

 **HAMMOND**
SERVICE MANUAL

XK-1

CAUTION !
See safety notice inside



JUL.2006



SUZUKI MUSICAL INST.MFG.CO.,LTD.

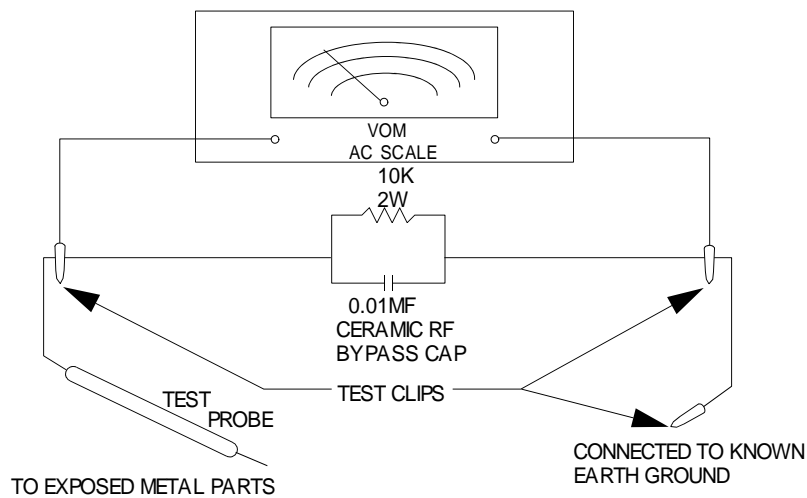
25-12,RYOKE 2-CHOME,HAMAMATSU, JAPAN

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**

Explosionsfara vid felaktigt batteribyte.
Använd samma batterityp eller et ekvivalent typ som rekommenderes av apparatillverkaren,
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.

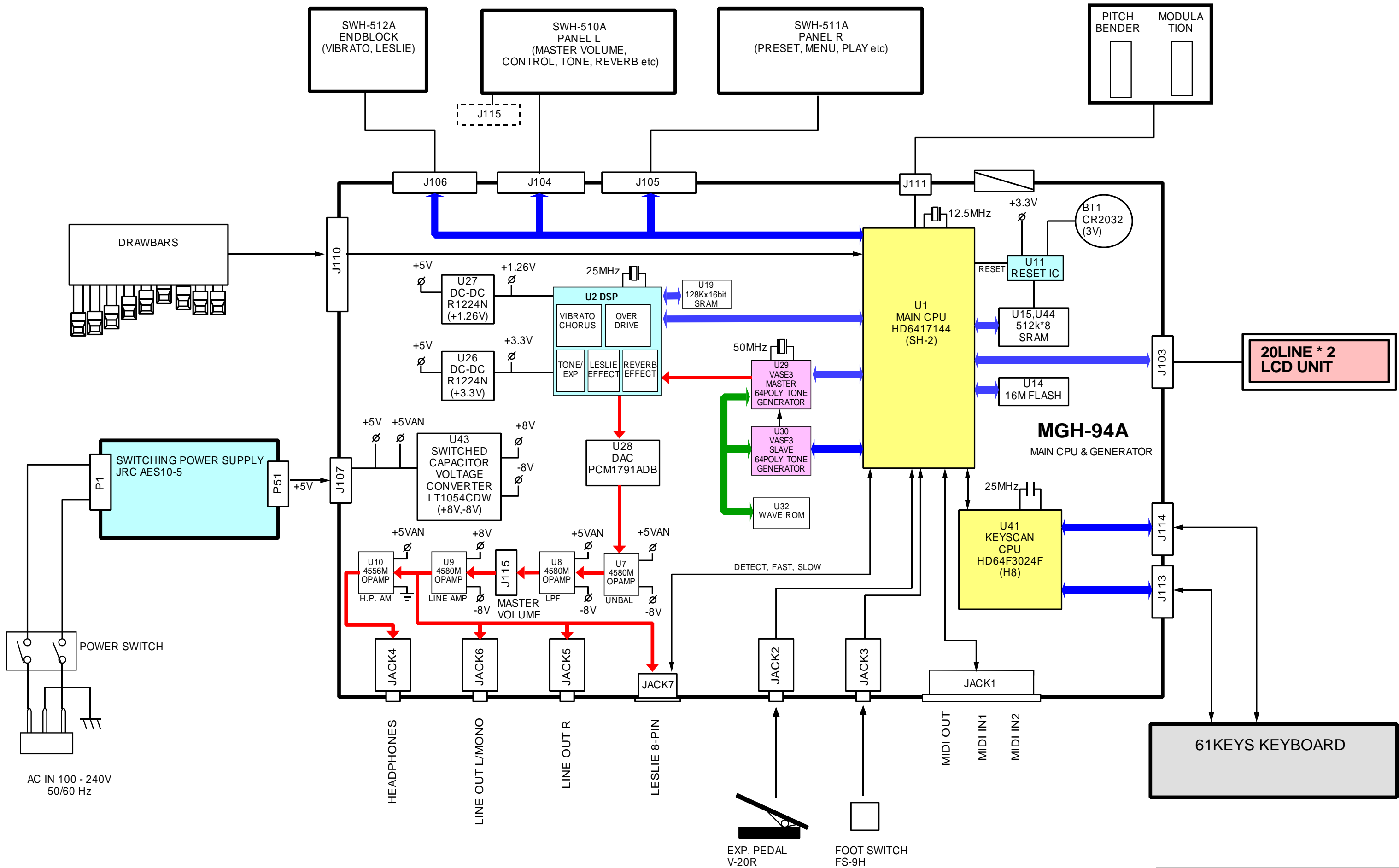
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1. Specifications

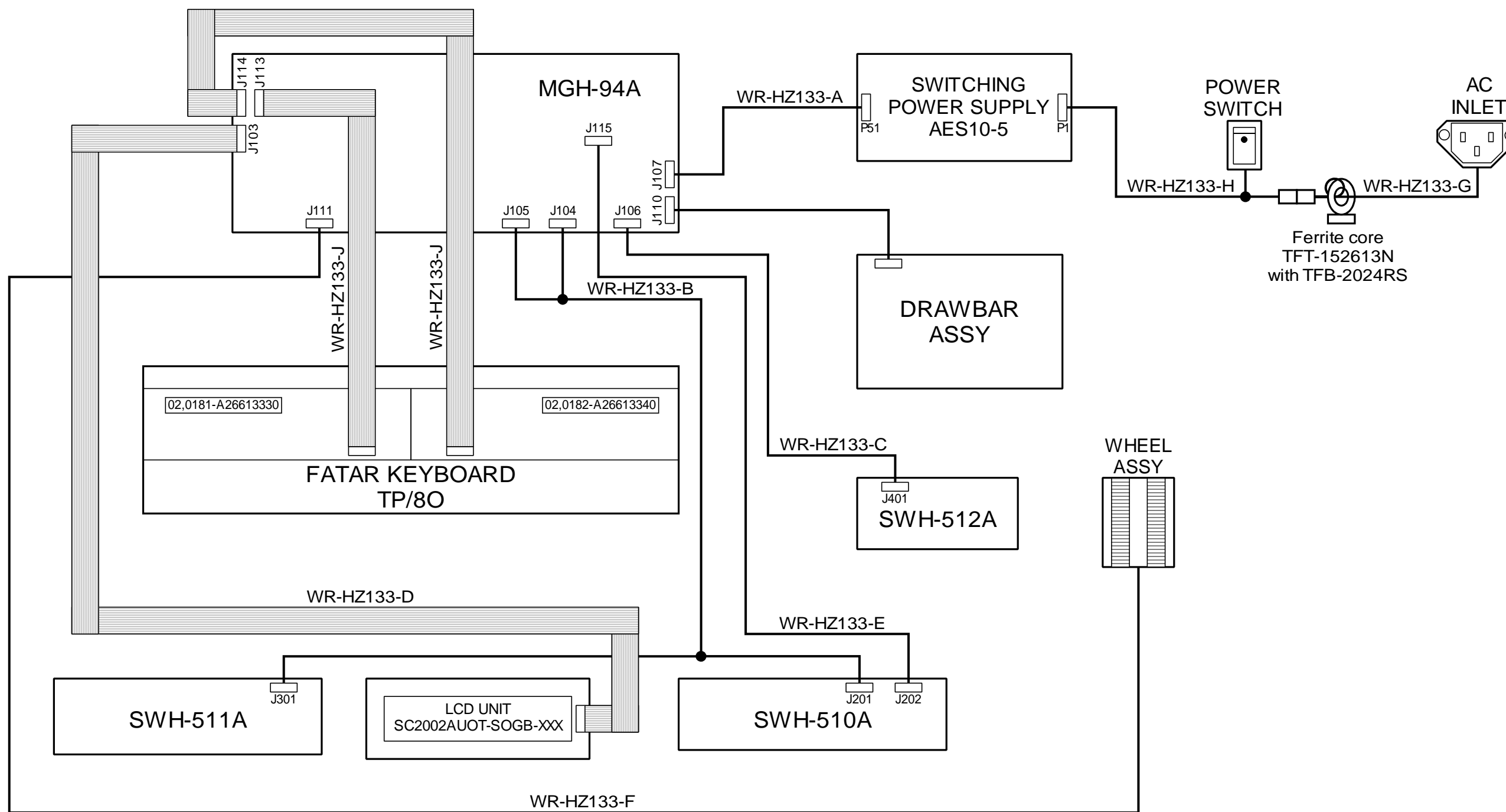
XK-1

Sound Generator	2 x VASE3 as Digital Tone-wheels
Keyboard	61 notes Water Fall type with Velocity
Harmonic Drawbars	
Knobs	9 Pitches
Drawbar Select Tabs	Upper, Pedal, Lower
Waveform	B-type/ Mellow/ Brite (Upper and Lower) Muted/ Normal / Synth 1/ Synth 2 (Pedal)
Percussion	
Tabs	Second On, Third On, Fast Decay, Soft
Adjustable	Touch, Velocity, Decay (Fast, Slow), Level (Soft, Normal)
Extra Voice	8 Instruments
Tuning	
Master	430 - 450 1Hz Steps
Transpose	-6 - 0 - +6 semitones
Effects	
Internal Leslie	On, Fast, Brake Digital, 2 Rotors
Vibrato and Chorus	V1, V2, V3, C1, C2, C3 Upper & Lower On / Off Speed : 5 (6.10 - 7.25 Hz)
Overdrive	Digital Overdrive
Equalizer	3 Bands
Reverb	10 Programs
Sustain	5 Lengths (Pedal)
Internal Zone	
Tabs	Split, Manual Bass
Adjustable	Map Low, High Split Point, Lower Octave, Pedal Top Key
Combination Presets	12 banks x 11 Numbers + Adjust Switchable : Link / Independent
Controllers	
Switches	Power On / Off
Rotary Controllers	Master Volume, Overdrive, Tone
Wheels	Pitch Bend, Modulation
Display	20-characters, 2 lines with 9 control switches and Rotary encoder
Storage	None
MIDI	Templates : 3 modes Zoned 3 parts and keyboard Ch.
Connections	AC Inlet MIDI In 1, In 2, Out Exp. Pedal (Phone Jack), Foot Switch, Line Out L / Mono, R, Headphones, 8-pin Leslie
Dimension	116 (W) x 33.4 (D) x 11(H) cm
Weight	13.5 kg



XK-1
2.BLOCK DIAGRAM

STEP	SUBJECT	MASTER VOLUME	STONE	DRAWBAR	SELECTOR	PLAY KEYS	TEST POINT	SPECIFICATION	NOISE METER WEIGHTING
1	LINE OUT L	max	center	UPPER:16' max	L	C2	LINE OUT L	130±13 mVrms	WIDE BAND
2				UPPER:2' max		C5		28±3 mVrms	
3				Noise level		ALL: min		nothing	
4	LINE OUT R			UPPER:16' max	R	C2	LINE OUT R	130±13 mVrms	WIDE BAND
5				UPPER:2' max		C5		28±3 mVrms	
6				Noise level		ALL: min		nothing	
7	LESLIE 8PIN			UPPER:16' max	LESLIE	C2	LESLIE 8PIN-1 pin	130±13 mVrms	WIDE BAND
8				UPPER:2' max		C5		28±3 mVrms	
9				Noise level		ALL: min		nothing	



5. WIRING CHART

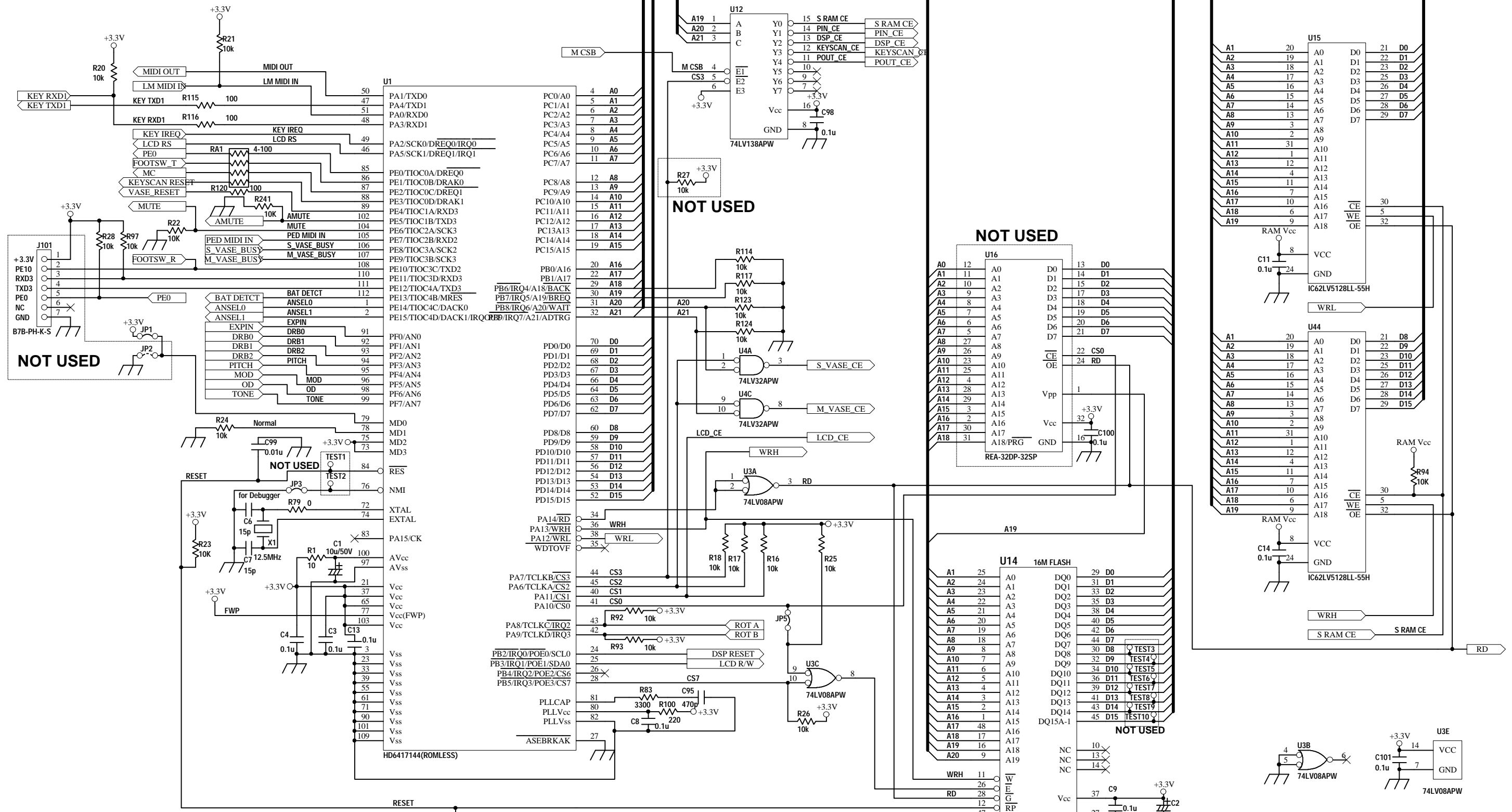
XK-1

MAIN MGH-94A						PLUG No.	FROM PIN No.	TO PLUG & PIN NO.	WIRE COLOR	TO PWB NAME	FUNCTION	
J103	1	1	RED	LCD UNIT	VSS	J110	1	DB-1	WHT	DB-209	GND	
	2	2			VDD		2	2	BLK		4'	
	3	3			VO		3	3	BLK		2'	
	4	4			RS		4	4	BLK		1'	
	5	5			R/W		5	5	BLK		1 3/5'	
	6	6			E		6	6	BLK		8'	
	7	7			DB0		7	7	BLK		16'	
	8	8			DB1		8	8	BLK		1 1/3'	
	9	9			DB2		9	9	BLK		2 2/3'	
	10	10			DB3		10	10	BLK		5 1/3'	
	11	11			DB4		11	11	BLK		+3.3V	
	12	12			DB5		12	12	BLK		NC	
	13	13			DB6		J111	1	M-3, P-1	YEL	WHEEL	+3.3V
	14	14			DB7			2	P-2	RED	ASSY	PITCH
	15	15			A			3	M-2	WHT		MOD
	16	16			K			4	M-1, P-3	BLK		GND
J104	1	J201-1	BRN	SWH-510A	COM0	J113	1	L-1	RED	KEYBOARD	KCOM0	
	2	2	RED		COM1		2	2			DK0	
	3	3	ORG		COM2		3	3			KCOM1	
	4	4	PNK		COM3		4	4			DK1	
	5	5	GRN		COM4		5	5			KCOM2	
	6	6	BLU		GSW0		6	6			DK2	
	7	7	VIO		GSW1		7	7			KCOM3	
	8	8	GRY		GLED0		8	8			DK3	
	9	9	WHT		GLED1		9	9			KCOM4	
	10	10	YEL		+3.3V		10	10			DK4	
	11	11	BRN		O.D.		11	11			KCOM5	
	12	12	RED		TONE		12	12			DK5	
	13	13	BLK		GND		13	13			KCOM6	
J105	1	J301-1	ORG	SWH-511A	GLED4	J114	1	H-1	RED	KEYBOARD	KCOM0	
	2	2	PNK		GLED3		2	2			DK8	
	3	3	GRN		GLED2		3	3			KCOM1	
	4	4	BLU		GSW5		4	4			DK9	
	5	5	VIO		GSW4		5	5			KCOM2	
	6	6	GRY		GSW3		6	6			DK10	
	7	7	WHT		GSW2		7	7			KCOM3	
	8	8	BRN		COM0		8	8			DK11	
	9	9	RED		COM1		9	9			KCOM4	
	10	10	ORG		COM2		10	10			DK12	
	11	11	PNK		COM3		11	11			KCOM5	
	12	12	GRN		COM4		12	12			DK13	
	14	13	BLU		ROT A		13	13			KCOM6	
	13	14	VIO		ROT B		14	14			DK14	
	15	15	BLK		GND		15	15			KCOM7	
J106	1	J401-1	BRN	SWH-512A	GSW5	J115	1	J202-1	BLK	SWH-510A	AGND	
	2	2	RED		GLED1		2	2	WHT		OUT L	
	3	3	ORG		COM0		3	3	RED		OUT R	
	4	4	YEL		COM1		4	4	WHT		IN L	
	5	5	GRN		COM2		5	5	RED		IN R	
	6	6	BLU		COM3		6	6	BLK		AGND	
	7	7	VIO		COM4							
	8	8	GRY		GSW6							
	9	9	WHT		GLED5							
J107	1	P51-1	BLK	POWER	DG							
	2	2	BLK	SUPPLY	DG							
	3	3	YEL		+5V							
	4	4	YEL		+5V							

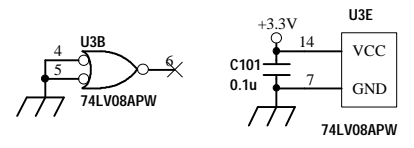
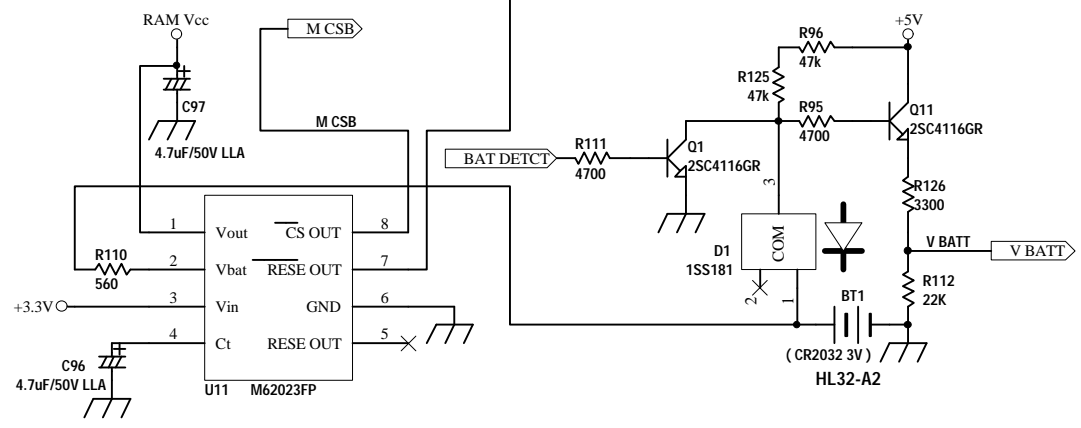
PANEL SW L SWH-510A						PLUG No.	FROM PIN No.	TO PLUG & PIN NO.	WIRE COLOR	TO PWB NAME	FUNCTION
J201	1	J104-1	BRN	MGH-94A	COM0						
	2	2	RED		COM1						
	3	3	ORG		COM2						
	4	4	PNK		COM3						
	5	5	GRN		COM4						
	6	6	BLU		GSW0						
	7	7	VIO		GSW1						
	8	8	GRY		GLED0						
	9	9	WHT		GLED1						
	10	10	YEL		+3.3V						
	11	11	BRN		O.D.						
	12	12	RED		TONE						
	13	13	BLK		GND						
J202	1	J115-1	BLK	MGH-94A	AGND						
	2	2	WHT		IN L						
	3	3	RED		IN R						
	4	4	WHT		OUT L						
	5	5	RED		OUT R						
	6	6	BLK		AGND						
PANEL SW R SWH-511A											
J301	1	J105-1	ORG	MGH-94A	GLED4						
	2	2	PNK		GLED3						
	3	3	GRN		GLED2						
	4	4	BLU		GSW5						
	5	5	VIO		GSW4						
	6	6	GRY		GSW3						
	7	7	WHT		GSW2						
	8	8	BRN		COM0						
	9	9	RED		COM1						
	10	10	ORG		COM2						
	11	11	PNK		COM3						
	12	12	GRN		COM4						
	13	13	BLU		ROT A						
	14	14	VIO		ROT B						
	15	15	BLK		GND						
END BLOCK SW SWH-512A											
J401	1	J106-1	BRN	MGH-94A	GSW5						
	2	2	RED		GLED1						
	3	3	ORG		COM0						
	4	4	YEL		COM1						
	5	5	GRN		COM2						
	6	6	BLU		COM3						
	7	7	VIO		COM4						
	8	8	GRY		GSW6						
	9	9	WHT		GLED5						

6.PRINTED WIRING BOARD ASS'Y LIST XK-1

FUNCTION	PWB.NAME	PART No.
MAIN	MGH-94A	00228-25216
PANEL L	SWH-510A	00225-42236
PANEL R	SWH-511A	00225-42241
ENDBLOCK	SWH-512A	00225-42246

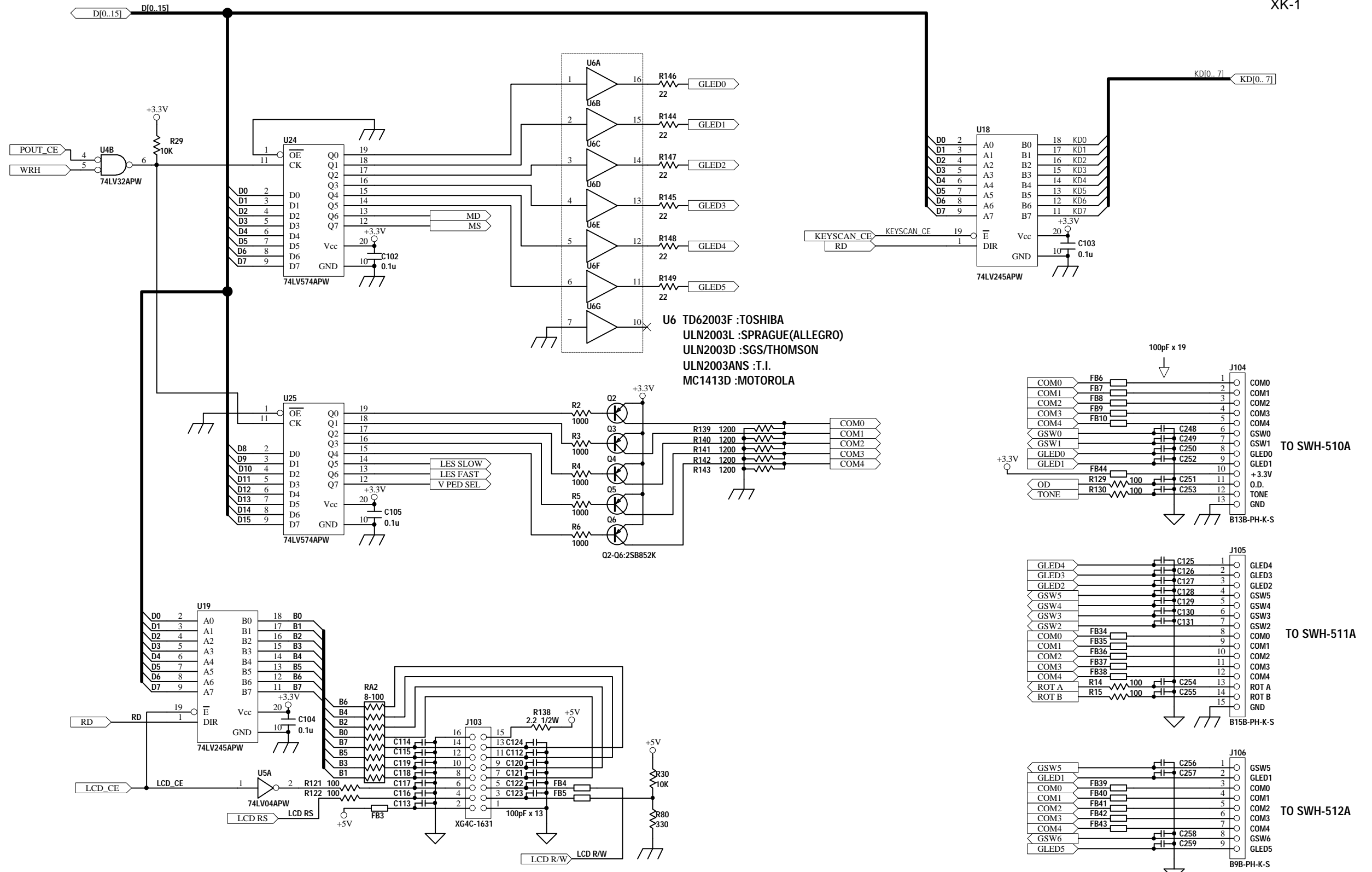


	JP1	JP2	JP5
Debug	X	O	X
On Flash	O	X	O

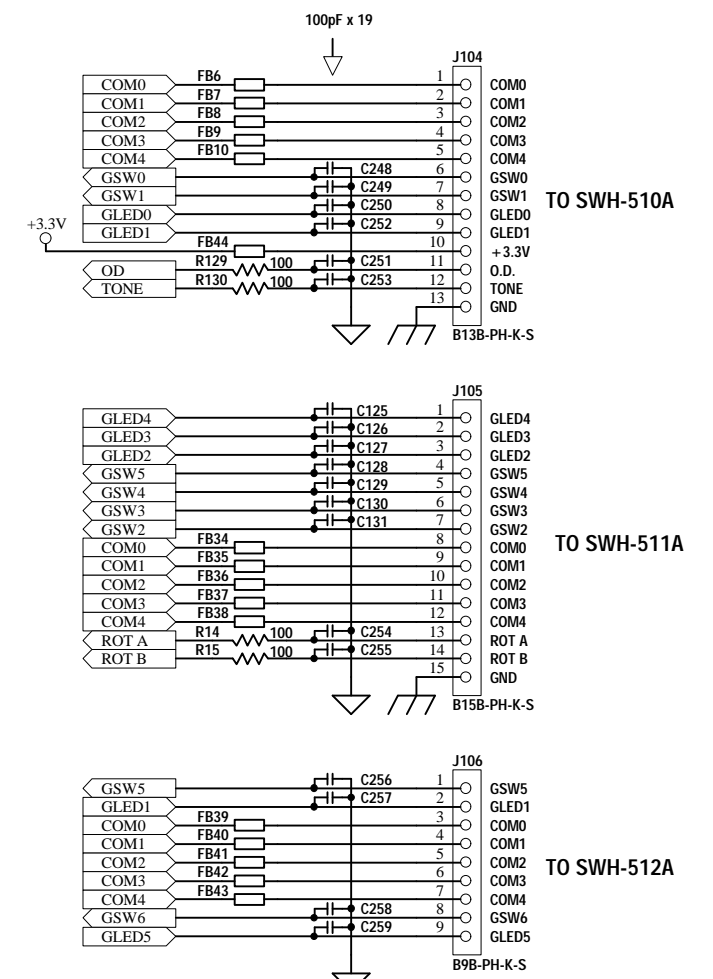
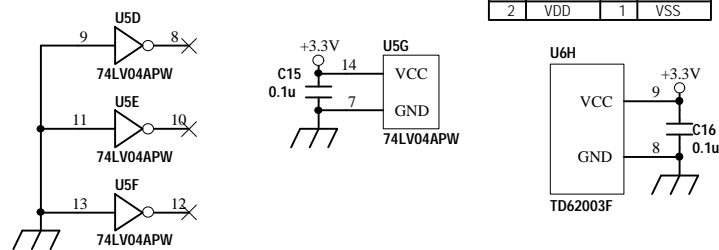


CPU SYSTEM

XK-1
 MGH-94A(1/9)
 00228-25216

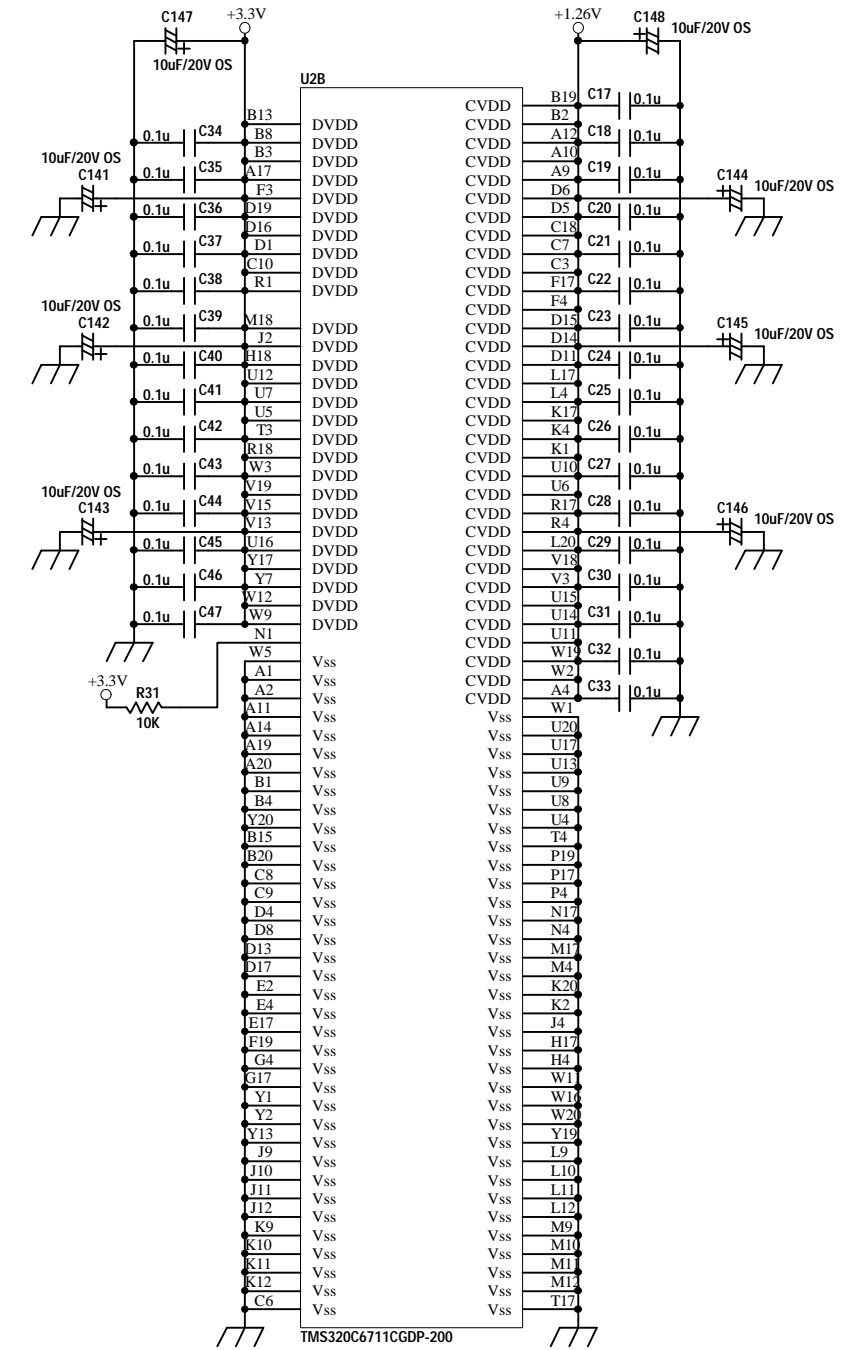
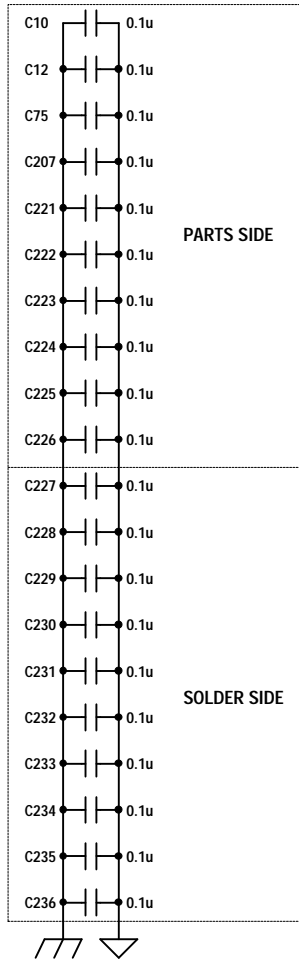
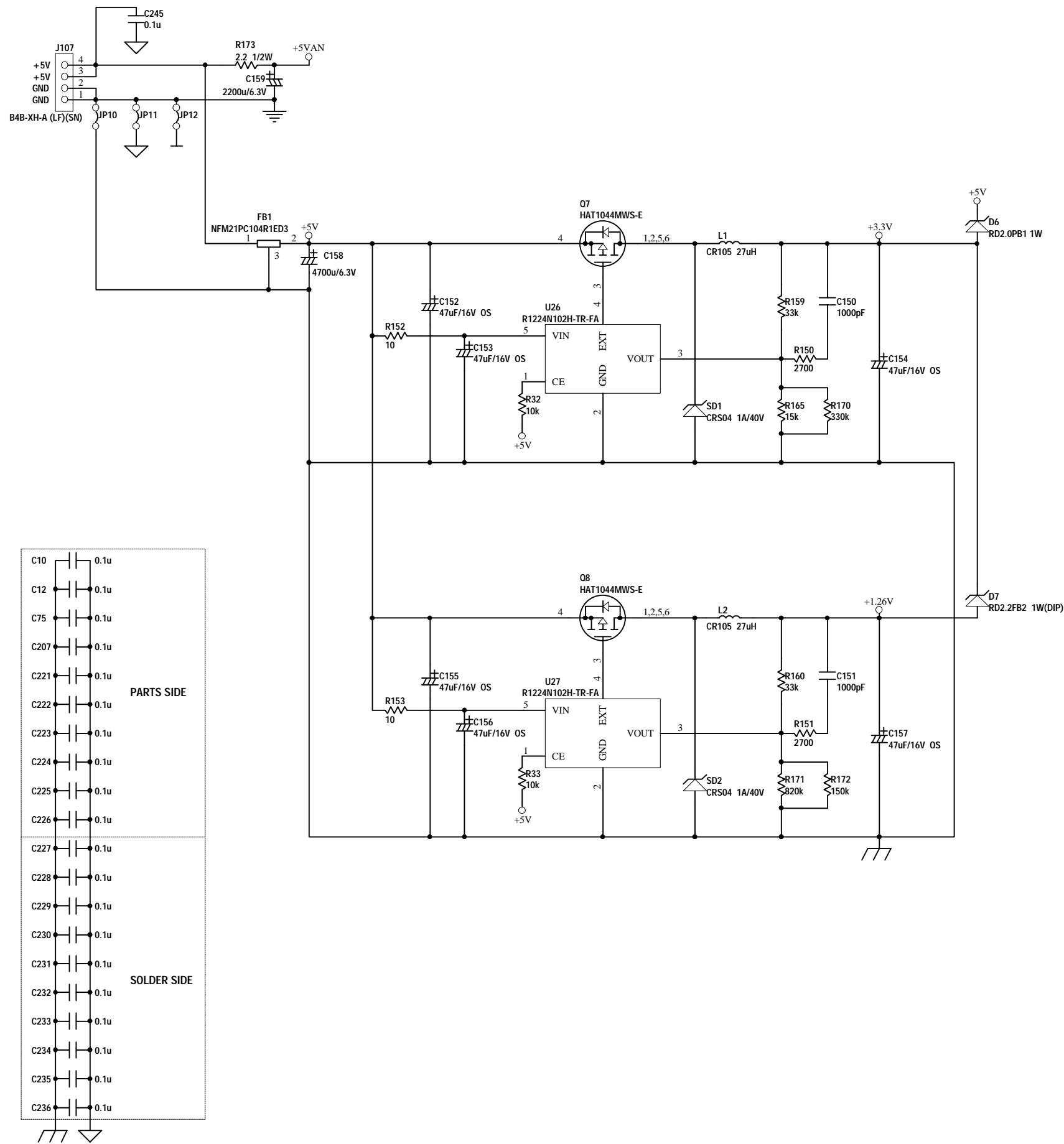


LCD I/F			
NO.	SYMBOL	NO.	SYMBOL
16	K	15	A
14	DB7	13	DB6
12	DB5	11	DB4
10	DB3	9	DB2
8	DB1	7	DB0
6	E	5	R/W
4	RS	3	VO
2	VDD	1	VSS



KeyScan & I/O SIO

XK-1
 MGH-94A(2/9)
 00228-25216

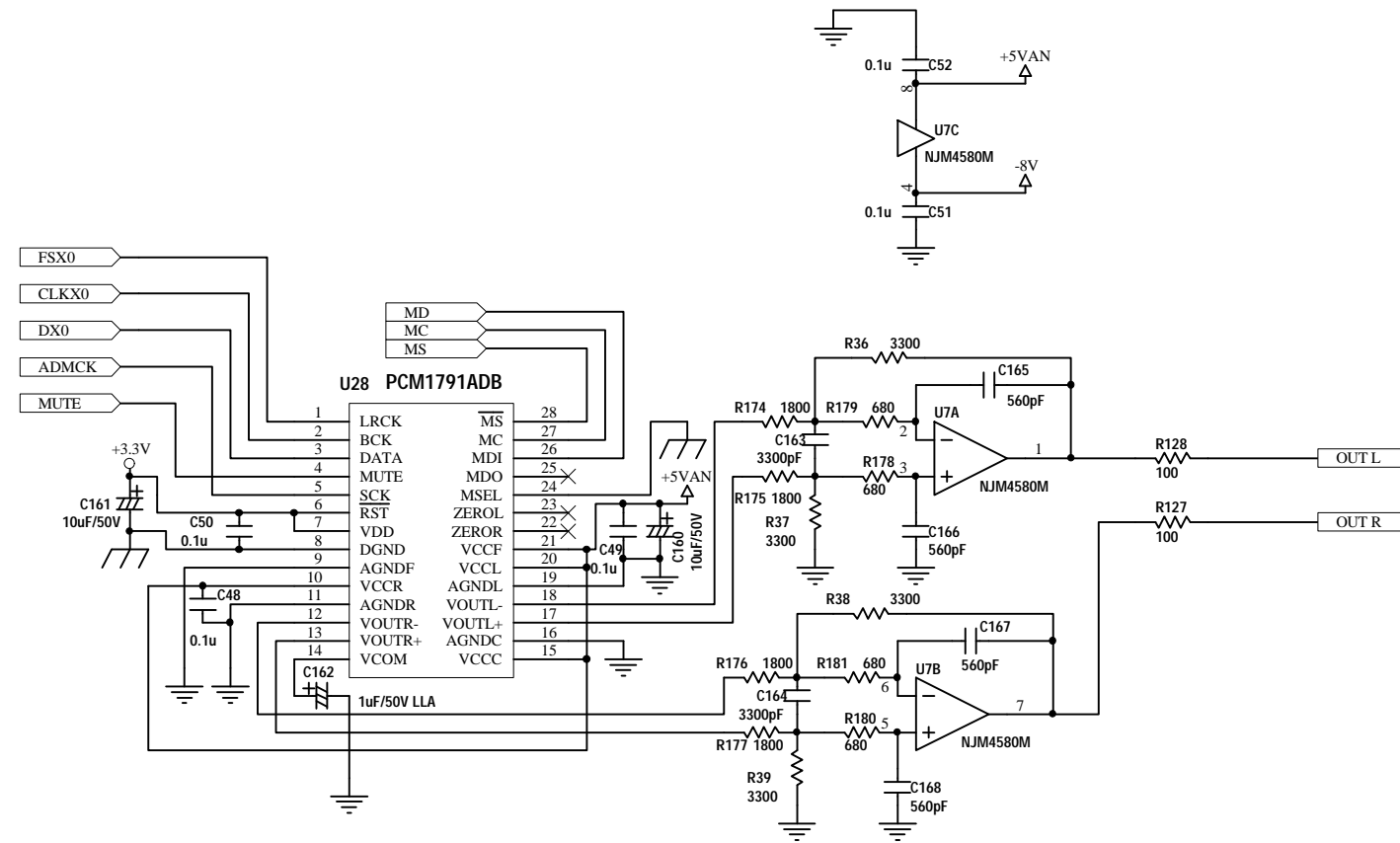


DSP SUPPLY

XK-1

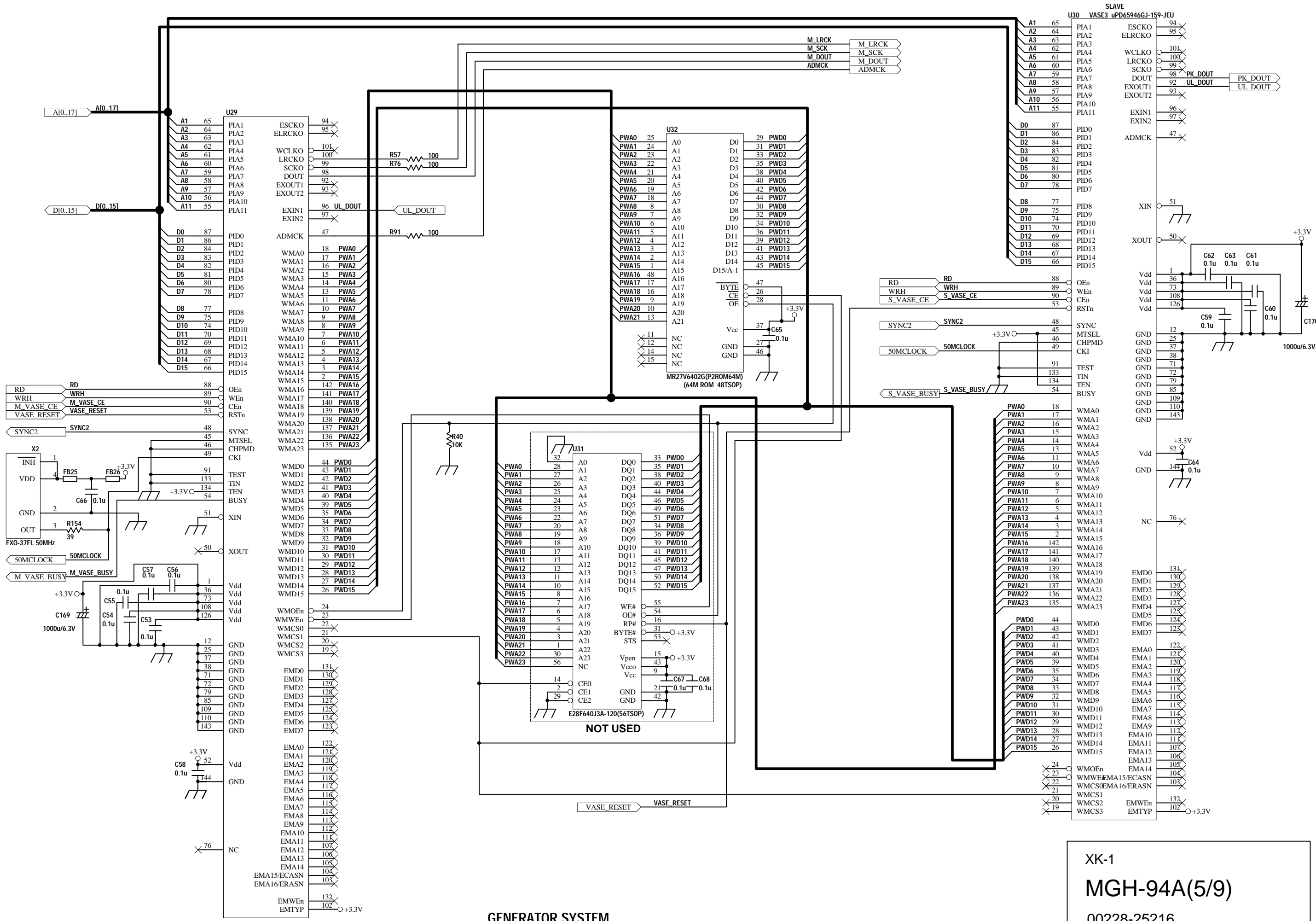
MGH-94A(3/9)

00228-25216



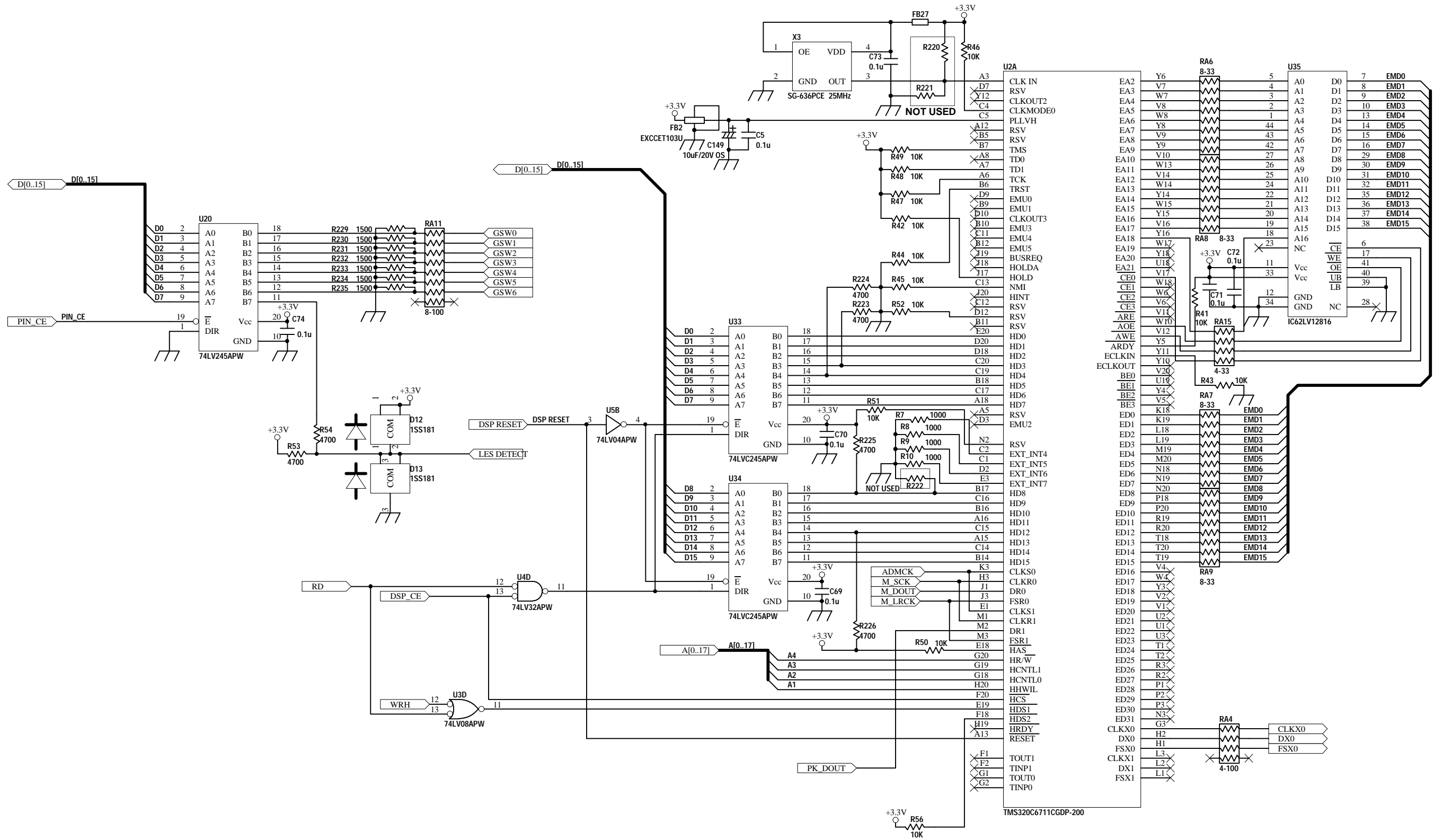
AD/DA SECTION

XK-1
MGH-94A(4/9)
00228-25216



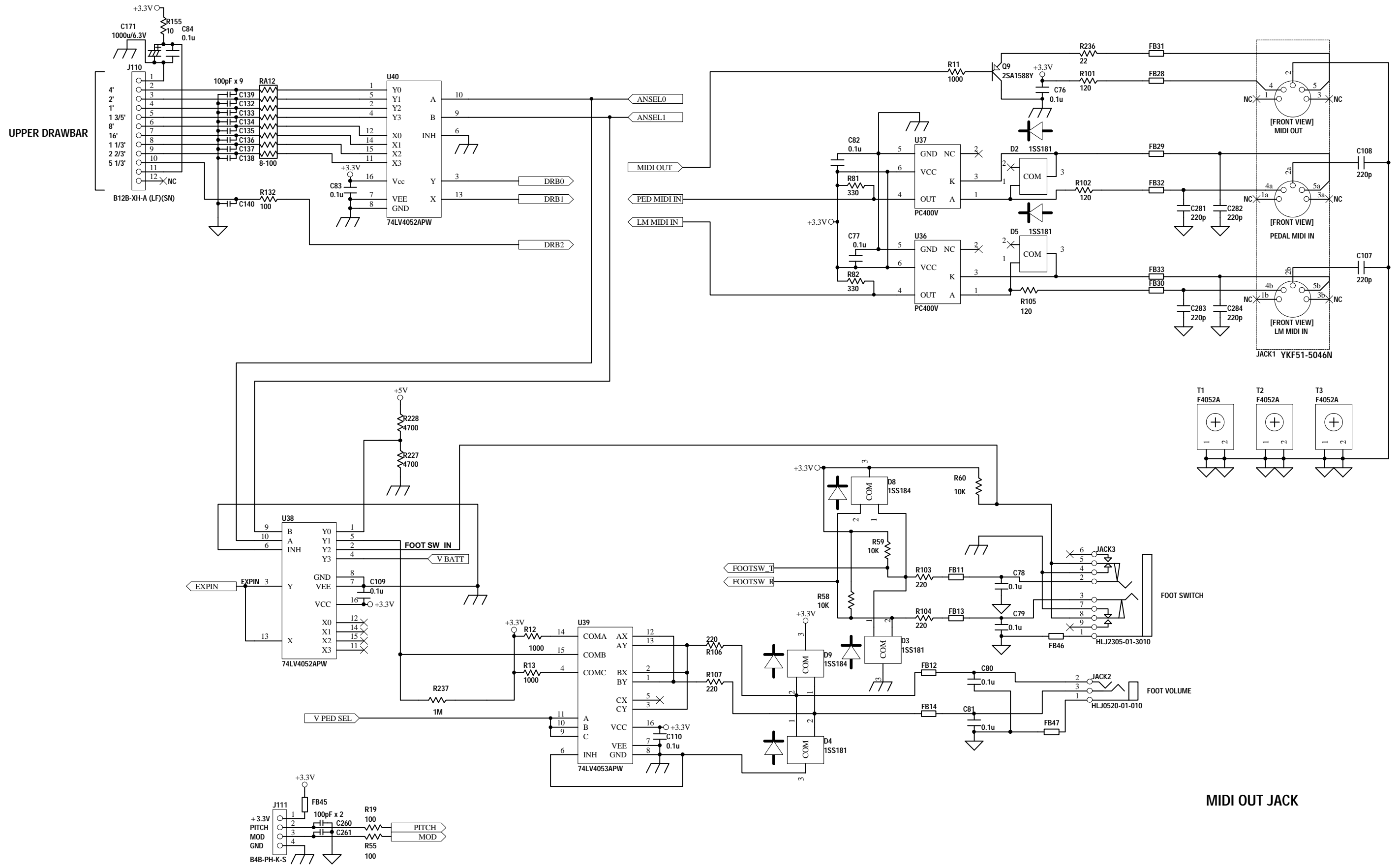
GENERATOR SYSTEM

XK-1
 MGH-94A(5/9)
 00228-25216



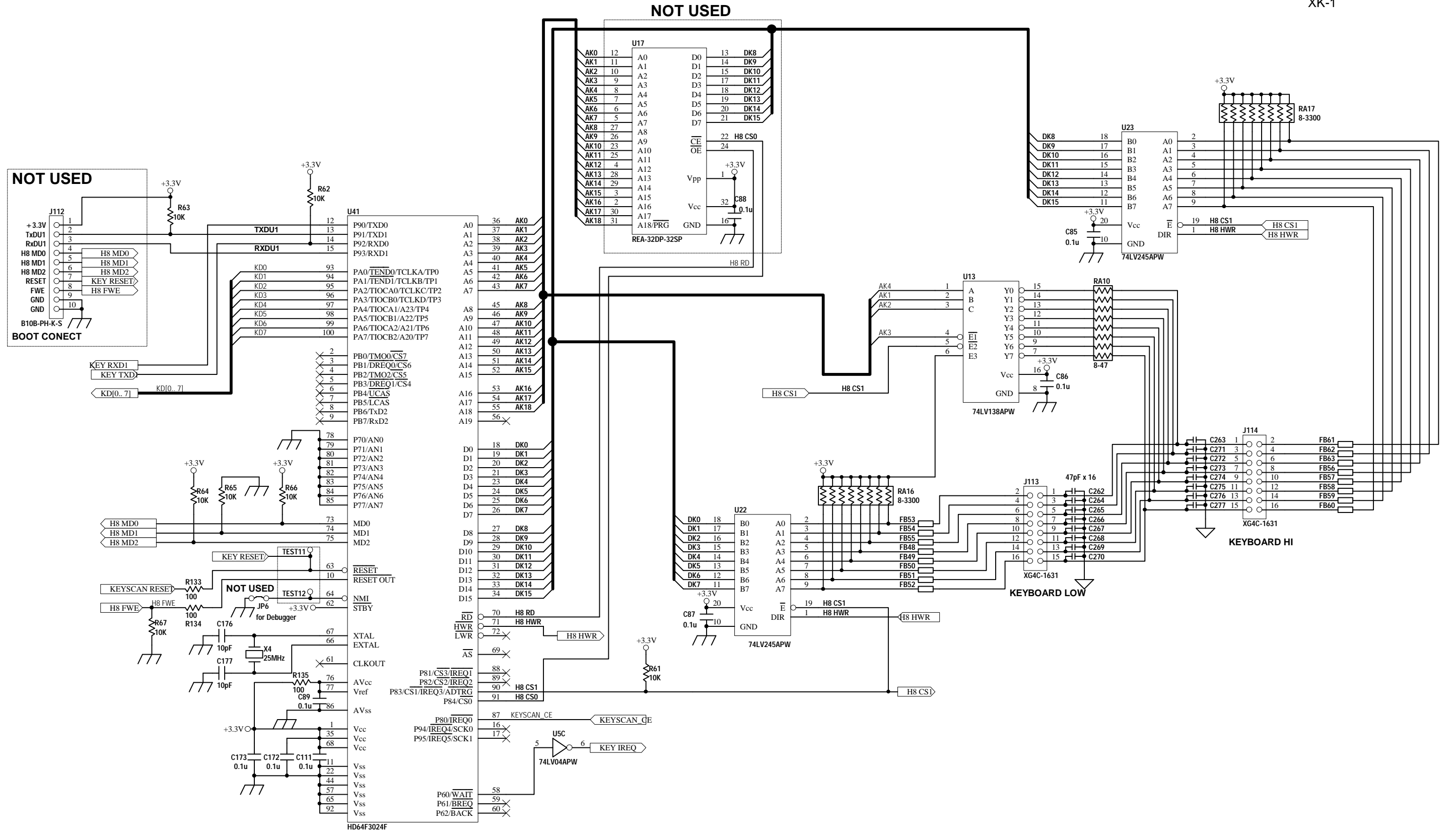
SYSTEM & DSP SECTION

XK-1
 MGH-94A(6/9)
 00228-25216



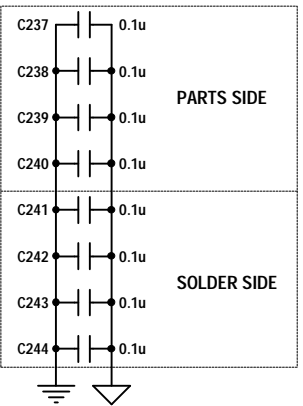
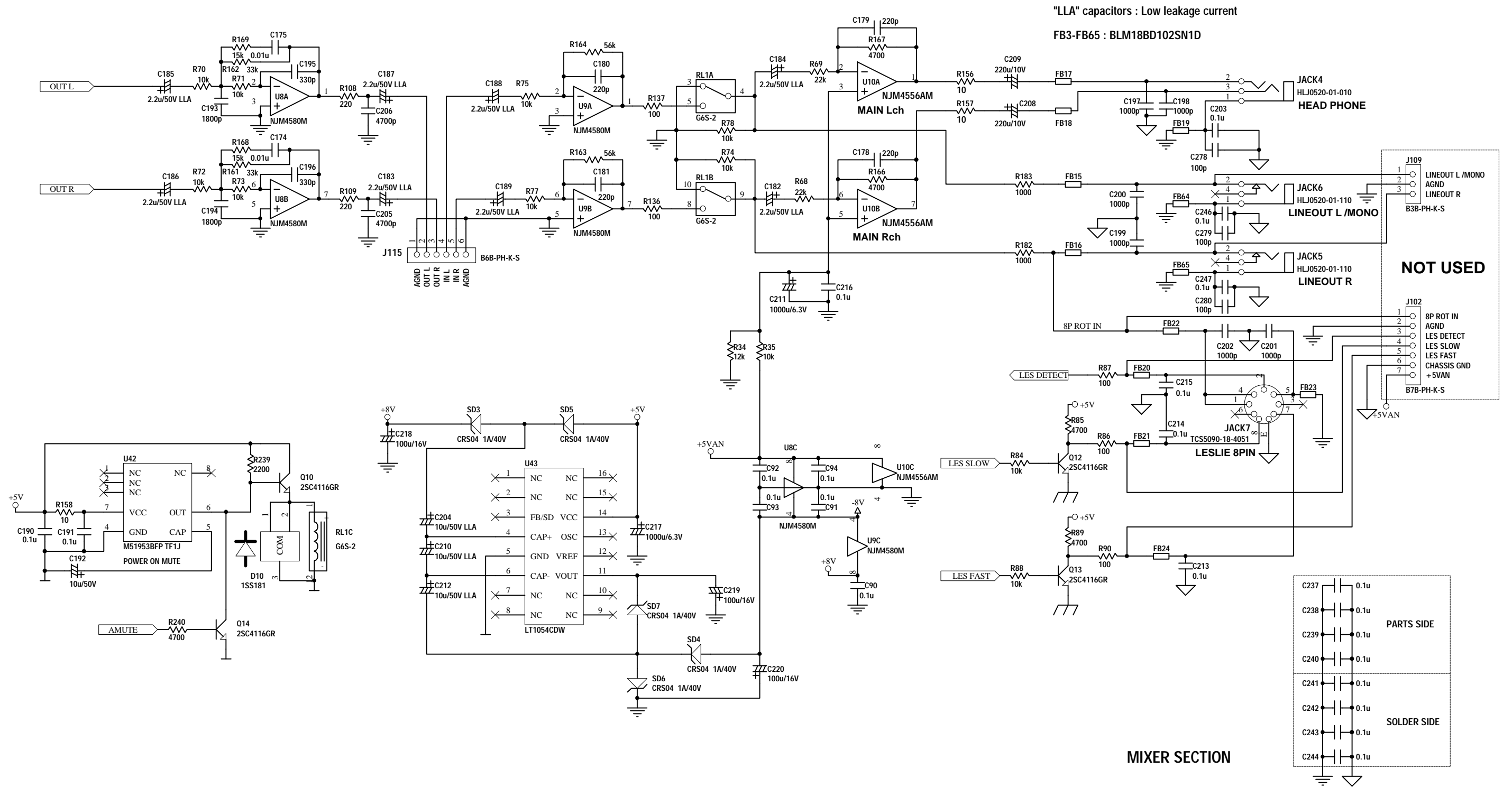
MIDI OUT JACK

XK-1
 MGH-94A(7/9)
 00228-25216



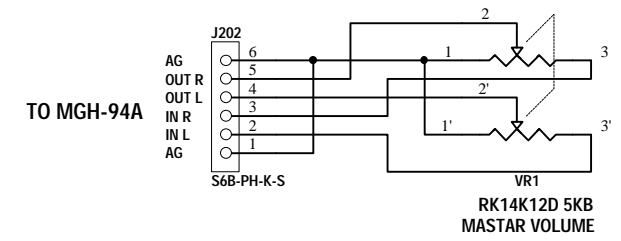
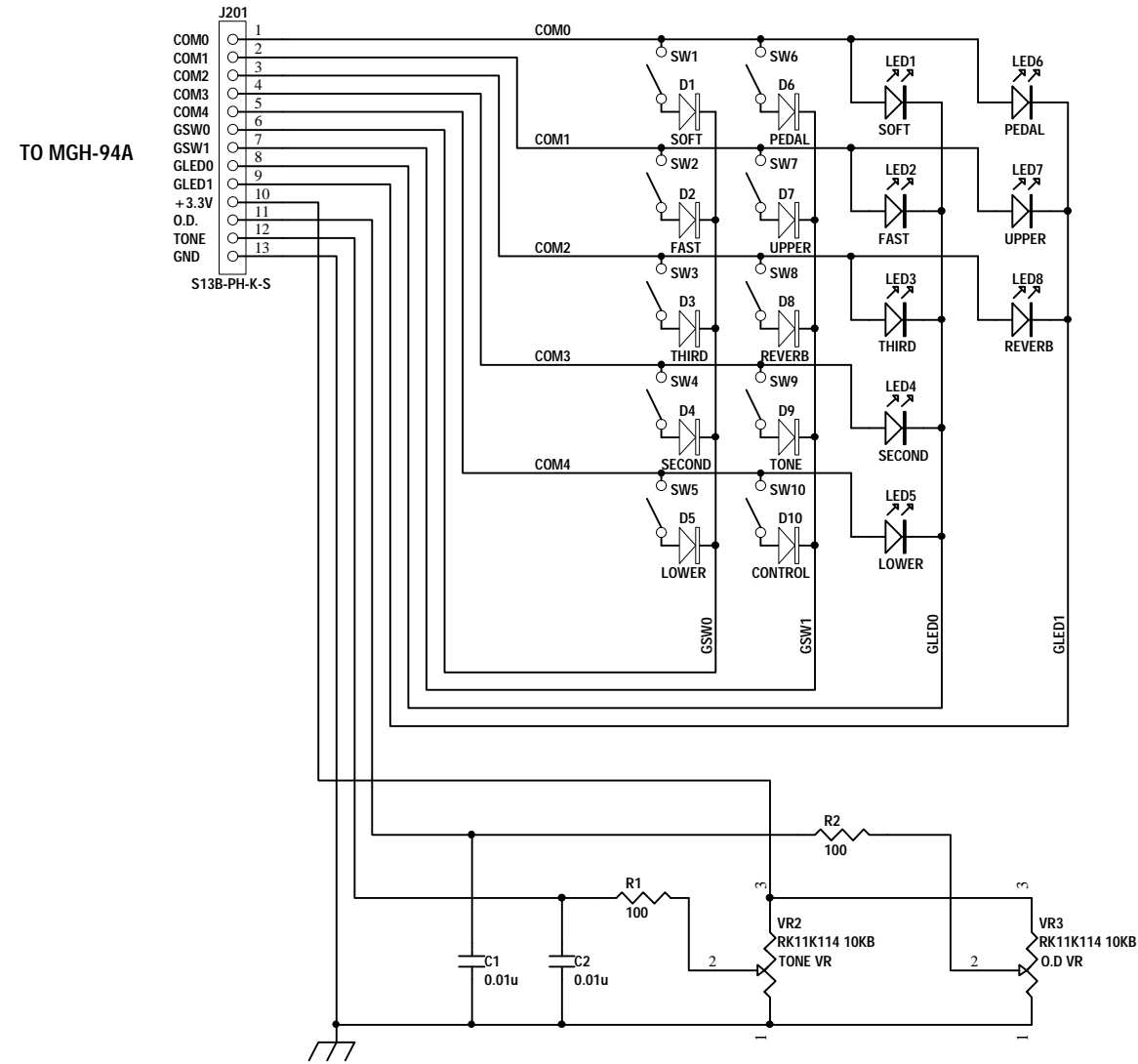
	MD0	MD1	MD2	FWE
Debug(mode 3)	1	1	0	0
On Flash(mode 5)	1	0	1	0
Boot Mode(mode 5)	1	0	0	1

XK-1
MGH-94A(8/9)
 00228-25216



MIXER SECTION

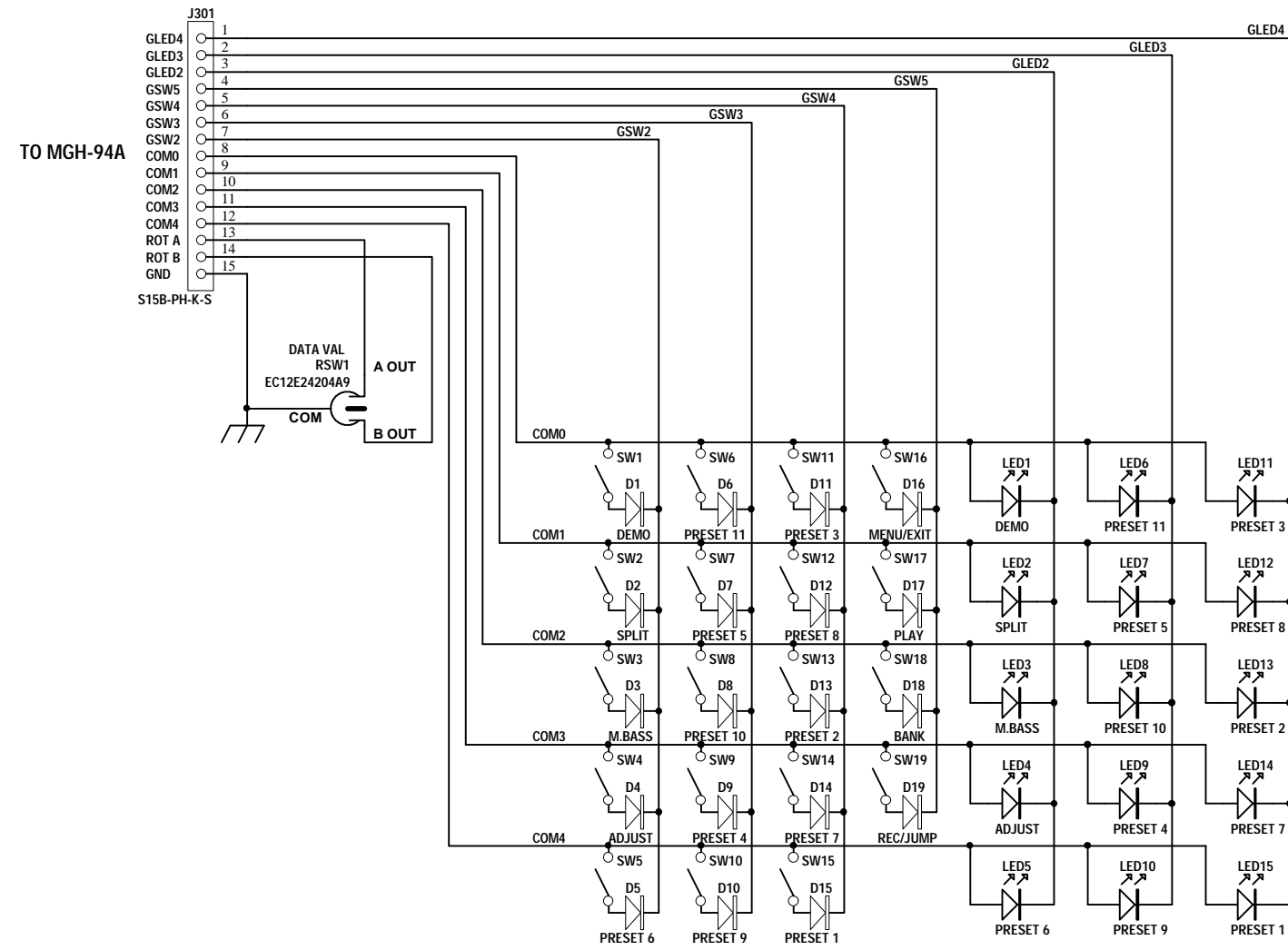
XK-1
 MGH-94A(9/9)
 00228-25216



SW1-SW10 : SKHVBE
 D1-D10 : 1SS133 T-77
 LED1-LED8 : L-7104SED(ORANGE) with LED Spacer LDS-90K

PANEL L

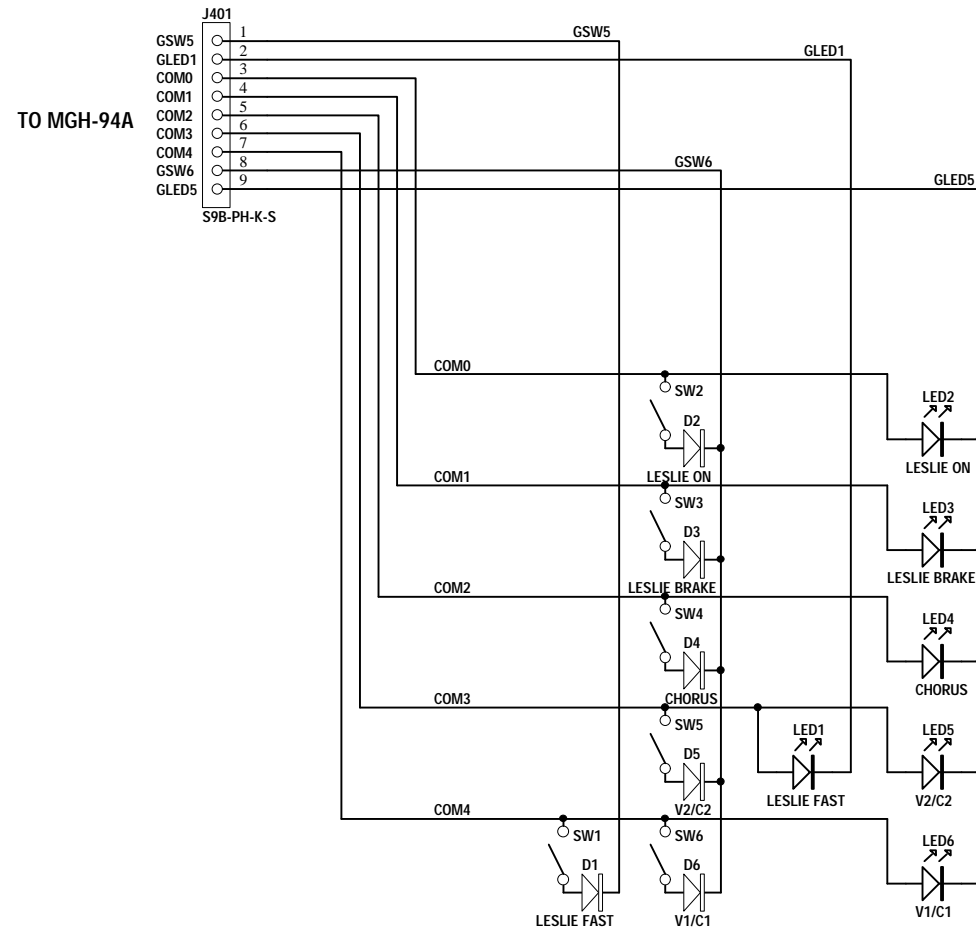
XK-1
 SWH-510A
 00225-42236



SW1-SW19 : SKHVBE
 D1-D19 : 1SS133 T-77
 LED1-LED15 : L-7104SED(ORANGE) with LED Spacer LDS-90K

PANEL R

XK-1
 SWH-511A
 00225-42241



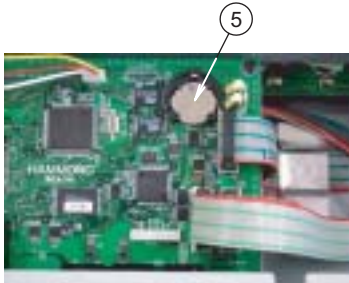
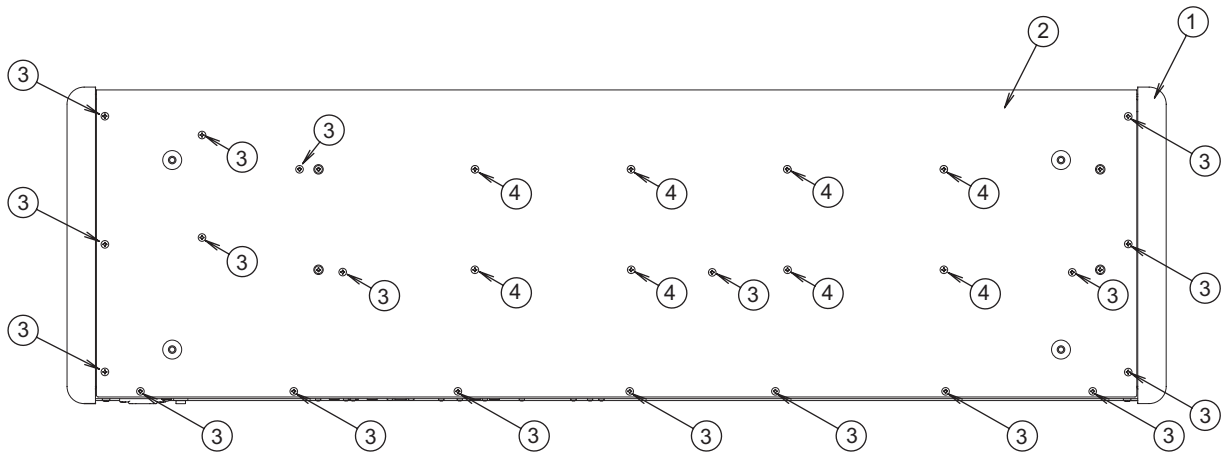
SW1-SW6 : SKHVBE
D1-D6 : 1SS133 T-77
LED1-LED6 : L-7104SED(ORANGE) with LED Spacer LDS-80P

ENDBLOCK

XK-1
SWH-512A
00225-42246

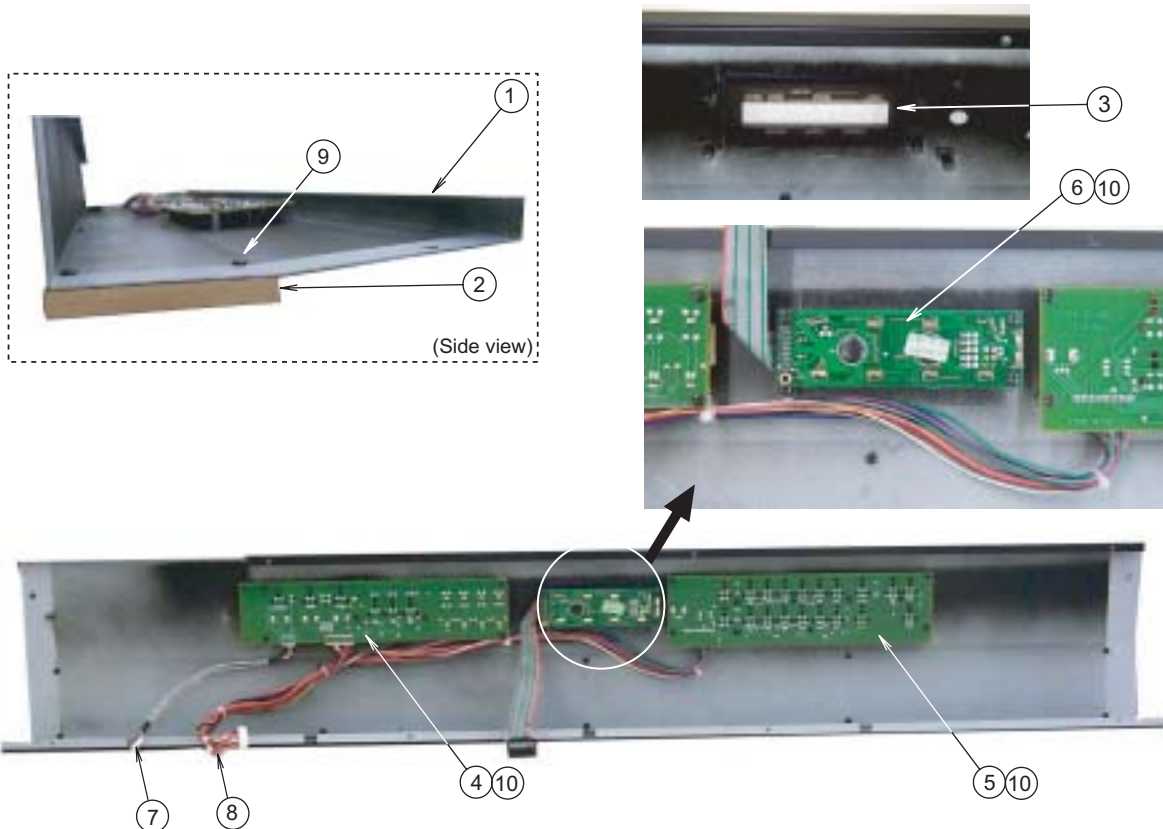
8.PARTS LIST

1.FINAL ASS'Y(66710-01101)

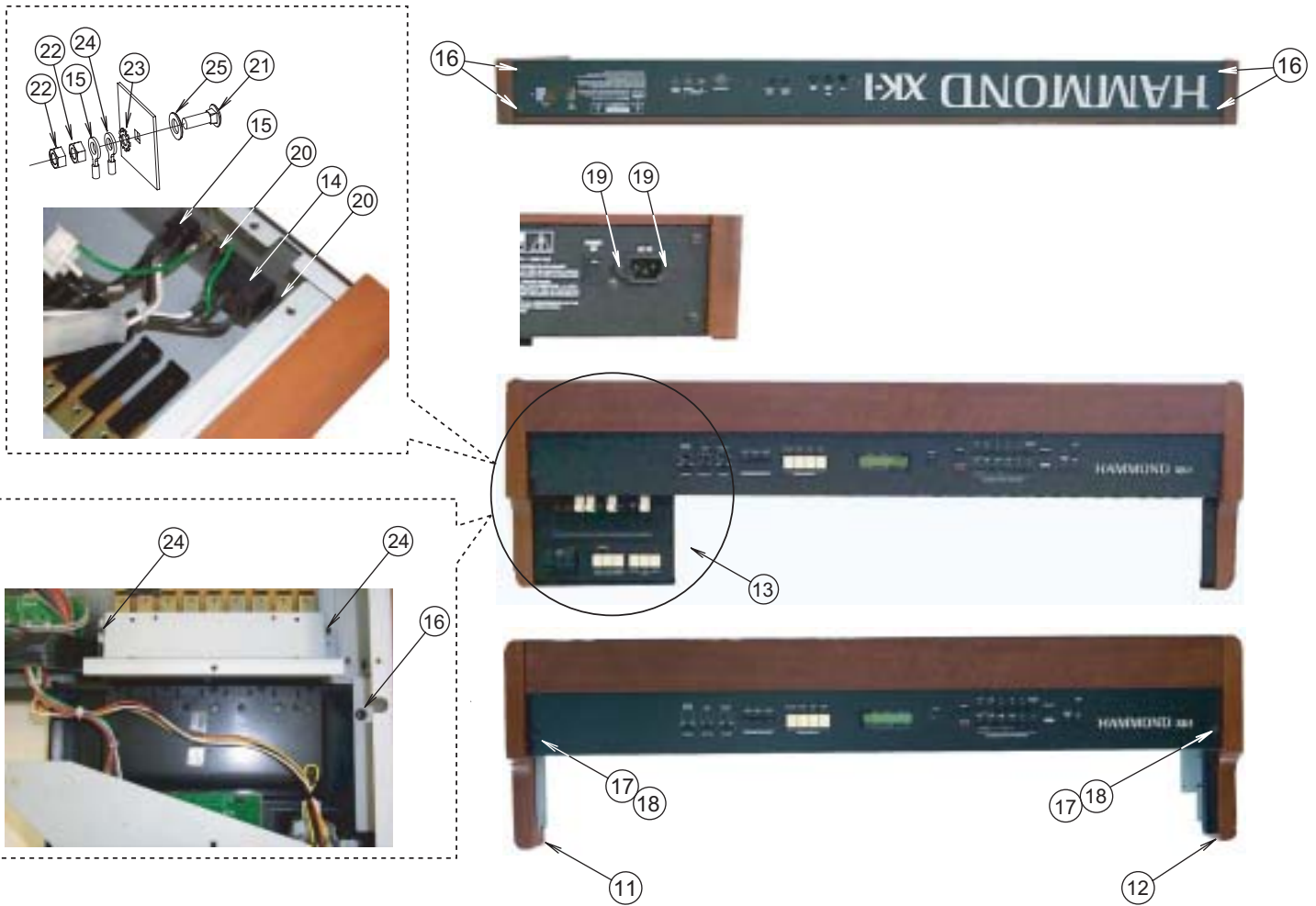


- ① Top Panel Ass'y 66710-02101
- ② Bottom Panel Ass'y 66710-02201
- ③ Cross Recessed Tapping Screw Type3 (Binding Head, 4x5, ZnB) 00673-54005
- ④ Cross Recessed Tapping Screw (For Plastic) (Binding Head, 4x12, ZnB) 00683-54012
- ⑤ Lithium Batteries (CR2032) 00357-01009

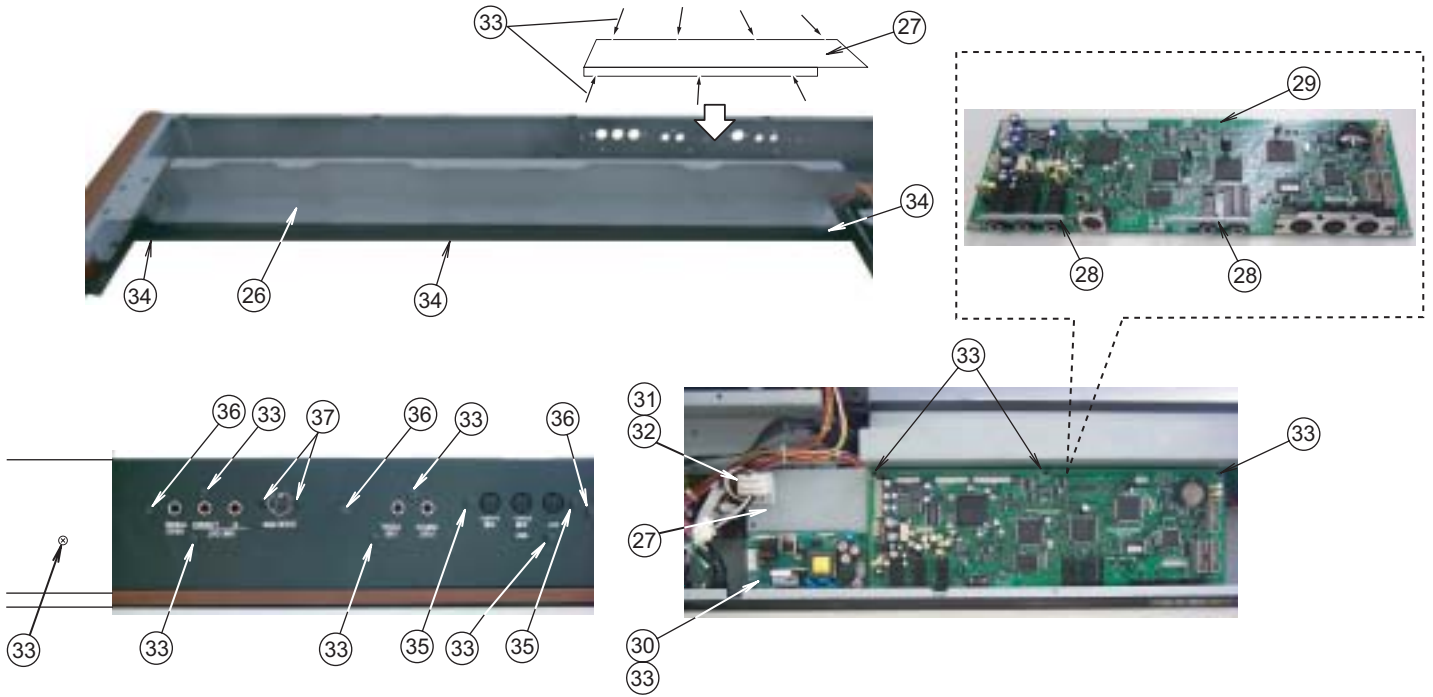
2.TOP PANEL ASS'Y(66710-02101)



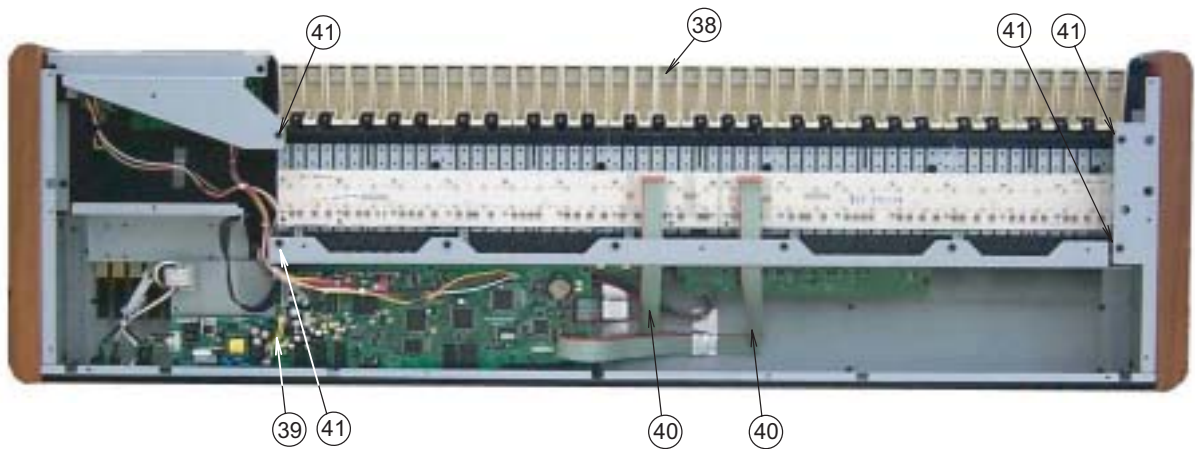
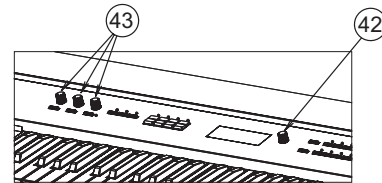
① Top Panel	00451-40549	⑦ WR-HZ133-E	00443-01350
② Top Board	00450-40719	⑧ WR-HZ133-B	00443-01347
③ LCD Cover	00452-40198	⑨ Cross Recessed Tapping Screw Type1 (Binding Head, 3x8, ZnY)	00615-53008
④ Switch Board L Ass'y	66710-02103	⑩ Cross Recessed Tapping Screw Type3 (Binding Head, 3x5, ZnB)	00673-53005
⑤ Switch Board R Ass'y	66710-02104		
⑥ LCD Unit HZ-133 Ass'y	66710-02106		



⑪ Side Board L Ass'y	66710-02202	⑲ Machine Screw (Oval Countersunk Head, M3x12, ZnB)	00703-23012
⑫ Side Board R Ass'y	66710-02203	⑳ Serrated Toothed Flange Nut(M3, ZnY)	00725-83000
⑬ Endblock L Ass'y	66710-02102	㉑ Cap Square Neck Bolt(M4x12, A1, ZnB)	00713-64012
⑭ WR-HZ133-G	00443-01352	㉒ Hexagon Nut(M4, ZnY)	00725-14000
⑮ WR-HZ133-H	00443-01353	㉓ Toothed Lock Washer(Btype, 4, ZnY)	00755-44000
⑯ Cross Recessed Tapping Screw Type2 (Fluted Point)(Binding Head, 4x8, ZnB)	00653-54008	㉔ Cross Recessed Tapping Screw Type3 (Binding Head, 3x5, ZnB)	00673-53005
⑰ Machine Screw (Oval Countersunk Head, M4x10, ZnB)	00703-24010	㉕ Plain Washer(5x12x1, ZnB)	00743-25000
⑱ Rosette Washer(5x14x3, ZnB)	00750-04002		

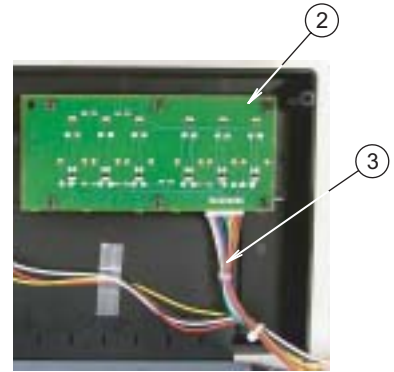
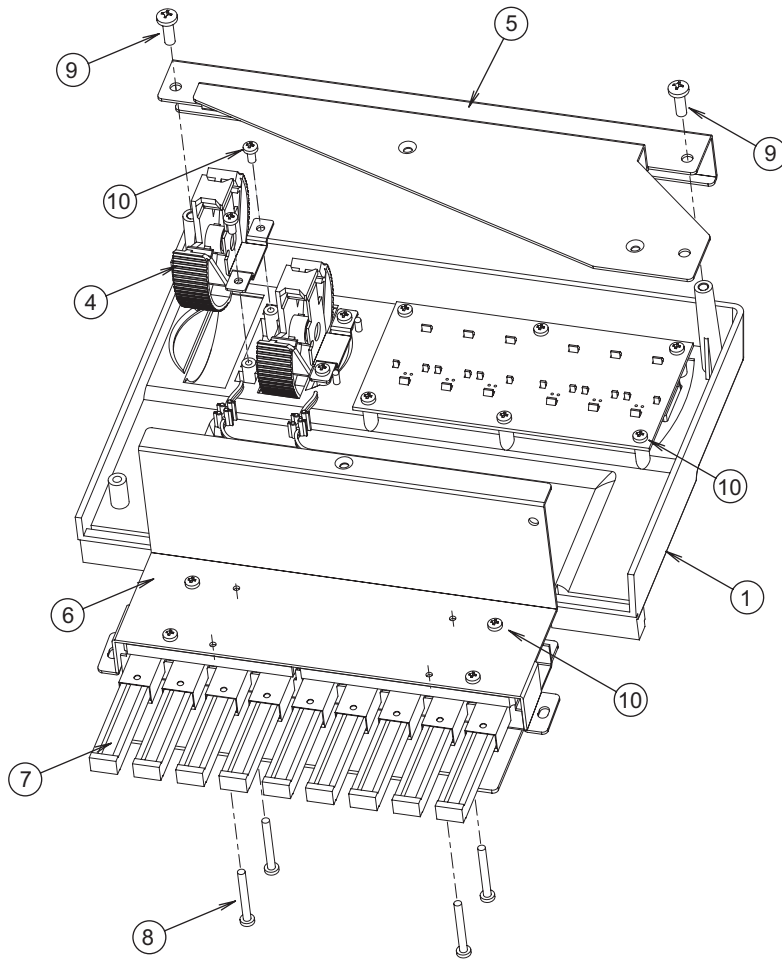


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|---------------------------------------|-------------|---------------------------------------|-------------|
| ②6 Top Panel Bracket | 00451-40553 | ③4 Cross Recessed Tapping Screw Type2 | 00653-33005 |
| ②7 Main Board Bracket | 00451-40556 | (Fluted Point)(Flat Head, 3x5, ZnB) | |
| ②8 Jack Bracket | 00451-40586 | ③5 Cross Recessed Tapping Screw | 00683-53008 |
| ②9 MGH-94A Ass'y | 00228-25216 | (For Plastic)(Binding Head, 3x8, ZnB) | |
| ③0 Switching Power Supply | 00366-01015 | ③6 Machine Screw | 00703-53006 |
| ③1 Ferrite Core | 00362-01017 | (Binding Head, M3x6, ZnB) | |
| ③2 Fixture For Ferrite Core | 00362-01018 | ③7 Nylon Rivet(P3045BLK) | 00760-03003 |
| ③3 Cross Recessed Tapping Screw Type3 | 00673-53005 | | |
| (Binding Head, 3x5, ZnB) | | | |



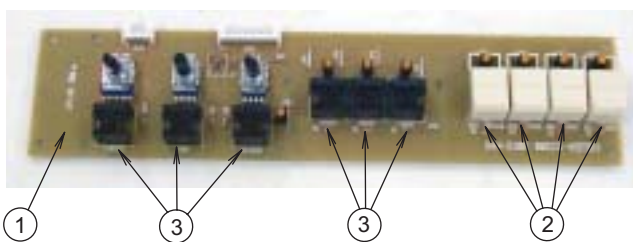
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|---------------|-------------|--|-------------|
| ③8 KEYBOARD | 00277-15001 | ④1 Cross Recessed Tapping Screw(For Plastic) | 00683-54012 |
| ③9 WR-HZ133-A | 00443-01346 | (Binding Head, 4x12, ZnB) | |
| ④0 WR-HZ133-J | 00443-01354 | ④2 Knob #1 | 00452-40199 |
| | | ④3 Knob #2 (With White Line) | 00452-40200 |

3. ENDBLOCK L ASS'Y (66710-02102)



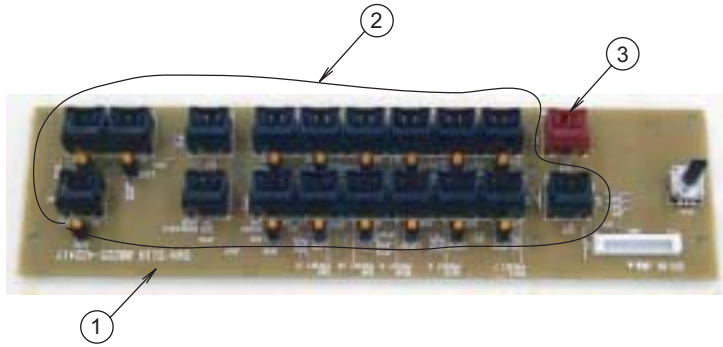
① Endblock L	00452-40203	⑧ Cross Recessed Tapping Screw Type2	00655-53025
② Switch Board EL Ass'y	66710-02105	(Fluted Point)(Binding Head, 3x25, ZnY)	
③ WR-HZ133-C	00443-01348	⑨ Cross Recessed Tapping Screw	00683-54012
④ Wheel Ass'y	66710-02107	(For Plastic)(Binding Head, 4x12, ZnB)	
⑤ Endblock Bracket L1	00451-40554	⑩ Cross Recessed Tapping Screw	00683-53006
⑥ Endblock Bracket L2	00451-40555	(For Plastic)(Binding Head, 3x6, ZnB)	
⑦ Drawbar Ass'y DB-609A	00278-51001		

4. SWITCH BOARD L ASS'Y (66710-02103)



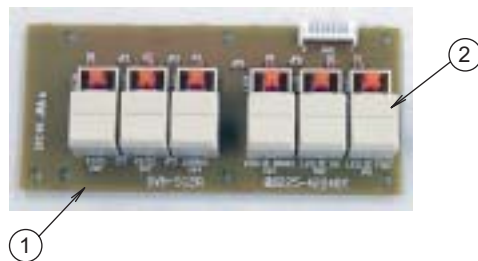
① SWH-510A Ass'y	00225-42236
② Keytop #1	00452-40205
③ Keytop #2-K	00452-40206

5. SWITCH BOARD R ASS'Y (66710-02104)



- ① SWH-511A Ass'y 00225-42241
- ② Keytop #2-K 00452-40206
- ③ Keytop #2-R 00452-40207

6. SWITCH BOARD EL ASS'Y (66710-0215)



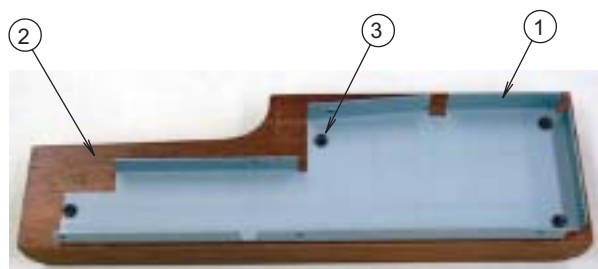
- ① SWH-512A Ass'y 00225-42246
- ② Keytop #1 00452-40205

7. BOTTOM PANEL ASS'Y (66710-02201)



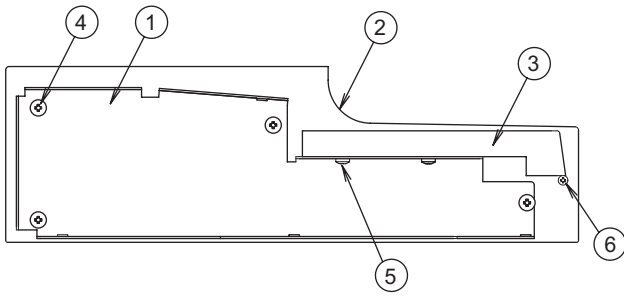
- ① Bottom Panel 00451-40550
- ② Plastic Foot 00453-40028

8. SIDE BOARD L ASS'Y (66710-02202)



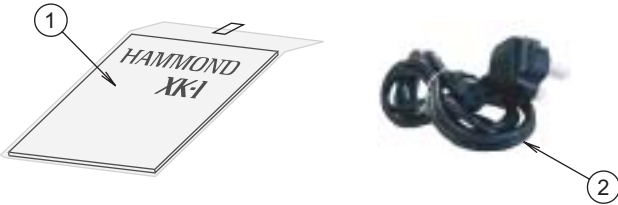
- ① Side Bracket L 00452-40203
- ② Side Board L 66710-02105
- ③ Cross Recessed Tapping Screw Type1 66710-02105
(Truss Head, 4x16, ZnY)

9. SIDE BOARD R ASS'Y (66710-02203)



- ① Side Bracket R 00451-40552
- ② Side Board R 00450-40718
- ③ Endblock R 00452-40204
- ④ Cross Recessed Tapping Screw type1 00615-64016
(Truss head, 4x16, ZnY)
- ⑤ Cross Recessed Tapping Screw for plastic 00683-54012
(Binding Head, 4x12, ZnB)
- ⑥ Cross Recessed Tapping Screw type1 00615-53012
(Binding Head, 3x12, ZnY)

10. ACCESSORY



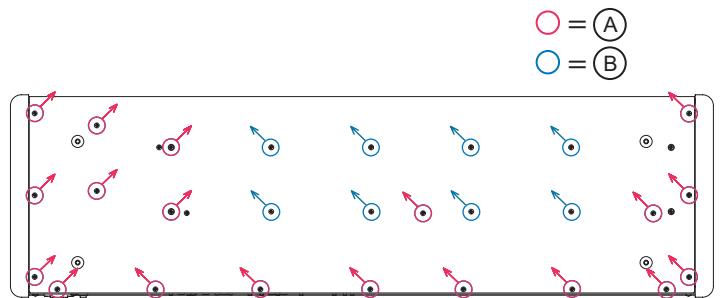
- ① User's Manual(Japanese) 00457-40112
User's Manual(English) 00457-40113
- ② AC Cord 100V(3m) 00439-02002
AC Cord 120V(3m) 00439-01004
AC Cord 220V(3m) 00439-01005
AC Cord 4622-001-0403 00439-01033
AC Cord 240V(3m) 00439-01006

9.DISASSEMBLING PROCEDURE

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

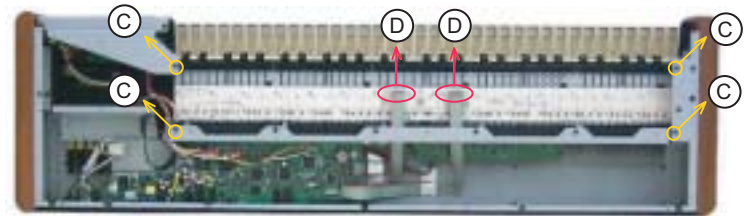
1.DISMOUNT THE BOTTOM PANEL

- ◆ Remove the 19 screws(Cross recessed tapping screw type3, Bind,4x5,ZnB) (A) from the bottom panel.
- ◆ Remove the 8 screws(Cross recessed tapping screw for plastic, Bind,4x12,ZnB) (B) from the bottom panel.



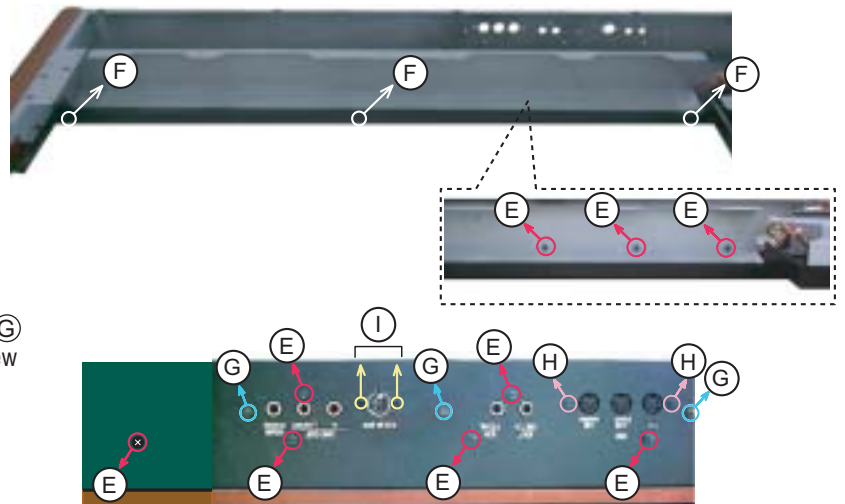
2.DISMOUNT THE KEYBOARD

- ◆ Remove the 4 screws(Cross recessed tapping screw for plastic, Bind,4x12,ZnB) (C) from the bottom panel.
- ◆ Remove the 2 Wiring(WR-HZ33-J) (D).
After that, Remove the Keyboard from the bottom panel.



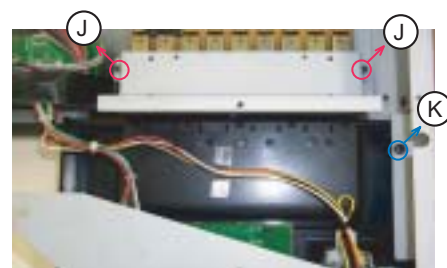
3.DISMOUNT THE KEYBOARD

- ◆ Remove the 9 screws(Cross recessed tapping screw for plastic ,Bind,3x5,ZnB) (E) from the Main board BKT.
- ◆ Remove the 3 screws(Cross recessed tapping screw type2,Flat,3x5,ZnB) (E) from the top panel BKT.
- ◆ Remove the 3 screws(Machine screw,Bind,M3x6,ZnB)(G) and Remove the 2 screws(Cross recessed tapping screw for plastic, Bind,3x8,ZnB) (H) from MGH-94A Ass'y.
- ◆ The rivet (I) is pushed out from the back.



4.DISMOUNT THE ENDBLOCK (L)

- ◆ Remove the 2 screws(Cross recessed tapping screw type3, Bind,3x5,ZnB) (J) from the endblock(L).
- ◆ Remove the 1 screws(Cross recessed tapping screw type2, fluted point,Bind,4x8,ZnB) (K) from the bottom panel.



WARNING

Battery Replacement

Replace battery with **SONY** or **HITACHI MAXELL** or
SHENZHEN GAONENGDA BATTERY CO.,LTD

Part No. **CR2032** Only.

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

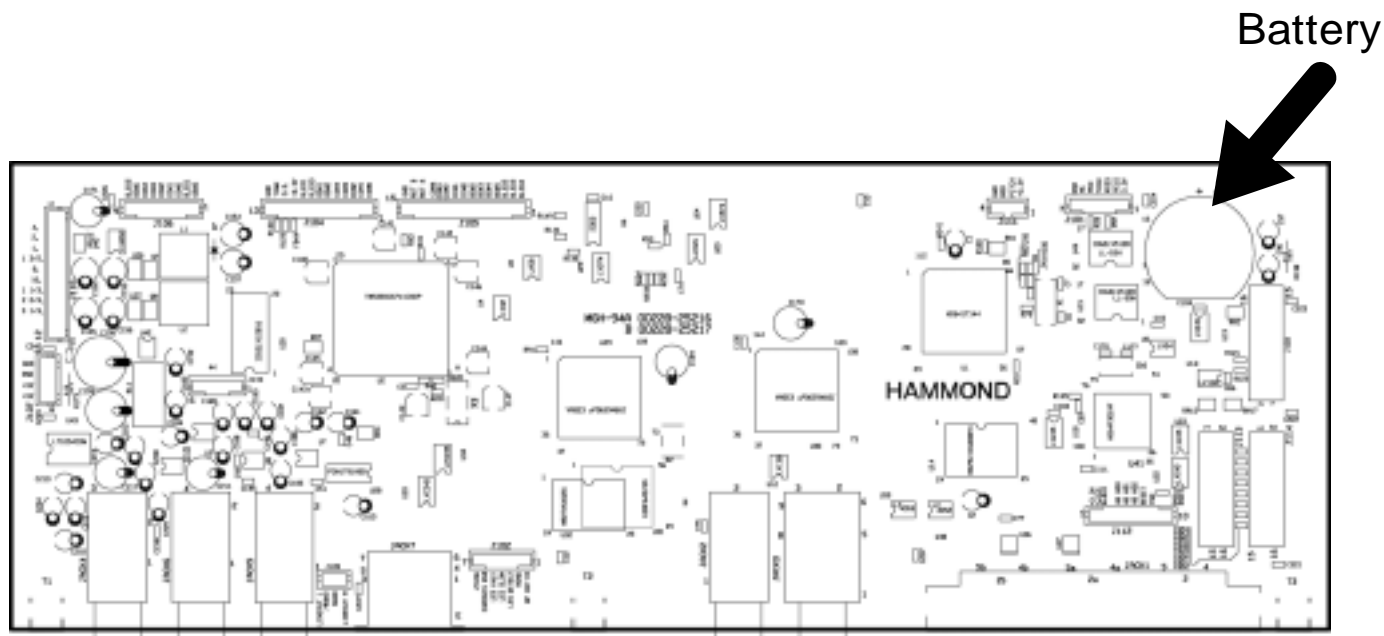
Battery may explode if mistreated.

Do not recharge,disassemble.

Collect used battery promptly.

Keep away from children.

Do not disassemble and do not dispose in fire.



MGH-94A

11. XK-1 Technical description

1. Switching power supply (JRC AES10-5)

This board commutates the AC power input and supplies +5V power. This +5V power is used as a MGH-94A's power source.

2. Main, CPU, VASE, DSP and JACK on the board MGH-94A

2 CPUs, 2 VASE3s (sound generator), DSP, D/A converter and jacks are all built in the MGH-94A. The Main CPU and the VASE 3 simulate the tone wheel generator and the multi-contact keying to provide the effects.

2-1. Main CPU

The U1 means the Main CPU (SH7144). This CPU communicates to the switch scan, each switch's operation, the LCD display, the analog-digital conversion for drawbars and volume, the VASE3, the DSP control and the SUB CPU.

2-2. SUB CPU

The U41 means the SUB CPU (3024). This CPU does key-scan and communicates with the Main CPU.

2-3. Main memory

Main soft wear is stored at the 16bit flash memory of the U14 (29LV160CBTC). The U15 and U44, 1Mbit SRAM is supplied VCC by a battery and saves the each parameter. It is also used for a workspace.

2-4. System reset

The U11 constantly monitors +3.3V and tells the Main CPU to reset when the voltage is reduced. This circuit helps to switch the back up SRAM power to the battery(BT1) at the same time.

2-5. VASE3 sound generator

The U29 and 30 is a sound generator LSI and each one has 64 simultaneous tones (Total is 128 tones). 96 out of 128 tones are

used for UM and LM tone wheel generator and the rest are used for pedal, percussion and key-click. It switches off the tone wheel channel when the extra voice is selected.

It also reads the data of U32 wave ROM and outputs the key sound which was ordered by the Main CPU, to DSP.

2-6 DSP

The U2, TMS320C6711CGDP is the high efficient DSP, which has a internal clock (200MHz). The memory for the delay system is the U35, 1M SRAM. This DSP has a chorus vibrato, overdrive, tone control, expression control, Leslie simulation, reverbs and delay system.

2-7 D/A converter

The U28 is the high efficient D/A converter, which has a 24 bit balanced output system. The U7, OPAMP, which is behind the D/A converter, converts the balanced signal to the unbalanced one and, at the same time, work as the LOWPASS FILTER which gets out the SAMPLING CLOCK.

2-8 Serial Interface

PK MIDI IN, LM MIDI IN and MIDI OUT are connected to the U1, Main CPU (SH7144) directly.

2-9 LCD control

The U1, Main CPU controls the LCD display (2 lines x 20 letters).

3. Panel Switch board SWH-510A, 511A, 512A

Each of them is connected to the MGH-94A and controlled by the U1, Main CPU (SH7144).

SWH-510 has the VR1 (master volume), VR2 (tone volume) and VR3 (overdrive volume). And it is connected to the MGH-94A. The tone volume has a center click.

SWH-511 has the RSW1 (rotary encorder) and is connected to the MGH-94A.

12. Initialization and checking the soft-wear versions

1. Initialization

Please follow the below procedure to initialize the XK-1.

- a. Turn off the power of the XK-1.
- b. Turn on the power again with pressing the [REC/JUMP] button.
- c. Keep pressing the [REC/JUMP] button till the screen shows "Loading Default ...".
- d. When the initialization is completed, the play mode appears on the display screen.

2. Check the soft-wear versions

Please follow the below procedure to check the XK-1 soft-wear version number.

- a. Turn on the XK-1.
- b. From the play mode screen, select a [MENU/EXIT] button and see the screen changes to the MENU. Select the page "D" from page button.
- c. Press [4] SYSTEM button and the Main Program appears on the screen.
- d. Press [>] button and the tone information appears on the screen.
- e. Press [>] button and the Demo songs appears on the screen.
- f. Press [>] button and the Key scan program appears on the screen.
- g. Press [>] button and the Boot program appears on the screen.