

SPH-323 SERVICE NOTES

SPECIFICATIONS

■ PHASE SHIFTER ■ SPH-323

Maximum Input Level/ Impedance

Balanced: +20dBm/15kΩ
 Unbalanced: +20dBm/15kΩ
 Guitar: +20dBm/1MΩ

Maximum Output Level/ Impedance

Balanced: +20dBm/200Ω
 Unbalanced: +20dBm/600Ω
 Guitar Amp: +20dBm/3kΩ

Phase Shift

4-stage: approx 700°
 8-stage: approx 1400°

Center Frequency Sweep Range:

50Hz-15kHz

Frequency Response, effect OFF:

20Hz-30kHz; ±1dB

Harmonic Distortion

Effect OFF: 0.004%
 4-stage: 0.015%
 8-stage: 0.02%

Residual Noise ("A" Weighted)

Balanced Output, effect OFF:
 -100dBm
 Balanced output, effect ON:
 -80dBm
 Guitar Output, effect OFF:
 -100dBm

Low Frequency Oscillators

LFO-1: 0.02Hz to 5Hz;
 triangle wave @10Vp-p
 LFO-2: 0.2Hz to 50Hz;
 triangle wave @10Vp-p

Power Consumption:

7W

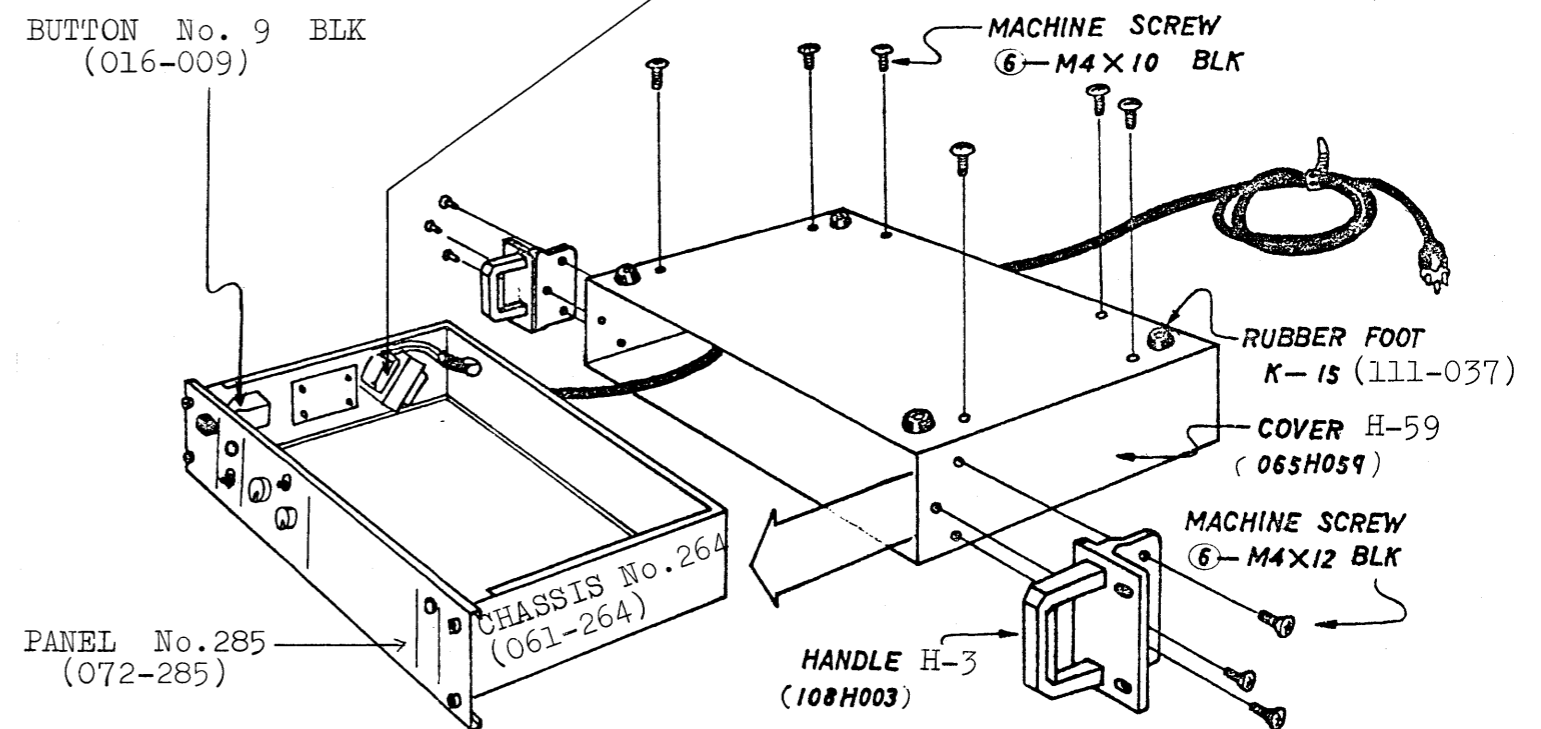
Dimensions:

482(W) x 92(H) x 240(D)mm
 19"(EIA-2U) rack mount

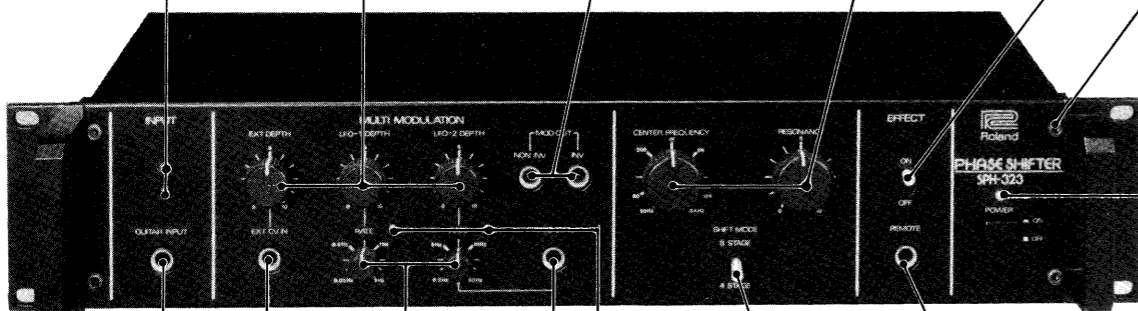
Weight:

4.2kg

- POWER SWITCH
- SDG5P001-1 (001-215) 100V
- SDG5P001-2 (001-216) 117V
- SDG5P502 (001-217) 220/240V
- BUTTON No. 9 BLK (016-009)
- POWER TRANSFORMER
- PT 86N (022-086N) 100V
- PT 86C (022-086C) 117V
- PT 86D (022-086D) 220/240V



- LED TLR-124 red (019-028)
- Pot. EVH6PA361B15 (026-430)
- Jack HLJ0190-01-020 (009-050)
- Pot. EVH6PA361B14 (026-427)
- Switch SLR-02203Y (001-280)
- TLG-124 green (019-029)
- Knob no.44 (016-044)
- Knob no.43 (016-043)
- Hexagon head bolt 4 x 6 mm black



- Jack HLJ0190-01-030 (009-046)
- Knob no.77 (016-077)
- LED red GL3AR2 (019-020)
- Switch SLR-02203Y (001-280)
- Jack HLJ0190-01-020 (009-050)
- Pot. (026-420)
- EVH6PA361A15
- POTENTIOMETER EVH6PA361 = EVH6PAK20

When ordering PCB, suffix alphabet if any. May be improved with Serial Number.

- CONTROL BOARD OP-148 (149-148)
- LED BOARD OP-149 (149-149)
- FUSE BOARD OP-143(149-143) 100V
- OP-144(149-144) 117V
- OP-145(149-145) 220/240V
- INDICATOR BOARD OP-153 (149-153)
- JACK HLJ-0235-01-060 (009-049)
- RECEPTACLE NC-3FP or HA16PR-3S (010-263)
- EFFECT BOARD ET-60 (151-060)
- JACK HLJ-0102-01-040 (009-015)
- RECEPTACLE NC-3MP or HA16R3P (010-264)
- TERMINAL TT-9-4 (042-041)

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41

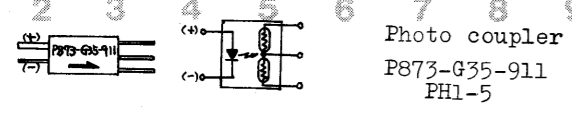
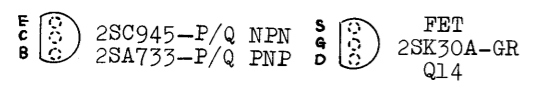
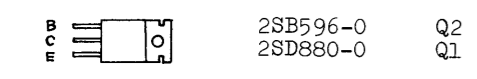


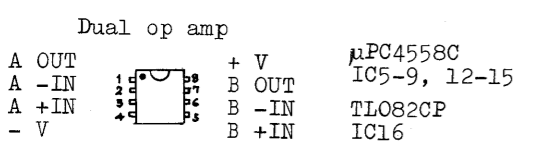
Photo coupler
P873-G35-911
PH1-5



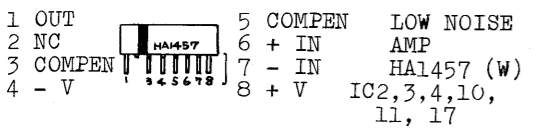
FET
2SC945-P/Q NPN
2SA733-P/Q PNP
2SK30A-GR
Q14



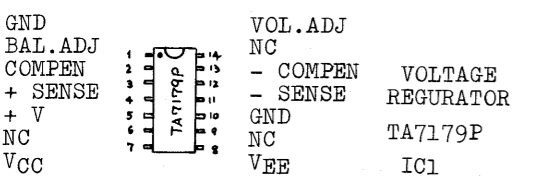
Dual op amp
2SB596-0 Q2
2SD880-0 Q1



Dual op amp
HA1457
1 OUT
2 NC
3 COMPEN
4 - V
5 COMPEN
6 + IN
7 - IN
8 + V
µPC4558C
IC5-9, 12-15
TL082CP
IC16

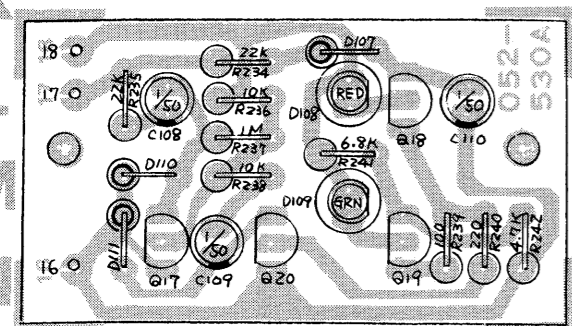


HA1457
1 OUT
2 NC
3 COMPEN
4 - V
5 COMPEN
6 + IN
7 - IN
8 + V
LOW NOISE
AMP
HA1457 (W)
IC2,3,4,10,
11, 17

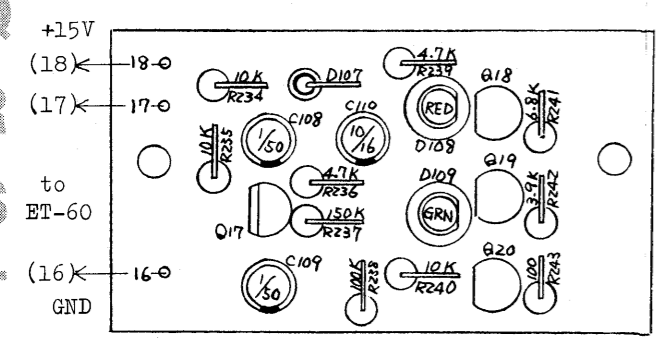


TA7179P
GND
BAL.ADJ
COMPEN
+ SENSE
+ V
NC
VCC
VOL.ADJ
NC
- COMPEN
- SENSE
GND
NC
VEE
VOLTAGE
REGULATOR
TA7179P
IC1

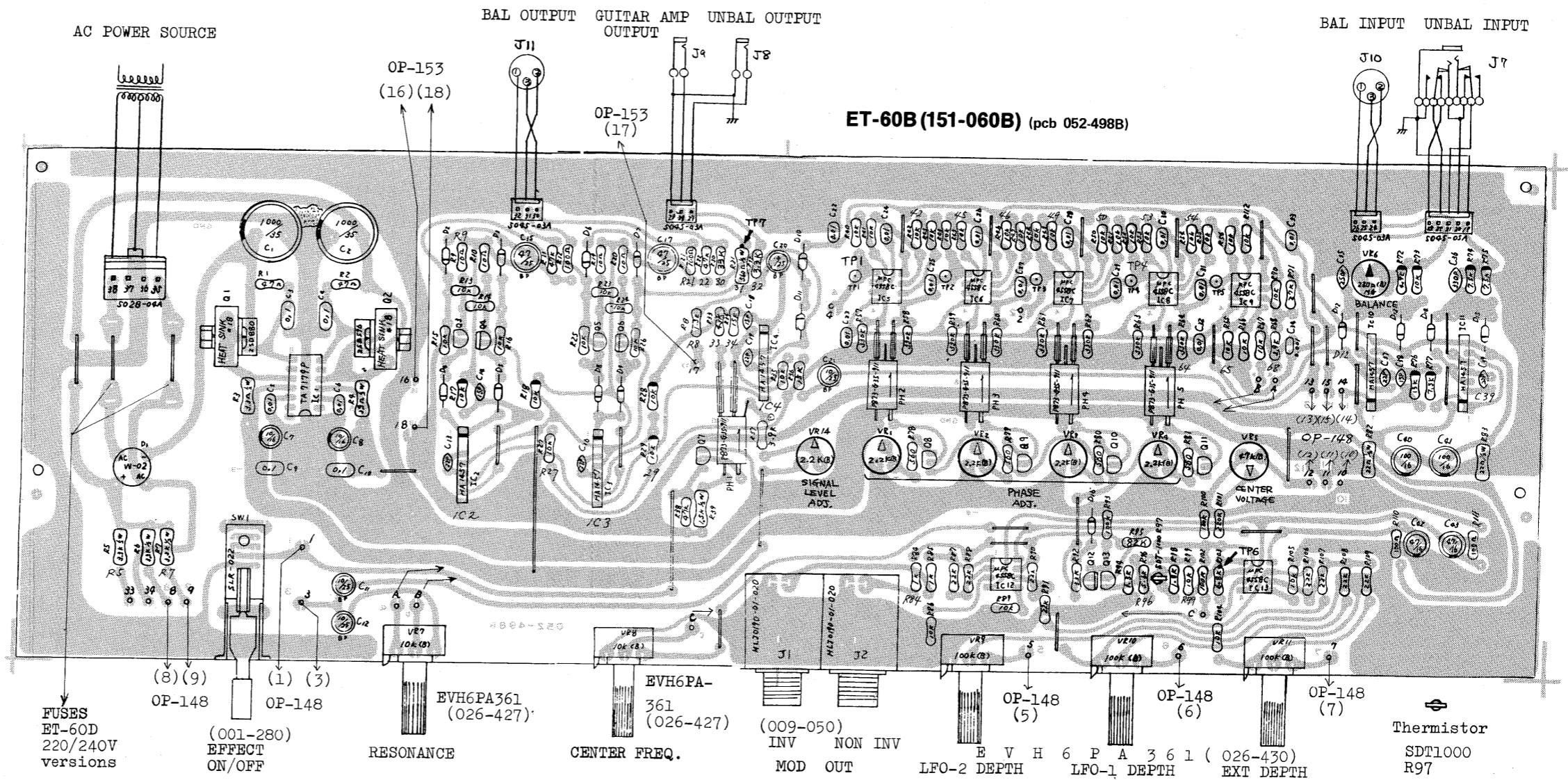
OP-153A (149-153A) (pcb 052-530A)
With serial no. 950550 and higher



View from the foil side
OP-153 (149-153) (pcb 052-530)
Serial nos. up to 950549



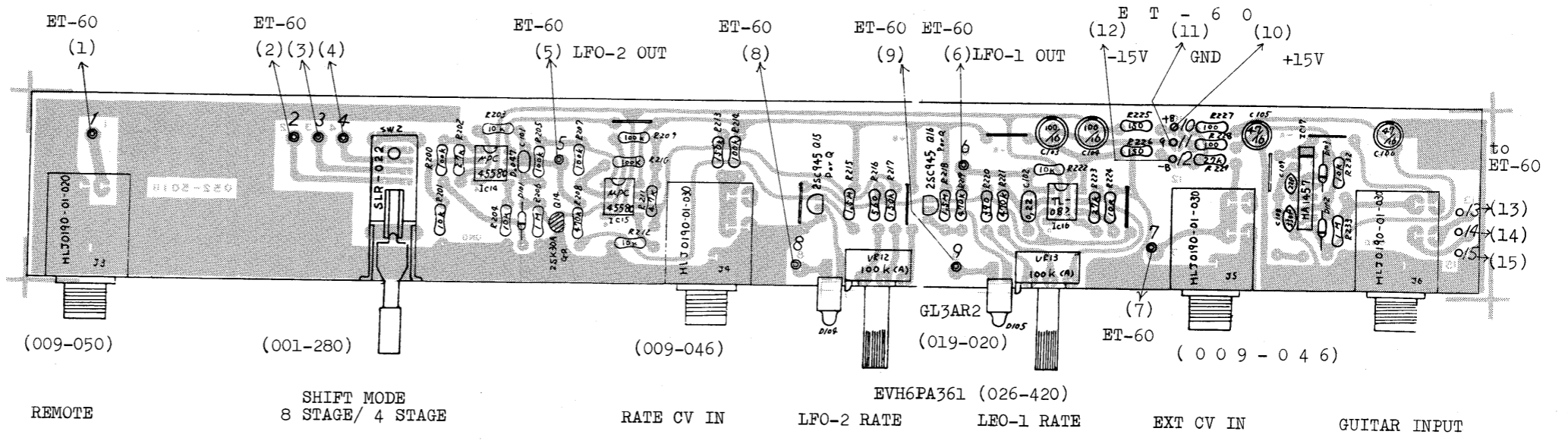
D108 TLR-124 red D109 TLG-124 green



ET-60B (151-060B) (pcb 052-498B)

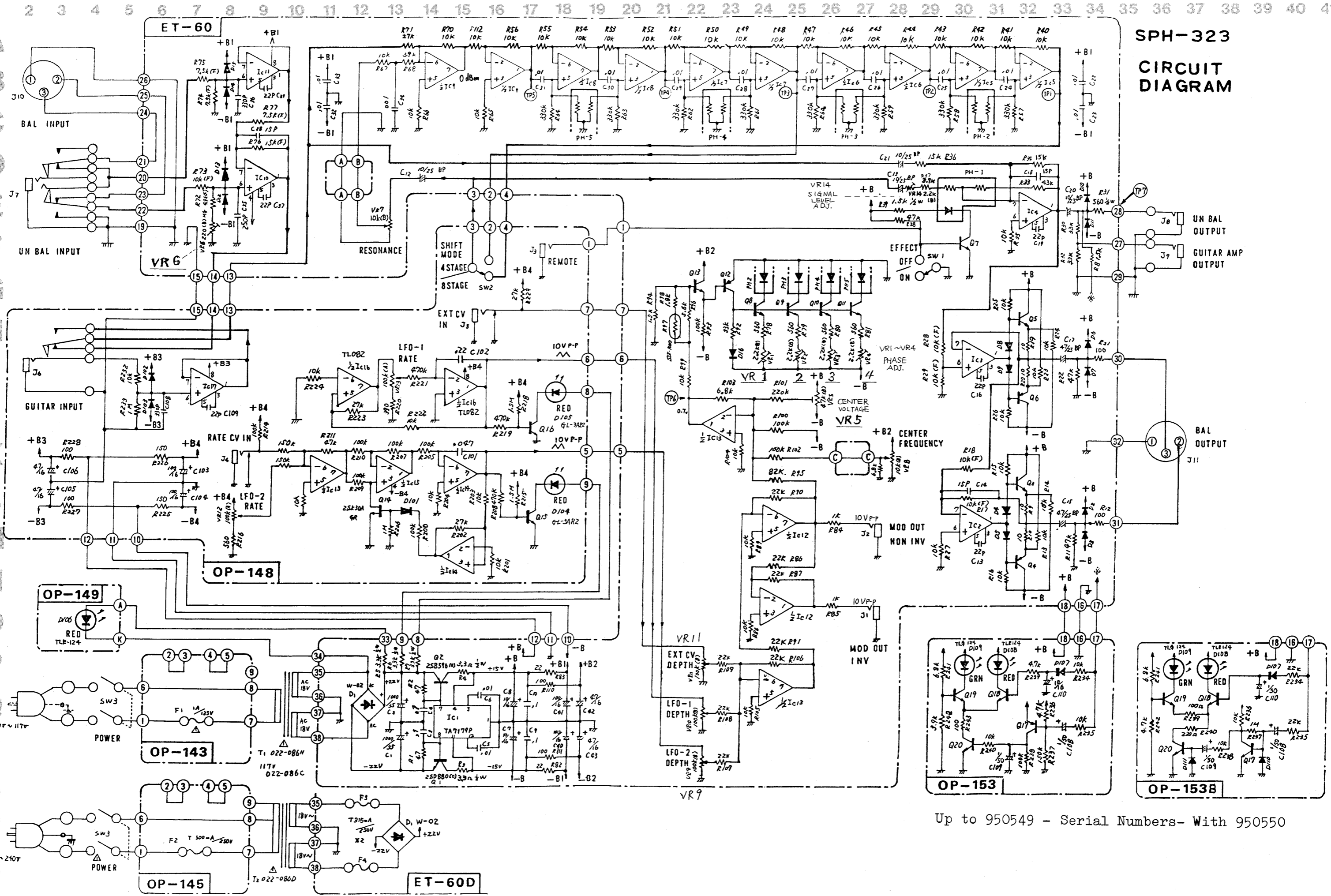
- Mylar 50V K
- Ceramic 50V K
- Non-polar
- ⊃ Metal film ±w 1%
- ⊃ Carbon ±w 5%
- 2SC945-P/Q
- 2SA733-P/Q
- 2SK30A-GR FET
- ⊃ Diode 1S2473
- ⊃ Trimmerpot VR6 CR19R
- ⊃ Trimmerpot VR1-5,14 SR-19R
- ⊙ Test point TP1-5

OP-148B (149-148B) (pcb 052-501B)



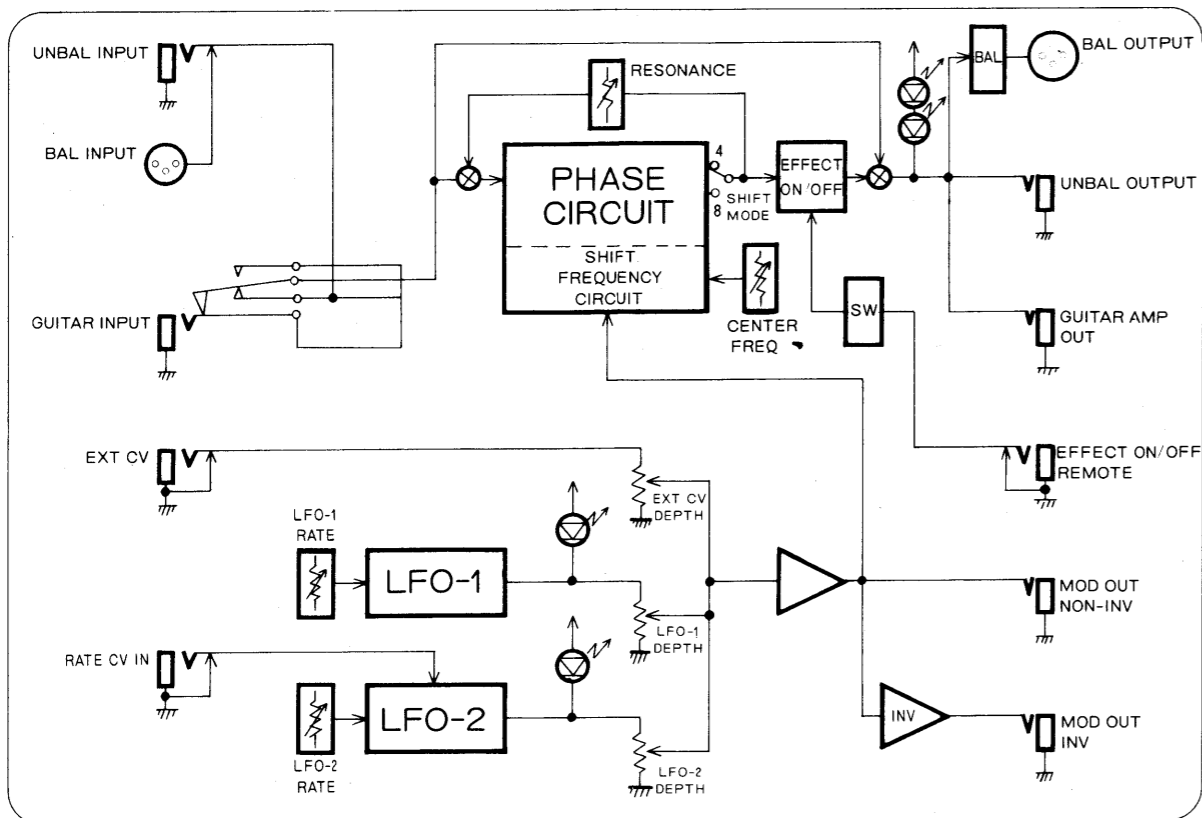
REMOTE
SHIFT MODE
8 STAGE/ 4 STAGE
RATE CV IN
LFO-2 RATE
LFO-1 RATE
EXT CV IN
GUITAR INPUT

SPH-323
CIRCUIT DIAGRAM



Up to 950549 - Serial Numbers- With 950550

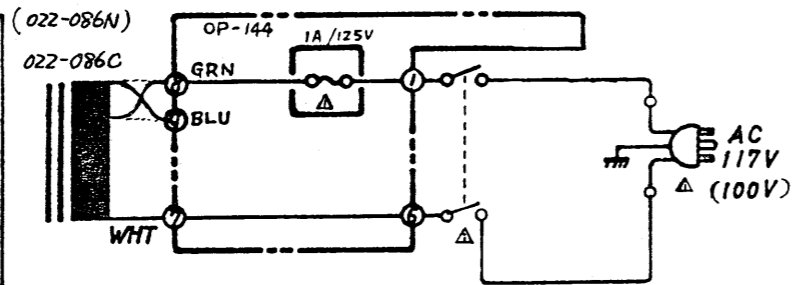
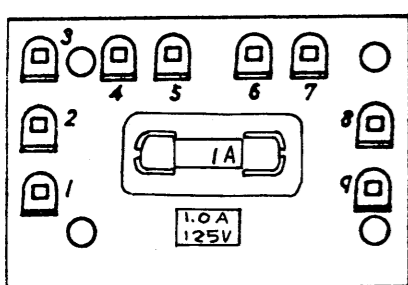
BLOCK DIAGRAM



FUSE BOARD

AC CONNECTIONS

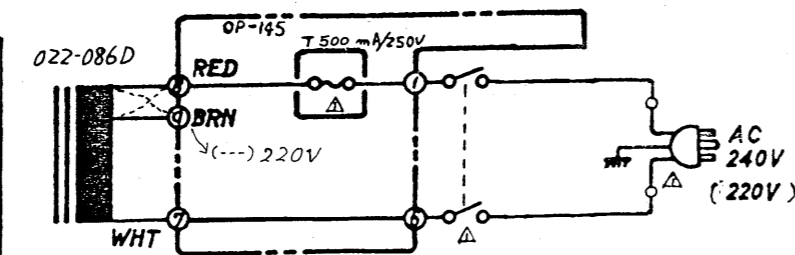
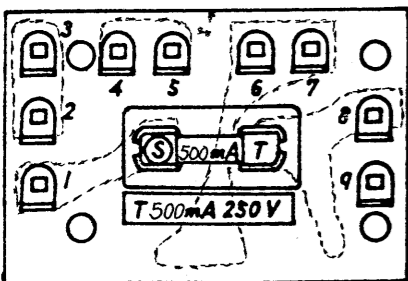
117V (100V)



OP-144A (OP-143A)
(149-144A) (149-143A)

POWER SW. SDG-5P-001-2
(001-216)
(SDG-5P-001-1)
(001-215)

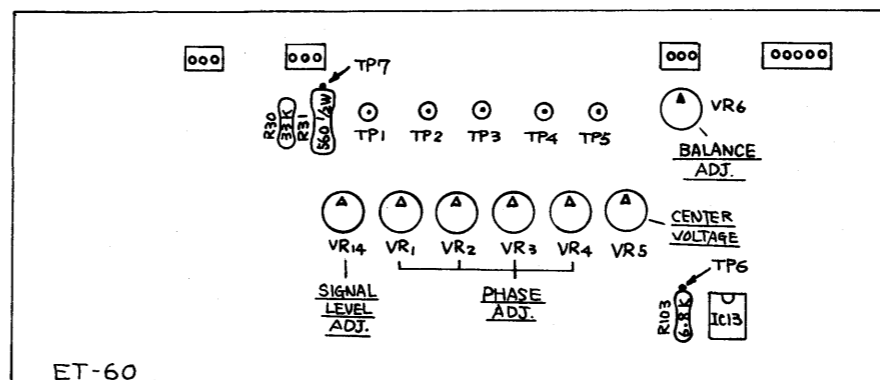
220 (240V)



OP-145A
(149-145A) (Etch mask 052H185A)

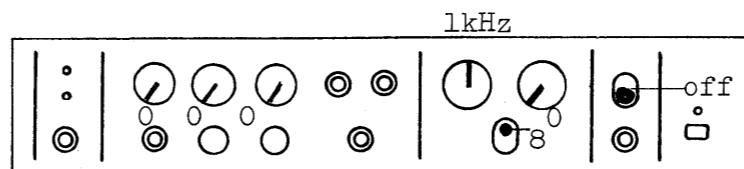
POWER SW. SDG-5P-502
(001-217)

ADJUSTMENT



1. BALANCING INPUT STAGE

- Common Mode Rejection -

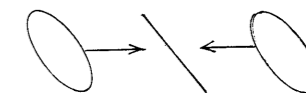
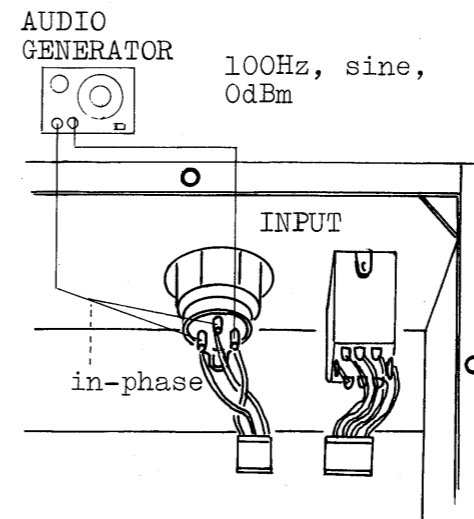


Set panel controls as shown above.

Feed a signal as illustrated at the right.

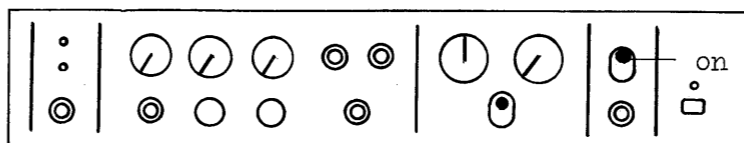
Connect an AC voltmeter to TP7 on ET-60.

Adjust VR6 for the minimum reading on the meter - less than -70dBm.



Proceed the adjustment to the next stage along the signal path in the order and combinations listed below.

2. SETTING THE CENTER FREQUENCY



Place EFFECT switch in ON.

Connect a DC voltmeter to TP6.

Adjust VR5 for -0.7V reading.

3. RANGING PHASE SHIFT

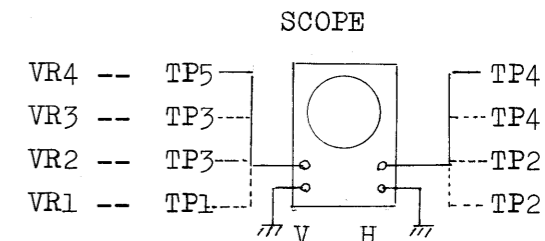
Control panel setting: same as in step 2.

Feed 1kHz, sine, 0dBm into UNBALANCED IN jack on the rear.

Connect TP5 to an oscilloscope V.IN and TP4 to H. IN.

Set the H and V gains on the 'scope for equal gain and to have the display fill about 50% of the CRT face.

Adjust VR4 to show the 180° phase shift display similar to the one at the center of the drawings shown below: a straight line crosses the X and Y axes at a 45° angle on the horizontal and slants upward to the left.



PARTS LIST

PANEL, CHASSIS

072-285 Panel no.285
 065H059 Cover (case) H-59
 108H003 Handle H-3
 111-037 Rubber foot K-15
 061-264 Chassis no.264

KNOB, BUTTON

016-043 Knob no.43 large
 016-044 Knob no.44 middle
 016-077 Knob no.77 small
 016-009 Button no.9 black, power switch

SWITCH

001-215 SDG5P001-1 power 100V
 001-216 SDG5P001-2 power 117V
 001-217 SDG5P502 power 220/240V
 001-280 SLR-02203Y lever (up-throw)

SOCKET, TERMINAL

009-049 Jack HLJ0235-01-060 phone, REAR IN
 009-015 Jack HLJ0102-01-040 phone, REAR OUT
 009-050 Jack HLJ0190-01-020 phone, MODE, REMOTE
 009-046 Jack HLJ0190-01-030 phone, FRONT INs
 010-264 Receptacle NC-3MP or HA16R3P male REAR OUT
 010-263 Receptacle NC-3FP or HA16PR-3S female REAR IN
 042-041 Terminal post no.41 TT-9-4 GROUND

POWER TRANSFORMER

022-086N PT no.86N 100V
 022-086C PT no.86C 117V
 022-086D PT no.86D 220/240V

PCB ASSEMBLY

149-143A OP-143A (pcb 052H185A) FUSE 100V
 149-144A OP-144A (pcb 052H185A) FUSE 117V
 149-145A OP-145A (pcb 052H185A) FUSE 220/240V
 149-148B OP-148B (pcb 052-501B) CONTROL
 149-153A OP-153A (pcb 052-530A) INDICATOR
 149-149 OP-149 (pcb 052H195) LED
 151-060B ET-60B (pcb 052-498B) EFFECT

SEMICONDUCTOR

Transistor

017-024 2SA733- P or Q
 017-160 2SB596-0
 017-023 2SC945- P or Q
 017-138 2SD880-0
 017-016 2SK30A-GR FET

Diode

018-014 1S2473
 018-082 W-02 rectifier bridge
 018-015 SDT-1000 thermistor
 019-028 TLR-124 LED red
 019-029 TLG-124A LED green
 019-020 GL-3AR-2 LED red
 019-015 P873-G35-911 photo coupler
 TLG-124 equiv. TLG-124A

IC

020-097 μ PC4558C
 020-080 HA1457 or HA1457W
 020-103 TA7179P
 020-100 TL082

POTENTIOMETER

026-427 EVH6PA 361(K20) 10KB
 026-430 EVH6PA 361(K20) 100KB
 026-420 EVH6PA 361(K20) 100KA
 030-485 CR19R 220 ohms trimmer
 030-461 SR19R 2.2k ohms trimmer
 030-469 SR19R 47k ohms trimmer
 030-459 SR19R 1k ohms trimmer

CAPACITOR

032-244 ECEA25N10 10 μ F 25V non-polar
 032-246 ECEA25N47 47 μ F 25V non-polar

FUSE, FUSE HOLDER

008-026 SGA 1A prim. 100/117V
 008-063 CEE T500mA prim. 220/240V
 008-061 CEE T315mA sec. 220/240V
 012-003 Fuse holder TF-758

OTHERS

120-015 Sleeve nut no.15 3 x 12mm
 120-002 Sleeve nut no.2 3 x 16mm
 064-200 PCB holder(rocking rivet)
 DLCBS-6N
 048-018 Heat sink SB-7