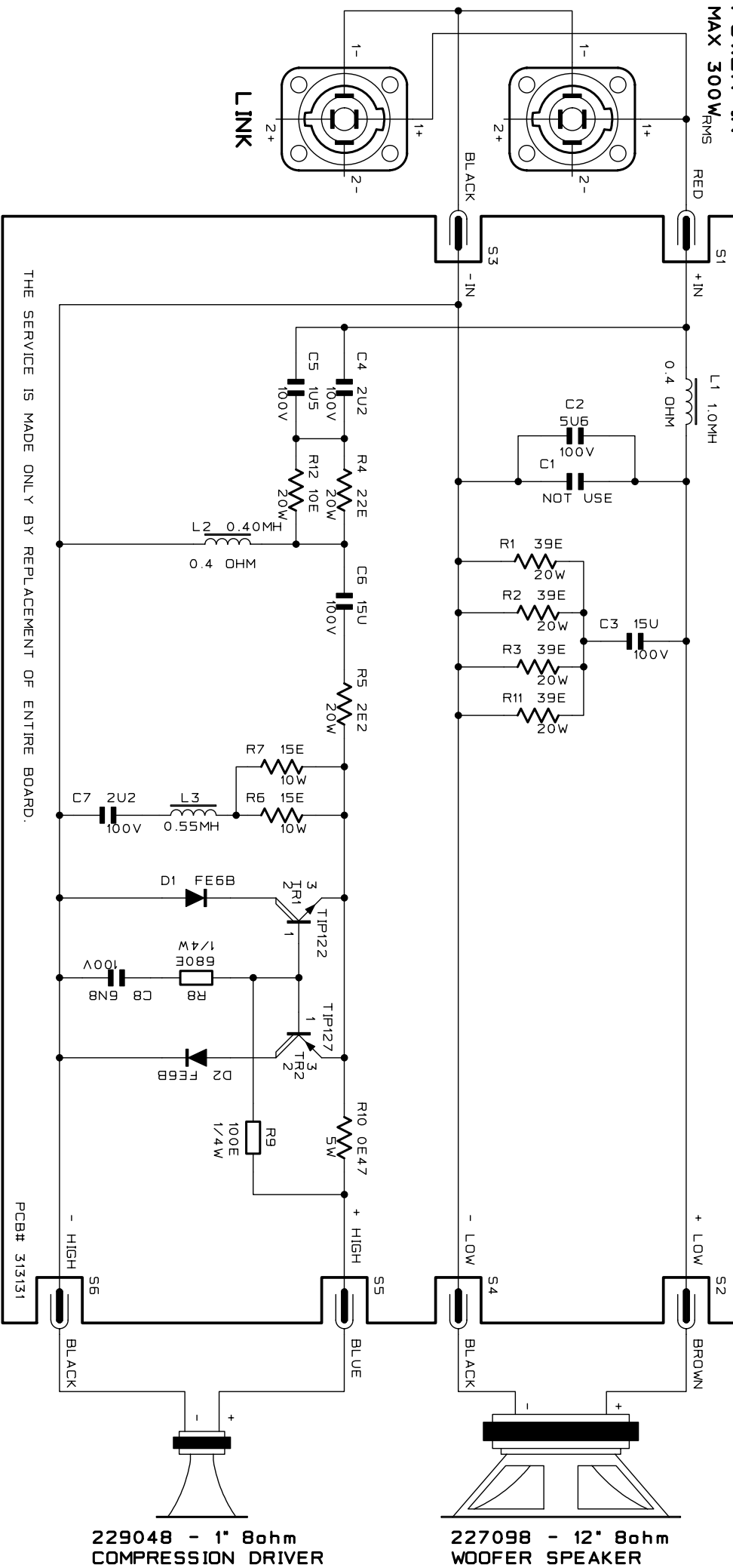


# 768297 - X300-4ohm CROSSOVER BOARD



DRW G. RICCI	DWG# 550739	PCB# 313131	GENERALMUSIC S.p.A. ITALY
CKD F. GATTO	DATE 16/09/03	SCHEMATIC DIAGRAM	ALL RIGHTS ARE RESERVED. NO COPIES OR REPRODUCE THIS DOCUMENT WITHOUT WRITTEN CONSENT BY GENERALMUSIC.
APP. N. ZAVATTA	REV: B	X300-4ohm CROSSOVER BOARD	

# 768302 - X300-8ohm CROSSOVER BOARD



DRW G. RICCI	DWG# 550749	PCB# 313131	GENERALMUSIC S.p.A. ITALY
CKD F. GATTO	DATE 28/07/03	SCHEMATIC DIAGRAM	ALL RIGHTS ARE RESERVED. NO COPIES OR REPRODUCE THIS DOCUMENT WITHOUT WRITTEN CONSENT BY GENERALMUSIC.
APP. N. ZAVATTA	REV: A	X300-8ohm CROSSOVER BOARD	

Spare Part List	
Legend	
EU=Europe Version 230Vac	
US=U.S. Version 115Vac	
Code	Description
Optional Accessories	
	Wall Mount Support
950978	SC31 Aluminium Telescopic Stand (for D400 SAT - T5SA SUB)
950860	SC20 Metallic Telescopic Stand (for D400/X300 standalone)
950199	SC30 Aluminium Telescopic Stand (for D400/X300 standalone)
951390	T5SA 230V Active Subwoofer (EU)
951391	T5SA 115V Active Subwoofer (US)
951133	15mt Speakon-Speakon Dual Wire Cable
D400	
Accessories	
277395	Owner's Manual (Italian/English)
130297	Mains Cable 10A (EU)
130283	Mains Cable 10A (US)
Cabinet Assembly	
841336	65cm Brown/Black 1.50mm² Faston/Faston Dual Wire
841333	65cm Blue/Black 0.75mm² Faston/Faston Dual Wire
667780	Handle
667767	Speaker Protection Grid
347419	Stand Fixing Knob
347418	Ø29x20mm Rubber Foot
347417	* Compression Driver Support (Throat)
347416	Rear Speaker Chassis
347415	Front Speaker Chassis
<b>229048</b>	<b>1" 8ohm Compression Driver</b>
<b>229051</b>	<b>* 1" 8ohm Diaphragm for 229048 Driver</b>
<b>227087</b>	<b>12" 4ohm Woofer</b>
210288	Ø3mm Rubber Sealer (specify mt)
210272	Speaker Filler (400gr/m² 30x50x4cm)
210217	Black Sealer (specify mt)
180829	"DSP" Adhesive Label
150298	100x2.5mm Nylon Cable Tie
120976	M5x20 Screw/M10x27 Nut-M4 Int.thread Spacer
120975	M10 Suspension Point (M14 external turned)
120606	M14x8 Nut
120525	5mm Black Spring Washer
120477	28x15x2.5 Washer
120461	5.3x10x1 Black Washer
120387	WL5x50tc Black Screw
120341	WL4x20tt Black Screw
120336	WL4x25tt Black Screw
120157	M5x50tt Screw
120147	M4x10tt Black Screw
120083	M6x25te Black Screw
Amplifier Assembly	
<b>737147</b>	<b>Amplifier Assembly 230V (EU)</b>
<b>737148</b>	<b>Amplifier Assembly 115V (US)</b>
Miscellaneous	
SKK347015	* 21mm Gray Knob
SKK347014	* 14mm Black Knob
SKK347013	* 10x5.5mm h=17.5mm Black Button Actuator
SKK177009	* Heatsink Support
841325	* 14 Wires 5cm Flat Cable
841280	* Single 15cm AWG18 White Faston/Faston Wire
841005	* 7.5cm Yel/Grn Faston/Faston AWG18 Wire
667768	* Amplifier Chassis
340186	* Adhesive Cable Fixing
340154	* TO3P/TO218 Mica Washer
340079	* TO220 Mica Washer
340078	* TO220 Insulated Bush
180707	* GND Symbol Adhesive Label
177800	* Amplifier HeatSink
150314	* 6.3mm Faston Insulator
150298	* 100x2.5mm Nylon Cable Tie
120963	* 15.3mm Spacer Screw
120841	* 6.3mm Female Brassed Faston
120825	* 6.2mm Spacer Screw
120784	* 7.3 Spacer Screw
120587	* M6 Black Nut
120582	* M3 Black Nut
120484	* 6mm Black Shakeproof Washer
120482	* 4mm Black Shakeproof Washer
120481	* 3mm Black Shakeproof Washer
120456	* 6.5x12.5x1.5 Black Washer
120451	* 3.2x7x0.5 Black Washer
120256	* B2.9x9.5tsp Black Screw

120130	*	M6x70te Black Screw
120113	*	M3x4tc Black Screw
120063	*	M4x20tc Black Screw
120029	*	M3x6tc Black Screw
120025	*	M3x10tsp Black Screw
120005	*	M3x10tc Screw
120003	*	M3x8tc Black Screw
120001	*	M3x6tsp Screw

Supply Assembly	
110614	* Mains Socket
110291	* 16A 250Vac Bipolar Power Switch
020491	* 100nF 10% 250Vac Polyester Capacitor
<b>238094</b>	<b>* 230V 400W Toroidal Transformer (EU)</b>
<b>238095</b>	<b>* 115V 400W Toroidal Transformer (US)</b>
110018	* T6.3A Fuse 5x20mm (EU)
110018	* T6.3A Fuse 6.3x32mm (US)

Fuses Board	
<b>768283</b>	<b>* Fuses Board (Pcb#313121)</b>
778177	** Supply Cables Assembly
120857	** 6.3mm Vertical Male Faston for Pcb
110119	** Fuse Clip 10A max (EU) (US)
080606	** GBU8D 8A Rectifier Diodes Bridge
080156	** 1N4002 1A 100V Rectifier Diode
020250	** 10n 400V 10% MKT Polyester Capacitor

Input & Controls Board	
<b>768282</b>	<b>* Input &amp; Controls Board (Pcb#313125)</b>
SKK074009	** 50KB RV09 Vert Rotary Potentiometer F35C
341038	** 22mm Led Spacer
230569	** FL5R200PNT EMI Coil For Signal
230523	** 80-85uH Switching Dual Coil
141206	** Vert Male XLR Socket (NC3MAV Neutrik)
141192	** Hor Female XLR-Jack Socket (NCJ6FI-V Neutrik)
141015	** 14 Contacts Vert Female Connector
140851	** 20 Contacts Vert Male Connector Din41651
140531	** 2 Pole Vert Latching Push Switch (h=18mm)
120857	** 6.3mm Vertical Male Faston for Pcb
120809	** 14.5mm Spacer
120521	** 3mm Black Spring Washer
120029	** M3x6tc Black Screw
110264	** 16 Position Hex/Binary Encoder
100943	** MC33079 Quad LN Op Amp
100901	** L4962 5-40V 1.5A Switching Regulator
080743	** 3mm Wide Diffused Green Led
080742	** 3mm Wide Diffused Red-Grn Led
080272	** 12V 1W 5% Zener Diode
080170	** BYV27 2A 100V Fast Recovery Diode
052050	** 15K 1/8w 5% Resistor
052048	** 10K 1/8w 5% Resistor
052046	** 6K8 1/8w 5% Resistor
052045	** 5K6 1/8w 5% Resistor
052044	** 4K7 1/8w 5% Resistor
052043	** 3K9 1/8w 5% Resistor
052037	** 1K2 1/8w 5% Resistor
052035	** 820E 1/8w 5% Resistor
052031	** 390E 1/8w 5% Resistor
052030	** 330E 1/8w 5% Resistor
050131	** 10E 1/4W 5% Resistor
030950	** 470u 25V 20% Low Esr Vert Electrolytic Capacitor
030715	** 1000u 6v3 20% Vert Electrolytic Capacitor
030567	** 220u 63V 20% Vert Electrolytic Capacitor
030403	** 47u 25V 20% Vert Electrolytic Capacitor
030247	** 10u 25V 20% Vert Electrolytic Bipolar Capacitor
030082	** 2u2 50V 20% Vert Electrolytic Capacitor
021018	** 33n 63V 10% MKT Polyester Capacitor
021006	** 3n3 63V 10% MKT Polyester Capacitor
021004	** 2n2 63V 10% MKT Polyester Capacitor
020250	** 10n 400V 10% MKT Polyester Capacitor
010595	** 100n 50V -20+80% Ceramic Cap. Multilayer
010402	** 330p 50V 10% CL2 Ceramic Capacitor
010271	** 22p 50V 10% CL2 Ceramic Capacitor

Cpu/Dsp Board	
<b>768286</b>	<b>* Cpu/Dsp Board (Pcb#313115)</b>
SKK177008	** 34.4x34.4mm Heatsink
557029	** 4Mbitx8 Flash memory - D400 Firmware
250524	** 25x25mm Thermoconductor Adhesive
231000	** BLM21A102STP Smd EMI Coil For Signal
142001	** 32Pin PLCC SMD Socket
140963	** 20 Contacts Vert Female Connector Din41651
140890	** 4 Contacts Hor Male Single-Strip
106003	** MAX709 Power Monitor With Reset
106001	** MC33078P SOIC Dual Low Noise Op. Amp.
105008	** RED208 Risc Cpu and Dsp
103071	** AK4528VF VSOP 24Bit 96KHz Audio Codec

055101	**	4K7 X4 1/16w 5% Smd Resistor Array
055100	**	100E X4 1/16w 5% Smd Resistor Array
055072	**	1M 1/16w 5% Smd Resistor 0603
055048	**	10K 1/16w 5% Smd Resistor 0603
055044	**	4K7 1/16w 5% Smd Resistor 0603
055039	**	1K8 1/16w 5% Smd Resistor 0603
055038	**	1K5 1/16w 5% Smd Resistor 0603
055035	**	820E 1/16w 5% Smd Resistor 0603
055030	**	330E 1/16w 5% Smd Resistor 0603
055028	**	220E 1/16w 5% Smd Resistor 0603
055024	**	100E 1/16w 5% Smd Resistor 0603
055016	**	22E 1/16w 5% Smd Resistor 0603
031007	**	10u 16V 20% Smd Electrolytic Tantalium Capacitor
030715	**	1000u 6v3 20% Vert Electrolytic Capacitor
030403	**	47u 25V 20% Vert Electrolytic Capacitor
030245	**	10u 50V 20% Vert Electrolytic Capacitor
011260	**	100n 16V 10% Cer. Cap. Smd CL2 X7R 0603
011242	**	3n3 16V 10% Cer. Cap. Smd CL2 X7R 0603
011238	**	1n5 16V 10% Cer. Cap. Smd CL2 X7R 0603
011232	**	470p 16V 10% Cer. Cap. Smd CL2 X7R 0603
011216	**	22p 16V 10% Cer. Cap. Smd CL2 X7R 0603
011214	**	15p 16V 10% Cer. Cap. Smd CL2 X7R 0603
010742	**	12,288MHz Quartz

Amplifier Board	
<b>768278</b>	<b>* Amplifier Board (Pcb#313120)</b>
141102	** 6 Contacts Vert Male Connector
141015	** 14 Contacts Vert Female Connector
130398	** AWG24 6 Wires 2.5mm Flat Cable
120857	** 6.3mm Vertical Male Faston for Pcb
110316	** Relay 24V / 1 Switch no 16A 250V
106001	** MC33078P SOIC Dual Low Noise Op. Amp.
100965	** TDA7294 70W Audio Amplifier with Mute
091001	** BC857B/C TO236 Smd Pnp Transistor (9BB/C-3F/G)
091000	** BC847B/C TO236 Smd Npn Transistor (8BB/C-1F/G)
090917	** MJE350 TO126 Pnp Transistor
090916	** MJE340 TO126 Npn Transistor
090201	** 2N5401 TO92 Pnp Transistor
090200	** 2N5550 TO92 Npn Transistor
090153	** BC327 TO92 Pnp Transistor
081000	** PMLL4148 Smd 100mA 75V Signal Diode
080245	** 7V5 1W 5% Zener Diode
080171	** FE6B 6A 100V Fast Recovery Diode
080156	** 1N4002 1A 100V Rectifier Diode
080103	** 1N4148 100mA 75V Signal Diode
070106	** 470E 20% Horizontal Linear Trimmer
060591	** 8K2 2W 10% Resistor
060339	** 47E 5W 10% Wire Resistor
060051	** 0E22 5W 5% Wire Resistor
055062	** 150K 1/16w 5% Smd Resistor 0603
055060	** 100K 1/16w 5% Smd Resistor 0603
055056	** 47K 1/16w 5% Smd Resistor 0603
055055	** 39K 1/16w 5% Smd Resistor 0603
055052	** 22K 1/16w 5% Smd Resistor 0603
055050	** 15K 1/16w 5% Smd Resistor 0603
055048	** 10K 1/16w 5% Smd Resistor 0603
055044	** 4K7 1/16w 5% Smd Resistor 0603
055036	** 1K 1/16w 5% Smd Resistor 0603
055034	** 680E 1/16w 5% Smd Resistor 0603
055030	** 330E 1/16w 5% Smd Resistor 0603
055012	** 10E 1/16w 5% Smd Resistor 0603
052058	** 68K 1/8w 5% Resistor
052056	** 47K 1/8w 5% Resistor
052049	** 12K 1/8w 5% Resistor
052047	** 8K2 1/8w 5% Resistor
052044	** 4K7 1/8w 5% Resistor
052040	** 2K2 1/8w 5% Resistor
052038	** 1K5 1/8w 5% Resistor
052036	** 1K 1/8w 5% Resistor
052035	** 820E 1/8w 5% Resistor
052033	** 560E 1/8w 5% Resistor
052032	** 470E 1/8w 5% Resistor
052031	** 390E 1/8w 5% Resistor
052022	** 68E 1/8w 5% Resistor
052020	** 47E 1/8w 5% Resistor
050351	** 680E 1/4W 5% Resistor
050131	** 10E 1/4W 5% Resistor
050091	** 4E7 1/4W 5% Resistor
040134	** 10E 1/2W 5% Resistor
030883	** 10000uF 63V 20% Snap-In Electrolytic Capacitor
030882	** 10000uF 50V 20% Snap-In Electrolytic Capacitor
030715	** 1000u 6V3 20% Vert Electrolytic Capacitor
030565	** 220u 25V 20% Vert Electrolytic Capacitor
030525	** 2200u 63V 20% Snap-In Electrolytic Capacitor
030324	** 22u 50V 20% Vert Electrolytic Capacitor
030247	** 10u 25V 20% Vert Electrolytic Bipolar Capacitor
030245	** 10u 50V 20% Vert Electrolytic Capacitor

030124	**	1u	50V	20%	Vert Electrolytic Bipolar Capacitor
030005	**	1u	50V	20%	Vert Electrolytic Capacitor
021024	**	100n	63V	10%	MKT Polyester Capacitor
021008	**	4n7	63V	10%	MKT Polyester Capacitor
011244	**	4n7	16V	10%	Cer. Cap. Smd CL2 X7R 0603
011218	**	33p	16V	10%	Cer. Cap. Smd CL2 X7R 0603
010595	**	100n	50V	-20+80%	Ceramic Cap. Multilayer
010462	**	1n	50V	10%	CL2 Ceramic Capacitor
010426	**	470p	50V	10%	CL2 Ceramic Capacitor
010413	**	390p	50V	10%	CL2 Ceramic Capacitor
010405	**	220p	500V	10%	CL2 Ceramic Capacitor
010335	**	100p	500V	10%	CL2 Ceramic Capacitor
010304	**	47p	50V	10%	CL2 Ceramic Capacitor
080821	*	Ptc	100°	PTH9L04BD222TS2F330	Murata

## Power Devices

100060	*	7815 +15V 1A Voltage Regulator
100059	*	7805 +5V 1A Voltage Regulator
100049	*	7915 -15V 1A Voltage Regulator
090920	*	MJE802 TO126 Npn Darl Transistor
090919	*	MJE15031 TO220 Pnp Transistor
090918	*	MJE15030 TO220 Npn Transistor
<b>090863</b>	*	<b>TIP36C TO218 Pnp Transistor</b>
<b>090862</b>	*	<b>TIP35C TO218 Npn Transistor</b>
<b>SKK090014</b>	*	<b>2SA1943 TO264 Pnp Transistor</b>
<b>SKK090013</b>	*	<b>2SC5200 TO264 Npn Transistor</b>
080609	*	GBPC2502W 25A 200V Rectifier Diode Bridge

## X300

## Accessories

277407	Owner's Manual
--------	----------------

## Cabinet Assembly

841338	40cm Blue/Black 0.75mm <sup>2</sup> Faston/Faston Dual Wire
841337	40cm Brown/Black 1.50mm <sup>2</sup> Faston/Faston Dual Wire
<b>768297</b>	<b>4 Ohm Crossover &amp; Protection Board (Pcb#313131)</b> This part is replaced entirely only.
<b>768302</b>	<b>8 Ohm Crossover &amp; Protection Board (Pcb#313131)</b> This part is replaced entirely only.
667780	Handle
667767	Speaker Protection Grid
347423	Rear Speaker Chassis
347419	Stand Fixing Knob
347418	Ø29x20mm Rubber Foot
347417	Compression Driver Support (Throat)
347415	Front Speaker Chassis
<b>229048</b>	<b>1" 8ohm Compression Driver</b>
<b>229051</b>	<b>* 1" 8ohm Diaphragm for 229048 Driver</b>
<b>227087</b>	<b>12" 4ohm Woofer</b>
<b>227098</b>	<b>12" 8ohm Woofer</b>
210288	Ø3mm Rubber Sealer (specify mt)
210217	Black Sealer (specify mt)
180835	"X300" Adhesive Label
150298	100x2.5mm Nylon Cable Tie
120976	M5x20 Screw/M10x27 Nut-M4 Int.thread Spacer
120975	M10 Suspension Point (M14 external turned)
120606	M14x8 Nut
120525	5mm Black Spring Washer
120477	28x15x2.5 Washer
120461	5.3x10x1 Black Washer
120387	WL5x50tc Black Screw
120364	WL3.5x12tt Black Screw
120341	WL4x20tt Black Screw
120336	WL4x25tt Black Screw
120157	M5x50tt Screw
120147	M4x10tt Black Screw
120083	M6x25te Black Screw
<b>727655</b>	<b>4 Ohm Input Panel Assembly</b>
778165	* Single Speakon Cables Assembly
141200	** Speakon Socket (NL4MP Neutrik)
667782	* 4 Ohm Input Panel
120581	* M3 Black Self-Locking Nut
120451	* 3.2x7x0.5 Black Washer
120030	* M3x12tsp Black Screw
<b>727656</b>	<b>8 Ohm Input Panel Assembly</b>
778178	* Dual Speakon Cables Assembly
141200	** Speakon Socket (NL4MP Neutrik)
667783	* 8 Ohm Input Panel
120581	* M3 Black Self-Locking Nut
120451	* 3.2x7x0.5 Black Washer
120030	* M3x12tsp Black Screw

**Note:**

- |  |
|--|
| All dimensions are in mm unless otherwise specified.   |
| - The screw description is defined as follows:<br>type of screw + diameter + X + length + type of head<br>where type of screw is one of these:<br>M       = Metric thread<br>B       = Self-tapping screw for metal<br>WL      = Self-tapping screw for wood<br>and type of head is one of these:<br>tc      = cylinder Phillips head<br>ts      = flared Phillips head<br>tt      = rounded Phillips head<br>te      = hexagonal nut head<br>tsp     = flat flared Phillips head<br>tce     = cylinder Allen hexagonal head<br>tspe    = flat flared Allen hexagonal head |
| - The washer description is defined as follow:<br>hole diameter + X + external diameter + X + thick  |
| - Each spare part is single quantity unless otherwise specified.   |
| - Asterisk prefix explanation:<br>Omitted     = First level spare part.<br>One asterisk   = Second level, part of previous listed first level part.<br>Two asterisk   = Third level, part of previous listed second level part.<br>Three asterisk = .....  |
| - Any request for not above mentioned part must encompass specific description including:<br>1) Model name,<br>2) Section name,<br>3) Module code,<br>4) Reference name,<br>5) Quantity number.  |