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SERVICE MANUAL
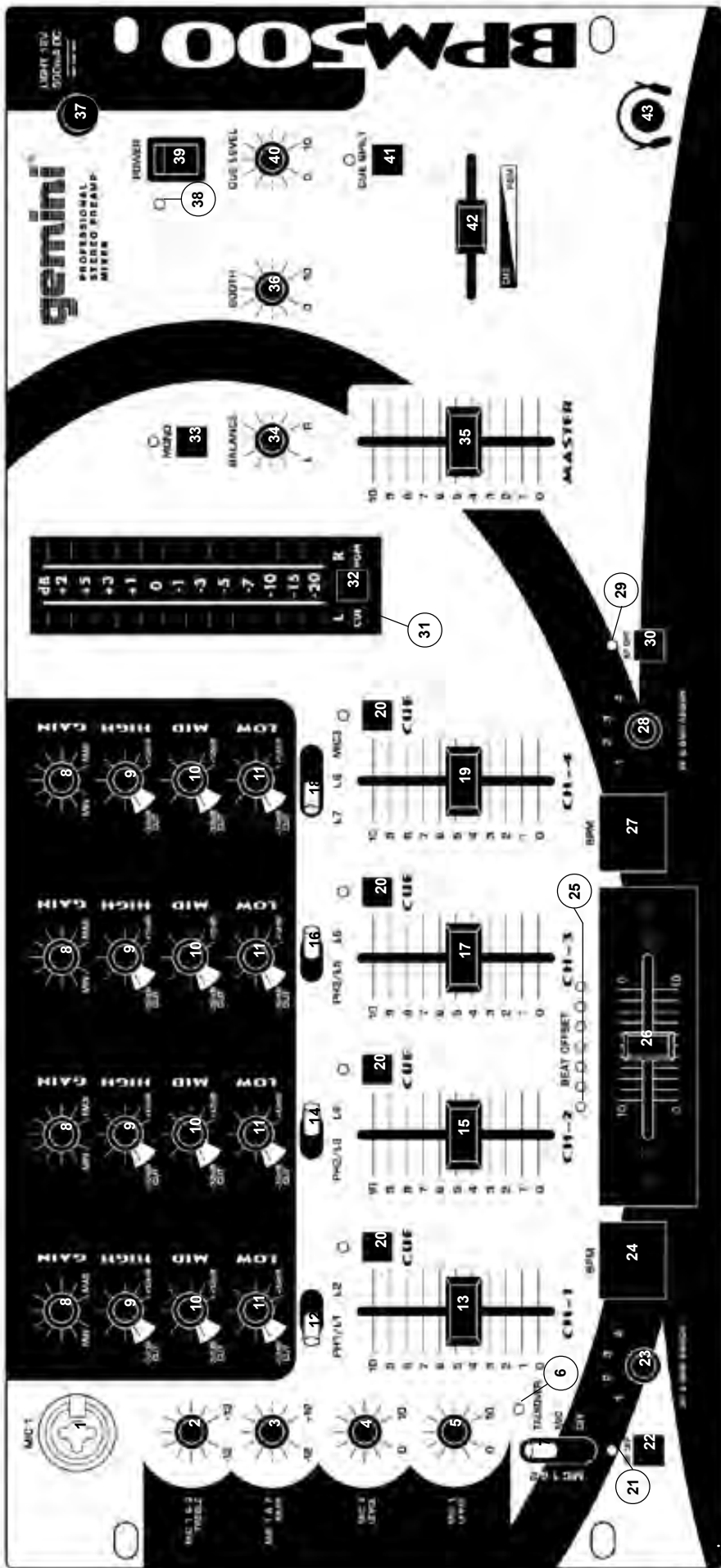# BPM-500
Stereo Preamp Mixer
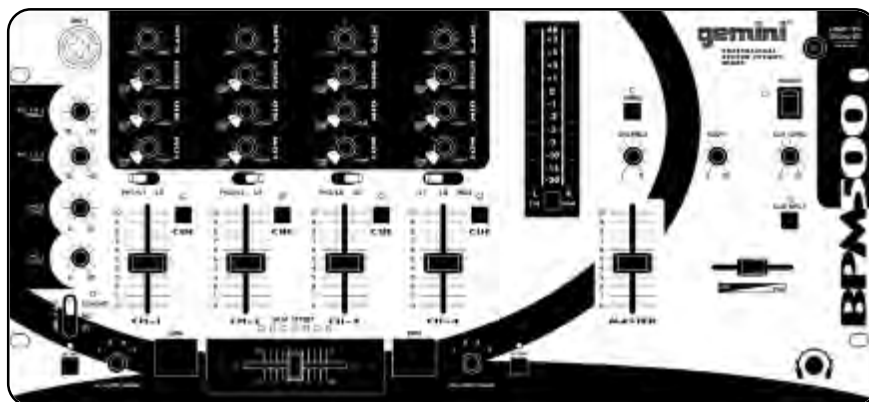
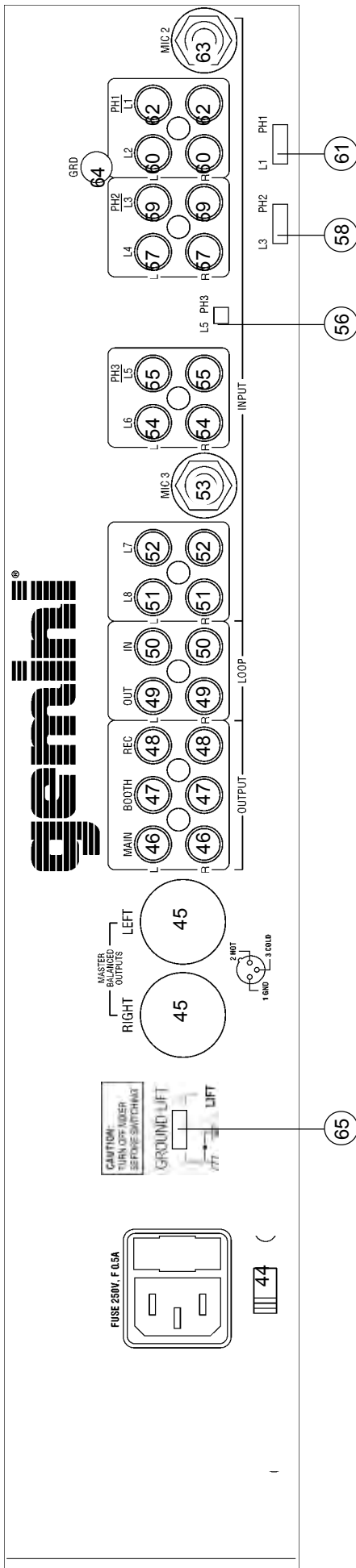## CONTENT'S:

gemini®

MIC 2 — 63

PH1 L1 — 62 62
L2 — 60 60
GRD — 64
PH2 L3 — 59 59
L4 — 57 57

PH1 L1 — 61
PH2 L3 — 58
L5 PH3 — 56

PH3 L5 — 55 55
L6 — 54 54
INPUT

MIC 3 — 53

L7 — 52 52
L8 — 51 51
IN — 50 50
OUT — 49 49
LOOP
REC — 48 48
BOOTH — 47 47
MAIN — 46 46
R
OUTPUT

MASTER BALANCED OUTPUTS
LEFT — 45
RIGHT — 45

2 HOT
1 GND
3 COLD

CAUTION:
TURN OFF MIXER
BEFORE SWITCHING

GROUND LIFT
LIFT — 65

FUSE 250V, F 0.5A

44

Connections

1. Before plugging in the power cord, make sure that the **VOLTAGE SELECTOR (44)** switch is set to the correct voltage.

NOTE: This product is double insulated and not intended to be grounded.

2. Make sure that the **POWER (39)** switch is in the off position. The **POWER LED (38)** will be off.

3. The BPM-500 is supplied with 4 sets of amp output jacks. The **BALANCED OUTPUT (45)** jacks are used to connect to your main amplifier using standard XLR cables. We recommend using the balanced amp outputs if the cables to your amp are 25 feet or more. **BALANCED OUTPUTS** have three separate conductors, two of which are signal (positive and negative) and one shield (ground). Pin 1 is ground (shield). Pin 2 is signal hot (positive). Pin 3 is signal cold (negative). The **MAIN OUTPUT (46)** jacks are unbalanced and used to connect to your main amplifier. The **REC OUTPUT (48)** jacks can be used to connect the mixer to the record input of your recorder enabling you to record your mix. The **BOOTH OUTPUT (47)** jacks allow you to hook up an additional amplifier.

4. The **MIC 1 (1)** input (found on the front panel) accepts a 1/4" or XLR connector. The **MIC 2 (63)** input and the **MIC 3 (53)** input (found on the rear panel) accept 1/4" connectors. All accept balanced and unbalanced microphones.

5. On the rear panel are 3 stereo **PHONO/LINE (55, 59, 62)** inputs and 5 stereo **LINE (51, 52, 54, 57, 60)** inputs. The **PHONO/LINE SWITCH (56)** enables you to set the **(55)** input to Phono or Line. The **PHONO/LINE SWITCH (58)** enables you to set the **(59)** input to Phono or Line. The **PHONO/LINE SWITCH (61)** enables you to set the **(62)** input to Phono or Line. The phono inputs will accept only turntables with a magnetic cartridge. A **GROUND SCREW (64)** for you to ground your turntables is located on the rear panel. The stereo line inputs will accept any line level input such as a CD player, a cassette player, etc.

6. Headphones can be plugged into the front panel mounted **HEADPHONE (43)** jack.

7. The BPM-500 comes with a front panel **BNC LIGHT (37)** jack. This jack is for use with a gooseneck light like the Gemini GNL-700.

8. There are **LOOP INPUTS (50)** and **LOOP OUTPUTS (49)** located on the rear panel. If you are using an outboard signal processor, you can use the **LOOP OUTPUTS (49)** to send the signal to the device and the **LOOP INPUTS (50)** to bring the signal back in to the mixer. The unit comes with jumpers to be used with the loop inputs and outputs. Keep the jumpers in the unit if you are not using the loop to prevent interruptions in your music program.

Using the Ground Lift Switch

Depending on your system configuration, sometimes applying the ground will create a quieter signal path. Sometimes lifting the ground can eliminate ground loops and hum to create a quieter signal path.

1. With the mixer on, listen to the system in idle mode (no signal present) with the ground applied (the **GROUND LIFT SWITCH (65)** in the left position).

2. **Then turn the power off before moving the GROUND LIFT SWITCH (65)**. Lift the ground by moving the **GROUND LIFT SWITCH** to the right, turn the power back on and listen to determine which position will provide a signal devoid of background noise and hum. Keep the **GROUND LIFT SWITCH** in the ground position if the noise level remains the same in either position.

CAUTION: DO NOT TERMINATE THE AC GROUND ON THE POWER MIXER IN ANY WAY. TERMINATION OF THE AC GROUND CAN BE HAZARDOUS.

Operation

1. POWER ON: Once you have made all the equipment connections to your mixer, press the **POWER SWITCH (39)**. The power will turn on and the **POWER LED (38)** will glow RED.

2. CHANNEL 1: The **GAIN (8)**, **HIGH (9)**, **MID (10)**, and **LOW (11)** controls allow you to fully adjust the selected source. Switch # **(12)** allows you to select the **PHONO 1/LINE 1 (62)** or the **LINE 2 (60)** input. The **CHANNEL SLIDE (13)** controls the input level of this channel.

3. CHANNEL 2: The **GAIN (8)**, **HIGH (9)**, **MID (10)**, and **LOW (11)** controls allow you to fully adjust the selected source. Switch # **(14)** allows you to select the **PHONO 2/LINE 3 (59)** or the **LINE 4 (57)** input. The **CHANNEL SLIDE (15)** controls the input level of this channel.

4. CHANNEL 3: The **GAIN (8)**, **HIGH (9)**, **MID (10)**, and **LOW (11)** controls allow you to fully adjust the selected source. Switch # **(16)** allows you to select the **PHONO 3/LINE 5 (55)** or the **LINE 6 (54)** input. The **CHANNEL SLIDE (17)** controls the input level of this channel.

5. CHANNEL 4: The **GAIN (8)**, **HIGH (9)**, **MID (10)**, and **LOW (11)** controls allow you to fully adjust the selected source. Switch # **(18)** allows you to select the **LINE 7 (52)**, **LINE 8 (51)** or the **MIC 3 (53)** input. The **CHANNEL SLIDE (19)** controls the input level of this channel.

NOTE: There is Low, Mid and High equalization for each channel with an extremely wide range of adjustment.

SUGGESTION: You can use the Cut Features on each channel to remove Low, Mid and/or High to create special effects.

6. CROSSFADER SECTION: The **CROSSFADER (26)** allows the mixing of one source into another. The BPM-500 features an assignable crossfader. The **ASSIGN (23, 28)** switches allow you to select which channel will play through each side of the crossfader. The **ASSIGN (23)** switch has 4 settings (1, 2, 3 or 4) and allows you to select channel 1, 2, 3 or 4 to play through the left side of the crossfader. The **ASSIGN (28)** switch has 4 settings (1, 2, 3 or 4) and allows you to select channel 1, 2, 3 or 4 to play through the right side of the crossfader. There are two **OFF (22, 30)** buttons for the crossfader. When the **OFF (22)** button is pressed, the left side of the crossfader will be inactive and the **OFF LED (21)** will light. When the **OFF (30)** button is pressed, the right side of the crossfader will be inactive and the **OFF LED (29)** will light. Using the **OFF** button, be sure to deactivate the crossfader before changing the **ASSIGN** setting. This will avoid any click or popping sound in your signal while you are changing the assign setting. The **CROSSFADER (26)** in your unit is removable and if the need arises can be easily replaced. Crossfader units are available in three varieties. Part # RF-45 (which is identical to the crossfader supplied with the mixer) has a 45 mm travel from side to side. Part # RF-30 is available with a 30 mm travel distance. Also available is the PSF-45 with a special curve designed for scratch mixing. Just purchase one of these crossfader units from your Gemini dealer and follow these instructions:

   1. Unscrew the outside FADER PLATE SCREWS (B). Do not touch the INSIDE SCREWS (C).

   2. Carefully lift the fader and unplug the CABLE (D).

   3. Plug the new fader into the cable and place it back in the mixer.

   4. Screw the fader to the mixer.
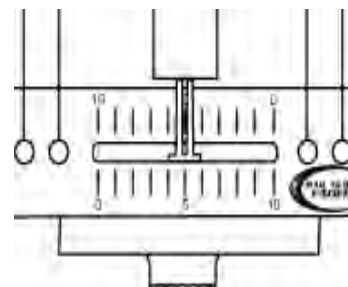
7. BPM DISPLAY: There are **BPM DISPLAYS (24, 27)** for the two channels assigned to each side of the **CROSSFADER (26)**. They update approximately every beat and digitally display the Beats Per Minute allowing you to match the beats visually. **BPM DISPLAY (24)** reflects the Beats Per Minute of the channel assigned to the left side of the **CROSSFADER**, and **BPM DISPLAY (27)** reflects the Beats Per Minute of the channel assigned to the right side of the **CROSSFADER**.

NOTE: A [- -] reading will appear on the BPM DISPLAY if the track has unclear beats. The [- -] reading will also appear if there is no signal present.

8. The **BEAT OFFSET INDICATORS (25)** light when the tracks of the two channels assigned to the crossfader are within 11 BPMs of each other and display how aligned the beats of the two channels are. When the RED LEDs light, the beats are not aligned. When the YELLOW LEDs light, the beats are almost aligned. When the GREEN LED lights, the beats are aligned perfectly.

NOTE: If the diffence between the two channel's beats exceed 11 BPM, the BEAT OFFSET INDICATORS will not light.

SUGGESTION: You can use the BPM DISPLAYS to determine which tracks have similar or the same Beats Per Minute. When mixing two tracks with similar Beats Per Minute, you can use one source's pitch control to align the Beats Per Minute with the other source's BPM. The BPM DISPLAYS and the BEAT OFFSET INDICATORS update every beat and will reflect the change in BPM and indicate when the beats are aligned.

NOTE: Beat mixing is a skill that requires practice. Not every track has a strong beat, and beat mixing works best with tracks with clear and strong beats.

9. LOOP SECTION: Removing the jumpers from the **LOOP OUTPUT (49)** and **LOOP INPUT (50)** jacks will activate the loop. Any device connected between the **LOOP OUTPUT (49)** and **LOOP INPUT (50)** jacks will be inserted into the signal path.

10. OUTPUT CONTROL SECTION: The level of the **MAIN OUT (45, 46)** is controlled by the **MASTER (35)** slide. Activating the **MONO (33)** button (the mono LED will light) makes the overall output mono. The **BOOTH (36)** control adjusts the level of the **BOOTH OUTPUT (47).** HINT: The booth output is used by some DJs to run monitor speakers in their DJ booth. You can also use it as a second ZONE or AMP output.

NOTE: The **RECORD OUT (48)** has no level control. The level is set by the channel slides and the gain controls of the selected channel. The tonal qualities are set by the low, mid and high controls of that same channel.

11. TALKOVER SECTION: The purpose of the talkover section is to allow the program playing to be muted so that the mic can be heard above the music. The **MIC/TALKOVER SWITCH (7)** controls MIC 1 and MIC 2 and has three settings. When the **MIC/TALKOVER SWITCH (7)** is in the bottom position, MIC 1 and MIC 2 and talkover are off. When the **MIC/TALKOVER SWITCH (7)** is in the center position MIC 1 and MIC 2 are on, the **MIC INDICATOR (6)** will glow, but talkover is off. When the **MIC/TALKOVER SWITCH (7)** is in the top position, MIC 1 and MIC 2 and talkover will be on and the volume of all sources except the MIC 1 and MIC 2 inputs are lowered by 16 dB. The **TREBLE (2)** and **BASS (3)** controls allow you to fully adjust the tone of MIC 1 and MIC 2. **MIC 1 LEVEL (5)** controls the level of MIC 1. The **MIC 2 LEVEL (4)** controls the level of MIC 2.

12. CUE SECTION: By connecting a set of headphones to the **HEADPHONE (43)** jack, you can monitor any or all of the channels. Press the **CUE ASSIGN (20)** buttons for channels 1 - 4 to select the channel or channels to be monitored and their respective LED indicators will glow. Use the **CUE LEVEL (40)** control to adjust the cue volume without effecting the overall mix. By moving the **CUE PGM PAN (42)** control to the left you will be able to monitor the assigned cue signal. Moving the control to the right will monitor the PGM (program) output. Use the **CUE SPLIT (41)** button to split the signals from cue and program so that cue will be heard in one earphone and program will be heard in the other earphone.

13. DISPLAY: The peak hold, dual function **DISPLAY (31)** indicates either the **MASTER (45, 46)** output left and right levels OR the the selected cue and program (premaster output) levels. You can choose the option you want by pressing the **DISPLAY (32)** button.

NOTE: When the **DISPLAY (31)** is in the cue/program mode, by adjusting **GAIN (8)**, you can increase or decrease the signal to match the other channel's signal.

Specifications

INPUTS:

DJ Mic	1.5mV 2Kohm balanced
Phono	3mV 47Kohm
Line	150 mV 27Kohm

OUTPUTS:

Amp/Booth	0 dB 1V 400ohm
Max	20V Peak to Peak
Rec	225mV 5Kohm

MIC 1 & MIC 2:

DJ Mic	1.5mV 2Kohm balanced
Bass	± 12dB
High	± 12dB

MIC 3:

DJ Mic	1.5mV 2Kohm balanced
Controls	Channel 4

GENERAL:

Bass (Chnls 1-4)	+ 12dB/- 32 dB
Mid (Chnls 1-4)	+ 12dB/- 32 dB
Treble (Chnls 1-4)	+ 12dB/- 32 dB
Gain (Chnls 1-4)	0 to -20dB
Frequency Response	20Hz - 20KHz +/- 2dB
Distortion	0.02%
S/N Ratio	better than 80dB
Talkover Attenuation	-16dB
Headphone Impedance	16ohm
Power Source	115/230V 50/60Hz 20W
Dimensions	19"w x 4"h x 9"d
Weight	10.2 lbs

Parts Lists

Cabinet Parts and Packing

Item #	Description	Part #
1	PANEL CONTROL	002-199
2	BRACKET VR	021-760
3	COVER BOTTOM	021-335A
4	PANEL REAR	021-991
5	HOLDER X-FADER	022-360
6	PROTECTOR PLATE FOR 115/230V SWITCH	022-305
7	SWING LEVEL (LONG)	023-674
8	PCB SPACER SUPPORT	047-474
9	PCB SPACER SUPPORT	047-468
10	KNOB PUSH (SMALL)	002-531
11	BUSHING FOR KNOB (SMALL)	002-532
12	KNOB SLIDE (BIG)	002-713
13	KNOB SLIDE (SMALL)	002-714
14	KNOB ROTARY (B)	003-131
15	KNOB INLAY (BLACK); BALANCE,MASTER,MIC,CUE,BOOTH	148-236
16	KNOB INLAY (RED); GAIN	148-238
17	KNOB INLAY (GRAY); TREBLE,BASS,LOW,MID,HIGH	148-239
18	PLATE DISPLAY (SMALL)	003-372
19	HOLDER LED	003-989A
20	VR INLAY	003-970
21	PLATE LED	003-370
22	HOLDER LED 3fLED (17mm)	003-969
23	HOLDER LED 3f (7mm)	003-711
24	PAD FOOT	049-206
25	GND SCREW	146-710
26	HOLDER BUSHING LED	003-993
27	BNC DUST PROOF CLOTH	159-201
28	VR DUST PROOF CLOTH (SMALL)	159-167
29	VR DUST PROOF CLOTH	159-171
30	SWING DUST PROOF CLOTH	159-216
31	SCREEN	046-024
32	SNAP RIVET	003-612
33	DRYER	190-062
34	PAN-HEAD MACHINE SCREW; PMS 2.6X4(B)	102-025
35	BAND-HEAD TAPPING SCREW /TW-E; BTB-3/TW-3 3X6(AB)	121-003
36	BAND-HEAD TAPPING SCREW; BTS-3 3X5(AB)	111-051A
37	BAND-HEAD TAPPING SCREW; BTS-3 3X6(AB)	111-046A
38	BAND-HEAD TAPPING SCREW; BTS-3 3X10(AB)	111-044A
39	PAN-HEAD TAPPING SCREW/TWIN SCREW; PTS-2 3X8(AB) TWIN	110-153A
40	FLAT-HEAD TAPPING SCREW; FTS-3 3X6(AB)	111-043A
41	BAND-HEAD MACHINE SCREW; BMS 3X2X4	107-015
42	FLAT-HEAD TAPPING SCREW; FTS-3 3X12(AB)	111-049A
43	NUT/WASHER	131-081
44	PAN-HEAD MACHINE SCREW; PMS 2X4(B)	102-007

Printed Circuit Boards

Item #	Description	Part #
1	PRINTED CIRCUIT BOARD PS-900-1; IN/OUT	162-940
2	PRINTED CIRCUIT BOARD BPM500-2; MAIN	262-019
3	PRINTED CIRCUIT BOARD BPM500-3; MASTER VR	262-022
4	PRINTED CIRCUIT BOARD BPM500-4; FADER	262-020
5	PRINTED CIRCUIT BOARD BPM500-5; DJ MIC	262-021
6	PRINTED CIRCUIT BOARD BPM500-6; PHONES	262-023
7	PRINTED CIRCUIT BOARD PS-900-8; PHONO/LINE	162-955
8	PRINTED CIRCUIT BOARD BPM250-7; BIT AMP	162-979
9	PRINTED CIRCUIT BOARD BPM250-8; BIT DISPLAY (CEM-1 41×166mm)	162-980

Parts Lists - PCB1 Input/Output

ICs

Item #	Designators	Description	Part #
1	IC8	INTEGRATED CIRCUIT NJM4556L	074-113
2	IC1-6	INTEGRATED CIRCUIT NJM2068LD	074-145
3	IC7	INTEGRATED CIRCUIT NJM7812FA	074-107
4	IC10	INTEGRATED CIRCUIT NJM7805FA	074-074

Transistors

Item #	Designators	Description	Part #
1	Q1-5, Q7	TRANSISTOR 2SC2878	076-095
2	Q6	TRANSISTOR 2SA1048 (2SA1317)	076-104

Electrical Parts

Item #	Designators	Description	Part #
1	D3-7	RECTIFIER DIODE 1N4002 (1N4003,1N4004)	079-027
2	D1, D2	SILICON DIODE 1N4148	079-003
3	SW1	SLIDE SWITCH 2P2C PH/LINE	081-027
4	EXT1, EXT2	SLIDE SWITCH 2P2C	081-004
5	J1, J5	PHONE JACK 6.3	092-078
6	J9, J10	PHONE JACK XLR	092-113

Parts Lists - PCB2 Phono

ICs

Item #	Designators	Description	Part #
1	IC4	INTEGRATED CIRCUIT NJM4556L	074-113

Electrical Parts

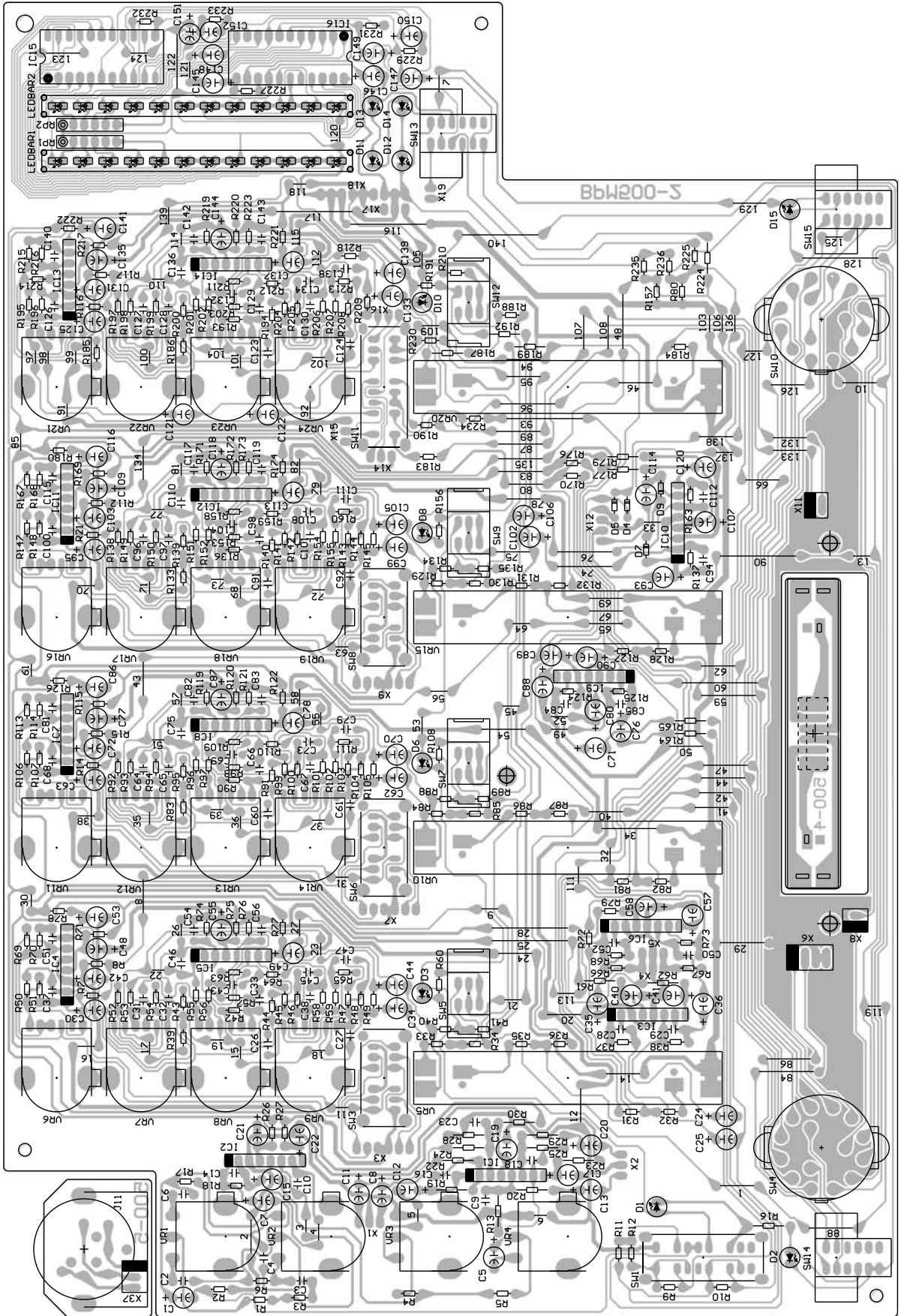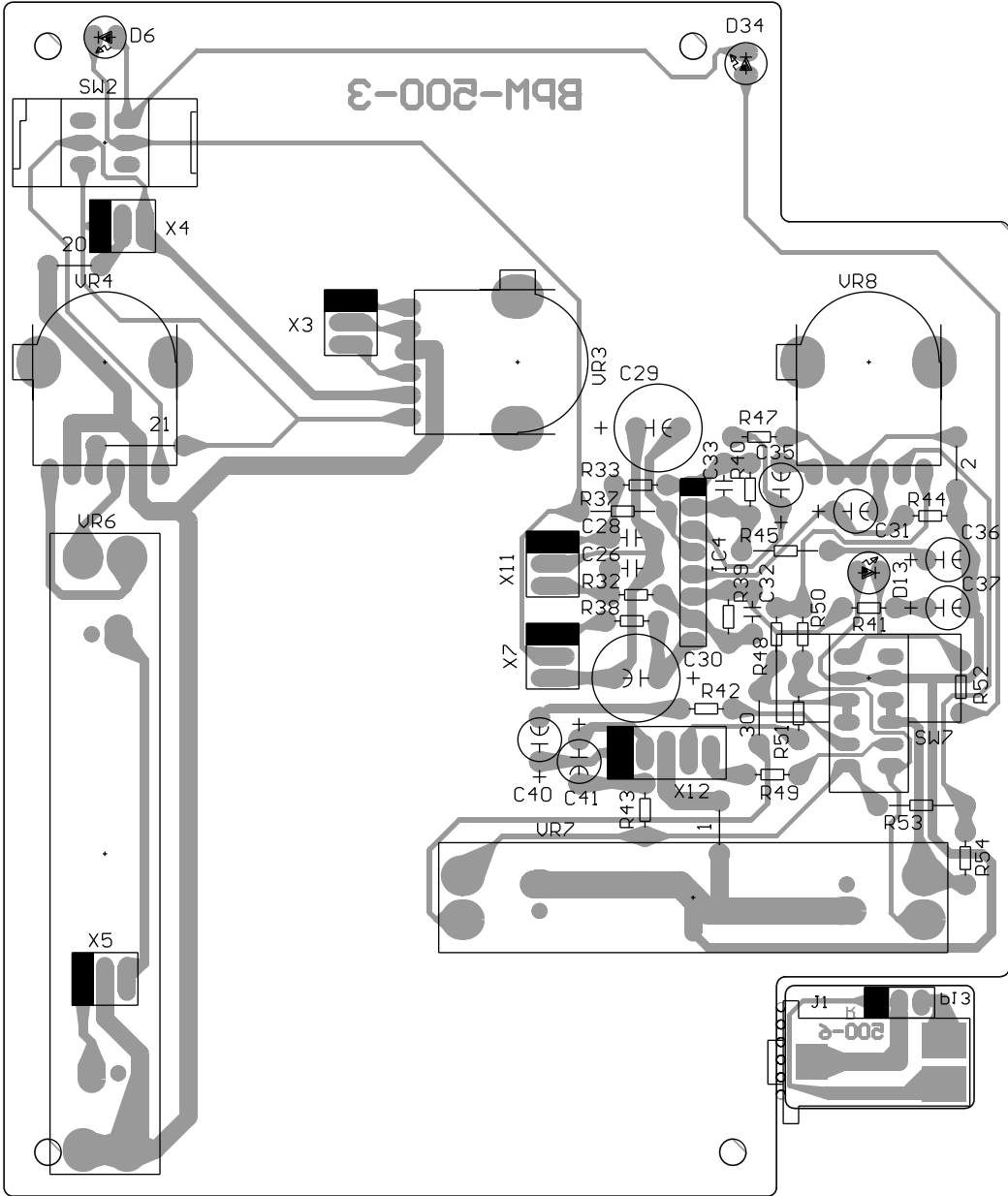| Item #	Designators	Description	Part #
1	D6, D13, D34	LIGHT EMITTING DIODE (RED) 3.15	080-091
2	J1	PHONE JACK 6.3	092-078
3	SW2	PUSH SWITCH 2P2C L=12.5	083-069
4	SW7	SWITCH 4P2C L=12.5	083-097
5	VR6	SLIDE VR 45mm L=20 CH VOL MASTER 10KA×2	072-091
6	VR7	SLIDE VR 30mm L=15 CUE FADER 20KBx2	072-092
7	VR3, VR8	ROTARY VR 16 L=20 BOOTH CUE VOL 50KAx2	071-084
8	VR4	ROTARY VR 16 L=20 BAL 20KMN C.C	071-136

Parts Lists - PCB3 Main

ICs

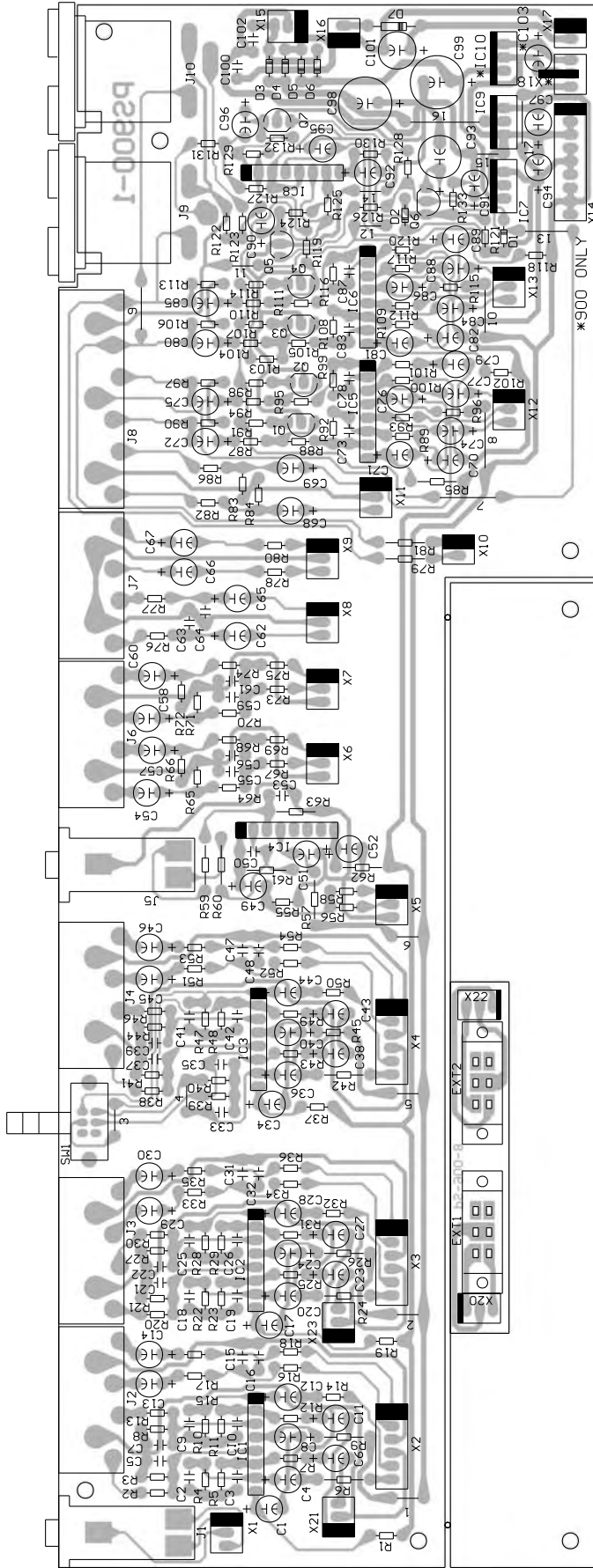| Item #	Designators	Description	Part #
1	IC2-14	INTEGRATED CIRCUIT NJM4558LD	074-104
2	IC1	INTEGRATED CIRCUIT NJM2068LD	074-145
3	IC15, IC16	INTEGRATED CIRCUIT LB1412	074-111

Electrical Parts

Item #	Designators	Description	Part #
1	D4, D5, D7, D9	SILICON DIODE 1N4148	079-003
2	D1-3, D6, D8, D10, D11-15	LIGHT EMITTING DIODE (RED) 3.15f	080-091
3	Green 2.5x5	LIGHT EMITTING DIODE (GREEN) 2.5×5	080-077
4	Yellow 2.5x5	LIGHT EMITTING DIODE (YELLOW) 2.5×5	080-076
5	Red 2.5x5	LIGHT EMITTING DIODE (RED) 2.5×5	080-075
6	J11	PHONE JACK COMBINED 6.3f+XLR	092-090
7	SW11	LEVER SW 4P3C	082-022
8	SW5, SW7, SW9, SW12	PUSH SWITCH 2P2C L=12.5	083-069
9	SW13-15	PUSH SWITCH 4P2C L=12.5	083-097
10	VR5, VR10, VR15 VR20	SLIDE VR 45mm L=20 CH VOL MASTER 10KA×2	072-091
11	VR6, VR11, VR16	ROTARY VR 16f L=20 BOOTH CUE VOL 50KA×2	071-084
12	VR7-9, VR12-14,	ROTARY VR 16f L=20 TONE 50KE×2 C.C	071-145
13	VR17-19, VR22-24		
14	VR3, VR4	ROTARY VR 16f L=20 MIC VOL 10KB	071-173
15	VR1, VR2	ROTARY VR 16f L=20 MIC TONE 50KW C.C	071-174

Schematic