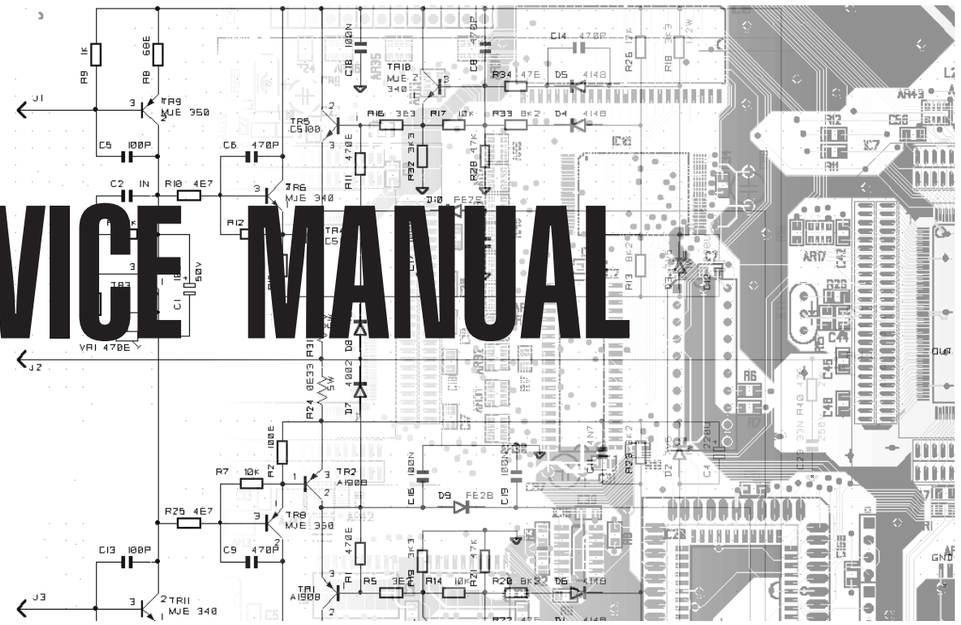
PFX 1.3

SWITCHING POWER AMPLIFIER

SERVICE MANUAL



GENERALMUSIC®

CODE: 270261

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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 1/8W unless otherwise specified.

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

⏚ Signal supply ground.

⏚ Analog supply ground.

⏚ Chassis ground.

ATTENTION Observe precautions when handling electrostatic sensitive devices.

Address

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TECHNICAL SPECIFICATIONS

Dimensions:	(WxHxD)	483x89x450mm (2U)
Weight:		11.3Kg
Power Requirements:	(230Vac±10% 50/60Hz)	2000VA
Output Power*:	(4Ω dual)	2x 720Wrms
	(8Ω dual)	2x 400Wrms
	(8Ω bridge)	1400Wrms
Max. Undistorted Out*:	(4Ω dual)	152Vpp
	(8Ω dual)	160Vpp
	(8Ω bridge)	300Vpp
Input Sensitivity:	(0dB)	0.775Vrms
Input Impedance:	(balanced)	20KΩ
	(unbalanced)	10KΩ
Voltage Gain:		37±0.5dB
Slew Rate:	(8Ω stereo)	30V/µS
	(8Ω bridge)	40V/µS
Damping Factor:	(8Ω stereo)	>200
Frequency Response	(-0.2dB)	20Hz÷20KHz
at Full Power:	(-3dB)	10Hz÷55KHz
IMD:	(SMPTE 60Hz/7KHz 4:1)	<0.1%
THD:	(THD+N)	<0.1%
S/N Ratio:	(unweighted)	>100dB
Crosstalk:	(1KHz)	>60dB

* Measured with limiter circuit operative.

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 (C301, C302, C318, C321, C320, C323, C326, C329, C328, C331). If your measurement on any of the caps is greater than 10Vdc, connect a 1KΩ 100W 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 amplifier.

Remarks

- The power supply utilizes a SMPS (Switching Mode Power Supply) circuit assuring an high efficiency on power requirements with a reduced weight toghether with a musical behaviour.
- The SMPS circuit operates with a fixed PWM (Pulse Width Modulation) of about 50% with a behaviour similar to a traditional transformer supply circuit but with the high efficiency of the switching technology.
- Each amplifier utilizes a dual bipolar DC rail configuration with low and high voltages; one positive and one negative low rail (+/-Vc) and one positive and one negative high rail (+/-Vcc), this kind of circuit optimizes the power dissipation requirements with a musical signal.
- All component referments outside brackets are referred to CH1 while those enclosed are referred to CH2.

Visual Check

- Use compressed air to clear dust in the amplifier chassis.
- 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 Instrument

- Audio Generator
- Dual Trace Oscilloscope
- Digital Multimeter
- 4Ω 1000W, 8Ω 1500W, 1KΩ 100W resistors
- Variac
- Temperature Meter

Setup

- Connect the Variac between the DRV & PRT board and the SMPS board, disconnecting L1 and N1 faston sockets from DRV & PRT board.
- Set the Variac at zero voltage.
- Set the amplifier in DUAL MODE and turn full counter-clockwise the LEVEL potentiometers.
- Connect the audio generator to the channel inputs and set it to 1KHz 775mV$_{RMS}$ (0dB) sinusoidal signal.
- Set the oscilloscope in DC at 5V/div. 5µS/div.
- The procedures that follow must be executed subsequently in the order specified.

Supply Check

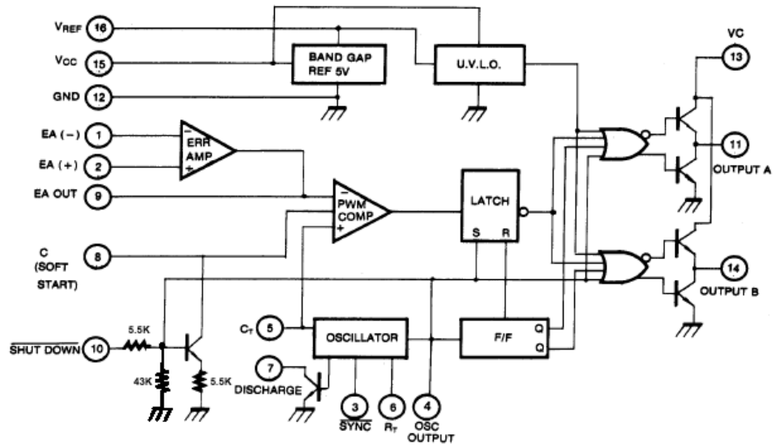
- Disconnect the supplies from CH1 and CH2 PWR AMP boards extracting W301 and W401 connectors.
- Turn on the Amplifier, the T1 Transformer supply the DRV & PRT board and also the double SMPS driver circuit, check these voltages:
  CON5 pin 8 = +12Vdc
  CON5 pin 4 = +15±1Vdc
  on DRV & PRT board.
- The cooling fans voltage runs at their minimum.
- The KA3525A, U301, IC have the PWM fixed at 50% with the soft start circuit generated by it-self (pin 8), it also be locked externally by Q305, Q306 from DRV & PRT board if a protection trips. Check with the oscilloscope if the SMPS driver circuit works right: connect its probe 1 between GND (clip) and pin 11 (tip) and pin 14 of U301, the scope screen must show the wave form of figure 1.
- **CAUTION: Be sure you have all the capacitors completely discharged before proceeding further.**
  Move the probe 1 clip to a SOURCE pin of a power MOSFET Q301-304, check alternatively with the probe tip each GATE of these MOSFETs: the scope screen must show the wave form of figure 2.
- **Note:** When the amplifier goes in protect mode with the load attached to the AMP channel one of the most probably reasons is the unbalancing of the power supplies. This could happen even if all DC voltages are regular, in fact the unbalancing could be caused by a broken MOSFET on primary windings of the transformers, even these devices are connected in parallel two by two: check each one separately to find shorts between GATE and DRAIN/SOURCE pins (note: each MOSFET have an internal diode between DRAIN and SOURCE pins).
- Set the Variac to the nominal mains voltage.
- Verify the PWR AMP supply voltages on each female connector as follows:
  Red wire = +100±5Vdc
  Orange wire = +42±3Vdc
  Brown wire = -42±3Vdc
  Blue wire = -100±5Vdc
  Verify all others DC supplies on DRV & PRT board checking:
  CON5 pin 4 = +25±3Vdc
  CON5 pin 5 = +25±3Vdc
  CON5 pin 6 = -25±3Vdc
  CON5 pin 3 = -12±1Vdc
  CON5 pin 2 = +42±3Vdc
  CON5 pin 1 = -42±3Vdc
- If one of these voltages does not correspond re-check the SMPS circuit on SMPS board, figure 3 thru 5 must appear for each supply circuit, if necessary check rectifiers, capacitors and transformers disconnecting them from circuitry, refer to schematics.

Channels Check

- These procedures are intended for one channel at a time, repeat these operation for the other channel.
- Check the channels one at time to determine which is right (note: if you have a spare amplifier module that you know as right, use it).
- The CH1 channel is on the left and CH2 channel is on the right.
  CH1 and CH2 channels have the same circuit but the printed circuit are mirrored.

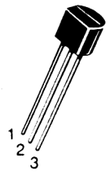
- Re-set the Variac at zero voltage, turn off the amplifier. Re-connect the supply connector W301 (W401) to the CH1 (CH2) PWR AMP board.
  Be Careful: do not invert the supply connectors of each channel between them, they have different connections.
- **Note:** verify, with the multimeter as ohm-meter, the insulation between the heatsink and the transistor collectors placing the multimeter tips between the screw heads and the collector pins, this simple trick exclude an erroneus reading due to the insulation of the heatsink anodization.
- **SETUP:**
  Connect the trace 1 probe clip to the output GND black terminal.
  Connect the trace 1 probe tip to output wire H301 (H401) of the channel under test.
  Connect the trace 2 probe tip to the cathode of D315 (D415) on PWR AMP board.
  Set both to 50V/div. 200µS/div in DC position.
  Connect the multimeter to the VARIAC output.
  The load resistor is disconnected.
  Be sure you have the output wire connected to the relative faston on DRV & PRT Board, this is necessary to run the amplifier in closed-loop.
  Be Careful: if you supply any PWR AMP board in open-loop, without the output wire connected to DRV & PRT board, you will have DC on the output and R325 (R425),R328 (R428) will burn.
- **INITIAL TEST:**
  Set up the Variac slowly monitoring the output with the oscilloscope, trace 1 should display nothing, while trace 2 increase up to about 42VDC, if a DC voltage occur on trace 1 or the protection trips, turn down the Variac and turn off the amplifier, wait some minutes and disconnect the supplies from the outputs modules (W301 and W401 on PWR AMP boards).
  ✓ *If you have determinate that the problem is a short on a 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.*
- **SIGNAL TEST:**
  When you have reached the 230VAC mains voltage set up slowly the LEVEL potentiometer, the channel output signal must be symmetrical respect the GND without visible distortion and oscillation as shown by the centre trace of figure 6, if a distortion occur check the DRV & PRT and the PWR AMP boards as following suggested:
  ✓ *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 low rail.*
  ✓ *If the positive cycle appears distorted, you can assume that the problem is in the circuitry of the negative low rail.*
  Verify that the cooling fans run faster when the signal exceed about 20V.
- **HIGH RAIL CHECK:**
  When the output signal (Positive half-wave) is less than 36Vp the voltage on D315 (D415) cathode must remain constant at 42V, when the output signal exceeds 42Vp the voltage must follow the output signal with 6V offset as shown by the upper trace of figure 6, to check the negative high rail move the probe to D322 (D422) anode the trace appears as shown in the bottom of figure 6.
  ✓ *If the high rails appear distorted or are not modulating as shown in figure, then the problem probably exists somewhere in the circuitry of the respective (+ or -) defective high rail. Refer to the schematics.*
- **POWER CHECK:**
  Connect the 4Ω 1000W load on the output and repeat the INITIAL, SIGNAL and HIGH RAIL checks.
  Check the signal clipping, it must occur at 162±5Vpp.
  ✓ *If the protection trip re-check the SMPS supply circuit.*
- **BANDWIDTH CHECK:**
  Sweep the generator frequency from 20Hz to 20KHz, the output level must have not detectable level changes.
- **SIGNAL/CLIP SENSOR CHECK:**
  Set the LEVEL pot to minimum, set the scope timebase at 1V/div. 200µS/div., then increase the level and check the SIGNAL led activity: it lights when the amplifier output is higher than 5Vpp.
  Set the scope at 50V/div. and increase the level, check the CLIP led: it lights when the amplifier output signal clip.
- **OFFSET SENSOR CHECK:**
  Set the LEVEL pot at minimum, set the Variac to zero voltage output, disconnect the load, disconnect the supply connection W301 (W401) from the PWR AMP board and disconnect the output wire from DRV & PRT board, turn on the amplifier, connect temporarily the +47Vdc (by means of a suitable conductor wire from the orange conductor of the PWR AMP supply plug) to the respective channel faston on DRV & PRT board, the PROTECT led must turn on immediately, the relay disconnect the output, the fan must run at maximum speed.
  Wait about 20sec. and the relay restore the output connection, connect temporarily the faston to -47Vdc (brown wire), the led PROTECT must turn on again, wait about 20sec. and the relay restore the output connection.
  Reconnect the load, reconnect the supply connection W301 (W401) to the PWR AMP board and reconnect the output wire to DRV & PRT board.
- **BIAS ADJUSTMENT:**
  SETUP:
  Connect the trace 1 probe clip to the output GND black terminal.
  Connect the trace 1 probe tip to output wire H301 (H401) of the channel under test.
  Connect the Multimeter across TR305 (TR405) and TR308 (TR408) collectors of AMP PWR board.
  Place the temperature meter in the same location of the NTC Resistor at centre of heatsink: TH301 (TH401).
  ADJUSTMENT:
  Set up the Variac to the mains voltage, adjust the VR301 (VR401) trimmer to read 5.9±0.1Vdc on the Multimeter.
  VERIFICATION:
  Set up the LEVEL pot, after some minutes the heatsink temperature rises at 50°C, turn down the LEVEL, read the value on the multimeter, it must be within 5.6±0.1Vdc.
  Set the scope sensitivity at 1V/div. adjust the generator level until the sinewave appears at full screen amplitude, **no crossover distortion must be detectable: if necessary re-adjust VR301 (VR401)**.
- **SIGNAL TO NOISE RATIO CHECK**
  Set LEVEL to minimum, the output signal (noise) must be less 2mVpp.

KA3525A Block Diagram

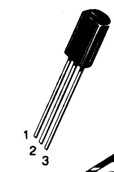


Packages & Pin Outs

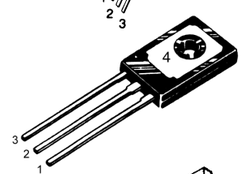
TO92
TL431
1 = Cathode 2 = Anode 3 = Reference
KSA1268, KSC3200, KTC3198
1 = Emitter 2 = Collector 3 = Base
2N4401 or eq. 2N5550
1 = Emitter 2 = Base 3 = Collector
2SK30AGR
1 = Source 2 = Gate 3 = Drain



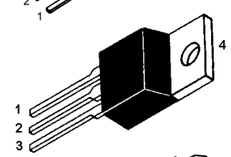
TO92L
KTA1023, KTA1027
1 = Emitter 2 = Collector 3 = Base



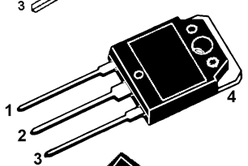
TO126
KSE340 or MJE340, KSE350 or MJE350
1 = Emitter 2-4 = Collector 3 = Base



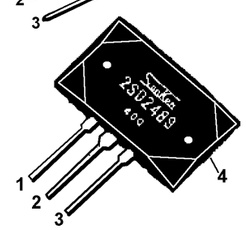
TO220
KSE3055T, KSE2955T
1 = Base 2-4 = Collector 3 = Emitter



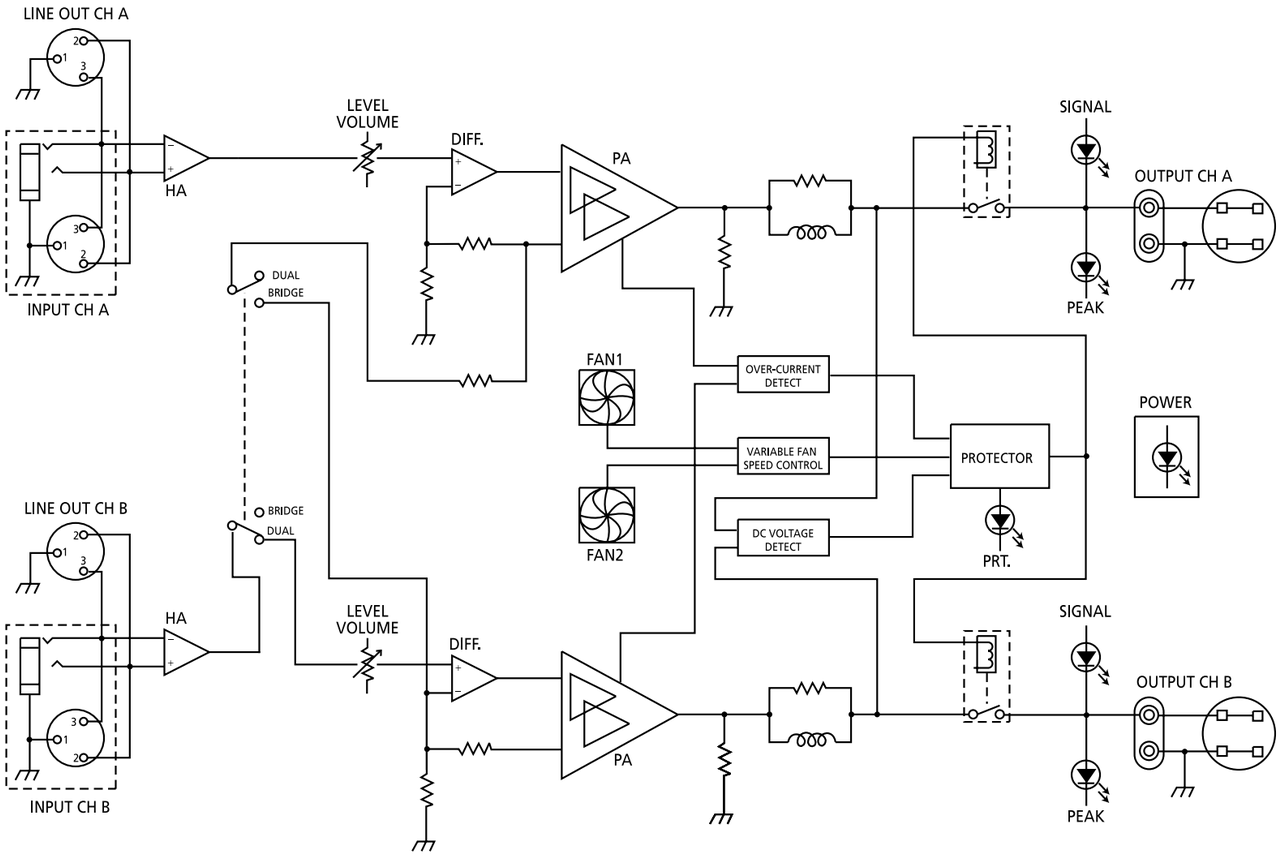
TO3P
2SC3856, 2SA1492
1 = Base 2-4 = Collector 3 = Emitter
SSH11N90
1 = Gate 2-4 = Drain 3 = Source



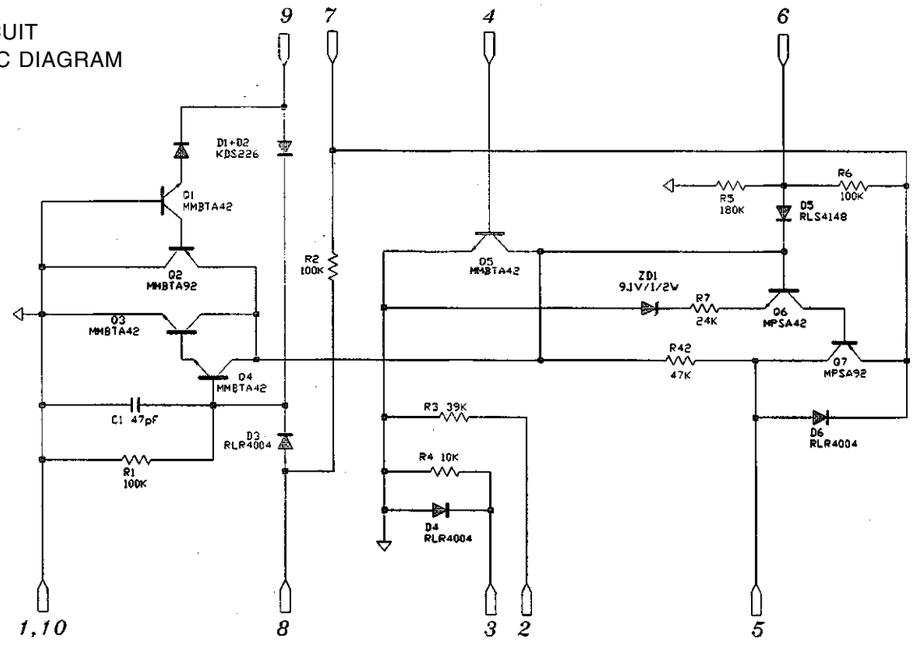
TO3P-2
2SC3858, 2SA1494
1 = Base 2 = Collector 3 = Emitter



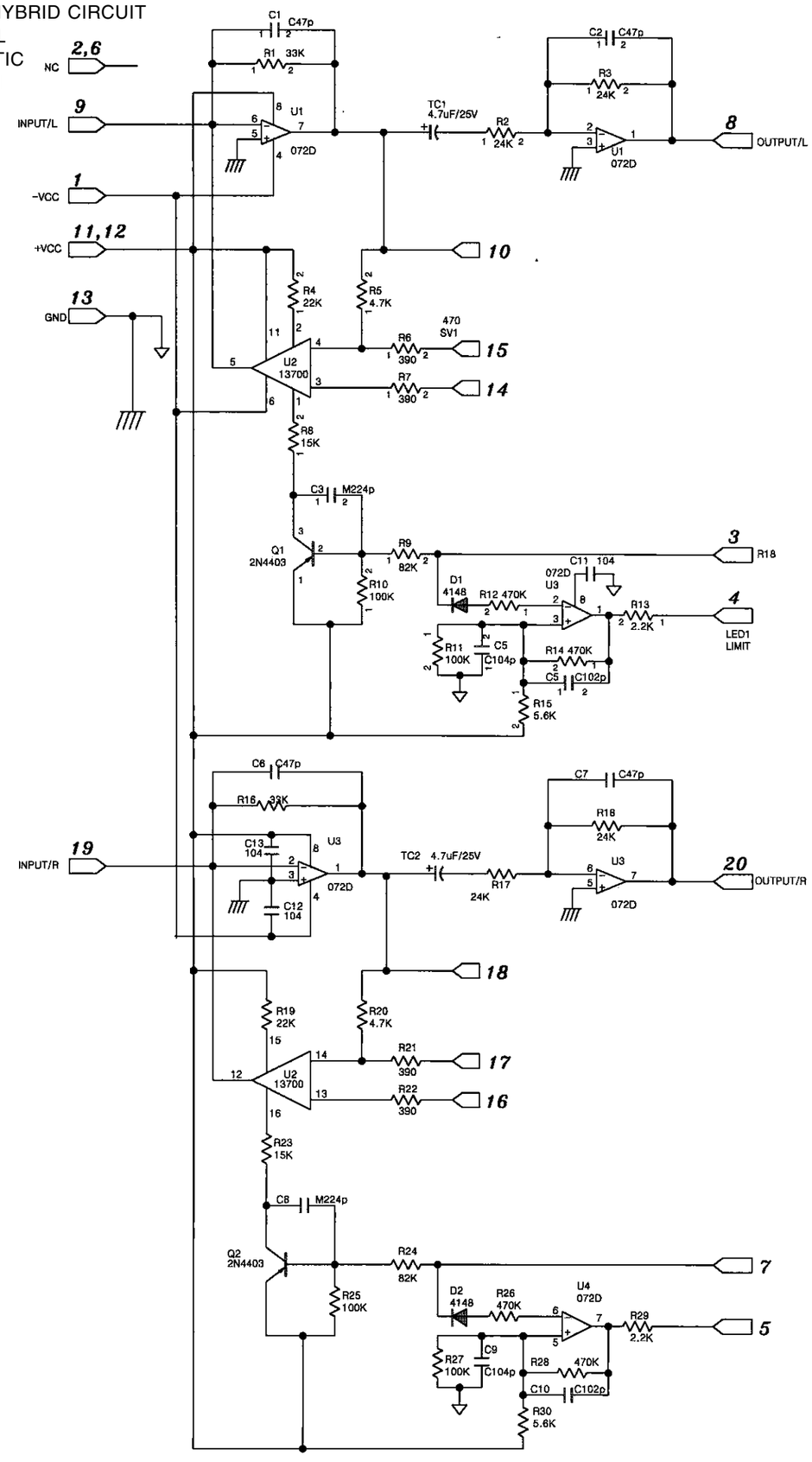
BLOCK DIAGRAM



PROT01 HYBRID CIRCUIT INTERNAL SCHEMATIC DIAGRAM



LIMIT01 HYBRID CIRCUIT INTERNAL SCHEMATIC DIAGRAM



TNS768000 - INPUT BOARD

CH1 LINK
CH1 INPUT
CH2 INPUT
CH2 LINK

XLR1 XLMN-3PV
XLR2 CXLF-03
XLR4 CXLF-03
XLR3 XLMN-3PV
TF2 STB102KBA
TF1 STB102KBA
TF3 STB102KBA
TF4 STB102KBA
-CH1 7
+CH1 6
GND 5
+CH2 4
-CH2 3
GND 2
GND 1
W1 5268-07A

TNS768003 - DRV & PRT BOARD

U11 LIMIT01
LIMITER CH2 ON J4 1N4148 D25 2N4401 Q13 4.7K/1% R134 R135 2.7K/1%
LIMITER CH1 ON J3 D22 1N4148 2N4401 Q11 4.7K/1% R124 R125 2.7K/1%
VR3 100 VR4 100
33K/1% R133
33K/1% R123 10uF/50V C68 1K R6
C70 10uF/50V R37 1K
C67 10uF/50V R7 390/1%
BRIDGE SW2 JSS2215
CON1-1 5267-07A
7 -CH1
6 +CH1
5 GND
4 +CH2
3 -CH2
2 GND
1 GND
R1 10K/1% C1 22uF/25V R4 10K/1% C4 C100p R5 4.7 C5 4.7uF/50V
R2 10K/1% C2 22uF/25V R3 10K/1% C3 C100p U1 TL072
R31 10K/1% C18 22uF/25V R32 10K/1% C19 22uF/25V R34 10K/1% C20 C100p R35 4.7 C22 4.7uF/50V
C21 C100p U3 TL072
D23 1N4148 D26 1N4148 R136 220K R137 220K R138 820K R139 820K
D21 1N4148 Q10 A1268
C69 10uF/50V R38 390/1%
C104p C12 470uF/16V C14 R6 4.7/1/4W R9 4.7/1/4W
A1268GR 1N4148 D24 Q12
C15 470uF/16V C13 C104p R145 68/1/4W
U1 TL072 R9 47K C6 C100p R11 27K C9 1uF/50V(BP) R14 2K/1% R16 5.1K/1% C8 C10p R17 5.1K/1%
R144 68/1/4W
1N4004 D29 1N4004 D30 1N4004 D31 1N4004 D32
100uF/35V C7 R10 620/1% C10 C27p R12 47K/1% C11 C27p R13 47K/1%
1N4004 D33 1N4004 D34 1N4004 D35 1N4004 D36
L1 7.0uH R29 2.2/5W/F CH1 OUT 15 R30 22/2W/F M104p/250V C17 RY1 HRCR313DC012K5H
L2 7.0uH R54 2.2/5W/F CH2 OUT 16 R55 22/2W/F C30 M104p/250V RY2 HRCR313DC012K5H
U3 TL072 R40 47K C24 C100p C25 100uF/35V R41 620/1% R42 27K C27 1uF/50V(BP) C26 C10p R44 2K/1% R45 2K/1% R46 5.1K/1%
C64 C33p C28 C27p R28 47K/1% C65 C33p
R47 5.1K/1%
SPKA GP881202-2
SPKAG GP881202-2
SPKB GP881202-2
SPKBG GP881202-2
GND X 1
C-SIG 2
GND X 3
INPUT+ 4
INPUT- 5
GND 6
TH SW. 7
TH SW. 8
O/C 9
LIMIT 10
CON7 5267-10A
CON8 5267-10A
MAX1 7
CEN1 6
MIN1 5
MIN2 4
CEN2 3
MAX2 2
PWR 1
CON6-1 5267-07A
GND 12
LP1+ 11
LP1- 10
LP2+ 9
LP2- 8
LS1+ 7
LS1- 6
LS2+ 5
LS2- 4
PRT 3
LIMIT 2
LIMIT 1
CON12 5267-12A

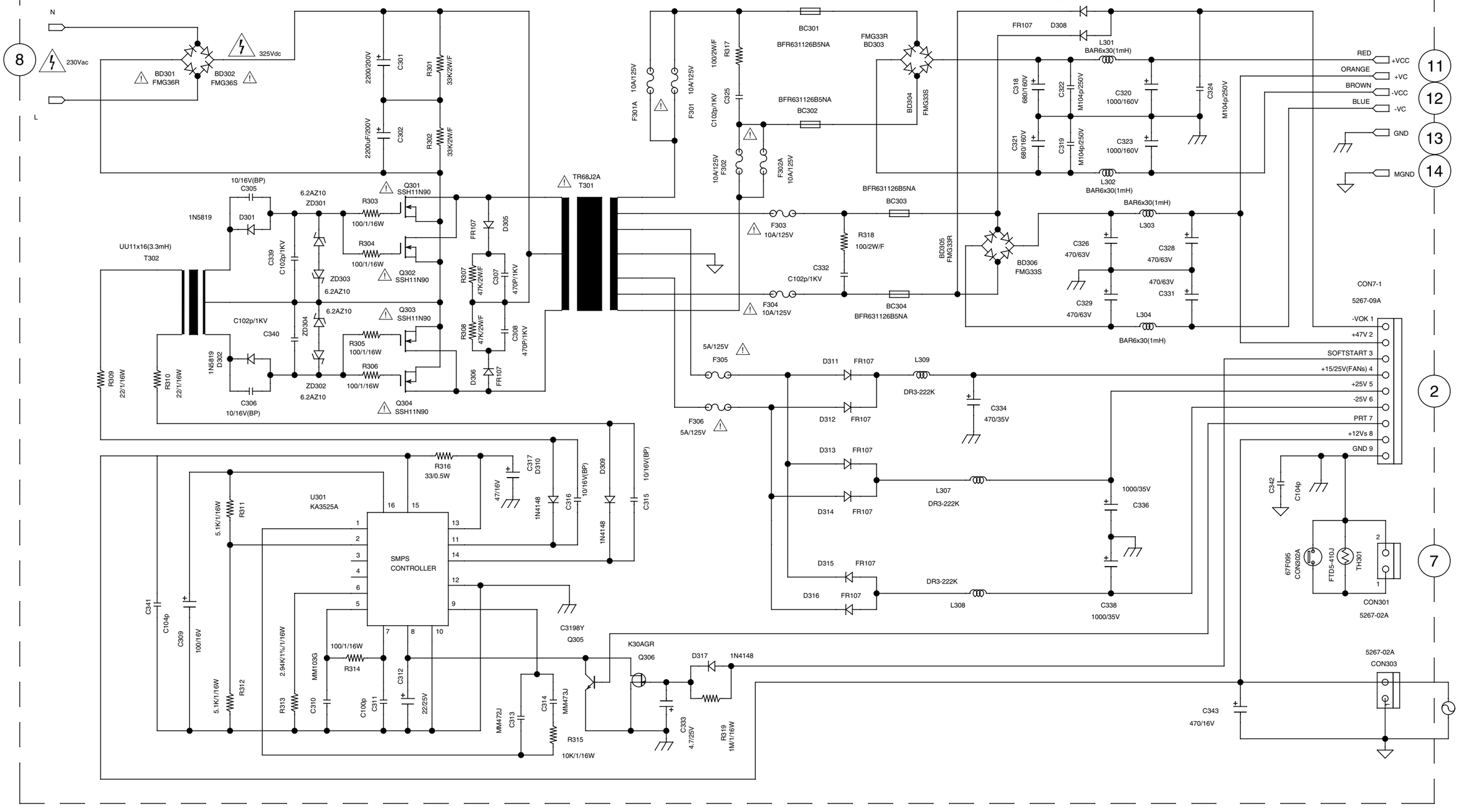
TNS768001 - OUTPUT BOARD
CH1 OUTPUT
- BRIDGE OUTPUT +
CH2 OUTPUT

TNS768002 - CTRL BOARD
CON6 5268-07A
MP1 A10W21C
VR2 A10W21C
LED2 POWER
CON12-1 5268-12A
LED3 PEAK CH1
LED4 PEAK CH2
LED5 SIGN CH1
LED6 SIGN CH2
LED1 PRT

U7 SE-PRT01
U5 MCT7815CT
U6 MCT7915CT
C36 C104p C37 C104p C38 1000uF/35V C40 1000uF/16V C39 C104p C41 C104p
D17 1N4148 R108 120 U8 74HCT02 U8 74HCT02 C75 22/16V
D19 1N4148 D20 1N4148
D18 1N4148 R8 3.9K C66 10uF/16V R114 47K
U2 2902N
R113 47K R96 2.2K/1% R102 22K R99 2.2K R97 1K/1% R98 390 R103 22K R93 2.2K
R36 680 R49 100 U8 74HCT02 R28 4.7K D16 1N4148 R120 1.2K
D5 1N4148 D15 1N4148 D14 1N4148
R79 2.2K R66 22K R87 2.2K
R71 4.7K
CON5 5267-09A
1 -VOK
2 +VC
3 SOFTSTART
4 +15V
5 +25V
6 -25V
7 PRT
8 +12Vs
9 NC
R121 10K C49 47uF/16V U4 MCT7812CT R168 22/7W C33 470uF/35V C35 100uF/16V
C50 100uF/25V C51 100uF/25V R109 150K C52 22uF/50V R108 150K R39 10/1/4W ZD2 5.6V/1W Q5 MJE350
R101 1.2K R100 100K R69 220 R67 4.7K R90 2.2K/1% R94 6.8K/1% R95 2.2K R89 2.2K R88 6.8K/1% R91 1K/1% R92 390 U9 TL431 R68 4.7K C54 47uF/16V C59 C104p C58 C104p
R84 2.2K/1% R85 5.11K/1% R86 30 FANA AD8812HS-A70GL C62 100uF/16V R82 10K R83 56K Q6 KSE350 A1268 Q4 C56 22uF/16V R81 47 R78 6.8K/1% R80 2.2 Q14 C3200 C73 0.47uF/50V R141 2.2M R140 200K
R56 56K C32 22uF/16V R50 6.8K/1% Q3 KSE350 A1268 Q2 R52 47 C3200 Q15 R51 2.2 0.47uF/50V C74 R142 200K FANB AD8812HS-A70GL C63 100uF/16V R83 10K
R72 470K/1/4W R73 470K/1/4W
2.2M R143 D28 1N4148
R74 2.2K/1/2W R75 2.2K/1/2W
R76 1.8K D27 1N4148
D6 1N4004 R26 220 R27 220 D7 1N4004 D9 1N4004 D8 1N4004
U10 MCT7812CT C47 100uF/16V C48 C104p R150 2M R151 2M J1 C104p C55 THSWA 5267-02A
RY4 Q1 KSE340 R106 1.2K R104 1.2K R107 100 Q7 C3200 R105 470 R7 4.7K C31 0.22uF/50V R10 1K/1/4W D12 1N4004 D13 1N4004 D40 1N4004 D39 1N4004
RY3 PTH1 10D22 HRCR313DC012K5H
F1 T10A 250Vac LSW1 NSW1 C44 M474/275VAC T1 L48X20 L6 14X7X7.5/LSA15009 C34 M684/275VAC N1-1 GP881202-2 L1-1 GP881202-2
D10 1N4004 D11 1N4004 C46 470uF/35V
R150 6.8K/1% R147 R153 4.7K Q17 A1268 Q16 C3200 GRN LED3 R155 560
R152 47 R154 47K Q18 A1268 R157 2.2 Q23 A1268 Q21 A1268 R158 47K
R159 47 R161 47K Q20 A1268 R156 47 R164 47 R165 2.2 Q25 A1268 R163 2.2 Q24 A1268 R160 2.2 Q22 A1268 R162 2.2
C42 MT05/275VX2 R17 1M/1/2W L4 LF1 L5 PC2-F15 SW3 C1350AB NF1
GP881202-2 L GP881202-2 N
MAINS LINE (EU) 230Vac +/-10% 50Hz
L7 GND-CORE GP881202-2 GIN GOUT GP881202-2
14 GP881202-2 MG
13 GP881202-2 G

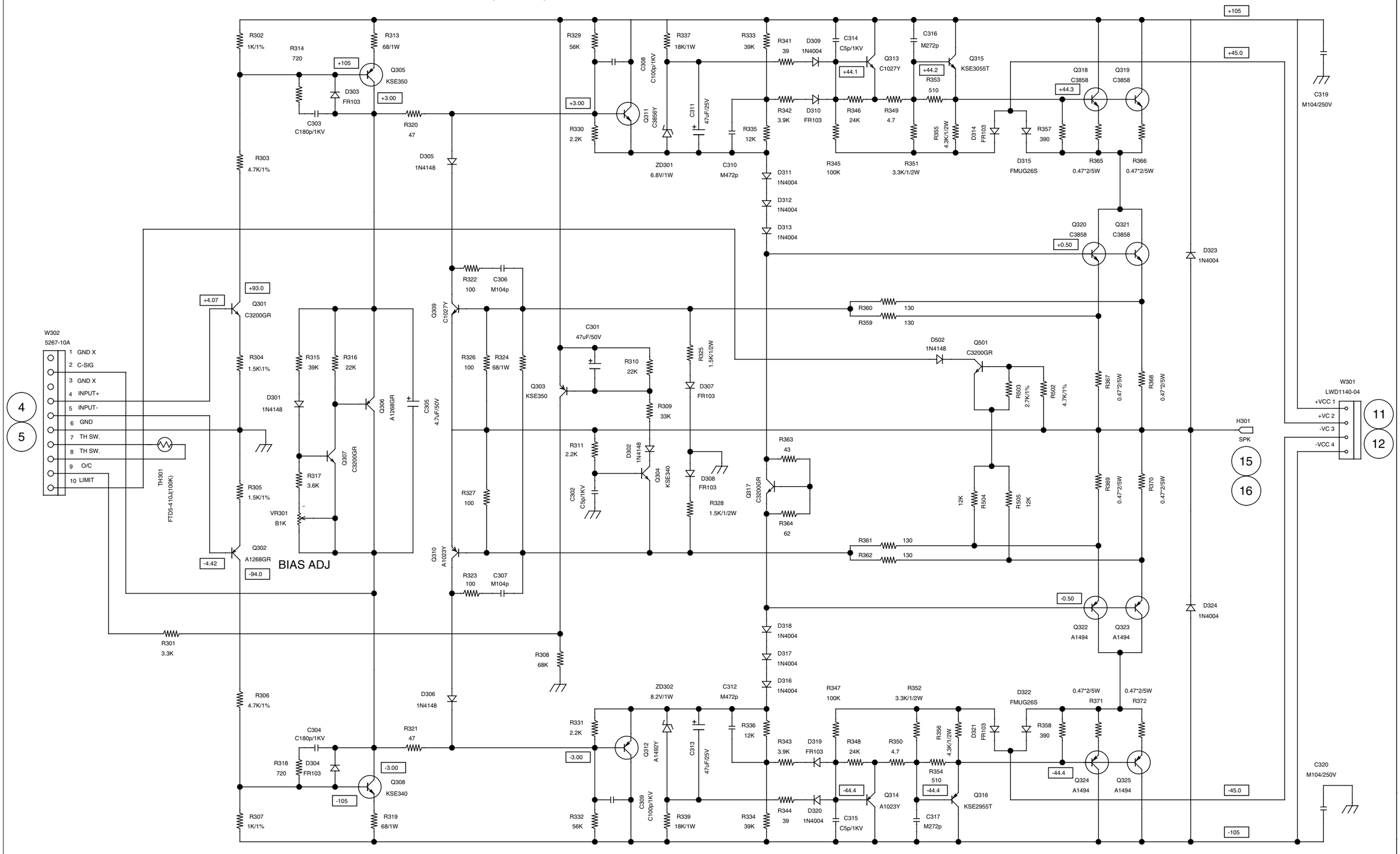
DRW G.BOCCATO	DWG# 500671	PCB#	GENERALMUSIC S.p.A. ITALY
CKD G.RICCI	DISK: 2 PRT: 1/1	PFX1.3 DRV & PRT BOARD	
APP. R.FALCONI	REV: 20/03/01		

TSN768005 - SMPS BOARD (PFX1.3)



DRW G.BOCCATO	DWG# 550672	PCB#	GENERALMUSIC S.p.A. ITALY
CKD G.RICCI	DISK: PRT: 1/1	PFX1.3 SMPS BOARD	
APP. R.FALCONI	REV: 14/03/01		

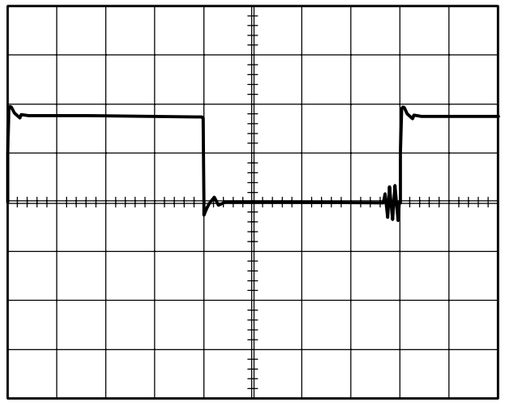
TSN768007 - CH1 PWR AMP BOARD (PFX1.3)
TSN768008 - CH2 PWR AMP BOARD (PFX1.3)



Notes: the numbers enclosed into squares are approximate DC voltages measured with 230Vac of mains line voltage at 25˚c, without any audio signal in input.
All component references are relative to Channel1, Channel2 references are prefixed by 4 and 6 instead 3 and 5 respectively.

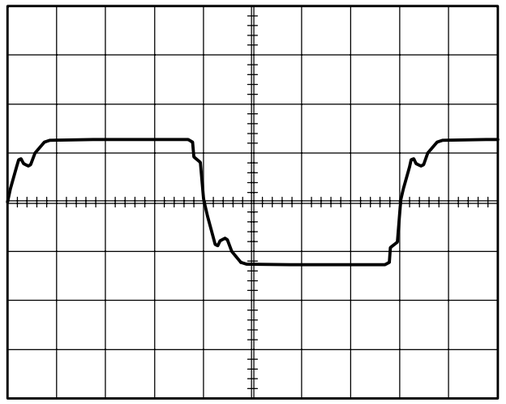
DRW G.BOCCATO	DWG# 550673	PCB#	GENERALMUSIC S.p.A. ITALY
CKD G.RICCI	DISK: PRT: 1/1	PFX1.3 CHANNEL 1/2 PWR AMP BOARD	
APP. R.FALCONI	REV: 14/03/01		

Figure 1



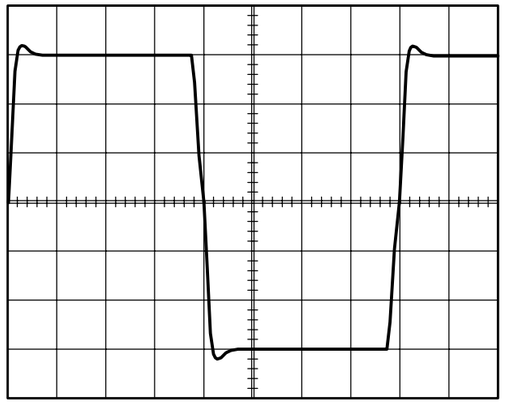
5V/div. clip: GND
5µS/div. tip: PIN11/14 U301

Figure 2



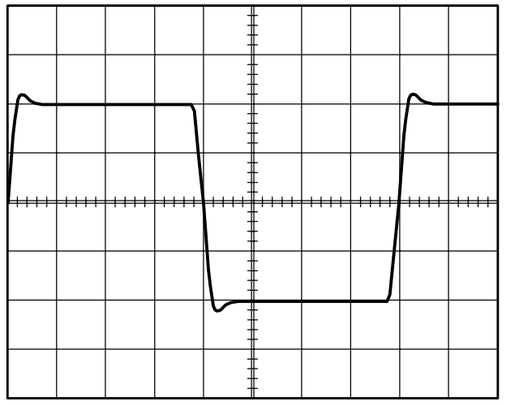
5V/div. clip: any MOSFET Source
5µS/div. tip: each MOSFET Gate

Figure 3



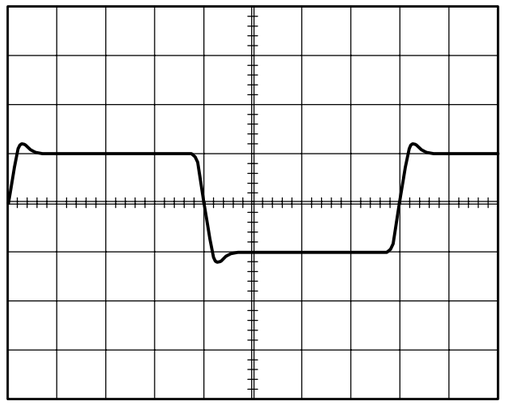
100V/div. clip: any MOSFET Source
5µS/div. tip: each MOSFET Drain

Figure 4



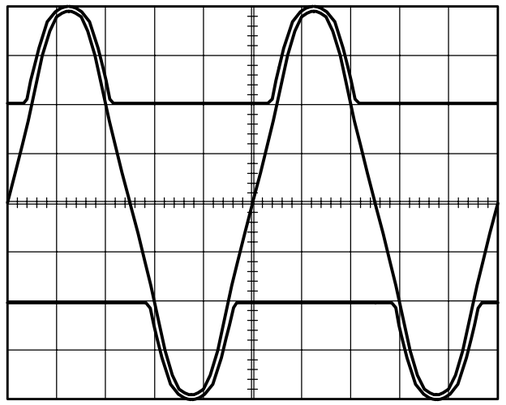
50V/div. clip: F301
5µS/div. tip: F302

Figure 5



50V/div. clip: F303
5µS/div. tip: F304

Figure 6



20V/div. clip1: GND
200µS/div. tip1: OUT CH1/OUT CH2
tip2: D315/D415 CATHODE
tip2: D322/D422 ANODE

DRW G.BOCCATO	DWG# 550674	PCB#	GENERALMUSIC S.p.A. ITALY
CKD G.RICCI	DATE 13-03-01	SCHEMATIC DIAGRAM PFX1.3 SCOPE WAVEFORMS FIG.1-6	ALL RIGHTS ARE RESERVED. NO COPIES OR REPRODUCE THIS DOCUMENT WITHOUT WRITTEN CONSENT BY GENERALMUSIC.
APP. R.FALCONI	REV: B		

Spare Part List

Code	Description

Accessories

277356	Owner's Manual PFX-Series

Assembly

TSN667003	Bottom Chassis
TSN667005	Top Cover
TSN778000	Cables Kit
TSN230500	Mains Line Filter PC2-F15 250Vac 15A

Rear Panel Assembly

TSN110301	Fan 12Vdc-0.25A 80x80x25mm
130285	Mains Cable (EU)
347201	Cord Lock (use this lock when replace the mains cable)
TSN768000	Inputs Board
TSN768001	Outputs Board
TSN667002	Rear Panel

Front Panel Assembly

TSN667000	**Controls Panel**
110285	Bipolar Mains Switch
TSN657000	Potentiometer Knob
TSN768002	CTRL Board
TSN074000	10KA Rotary Potentiometer with 20 steps

DRV & PRT Board

TSN768003	**DRV & PRT Board**
110027	T10A Fuse 6.3x32mm
TSN080800	NTC 10D Surge Current Limiter
TSN020000	470nF 275Vac Capacitor
TSN020001	680nF 275Vac Capacitor
TSN020002	1uF 275Vac Capacitor
TSN230501	LH316042 Mains Line Dual Coil Filter
TSN230502	LSA15009 Mains Line Dual Coil Filter
TSN237000	Z 4121.5 230Vac/15+15Vac Transformer
TSN110302	HRCR313DC012K5H Relay
080158	1N4004 1A 400V Rectifier Diode
080103	1N4148 100mA 75V Signal Diode
080241	5V6 1W 5% Zener Diode
080242	6V2 1W 5% Zener Diode
080173	1N5817 1A 40V High Current Schottky Diode
TNS080007	TL431 Adjustable Voltage Reference Diode
090200	2N5550 TO92 Npn Transistor (2N4401 equivalent)
090917	MJE350 TO126 Pnp Transistor (KSE350 equivalent)
090916	MJE340 TO126 Npn Transistor (KSE340 equivalent)
TSN090001	KTA1268GR TO92 LN Pnp Transistor
TSN090000	KTC3200GR TO92 LN Npn Transistor
100601	74HCT02 DIP Quad 2-In Nor Gate
100061	TL072 Dual J-Fet Operational Amplifier
100045	7812 +12V 1A Voltage Regulator
100049	7915 -15V 1A Voltage Regulator
100060	7815 +15V 1A Voltage Regulator
TSN100000	NJM2902 SOIC Quad Single Supply Operational Amplifier
TSN102000	PRT01 Protection Hybrid Circuit
TSN102001	LIMIT01 Limiter Hybrid Circuit
340079	TO220 Mica Washer

SMPS Board

TSN768005	**SPMS Board**
TSN110000	5A 125V Picofuse
TSN110002	10A 125V Picofuse
TSN230503	BFR631126B5NA EMI Suppression Ferrite Bead
TSN230504	BAR6x30 (1mH) Supply Core Coil
TSN230505	DR3-222K Supply Core Coil
TSN230506	UU11x16(3.3mH) SWT-Driver Transformer
TSN238000	TR68J2A Toroidal SWT-Power Transformer
030652	470uF 35V 20% Vert Electrolytic Capacitor
030653	470uF 63V 20% Vert Electrolytic Capacitor
030722	1000uF 35V 20% Vert Electrolytic Capacitor
TSN030000	680uF 160V 20% Snap-in Electrolytic Capacitor
TSN030001	1000uF 160V 20% Snap-in Electrolytic Capacitor
TSN030002	2200uF 200V 20% Snap-in Electrolytic Capacitor
TSN080801	FTD5-410J (100K) NTC Thermistor
TSN080802	67F095 AIRPAX Thermostat 95°c
TSN080000	FMG33R 20A 300V Ultra Fast Recovery Dual Rectifier Diode
TSN080001	FMG33S 20A 300V Ultra Fast Recovery Dual Rectifier Diode
TSN080002	FMG36R 15A 600V Ultra Fast Recovery Dual Rectifier Diode
TSN080003	FMG36S 15A 600V Ultra Fast Recovery Dual Rectifier Diode
TSN080004	FR107 or BA159GP 0,5A 1000V Fast Switching Rectifier Diode
TSN090002	KTC3198Y TO92 Pnp Transistor
TSN090003	2SK30AGR N-Channel J-Fet Transistor
TSN090004	SSH11N90 Mosfet-N 900V 11A
TSN100001	KA3525A SMPS Controller
340154	TO3P Mica Washer

CH1/CH2 PWR AMP Board

TSN768007	**CH1 PWR AMP Board**
TSN768008	**CH2 PWR AMP Board**
TSN060000	0.47ohm 5% 5W Dual Resistor
080243	6V8 1W 5% Zener Diode
080258	8V2 1W 5% Zener Diode
042505	1K50 1/4W 1% Metalized Film Resistor
042485	1K00 1/4W 1% Metalized Film Resistor
042535	2K70 1/4W 1% Metalized Film Resistor
042564	4K70 1/4W 1% Metalized Film Resistor
TSN080801	FTD5-410J (100K) NTC Thermistor
TSN080005	FR103 or 1N4936 0.5A 400V Fast Switching Rectifier Diode
TSN080006	FMU-G26S 10A 600V Fast Recovery Rectifier Diode
TSN090001	KTA1268GR TO92 LN Pnp Transistor
TSN090000	KTC3200GR TO92 LN Npn Transistor
TSN090006	KTA1023Y TO92L Pnp Transistor
TSN090005	KTC1027Y TO92L Npn Transistor
090917	MJE350 TO126 Pnp Transistor (KSE350 equivalent)
090916	MJE340 TO126 Npn Transistor (KSE340 equivalent)
TSN090007	KSE3055T TO220 Npn Transistor
TSN090008	KSE2955T TO220 Pnp Transistor
TSN090009	2SC3856Y TO3P Npn Transistor
TSN090010	2SA1492Y TO3P Pnp Transistor
TSN090011	2SC3858 TO3P-2 Npn Transistor
TSN090012	2SA1494 TO3P-2 Pnp Transistor
340750	TO126 Mica Washer
340079	TO220 Mica Washer
340154	TO3P Mica Washer
TSN340000	TO3P-2 Mica Washer

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.