

 **HAMMOND**  
**SERVICE MANUAL**

**XK-3**

**CAUTION !**  
see safety notice inside



NOV.2004



**SUZUKI MUSICAL INST.MFG.CO.,LTD.**

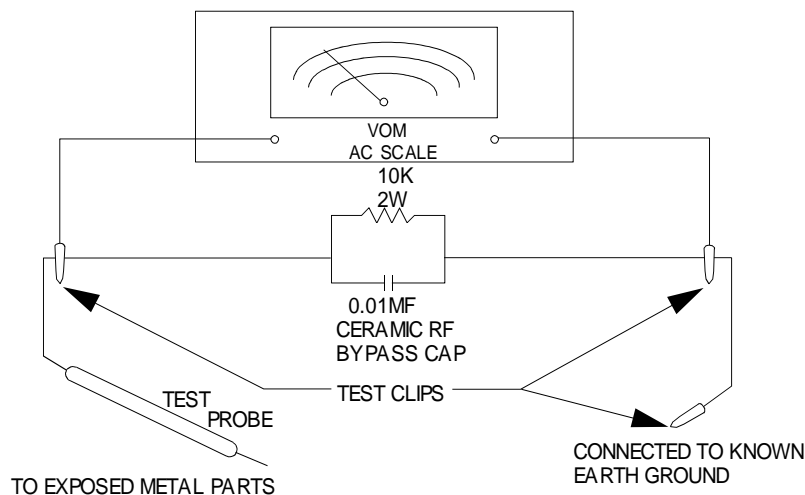
25-12,RYOKE 2-CHOME,HAMAMATSU, JAPAN

## 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 Voltmeter 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.

### Advarsell

Lithiumbatteri. Eksplosjonsfare ved feilagtig håndtering.  
Udskiftning må kun ske med batteri as samme fabriket og type.  
Lebér 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

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

### Finland: VAROITUS

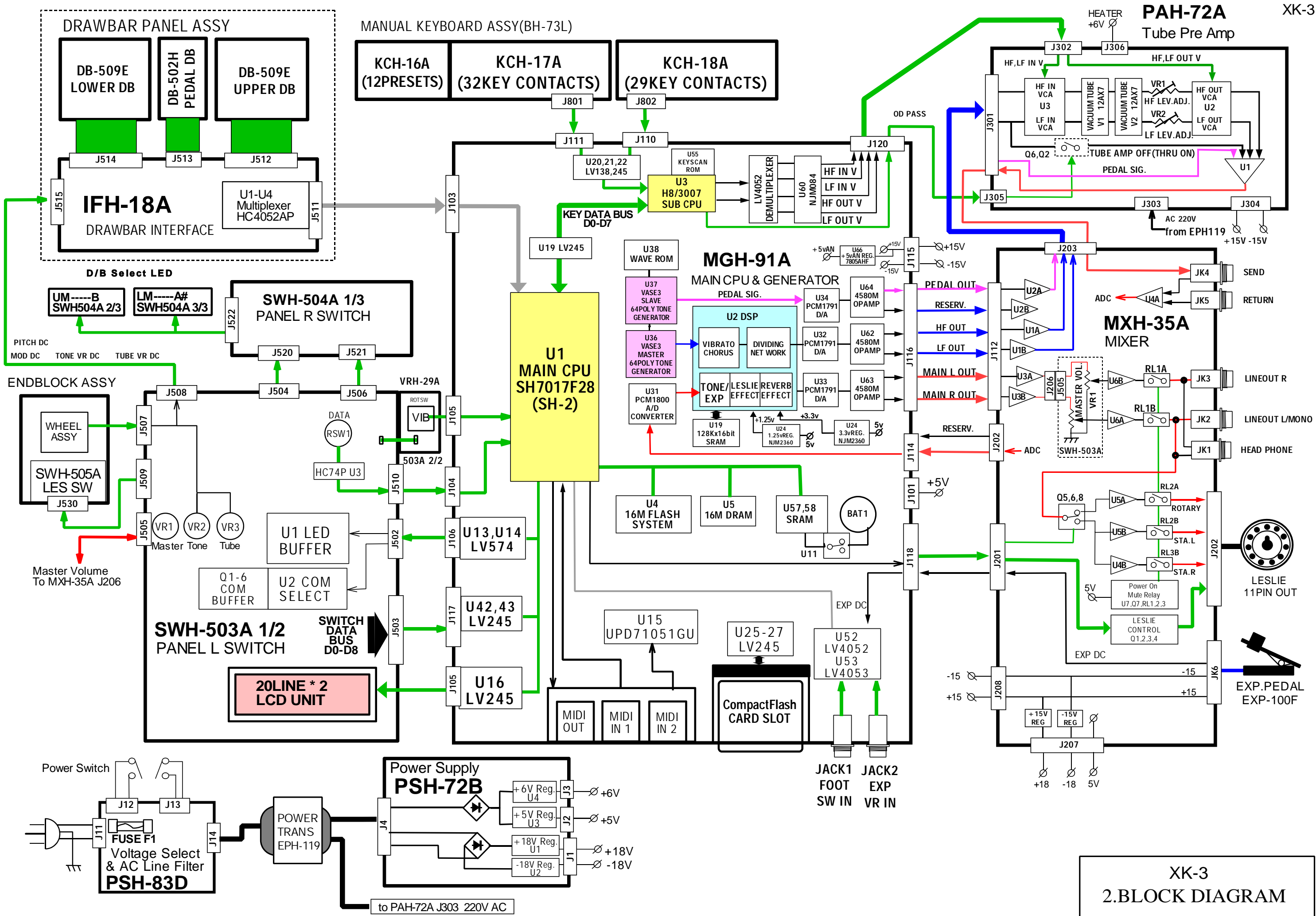
Paristo voi räjähtää, jos se on virheellisesti asennettu  
Vaihda paristo ainoastaan laitevalmistajan suosittelemaan  
tyyppöön, Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.

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# 1.Specifications

<b>Keyboard</b>	73(61+12 PRESET KEYS) - WATAR FALL KEYS with VELOCITY
<b>Drawbars</b>	3Sets of DRAWBARS, 9-UPPER, 9-LOWER, 2-PEDAL
<b>Generator</b>	96 DIGITAL TONE WHEELS
<b>Waveform</b>	B-3 LONG LOOP SAMPLING (SAME as New B-3)
<b>Polyphony</b>	FULL POLYPHONY
<b>Internal Memory</b>	11 PRESETS x 12 BANKS + CANCEL
<b>Leslie</b>	HIGH QUALITY 2 ROTOR - DIGITAL LESLIE
<b>Preamp</b>	VACUUM TUBE AMPLIFIER
<b>Overdrive</b>	VACUUM TUBE OVER DRIVE
<b>Reverb</b>	8-MODES
<b>Tone Control</b>	BASS, MID, TREBLE
<b>Sustain</b>	PEDAL DRAWBARS
<b>Wheel</b>	PITCH BEND, MODULATION
<b>Panel Control</b>	
<b>Leslie</b>	SLOW/FAST, ON/OFF, BRAKE/THRU
<b>Vibrato/Chorus</b>	ON, V1,V2,V3,C1,C2,C3 With 6-POS.ROTARY KNOB
<b>Percussion</b>	SECOND, THIRD, DECAY FAST, SOFT
<b>Control</b>	MANUAL BASS, SPLIT
<b>Effect</b>	TUBE AMP, REVERB ON
<b>Demo</b>	DEMO / PEDAL SUSTAIN
<b>Display Switch</b>	PAGE UP / DOWN, PARAMETER, VALUE $\pm$ , ROTARY ENCODER MENU / EXIT, PLAY,REC,BANK
<b>Volume Control</b>	MASTER VOLUME, TONE CONTROL, TUBE OVERDRIVE
<b>Display</b>	20-CHARACTER 2 LINES BACKLIGHT LCD
<b>TERMINAL</b>	AC INLET, LINE OUT L/R, HEADPHONE, SEND / RETURN EXP.PEDAL(EXP-100F), EXP PEDAL, FOOT SWITCH / LESLIE SWITCH LESLIE 11-PIN, MIDI IN1 / IN2 / OUT, COMPACTFLASH CARD SLOT
<b>WEIGHT</b>	19.5kg
<b>DIMENSION</b>	119(W) x 40(D) x 12(H) cm
<b>OPTION</b>	EXP.PEDAL(EXP-100A,EXP-100F), LESLIE SWITCH(LEVER TYPE CU-1) MIDI PEDALBOARD(XPK-100), FOOT SWITCH(FS-9H) HAMMOND COMPACTFLASH(HCF-32)

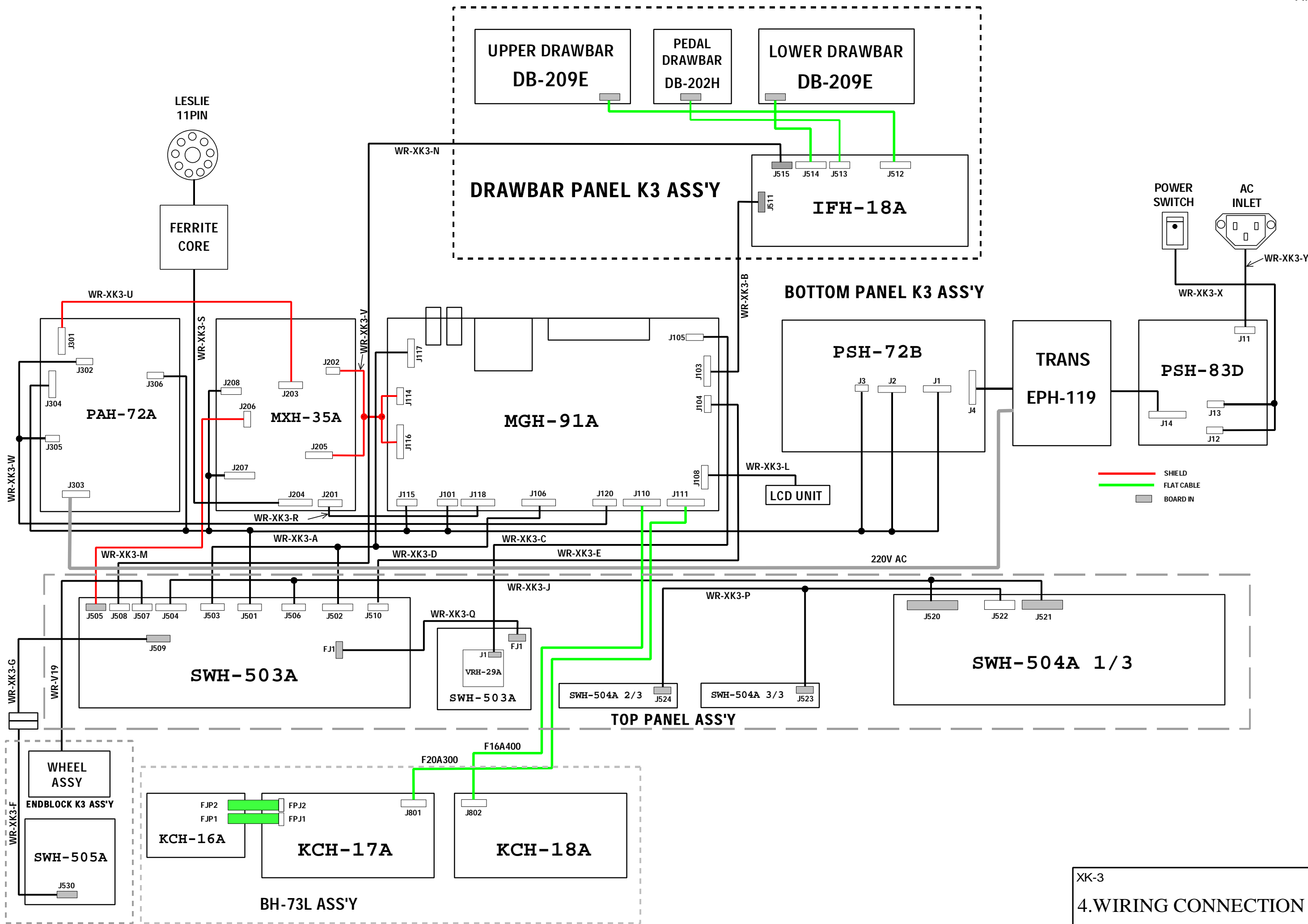


**XK-3**  
**2.BLOCK DIAGRAM**

XK-3 TEST & ADJUSTMENT

STEP	SUBJECT	SETTING	PLAY KEYS	TEST POINT	ADJUSTMENT POINT	SPECIFICATION	NOTE
4--1 a	AC Power Supply	100V, 120V, 220-230V, 230-240V		AC LINE		See below	
b	DC Power Supply	+5V		PSH-72B J2-3		DC +5V ±5%	
c	↓	+15V		MXH-35A PSW-2		DC +15V ±5%	
d		-15V		MXH-35A PSW-1		DC -15V ±5%	
		MasterVR max, Tone center, Overdrive min.					
4--2 a	LINE OUT PEDAL	ALL EFFECT Off PED DRAWBAR 16' MAX MANUAL BASS ON	C2	LINE OUT L JACK		800±80mVrms	
b	LINE OUT L-Low	ALL EFFECT Off UM DRAWBAR 16' MAX TUBE AMP OFF	C2	LINE OUT L JACK		230±25mVrms	
c	R-Low	↓	↓	R JACK		230±25mVrms	
d		TUBE AMP ON	↓	R JACK	PAH72A-VR2	Adjust TUBE AMP OFF Level.	
e	L-High	ALL EFFECT Off UM DRAWBAR 2' MAX TUBE AMP OFF	C5	L JACK		46±5 mVrms	
f	R-High	↓	↓	R JACK		46±5 mVrms	
g		TUBE AMP ON	↓	R JACK	PAH72A-VR1	Adjust TUBE AMP OFF Level.	
		LESLIE 11P CONNECT					
4--3 a	LESLIE 11pin ROT	ALL EFFECT Off UM DRAWBAR 2' MAX TUBE AMP OFF	↓	11pin-pin 1		130 ± 15 mVrms	
b	ROT	ALL EFFECT Off UM DRAWBAR 16' MAX TUBE AMP OFF	C2	11pin-pin 1		640 ± 65 mVrms	
c	STA-L	LES1ch-->2 or 3ch , LESLIE OFF	↓	11pin-pin 2		420 ± 45 mVrms	
d	STA-R	↓	↓	11pin-pin 3		420 ± 45 mVrms	
4--4 a	NOISE LINE OUT L			LINE OUT L JACK		100 uV max (IEC"A"net)	
b	LINE OUT R			LINE OUT R JACK		100 uV max (IEC"A"net)	
c	LINE OUT R		ANY KEY	↓		165 uV max (IEC"A"net)	
d	11P ROT			11pin-pin 1		190 uV max (IEC"A"net)	

VOLTAGE	AC CURRENT
100V	270 mA±30
120V	210 mA±25
230V	120 mA±15
240V	110 mA±15



XK-3  
4.WIRING CONNECTION

# 5. WIRING CHART

XK-3

MAIN MGH-91A						
PLUG No.	FROM PIN No.	TO PLUG & PIN No.	WIRE COLOR	TO PWB NAME	FUNCTION	
J101	1	NC				
	2	J2-4	BLK	PSH-72B	+5V	
	3	NC				
	4	J2-2	YEL	PSH-72B	GND	
J103	1	J511-1	YEL	IFH-18A	+5V	
	2	-10	BRN	↓	AN7	
	3	-9	RED	↓	AN6	
	4	-8	ORG	↓	AN5	
	5	-7	PNK	↓	AN4	
	6	-6	GRN	↓	AN3	
	7	-5	BLU	↓	AN2	
	8	-4	VIO	↓	AN1	
	9	-3	GRY	↓	SEL2	
	10	-2	WHT	↓	SEL1	
	11	↓ -12	BLK	↓	D GND	
J104	1	J510-3	ORG	SWH-503A	ROT I REQ	
	2	-1	RED	↓	ROT D	
	3	-4	BRN	↓	ROT R	
	4	NC				
	5	NC				
	6	↓ NC				
J105	1	J1-2	BRN	VRH-29A	B SW	
	2	-3	RED	↓	A SW	
	3	↓ -1	ORG	↓	COM	
J106	1	J502-5	YEL	SWH-503A	LED 0	
	2	-6	BRN	↓	LED 1	
	3	-7	RED	↓	LED 2	
	4	-8	ORG	↓	LED 3	
	5	-9	PNK	↓	LED 4	
	6	-10	GRN	↓	LED 5	
	7	↓ -11	BLU	↓	LED 6	
	8	NC			LED 7	
	9	J502-2	GRY	SWH-503A	SEL 0	
	10	-3	WHT	↓	SEL 1	
	11	-4	BLK	↓	SEL 2	
	12	↓ -1	BRN	↓	D GND	
J108	1	CN1-15	BLK	LCD UNIT 2/2	D GND	
	2	↓ -13	YEL	↓	LCD+5V	
	3	↓ -11	GRY	↓	D7	
	4	↓ -9	VIO	↓	D6	
	5	↓ -7	BLU	↓	D5	
	6	↓ -5	GRN	↓	D4	
	7	↓ -3	YEL	↓	D3	
	8	↓ -1	ORG	↓	D2	
	9	CN1-15	RED	LCD UNIT 1/2	D1	
	10	↓ -13	BRN	↓	D0	
	11	↓ -11	WHT	↓	LCDE	
	12	↓ -9	PNK	↓	LCDR/W	
	13	↓ -7	RED	↓	LCDA0	
	14	↓ -5	BRN	↓	CONT	
	15	↓ -3	YEL	↓	+5V	
	16	↓ -1	BLK	↓	DG	
J110	1	J802-1	GRY	KCH-18A	KSELF0	
	2	-2	GRY	↓	KD0	
	3	-3	GRY	↓	KSELS0	
	4	-4	GRY	↓	KD1	
J110	5	J802-5	GRY	KCH-18A	KSELF1	
	6	-6	GRY	↓	KD2	
	7	-7	GRY	↓	KSELS1	
	8	-8	GRY	↓	KD3	
	9	-9	GRY	↓	KSELF2	
	10	-10	GRY	↓	KD4	
	11	-11	GRY	↓	KSELS2	
	12	-12	GRY	↓	KD5	
	13	-13	GRY	↓	KSELF3	
	14	-14	GRY	↓	KD6	
	15	-15	GRY	↓	KSELS3	
	16	-16	GRY	↓	KD6	
	J111	1	J801-1	GRY	KCH-17A	KD8
		2	-2	GRY	↓	KSELF0
		3	-3	GRY	↓	KD9
		4	-4	GRY	↓	KSELS0
5		-5	GRY	↓	KD10	
6		-6	GRY	↓	KSELF1	
7		-7	GRY	↓	KD11	
8		-8	GRY	↓	KSELS1	
9		-9	GRY	↓	KD12	
10		-10	GRY	↓	KSELF2	
11		-11	GRY	↓	KD13	
12		-12	GRY	↓	KSELS2	
13		-13	GRY	↓	KD14	
14		-14	GRY	↓	KSELF3	
15		-15	GRY	↓	KD15	
16		-16	GRY	↓	KSELS3	
17		-17	GRY	↓	KSELF4	
18		-18	GRY	↓	KSELS4	
19		-19	GRY	↓	KSELF5	
20		-20	GRY	↓	KSELS5	
J114	1	J202-4	SHIELD	MXH-35A	A GND	
	2	J202-1	WHT	MXH-35A	PERCUS IN	
	3	NC				
	4	J202-3	RED	MXH-35A	MIX IN	
J115	1	J208-2	ORG	MXH-35A	-15V	
	2	NC				
	3	J208-4	BLK	MXH-35A	AG	
	4	NC				
	5	J208-6	GRN	MXH-35A	+15V	
	6	NC				
J116	1	J205-4	WHT	MXH-35A	HF OUT	
	2	↓ -5	SHIELD	↓	A GND	
	3	↓ -6	RED	↓	LF OUT	
	4	NC				
	5	J205-9	WHT	MXH-35A	MIX OUT L	
	6	↓ -10	SHILED	↓	A GND	
	7	↓ -3	WHT	↓	MIX OUT R	
	8	NC				
	9	J205-3	WHT	MXH-35A	PEDAL	
	10	↓ -2	SHIELD	↓	A GND	
	11	↓ -1	RED	↓	PERCUS OUT	
J117	1	J503-9	BRN	SWH-503A	SWD0 IN	
	2	↓ -8	RED	↓	SWD1 IN	
	3	↓ -7	ORG	↓	SWD2 IN	
	4	↓ -6	YEL	↓	SWD3 IN	
	5	↓ -5	GRN	↓	SWD4 IN	
	6	↓ -4	BLU	↓	SWD5 IN	
	7	↓ -3	VIO	↓	SWD6 IN	



MAIN MGH-91A					
PLUG No.	FROM PIN No.	TO PLUG & PIN No.	WIRE COLOR	TO PWB NAME	FUNCTION
J117	8	J503-2	GRY	SWH-503A	SWD7 IN
	9	J503-1	WHT	SWH-503A	SWD8 IN
	10	NC			
J118	1	J201-5	WHT	MXH-35A	LES OFF
	2	-1	BLK		DGND
	3	-9	BRN		EXP DCIN
	4	-4	RED		LES FAST
	5	-3	ORG		LES SLOW
	6	-2	YEL		LES DETECT
	7	-10	GRN		FOOT SW1
	8	-7	BLU		D GND
	9	NC			KEY DOWN
	10	NC			DB MUTE
	11	NC			MAIN OFF
	12	NC			
	13	NC			
J120	1	J302-1	GRN	PAH-72A	HF IN-V
	2	-2	BLU		LF IN-V
	3	-3	VIO		HF OUT-V
	4	-4	GRY		HF OUT-V
	5	-5	BRN		HFATT
	6	-6	RED		LFATT
	7	J305-4	ORG		OD PASS
	8	-3	BLK		GND
	9	-2	YEL		+5V

TUBE PREAMPLIFIER PAH-72A					
J301	1	J203-5	WHT	MXH-35A	A GND
	2	-7	RED		MIX OUT
	3	-6	SHIELD		A GND
	4	-4	SHIELD		PEDAL IN
	5		SHIELD		A GND
	6	J203-1	SHIELD		LF IN
	7	J203-2	SHIELD		HF IN
J302	1	J120-1	GRN	MGH-91A	HIV
	2	-2	BLU		LIV
	3	-3	VIO		HOV
	4	-4	GRY		LOV
	5	-5	BRN		HAT
	6	-6	RED		LAT
J303	1	EP119	RED	AC 220V	
	2	NC			
	3	EP119	RED	AC 220V	
J304	1	J208-1	ORG	MXH-35A	-15V
	2	NC			-15V
	3	J208-3	BLK	MXH-35A	GND
	4	NC			GND
	5	J208-5	GRN	MXH-35A	+15V
	6	NC			+15V
J305	1	NC			
	2	J120-9	YEL	MGH-91A	+5V
	3	-8	BLK		GND
	4	-7	ORG		OD PASS
J306	1	J3-1		PSH-72B	PS
	2	NC			
	3	J3-4		PSH-72B	6V

MIXER & JACK MXH-35A					
J201	1	J118-2	BLK	MGH-91A	D GND
	2	J118-6	YEL	MGH-91A	D GND
	3	-5	ORG		LES DETECT
	4	-4	RED		LES SLOW
	5	-1	WHT		LES SLOW
	6	NC			LES FAST
	7	J118-7	BLU		LES
	8	NC			D GND
	9	J118-3	BRN		EXP DC
	10	J118-7	GRN		FOOT SW1
J202	1	J114-2	WHT	MGH-91A	PERC OUT
	2	NC			A GND
	3	J114-4	RED	MGH-91A	MIX OUT
	4	J114-1	SHIELD	MGH-91A	A GND
J203	1	J301-6	SHIELD	PAH-72A	SEND(MIX OUT)
	2	-7			A GND
	3	-4			PED D/B OUT
	4	NC			
	5	J301-1	WHT	PAH-72A	HF OUT
	6	-3	SHIELD		A GND
	7	-2	RED		LF OUT
J204	1	11Pin-1	BRN	LESLIE 11Pin	ROTARY
	2	2	RED		STAT L
	3	-3	ORG		STAT R
	4	-4	BLK		AUDIO
	5	-5	BLK		AUDIO
	6	-6	BLU		POWER ON
	7	-7	VIO		FAST
	8	-8	GRY		SLOW
	9	NC			
	10	NC			
	11	11Pin-9	WHT	LESLIE 11Pin	+B
J205	1	J116-11	RED	MGH-91A	PERCUS IN
	2	-10	SHIELD		A GND
	3	-9	WHT		PED IN
	4	-1	WHT		HF IN
	5	-2	SHIELD		A GND
	6	-3	RED		LF IN
	7	-7	RED		MIX IN R
	8	NC			A GND
	9	J116-5	WHT	MGH-91A	MIX IN L
	10	J116-6	SHIELD	MGH-91A	A GND
	11	NC			+5VAN OUT
J206	1	J505-4	WHT	SWH-503A	VROUT R
	2	-1	WHT		VROUT L
	3	-3	SHIELD		A GND
	4		SHIELD		A GND
	5	J505-5	RED	SWH-503A	IN R
	6	J505-2	RED	SWH-503A	IN L
J207	1	J1-2	ORG	PSH-72B	+18V
	2	NC			+18V
	3	J1-8	BLK	PSH-72B	GND
	4	NC			GND
	5	J1-6	BLU	PSH-72B	18V
	6	NC			18V
	7	J501-5	BLK	SWH-503A	DG
	8	NC			DG
	9	J501-2	YEL	SWH-503A	+5V
	10	NC			+5V

MIXER & JACK MXH-35A					
PLUG No.	FROM PIN No.	TO PLUG & PIN No.	WIRE COLOR	TO PWB NAME	FUNCTION
J208	1	J304-1	ORG	PAH-72A	+15V
	2	J115-1	ORG	MGH-91A	+15V
	3	J304-3	BLK	PAH-72A	GND
	4	J115-3	BLK	MGH-91A	GND
	5	J304-5	GRN	PAH-72A	-15V
	6	J115-5	GRN	MGH-91A	-15V
PANEL SW L SWH-503A					
J501	1	J2-3	YEL	PAH-72B	+5V
	2	J207-9	YEL	MXH-35A	+5V
	3	NC			
	4	J2-5	BLK	PAH-72B	D GND
	5	J207-7	BLK	MXH-35A	D GND
J502	1	J106-12	BLK	MGH-91A	D GND
	2	-9	VIO		CSEL0
	3	-10	GRY		CSEL1
	4	-11	WHT		CSEL2
	5	-1	YEL		LED0
	6	-2	BRN		LED1
	7	3	RED		LED2
	8	-4	ORG		LED3
	9	-5	PNK		LED4
	10	-6	GRN		LED5
	11	-7	BLU		LED6
J503	1	J117-9	WHT	MGH-91A	D0
	2	8	GRY		D1
	3	-7	VIO		D2
	4	-6	BLU		D3
	5	-5	GRN		D4
	6	-4	YEL		D5
	7	-3	ORG		D6
	8	-2	RED		D7
	9	-1	GRN		D8
J504	1	J520-12	PNK	SWH-504A	COM3
	2	-11	BLK		COM4
	3	-10	RED		COM5
	4	NC			COM0
	5	J520-9	WHT	SWH-504A	SW8
	6	-8	GRY		SW7
	7	-7	VIO		SW6
	8	-6	BLU		SW5
	9	-5	GRN		SW4
	10	-4	YEL		SW3
	11	-3	ORG		SW2
	12	-2	RED		SW1
	13	-1	BRN		SW0
J505	1	J206-1	WHT	MXH-35A	IN R
	2	-6	RED		VR OUT R
	3	-3	SHIELD		A GND
	4	-1	WHT		IN L
	5	-5	RED		VR OUT L
J506	1	J521-1	BRN	SWH-504A	LED0
	2	-2	RED		LED1
	3	-3	ORG		LED2
	4	-4	YEL		LED3
	5	-5	GRN		LED4

SW CPU SWH-496A					
J506	6	J521-6	BLU	SWH-504A	LED5
	7	J521-7	VIO	SWH-504A	LED6
	8	NC			
J507	1	VR COM	YEL	WHEEL ASSY	+5V
	2	PITCH WAP	RED		PITCH DC
	3	MOD WAP	WHT		MOD DC
	4	VR GND	BLK		GND
J508	1	J515-1	BRN	IFH-18A	D GND
	2	-3	RED		MOD DC
	3	-2	ORG		PITCH DC
	4	-4	YEL		OD DC
	5	-5	GRN		TONE DC
	6	NC			
	7	J515-7	BLU		+5V
J509	1	NC			
	2	J530-9	BRN	SWH-505A	COM4
	3	-8	RED		COM2
	4	-7	ORG		LED0
	5	-6	YEL		LED1
	6	-5	GRN		LED2
	7	-4	BLU		LED3
	8	-3	VIO		SW2
	9	-2	GRY		SW1
	10	-1	WHT		SW0
J510	1	J104-2	RED	MGH-91A	ROT D
	2	NC			
	3	J104-1	ORG	MGH-91A	ROT IREQ
	4	J104-3	BRN	MGH-91A	ROT R
FJ1	1	FJ1-1	BRN	SWH-503(2/2)	COM2
	2	-2	RED		LED1
	3	-3	ORG		LED2
	4	-4	YEL		LED3
	5	-5	GRN		LED4
	6	-6	BLU		LED5
	7	-7	VIO		LED6
PANEL SW R SWH-504A					
J520	1	J504-13	BRN	SWH-503A	SW0
	2	-12	RED		SW1
	3	-11	ORG		SW2
	4	-10	YEL		SW3
	5	-9	GRN		SW4
	6	-8	GRY		SW5
	7	-7	VIO		SW6
	8	-6	BLU		SW7
	9	-5	WHT		SW8
	10	-4	GRY		COM5
	11	-3	BLK		COM4
	12	-2	PNK		COM3
J521	1	J506-1	BRN	SWH-503A	LED0
	2	-2	RED		LED1
	3	-3	ORG		LED2
	4	-4	YEL		LED3
	5	-5	GRN		LED4
	6	-6	BLU		LED5
	7	-7	VIO		LED6
J522	1	J523-3	ORG	SWH-504A(3/3)	LED15
	2	J523-2	YEL	SWH-504A(3/3)	LED16

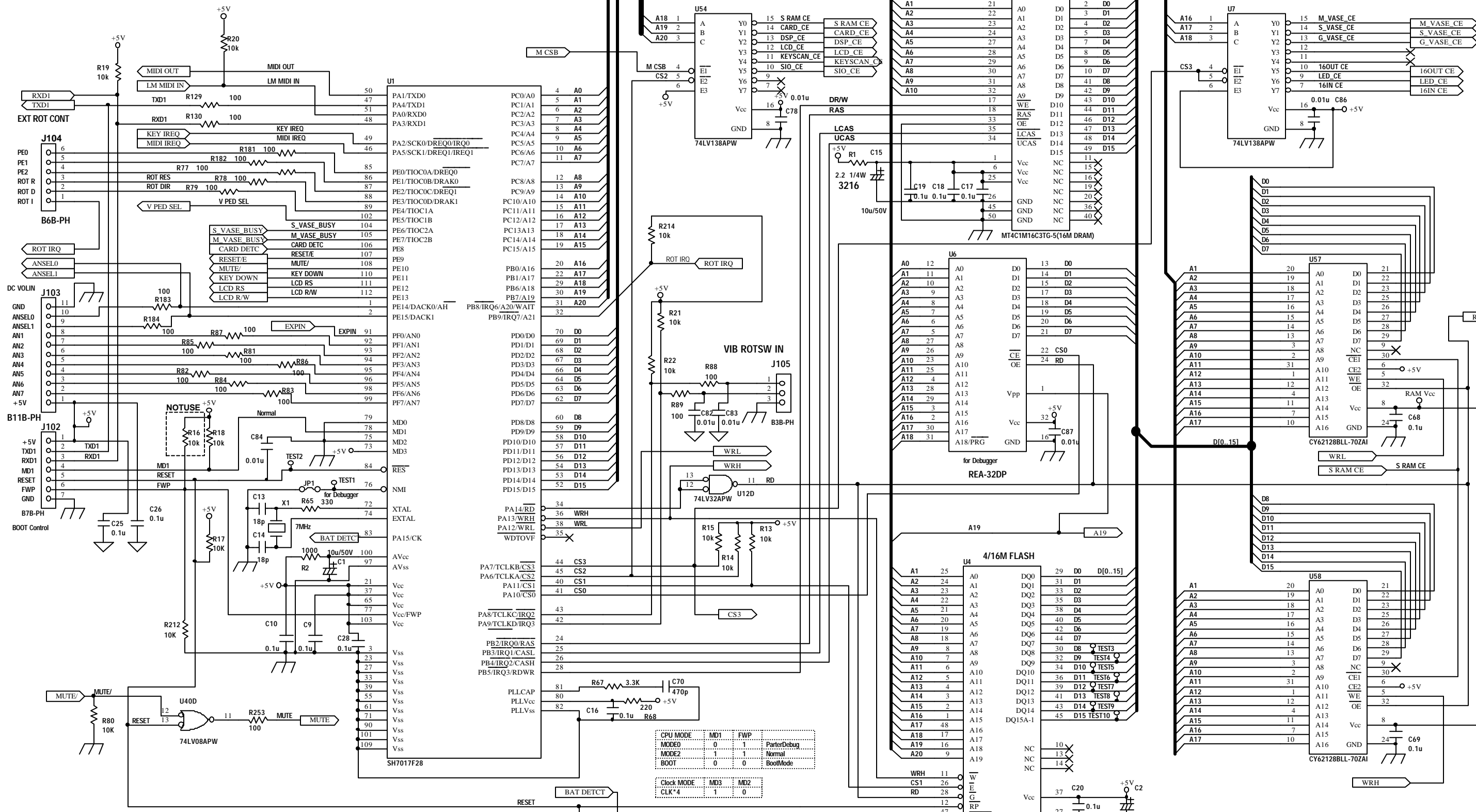
PANEL SW R SWH-504A					
PLUG No.	FROM PIN No.	TO PLUG & PIN No.	WIRE COLOR	TO PWB NAME	FUNCTION
J522	3	J523-1	GRN	SWH-504A(3/3)	COM5
	4	J524-1	BLU	SWH-504A(2/3)	LED14
	5	J524-3	VIO	SWH-504A(2/3)	LED13
J523	1	J522-3	GRN	SWH-504A(1/3)	COM5
	2	↓ -2	YEL	↓	LED16R
	3	↓ -1	ORG	↓	LED15
	4	J524-2	GRN	SWH-504A(2/3)	COM5
J524	1	J522-4	BLU	SWH-504A(1/3)	LED14R
	2	J523-4	GRN	SWH-504A(3/3)	COM5
	3	J522-5	VIO	SWH-504A(1/3)	LED13
ENDBLOCK L SW SWH-505A					
J530	1	J509-10	WHT	SWH-503A	SW0
	2	↓ -9	GRY	↓	SW1
	3	↓ -8	VIO	↓	SW2
	4	↓ -7	BLU	↓	LED3
	5	↓ -6	GRN	↓	LED2
	6	↓ -5	YEL	↓	LED1
	7	↓ -4	ORG	↓	LED0
	8	↓ -3	RED	↓	COM2
	9	↓ -2	BRN	↓	COM4
DRAWBAR I / F IFH-18A					
J511	1	J103-1	YEL	MGH-91A	+5V
	2	↓ -10	WHT	↓	SEL1
	3	↓ -9	GRY	↓	SEL2
	4	↓ -8	VIO	↓	AN1
	5	↓ -7	BLU	↓	AN2
	6	↓ -6	GRN	↓	AN3
	7	↓ -5	PNK	↓	AN4
	8	↓ -4	ORG	↓	AN5
	9	↓ -3	RED	↓	AN6
	10	↓ -2	BRN	↓	AN7
	11	NC			
	12	J103-11	BLK	MGH-91A	D GND
J512	1	DB-509E	BLK	UM D/B	GND
	2	↓	BLK	↓	4'
	3	↓	BLK	↓	2'
	4	↓	BLK	↓	1'
	5	↓	BLK	↓	13/5'
	6	↓	BLK	↓	8'
	7	↓	BLK	↓	16'
	8	↓	BLK	↓	11/3'
	9	↓	BLK	↓	22/3'
	10	↓	BLK	↓	51/3'
	11	↓	BLK	↓	+5V
	12	NC			
J513	1	DB-502H	BLK	PED D/B	GND
	2	↓	BLK	↓	8'
	3	↓	BLK	↓	16'
	4	↓	BLK	↓	+5V
J514	1	DB-509E	BLK	LM D/B	GND
	2	↓	BLK	↓	4'
	3	↓	BLK	↓	2'
	4	↓	BLK	↓	1'
	5	↓	BLK	↓	13/5'

J514	6	DB-509E	BLK	LM D/B	8'	
	7	↓	BLK	↓	16'	
	8	↓	BLK	↓	11/3'	
	9	↓	BLK	↓	22/3'	
	10	↓	BLK	↓	51/3'	
	11	↓	BLK	↓	+5V	
	12	NC				
	J515	1	J508-1	BRN	SWH-503A	D GND
		2	↓ -3	RED	↓	PITCH
		3	↓ -2	ORG	↓	MOD
		4	↓ -4	YEL	↓	OD
		5	↓ -5	GRN	↓	TONE
6		NC				
7		J508-7	BLU	SWH-503A	+5V	
VIBRATO ROTARY SWITCH VRH-29A						
J1	1	J105-2	RED	MGH-91A	COM	
	2	↓ -3	ORG	↓	B SW	
	3	↓ -1	BRN	↓	A SW	
POWER SUPPLY PSH-72B						
J1	1	NC				
	2	J207-1		MXH-35A	+18V	
	3	NC				
	4	NC				
	5	NC				
	6	J207-5		MXH-35A	-18V	
	7	NC				
	8	J207-3		MXH-35A	AG	
J2	1	NC				
	2	J101-4	YEL	MGH-91A	DG	
	3	J501-1	YEL	SWH-503A	+5V	
	4	J101-2	BLK	MGH-91A	+5V	
	5	J-501-4	BLK	SWH-503A	RESET	
J3	1	J306-1	BLK	PAH-72A	6V	
	2	NC				
	3	NC				
	4	J306-3	PNK	PAH-72A	DG	
J4	1	EPH119	BRN	AC 22V	AC IN	
	2	↓	BLK	COM	GND	
	3	↓	BLN	AC 22V	AC IN	
	4	NC			GND	
	5	↓	YEL	AC 7.2V	AC IN	
	6	NC			GND	
	7	↓	YEL	AC 7.2V	AC IN	
AC LINE FILTER PSH-83D						
J11	1	AC INLET L	BLK	AC INLET		
	2	AC INLET N	WHT	AC INLET		
J12	1	POWER SW	WHT	POWER SW		
	2	NC				
	3	POWER SW	WHT	POWER SW		
J13	1	POWER SW	BLK	POWER SW		
	2	NC				
	3	POWER SW	BLK	POWER SW		
J14	1	EPH119	WHT	COM		
	2	↓	BLU	100V		
	3	↓	GRN	120V		
	4	↓	YEL	230V		
	5	↓	OEG	240V		



# 6.PRINTED WIRING BOARD ASS'Y LIST XK-3

FUNCTION	PWB.NAME	PART No.
MAIN	MGH-91A	00228-24286
TUBE PREAMPLIFIER	PAH-72A	00219-54211
MIXER & JACK	MXH-35A	00230-07206
PANEL SW - L	SWH-503A	00225-41286
VIBRATO ROTARY SWITCH	VRH-29A	00225-42201
PANEL SW - R	SWH-504A	00225-41291
ENDBLOCK L SW	SWH-505A	00225-41296
DRAWBAR I / F	IFH-18A	00232-14271
POWER SUPPLY	PSH-72B	00224-18207
AC LINE FILTER	PSH-83D	00224-18264
PRESET KEY CONTACT	KCH-16A	00229-22226
32KEY CONTACT	KCH-17A	00229-22231
29KEY CONTACT	KCH-18A	00229-22236



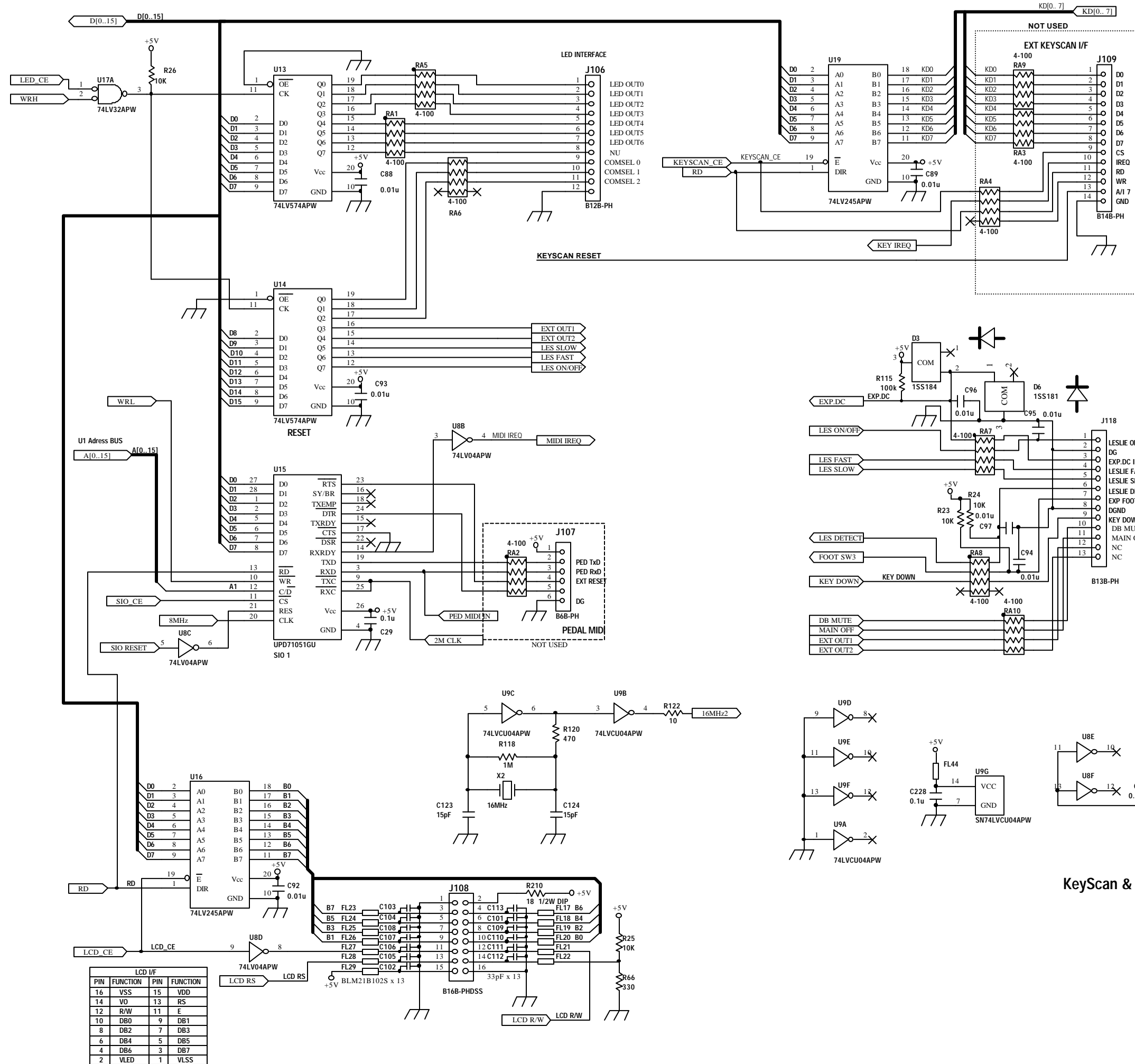
CPU MODE	MD1	FWP	
MODE0	0	1	ParterDebug
MODE2	1	1	Normal
BOOT	0	0	BootMode

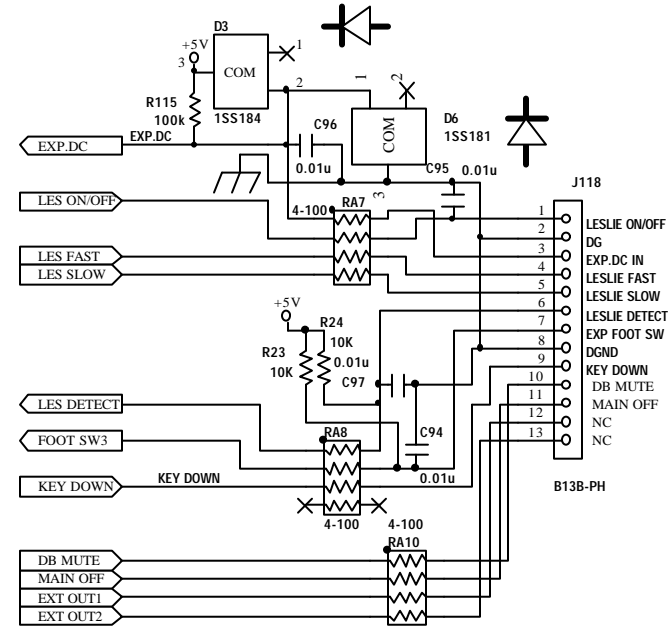
Clock MODE	MD3	MD2
CLK*4	1	0

**CPU SYSTEM**

XK-3  
**MGH-91A**  
 00228-24286

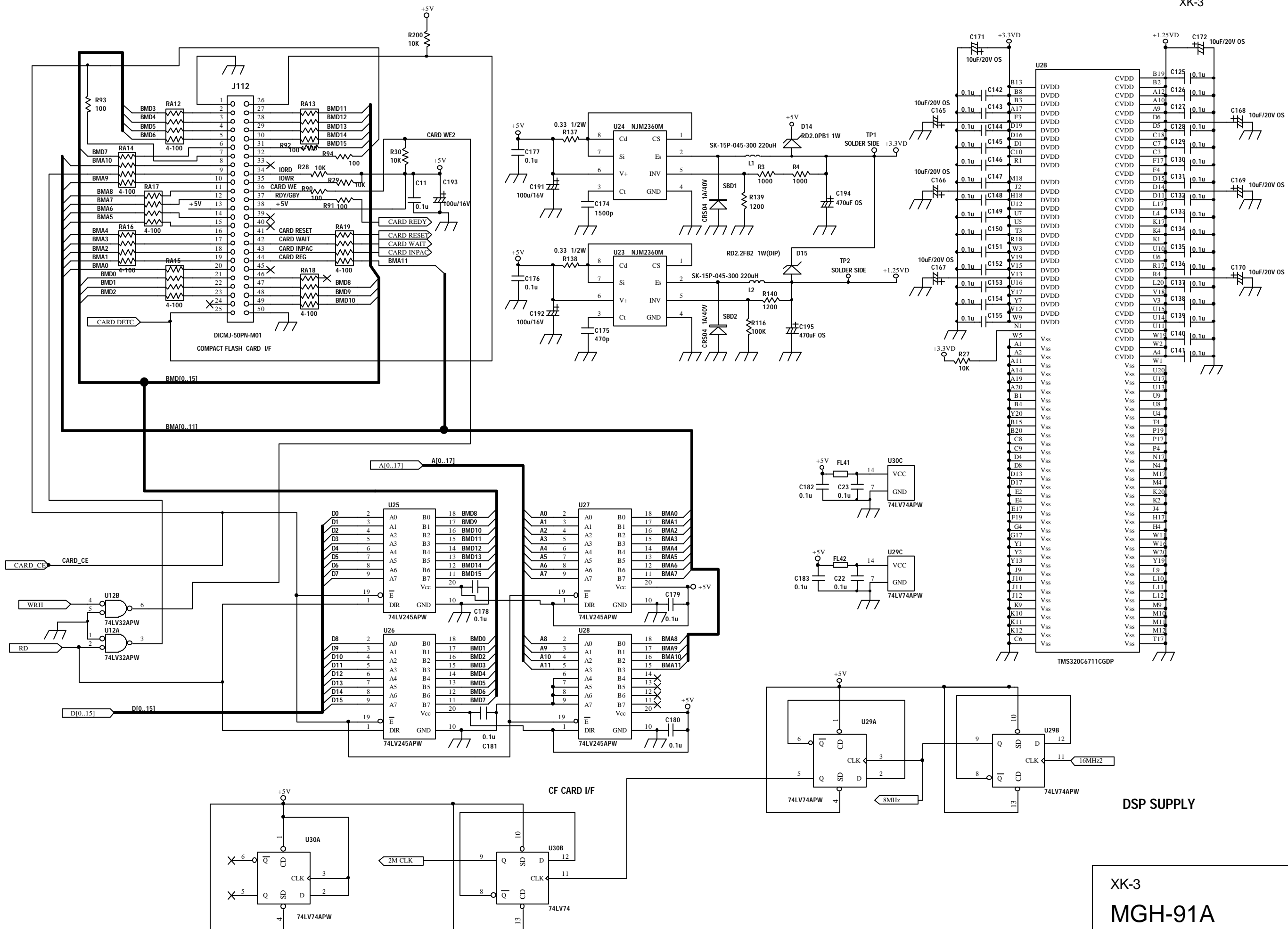


LCD I/F			
PIN	FUNCTION	PIN	FUNCTION
16	VSS	15	VDD
14	VO	13	RS
12	R/W	11	E
10	DB0	9	DB1
8	DB2	7	DB3
6	DB4	5	DB5
4	DB6	3	DB7
2	VLED	1	VLSS



KeyScan & I/O SIO

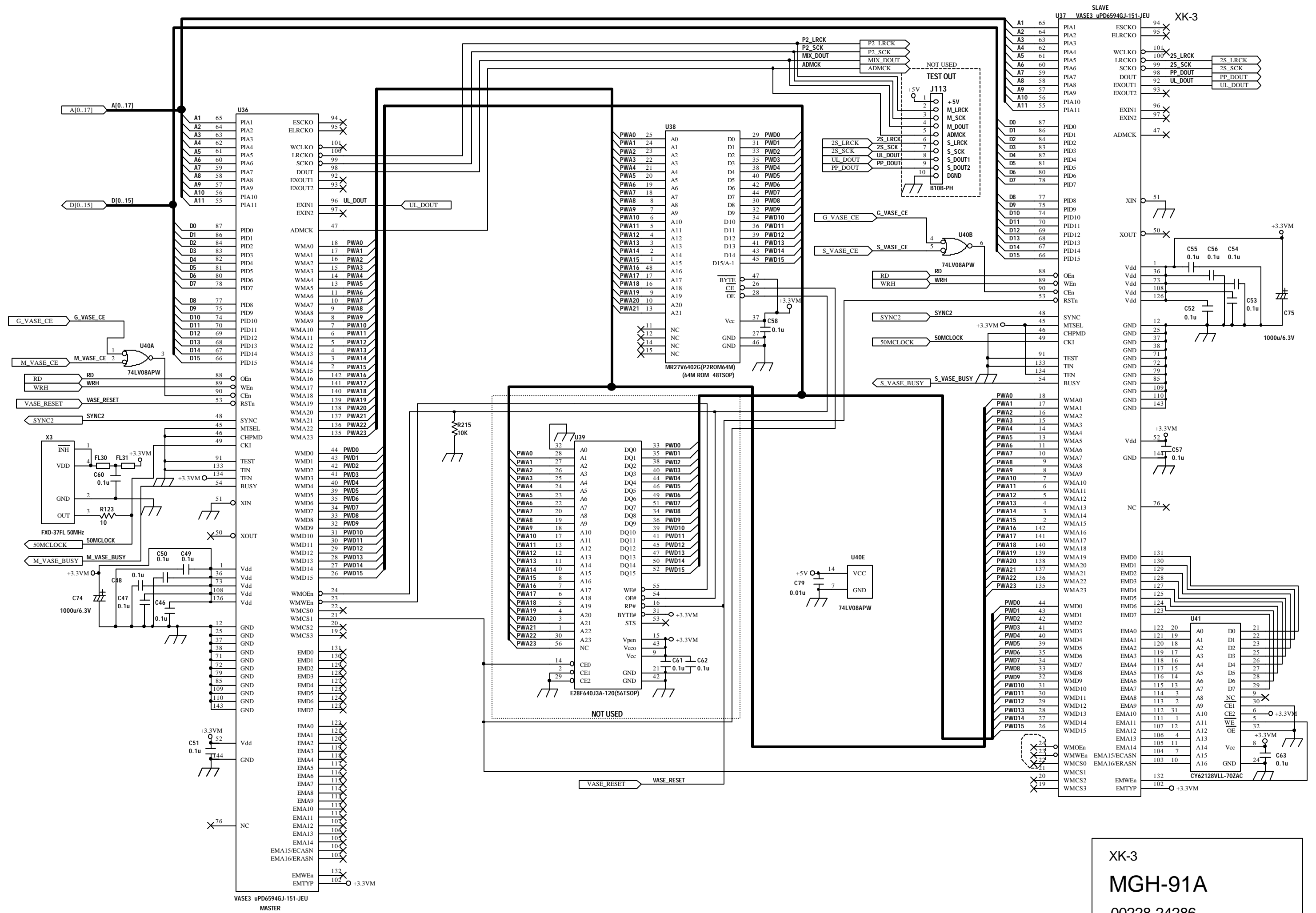
XK-3  
**MGH-91A**  
 00228-24286



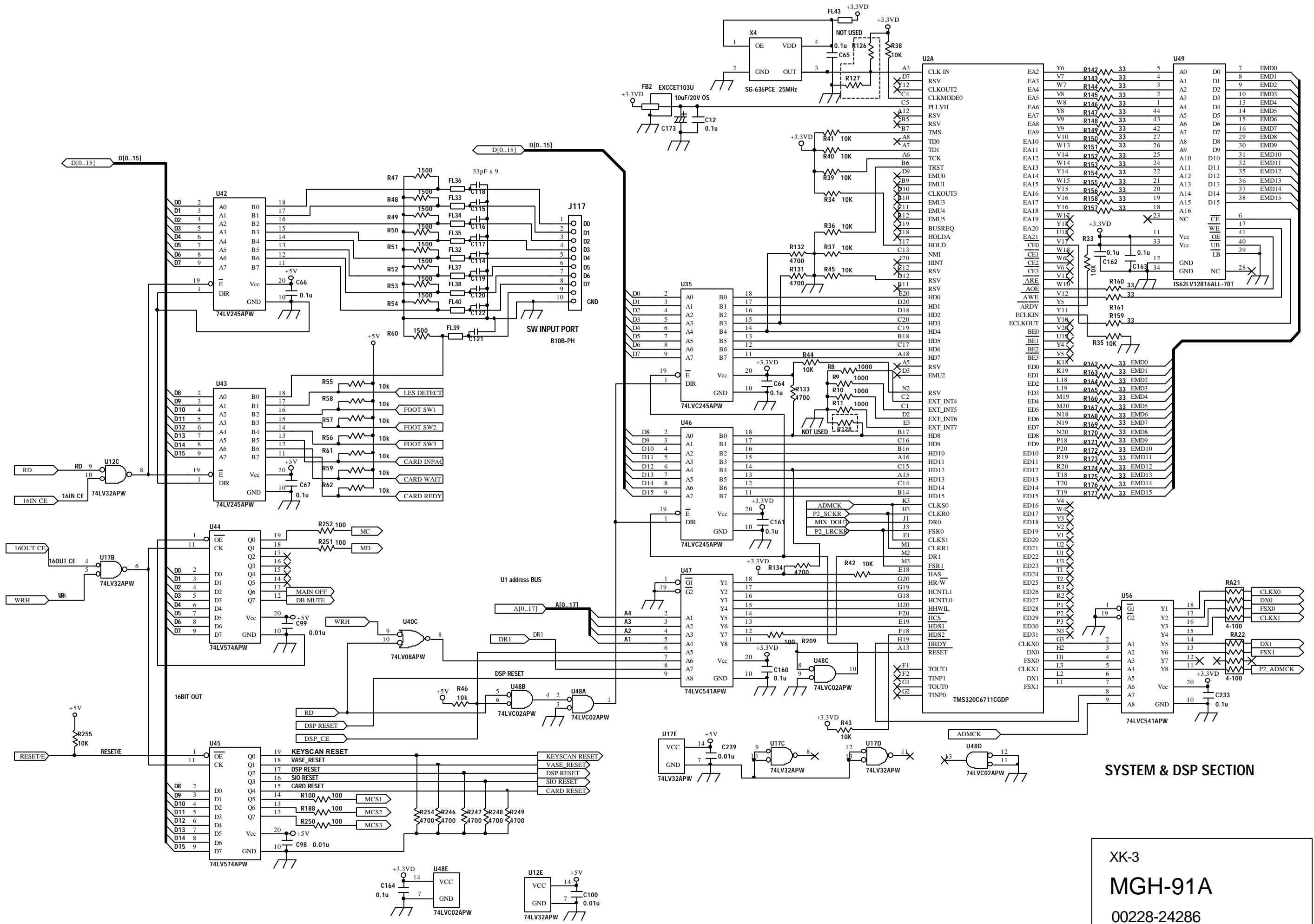
XK-3  
**MGH-91A**  
 00228-24286





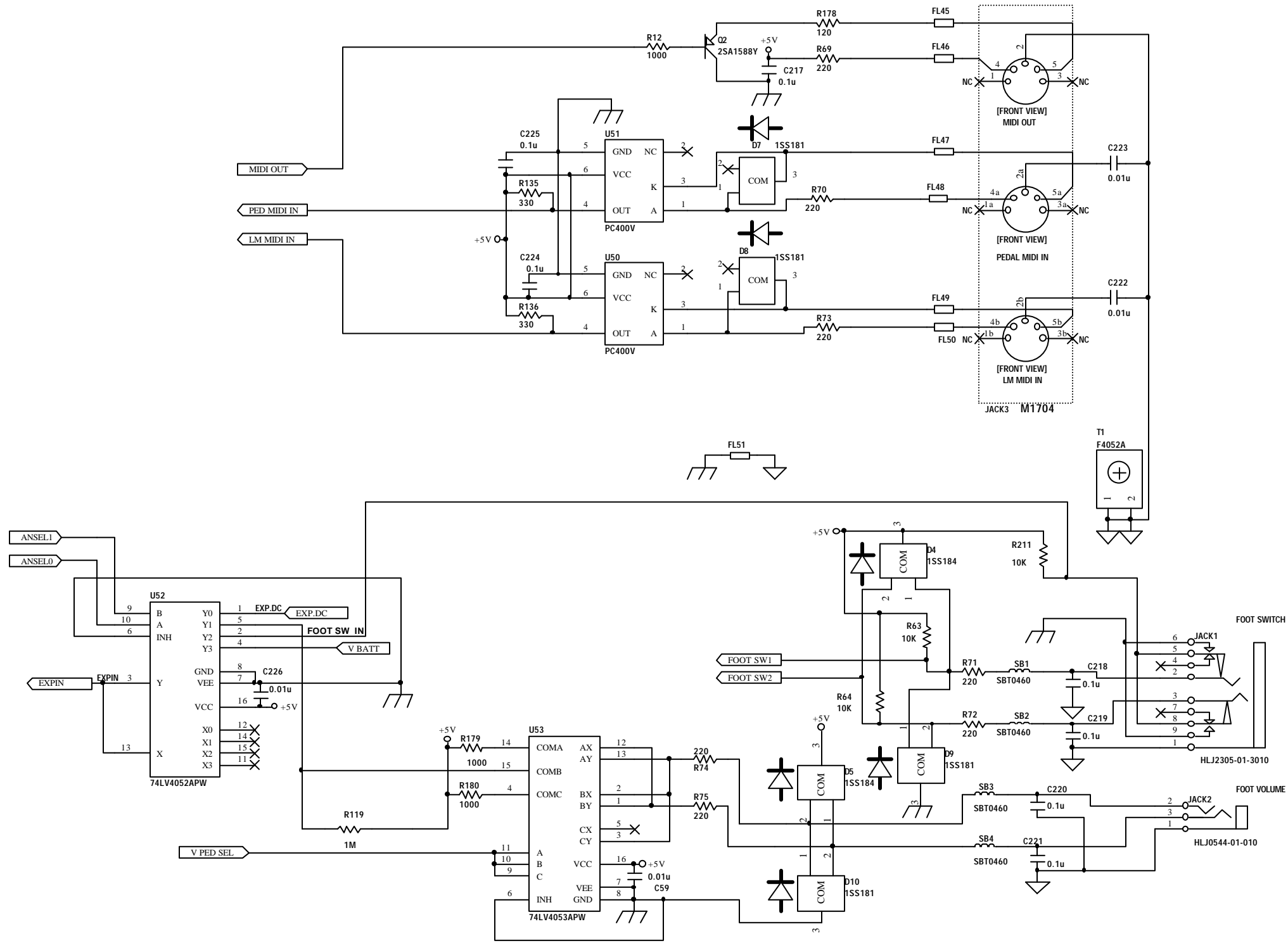


KX-3  
**MGH-91A**  
 00228-24286



SYSTEM & DSP SECTION

XK-3  
 MGH-91A  
 00228-24286

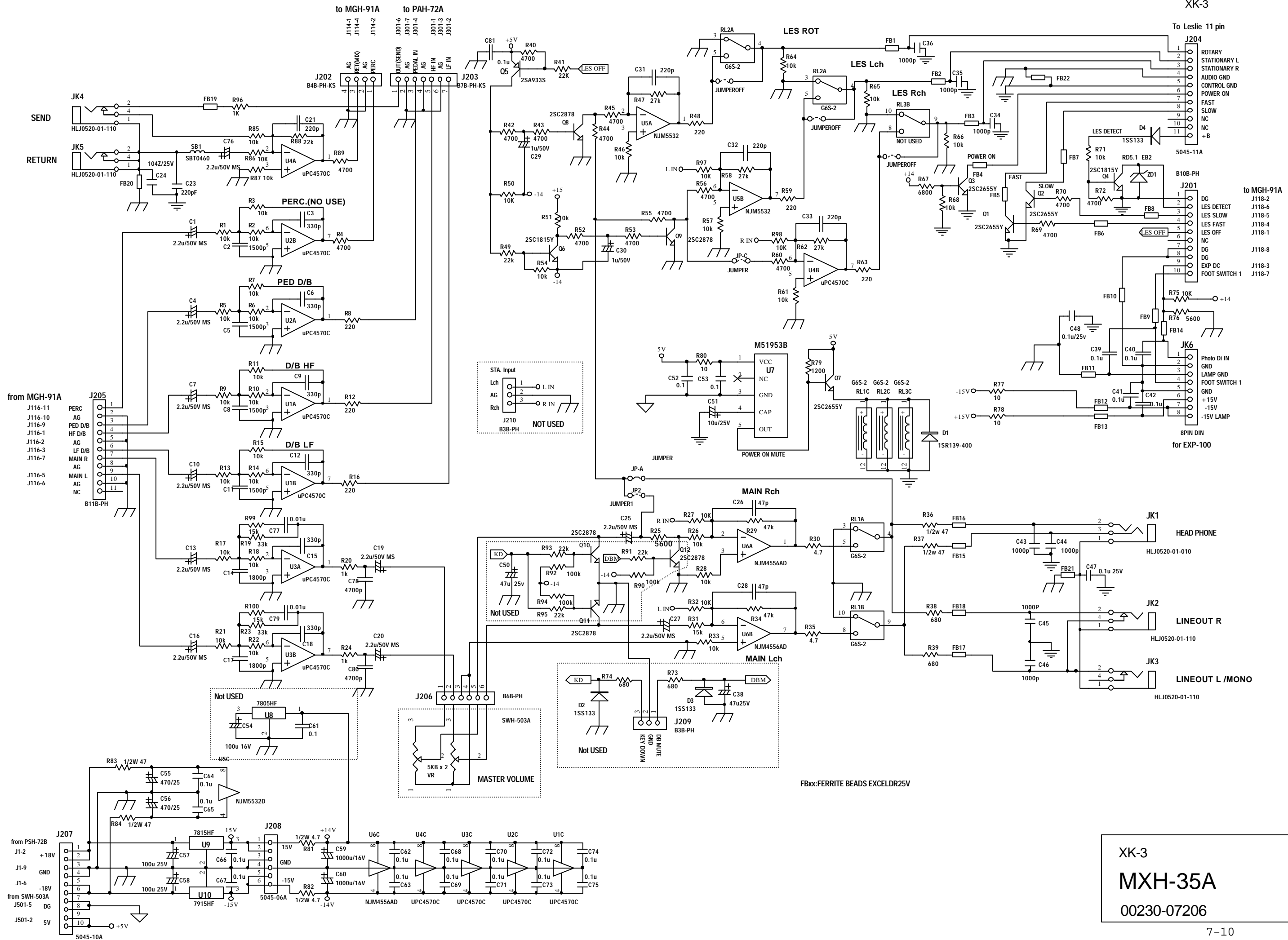


MIDI OUT JACK

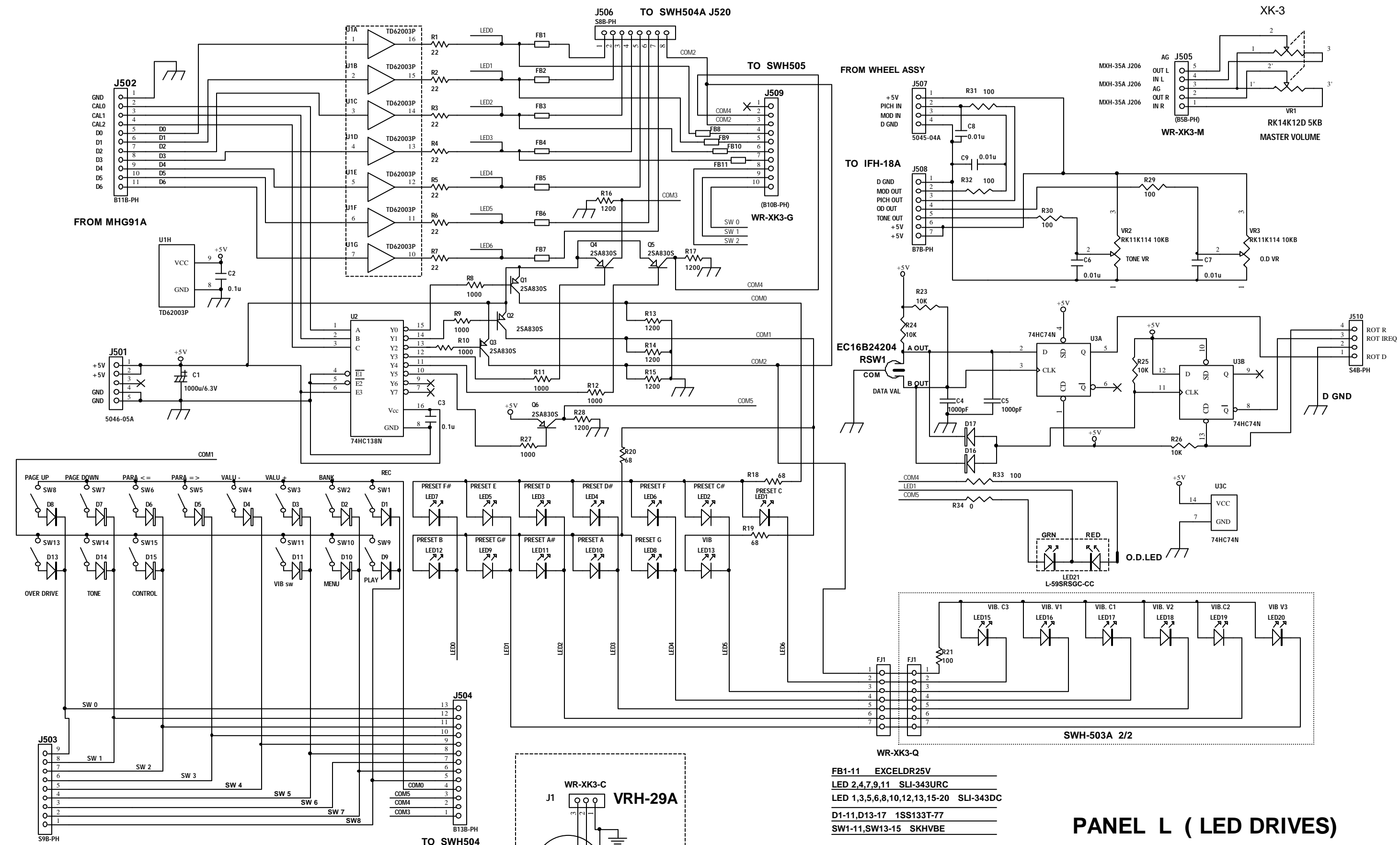
XK-3  
**MGH-91A**  
 00228-24286







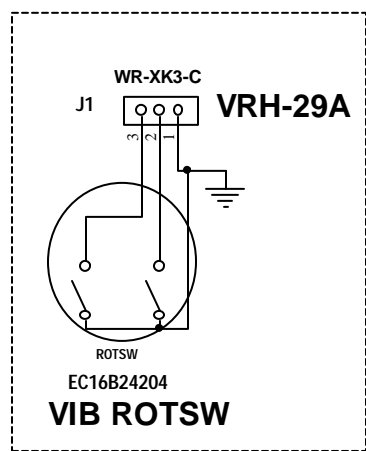
XK-3  
 MXH-35A  
 00230-07206



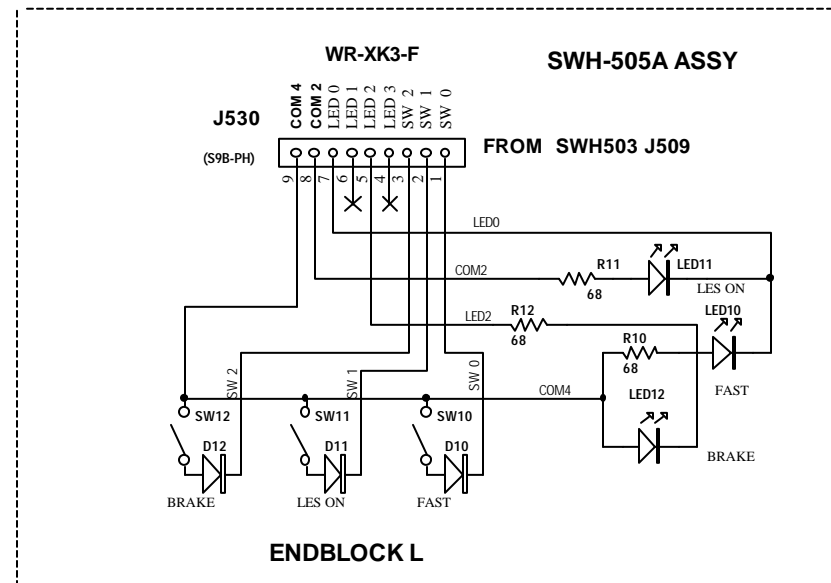
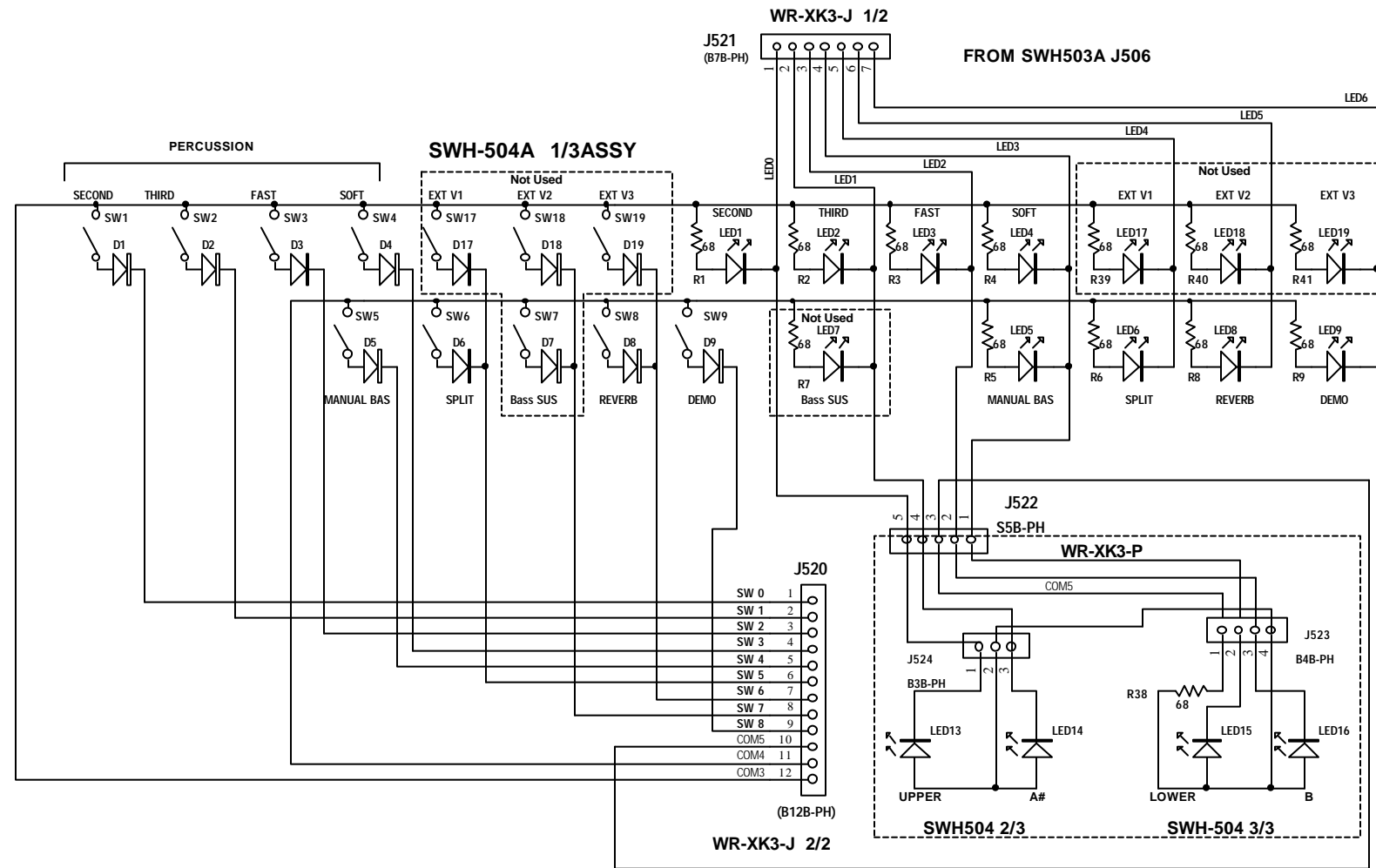
- FB1-11 EXCELDLR25V
- LED 2,4,7,9,11 SLI-343URC
- LED 1,3,5,6,8,10,12,13,15-20 SLI-343DC
- D1-11,D13-17 1SS133T-77
- SW1-11,SW13-15 SKHVBE

**PANEL L ( LED DRIVES )**

XK-3  
**SWH-503A/VRH-29A**  
 00225-41286/42201



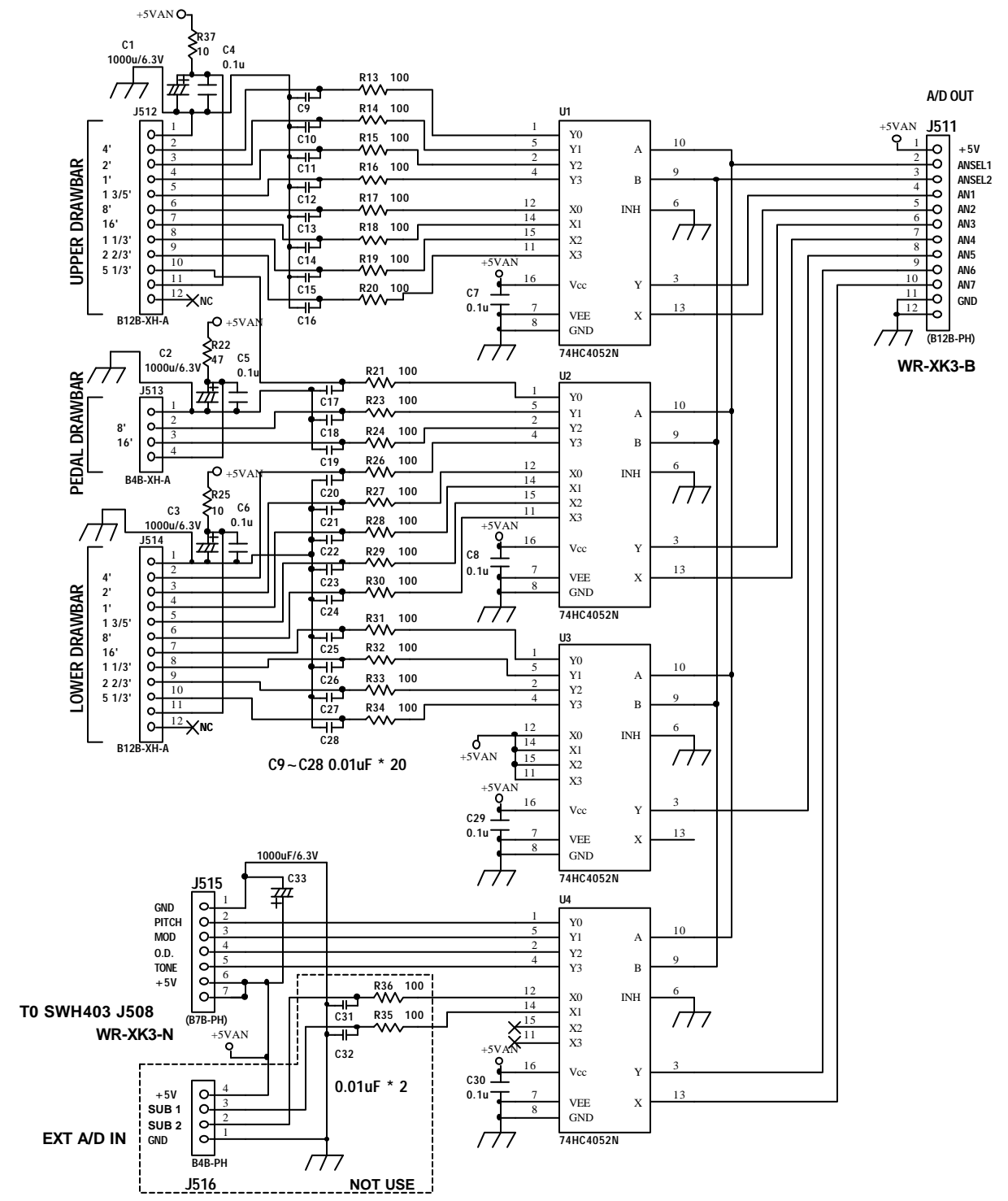




- LED 14,16 SLI-343URC
- LED 1-6,8-13,16 SLI-343DC
- D1-6,8-16 1SS133T-77
- SW1-6,SW8-12 SKHVBE

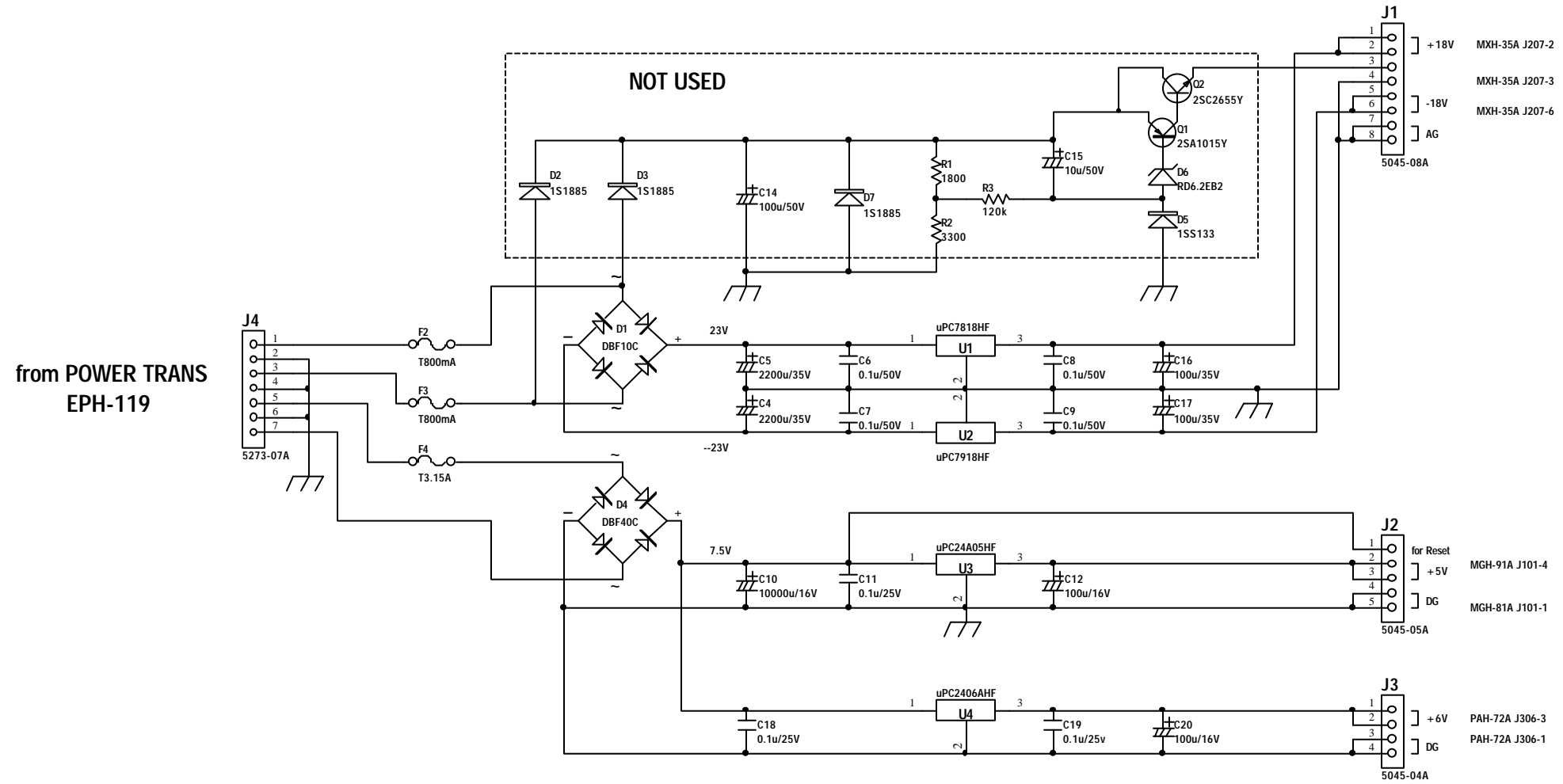
PANEL L ( A/D SEL & LED DRIVES)

XK-3  
**SWH-504A/505A**  
 00225-41291/296

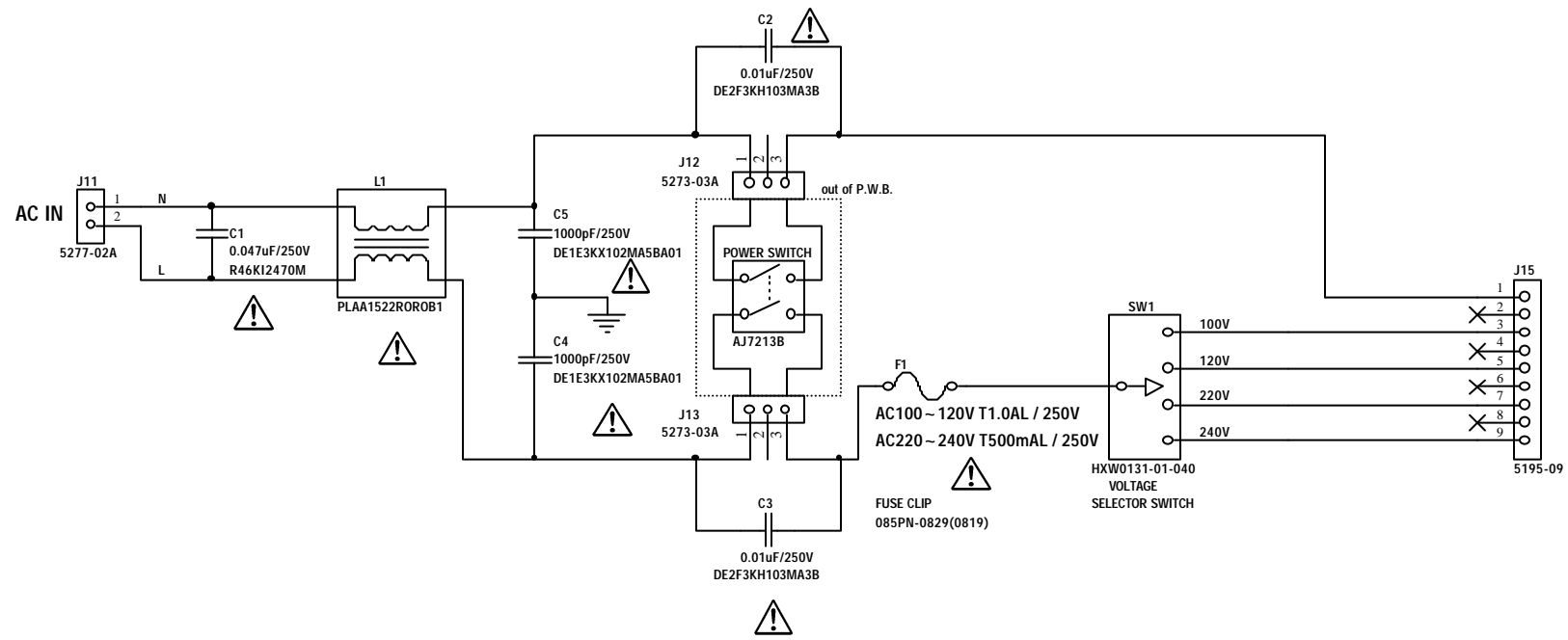


PANEL L ( A/D SEL & LED DRIVES)

XK-3  
 IFH-18A  
 00232-14271

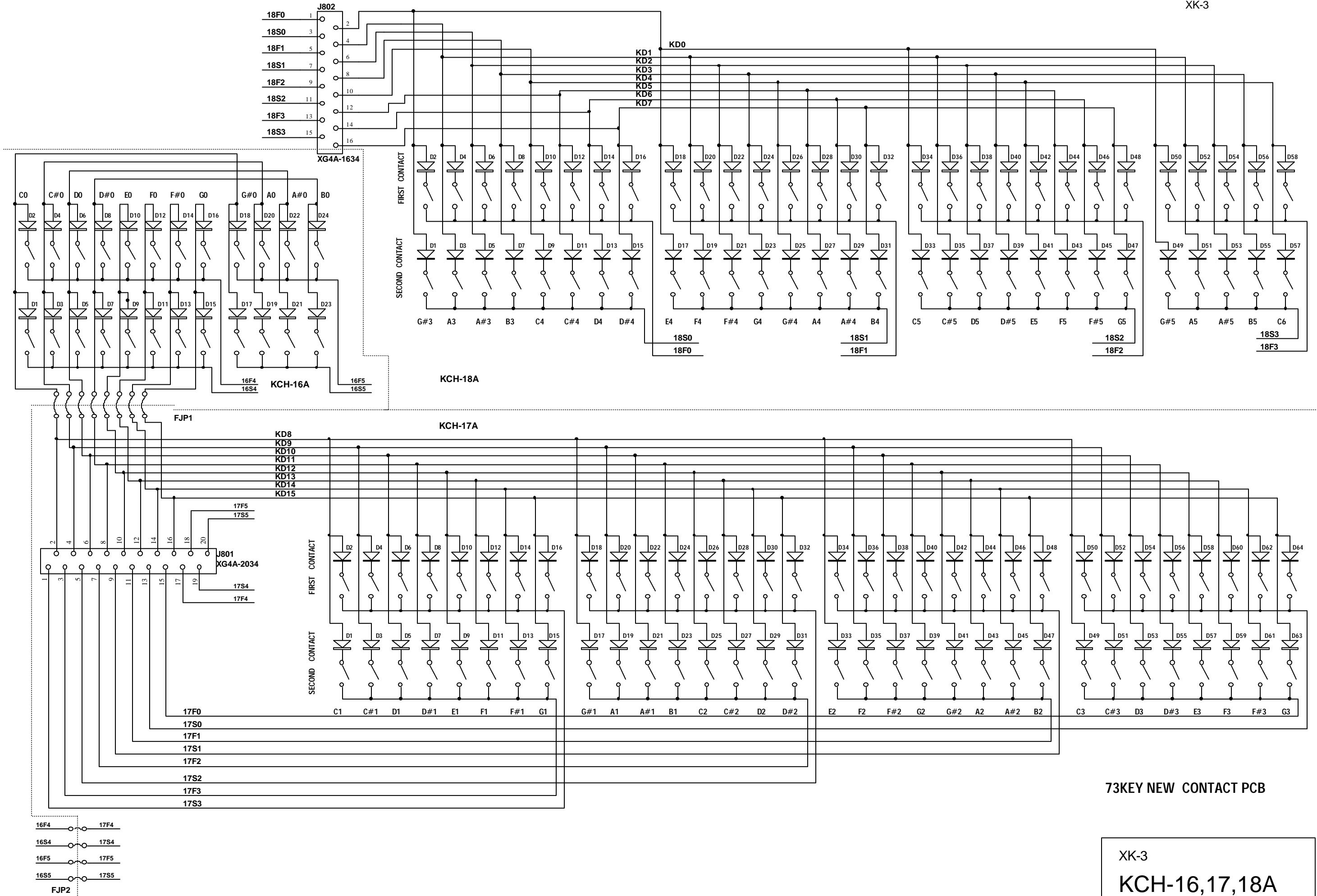


XK-3  
**PSH-72B**  
 00224-18207



TO POWER TRANS EPH-119

XK-3  
PSH-83D  
00224-18264

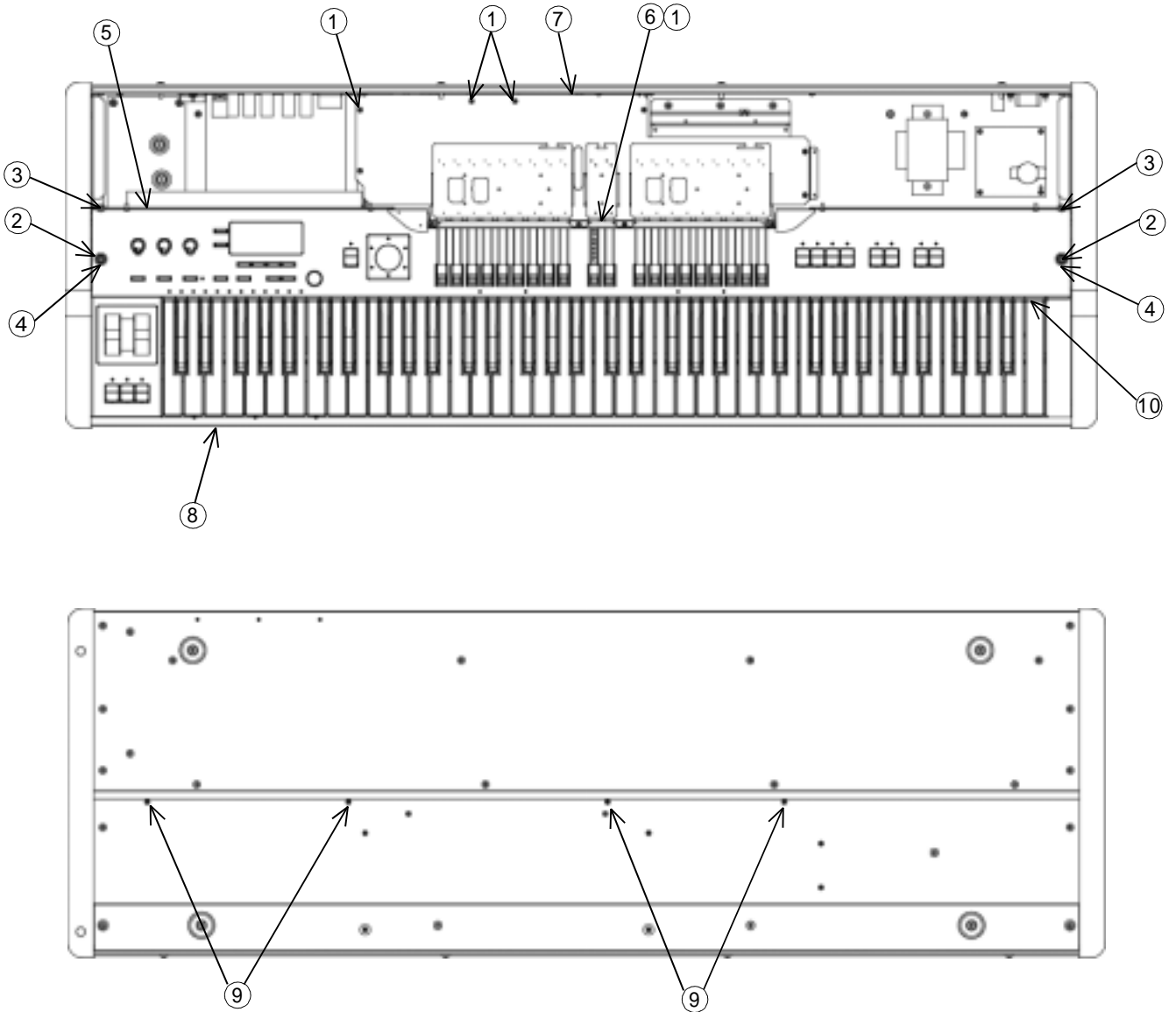


73KEY NEW CONTACT PCB

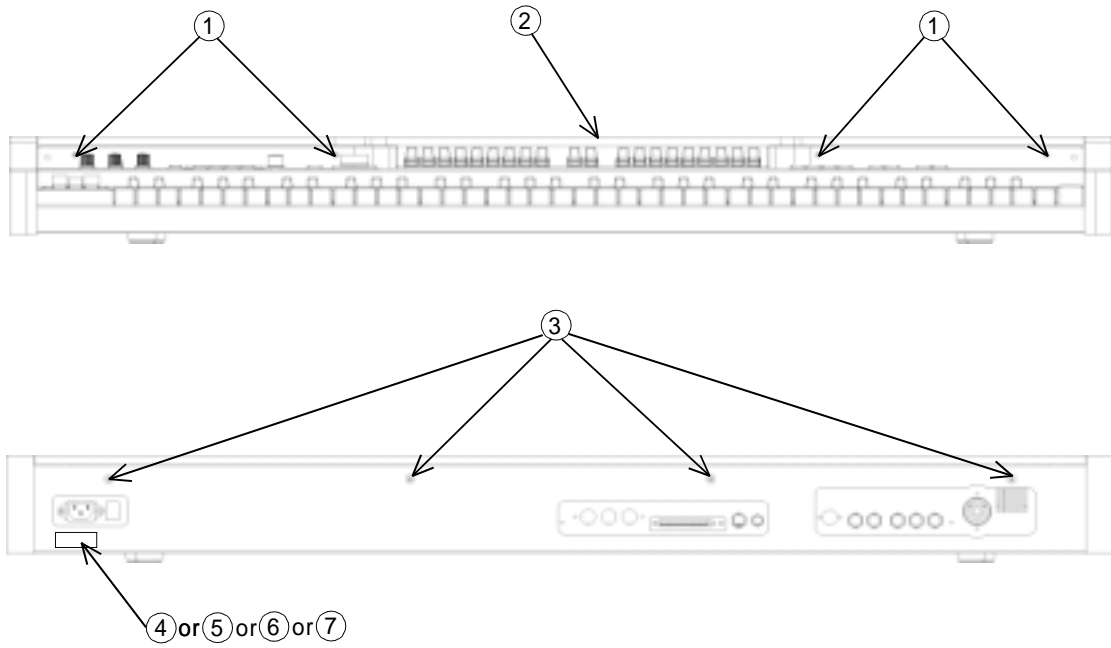
XK-3  
**KCH-16,17,18A**  
 00229-22226,31,36

# 8.PARTS LIST

## 1.TOTAL ASS'Y(66681-01101)

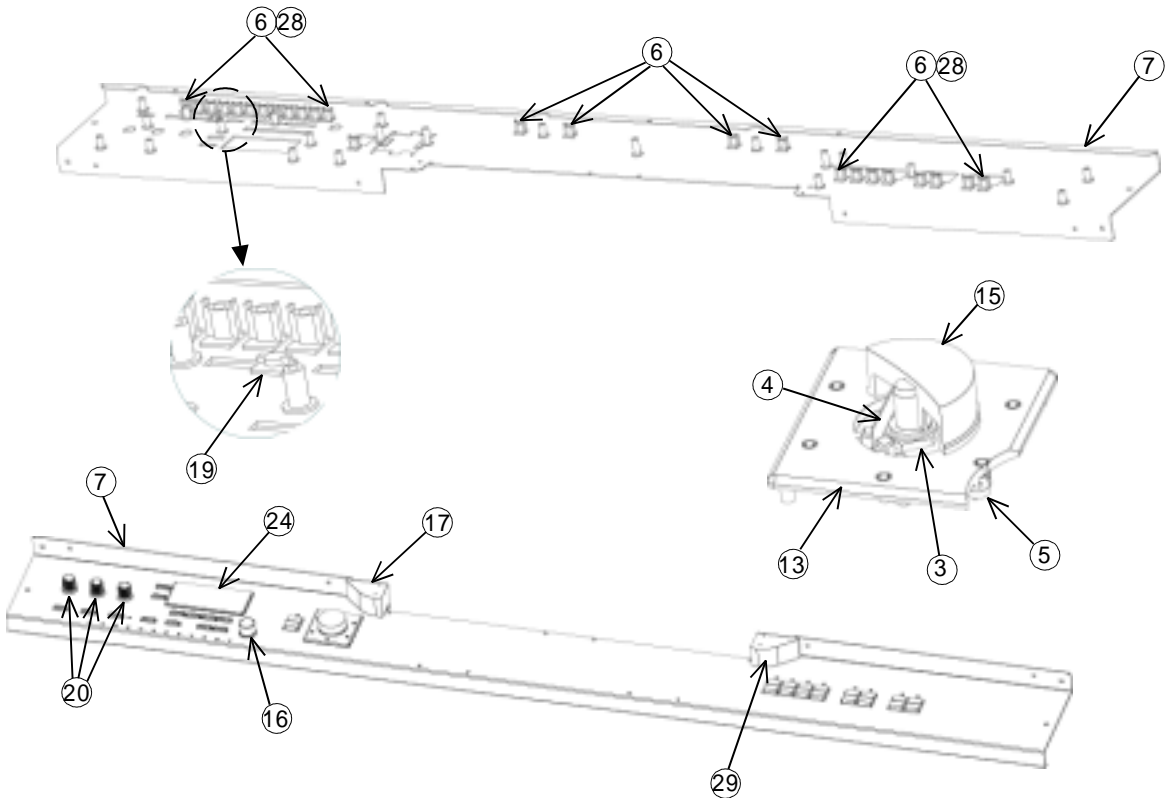


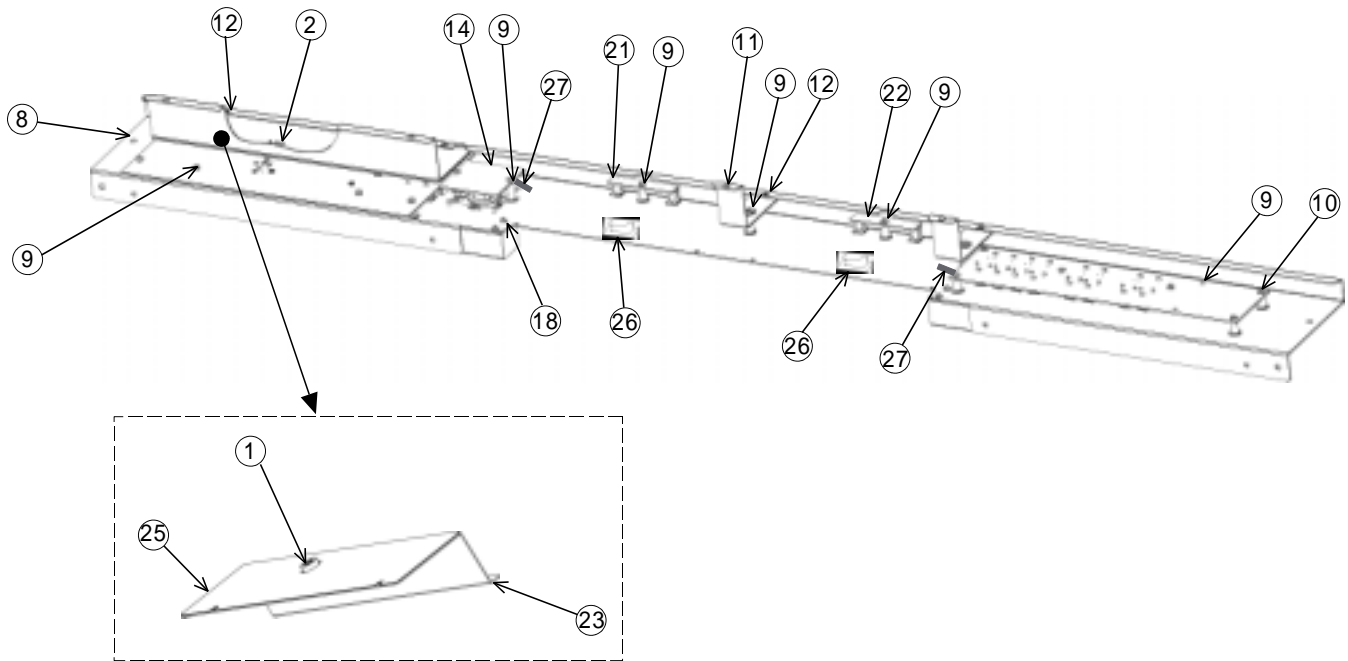
① Tapping Screw TYPE2(3x6,Bind,ZnB)	00623-53006
② Machine Screw(M4x10,Oval Head,ZnB)	00703-24010
③ Machine Screw(M4x5,Bind,ZnB)	00703-54005
④ Rosette Washer (Ø5,ZnB)	00750-04002
⑤ Top Panel K3 Ass'y	66681-02101
⑥ Drawbar Cover K3	00451-40475
⑦ Drawbar Panel K3 Ass'y	66681-03301
⑧ Bottom Panel K3 Ass'y	66681-03101
⑨ Machine Screw(M3x6,Bind,ZnB)	00703-53006
⑩ Key Felt(10x1015)	00402-03218



- |                                |             |
|--------------------------------|-------------|
| ① Machine Screw(M3x6,Bind,ZnB) | 00703-53006 |
| ② Top Board K3 Ass'y           | 66681-04101 |
| ③ Screw(4x16,Truss,ZnB)        | 00703-64016 |
| ④ Product Label 100V           | 00412-02079 |
| ⑤ Product Label 120V UL        | 00412-02080 |
| ⑥ Product Label 220 ~ 230V CE  | 00412-02081 |
| ⑦ Product Label 230 ~ 240V     | 00412-02082 |

**2.TOP PANEL ASS'Y(66681-02101)**

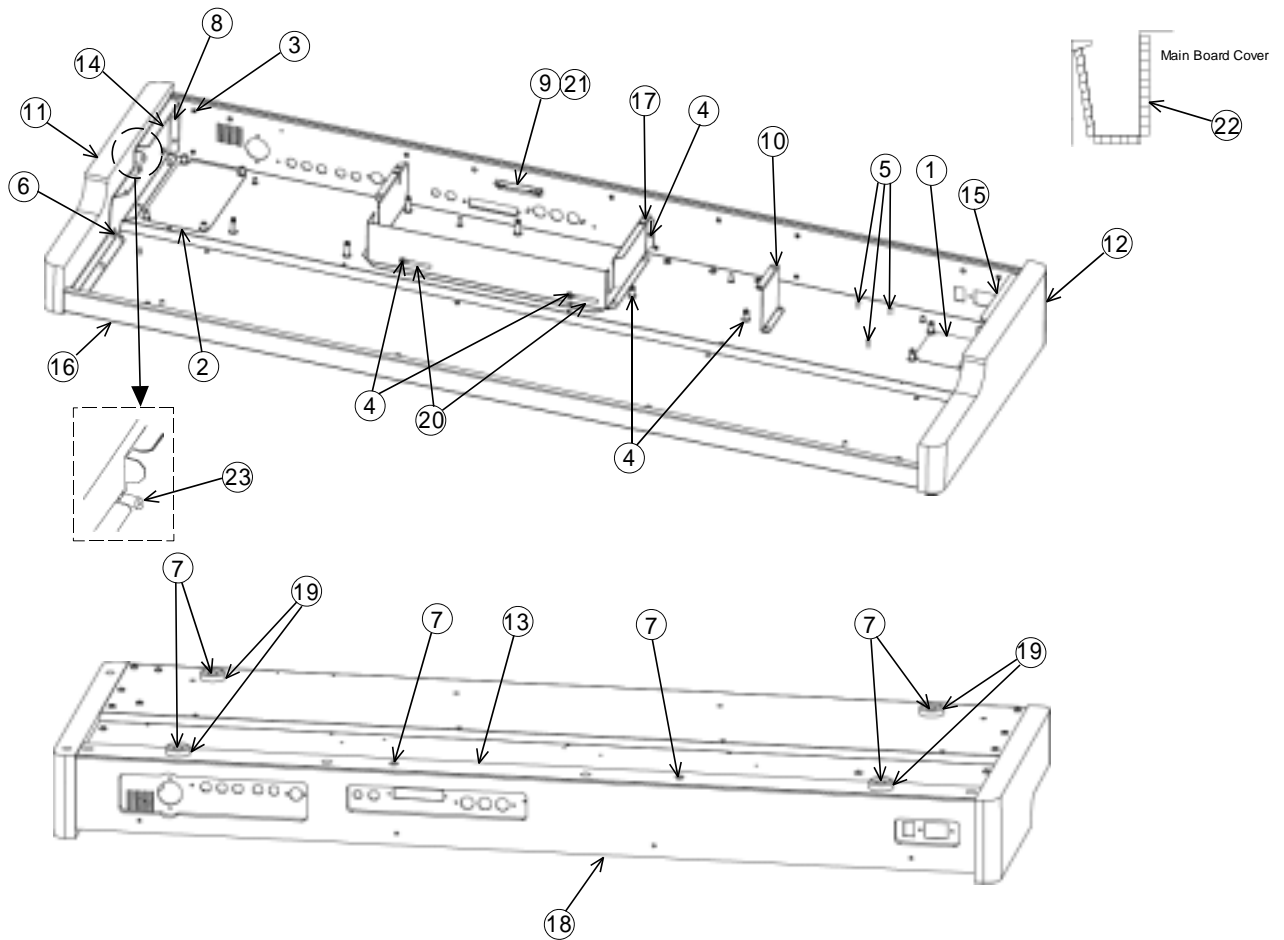




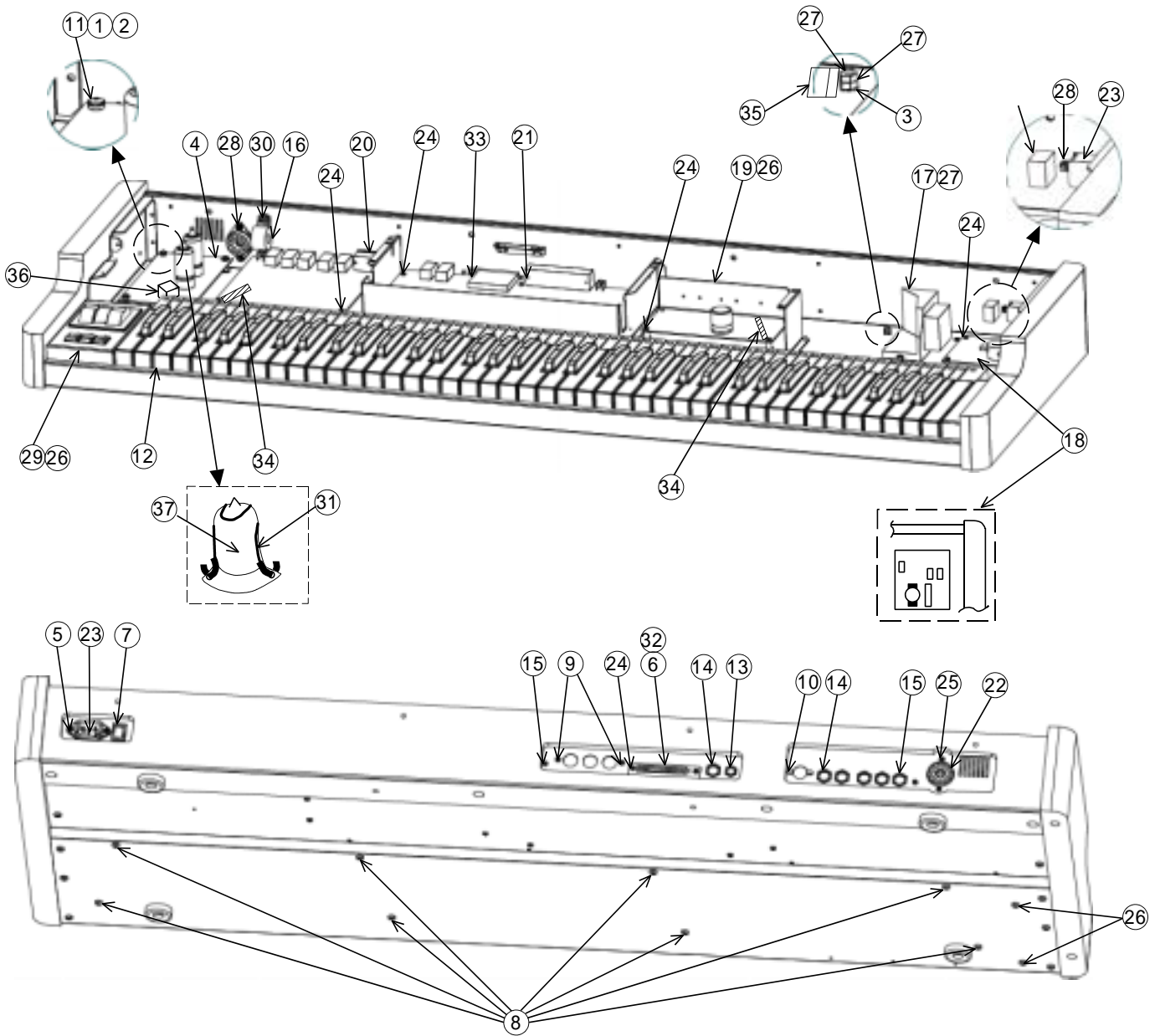
① PWB Spacer	00452-40080
② Tapping Screw TYPE2(3x8,Bind,ZnB)	00623-53008
③ Hexagon Volume Nut(M9)	(Accessory)
④ Spring Plate for Rotary Knob	00451-40206
⑤ Lens(Single)	00122-04108
⑥ Lens K3	00452-40176
⑦ Top Panel K3(Silk)	00451-40465
⑧ SW PWB K3-L Ass'y	66681-02301
⑨ Tapping Screw TYPE2(3x6,Bind,ZnB)	00623-53006
⑩ SW PWB K3-R Ass'y	66681-02401
⑪ Top Panel BKT K3-1	00451-40471
⑫ Tapping Screw TYPE2(3x4,Flat Head,ZnB)	00624-33004
⑬ Rotary Knob Stand(Silk)	00452-40119
⑭ VRH-26A PWB Ass'y	00225-42201
⑮ Rotary Knob(Silk)	00452-40118
⑯ Volume Knob	00402-31071
⑰ Drawbar Wood Cover K3-L	00450-40672
⑱ Tapping Screw TYPE1(3x8,Bind,ZnB)	00613-53008
⑲ Lens K3S	00452-40192
⑳ Knob CHK	00452-30123
㉑ SWH504A(2/3) PWB Ass'y	00225-41291
㉒ SWH504A(3/3) PWB Ass'y	00225-41291
㉓ Top Panel BKT K3-2	00451-40494
㉔ LCD Cover K3	00452-40177
㉕ Friction Sheet K3-1	00453-40256
㉖ DKN-07G	00340-06004
㉗ Coating Clip CS-2	00401-03203
㉘ Lens K3 Cover	00453-40259
㉙ Drawbar Cover K3-R	00450-40694



**3. BOTTOM PANEL ASS'Y(66681-03101)**

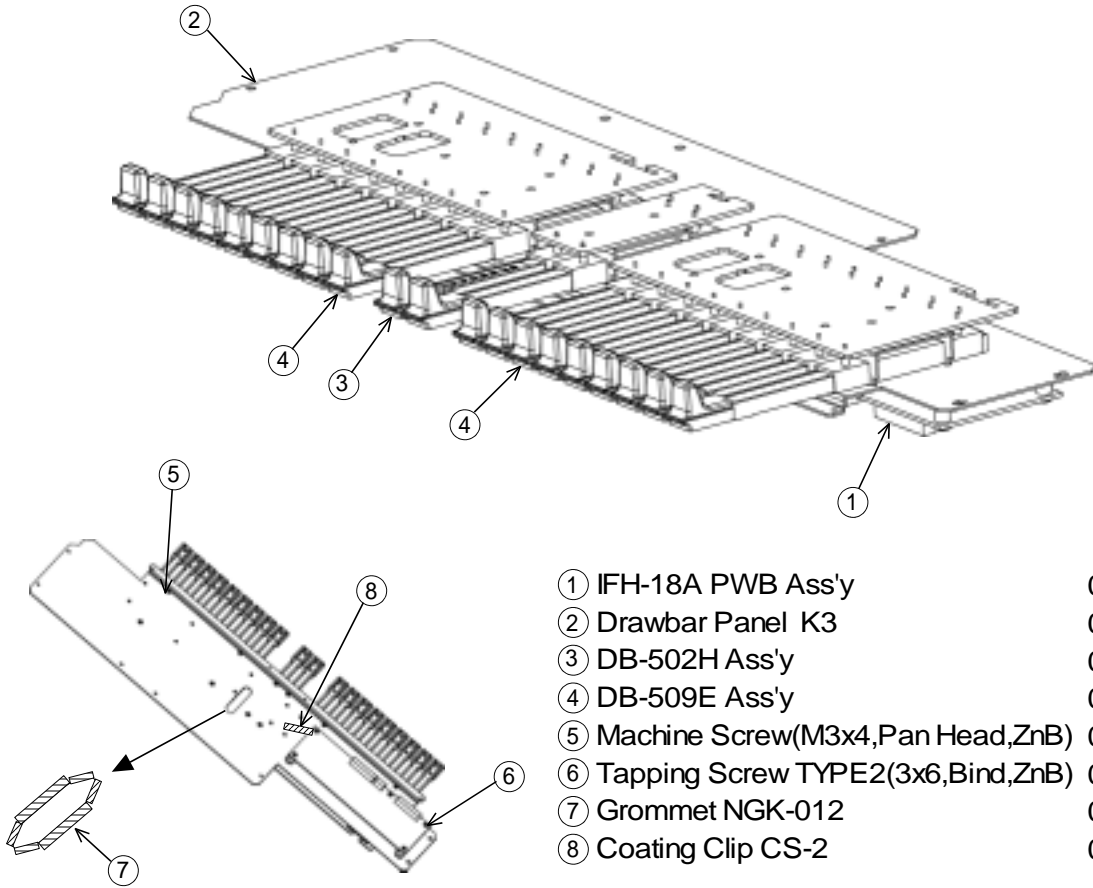


① Friction Sheet PSH	00402-16019
② Friction Sfeet PAH72	00453-40232
③ Tapping Screw TYPE1(3x8,Bind,ZnB)	00613-53008
④ Tapping Screw TYPE2(3x6,Bind,ZnB)	00623-53006
⑤ S Tite(4x10,Truss,ZnB)	00673-64010
⑥ Tapping Screw TYPE1(4x16,Truss,ZnB)	00613-64016
⑦ Tapping Screw TYPE2(4x20,Truss,ZnB)	00623-64020
⑧ Tapping Screw TYPE2(4x8,Bind,ZnB)	00623-54008
⑨ Metal Fittings L(60x10)	00451-40474
⑩ Type Z BKT-1	00451-40476
⑪ Side Panel K3-L	00450-40665
⑫ Side Panel K3-R	00450-40666
⑬ Support Wood K3	00450-40669
⑭ Side BKT K3-L	00451-40469
⑮ Side BKT K3-R	00451-40470
⑯ Bottom Panel K3(Silk)	00451-40466
⑰ Main Board Cover K3	00451-40472
⑱ Rear Board K3	00450-40668
⑲ Rubber Foot with K-12W	00402-05084
⑳ Coating Clip CS-2	00401-03023
㉑ Mschine Screw(M3x6,Bind,ZnB)	00703-53006
㉒ Grommet NGK-012	00340-09010
㉓ Space Holder	00402-01029



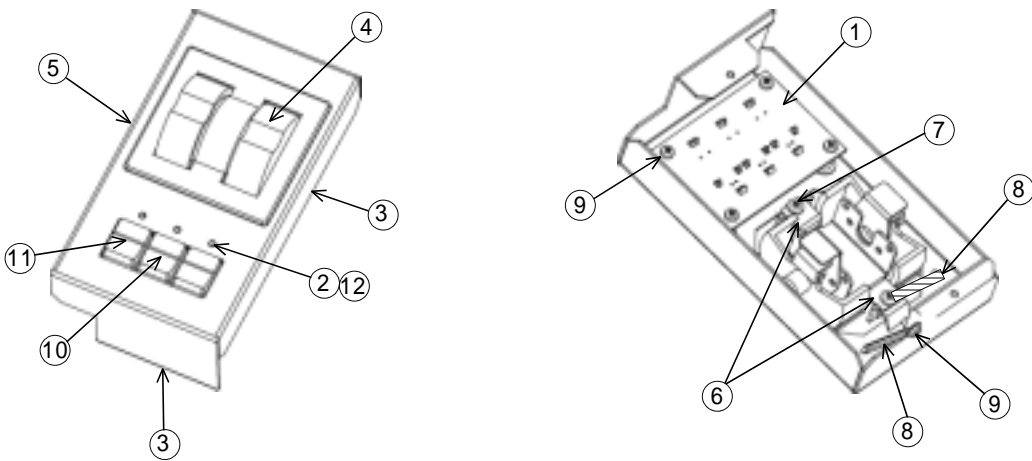
① Bush Spacer(3x5,ZnY)	00453-40235	⑩ Nylon Rivet P3045BLK	00760-03003	⑲ PSH-72B PWB Ass'y	00224-18207
② Grommet G105	00453-40223	⑪ Machine Screw(M3x6,Bind,ZnB)	00703-53006	⑳ MXH-35A PWB Ass'y	00230-07206
③ Toothed Lock Washer(Ø4,ZnY)	00755-44000	⑫ BH-73L Key Board Ass'y	00289-01002	㉑ MGH-91A PWB Ass'y	00228-24286
④ PAH-72A PWB Ass'y	00219-54211	⑬ Jack Nut(M9) HLJ0990-01-240	00340-12004	㉒ Wiring WR-XK3-S	00443-01324
⑤ Machine Screw(M3x12,Oval Head,ZnB)	00703-23012	⑭ Jack Nut(M12) HLJ0990-01-250	00340-12009	㉓ Wiring WR-XK3-Y	00443-01329
⑥ Card Bezel	00452-40094	⑮ Machine Screw(M3x5,ZnY)	00362-01015	㉔ Tapping Screw TYPE2(3x6,Bind,ZnB)	00623-53006
⑦ Wiring WR-XK3-X	00443-01328	⑯ PSH-72B PWB Ass'y	00625-73010	㉕ Machine Screw(M3x10,Bind,ZnB)	00703-53010
⑧ Machine Screw(M4x5,Bind,ZnB)	00703-54005	⑰ EPH-119 PWB Ass'y	00307-01319	㉖ Tapping Screw TYPE2(4x8,Bind,ZnB)	00623-54008
⑨ Tapping Screw P Tite(3x8,Bind,ZnB)	00683-53008	⑱ PSH-83D PWB Ass'y	00224-18224	㉗ Hexagon Nut	00725-14000
⑩ Nylon Rivet P3045BLK	00760-03003			㉘ Hexagon Nut With Flange(ZnY)	00725-83000
⑪ Machine Screw(M3x12,Oval Head,ZnB)	00703-23012			㉙ Endblock K3-L Ass'y	66681-03401
⑫ BH-73L Key Board Ass'y	00289-01002			㉚ Tapping Screw TYPE2(3.5x6,Bind,ZnB)	00623-53306
⑬ Jack Nut(M9) HLJ0990-01-240	00340-12004			㉛ Tube Retainer Spring	66681-05101
⑭ Jack Nut(M12) HLJ0990-01-250	00340-12009			㉜ Card Cover	00452-40095
⑮ Machine Screw(M3x6,Bind,ZnB)	00703-53006			㉝ DICMJ-EJECT-50ER	00317-07011
⑯ PSH-72B PWB Ass'y	00307-01319			㉞ Coating Clip CS-2	00401-03023
⑰ EPH-119 PWB Ass'y	00224-18224			㉟ Ground Label	00402-09242
⑱ PSH-83D PWB Ass'y				㊱ Friction Sheet(30x35)	00453-40263
				㊲ Vacuum Tube 12X7	00308-06001

**4. DRAWBAR PANEL K3 ASS'Y(67273-02115)**



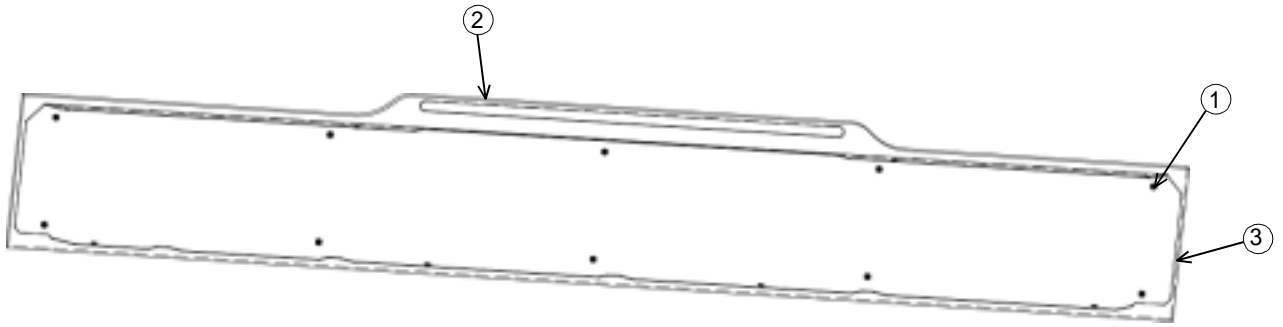
① IFH-18A PWB Ass'y	00232-14271
② Drawbar Panel K3	00451-40468
③ DB-502H Ass'y	00278-02209
④ DB-509E Ass'y	00278-09243
⑤ Machine Screw(M3x4,Pan Head,ZnB)	00703-43004
⑥ Tapping Screw TYPE2(3x6,Bind,ZnB)	00623-53006
⑦ Grommet NGK-012	00340-09010
⑧ Coating Clip CS-2	00401-03023

**5. ENDBLOCK K3-L ASS'Y(66681-03401)**



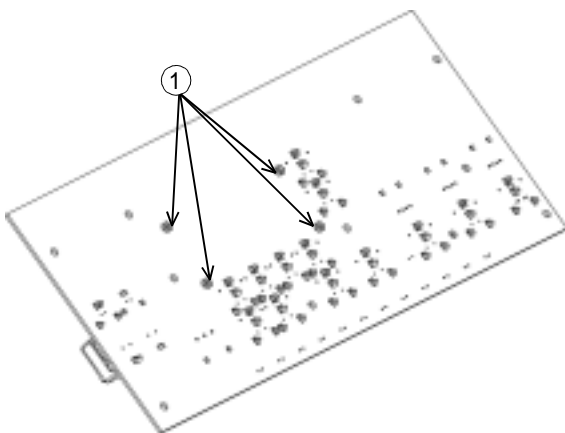
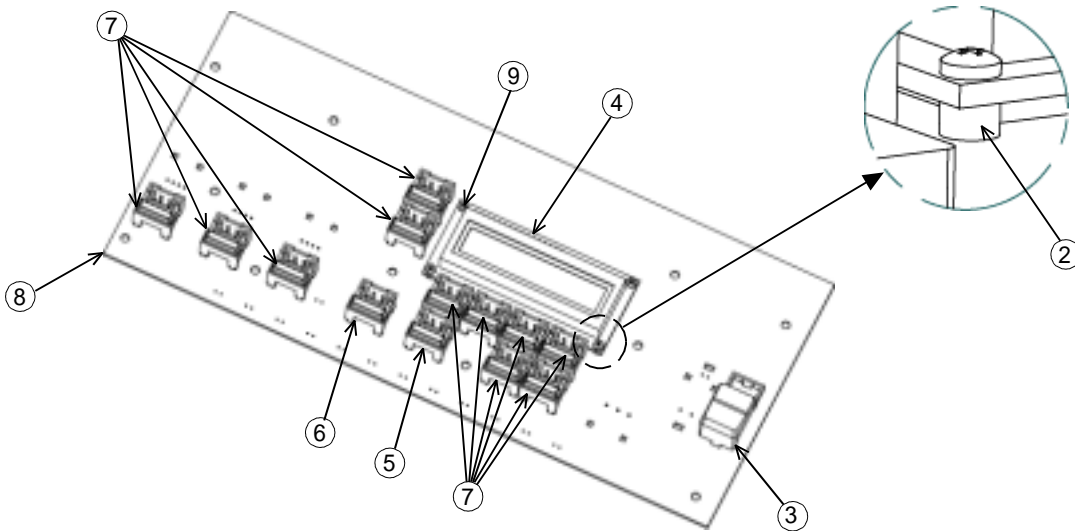
① SWH-505A PWB Ass'y	00225-41296	⑦ Tapping Screw TYPE2(3.5x8,Bind,ZnB)	00623-53508
② Lens K3	00452-40176	⑧ Coating Clip CS-2	00401-03023
③ Endblock K3-L	00451-40467	⑨ Tapping Screw TYPE2(3x6,Bind,ZnB)	00623-53006
④ Wheel Ass'y	00105-17243	⑩ Key Top XB(I)	00452-40037
⑤ Wheel Bezel XB-5	00402-31008	⑪ Key Top XB(G)	00452-40038
⑥ Bezel Holder	00402-31015	⑫ Lens K3 Cover	00453-40259

**6.TOP BOARD K3 ASS'Y(66681-04101)**



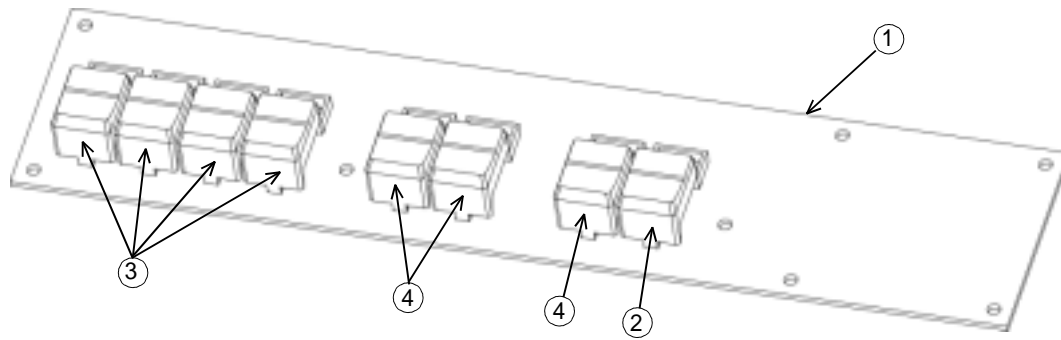
- ① Tapping Screw TYPE1(3x8,Bind,ZnB) 00613-53008
- ② Top Board K3 00450-40667
- ③ Top Board BKT K3 00451-40473

**7.SWITCH PWB K3-L ASS'Y(66681-02301)**



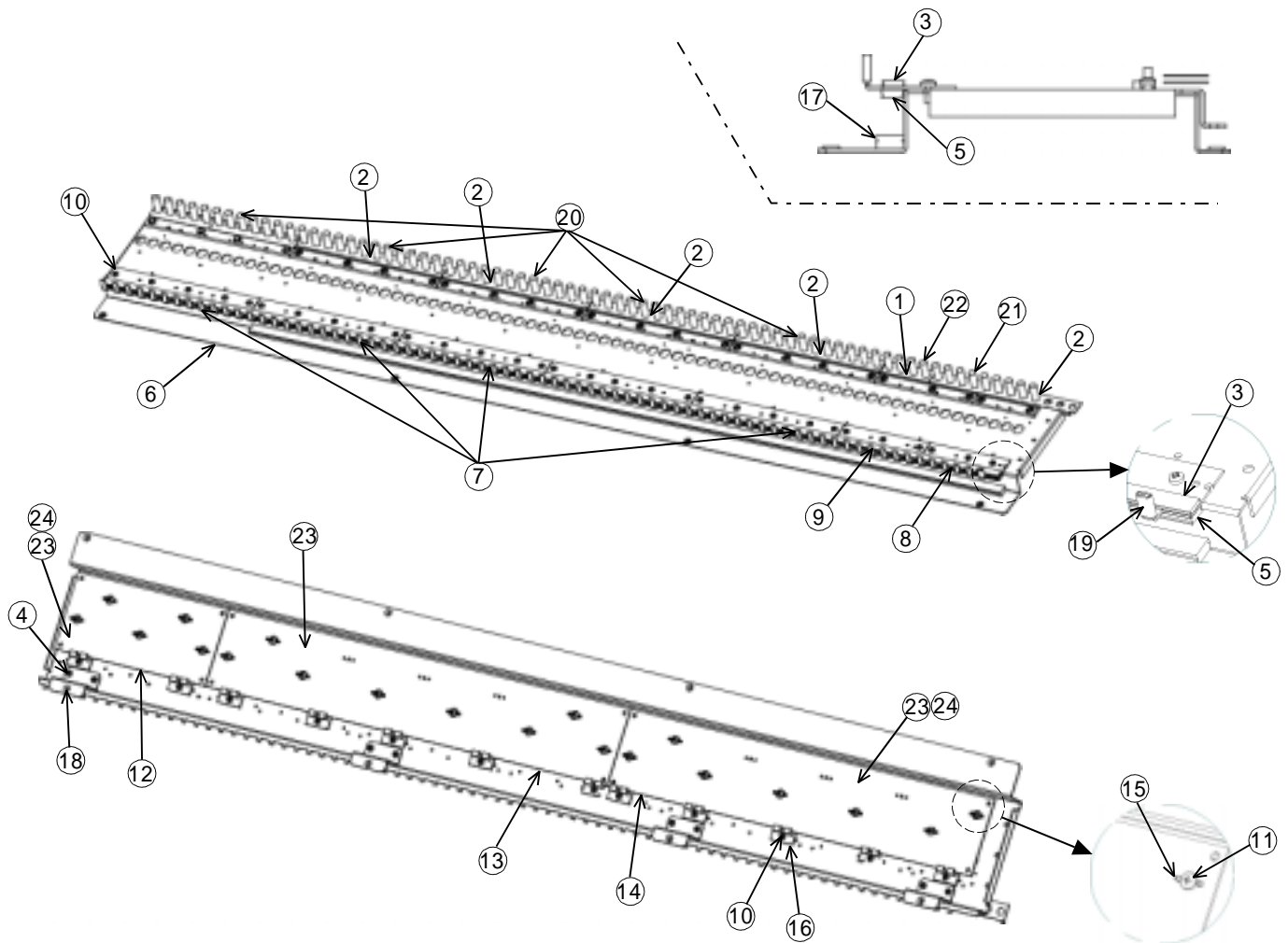
- ① Hexagon Nut TYPE1(M2,ZnW) 00724-12000
- ② Spacer C2002.5-4 00453-40231
- ③ Key Top XB(I) 00452-40037
- ④ LCD Unit Ass'y 66681-02201
- ⑤ Key Top K3-R 00452-40174
- ⑥ Key Top K3-GRY 00452-40175
- ⑦ Key Top K3-BLK 00452-40173
- ⑧ SWH-503A PWB Ass'y 00225-41286
- ⑨ Machine Screw(M2x8,Bind,ZnW) 00704-52008

**8. SWITCH PWB K3-R ASS'Y(66681-02401)**

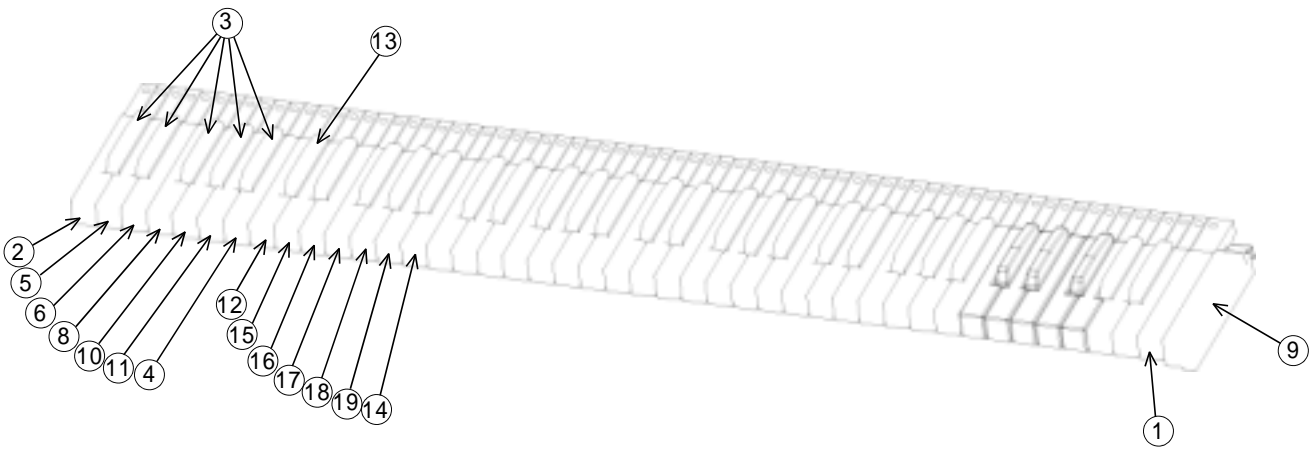
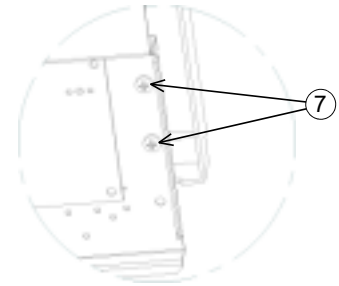
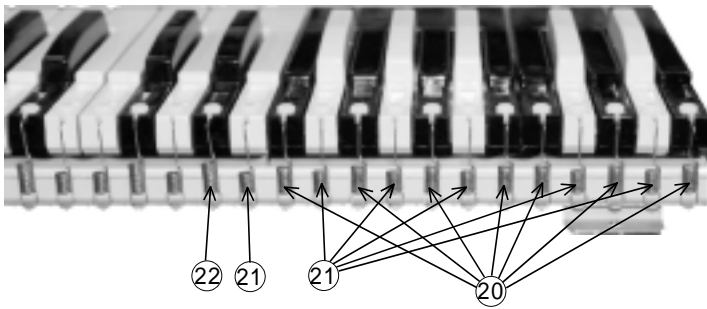


- |                     |             |
|---------------------|-------------|
| ① SWH504A PWB Ass'y | 00225-41291 |
| ② Key Top XB(G)     | 00452-40038 |
| ③ Key Top XB(I)     | 00452-40037 |
| ④ Key Top XB(S)     | 00452-40039 |

**9. BH-73L KEYBOARD ASS'Y(00289-01002)**



① Pilot Rubber (S) 4P	00285-01125	⑬ KCH-17A PWB Ass'y	00229-22231
② Pilot Rubber (L) 12P	00285-01124	⑭ KCH-18A PWB Ass'y	00229-22236
③ Down Stop Felt	00453-40109	⑮ PWB Spacer	00452-40080
④ Tapping Screw TYPE2(3x5,Bind,ZnB)	00623-53005	⑯ PWB Holder E-00-021	00289-01207
⑤ Level Felt	00289-01126	⑰ Down Stop Felt #73-1	00453-40261
⑥ Key Board Chassis 73L	00451-40477	⑱ Key Board Foot 736	00451-40478
⑦ BH Key Guide 12P	00289-01120	⑲ Guide Bush E-00-059	00453-40156
⑧ BH Key Guide 6P	00289-01119	⑳ BH Key Support 12P	00289-01122
⑨ BH Key Guide 7P	00289-01118	㉑ BH Key Support 8P	00289-01122-8
⑩ Tapping Screw TYPE2(3x6,Bind,ZnB)	00623-53006	㉒ BH Key Support 5P	00289-01122-5
⑪ Tapping Screw with Washer(Ø3x10,ZnY)	00625-73010	㉓ Contact Rubber 5P(8pcs)	00280-21009
⑫ KCH-16A PWB Ass'y	00229-22226	㉔ Contact Rubber 7P(3pcs)	00280-21010



① White Key RC	00289-01114	⑫ White Key C	00289-01107
② Natural Key C (BLACK)	00289-01107-1	⑬ Black Key	00289-01115
③ Sharp Key (WHITE)	00289-01115-1	⑭ White Key B	00289-01113
④ Natural Key B (BLACK)	00289-01113-1	⑮ White Key D	00289-01108
⑤ Natural Key D (BLACK)	00289-01108-1	⑯ White Key E	00289-01109
⑥ Natural Key E (BLACK)	00289-01109-1	⑰ White Key F	00289-01110
⑦ P Tite(4x12,Bind,ZnB)	00683-54012	⑱ White Key G	00289-01111
⑧ Natural Key F (BLACK)	00289-01110-1	⑲ White Key A	00289-01112
⑨ Endblock B-3R(M)	00452-40179	㉑ Spring for Natural Black Key	00289-01103
⑩ Natural Key G (BLACK)	00289-01111-1	㉒ Spring for Natural Key	00289-01102
⑪ Natural Key A (BLACK)	00289-01112-1	㉓ Black Key Spring	00453-40258

**AC CORD SET**



100V 00439-02002



120V UL 00439-01004



220V CE 00439-01005



240V BS 00439-01033



240V SAA 00439-01006

**OPERATION MANUAL**

100V	(Japanese)	00457-40095
120V UL	(English)	00457-40096
230V CE	(English)	00457-40096
240V BS	(English)	00457-40096
240V SAA	(English)	00457-40096

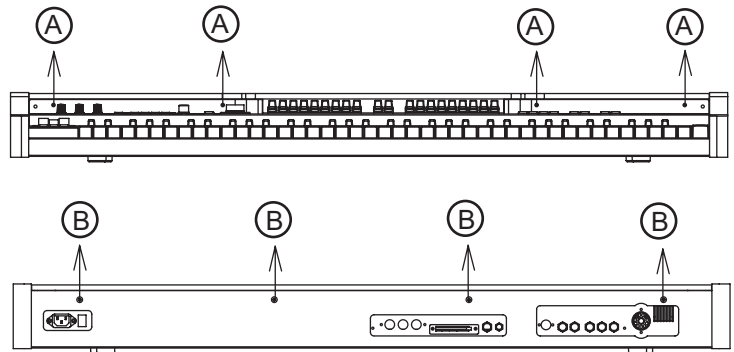


# 9.DISASSEMBLING PROCEDURE

 CAUTION:First,Disconnect ORGAN from A.C.source.

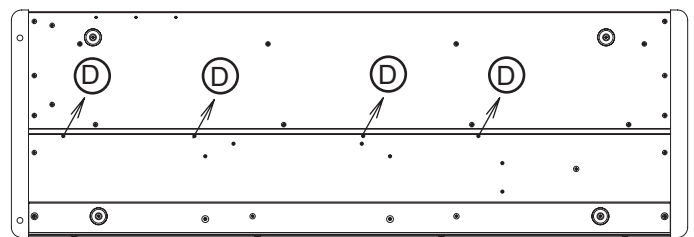
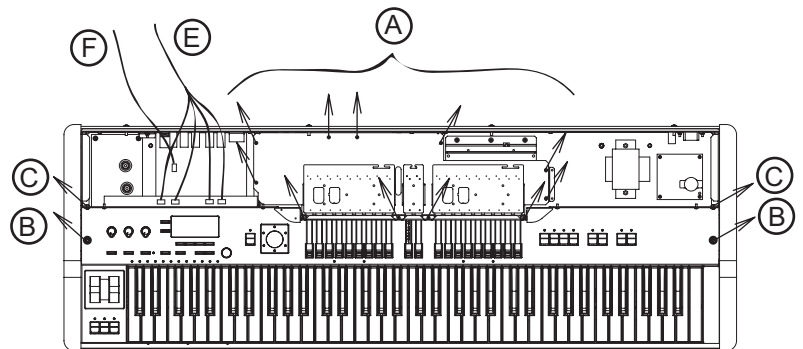
## 1.REMOVE THE TOP BOARD:

- ◆ Remove the 4 screws(M3x6,Bind,ZnB) (A) from the top board.
- ◆ Remove the 4 screws(4x16,Truss,ZnB) (B) from the top board.



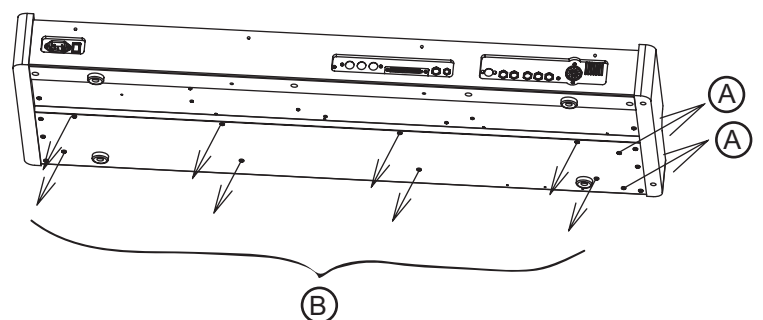
## 2.REMOVE THE DRAWBAR PANEL: THE TOP PANEL:

- ◆ Remove the 11 screws(Tapping TYPE 2, 3x6,Bind,ZnB) (A) from the drawbar panel.
- ◆ Remove the 2 screws(M4x10,Oval head, ZnB) (B) from the top panel.
- ◆ Remove the 2 screws(M4x5,Bind,ZnB) (C) from the top panel.
- ◆ Remove the 4 screws(M3x6,Bind,ZnB) (D) from the top panel.
- ◆ Disconnect the wirings (E) from J501,J502 J503,J510 on SWH-503A.
- ◆ Disconnect the wirings (F) from J206 on MXH-35A.



## 3.REMOVE THE ENDBLOCK(L): THE KEYBOARD:

- ◆ Remove the 2 screws(Tapping TYPE 2, 4x8,Bind,ZnB) (A) from the endblock.
- ◆ Remove the 8 screws(M4x5,Bind,ZnB) (B) from the keyboard.
- ◆ Disconnect the flat cables from J110,J111 on the MGH-91A.





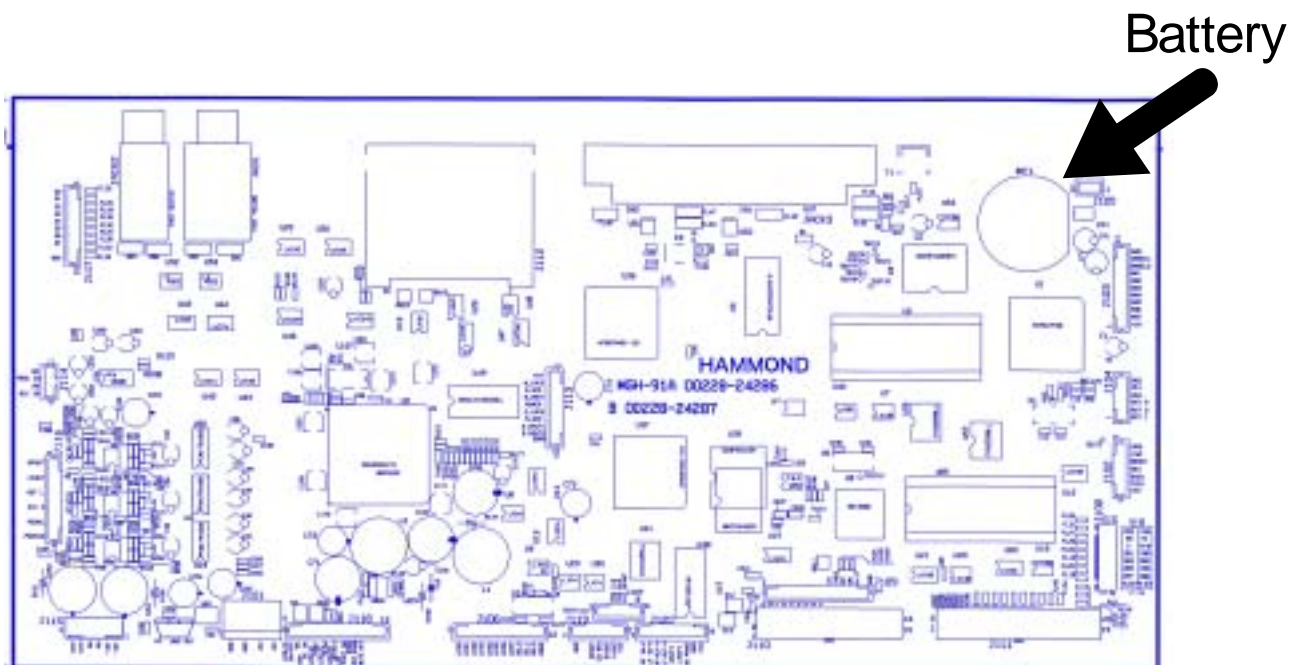
## WARNING

### 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.



## 11. Technical Description

### 1. AC Line Filter (**PSH-83D**)

The AC line filter board is comprised of inductor L1 and capacitors C1 – C5, a fuse and voltage selector switch. The line filter prevents noise from the organ leaving through the AC line cord. SW1 is voltage selector switch this allows selection of various line voltages available throughout the world to provide power for the organ. The fuse value is selected depending on the source AC voltage the organ is using.

### 2. Power Supply Board (**PSH-72B**)

This board takes the AC voltage from the secondary of the power transformer PSH-119, rectifies it and makes the DC voltages needed to operate the organ (+5V, +6V, +/-18V). The Regulator U3 provides the +5V for the MGH-91A. Regulator U4 provides the +6V used for the heater of the vacuum tubes on the PAH-72A board. The +/-18V is used for the amplifier ICs on MXH-35A board. The regulator U1 a 7818 creates the +18volts and U2 a 7918 creates the -18volts.

### 3. Main CPU, Sound generator and DSP Board (**MGH-91A**)

This board has two CPUs, two VASE3 sound generators a digital signal processor and three D/A converters. The main CPU controls the tone wheel generator and multi-contact keying and the DSP provides the effects, reverb, vibrato, Leslie and tone control.

#### 3-1. Main CPU

U1 is main CPU (SH7017). This CPU has internal flash ROM. Update of the system's program is from an outside 16M flash ROM U4. New system software is loaded from CompactFlash card "CF card." The Main CPU also controls the VASE3 generators U37 and U36, U2 the DSP, LCD display and switch scan functions.

#### 3-2. Sub CPU

U3 is sub CPU (3007). This CPU is a high-speed processor it controls the key scan and tube overdrive circuits.

#### 3-3. Main Memory

Main software is stored in 16M bit flash memory of U4 (29F160B). U57 and U58 is 1M bit SRAM preset and panel switch data is saved in this pair of chips. These chips are battery backed up by BAT 1. U5 is 16M bit DRAM this is workspace memory.

#### 3-4. System Reset

U11 is a monitor of the +5v and provides reset to main CPU, when this voltage falls.

This circuit is used to switch the power supply of Backup SRAM to a battery (BAT1) simultaneously.

### 3-5. VASE3 Sound generator

U36, U37 is generator LSI. This LSI reads the wave data from ROM (U38) and outputs it to DSP and D/A. The upper drawbar, lower drawbar and percussion sounds are mixed. They are sent to DSP U2. And after being divided into the frequencies of High(HF) and Low(LF), they are sent to MXH-35A. Pedal BASS is a separate channel.

### 3-6. DSP

U2 is a Multi-channel dual serial input port DSP. It has a very hi speed (200MHz) internal clocks and U49 is 1M SRAM. The first half of the DSP receives upper and lower manual digital tone wheel signals from the VASE3 generator. It adds chorus, vibrato to the drawbars if selected and then splits the Frequency range in two, HF and LF. The second half of the DSP receives data from the A/D U31 and adds tone control, expression, digital Leslie and reverb if selected to the signal.

### 3-7. D/A Converters and A/D Converter

U32, U33, U34 are 24-bit D/A converters. The output of U32 is the upper, lower and percussion drawbars split into HF and LF these signals will go to the mixer board and then out to the Tube overdrive circuit PAH-72A. The output of U34 is the Pedals. The output of U33 is the combined organs output with all effects added split into Left and Right outputs. All of these signals will go to the mixer board.

### 3-8. Serial Interface, MIDI

U15 (PD71051GU) is a serial interface to U1 main CPU. This interface is for the PEDAL MIDI in. A photo coupler, U51 (PC400v) is used to couple MIDI IN signals into the serial interface U15. There is an additional MIDI IN for an added keyboard to be used for lower manual or other MIDI control of keyboard, it is labeled LM MIDI IN. Photo coupler U50 (PC400v) is used to couple the MIDI IN signals directly into the CPU. The LM MIDI IN is controlled directly from the Main CPU thru port 0. Transistor Q2 is used to buffer the MIDI OUT signals generated through CPU output TxD0. The combination of these circuits allows MIDI merging of the 2 MIDI IN ports.

### 3-9. LCD (Liquid Crystal Display) Control

The main CPU, U1 controls the LCD (20 character x2 lines).

## 4. Draw Bar Interface Board (IFH-18A)

ICs U1, U2 and U3 are analog switches that are used to scan 20 channels of analog data from the

upper, lower and pedal drawbars. The output of these ICs is fed directly into an A/D port of the CPU U1 on the MGH-91A board from connector J103. U4 is an analog switch used to scan 4 channels of analog data from pitch wheel, modulation wheel, tone control and overdrive level. This analog data comes from J508 on the SWH-503A board. This data is also fed to the A/D port of the Main CPU on MGH-91A.

#### 5. Switch boards (**SWH-503A, 504A, 505A**)

These three boards contain the tab switches and LED indicators and controls for the entire organ. The **SWH-503A** contains the decoder and LED driver circuits for all of the switches on the XK-3. The **SWH-504A** and **SWH-505A** boards are wired to the **SWH-503A** board and utilize the decoder and LED driver circuits on the **SWH-503A**.

The **SWH-503A** board sends and receives switch and LED signals to main board (**MGH-91A**) on connectors J503 and J502

#### 6. Vibrato Mode Switch **VRH-29A**

This board is the rotary switch which selects the vibrato / chorus mode of C1-V3. It Connects to J105 of MGH-91A. If you need to change the board, first remove the 4 screws holding SWH-503A LED indicator board under the switch assembly. Then pull out the knob and remove the nut on the rotary switch's shaft. The switch assembly will then drop down and out of the control panel.

#### 7. Vacuum Tube Overdrive Board (**PAH-72A**)

The Tube overdrive board consists of opamp (U1), dual VCA ICs (U2, U3), Tubes (V1, V2) and a 220V dc power supply circuit (D1-4) and (Q1) for vacuum tubes plate voltage.

The signals from MXH-35A enter the board at J301. There are 3 signals HF, LF and Pedal. There are 2 parallel audio paths through tube circuits one is for (HF) high frequency and one is for (LF) low Frequency. The Pedal signal does not pass through the Tube overdrive circuit; it bypasses it and is mixed back in at U1B. The U3 vca controls gain of overdrive level of the vacuum tubes. The overdrive gain is controlled by the DC voltage (0-5V) control signal from MGH-91A J120. The U3 output signals are amplified by tubes V1 and V2. The U2 vca attenuates the overdrive signals back to the original input levels. The signal is then mixed with pedal signal at U1B. The signal then leaves the board at J301 and goes to MXH-35A. The control signal is programmed to rectify according to an overdrive level by HF OUT-V and LF OUT-V this comes from MGH91A CPU. VR1 (HF) and VR2 (LF) are TRIM. Pots in order to revise volume level of TUBE ON or OFF. Please refer to the TEST & ADJUSTMENT for the adjustment method. The Q2 is transistor is an analog switch, if TUBE AMP ON thru signal is stopped. When TUBE AMP Off then U2 gain turned off by MGH-91A.

**CAUTION:** The vacuum tube power supply voltage is 220VDC. There is a danger of electrical shock if you touch components in this circuit. Use caution when testing this circuit, damage will occur to the Main board and other ICs If you short the high voltage circuit to other components on the board. Please note the capacitor in the high voltage circuit will maintain a charge beyond 100V even after the power is off for over 1 hour.

#### 8. Mixer Board (MXH-35A)

This board is an audio mixer board; it consists of Op Amps, Muting relays, Leslie control transistors, voltage regulators and audio jacks. The six audio signals from MGH-91A enter the board and are conditioned by integrated circuits U1, U2 and U3. U1 and U2 act as no gain low pass filters. They have a cut off frequency at 20kHz this is to filter out the Digital noise. After leaving U1 and U2 the HF, LF, and a PEDAL signals are sent to PAH-72A. After being processed by the overdrive board the signals return to the mixer board and are mixed with any signal from the send/ return loop by U4A. The signal is then sent out of the board to the A/D converter on MGH-91A. After the DSP signal processing and D/A conversion The Left and Right audio signals return to the mixer board to U3A and U3B. Op amps U3 provide a cut off frequency of 20kHz or more and boost of frequencies 100Hz or less about 10dB. This signal leaves the board and goes through the dual volume control at J206 and return to U6 and the output is sent to a headphone jack and lineout jacks. The main Rch signal is sent to U5 for the Leslie output it goes to the 11-pin connector through J204. U7 and Q7 control the muting relay at the time of power On/Off. There is a 3 to 5 seconds delay to the relay turning on after the power supply is energized; the turn off time is short. Q3 is power ON transistor for external Leslie. When organ is turned on and Leslie is connected to organ this transistor pulls pin 6 of Leslie 11 pin plug to ground thus turning on Leslie. Transistor Q1 is for Fast speed and Q2 is for slow. These transistors receive control voltage from MGH-91A they pull either pin 7 (Fast) or pin 8 (Slow) of 11 pin plug to ground causing Leslie motors to operate at proper speed. U9 and U10 are voltage regulators they Regulate the + and - 18volts to 15 volts for the op amps on the board. This regulated voltage is also supplied to other boards through J208.

## 12 Reset To The Initial Status & Check The Software Versions

1. Please perform the following steps to reset the XK-3 to the initial default setting.

### STEPS TO TAKE

- a. Switch off the power of the XK-3.
- b. Holding the [REC/JUMP] Button, switch on the power.
- c. Hold down / Keep pressing the [REC/JUMP] Button until "Loading Default..." appears on the Display.
- d. If everything is in order, PLAY Mode appears on the Display. (Completed)

### 2. HOW TO CHECK THE VERSIONS

- a. Touch the [MENU/EXIT] button to display the MENU, select PAGE E by the [PAGE] button, and then touch the [2] SYSTEM button then, "Noise Gate" page appears.
- b. Touch the [PAGE UP], you can see the each software versions using [PARAM] buttons below;

VERSION - MAIN PROGRAM

VERSION - TONE INFORMATION

VERSION - KEY SCAN PROGRAM