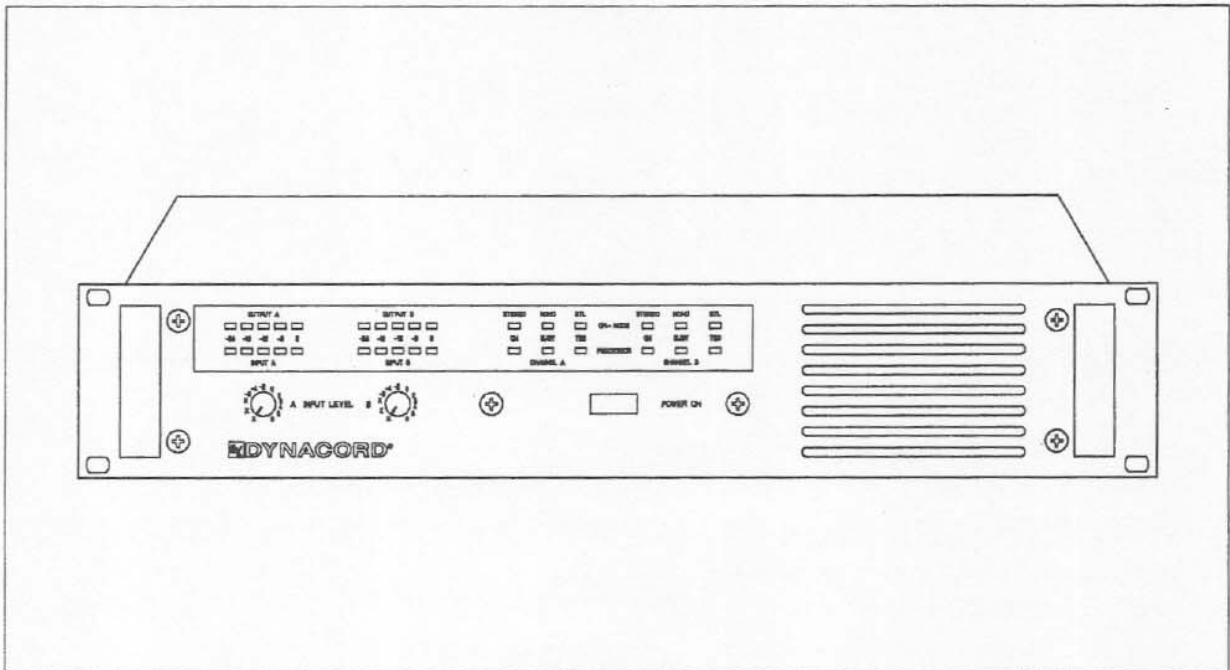


EV DYNACORD®

USER MANUAL



PCA 2250 / PCA 2450

Processor-Controlled Power Amplifier

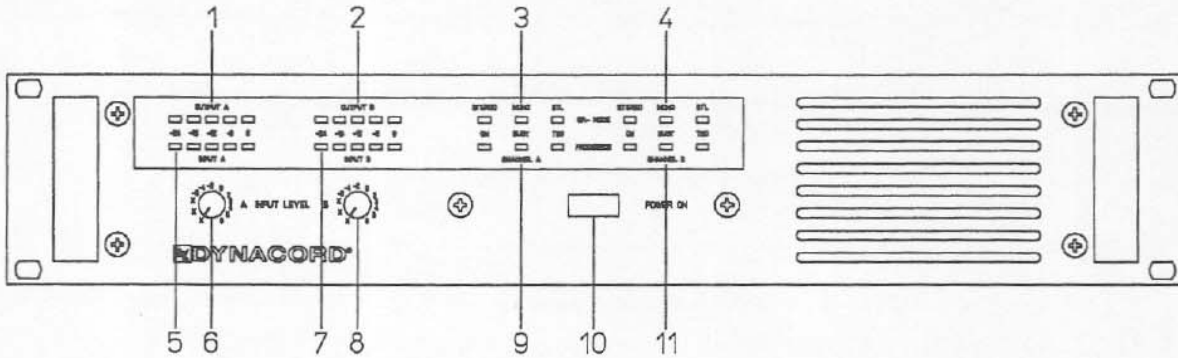
PCA 2250, PCA 2450 General Overview

Stereo Power Mosfet Power Amplifiers with built-in LPN Eq, Nonlinearity Controlled Limiter and Loudspeaker Thermal Voice Coil Overload Protection Network

- * PCA 2250 2 * 250 W / 4 Ohms rated power
- * PCA 2450 2 * 400 W / 4 Ohms rated power
- * Excellent dynamic headroom (1.5 dB IHF-A)
- * Excellent internal rise-time and slew-rate
- * Electronically balanced XLR inputs
- * Unbalanced phone-jack inputs
- * Transformer isolated inputs optional
- * SPEAKON loudspeaker connectors for Channel A and Channel B
- * SPEAKON loudspeaker connectors for "Bridged Mode"
- * 2nd order low frequency low-pass-notch-filter eq (LPN)
- * Built-in fast acting nonlinearity controlled limiter
- * 1st order built-in voice coil model for protection of loudspeaker cabinets against voice coil thermal overload
- * Large input and output level display
- * Status indicators
- * Excellent reactive load drive capability up to +- 90 degrees load phase angle
- * No foldback current limiting
- * Can drive audio transformers safely without the typical annoying "saturation clicks" of foldback current limited bipolar power amplifiers
- * 2 built-in dual-speed temperature controlled fans
- * Crowbar DC loudspeaker protection

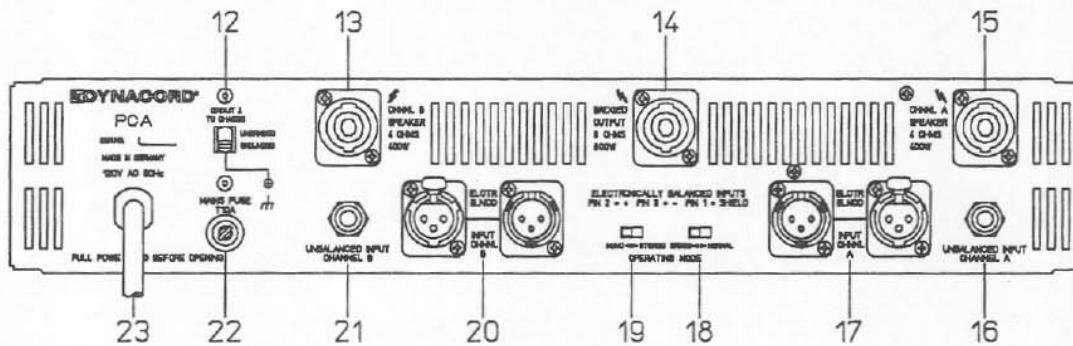
CONTROLS AND CONNECTIONS

FRONT PANEL



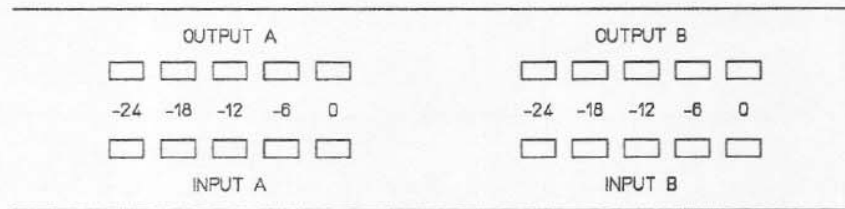
- | | |
|--------------------------------|----------------------------------|
| 1. Output display, channel A | 7. Input display, channel B |
| 2. Output display, channel B | 8. Volume control, channel B |
| 3. Function display, channel A | 9. Processor display, channel A |
| 4. Function display, channel B | 10. Mains switch |
| 5. Input display, channel A | 11. Processor display, channel B |
| 6. Volume control, channel A | |

REAR PANEL



- | | |
|--------------------------------------|--------------------------------------|
| 12. Groundlift switch | 18. Normal/bridged mode switch |
| 13. Speaker output, channel B | 19. Stereo/mono switch |
| 14. Speaker output, "bridged mode" | 20. XLR inputs, balanced, channel B |
| 15. Speaker output, channel A | 21. Input jack unbalanced, channel B |
| 16. Input jack unbalanced, channel A | 22. Fuse holder |
| 17. XLR inputs, balanced, channel A | 23. Power cord |

OPERATION



INPUT A, INPUT B DISPLAY

These LED arrays indicate the input signal for the processor section and power amplifiers. In electrical terms, these displays are positioned behind of the level controls (post fader), i.e. no display will given when the level controls are turned down.

OUTPUT A, OUTPUT B DISPLAY

These LED arrays indicate the sound signal applied to the output sockets. In the event of the speaker lines being shorted, these displays will only be illuminated slightly or not at all, whereas the input displays will continue to light up.

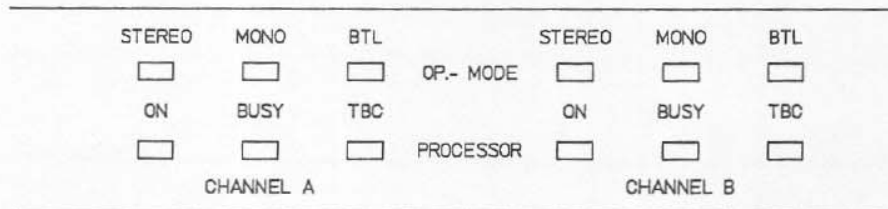


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INPUT LEVEL A, INPUT LEVEL B

Controls to adjust the power amplifier input level. These controls should normally be positioned between 0 and 6 in order to avoid distortion in output amplifiers of mixers. If these controls are turned to the X position, distortion from overdriving mixer output amplifiers must be expected at high levels. Distortions of this type can, of course, not be corrected by the power amplifier processor.

OPERATION



STEREO

The STEREO LEDs will light up when the selector switch (rear panel) is set to the STEREO position. Channel A and channel B are processed separately.

MONO

The red MONO LEDs will light up when the selector switch (rear panel) is set to the MONO position. In the MONO position, the input sockets for channel A and channel B are directly connected in parallel. The volume for channel A and channel B can, however, be adjusted separately by means of level controls A, B.

If transformers are retrofitted (transformer-balanced input), the input sockets for channel A and B are not directly connected in the MONO position.

BTL

Display for bridged mode (selector switch on rear panel). In this position, the bridge output jack (rear panel) must be used only. The green or red LED shows that channel A is operating in phase, channel B in opposite phase.

In bridged mode, MONO will be automatically selected so that the input sockets A or B can be used. The input level will only be indicated on the channel A display.

ON

LED to indicate that the unit is switched on or off.

BUSY

This display will light up when the limiter section of the processor is activated. Permanent illumination of the BUSY LED shows amplifier overdriving and should be avoided by reducing the mixer output volume.

TBC

The short-term peak output power of the PCA power amps is considerably higher than the rated output power in order to give you excellent dynamic behaviour. The "dynamic headroom" (IHF-A) is 1.5 dB which is approximately 40% higher than the rated output power. The TBC circuit contains a simple 1st-order voice coil model to simulate the thermal behaviour of a typical woofer. At continuous overdriving or modulation with square wave signals this part of the processor reduces the power output to the rated output, in order to protect the connected loudspeaker system against thermal overload of the woofer's voice coil.

Please note that speakers with less power capability than the rated power cannot be protected completely by the "Thermal Brain Circuit".

OPERATION

INPUTS, CHANNEL A, CHANNEL B.



UNBALANCED INPUT
CHANNEL A

Input jacks, unbalanced

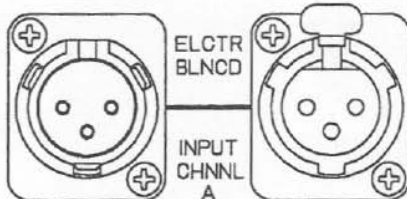
XLR input sockets, electronically balanced

PIN 2 = +

PIN 3 = -

PIN 1 = SHIELD

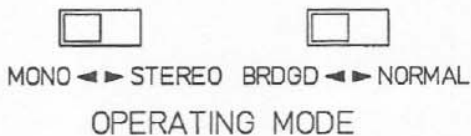
The XLR jacks are wired in accordance with IEC268-12 (PIN 2 = +, PIN 3 = -, PIN 1 = SHIELD).



CAUTION:

When using cables featuring the "obsolete" wiring (PIN 3 = +, PIN 2 = -, PIN 1 = SHIELD), the power amplifier will operate in the "wrong phase". In order to avoid problems of this kind, which are difficult to detect, you should always have your system wiring tested by an authorised dealer.

MODE SELECTOR SWITCHES



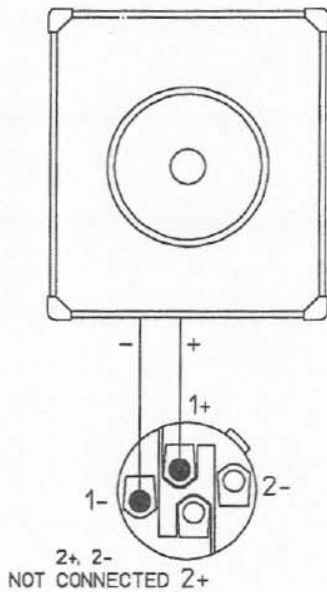
MONO - STEREO

The STEREO/MONO selector connects the inputs in parallel.

BRDGD-NORMAL

Used for selecting "bridged mode". In "bridged mode" Channel A, and Channel B a working "push-pull", i.e. in opposite phase and deliver twice the normal output voltage to the speaker terminals.

OPERATION



SPEAKER OUTPUTS

SPEAKON speaker output sockets for channel A, B.

Check the polarity of the connected speaker cabinets

To prevent acoustic cancellation problems, the polarity of the loudspeaker cabinets connected to the outputs must be equal. Otherwise the bass can sound muddy, suppressed and unprecise and weird midrange lobing problems can occur.

A very simple checking method involves a 9 V battery. If the + pole of the battery is connected to the + pole of the loudspeaker connector, the cone of the woofer should move outwards.

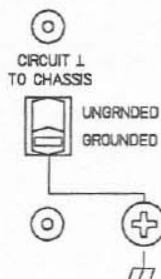
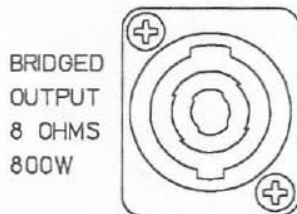
The correct polarity of mid-range and high-range speakers cannot be checked in this way, because some crossover networks change the polarity of speakers in the mid-range and high-range region.

E-V loudspeaker cabinets are internally wired correctly and do not need any polarity check procedure.

Minimum recommended load impedance is 3 ohms.

OUTPUT FOR BRIDGED MODE

In the "bridged mode" (BTL MODE), channels A and B operate in phase opposition so that the bridge output socket is fed with double the output voltage at the normal output sockets. Since the rated output power in the BTL MODE is 500W (PCA 2250), 800W (PCA 2450) at 8 ohms, speakers should only be connected which are actually capable of processing this power as rated power (not music output or cont. progr.). If speakers with a lower power handling capacity are used in the bridged mode, the continual activation of protection switches in the speakers or even speaker failure must be expected.



GROUND LIFT SWITCH

Slide switch to eliminate "hum" resulting from ground loops. Separates the circuit ground from the chassis.

SPECIFICATIONS

	PCA 2250	PCA 2450
Input level, XLR	510 mV - 10 V	650 mV - 10 V
Input level, jack	510 mV - 10 V	650 mV - 10 V
Input impedance	10 kohms (20k bal.)	10 kohms (20k bal.)
Music power 8 ohms	2 x 180 W	2 x 300 W
Music power 4 ohms	2 x 300 W	2 x 480 W
Rated power 8 ohms	2 x 150 W	2 x 250 W
Rated power 4 ohms	2 x 250 W	2 x 400 W
Rated Power 8 ohms (Bridged Mode)	1 x 500 W	1 x 800 W
Minimum load impedance	3 ohm	3 ohm
Frequency response (- 3dB)	3.5 Hz - 70 kHz	3.5 Hz - 70 kHz
THD at rated output	< 0,03%	< 0,03 %
Crosstalk attenuation 1kHz	> 70 dB	> 70 dB
S/N ratio (A, RMS)	> 101 dB	> 101 dB
Slew rate (internal)	> 70 V/μsec	> 100 V/μsec
Rise time (internal)	< 2,5 usec	< 2 usec
Damping factor (internal)	> 300	> 300
Power consumption (1/8 P _N IEC noise)	350 VA	570 VA
Operating voltage	120 V AC 60 Hz	120 V AC 60 Hz
Thermal Brain Circuit	TBC 250 W	TBC 400 W
Weight	16 kg (35.2 lbs)	16,5 kg (36.3 lbs)
Dimensions (WxHxD)	483 x 95 x 421 mm	483 x 95 x 421 mm
Height units	2	2
POWER ON delay	yes	yes
Safety class	I	I
Conversion kits	90151 # 111 978	90151 # 111 978
XLR inputs transformer balanced		

Specifications are subject to change without notice.

TECHNICAL INFORMATION

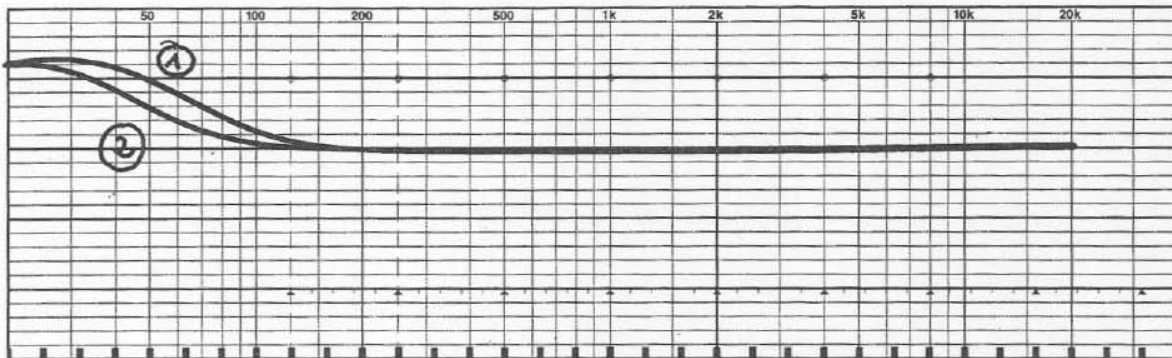
Bass Equalization

The PCA power amplifiers are equipped with a 2nd order shelving eq (LPN) to linearize the frequency response and phase response of vented loudspeaker cabinets. The corner frequencies and the quality factors of the LPN have been designed to match with the characteristics of modern high-efficiency loudspeaker cabinets.

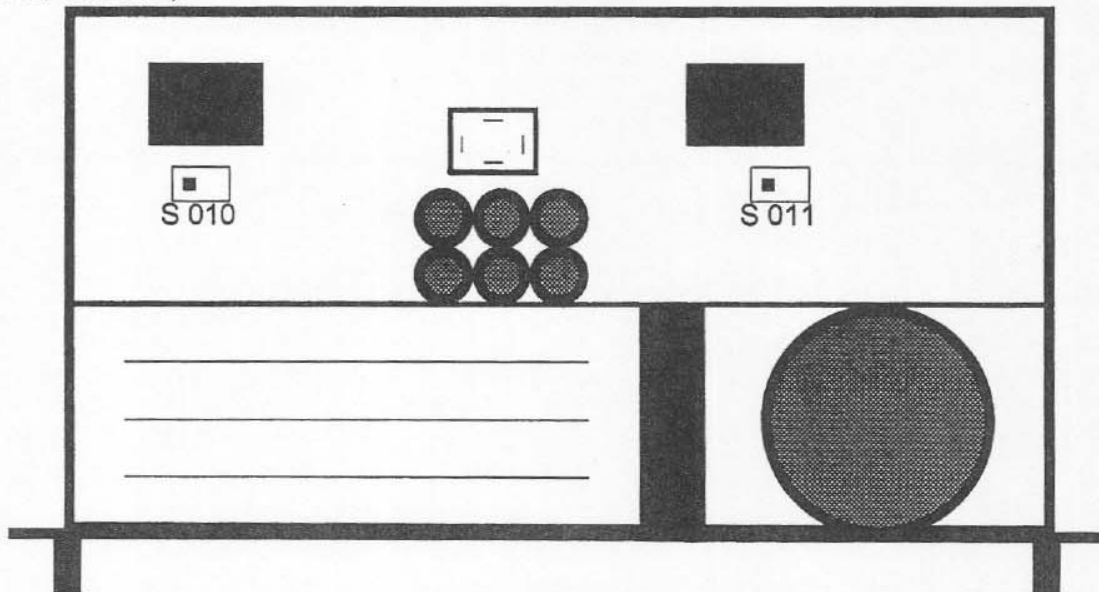
The corner frequencies of the LPN can internally be selected for two different classes of loudspeaker cabinets.

Position 1 (see below) is appropriate for high-efficiency cabinets with comparably small cabinet volumes, Position 2 should be used if studio monitors or extremely large bass horns are used.

Factory setting is Position 1.



Open the appliance. Selection is performed by means of switches (S 010, channel A and S 011, channel B).



Compensator 1 (switches S 010, S 011) switched to the left as viewed from the front, corresponds to the factory setting Position 1.

ADJUSTMENT INSTRUCTIONS

- TONE CONTROLS FOR MIXERS AND PREAMPLIFIERS

Before switching on, turn tone controls to the neutral position, equalizer to bypass. On the basis of this setting, adjust tone control to suit personal requirements. In the case of PCA power amplifiers, drastic adjustments to the tone controls are normally not necessary. Extreme adjustments to bass, mid-range or treble controls are normally indicative of inferior-quality speakers, microphones or preamplifiers.

- MICROPHONES

Directional microphones are associated with strong bass emphasis when spoken into at short distances. This can normally be eliminated by turning down the bass control or by activating the pop filter (if featured on the microphone). If possible, do not use third-octave or octave equalizers to eliminate pop interference since these in general uncontrollably lead to a deterioration of the phase and transient response of the entire system.

- EQUALIZERS

Third-octave or octave equalizers should, if at all, be adjusted with extreme caution. On many third-octave or octave equalizers, slight changes in the bass and mid-range produce unacceptable sound coloration which cannot be eliminated by any of the other tone controls.

- CALIBRATION USING REAL-TIME ANALYSERS AND EQUALIZERS

"Calibration" of amplifier systems with real-time analysers and third-octave or octave equalizers is generally not recommended for reasons of introduction of phase and group delay errors caused by equalizers (dependent on setting). Should calibration appear necessary, as a result of particularly unfavourable conditions, please observe the following precautionary measures when "calibrating" PA systems.

1. Only calibrate in the direct speaker field; this is normally a distance of approx. 3m to a maximum of 5m. If the test microphone is positioned at a greater distance (e.g. centre of the hall), direct sound as well as reverberated sound will be measured. Attempts to linearise this "mess" by means of a third-octave EQ will generally produce an extremely tinny, annoying sound quality.
2. When calibrating in the range from approx. 250 Hz - 5 kHz ("the critical range") using the EQ, only use "cut" positions, never "boost" frequency bands. A "hole" in the spectrum is not half as disturbing as a "boosted frequency band". Avoid boosting the bass range since the transient response of the entire system will be drastically worsened.
3. A maximum of 5 W (pink noise) should be used for calibration purposes in order to avoid power amplifier clipping and associated distortions. In commercially available noise generators, peak pink noise voltage is approximately 10 dB higher than the RMS level so that peaks up to 50 W occur at the output of the power amplifier.
4. Dominant acoustic feedback can sometimes be suppressed a little by means of third-octave EQs or parametric EQs. Applications of this type should, however, be treated with extreme caution so as not to destroy the increase in volume by a loss of intelligibility and a deterioration of the natural sound reproduction.

Overall TEST DATA for PCA 2250
 =====

Basic settings:

Set mode selector switch on rear panel to "STEREO" and "NORMAL"
 Turn input level switch "fully clockwise"
 Set bass equalisation switch to position 1 (on left-hand side as viewed from front = condition as delivered)

Perform measurements on channel A or B if nothing else is specified.

- | | | | |
|-----|---|----------------------------------|-----------|
| | Operating voltage | E = 120 V AC 50 Hz | |
| | Test frequency | F = 1 kHz | |
| 1.0 | Input voltage | E _{in} = 510 mV (± 10%) | |
| | Load impedance | R = 4 ohms | |
| 1.1 | Rated power output 8 ohms = 150 watts = 34.6 V at 8 ohms
(E _{in} = 555 mV ± 10%) | | |
| 1.2 | Rated power output 4 ohms = 250 watts = 31.6 V at 4 ohms
(E _{in} = 510 mV ± 10%) | | |
| | Bridged mode: | | |
| 1.3 | Rated power output 8 ohms = 500 watts = 63.2 V at 8 ohms
(input A and B in "bridged" position internally switched to mono !) E _{in} = 510 mV ± 10 % | | |
| 2. | Total harmonic distortion ≤ 0.03 % (8 Ω, 34.6 V, 1 kHz)
≤ 0.04 % (8 Ω, 3.5 V, 1 kHz) | | |
| 3.1 | Crosstalk attenuation | A > B > 70 dB | |
| | (1 kHz, 31.6 V) | B > A > 70 dB | |
| | Interference voltages: | Channel A | Channel B |
| | ----- | | |
| 4.1 | External voltage
(level controls turned up) | < 1.2 mV | < 1.2 mV |
| 4.2 | Noise voltage CCIR 468
(level controls turned up) "peak" | < 3.5 mV | < 3.5 mV |
| 4.3 | Noise voltage "A" RMS
(level controls turned up) | < 700 μV | < 700 μV |
| 4.4 | Noise voltage "A" RMS
(level controls turned down) | < 700 μV | < 700 μV |

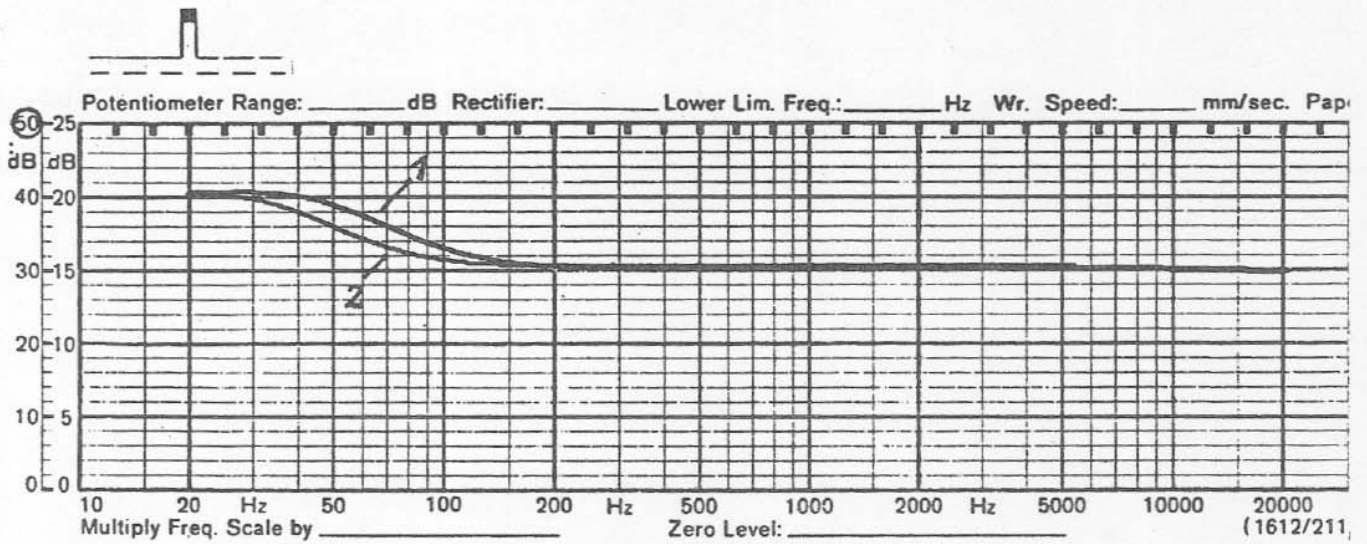
5. Frequency responses

FREQUENCY RESPONSE FOR COMPLETE UNIT 20 Hz-20 kHz input voltage

E = 51 mV(-20 dB)

1 = bass equalisation position 1 (PA systems)

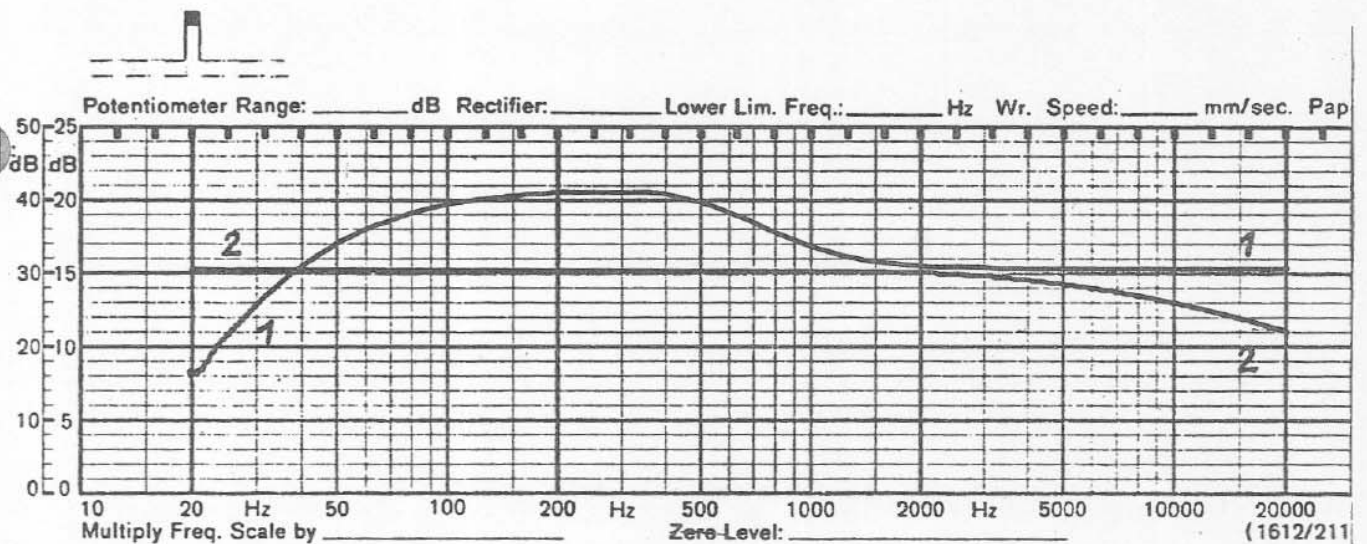
2 = bass equalisation position 2 (studio monitors)



FREQUENCY RESPONSE FOR COMPLETE UNIT input voltage E = 51 mV(-20dB)

1 = 2 Hz - 2 kHz

2 = 200 Hz - 200 kHz



Test points: 500 Hz \pm 0 dB, 50 Hz +8.5 dB (\pm 0.6 dB) -----
 50 kHz - 2.5 dB (\pm 1.5 dB)

6.1	Power input at no load	: 40 VA ($\pm 15\%$)
6.2	Power input at rated power (2x 250 watts at 4 ohms)	: 1200 VA ($\pm 15\%$)
7.1	Input impedance	: 10k ohms unbalanced 20k ohms electr. bal.
8.	Max. input voltage	: > 10 volts
9.	Damping factor internal (related to 8 ohms)	: > 300
10.	Slew rate (internal)	: > 70 V/ μ sec
11.	Rise time (internal)	: < 2.5 μ sec

A D J U S T M E N T S :

INTERNAL OFFSET :
(Level controls
turned down)

Channel A - adjust to 0 volt ± 50 mV
using R 055 at Tp Ch.A.

Channel B - adjust to 0 volt ± 50 mV
using R 122 at Tp Ch.B.

PROCESSOR CONTROL VOLTAGE:

Check voltage drop at R 066 (channel A)
and R 133 (channel B).
E = at least 1.2 V - 1.5 V

PROCESSOR ADJUSTMENT :

Adjust both channels until $E_{out} = 16$ V,
close service switch channel A = S 003,
B = S 004. Using R 024 = channel A
and R 029 = channel B, adjust output
voltage to minimum.
 $f = 1$ kHz, attenuation > 40 dB, $E < 160$ mV

PROCESSOR OFFSET :
(Level controls
turned down)

Alternately open and close service
switches S 003 and S 004, using R 028
or R 033 adjust to minimum offset at
power amplifier output.

CLOSED-CIRCUIT CURRENT
ADJUSTMENT:

Measure indirectly via power input on
amplifier board 84121. Remove fuse in
the + line and replace by 0.1 ohm
resistor. Adjust voltage drop to 5 mV
(= 50 mA closed-circuit current).

INDICATOR ADJUSTMENT :

With an output voltage of $E = 16$ V,
adjust output indicator in such a way
that penultimate LED in each array just
starts to go out. (Channel A = R 098,
channel B = R 100 on board 84122)
With an output voltage of $E = 16$ V,
adjust output indicator in such a way
that penultimate LED in each array just
starts to go out. (Channel A = R 015,
channel B = R 018 on board 84122)

BAL. INPUT : Apply signal to pins 2 and 3 of XLR input jack, pin 1 = chassis, E = 480 mV - using R 016 (channel A) and R 019 (channel B) adjust output signal to minimum.

PROCESSOR TEST : Adjust both channels until Eout = 31.6 V; increase input voltage by 10 dB -- BUSY LED will light up, output voltage will rise by approx. 2 dB to 40 volts.

SHORT-CIRCUIT TEST : Adjust both channels individually until 31.6 volts at 4 Ω. Connect 1 Ω resistor in parallel. Power input will increase to approx. 950 VA and then continually fall back to approx. 500 VA (approx. 30 sec.) BUSY LED will light up!

FAN CONTROL : Both fans generally run "slow" !
Switching from "slow" > "fast" at 90 °C
Switching from "fast" > "slow" at 70 °C

ON DELAY : E002 (power limitation), E003 and E004 (LF output) attract simultaneously.

TBC TEST : Switch unit off. After approx. 10 sec. (TBC circuitry discharged) turn unit back on again at Ein +10 dB. BUSY LED will light up, Eout = 40 V. TBC protective circuitry will respond after approx 30 sec. and reduce the output voltage to approx. 31.6V. (TBC LED will light up.)

S P E C I F I C A T I O N S

Input voltage, XLR	: 510 mV - 10 V
Input voltage, jack	: 510 mV - 10 V
Input impedance	: 10 kΩ (20 kΩ bal.)
Music power 8 Ω	: 2 x 180 watts
Music power 4 Ω	: 2 x 380 watts
Rated power 8 Ω	: 2 x 150 watts
Rated power 4 Ω	: 2 x 250 watts
Rated power 8 Ω (bridged mode)	: 500 watts
Min. load impedance	: 3 ohms
Frequency response (-3 dB)	: 3.5 Hz - 70 kHz
Total harmonic distortion	: < 0.03 %
Crosstalk attenuation at 1kHz	: > 70 dB
S/N ratio (A, RMS)	: > 101 dB
Slew rate (internal)	: > 70 V/μsec
Rise time (internal)	: < 2.5 μsec
Damping factor (internal)	: > 300
Power input	: 1200 VA
Operating voltage	: 120 V ± 10% AC 50-60 Hz
Weight	: approx. 16 kg.
Dimensions (WxHxD)	: 483x95x421mm, 2units high
ON delay	: yes
Enclosure class	: I
Retrofit kit (input balanced)	: 90151 # 111798

Overall TEST DATA for PCA 2450
 =====

Basic settings:

Set mode selector switch on rear panel to "STEREO" and "NORMAL"
 Turn input level switch "fully clockwise"
 Set bass equalisation switch to position 1 (on left-hand side as viewed from front = condition as delivered)

Perform measurements on channel A or B if nothing else is specified.

- | | | | |
|-----|---|------------------------------|-----------|
| | Operating voltage | E = 120 V AC 50 Hz | |
| | Test frequency | F = 1 kHz | |
| 1.0 | Input voltage | Ein = 650 mV (± 10%) | |
| | Load impedance | R = 4 ohms | |
| 1.1 | Rated power output 8 ohms | = 250 watts = 45 V at 8 ohms | |
| | | (Ein = 750 mV ± 10%) | |
| 1.2 | Rated power output 4 ohms | = 400 watts = 40 V at 4 ohms | |
| | | (Ein = 650 mV ± 10 %) | |
| | Bridged mode: | | |
| 1.3 | Rated power output 8 ohms | = 800 watts = 80 V at 8 ohms | |
| | (input A and B in "bridged" position internally switched to mono !) | | |
| | | Ein = 650 mV ± 10 % | |
| 2. | Total harmonic distortion | ≤ 0.03 % (8 Ω, 45 V, 1 kHz) | |
| | | ≤ 0.04 % (8 Ω, 4.5 V, 1 kHz) | |
| 3.1 | Crosstalk attenuation | A > B > 70 dB | |
| | (1 kHz, 40 V) | B > A > 70 dB | |
| | Interference voltages: | | |
| | | Channel A | Channel B |
| 4.1 | External voltage
(level controls turned up) | < 1.2 mV | < 1.2 mV |
| 4.2 | Noise voltage CCIR 468
(level controls turned up) "peak" | < 3.5 mV | < 3.5 mV |
| 4.3 | Noise voltage "A" RMS
(level controls turned up) | < 700 μV | < 700 μV |
| 4.4 | Noise voltage "A" RMS
(level controls turned down) | < 700 μV | < 700 μV |

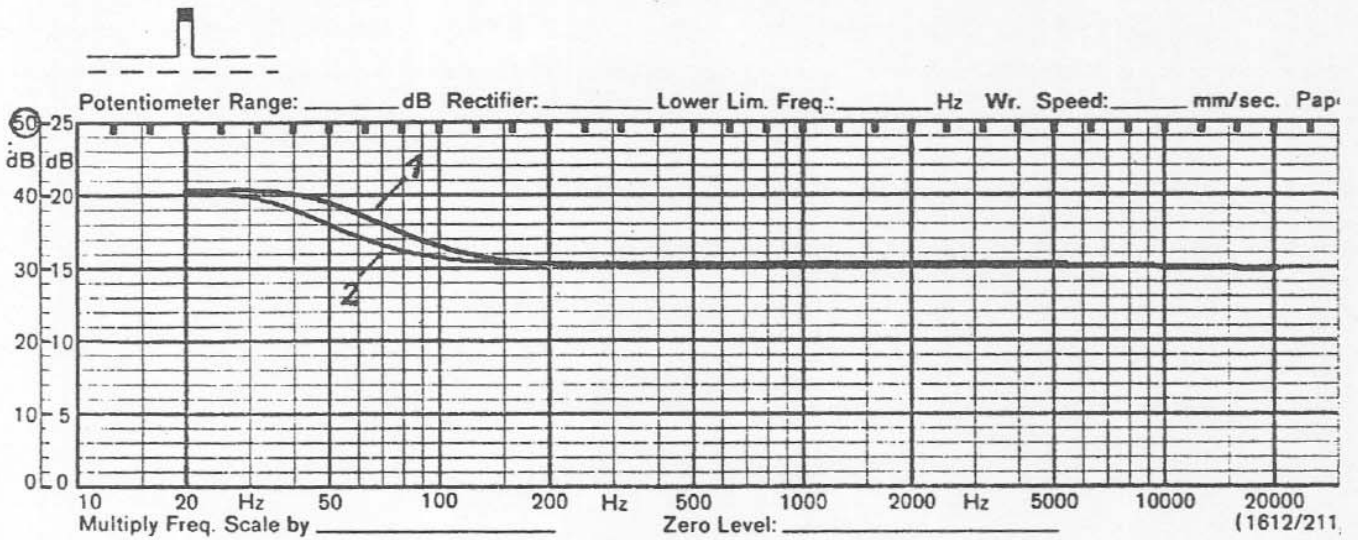
5. Frequency responses

FREQUENCY RESPONSE FOR COMPLETE UNIT 20 Hz-20 kHz input voltage

E = 65 mV(-20 dB)

1 = bass equalisation position 1 (PA systems)

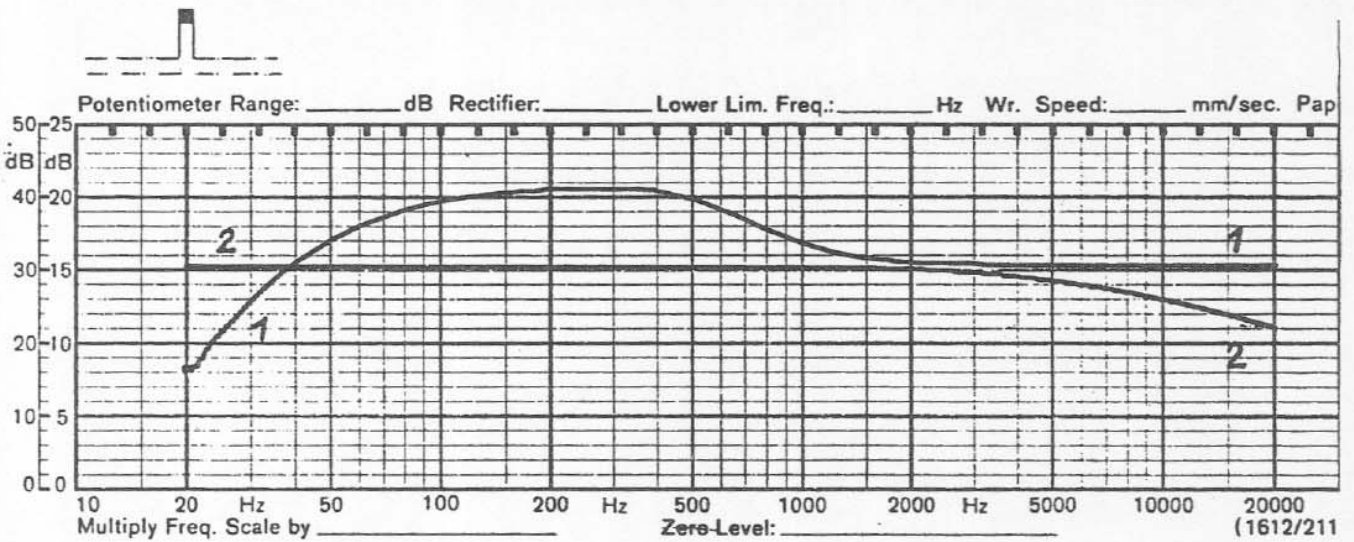
2 = bass equalisation position 2 (studio monitors)



FREQUENCY RESPONSE FOR COMPLETE UNIT input voltage E = 65 mV(-20dB)

1 = 2 Hz - 2 kHz

2 = 200 Hz - 200 kHz



Test points: 500 Hz \pm 0 dB, 50 Hz +8.5 dB (\pm 0.6 dB) -----
50 kHz - 2.5 dB (\pm 1.5 dB)

- | | | |
|-----|--|--|
| 6.1 | Power input at no load | : 70 VA ($\pm 15\%$) |
| 6.2 | Power input at rated power
(2x 400 watts at 4 ohms) | : 1600 VA ($\pm 15\%$) |
| 7.1 | Input impedance | : 10k ohms unbalanced
20k ohms electr. bal. |
| 8. | Max. input voltage | : > 10 volts |
| 9. | Damping factor internal
(related to 8 ohms) | : > 300 |
| 10. | Slew rate (internal) | : > 100 V/ μ sec |
| 11. | Rise time (internal) | : < 2 μ sec |

A D J U S T M E N T S :

INTERNAL OFFSET : Channel A - adjust to 0 volt \pm 50 mV
(Level controls using R 055 at Tp Ch.A.
turned down)

Channel B - adjust to 0 volt \pm 50 mV
using R 122 at Tp Ch.B.

PROCESSOR CONTROL VOLTAGE: Check voltage drop at R 066 (channel A)
and R 133 (channel B).
E = at least 1.2 V - 1.5 V

PROCESSOR ADJUSTMENT : Adjust both channels until Eout = 20 V,
close service switch channel A = S 003,
B = S 004. Using R 024 = channel A
and R 029 = channel B, adjust output
voltage to minimum.
f=1 kHz, attenuation > 40 dB, E <200 mV

PROCESSOR OFFSET : Alternately open and close service
(Level controls switches S 003 and S 004, using R 028
turned down) or R 033 adjust to minimum offset at
power amplifier output.

CLOSED-CIRCUIT CURRENT Measure indirectly via power input on
ADJUSTMENT: amplifier board 84121. Remove fuse in
the + line and replace by 0.1 ohm
resistor. Adjust voltage drop to 10 mV
(= 100 mA closed-circuit current).

INDICATOR ADJUSTMENT : With an output voltage of E = 20 V,
adjust output indicator in such a way
that penultimate LED in each array just
starts to go out. (Channel A = R 098,
channel B = R 100 on board 84122)
With an output voltage of E = 20 V,
adjust output indicator in such a way
that penultimate LED in each array just
starts to go out. (Channel A = R 015,
channel B = R 018 on board 84122)

BAL. INPUT : Apply signal to pins 2 and 3 of XLR input jack, pin 1 = chassis, E = 650 mV - using R 016 (channel A) and R 019 (channel B) adjust output signal to minimum.

PROCESSOR TEST : Adjust both channels until Eout = 40V, increase input voltage by 10 dB -- BUSY LED will light up, output voltage will rise by approx. 2 dB to 50 volts.

SHORT-CIRCUIT TEST : Adjust both channels individually until 40 volts at 4 Ω. Connect 1 Ω resistor in parallel. Power input will increase to approx. 2000 VA and then continually fall back to approx. 900 VA (approx. 30 sec.) BUSY LED will light up!

FAN CONTROL : Both fans generally run "slow" ! Switching from "slow" > "fast" at 90 °C Switching from "fast" > "slow" at 70 °C

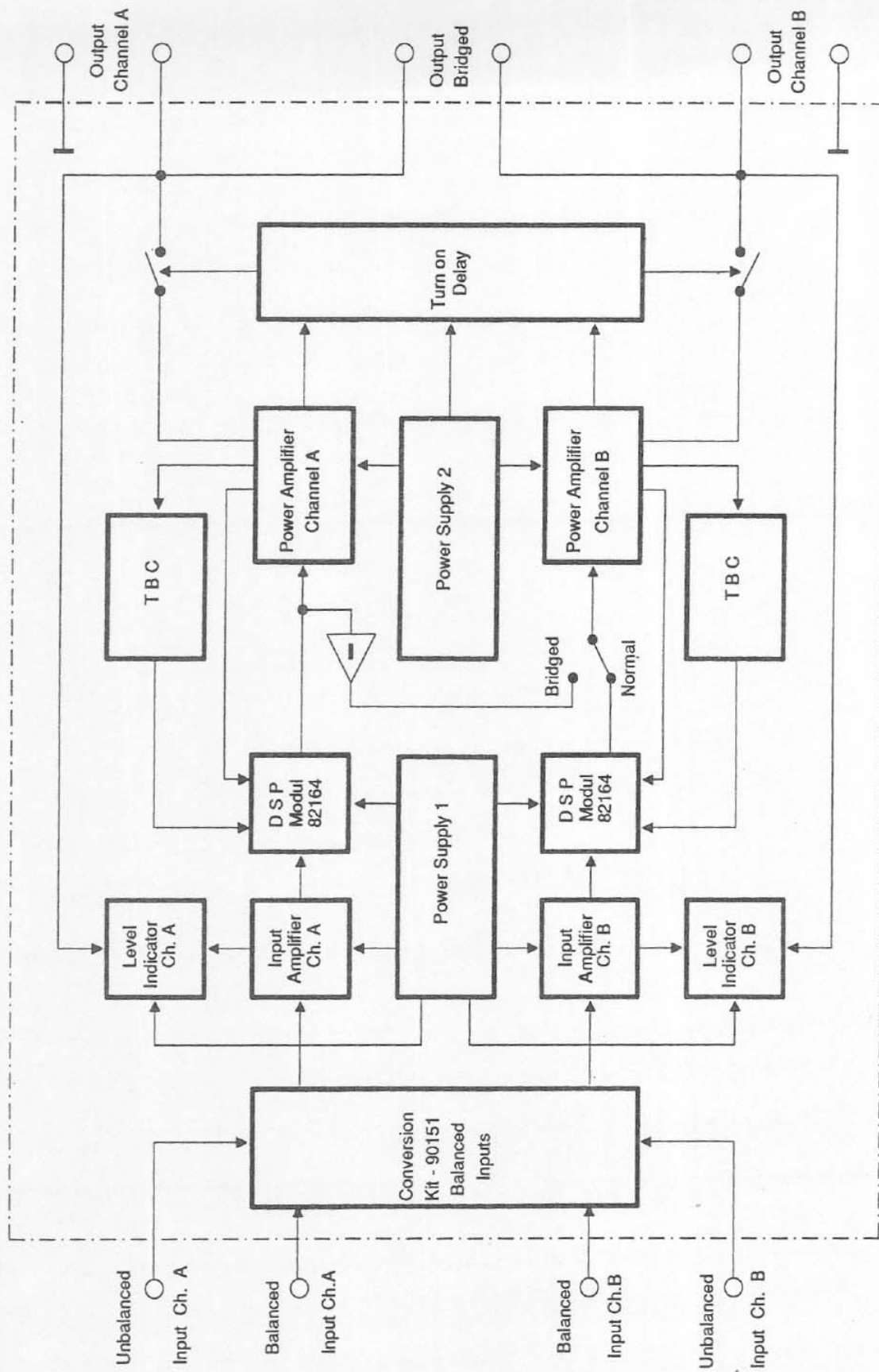
ON DELAY : E002 (power limitation), E003 and E004 (LF output) attract simultaneously.

TBC TEST : Switch unit off. After approx. 10 sec. (TBC circuitry discharged) turn unit back on again at Ein +10 dB. BUSY LED will light up, Eout = 50 V. TBC protective circuitry will respond after approx 30 sec. and reduce the output voltage to approx. 40 V. (TBC LED will light up.)

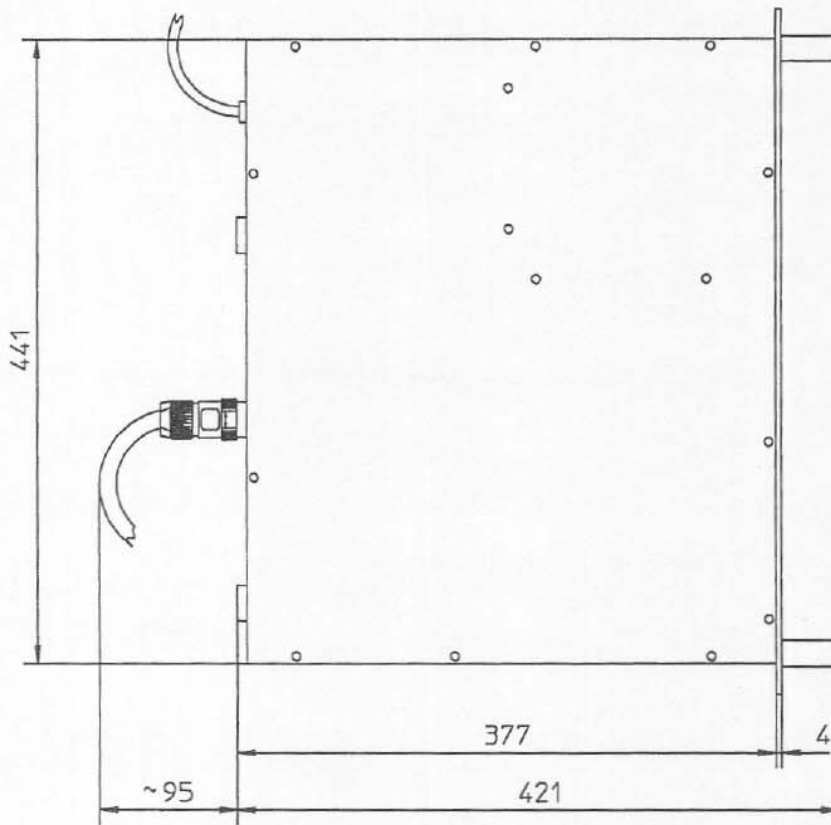
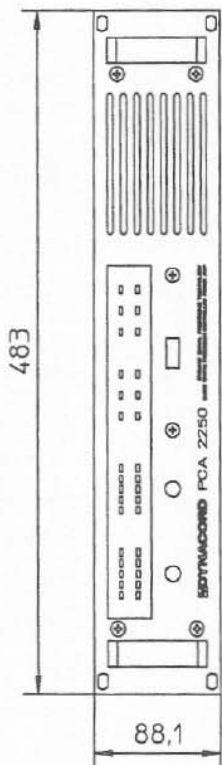
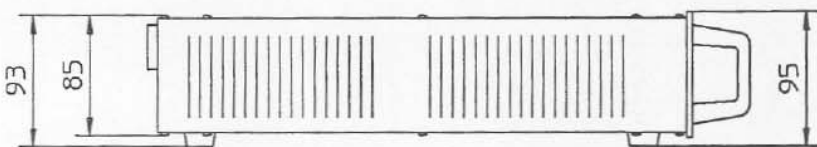
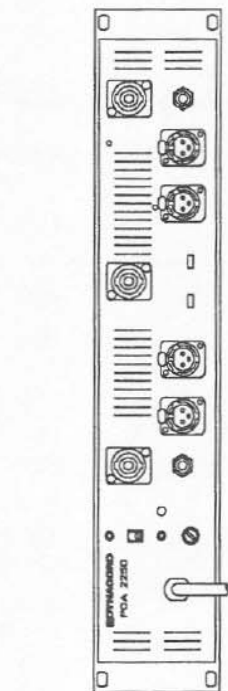
S P E C I F I C A T I O N S

Input voltage, XLR	: 650 mV - 10 V
Input voltage, jack	: 650 mV - 10 V
Input impedance	: 10 kΩ (20 kΩ bal.)
Music power 8 Ω	: 2 x 300 watts
Music power 4 Ω	: 2 x 480 watts
Rated power 8 Ω	: 2 x 250 watts .
Rated power 4 Ω	: 2 x 400 watts
Rated power 8 Ω (bridged mode)	: 800 watts
Min. load impedance	: 3 ohms
Frequency response (-3 dB)	: 3.5 Hz - 70 kHz
Total harmonic distortion	: < 0.03 %
Crosstalk attenuation at 1kHz	: > 70 dB
S/N ratio (A, RMS)	: > 101 dB
Slew rate (internal)	: > 100 V/μsec
Rise time (internal)	: < 2 μsec
Damping factor (internal)	: > 300
Power input	: 1600 VA
Operating voltage	: 120 V ± 10% AC 50-60 Hz
Weight	: approx. 16,5 kg
Dimensions (WxHxD)	: 483x95x421mm, 2units high
ON delay	: yes
Enclosure class	: I
Retrofit kit (input balanced)	: 90151 # 111798

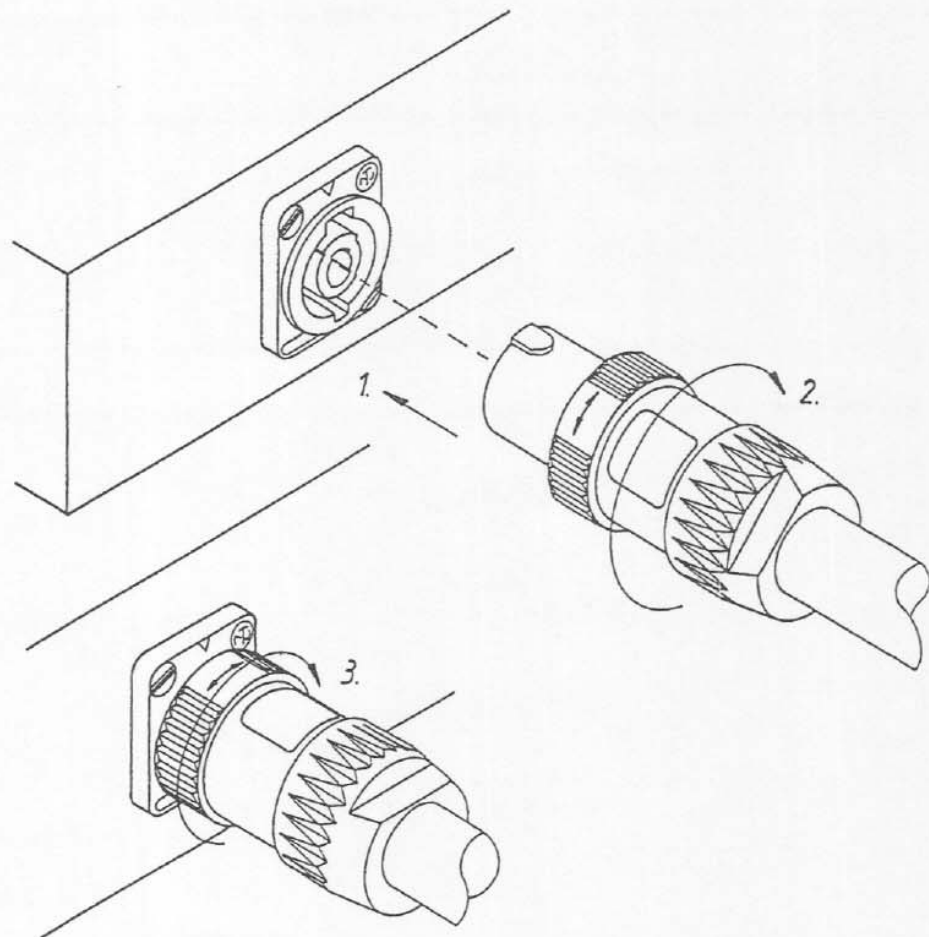
BLOCKDIAGRAM PCA2250/PCA2450



DIMENSIONS (mm)



SPEAKON PLUG CONNECTORS



1. Insert plug into socket.
2. Turn main body by 30° , electrical contact will be made after turning only.
3. Turn security ring by 180° , to secure the connection.

Pos. in diagram	description	Part-No.	Pos. in diagram	description	Part-No.
B 001	speaker socket 4pol.	341343	B003	phone jack	340985
B 002	speaker socket 4pol.	341343	B004	XLR socket female chassis	331267
B 003	speaker socket 4pol.	341343	B005	XLR socket male chassis	330607
S 001	sliding switch	335941	B006	phone jack	340985
00020	plexiglas panel	341264	C011	KO-EL 47MF 50V	343530
00030	knob D 10 black	341580	C012	KO-EL 47MF 50V	343530
00060	handle 55mm 2HE	341265	C026	KO-EL 47MF 50V	343530
00160	power button black	341382	C027	KO-EL 47MF 50V	343530
00170	switch	334628	C039	KO-EL 10MF 35V	307445
00180	wire unit L=497	340430	C040	KO-EL 10MF 35V	307445
00260	fan TYP 8314 24V/DC	341614	C041	KO-EL 1000MF 25V	337597
00870	rubber foot	335589	C042	KO-EL 1000MF 25V	337597
55000	PCB power amp	337050	C043	KO-EL 4700.000MF 100V	340437
Q 001	trans. 2SK 176	337637	C044	KO-EL 4700.000MF 100V	340437
Q 002	trans. 2SK 176	337637	C045	KO-EL 4700.000MF 100V	340437
Q 003	trans. 2SK 176	337637	C046	KO-EL 4700.000MF 100V	340437
Q 004	trans. 2SK 176	337637	C047	KO-EL 4700.000MF 100V	340437
Q 005	trans. 2SJ 56	337636	C048	KO-EL 4700.000MF 100V	340437
Q 006	trans. 2SJ 56	337636	C049	safety component	341714
Q 007	trans. 2SJ 56	337636	C050	safety component	341714
Q 008	trans. 2SJ 56	337636	C052	KO-EL 1000MF 25V	337597
Q 009	trans. 2SK 176	337637	C053	KO-EL 1000MF 25V	337597
Q 010	trans. 2SK 176	337637	D001	diode zener BZX 55C 15V	309450
Q 011	trans. 2SK 176	337637	D002	diode zener BZX 55C 15V	309450
Q 012	trans. 2SK 176	337637	D003	diode 1N 4002	304360
Q 013	trans. 2SJ 56	337636	D004	diode 1N 4002	304360
Q 014	trans. 2SJ 56	337636	D005	diode 1N 4002	304360
Q 015	trans. 2SJ 56	337636	D006	diode 1N 4002	304360
Q 016	trans. 2SJ 56	337636	D007	diode 1N 4002	304360
R 186	safety component	329981	D008	diode zener 1N 5352B 15V	331422
S 005	thermal cut out switch	339137	D009	diode zener 1N 5352B 15V	331422
10000	PCB	841218	D010	diode zener ZPD 12V 0,5W	305738
R005	wire-wound resistor 0,39ohm	341711	D011	diode 1N 4148	301254
R006	wire-wound resistor 0,39ohm	341711	D012	diode 1N 4148	301254
R007	wire-wound resistor 0,39ohm	341711	D013	diode zener ZPD 12V 0,5W	305738
R008	wire-wound resistor 0,39ohm	341711	D014	diode zener BZX 55C 2V4	329511
R009	wire-wound resistor 0,39ohm	341711	D015	diode zener ZPD 12V 0,5W	305738
R010	wire-wound resistor 0,39ohm	341711	D016	diode MBS 4991	338875
R011	wire-wound resistor 0,39ohm	341711	D017	diode MBS 4991	338875
R012	wire-wound resistor 0,39ohm	341711	D018	diode zener TYP 1,5 KE120CA	339061
R021	wire-wound resistor 0,39ohm	341711	D019	diode zener TYP 1,5 KE120CA	339061
R022	wire-wound resistor 0,39ohm	341711	D020	diode 1N 4002	304360
R023	wire-wound resistor 0,39ohm	341711	D021	diode 1N 4002	304360
R024	wire-wound resistor 0,39ohm	341711	D022	diode 1N 4002	304360
R025	wire-wound resistor 0,39ohm	341711	D023	diode 1N 4002	304360
R026	wire-wound resistor 0,39ohm	341711	D024	diode zener 1N 5352B 15V	331422
R027	wire-wound resistor 0,39ohm	341711	D025	diode zener 1N 5352B 15V	331422
R028	wire-wound resistor 0,39ohm	341711	D026	diode zener ZPD 12V 0,5W	305738
0005	fuse holder	306838	D027	diode 1N 4148	301254
B001	XLR socket female chassis	331267	D028	diode 1N 4148	301254
B002	XLR socket male chassis	330607	D029	diode zener ZPD 12V 0,5W	305738
			D030	diode zener BZX 55C 2V4	329511
			D031	diode zener ZPD 12V 0,5W	305738

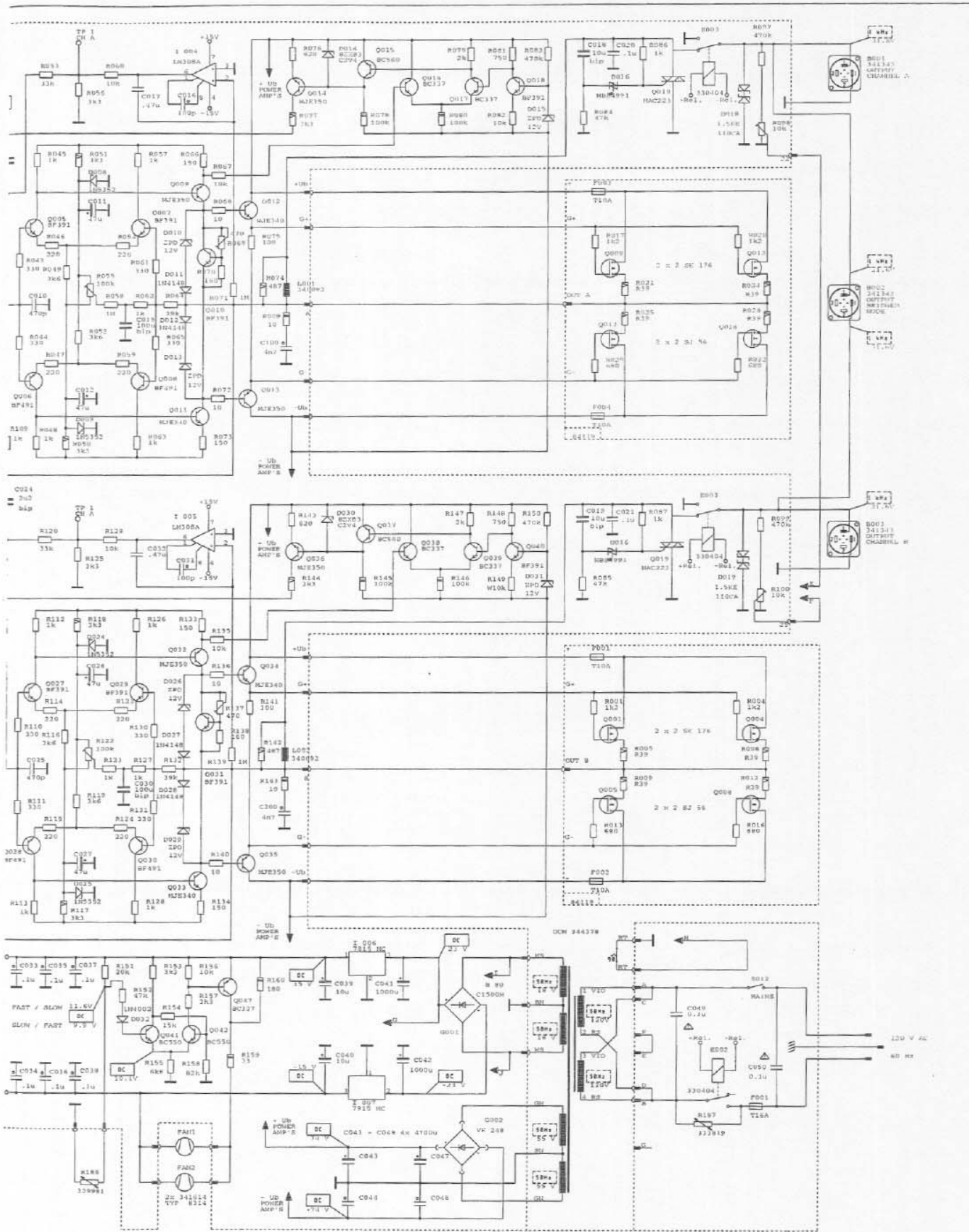
Pos. in diagram	description	Part-No.	Pos. in diagram	description	Part-No.
D032	diode 1N 4002	304360	Q029	trans. BF 391	307911
D033	diode BAT 85	301297	Q030	trans. BF 491	307912
D036	diode zener ZPD 20V 0,5W	301310	Q031	trans. BF 391	307911
D037	diode zener ZPD 51V 0,5W	341613	Q032	trans. MJE 350	338869
D038	diode 1N 4006	305739	Q033	trans. MJE 340	338868
D039	diode BAT 85	301297	Q034	trans. MJE 340	338868
D040	diode zener ZPD 20V 0,5W	301310	Q035	trans. MJE 350	338869
D041	diode zener ZPD 51V 0,5W	341613	Q036	trans. MJE 350	338869
D042	diode 1N 4006	305739	Q037	trans. BC 560 B	306928
E001	relay ES HA 001 24	339849	Q038	trans. BC 337-25	307150
E002	relay RP 310 024	330404	Q039	trans. BC 337-25	307150
E003	relay RP 310 024	330404	Q040	trans. BF 391	307911
E004	relay RP 310 024	330404	Q041	trans. BC 550 B	301184
F001	fuse T 16A 250V US	343377	Q042	trans. BC 550 B	301184
G001	rectifier B 80 C1500 M	340791	Q043	trans. BC 327-25	307430
G002	rectifier KBPC 35-04	343270	Q044	trans. BC 327-25	307430
I001	IC NE 5532 N	327197	Q045	trans. BC 327-25	307430
I002	IC NE 5532 N	327197	Q046	trans. BC 327-25	307430
I003	IC NE 5532 N	327197	Q047	trans. BC 327-25	307430
I004	IC LM 308 A	338359	R015	Res. trimpot 47 kohm lin	307602
I005	IC LM 308 A	338359	R016	Res. trimpot 2.2 kohm lin	335930
I006	IC LM 340 T-15	308292	R018	Res. trimpot 47 kohm lin	307602
I007	IC LM 7915 CT	308293	R019	Res. trimpot 2.2 kohm lin	335930
L001	coil DCN 340092	340092	R024	Res. trimpot 47 kohm lin	307602
L002	coil DCN 340092	340092	R028	Res. trimpot 47 kohm lin	307602
Q001	trans. BC 337-25	307150	R029	Res. trimpot 47 kohm lin	307602
Q002	trans. BC 337-25	307150	R033	Res. trimpot 47 kohm lin	307602
Q003	trans. BC 617	334633	R050	wire-wound resistor 3,3kohm	341712
Q004	trans. BC 617	334633	R051	wire-wound resistor 3,3kohm	341712
Q005	trans. BF 391	307911	R055	Res. trimpot 100kohm lin	308691
Q006	trans. BF 491	307912	R069	Res. trimpot 470 ohm lin	331427
Q007	trans. BF 391	307911	R074	wire-wound resistor 4,7ohm	341713
Q008	trans. BF 491	307912	R077	wire-wound resistor 3,3kohm	341712
Q009	trans. MJE 350	338869	R098	Res. trimpot 10 kOhm lin	308645
Q010	trans. BF 391	307911	R100	Res. trimpot 10 kOhm lin	308645
Q011	trans. MJE 340	338868	R117	wire-wound resistor 3,3kohm	341712
Q012	trans. MJE 340	338868	R118	wire-wound resistor 3,3kohm	341712
Q013	trans. MJE 350	338869	R122	Res. trimpot 100kohm lin	308691
Q014	trans. MJE 350	338869	R137	Res. trimpot 470 ohm lin	331427
Q015	trans. BC 560 B	306928	R142	wire-wound resistor 4,7ohm	341713
Q016	trans. BC 337-25	307150	R144	wire-wound resistor 3,3kohm	341712
Q017	trans. BC 337-25	307150	R187	safety component	333819
Q018	trans. BF 391	307911	S001	sliding switch	340423
Q019	triac MAC 223-6	338876	S002	sliding switch	340423
Q020	triac MAC 223-6	338876	S003	control element on/off	327947
Q021	trans. BC 327-25	307430	S004	control element on/off	327947
Q022	trans. BC 327-25	307430	S007	control element on/off	327947
Q023	trans. BC 550 B	301184	S009	control element on/off	327947
Q024	trans. BC 550 B	301184	S010	sliding switch	305412
Q025	trans. BC 550 B	301184	S011	sliding switch	305412
Q026	trans. BC 550 B	301184	S012	mains switch	334626
Q027	trans. BF 391	307911	0005	IC socket 8pol	309354
Q028	trans. BF 491	307912	0020	fuse holder	328390

Pos. in diagram description	Part-No.	Pos. in diagram description	Part-No.
0100 connector 6pol	306840	I001 IC BA 6144	338606
0101 connector 6pol	306840	I002 IC BA 6144	338606
0105 connector 4pol	306609	I003 IC BA 6144	338606
0110 connector 9pol	306446	I004 IC BA 6144	338606
0115 shorting plug	306397	R017 potentiometer 50k lin B	339727
		R018 potentiometer 50k lin B	339727
1000 PCA Modul kompl.	821648	00020 power transformer	344379
		00080 switch thermo UP6 90C	332753
00015 PCB	871008		
C001 KO-EL 2.2MF 50V	304986		
C002 KO-EL 2.2MF 50V	304986		
C003 KO-EL 10MF 35V	307445		
C004 KO-EL 10MF 35V	307445		
C005 KO-EL 2.2MF 50V	304986		
C006 KO-EL 2.2MF 50V	304986		
C007 KO-EL 10MF 35V	307445		
C008 KO-EL 10MF 35V	307445		
C009 KO-EL 10MF 35V	307445		
D001 LED green 2,5x5mm	334693		
D002 LED green 2,5x5mm	334693		
D003 LED green 2,5x5mm	334693		
D004 LED green 2,5x5mm	334693		
D005 LED green 2,5x5mm	334693		
D006 LED green 2,5x5mm	334693		
D007 LED green 2,5x5mm	334693		
D008 LED green 2,5x5mm	334693		
D009 LED green 2,5x5mm	334693		
D010 LED green 2,5x5mm	334693		
D011 LED green 2,5x5mm	334693		
D012 LED green 2,5x5mm	334693		
D013 LED red 2,5x5mm	334694		
D014 LED red 2,5x5mm	334694		
D015 LED green 2,5x5mm	334693		
D016 LED green 2,5x5mm	334693		
D017 diode 1N 4148	346335		
D018 diode zener BZX 55C 2V4	329511		
D019 diode 1N 4148	301254		
D020 LED red 2,5x5mm	334694		
D021 LED green 2,5x5mm	334693		
D022 LED green 2,5x5mm	334693		
D023 LED green 2,5x5mm	334693		
D024 LED green 2,5x5mm	334693		
D025 LED green 2,5x5mm	334693		
D026 LED green 2,5x5mm	334693		
D027 LED green 2,5x5mm	334693		
D028 LED green 2,5x5mm	334693		
D029 LED green 2,5x5mm	334693		
D030 LED green 2,5x5mm	334693		
D031 LED green 2,5x5mm	334693		
D032 LED red 2,5x5mm	334694		
D033 LED red 2,5x5mm	334694		
D034 LED red 2,5x5mm	334694		
D035 LED red 2,5x5mm	334694		

Pos. in diagram	description	Part-No.	Pos. in diagram	description	Part-No.
B 001	speaker socket 4pol.	341343	C049	safety component	341714
B 002	speaker socket 4pol.	341343	C050	safety component	341714
B 003	speaker socket 4pol.	341343	C052	KO-EL 1000MF 25V	337597
S 001	sliding switch	335941	C053	KO-EL 1000MF 25V	337597
00020	plexiglas panel	341264	D001	diode zener BZX 55C 15V	309450
00030	knob D 10 black	341580	D002	diode zener BZX 55C 15V	309450
00060	handle 55mm 2HE	341265	D003	diode 1N 4002	304360
00160	power button black	341382	D004	diode 1N 4002	304360
00170	switch	334628	D005	diode 1N 4002	304360
00180	wire unit L=497	340430	D006	diode 1N 4002	304360
00260	fan TYP 8314 24V/DC	341614	D007	diode 1N 4002	304360
00870	rubber foot	335589	D008	diode zener 1N 5352B 15V	331422
55000	PCB power amp	337049	D009	diode zener 1N 5352B 15V	331422
Q 001	trans. 2SK 176	337637	D010	diode zener ZPD 12V 0,5W	305738
Q 004	trans. 2SK 176	337637	D011	diode 1N 4148	301254
Q 005	trans. 2SJ 56	337636	D012	diode 1N 4148	301254
Q 008	trans. 2SJ 56	337636	D013	diode zener ZPD 12V 0,5W	305738
Q 009	trans. 2SK 176	337637	D014	diode zener BZX 55C 2V4	329511
Q 012	trans. 2SK 176	337637	D015	diode zener ZPD 12V 0,5W	305738
Q 013	trans. 2SJ 56	337636	D016	diode MBS 4991	338875
Q 016	trans. 2SJ 56	337636	D017	diode MBS 4991	338875
R 186	safety component	329981	D018	diode zener TYP 1,5 KE120CA	339061
S 005	thermal cut out switch	339137	D019	diode zener TYP 1,5 KE120CA	339061
10000	PCB	841198	D020	diode 1N 4002	304360
R005	wire-wound resistor 0,39ohm	341711	D021	diode 1N 4002	304360
R008	wire-wound resistor 0,39ohm	341711	D022	diode 1N 4002	304360
R009	wire-wound resistor 0,39ohm	341711	D023	diode 1N 4002	304360
R012	wire-wound resistor 0,39ohm	341711	D024	diode zener 1N 5352B 15V	331422
R021	wire-wound resistor 0,39ohm	341711	D025	diode zener 1N 5352B 15V	331422
R024	wire-wound resistor 0,39ohm	341711	D026	diode zener ZPD 12V 0,5W	305738
R025	wire-wound resistor 0,39ohm	341711	D027	diode 1N 4148	301254
R028	wire-wound resistor 0,39ohm	341711	D028	diode 1N 4148	301254
0005	fuse holder	306838	D029	diode zener ZPD 12V 0,5W	305738
B001	XLR socket female chassis	331267	D030	diode zener BZX 55C 2V4	329511
B002	XLR socket male chassis	330607	D031	diode zener ZPD 12V 0,5W	305738
B003	phone jack	340985	D032	diode 1N 4002	304360
B004	XLR socket female chassis	331267	D033	diode BAT 85	301297
B005	XLR socket male chassis	330607	D036	diode zener ZPD 20V 0,5W	301310
B006	phone jack	340985	D037	diode zener ZPD 51V 0,5W	341613
C011	KO-EL 47MF 50V	343530	D038	diode 1N 4006	305739
C012	KO-EL 47MF 50V	343530	D039	diode BAT 85	301297
C026	KO-EL 47MF 50V	343530	D040	diode zener ZPD 20V 0,5W	301310
C027	KO-EL 47MF 50V	343530	D041	diode zener ZPD 51V 0,5W	341613
C039	KO-EL 10MF 35V	307445	D042	diode 1N 4006	305739
C040	KO-EL 10MF 35V	307445	E001	relay ES HA 001 24	339849
C041	KO-EL 1000MF 25V	337597	E002	relay RP 310 024	330404
C042	KO-EL 1000MF 25V	337597	E003	relay RP 310 024	330404
C043	KO-EL 4700.000MF 100V	340437	E004	relay RP 310 024	330404
C044	KO-EL 4700.000MF 100V	340437	F001	fuse T 16A 250V US	343377
C047	KO-EL 4700.000MF 100V	340437	G001	rectifier B 80 C1500 M	340791
C048	KO-EL 4700.000MF 100V	340437	G002	rectifier KBPC 35-04	343270
			I001	IC NE 5532 N	327197
			I002	IC NE 5532 N	327197

Pos. in diagram	description	Part-No.	Pos. in diagram	description	Part-No.
I003	IC NE 5532 N	327197	Q047	trans. BC 327-25	307430
I004	IC LM 308 A	338359	R015	Res.trimpot 47 kohm lin	307602
I005	IC LM 308 A	338359	R016	Res. trimpot 2.2 kohm lin	335930
I006	IC LM 340 T-15	308292	R018	Res.trimpot 47 kohm lin	307602
I007	IC LM 7915 CT	308293	R019	Res. trimpot 2.2 kohm lin	335930
L001	coil DCN 340092	340092	R024	Res.trimpot 47 kohm lin	307602
L002	coil DCN 340092	340092	R028	Res.trimpot 47 kohm lin	307602
Q001	trans. BC 337-25	307150	R029	Res.trimpot 47 kohm lin	307602
Q002	trans. BC 337-25	307150	R033	Res.trimpot 47 kohm lin	307602
Q003	trans. BC 617	334633	R050	wire-wound resistor 3,3kohm	341712
Q004	trans. BC 617	334633	R051	wire-wound resistor 3,3kohm	341712
Q005	trans. BF 391	307911	R055	Res. trimpot 100kohm lin	308691
Q006	trans. BF 491	307912	R069	Res. trimpot 470 ohm lin	331427
Q007	trans. BF 391	307911	R074	wire-wound resistor 4,7ohm	341713
Q008	trans. BF 491	307912	R077	wire-wound resistor 3,3kohm	341712
Q009	trans. MJE 350	338869	R098	Res. trimpot 10 kOhm lin	308645
Q010	trans. BF 391	307911	R100	Res. trimpot 10 kOhm lin	308645
Q011	trans. MJE 340	338868	R117	wire-wound resistor 3,3kohm	341712
Q012	trans. MJE 340	338868	R118	wire-wound resistor 3,3kohm	341712
Q013	trans. MJE 350	338869	R122	Res. trimpot 100kohm lin	308691
Q014	trans. MJE 350	338869	R137	Res. trimpot 470 ohm lin	331427
Q015	trans. BC 560 B	306928	R142	wire-wound resistor 4,7ohm	341713
Q016	trans. BC 337-25	307150	R144	wire-wound resistor 3,3kohm	341712
Q017	trans. BC 337-25	307150	R187	safety component	333819
Q018	trans. BF 391	307911	S001	sliding switch	340423
Q019	triac MAC 223-6	338876	S002	sliding switch	340423
Q020	triac MAC 223-6	338876	S003	control element on/off	327947
Q021	trans. BC 327-25	307430	S004	control element on/off	327947
Q022	trans. BC 327-25	307430	S007	control element on/off	327947
Q023	trans. BC 550 B	301184	S009	control element on/off	327947
Q024	trans. BC 550 B	301184	S010	sliding switch	305412
Q025	trans. BC 550 B	301184	S011	sliding switch	305412
Q026	trans. BC 550 B	301184	S012	mains switch	334626
Q027	trans. BF 391	307911	0005	IC socket 8pol	309354
Q028	trans. BF 491	307912	0020	fuse holder	328390
Q029	trans. BF 391	307911	0100	connector 6pol	306840
Q030	trans. BF 491	307912	0101	connector 6pol	306840
Q031	trans. BF 391	307911	0105	connector 4pol	306609
Q032	trans. MJE 350	338869	0110	connector 9pol	306446
Q033	trans. MJE 340	338868	0115	shorting plug	306397
Q034	trans. MJE 340	338868			
Q035	trans. MJE 350	338869	1000	PCA Modul kompl.	821648
Q036	trans. MJE 350	338869			
Q037	trans. BC 560 B	306928	00015	PCB	871008
Q038	trans. BC 337-25	307150	C001	KO-EL 2.2MF 50V	304986
Q039	trans. BC 337-25	307150	C002	KO-EL 2.2MF 50V	304986
Q040	trans. BF 391	307911	C003	KO-EL 10MF 35V	307445
Q041	trans. BC 550 B	301184	C004	KO-EL 10MF 35V	307445
Q042	trans. BC 550 B	301184	C005	KO-EL 2.2MF 50V	304986
Q043	trans. BC 327-25	307430	C006	KO-EL 2.2MF 50V	304986
Q044	trans. BC 327-25	307430	C007	KO-EL 10MF 35V	307445
Q045	trans. BC 327-25	307430	C008	KO-EL 10MF 35V	307445
Q046	trans. BC 327-25	307430	C009	KO-EL 10MF 35V	307445

Pos. in diagram	description	Part-No.	Pos. in diagram	description	Part-No.
D001	LED green 2,5x5mm	334693			
D002	LED green 2,5x5mm	334693			
D003	LED green 2,5x5mm	334693			
D004	LED green 2,5x5mm	334693			
D005	LED green 2,5x5mm	334693			
D006	LED green 2,5x5mm	334693			
D007	LED green 2,5x5mm	334693			
D008	LED green 2,5x5mm	334693			
D009	LED green 2,5x5mm	334693			
D010	LED green 2,5x5mm	334693			
D011	LED green 2,5x5mm	334693			
D012	LED green 2,5x5mm	334693			
D013	LED red 2,5x5mm	334694			
D014	LED red 2,5x5mm	334694			
D015	LED green 2,5x5mm	334693			
D016	LED green 2,5x5mm	334693			
D017	diode 1N 4148	346335			
D018	diode zener BZX 55C 2V4	329511			
D019	diode 1N 4148	301254			
D020	LED red 2,5x5mm	334694			
D021	LED green 2,5x5mm	334693			
D022	LED green 2,5x5mm	334693			
D023	LED green 2,5x5mm	334693			
D024	LED green 2,5x5mm	334693			
D025	LED green 2,5x5mm	334693			
D026	LED green 2,5x5mm	334693			
D027	LED green 2,5x5mm	334693			
D028	LED green 2,5x5mm	334693			
D029	LED green 2,5x5mm	334693			
D030	LED green 2,5x5mm	334693			
D031	LED green 2,5x5mm	334693			
D032	LED red 2,5x5mm	334694			
D033	LED red 2,5x5mm	334694			
D034	LED red 2,5x5mm	334694			
D035	LED red 2,5x5mm	334694			
I001	IC BA 6144	338606			
I002	IC BA 6144	338606			
I003	IC BA 6144	338606			
I004	IC BA 6144	338606			
R017	potentiometer 50k lin B	339727			
R018	potentiometer 50k lin B	339727			
00020	power transformer	344378			
00080	switch thermo UP6 90C	332753			



▲ SAFETY COMPONENT (MUST BE REPLACED BY ORIGINAL PART)
 ○ AC VOLTAGE 50/60 HZ MEASURED WITH VOLTMETER 200V OHM/V
 □ DC VOLTAGE MEASURED WITH VOLTMETER 100 OHM/V

COMPONENTS			CIRCUIT DIAGRAM	1-
Q	TR	RES		
Q001	2N3044	10K	DYNACORD 343 402 PCA 2250 U	
Q002	2N3044	10K		
Q003	2N3044	10K		

WARRANTY (Limited)

Electro-Voice products are guaranteed against malfunction due to defects in materials or workmanship for a specified period, as noted in the individual product-line statement(s) below, or in the individual product data sheet or owner's manual, beginning with the date of original purchase. If such malfunction occurs during the specified period, the product will be repaired or replaced (at our option) without charge. The product will be returned to the customer prepaid. **Exclusions and Limitations:** The Limited Warranty does not apply to: (a) exterior finish or appearance; (b) certain specific items described in the individual product-line statement(s) below, or in the individual product data sheet or owner's manual; (c) malfunction resulting from use or operation of the product other than as specified in the product data sheet or owner's manual; (d) malfunction resulting from misuse or abuse of the product; or (e) malfunction occurring at any time after repairs have been made to the product by anyone other than Electro-Voice or any of its authorized service representatives. **Obtaining Warranty Service:** To obtain warranty service, a customer must deliver the product, prepaid, to Electro-Voice or any of its authorized service representatives together with proof of purchase of the product in the form of a bill of sale or receipted invoice. A list of authorized service representatives is available from Electro-Voice at 600 Cecil Street, Buchanan, MI 49107 (616/695-6831) and/or Electro-Voice West, at 8294 Doe Avenue, Visalia, CA 93291 (209/651-7777). **Incidental and Consequential Damages Excluded:** Product repair or replacement and return to the customer are the only remedies provided to the customer. Electro-Voice shall not be liable for any incidental or consequential damages including, without limitation, injury to persons or property or loss of use. Some states do not allow the exclusion or limitation of incidental or consequential damages so the above limitation or exclusion may not apply to you. **Other Rights:** This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Electro-Voice Electronics are guaranteed against malfunction due to defects in materials or workmanship for a period of three (3) years from the date of original purchase. Additional details are included in the Uniform Limited Warranty statement.

Service and repair address for this product: Electro-Voice, Inc. 600 Cecil Street, Buchanan, Michigan 49107.

Specifications subject to change without notice.



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