

HAMMOND

SERVICE MANUAL

Leslie[®] 21

Rotary Unit

CAUTION !
see safety notice inside

**LESLIE 2102
(SILVER)**



**LESLIE 2101
(BLACK)**



Units shown with optional stands.

Dec.2002



SUZUKI MUSICAL INST.MFG.CO.,LTD.

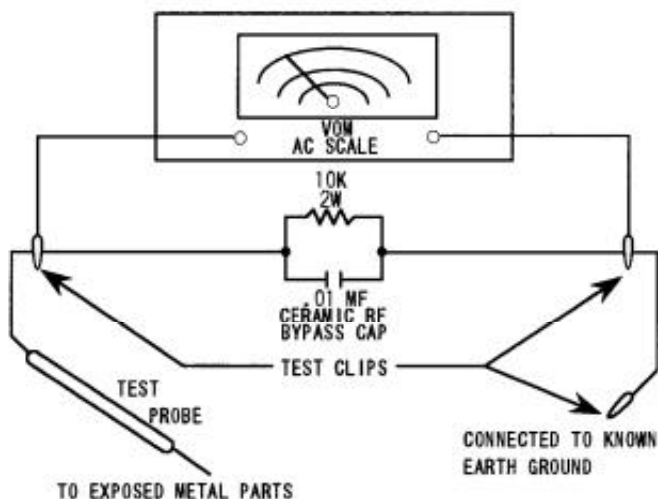
25-12, RYOKE 2-CHOME, HAMAMATSU, JAPAN

SAFETY NOTICE

Great care has been taken in the design and manufacture of this product to assure that no shock hazard exists on any exposed metal parts. Internal service operations can expose the technician to hazardous line voltages and accidentally cause these voltages to appear on exposed metal parts during repair or reassembly of product components. To prevent this, work on these products should only be performed by those who are thoroughly familiar with the precautions necessary when working on this type of equipment.

To protect the user, it is required that all enclosure parts and safety interlocks be restored to their original condition and the following tests be performed before returning the product to the owner after any service operation.

Plug the AC line cord directly into a line voltage AC receptacle (do not use an isolation transformer for this test) and turn the product on. Connect the network (as shown below) in series with all exposed metal parts and a known earth ground such as a water pipe or conduit. Use an AC VOM of 5,000 ohms per volt or higher sensitivity to measure the voltage drop across the network. Move the network connection to each exposed metal part (metal chassis, screw heads, knobs and control shafts, escutcheon, etc.) and measure the voltage drop across the network. Reverse the line plug and repeat the measurements. Any reading of 4 volts RMS or more is excessive and indicates a potential shock hazard which must be corrected before returning the product to the user.



CAUTION

Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the equipment manufacturer. Discard used batteries according to manufacturer's instructions.

Advarsel

Lithiumbatteri. Eksplosionsfare ved fejlagtig håndtering.
Udskiftning må kun ske med batteri
af samme fabrikat og type.
Løb det brugte batteri tilbage til leverandoren.

Norge:

ADVARSEL

Lithiumbatteri-Eksplosjonsfare.
Ved utskiftning benyttes kun batteri som
anbefalt av apparatfabrikanten.
Brukt batteri returneres apparatleverandoren.

Sverige:

VARNING

Explosionsfara vid felaktigt batteribyte.
Använd samma batterityp eller et ekvivalent
typ som rekommenderes av apparattillverkaren.
Kassera använt batteri enligt fabrikantens instruktion.

Finland:

VAROITUS

Paristo voi räjähtää, jos se on virheellisesti asennettu.
Vaihda Paristo ainoastaan laitevalmistajan suosittelemaan
tyyppoon. Hävitä käytetty paristo valmistajan ohjeiden
mukaisesti.

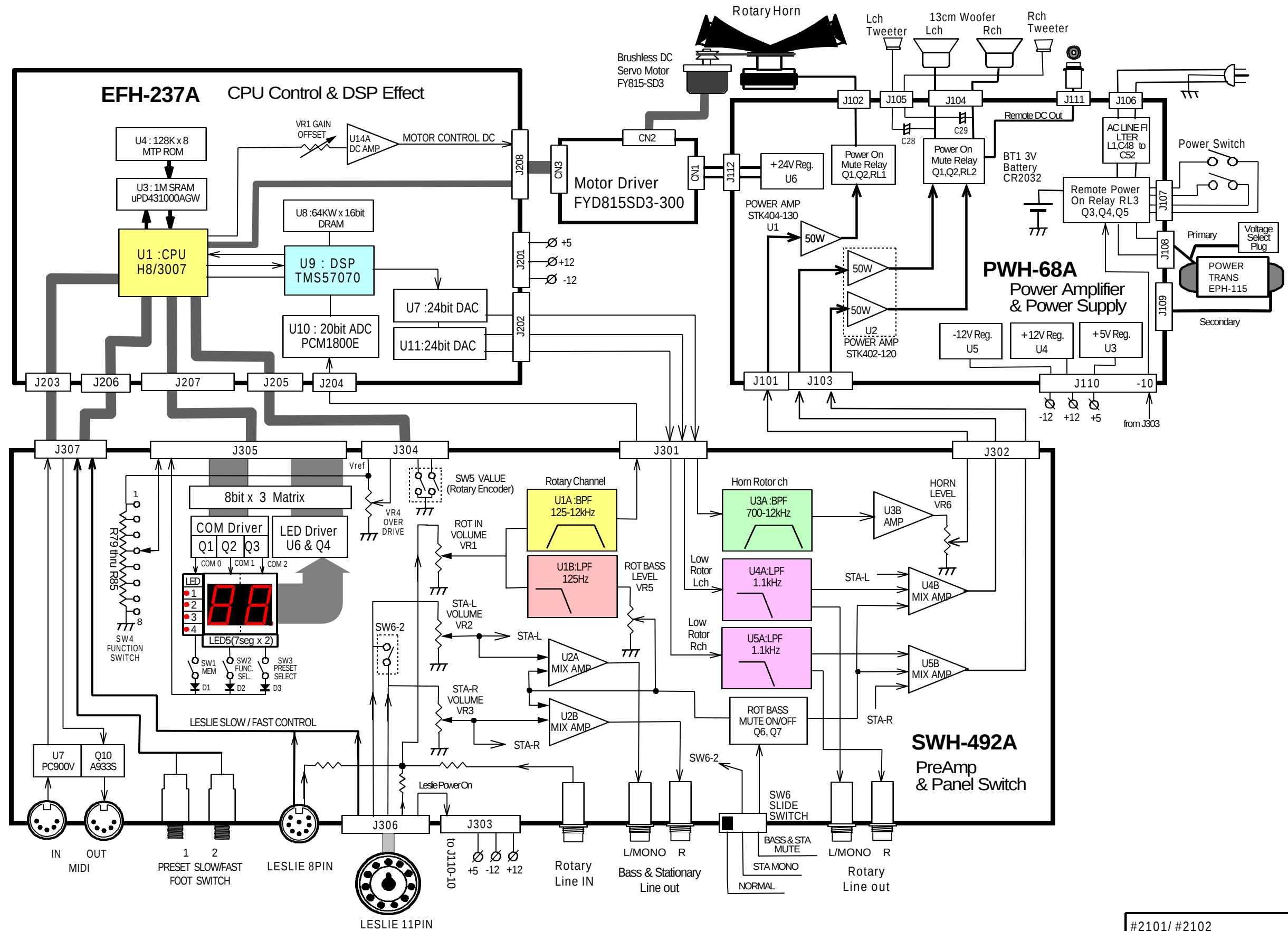
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1.SPECIFICATIONS

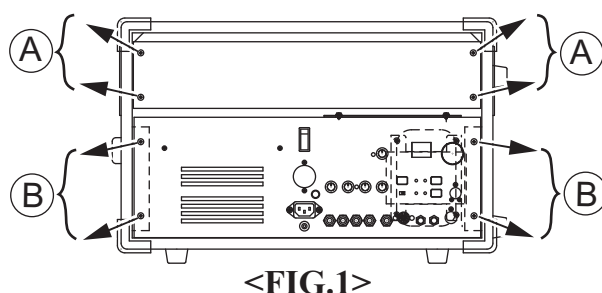
Rotary Unit #2101 (Black) , #2102 (Silver)

TYPE	: 3-channel (ROTARY, STATIONARY-L , STATIONARY-R) HORN ROTOR(ACOUSTIC) LOWER ROTOR(2channel DSP)
POWER OUTPUT	: ROTARY HORN 50W, LOWER CH 50WX2
SPEAKER	: ROTARY HORN COMPRESSION DRIVERX1, 13cm WOOFERX2.5cm TWEETERX2
CONTROL	: VOLUME: STA-L , STA-R , ROTARY , OVERDRIVE 8-POSITION FUNCTION SWITCH, VALUE UP/DOWN PRESET 1-2, MEMORY CHANNEL MODE: NORMAL-STA MONO, STA ROT BASS-MUTE
DISPLAY	: 7segment 2digit LED display
TERMINAL	: LESLIE 11PIN SOCKET , LESLIE 8PIN , ROTARY INPUT , FOOT SWITCH 1 (PRESET), FOOT SWITCH 2 (SLOW/FAST/STOP) LINEOUT(STATIONARY-L, STATIONARY-R, ROTARY-L, ROTARY-R) MIDI IN, MIDI OUT, REMOTE POWER for #2121
POWER CONSUMPTION	: AC 120V,220-230V,230-240V 190W
DIMENSION	: 51(W)X52(D)X33(H)cm
WEIGHT	: 23kg
OPTIONAL	: STATIONARY UNIT #2121, LESLIE CABLE 11PIN (LC11-7M) LESLIE CABLE 8PIN (LC8-7M),LESLIEY CABLE(LC11Y-7M) STAND ADAPTER(LSA-21) , FOOT SWITCH FS-9H



3.DISASSEMBLING PROCEDURE

CAUTION: Disconnect the line cord from A.C. Source before disassembling any portion of this product.



<FIG.1>

a.REMOVAL OF TOP REAR BOARD ASSEMBLY:

Unfasten the four (4) machine screws labeled (A) in Figure 1 from the rear board.

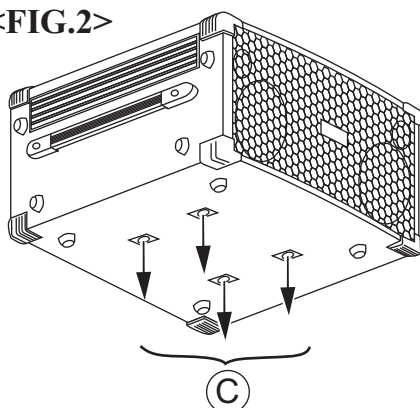
b.REMOVAL OF BOTTOM REAR PANEL

ASSEMBLY:

Unfasten the four (4) machine screws labeled (B) in Figure 1 from the rear panel.

c.REMOVAL OF ROTARY HORN ASSEMBLY:

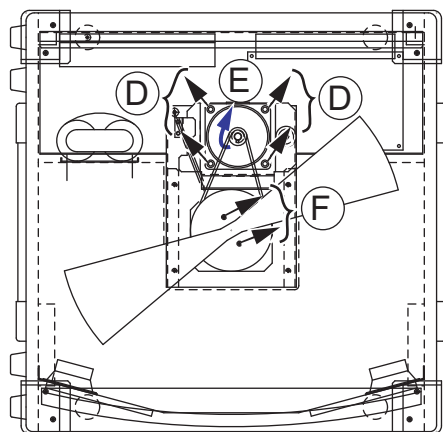
<FIG.2>



1. Remove the Rear Panel Assembly by following the procedure outlined in Section b.
2. Place the Leslie cabinet on it's side which has the four (4) rubber feet installed on a flat surface.
3. Unfasten the four (4) machine screws (C) from the unit as shown in Figure 2.

d.REMOVAL OF MOTOR ASSEMBLY:

- 1.Remove the Rotary Horn Assembly following the procedure outlined in Section c.
- 2.Unfasten the four (4) (D) machine screws as shown in Figure 3.



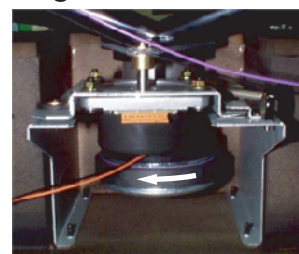
<FIG.3>

<CAUTION>

When reinstalling Motor assembly,make sure that these screws are tight!

e.REMOVAL OF HORN DRIVER:

1. Remove the Motor Assembly following the procedure outlined in Section d.
2. Disconnect (unplug) the wire assembly from the Driver.
3. Remove the Horn Driver by rotating the Driver in a counterclockwise direction.

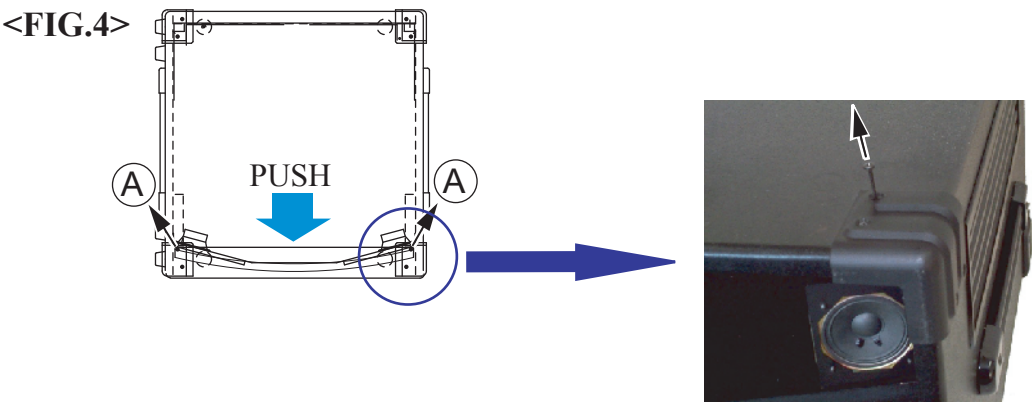


f.REPLACING THE CLOTH BELT:

1. Remove the Rear Panel following the procedure outlined in Section b.
2. Remove the belt (E) from motor pulley.
3. Unfasten the four (2) (F) machine screws from the rotary horn after remove the cloth belt as shown in Figure 3.

	Screw name	Part No.
(A)	A Tapping, Truss, Ø4x30	00613-64030
(B) (C)	Machine screws, W Sems, M4x30	00703-84030
(D)	Machine screws, Bind, M5x20 Flange, M5(hexagon nut)	00703-55020 00725-85000
(F)	Machine screws, Oval head, M3x18	00703-23018

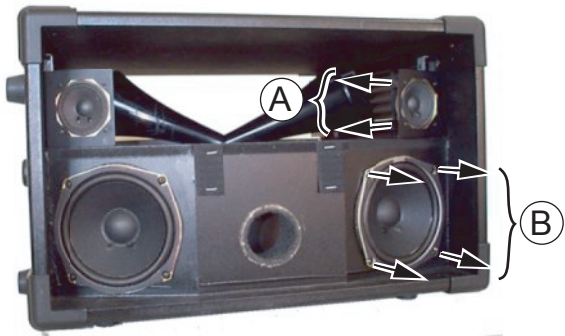
g.REMOVAL OF SPEAKER GRILLE:



- 1.Place the Leslie Cabinet on a flat surface with the top of the Leslie facing up.
2. Unfasten the two (2) screws labeled (A) in Figure 4.
- 3.Remove the Top Rear Board Assembly by following the procedure outlined in Section a.
- 4.Remove the speaker grille by gently pushing the grille out from the inside of the cabinet.

h.SPEAKER REMOVAL:

<FIG.5>

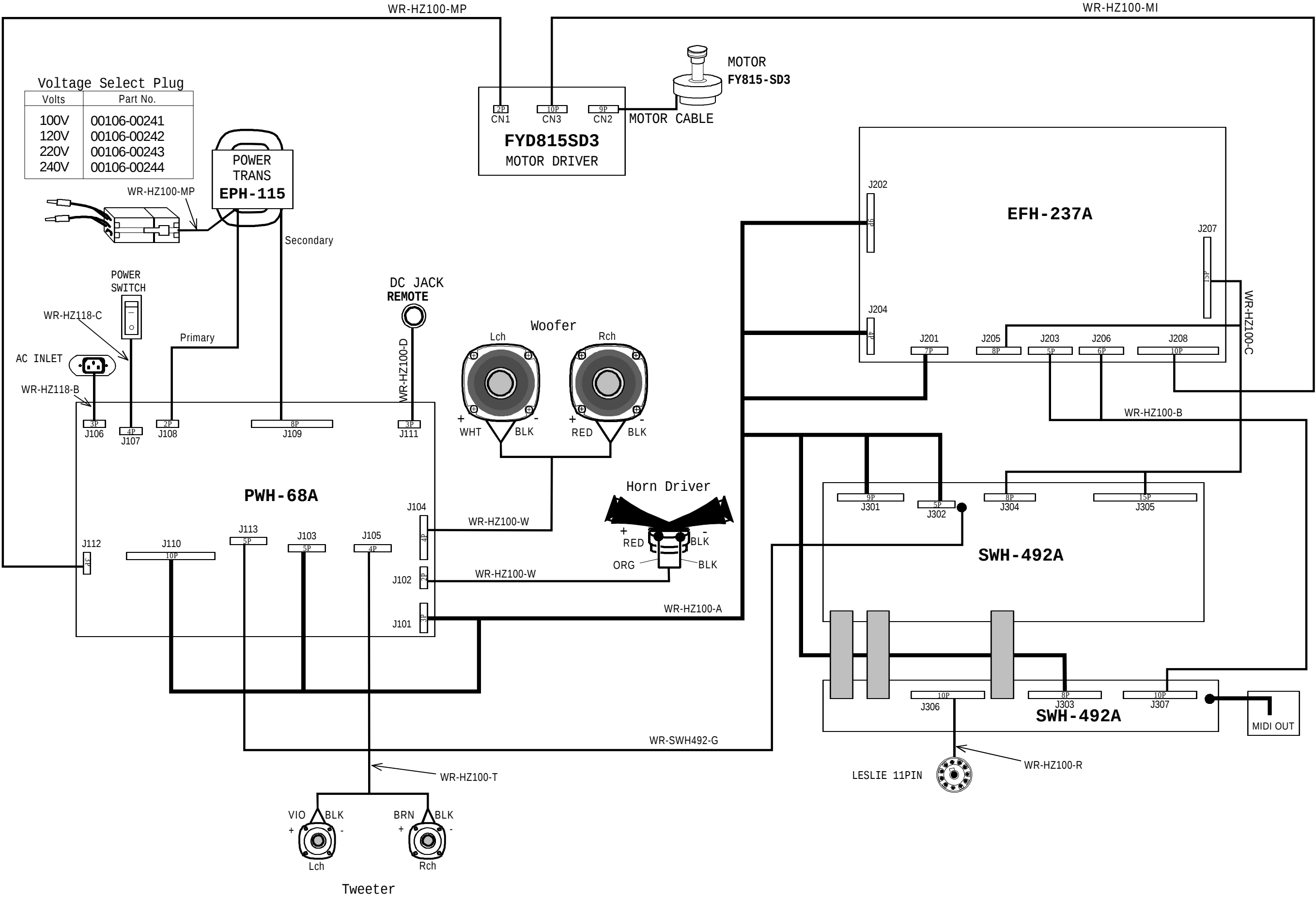


- 1.Remove the Speaker Grille by following the procedure outlined in Section g.
2. To remove the 5cm speaker , unfasten the two (2) screws labeled (B) in Figure 5.
- 3.To remove the 13cm speaker , unfasten the four (4) screws labeled (C) in Figure 5.

	Screw name	Part No.
(A)	A Tapping,Bind,Ø3x30,ZnB	00613-53025 □
(B)	A Tapping,Truss,Ø4x12	00613-64012 □
(C)	A Tapping,Truss,Ø4x16	00613-64016

OVERDRIVE VOL : Min.

STEP	SUBJECT	SETTING	INPUT	TEST POINT	ADJUST MENT POINT	SPECIFICATION	NOTE
1. a	DC Poewr Supply	+5V		PWH-68A J110-7		DC +5V ±5%	
b		+12V		J110-5		DC +12V ±5%	
c		-12V		J110-1		DC -12V ±5%	
d		+24V		J112-3		DC +24V ±1V	
e	Remote DC OUT			Remote DC JACK-Core		DC -18V ±1.5V(open)	
f	Remote DC OUT	Connect to Leslie 2121 thru DCC-2 cable		Remote DC JACK-Core		DC -3.0V ±0.4V(on Load)	
g	LESLIE 11PIN 11 DC OUT			LES11P -PIN11		DC +12V ±5%	
2. a	Motor Speed Control Voltage	LESLIE FAST , Function sw Fast Speed Value : 9 (Preset 1)		EFH-237A J208-5	VR-1	6.60V (400±7rpm)*	* round per mintue of Horn
b		LESLIE SLOW , Function sw Slow Speed Value : 5 (Preset 1)		EFH-237A J208-5		0.57±0.05V (36±1rpm)*	
3. a	Stationary Lch SP Level	STA-L VOL Max 400Hz SINE WAVE 1Vrms	LES11PIN-2	PWH-68A J104-2		19V rms ±2V	
b	Stationary Rch SP Level	STA-R VOL Max 400Hz SINE WAVE 1Vrms	LES11PIN-3	PWH-68A J104-4		19V rms ±2V	
c	Rotary HORN SP Level	ROTARY VOL Max , HORN LEV Max , 1kHz SINE 1Vrms	LES11PIN-1	PWH-68A J102-1		15V rms ±1.5V	Leslie Fast Mode
4. a	Stationary Lch Line out Level	STA-L VOL Max 400Hz SINE WAVE 1Vrms	LES11PIN-2	STA-L OUT JACK		3.1V rms ±0.4V	
b	Stationary Rch Line out Level	STA-R VOL Max 400Hz SINE WAVE 1Vrms	LES11PIN-3	STA-R OUT JACK		3.1V rms ±0.4V	
c	Rotary Line out Lch Level	ROTARY VOL Max , ROT BASS LEV Center, 1kHz 1Vrms	LES11PIN-1	ROT OUT-L JACK		300mV rms ±40mV	Leslie Fast Mode
d	Rotary Line out Rch Level	ROTARY VOL Max , ROT BASS LEV Center, 1kHz 1Vrms	LES11PIN-1	ROT OUT-R JACK		350mV rms ±40mV	Leslie Fast Mode
5. a	Stationary Lch SP Noise Level	STA-L,-R,ROTARY VOL Max		PWH-68A J104-2		1.0mV max (IEC"A"net)	
b	Stationary Rch SP Noise Level	STA-L,-R,ROTARY VOL Max		PWH-68A J104-4		1.0mV max (IEC"A"net)	
c	Rotary HORN SP Noise Level	STA-L,-R,ROTARY VOL Max		PWH-68A J102-1		1.0mV max (IEC"A"net)	



6.WIRING CHART

#2101/ #2102

POWER AMPLIFIER PWH-68A					
PLUG No.	FROM PIN No.	TO PLUG & PIN No.	WIRE COLOR	TO PWB NAME	FUNCTION
J101	1	J302-1	SHIELD	SWH-492A	HORN IN
	2	J302-2	SHIELD	SWH-492A	AG
	3	NC			
J102	1	+	ORG	Horn Driver	
	2	-	BLK	Horn Driver	
J103	1	J302-5	WHT	SWH-492A	LOW-L IN
	2	J302-4	SHIELD		AG
	3	J303-6	BLK		AG
	4	NC			AG
	5	J302-3	RED		LOW-R IN
J104	1	-	BLK	Woofers Lch	
	2	+	WHT	Woofers Lch	
	3	-	BLK	Woofers Rch	
	4	+	RED	Woofers Rch	
J105	1	+	VIO	Tweeters Lch	
	2	-	BLK	Tweeters Lch	
	3	+	BRN	Tweeters Rch	
	4	-	BLK	Tweeters Rch	
J106	1	AC INLET L	BLK	AC INLET	
	2	NC			
	3	AC INLET N	WHT	AC INLET	
J107	1	Power Sw	BLK	Send L	
	2	Power Sw	BLK	Return L	
	3	Power Sw	WHT	Return N	
	4	Power Sw	WHT	Send N	
J108	1	Power Trans			
	2	Power Trans			
J109	1	Power Trans			
	2				
	3				
	4				
	5				
	6				
	7				
	8				
J110	1	J303-5	GRN	SWH-492A	-15V
	2	J201-1	GRN	EFH-237A	-15V
	3	J303-3	BLK	SWH-492A	GND
	4	J201-4	BLK	EFH-237A	GND
	5	J303-8	ORG	SWH-492A	+15V
	6	J201-3	ORG	EFH-237A	+15V
	7	J303-4	YEL	SWH-492A	5V
	8	J201-7	YEL	EFH-237A	5V
	9	NC			DG
	10	J303-1	BRN	SWH-492A	Power On
J111	1	DC JACK	BLU	DC JACK	MJ-40
	2	NC			
	3	DC JACK	BLK	DC JACK	MJ-40
J112	1	CN1-2	BLK	MOTOR DRIVER	FYD815SD3
	2	NC			
	3	CN1-1	RED	MOTOR DRIVER	FYD815SD3
J113	1	NC		SWH-492A	
	2		BLK		GND
	3		BLK		GND
	4	NC			
	5	NC			

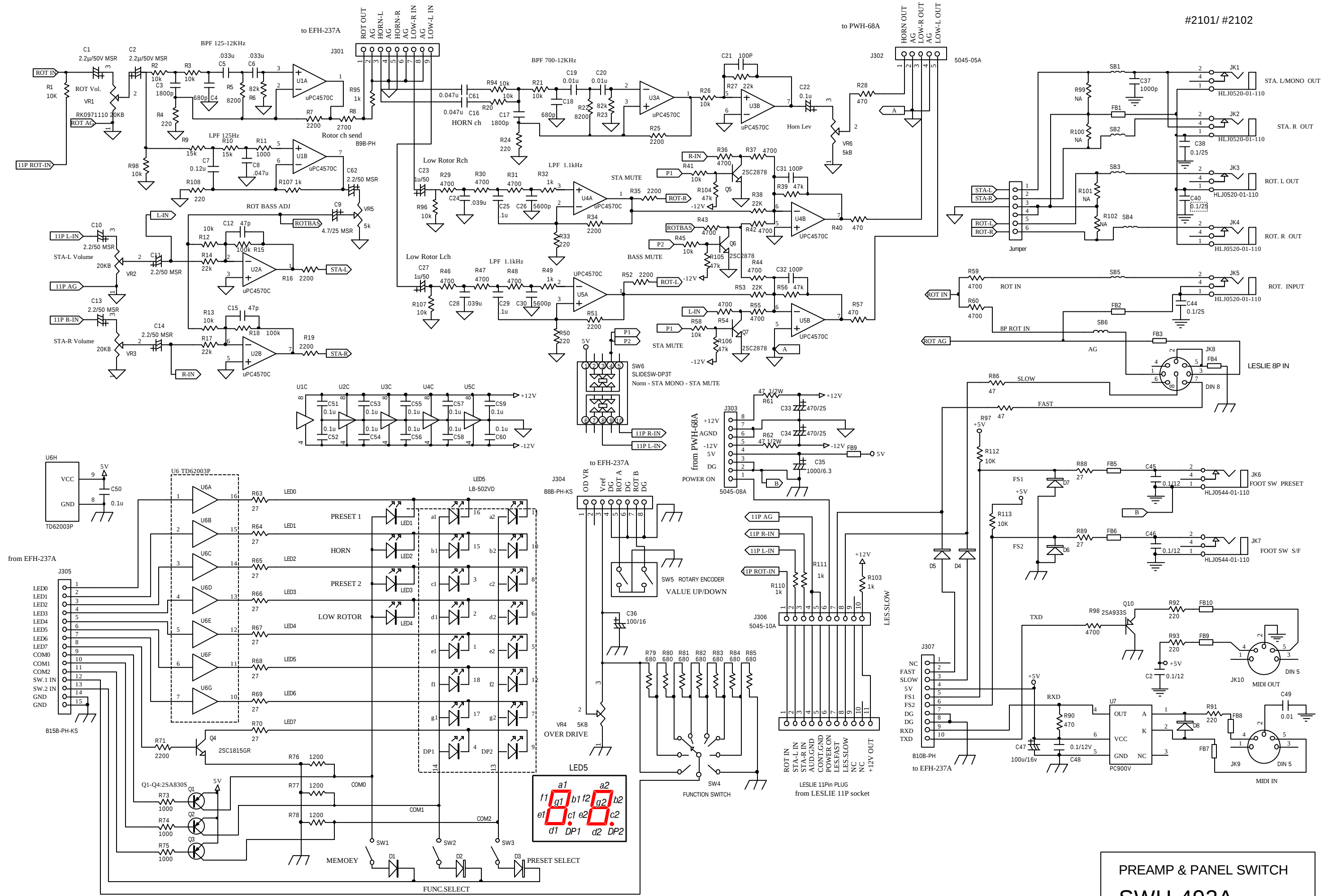
POWER SW & CONTROL SWH-492A					
J301					
	1	J204-1	SHIELD	EFH-237A	ROT OUT
	2	J204-2	SHIELD		SIG GND
	3	J202-3	WHT		HORN-L IN
	4	J202-4	SHIELD		AG
	5	J202-5	RED		HORN-R IN
	6	NC			AG
	7	J202-8	RED		LOW-R IN
	8	J202-7	SHIELD		AG
	9	J202-6	WHT		LOW-L IN
J302	1	J101-1	SHIELD	PWH-68A	HORN OUT
	2	J101-2	SHIELD		AG
	3	J103-5	RED		LOW-R OUT
	4	J103-2	SHIELD		AG
	5	J103-1	WHT		LOW-L OUT
J303	1	J110-10	BRN	PWH-68A	POWER ON
	2	NC			DG
	3	J110-3	BLK		DG
	4	J110-7	YEL		5V
	5	J110-1	GRN		-15V
	6	J103-3	BLK		AG
	7	NC			AG
	8	J110-5	ORG		+15V
J304	1	J205-1	RED	EFH-237A	
	2	NC			
	3	J205-3	GRY		
	4	-4			
	5	-5			
	6	-6			
	7	-7			
	8	-8			
J305	1	J207-1	RED	EFH-237A	
	2	-2	GRY		
	3	-3			
	4	-4			
	5	-5			
	6	-6			
	7	-7			
	8	-8			
	9	-9			
	10	-10			
	11	-11			
	12	-12			
	13	-13			
	14	-14			
	15	-15			
J306	1	LESLIE 11PIN			
	2				
	3				
	4				
	5				
	6				
	7				
	8				
	9				
	10				

POWER SW & CONTROL SWH-492A					
PLUG No.	FROM PIN No.	TO PLUG & PIN No.	WIRE COLOR	TO PWB NAME	FUNCTION
J307	1	NC			PORT2
	2	J206-4	RED	EFH-237A	FAST
	3	J206-5	ORG		SLOW
	4	J206-1	YEL		5V
	5	J206-3	GRN		FS1
	6	J206-2	BLU		FS2
	7	J203-5	BLK		DG
	8	NC			DG
	9	J203-3	VIO		RXD
	10	J203-2	GRY		TXD
DIGITAL LESLIE EFH-237A					
J201	1	J110-2	GRN	PWH-68A	-15V
	2	NC			AG
	3	J110-6	ORG		+15V
	4	J110-4	BLK		DG
	5	NC			DG
	6	NC			5V
J202	7	J110-8	YEL		5V
	1	NC			AG
	2	NC			DG
	3	J301-3	WHT	SWH-492A	L-OUT
	4	J301-4	SHIELD		AG
	5	J301-5	RED		R OUT
	6	J301-9	WHT		SUB-L OUT
	7	J301-8	SHIELD		AG
J203	8	J301-7	RED		SUB-R OUT
	9	NC			DG
	1	NC			5V
	2	J307-10	GRY	SWH-492A	TXD
	3	J307-9	VIO		RXD
J204	4	NC			DG
	5	J307-7	BLK		DG
	1	J301-1	SHIELD	SWH-492A	Lch IN
	2	J301-2	SHIELD	SWH-492A	AG
J205	3	NC			AG
	4	NC			Rch IN
	1	J304-1	RED	SWH-492A	
	2	NC			
	3	J304-3	GRY		
J206	4		-4		
	5		-5		
	6		-6		
	7		-7		
	8		-8		
	1	J307-4	YEL	SWH-492A	5V
	2	J307-6	BLU		FS2
	3	J307-5	GRN		FS1
J207	4	J307-2	RED		FAST
	5	J307-3	ORG		SLOW
	6	NC			PORT2
	1	J305-1	RED	SWH-492A	
	2		-2		
	3		-3		
	4		-4		
	5		-5		

J207	6	J305-6	GRY	SWH-492A	
	7		-7		
	8		-8		
	9		-9		
	10		-10		
	11		-11		
	12		-12		
	13		-13		
	14		-14		
	15		-15		
J208	1	CN3-1	BRN	MOTOR DRIVER	
	2		-2		
	3		-3		
	4		-4		
	5		-5		
	6		-6		
	7		-7		
	8		-8		
	9		-9		
	10		-10		
MOTOR DRIVER FYD815SD3					
CN1	1	J112-3	RED	PWH-68A	
CN2	2	J112-1	BLK	PWH-68A	
	1	MOTOR		MOTOR	
	2				
	3				
	4				
	5				
	6				
	7				
	8				
	9				
CN3	1	J208-1	BRN	EFH-237A	
	2		-2		
	3		-3		
	4		-4		
	5		-5		
	6		-6		
	7		-7		
	8		-8		
	9		-9		
	10		-10		

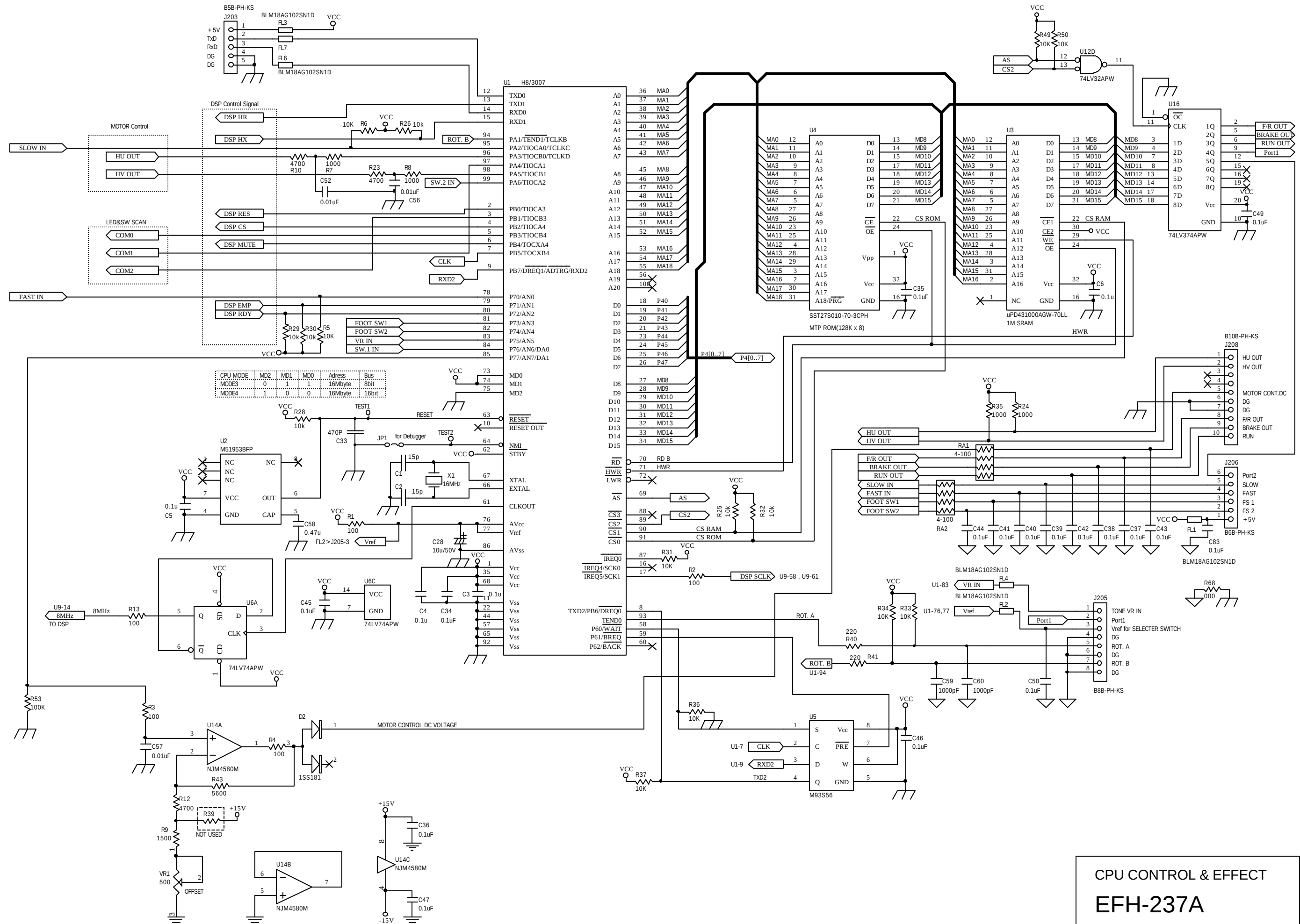
7.PRINTED WIRING BOARD ASS'Y LIST

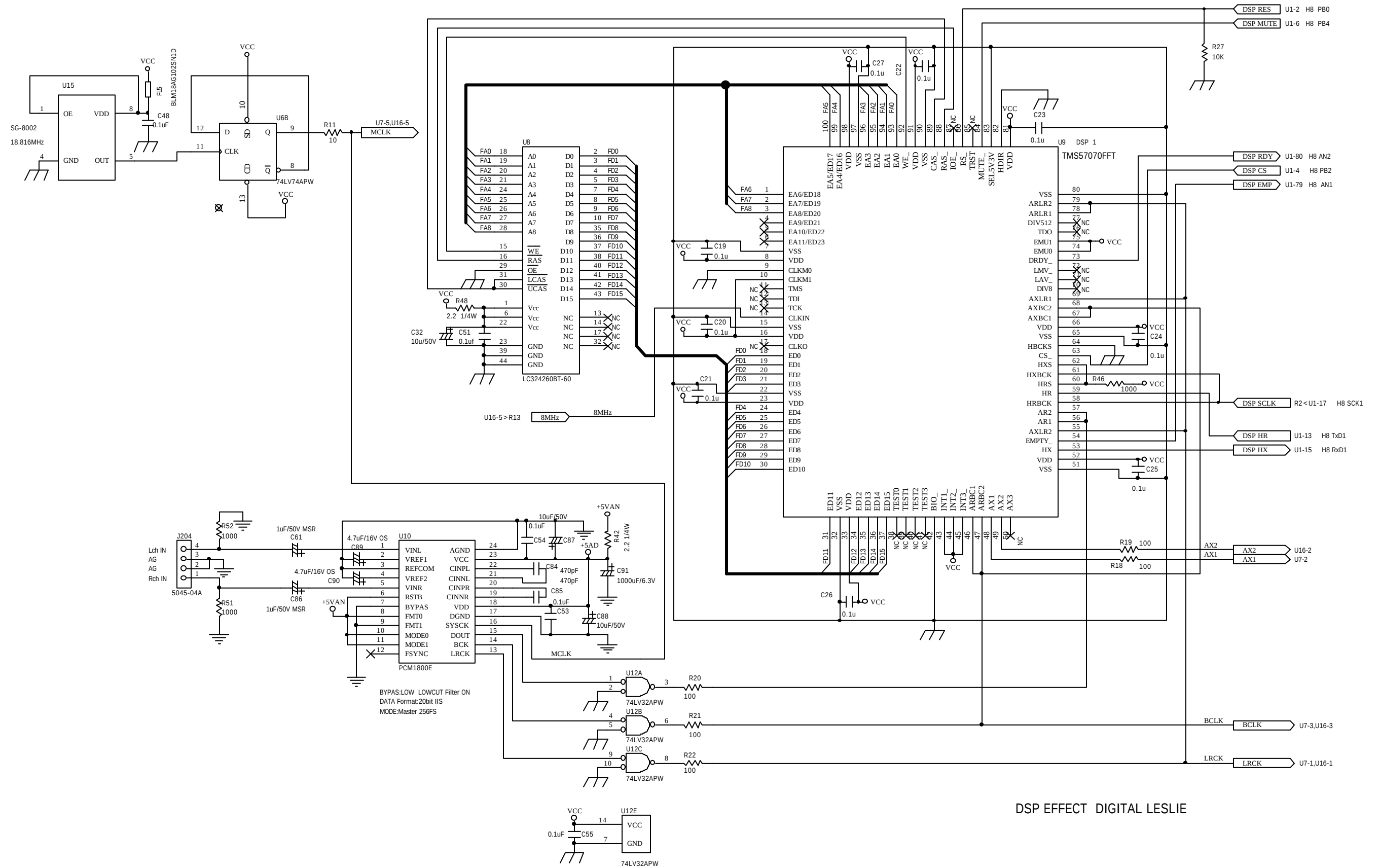
FUNCTION	PWB.NAME	PART No.
POWER SUPPLY & AMPLIFIER	PWH-68A	00218-28256
PREAMP & PANEL SWITCH	SWH-492A	00225-40296
CPU CONTROL & EFFECT	EFH-237A	00223-42201 (1/3~3/3)



Diode D1 thru D8 : 1SS133

PREAMP & PANEL SWITCH
SWH-492A
00225-40296

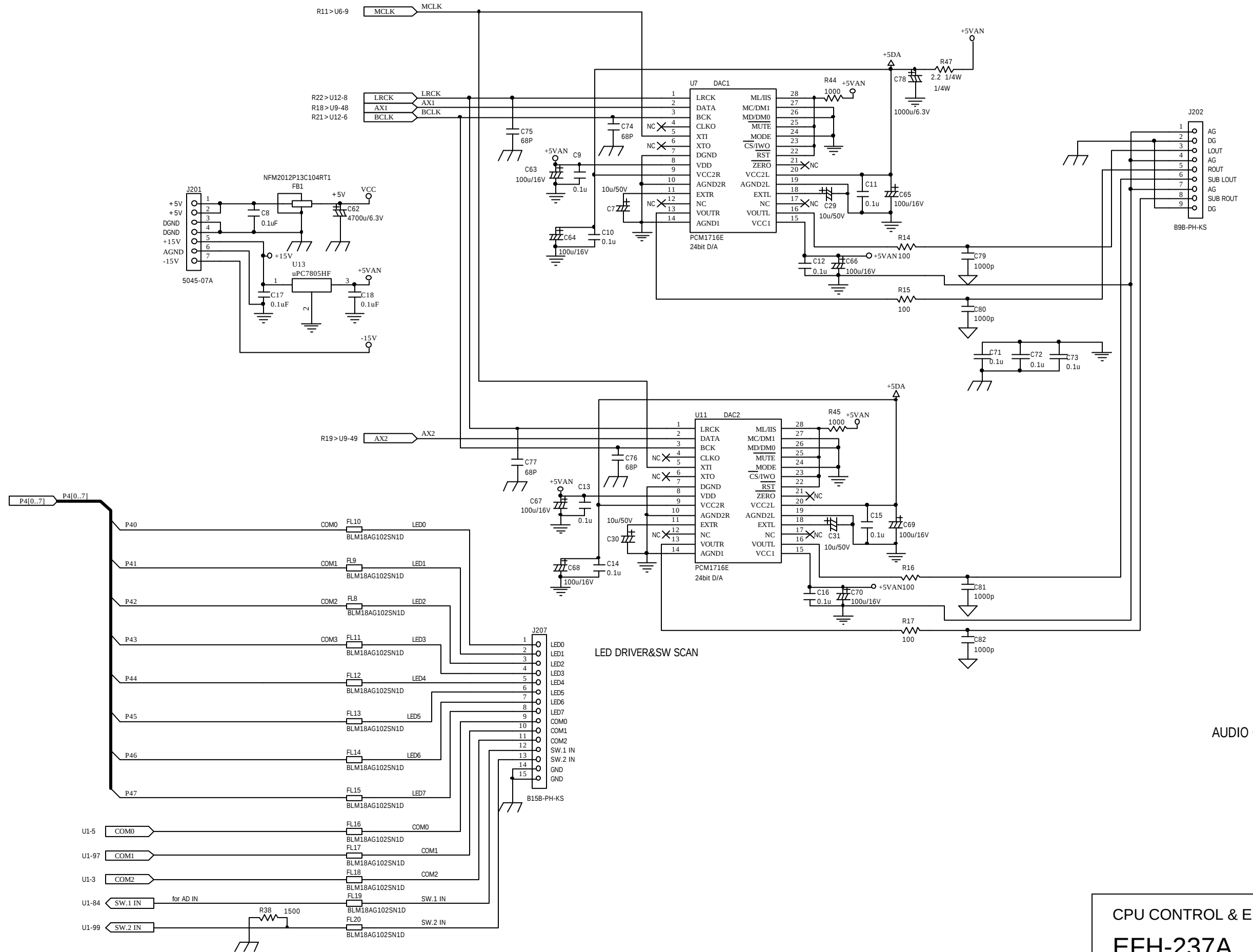




CPU CONTROL & EFFECT

EFH-237A

00223-42201 2/3



CPU CONTROL & EFFECT

EFH-237A

00223-42201 3/3

9.WARNING

#2101/ #2102



Battery Replacement

Replace battery with **SONY** or **HITACHI MAXELL**
Part No. **CR2032** Only.

Use of another battery may present a risk of fire or explosion.

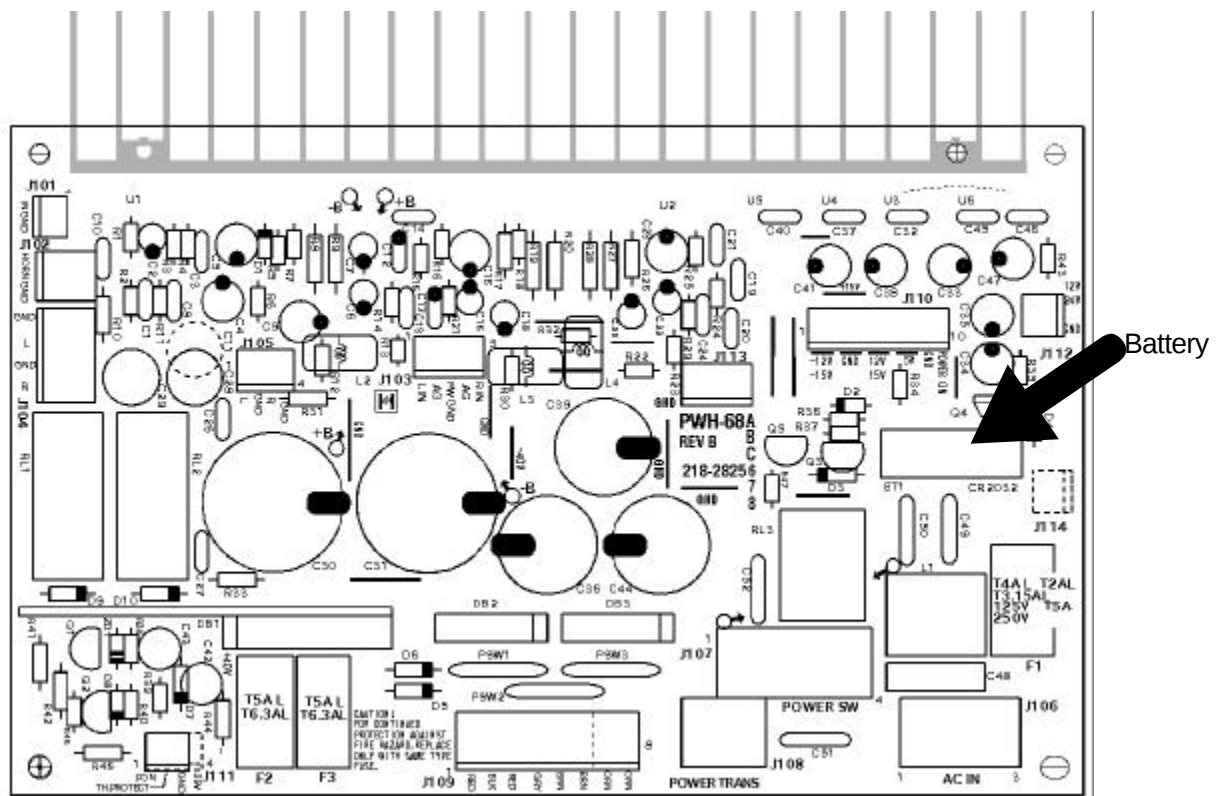
Battery may explode if mistreated.

Do not recharge, disassemble.

Collect used battery promptly.

Keep away from children.

Do not disassemble and do not dispose in fire.



PWH-68A

10. TECHNICAL DESCRIPTION

1. General

The Leslie 2101 system consists of 3 channels: Rotary, Stationary Left and Stationary Right, all of which are present at the 11-pin input. Each channel is rated at 50 watts. The Rotary channel has other two inputs - a 1/4" phone jack, and an 8-pin DIN socket for use with Hammond Drawbar Module XM-1. The high frequency portion of the Rotary channel consists of a spinning horn rotor driven by a DC servo motor, and the low frequency portion consists of a 2-channel stereo rotary simulator controlled by a DSP (Digital Signal Processor) system. The DC servo motor is controlled by the CPU, which allows programmable Rotor Speed, Rise Time, Fall Time and Brake Time. In addition, both the DC servo motor and the DSP bass rotor can respond to incoming MIDI commands from external MIDI equipment.

The PWBs consist of:

1. PREAMP & PANEL SWITCH PWB (SWH-492A)
2. CPU Control & DSP Effect PWB (EFH-237A)
3. POWER AMP & POWER SUPPLY PWB (PWH-68A)

2. Operation of PWB

A. PREAMP & PANEL SWITCH SWH-492A

This PWB is composed of three parts: PREAMP & FILTER, SWITCH & DISPLAY and JACK.

The signal for the Rotary channel is supplied through pin 1 of the 11-pin connector. Through J306-1, PHONE JACK JK-5 and JK-8 In input of PIN(1), to The OPAMP U1A and U1B from VR1 after Mixed U1A make pass a signal from 125Hz to 12KHz in Band Pass Filter and are sent to DSP of EFH-237A via J301-1. This signal is divided into HF(High Frequency) and LF(Low Frequency) at approximately 800 Hz of the crossover frequency in the DSP. The HF is, being returned via J301-3 as the Rotary Horn signal, through BPF circuit U3B, AMP circuit U3A and VR6, and it is supplied to POWER AMP via J302-1.

The LF signal is changed into the 2-Channel STEREO signal by Rotary simulator inside DSP. Among these, the Lch signal returns to J301-9. Then, it is filtered below 1.1KHz by 12dB/oct. Low Pass Filter in U5A, and the one of this output is sent to LINEOUT JACK.JK3. The other is sent to MIXER U4B. It is also mixed here with STATIONARY Lch. and the BASS signal, and output is supplied to PWH-68A POWER AMP via J302-5. Also, the Rch signal returns to J301-7 after that, it is same as Lch.

On the other hand, only the BASS signal less than 125 Hz is passed by U1B, and it is supplied to U2A, U2B and U4B, U5B through VR5(ROT BASS ADJUST).

When SLIDE SWITCH SW6 is in Position of STA & BASS MUTE at this time, a becoming BASS signal is stopped here by Transistor Q5, Q6, Q7 and Q8 which are switched ON.

B. CPU CONTROL & DSP EFFECT EFH-237A

This PWB consists of the MAIN CPU, DSP, ADC, DAC and MEMORY and controls switch functions, LCD display functions, Motor Control, Leslie simulator, DSP digital filter, etc. The MAIN CPU program is written in MTP ROM(1M bit) U4. The rotary channel signal sent from J301-1 of SWH-492 is converted into digital serial data of 20 bits in AD CONVERTER U10 via J204-1. and is connected to DSP U9-PIN(55) & PIN(56) via PIN(15) and U12A. It is filtered, and the DIGITAL EFFECT and ROTARY EFFECT are added here using the DSP. The 24-bit SERIAL DATA output of the DSP is sent from AX1(pin 48) and AX2(pin49) to U7(DAC1) and U8(DAC2)PIN(2) and converted back into an ANALOG signal of 4 channels and applied via J202 and J301 to SWH-492A.

The voltage of the MOTOR CONTROL is supplied from PIN 85(DAC OUT in CPU) of U1, through R3 to PIN(2) of OPAMP U14A. U14A functions as a DC AMP. The Output Voltage can be adjusted using TRIM POT VR1. Please refer to TEST & ADJUSTMENT for more information on making adjustments. This DC voltage is applied to the MOTOR DRIVER PWB via DIODE D2 and J208-5.

C. POWER SUPPLY & POWER AMP PWB PWH-68A

This PWB provides POWER SUPPLY, POWER AMP, POWER ON MUTE RELAY and REMOTE POWER ON circuit.

POWER SUPPLY:

The Primary coil of POWER TRANS EPH-115 can be changed 100V, 120V, 220-230V or 230-240V by replacing the VOLTAGE SELECT PLUG. There are three lines of +-34V, +-17.5V, +30V secondary sides of the transformer. Each three lines apply to the power amplifier, +-12 V, +5V regulator IC, and 24V for Motor Power supply.

The devices between the transformer volume line and the rectifier diode PSW 1, 2, 3 are POLY SWITCHes. These devices together perform the same function as a fuse; however, it is not usually necessary to replace them after a power surge, as they will automatically reset. RXE-185 in this place is equivalent to a 1.6A timelag or slo-blo fuse.

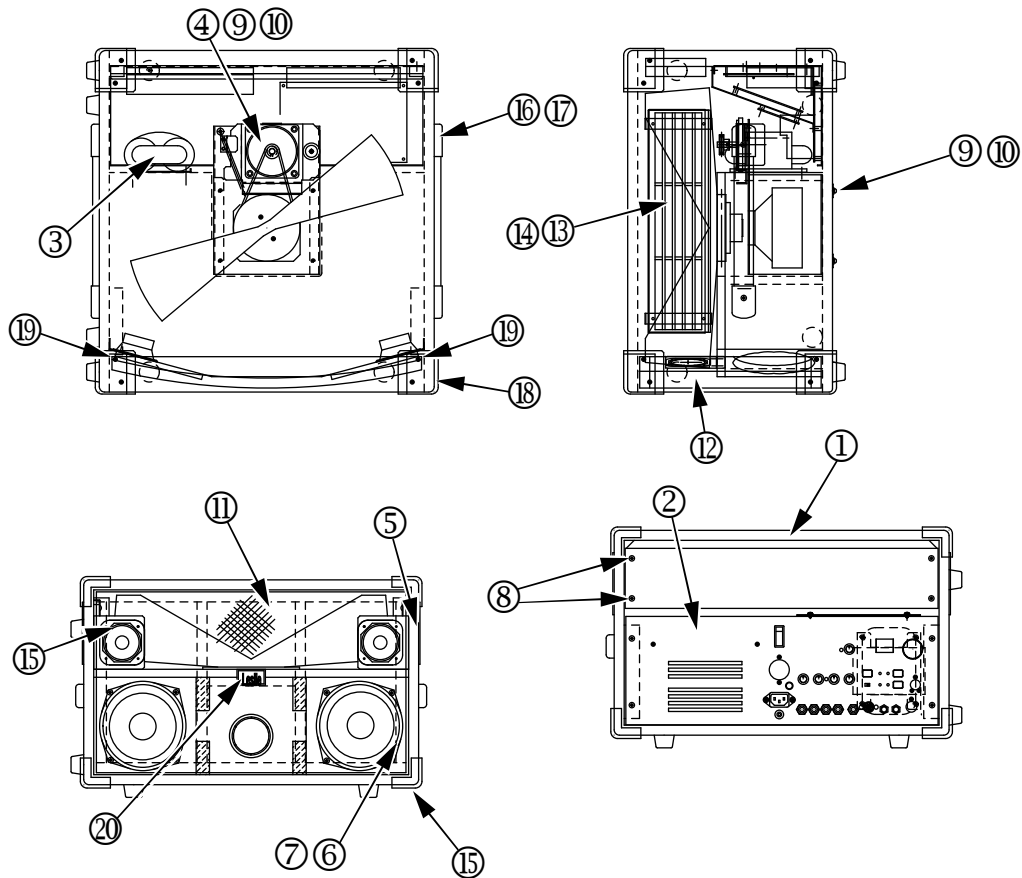
POWER AMP

The POWER AMP consists of 1-Channel Amp. U1 and 2-Channel Amp U2.

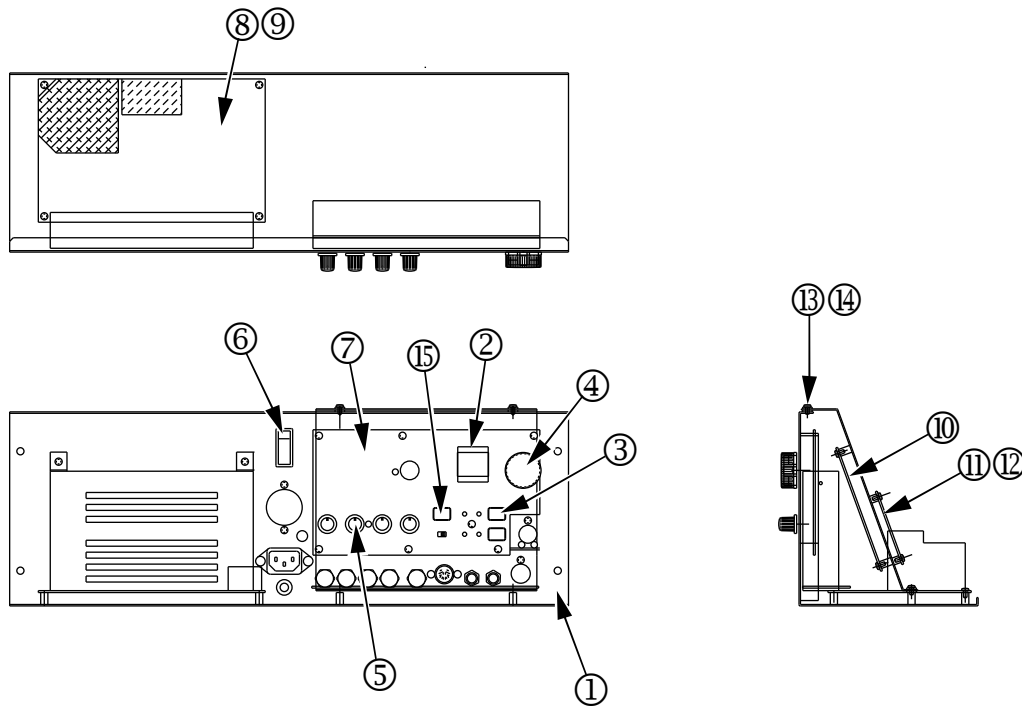
The two outputs from pins 12 and 13 of U1 are mixed at R8 and R9(0.22 ohm) and supplied through choke coil relay RL1A, and arrive at the Horn Driver via J102-1. RL1A is a muting Relay which prevents turn-on pop the power is turned “on” or “off.” The operation of U1 and U2 is identical. The service technician should exercise caution to avoid a short-circuit.

11.PARTS LIST

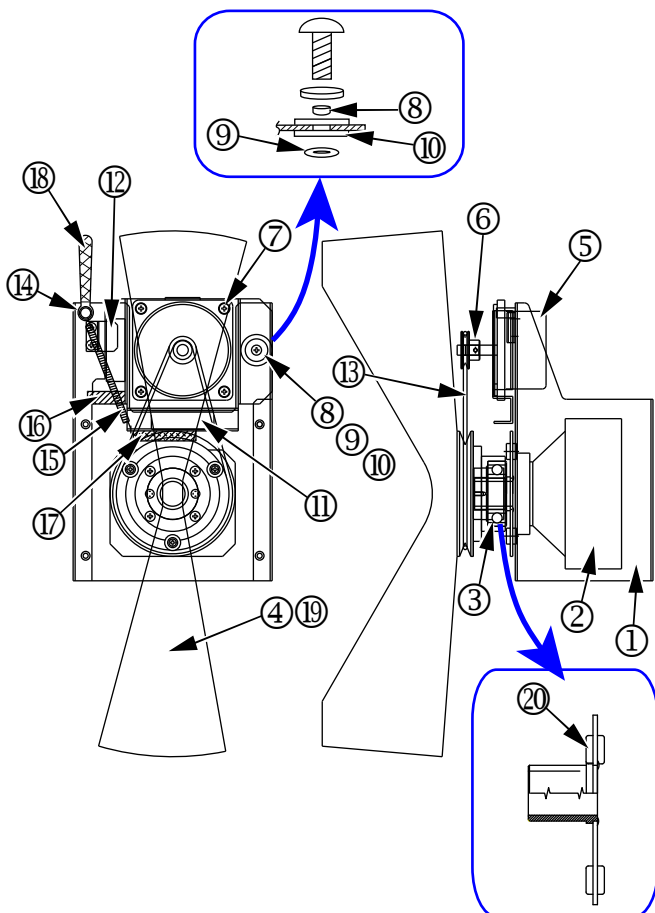
1.TOTAL ASS'Y (66640-01101) #2101, (66645-01101) #2102



① Cabinet Total Ass'y (#2101)	66641-02101
" (#2102)	66646-02101
② Rear Panel Ass'y	66641-02102
③ Power Transformer(EPH-115)	00307-01315
④ Rotary Horn Ass'y	66641-02104
⑤ Speaker 5cm	00315-01013
⑥ Speaker 13cm	00315-02002
⑦ Speaker Cushion XE	00453-40074
⑧ Tapping Screw TYPE A(Truss,Ø4x30)	00613-64030
⑨ Toothed Square Washer(BLACK)	00750-04001
⑩ Machine Screw(W SEMS,P=3,M4x30)	00703-84030
⑪ Speaker net Ass'y	66641-02103
⑫ Cabinet(wooded)Ass'y (#2101)	66641-02121
" (#2102)	66646-02121
⑬ Louver(0-404,BLACK) (#2101)	00402-01977
" (0-404, SILVER) (#2102)	00452-40150
⑭ Louver BKT#21	00451-40332
⑮ Rubber Cushion(TK-30)	00453-40129
⑯ Handle (#2101)	00343-03011
⑰ Screw(Over Head,M5x30,ZnB) (#2101)	00703-25030
⑱ Protector(Leslie) (#2101)	00452-40153
⑲ Tapping Screw TYPE A(Bind,Ø3x25,ZnB)(#2101)	00613-53025
⑳ Leslie Badge	00452-40147

2 . REAR PANEL ASS'Y (66641-02102)

① Rear Panel #2101	00451-40303	⑨ Battery(CR2032)	00357-01009□
② LED Cover(Leslie)	00452-40149□	⑩ EFH-237A PWB Ass'y	00223-42201□
③ Select Button B(GREY)	00452-40050□	⑪ Motor Driver(FYD815SD3)	00345-01007□
④ Rotary Knob XB	00452-40148□	⑫ Motor Cable	00443-05033□
⑤ Vol Knob XB	00402-31010□	⑬ Rubber Bushing(NG-79-A)	00453-40142□
⑥ Power SW(SDDJF30200)	00301-08029□	⑭ Spacer Pipe(Ø4X4)	00451-40310□
⑦ SWH-492A PWB Ass'y	00225-40296□	⑮ Select Botton(ORANGE)	00452-40152
⑧ PWH-68A PWB Ass'y	00218-28256□		

3 . ROTARY HORNE ASS'Y (66641-02104)

① Rotary Horn BASE	00451-40298
② Horn Driver	00315-08008□
③ Spindle Hub Set	66641-02120□
④ Rotary Horn(514-140436)	00315-08010□
⑤ Motor(FY815-SD3)	00345-01006
⑥ Motor Pulley#22	00451-40301□
⑦ Rubber Gromment(G-85)	00453-40126□
⑧ Spacer Pipe #8(Ø4X8,ZnY)	00451-40345□
⑨ Pedal Spacer(SSW-80FOM)	00453-40023□
⑩ Rubber Gromment(Fvc)	00453-40132□
⑪ Cushion(Large)	00453-40127□
⑫ Cushion(Small)	00453-40140□
⑬ Cloth Belt(Ø3)	00453-40128□
⑭ Hex Head Spacer Nut(M4X15)	00730-04012□
⑮ Spring(Leslie)	00451-40302□
⑯ Damper Sponge	00453-40176□
⑰ Damper Rubber	00453-40177□
⑱ Coationg Clip(CS-7,Ø4)	00340-07015□
⑲ Machine Screw(Oval,M3X18,ZnB)	00703-23018□
⑳ Rubber Gromment(G-91)	00453-40157□

AC CORD SET

100V 00439-02002



120V 00439-02004



220V CE 00439-01005



240V BS 00439-01033



240V SAA 00439-01006

WIRING

① WR-HZ100-A	00443-05024
② WR-HZ100-B	00443-05025
③ WR-HZ100-C	00443-05026
④ WR-HZ100-D	00443-05027
⑤ WR-HZ100-R	00443-05028
⑥ WR-HZ100-T	00443-05029
⑦ WR-HZ100-W	00443-05030
⑧ WR-HZ100-MP	00443-05031
⑨ WR-HZ100-MI	00443-05032
⑩ WR-HZ118-B	00443-05016
⑪ WR-HZ118-C	00443-05017

VOLTAGE SELECT PLUG

① 100V	00106-00241
② 120V(UL)	00106-00242
③ 220V CE	00106-00243
④ 240V BS/SAA	00106-00244

**FUSE****<PWH - 68A F1>**

100V	T4A 239004	00302-11043
120V(UL)	T3A 239003	00302-11040
220V CE	T2A S506T	00302-10202
240V BS/SAA	T2A S506T	00302-10202