



VERTICAL MONITOR
TWO PLAYER



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STEREO SOUND OPTION See page 4

INSTRUCTION MANUAL

Service #

708-215-5100

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LIGHTNING FIGHTERS KIT CONTENTS

Quantity	Part #	Description
1	939003	Lightning FIGHTERS PCB
1	939100	Lightning Fighters Control Panel Overlay
1	939101	Lightning Fighters Player Instruction
1	939200	Lightning Fighters Marquee
2	939300	Lightning Fighters Side Decals
1	939400	Lightning Fighters Manual
2	30110	Red Button
2	30111	White Button
2	30112	Blue Button
6	30202	Switch Holder
6	30250	Palnuts
1	30304	Red Joy Stick
1	30305	Blue Joy Stick
1	40310	Marquee Plexiglass
1	40605	FCC Cage
1	40608	Kit Box
1	40904	Kit Wire Harness

PUTTING YOUR BEST GAME FORWARD

PREPARATION:

For best results, all old graphics should be removed completely from the cabinet. "Stick-on" graphics can be removed by using a hairdryer or hot air device. The heat from the dryer will loosen the adhesive, allowing you to easily peel them off—any adhesive residue can be cleaned off with acetone and a soft dry cloth. (DO NOT USE ACETONE ON SURFACES PAINTED WITH FLAT PAINT.)

TOOLS YOU NEED:

1. Foaming Aerosol (such as "Windex").
2. Soft Squeegee.
3. X-Acto Knife.

SIDE PANEL DECALS

1. Spray area of cabinet where Side Panel decals are to be applied with foaming aerosol or a mild soap solution.
2. Remove protective backing from decals.
3. Position decals into place.
4. With a soft squeegee, beginning from the center of the decal, slowly and evenly press out excess foam until you achieve a smooth finish.
5. Allow to set approximately 2 to 3 hours before handling. Maximum adherence is achieved in 48 to 72 hours.

6. Trim side decal to fit your cabinet.

CONTROL PANEL OVERLAY:

1. Refer to Recommended Control Panel Layout
2. Drill any new holes needed.
3. Plug any holes that will not be used. (A permanent epoxy-filler works well for this step.)
4. Pre-position the overlay prior to removing the backing.
5. Slowly apply the overlay — inch by inch on the control panel, removing the backing as you apply it.
6. Once it's in place, by using an X-Acto knife, cut around the button and joystick placements.

INSTRUCTION/BUTTON DECALS:

Apply the Player Instruction, Button and 1 Player/2 Player decals in their respective positions. Apply pressure liberally. Allow to set as long as possible before putting game on location.

NOTE: Maximum adherence is achieved in 48 to 72 hours.

MARQUEE

(WEAR PROTECTIVE GLASSES WHILE TRIMMING MARQUEE)

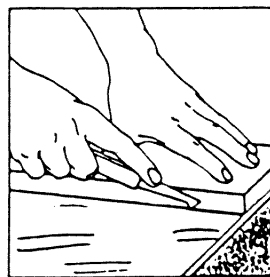
1/8" Acrylic Marquee should be cut to fit your game. DO NOT remove protective mask until this is done.

One way of cutting your Marquee is as follows: (Be sure to protect painted side of Marquee from any surface which may scratch or mar finish).

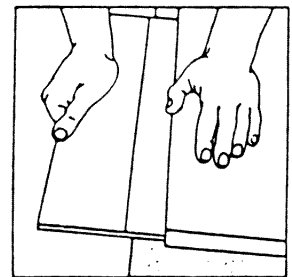
CUTTING WITH A KNIFE OR SCRIBER:

Acrylic sheet up to 3/16" thick may be cut by a method similar to that used for cutting window glass. Use a scribe of some kind — a scribing knife such as the one pictured, a metal scribe, an awl, or even a sturdy craft knife — to score the sheet. Draw the scribe several times (7 or 8 times for a 3/16" thick piece) along a straight edge held firmly in place. It is best not to remove the protective masking. Make the cuts carefully using firm, even pressure. For best results make each stroke cleanly off the edge of the sheet.

Then clamp the acrylic sheet or hold it rigidly under a straight edge with the scribe mark hanging just over the edge of a table. Protect your hands with a cloth, and apply a sharp downward pressure to the other side of the sheet. It will break along the scratch. Scrape the edges to smooth any sharp corners. This method is not recommended for long breaks or thick material.



Always draw the scribing knife along a straight edge.



Break sheet over edge of table after scribing.

P.C.B. CAGE INSTALLATION

Konami, Inc. now supplies a new style P.C.B. cage which is superior to old style cages because of ease of installation. The cage is made of a 32 point stem-stock which is fire retardant.

TO INSTALL THE CAGE:

1. Open cage bottom and secure to desired P.C.B. position.
2. Install printed circuit board inside cage using wood screws, screwed through the cage bottom into cabinet side.
3. Close the cage over printed circuit board and secure with latch on cage.

MONITOR INFORMATION

SERVICE INSTRUCTIONS

NOTE: All monitors are equipped with automatic degaussing coils (L701) which demagnetize the picture tube every time the monitor is turned on after being off for a minimum of 5 minutes. Should any part of the chassis become magnetized it will be necessary to degauss the affected area with a manual degaussing coil. Move the coil slowly around the CRT face and all surrounding metal parts. Then slowly withdraw for a distance of 6 feet before turning off.

1.0 BLACK LEVEL CONTROL ADJUSTMENT

This control has been set at the factory and should not need further attention, however, when the game is connected a slight adjustment of VR201 may be necessary to obtain the proper black level (the black portion of the picture just extinguished).

2.0 VERTICAL SIZE (HEIGHT)

Location of this control is shown in Fig. 1. This control must be adjusted slowly, if necessary, until the picture or test pattern attains the correct vertical proportions.

3.0 CIRCUIT PROTECTION

A 4.0A pigtail fuse, mounted on the Main Board has been provided to protect the Power Output Circuit.

4.0 FOCUS

Adjust the focus control, located on the HV unit (T352), for maximum over-all definition and fine picture detail.

5.0 HORIZONTAL HOLD CONTROL ADJUSTMENT, VR351 (See Fig. 1)

A warm-up period of at least five minutes should be allowed before alignment is carried out. With the monitor being driven from the game signal, short TP601 to TP31. Adjust VR351 until the picture stops sliding horizontally. Remove the short.

6.0 HORIZONTAL VIDEO POSITION

If the video is off center on the raster some compensation can be made by adjusting this control.

7.0 VERTICAL RASTER POSITION ADJUSTMENT

If the video is off center vertically, (short dimension of picture tube) some compensation can be made by moving the vertical raster position adjustment jumper to either positions "U" or "D".

8.0 HORIZONTAL RASTER POSITION ADJUSTMENT

If the video is off center horizontally (long dimension of the picture tube) some compensation can be made by moving the horizontal raster position adjustment jumper to either positions "R" or "L".

9.0 HORIZONTAL WIDTH ADJUSTMENT

The horizontal width coil is a hexagonal tuning tool adjustment. This control must be adjusted slowly, if necessary, until the picture or test pattern attains the correct horizontal proportions.

* KONAMI GAMES ARE ALL NEGATIVE COMPOSITE SYNC. USE THE THREE PIN CONNECTOR ON THE MONITOR.

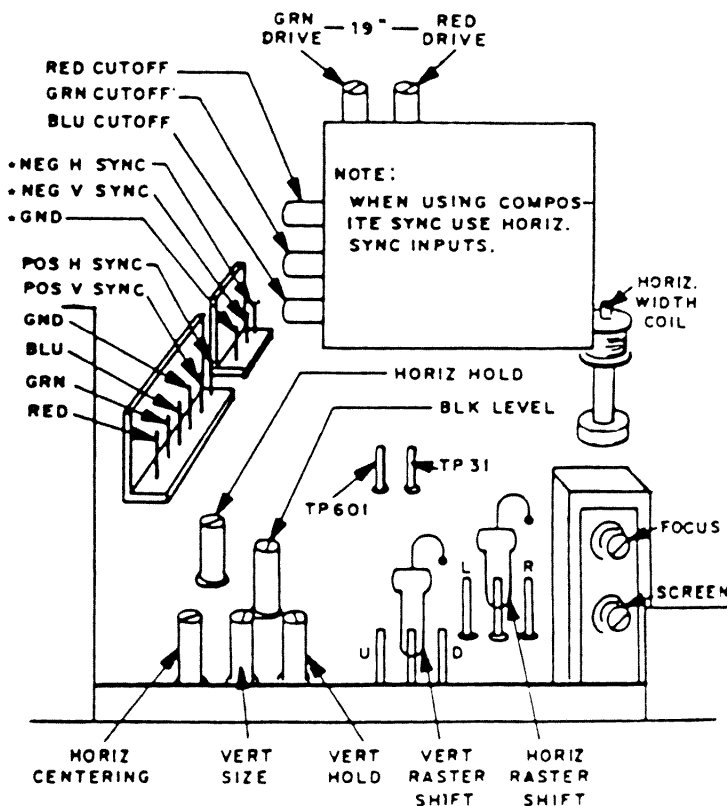


FIGURE 1

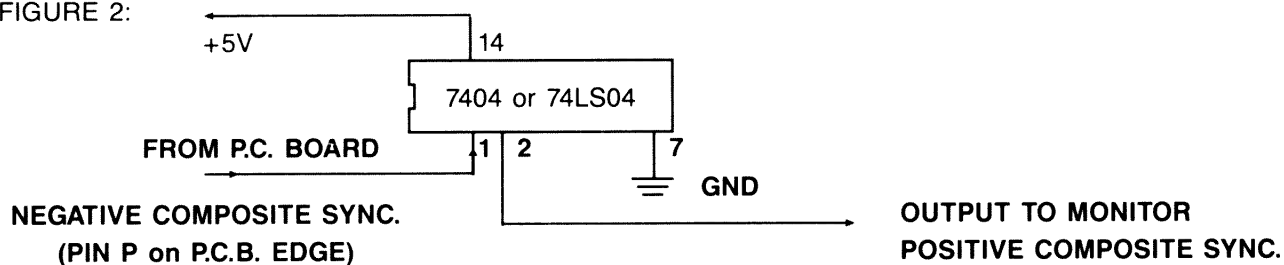
LIGHTNING FIGHTERS TECHNICAL INFORMATION

Lightning Fighters requires vertically mounted monitor. It also generates composite negative sync. If your monitor is composite positive sync, you will have to change to composite negative sync.

To alternate composite positive sync to composite negative sync, use 7404 IC or 74LS04 IC. The signal on the output pin from the P.C.B. is a combination of H-sync and V-sync.

NOTE: Please refer to Figure 2.

FIGURE 2:



(+5V and GND should be taken out of the P.C. Board.)

TROUBLE SHOOTING GUIDE

PROBLEM:	POSSIBLE SOLUTION
No Screen or Constant Reset	<ol style="list-style-type: none"> 1). Check +5V line at the P.C.B. Adjust if necessary. 2). Make sure all socketed eproms and custom IC's are seated securely. Apply light pressure to secure. 3). Check harness to be sure it is not on backwards.
No Sound	<ol style="list-style-type: none"> 1). Check +12V line at the P.C.B. 2). Make sure both speaker out wires are connected to the speakers. (DO NOT CONNECT A GROUND.)
Distorted Sound	<ol style="list-style-type: none"> 1). Replace cabinet speaker.
I/O Problem (coin 1 doesn't work or Joystick Up doesn't work, etc.)	<ol style="list-style-type: none"> 1). Do not hook a coin counter to the coin 1 or coin 2 outputs. This will cause damage. 2). Check your schematic for the 74LS253 IC that corresponds to your I/O problem. Check the appropriate pin with a scope or multimeter for a high output (5V), if output is low replace the 74LS253.

CAUTION

DO NOT WIRE COIN COUNTERS TO THE COIN 1 OR COIN 2 OUTPUTS. THIS WILL CAUSE DAMAGE TO THE I/O MICROCHIP 74LS253. COIN COUNTERS CAN ONLY BE WIRED TO COIN COUNTER OUTPUTS.

LIGHTNING FIGHTERS TECHNICAL INFORMATION

TECHNICAL INFORMATION

- (1) Required power capacity
GND-Vcc 5V 4A or more
GND-(+12V)
*See the Wiring Diagram.
- (2) Output
R (red) analog, positive
G (green) analog, positive
B (blue) analog, positive
SYNC. H-V complexed, negative
- (3) The monitor should be vertically installed.
- (4) Use the volume knob on the PCB to adjust sound level.
Turn the knob clockwise and it becomes louder.
- (5) Handle with care.

PLAY INSTRUCTION

- 1 or 2 players. Second player can join at anytime.
- Move your jet fighter using the 8-way joystick and destroy the enemies with SHOOT button.
- Destroy a red enemy formation and a power up item will appear, which turns from VULCAN (V) to SPREAD (S) in turn. Pick up the same item again and again and your power up level will increase up to a max of five times.
- Destroy a certain enemy on the ground and capture the SPECIAL WEAPON. Two kinds of SPECIAL WEAPON, DRAGON LASER and PARTICLE BEAM, turn into one another. SPECIAL WEAPON can be stored up to a max of six altogether. Use SPECIAL WEAPON button to fire.
- In 2-player mode, when you destroy a silver enemy formation, you can obtain TRIGON, an automatic fire Cyber Weapon. There are four types of TRIGON: SINGLE, TWIN, HUNTING and BLAST TRIGONS, one of which is positioned between players firing automatically.
- Continuation is available by inserting additional coins and pressing start button within the time given.
- 9 stages in all. The game ends after completing the second round.

SELF TEST

Normal: OK will be displayed. Then the game will start.
Abnormal: BAD will be displayed and self test will repeat itself.

MANUAL TEST

- (1) How to start
Turn on the power while the SW3 of the DIP SWITCH No. 3 is on. Push player 1 START button to change items.
- (2) Test items
 1. ROM check
 2. Picture contortion
 3. Color check
 4. I/O check
 5. Sound check
 6. Dip switch settings*Push player 1 SHOOT button to change sound code.

* STEREO SOUND OPTION *

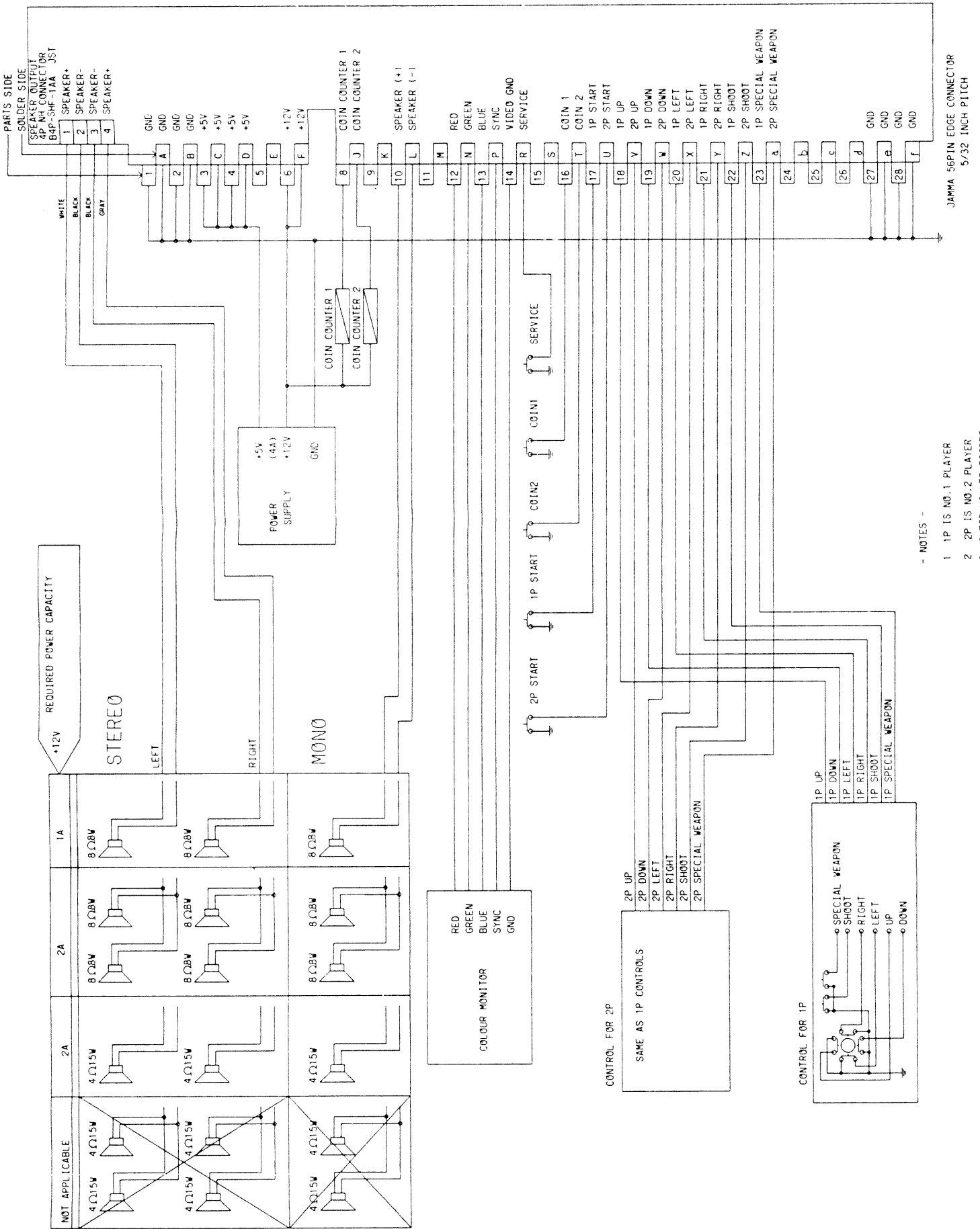
Lighting Fighters has the option of either stereo or mono sound. Set dip switch bank #3, switch #2 off for mono or on for stereo (when wiring for stereo sound see wiring diagram on page 6).

LIGHTNING FIGHTERS WIRING COLOR CODE

WIRE COLOR KEY:		← Solder Side		Parts Side →		
		Color	Label	Pin	Label	Color
BLACK		GND	A	1	GND	BLACK
BLACK		GND	B	2	GND	BLACK
RED		+5V DC	C	3	+5V DC	RED
RED		+5V DC	D	4	+5V DC	RED
BLUE		NOT USED	E	5	NOT USED	BLUE
ORANGE		+ 12V DC	F	6	+ 12V DC	ORANGE
		*KEY	H	7	*KEY	
WHITE/RED		COIN COUNTER 2	J	8	COIN COUNTER 1	WHITE/BLACK
		(EMPTY)	K	9	(EMPTY)	
RED/BLACK		SPEAKER	L	10	SPEAKER	RED/YELLOW
		(EMPTY)	M	11	(EMPTY)	
GREEN		VIDEO GREEN	N	12	VIDEO RED	RED
WHITE		VIDEO SYNC	P	13	VIDEO BLUE	BLUE
WHITE/ORANGE		SERVICE SW	R	14	VIDEO GROUND	BLACK
BLACK/WHITE		(EMPTY)	S	15	(EMPTY)	WHITE/BROWN
BROWN/BLACK		COIN 2	T	16	COIN 1	YELLOW/BLACK
RED/WHITE		2P START	U	17	1P START	RED
BLUE/WHITE		2P UP	V	18	1P UP	BLUE
GREEN/WHITE		2P DOWN	W	19	1P DOWN	GREEN
ORANGE/WHITE		2P LEFT	X	20	1P LEFT	ORANGE
YELLOW/WHITE		2P RIGHT	Y	21	1P RIGHT	YELLOW
BROWN/WHITE		2P SHOOT 2	Z	22	1P SHOOT 1	BROWN
VIOLET/WHITE		2P SHOOT 2	a	23	1P SHOOT 2	VIOLET
GRAY/WHITE		NOT USED	b	24	NOT USED	GRAY
		NOT USED	c	25	NOT USED	
		NOT USED	d	26	NOT USED	
BLACK		GND	e	27	GND	BLACK
BLACK		GND	f	28	GND	BLACK

(BASE COLOR/LINE COLOR)

WIRING DIAGRAM



- NOTES -

- 1 1P IS NO.1 PLAYER
- 2 2P IS NO.2 PLAYER
- 3 SURGE KILLER DIODES FOR COIN COUNTER INSTALLED ON P.C.B

JAMMA 56PIN EDGE CONNECTOR
5/32 INCH PITCH

DIP SWITCH SETTINGS

DIP SWITCH NO. 1 SETTINGS

1. COIN SWITCH NO. 1 SETTINGS

SW	1	2	3	4	COIN	PLAY
○	OFF	OFF	OFF	OFF	1	1
	ON				1	2
	OFF	ON			1	3
	ON				1	4
	OFF	OFF	ON	OFF	1	5
	ON				1	6
	OFF	ON			1	7
	ON				2	1
	OFF	OFF	OFF	ON	2	3
	ON				2	5
	OFF	ON			3	1
	ON				3	2
	OFF	OFF	ON	ON	3	4
	ON				4	1
	OFF	ON			4	3
	ON				FREEPLAY	

FREEPLAY: You can play games without coins.

2. COIN SWITCH NO. 2 SETTINGS

SW	5	6	7	8	COIN	PLAY
○	OFF	OFF	OFF	OFF	1	1
	ON				1	2
	OFF	ON			1	3
	ON				1	4
	OFF	OFF	ON	OFF	1	5
	ON				1	6
	OFF	ON			1	7
	ON				2	1
	OFF	OFF	OFF	ON	2	3
	ON				2	5
	OFF	ON			3	1
	ON				3	2
	OFF	OFF	ON	ON	3	4
	ON				4	1
	OFF	ON			4	3
	ON				VOID	

DIP SWITCH NO. 2 SETTINGS

1. THE NUMBER OF PLAYER'S LIFE

SW	1	2	NUMBER
○	OFF	OFF	2
	ON		3
	OFF	ON	5
	ON		7

2. BONUS LIFE

SW	4	5	BONUS LIFE
○	OFF	OFF	1ST AT 100,000 PTS, 2ND AT 400,000 PTS
	ON		1ST AT 150,000 PTS, 2ND AT 500,000 PTS
	OFF	ON	1ST AT 200,000 PTS ONLY
	ON		NO BONUS LIFE

3. DIFFICULTY OF THE GAME

SW	6	7	DIFFICULTY
○	OFF	OFF	EASY
	ON		NORMAL
	OFF	ON	DIFFICULT
	ON		VERY DIFFICULT

4. SOUND IN ATTRACTIVE MODE

SW	8	SOUND
○	OFF	OFF
	ON	ON

SW3 is not used.

DIP SWITCH NO. 3 SETTINGS

1. VIDEO SCREEN FLIP

SW	1	
○	OFF	NORMAL
	ON	UPSIDE DOWN

2. MONAURAL/STEREO SOUND OUTPUT

SW	2	SOUND OUTPUT
○	OFF	MONAURAL
	ON	STEREO

3. CHANGE OF MODE

SW	3	MODE
○	OFF	GAME
	ON	TEST

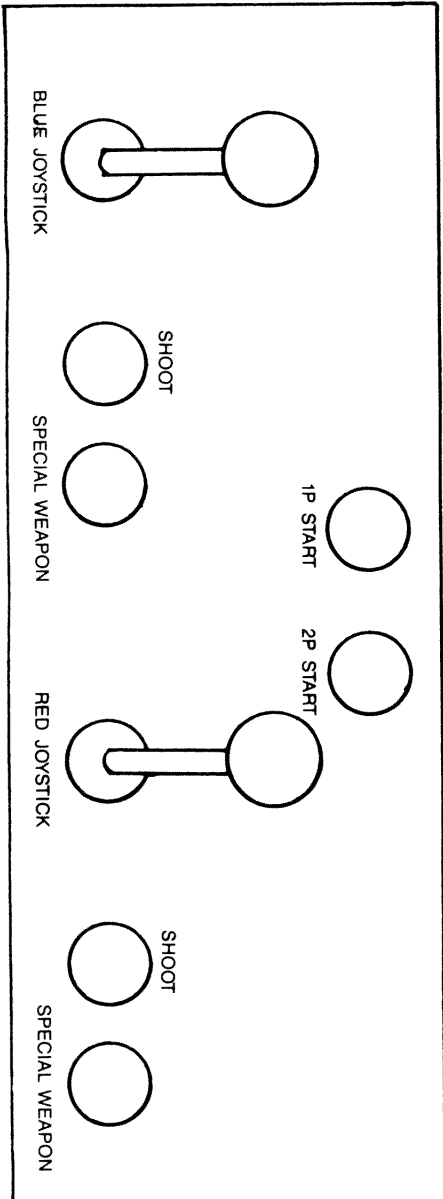
SW4 is not used.

○ shows recommended settings.

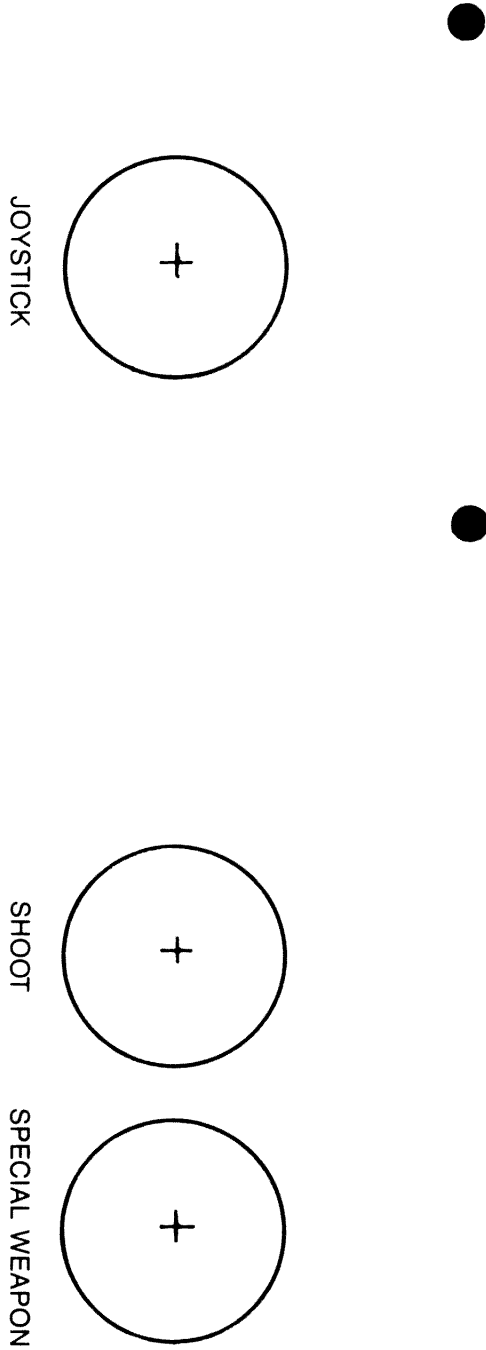
CONTROL PANEL DRILLING TEMPLATE

Button Hole Size 1-3/16 Inch

Use this Template for Player 1 and Player 2 Controls



RECOMMENDED CONTROL PANEL LAYOUT



USER INFORMATION
WARNING
F.C.C. REGULATION COMPLIANCE

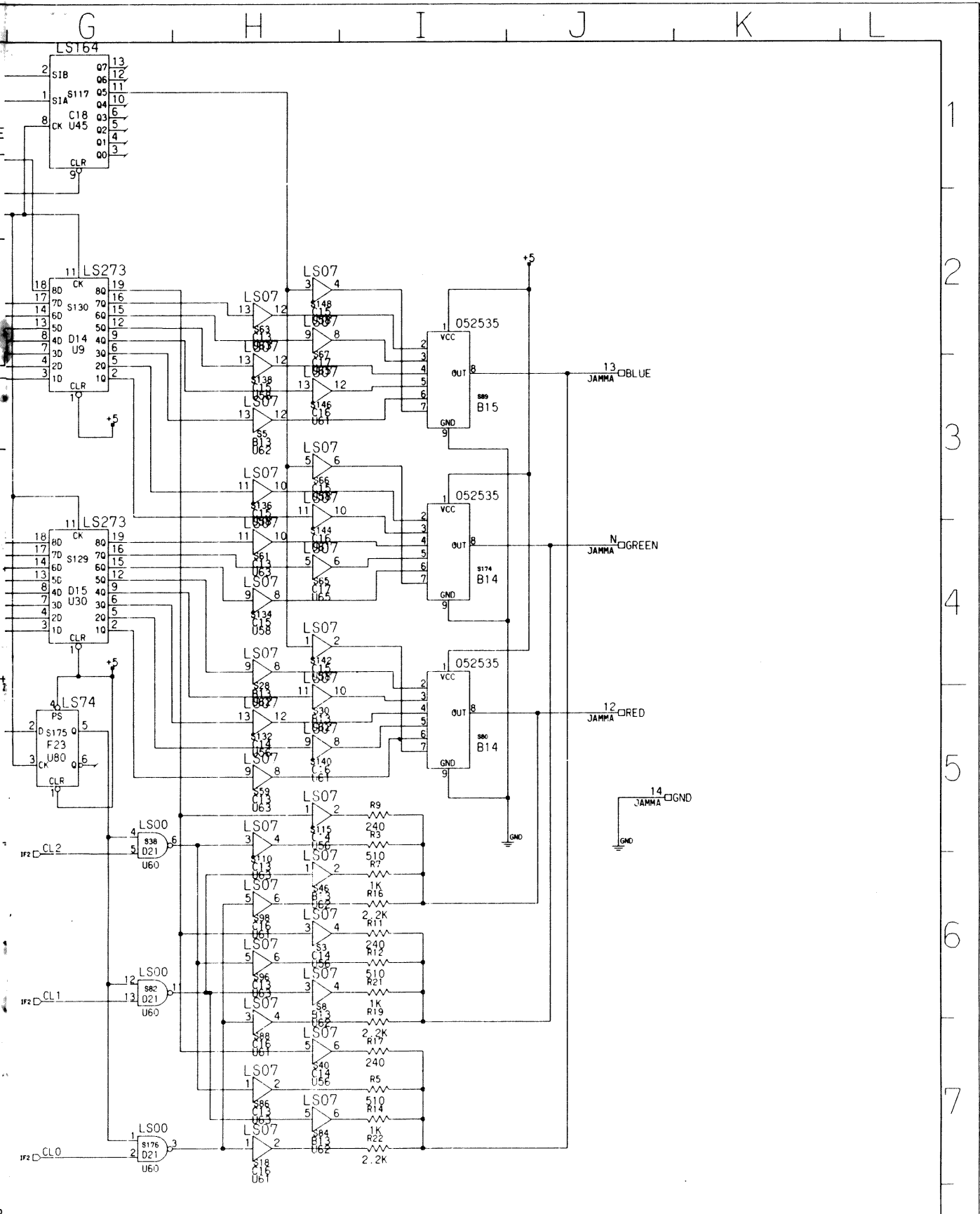
THIS KIT IS INTENDED FOR USE ONLY ON COIN-OPERATED VIDEO GAMES MANUFACTURED AFTER OCTOBER 1, 1983 WHICH HAVE BEEN VERIFIED FOR COMPLIANCE WITH REQUIREMENTS IN PART 15 OF F.C.C. RULES FOR A CLASS A COMPUTING DEVICE.

IMPROPER CONNECTION OF THIS KIT OR CONNECTION TO ANY OTHER GAME NOT SO MANUFACTURED OR VERIFIED FOR COMPLIANCE MAY CAUSE UNACCEPTABLE INTERFERENCE TO RADIO AND TV. RECEPTION, REQUIRING THE OPERATOR TO TAKE WHATEVER STEPS ARE NECESSARY TO CORRECT THE INTERFERENCE.

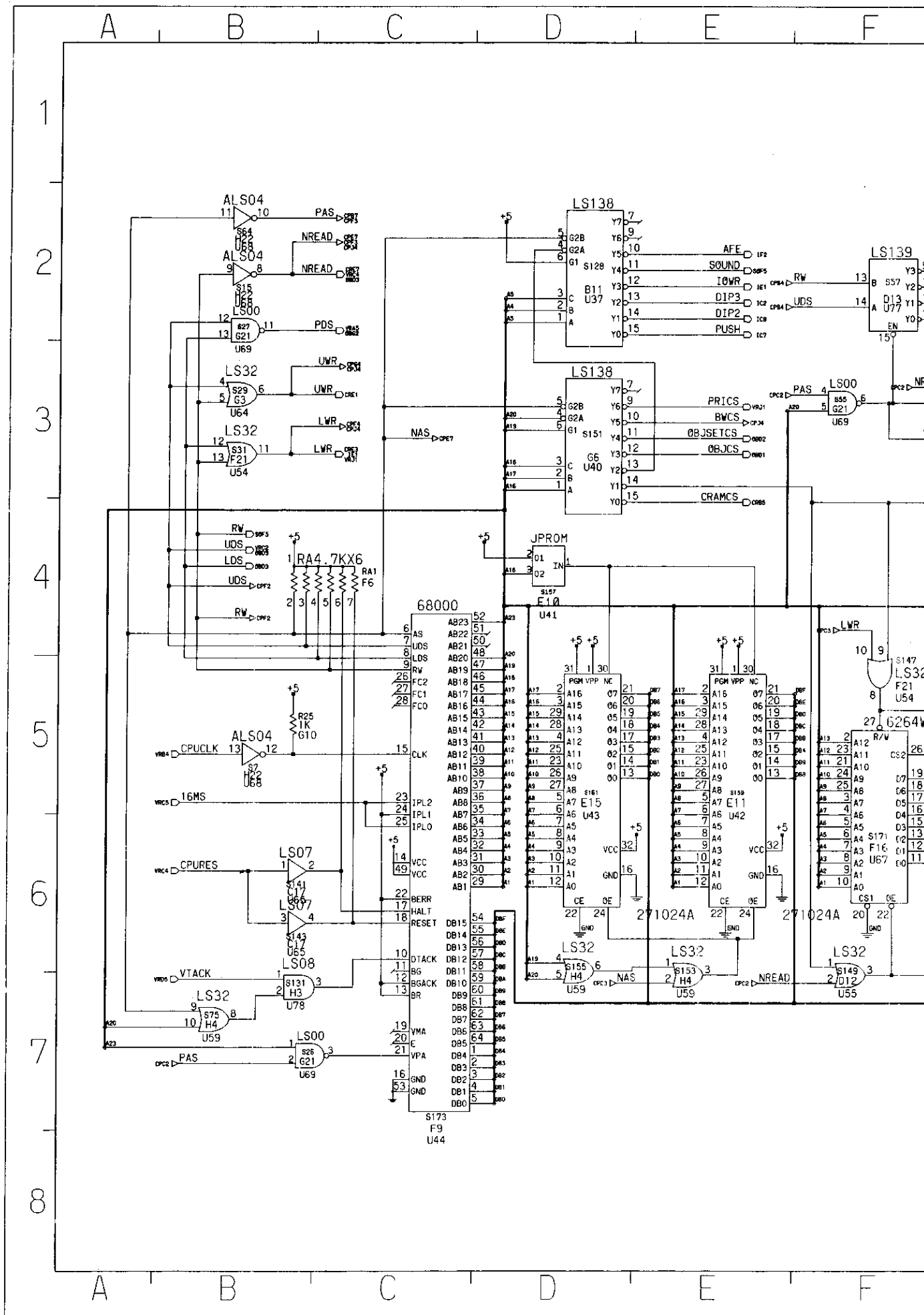
THE P.C. BOARD CAGE SUPPLIED WITH THIS CONVERSION KIT MUST BE UTILIZED AND TERMINATED TO GROUND AT THE TIME OF INSTALLATION.

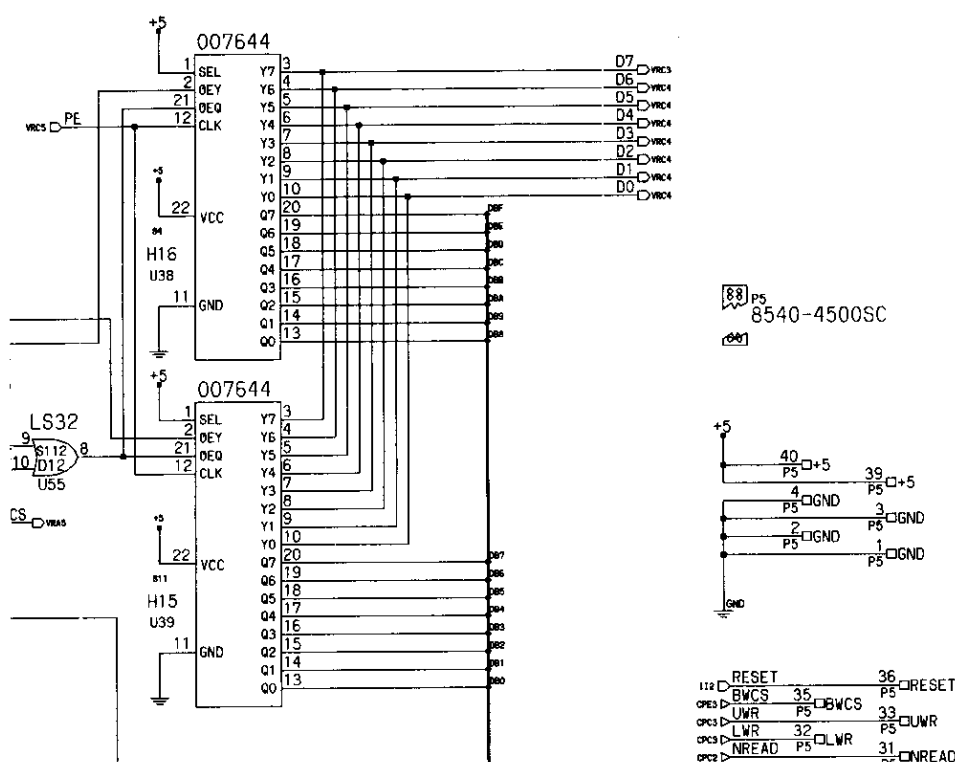


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Telephone: (312) 215-5100, Telex: 6871385 KONAM UW, Fax: (708) 215-5122

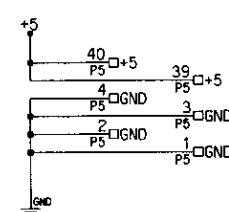


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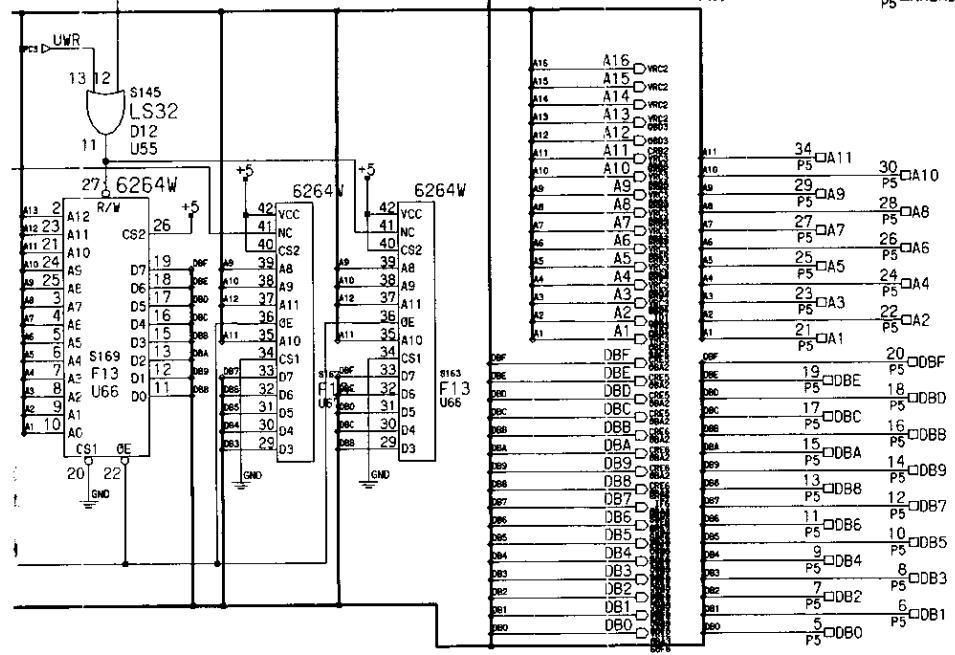




88 P5 8540-4500SC
89



RESET 36
112 BWCS 35
OP3 UWR P5
OP3 LWR 32
OP3 NREAD P5

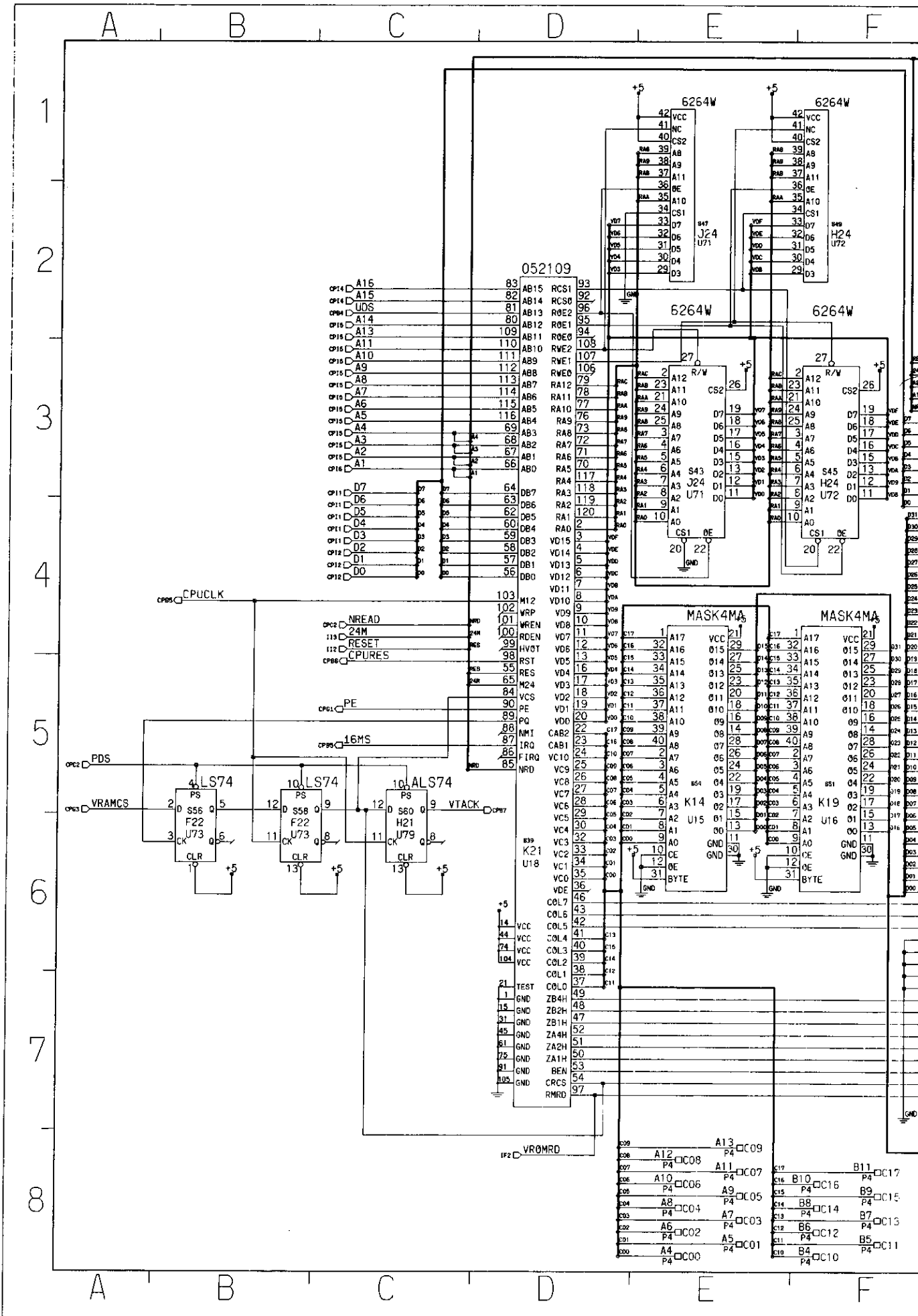


A16 A16
A15 A15
A14 A14
A13 A13
A12 A12
A11 A11
A10 A10
A9 A9
A8 A8
A7 A7
A6 A6
A5 A5
A4 A4
A3 A3
A2 A2
A1 A1
DBF
DBE
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DB4
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DB1
DB0

NOTES

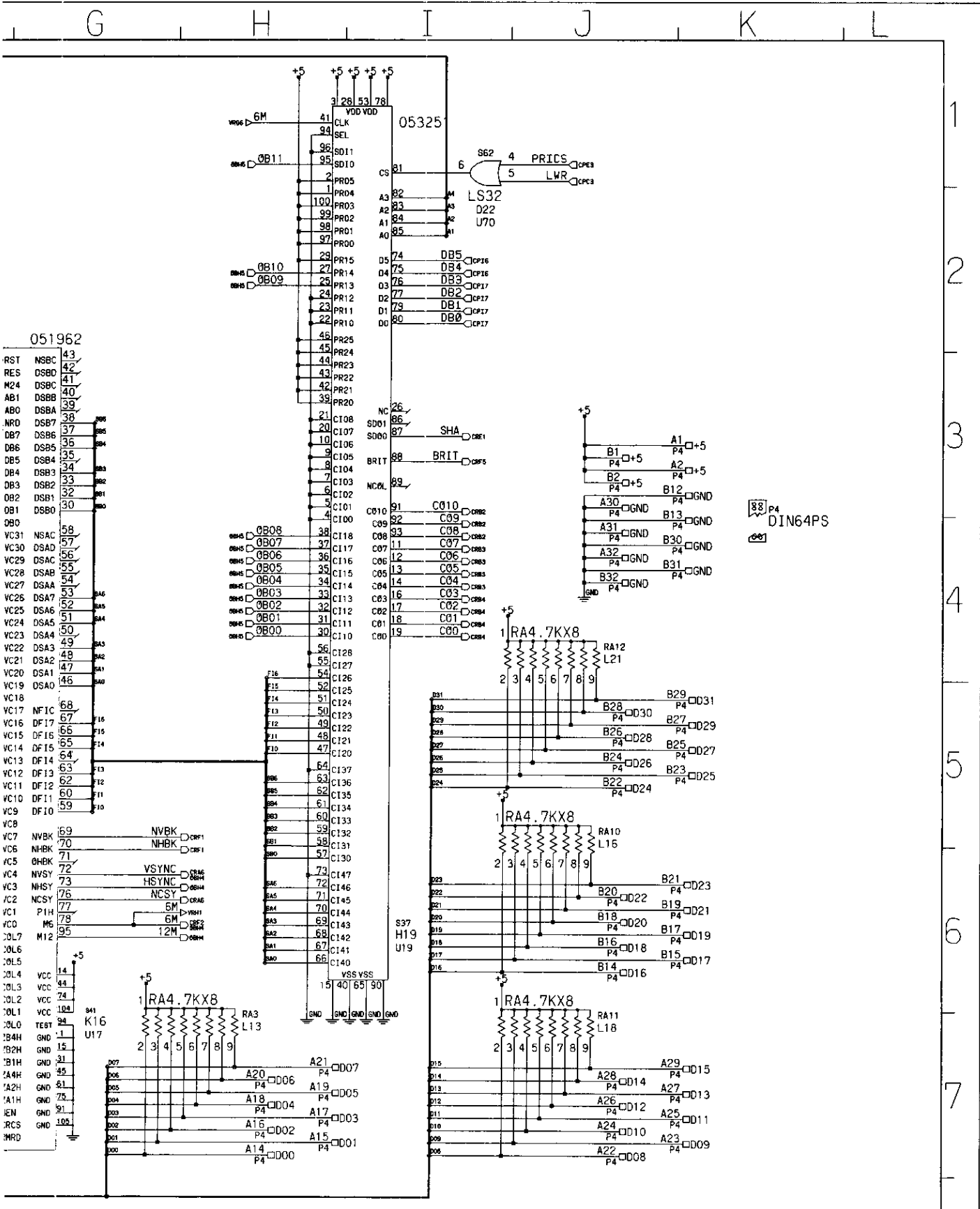
- KINDS OF CAPACITOR
E: ELECTROLYTIC
M: MYLAR
T: TANTALUM
C: CERAMIC
 - KINDS OF CONNECTOR
JAMMA □ JAMMA 56PIN EDGE
NUMBER: PARTS SIDE
ALFABET: SOLDER SIDE
(/A/ IS SMALL LETTER)
- 1P □ CN1 (VSYNC)
 - 2P □ D1N64P (D/A)
 - 3P □ D1N64P (OBJ)
 - 4P □ D1N64P (VRAM)
 - 6P □ NHCN4P (STEREO)

				KONAMI INDUSTRY CO., LTD.		REG. TYPE		CPU SCHEMATIC DIAGRAM	
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DESIGN	DRAW	CHECK	APPROVE	RELEASE DATE	89. 10. 30		CODE NO.		
				SCALE	TOLERANCE		351925 1/6		



CP14	A16	83	AB15	RCS1	93
CP14	A15	82	AB14	RCS0	92
CP14	UDS	81	AB13	ROE2	96
CP14	A14	80	AB12	ROE1	95
CP15	A13	109	AB11	ROE0	94
CP15	A11	110	AB10	RWE2	108
CP15	A10	111	AB9	RWE1	107
CP15	A9	112	AB8	RWE0	106
CP15	A8	113	AB7	RA12	79
CP10	A7	114	AB6	RA11	78
CP15	A6	115	AB5	RA10	77
CP15	A5	116	AB4	RA9	76
CP15	A4	69	AB3	RA8	73
CP15	A3	68	AB2	RA7	72
CP15	A2	67	AB1	RA6	71
CP16	A1	66	AB0	RA5	70
CP11	D7	67	DB7	RA4	117
CP11	D6	66	DB6	RA3	118
CP11	D5	65	DB5	RA2	119
CP11	D4	64	DB4	RA1	120
CP11	D3	63	DB3	RA0	2
CP12	D2	62	DB2	VD15	3
CP12	D1	61	DB1	VD14	4
CP12	D0	60	DB0	VD13	5
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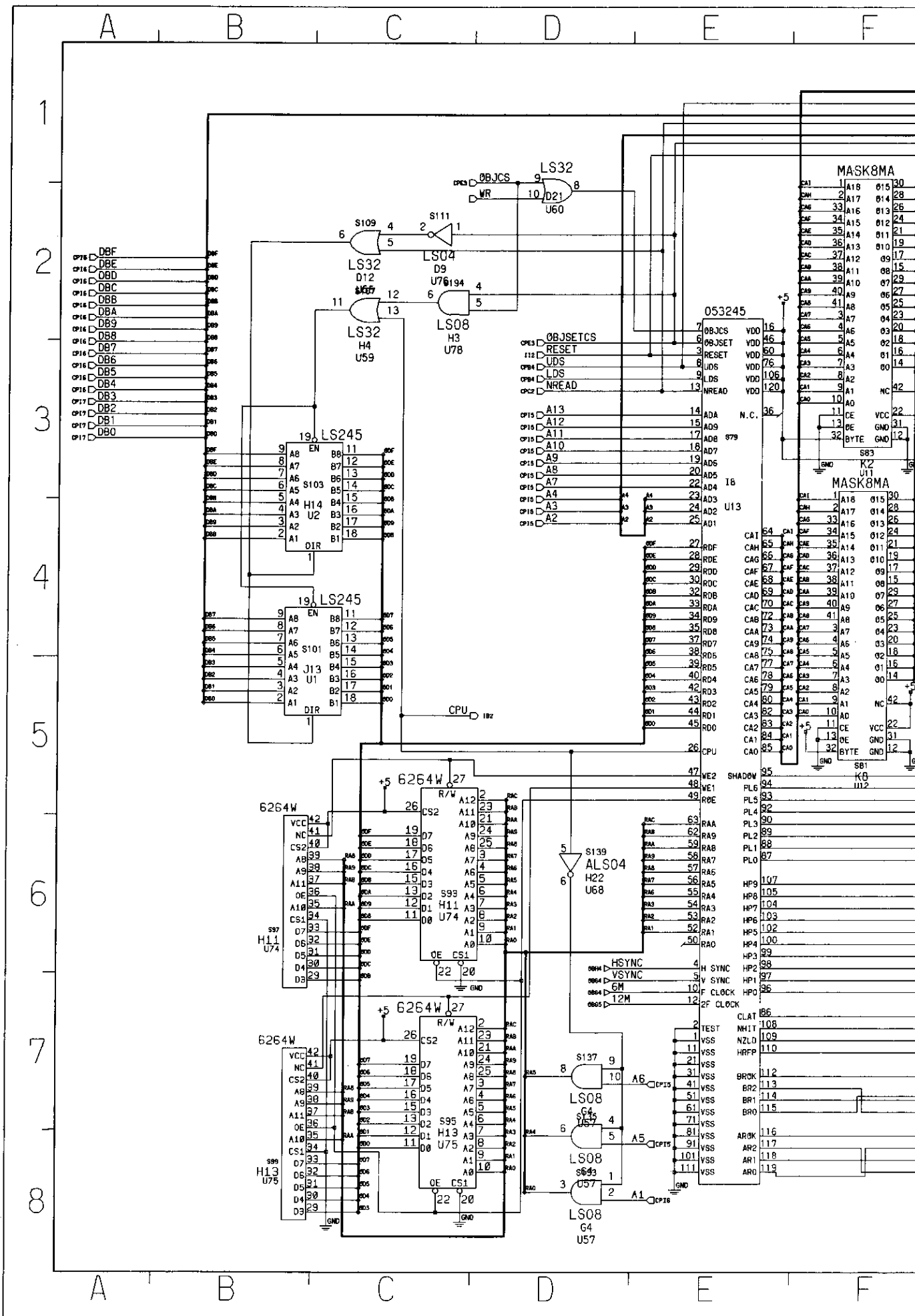
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804	A8	OC04	C12	B6	OC12
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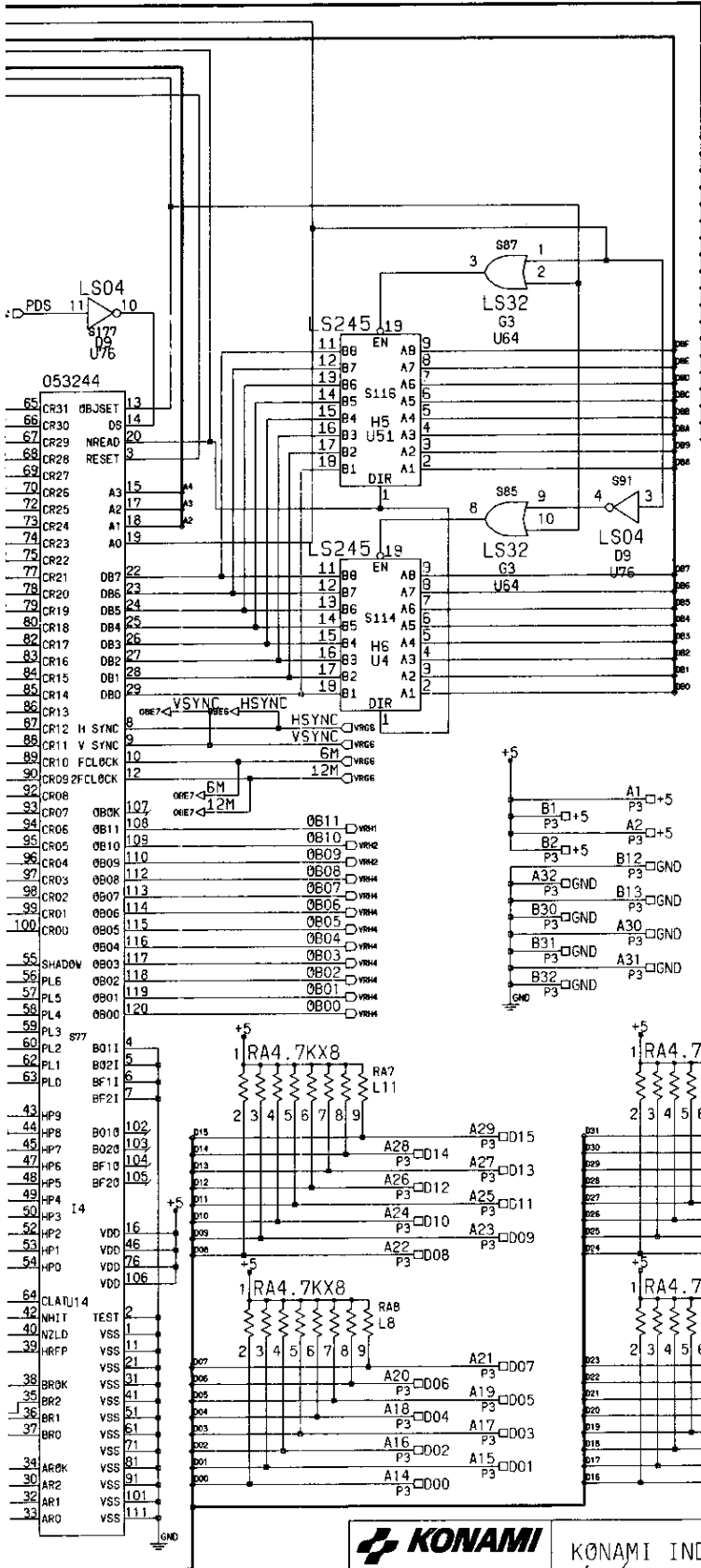


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			SCALE	TOLE-RANCE		CODE NO.	351925 2/6

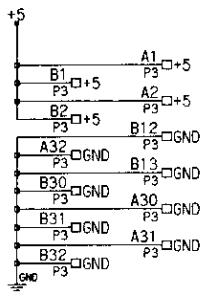
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G H I J K L

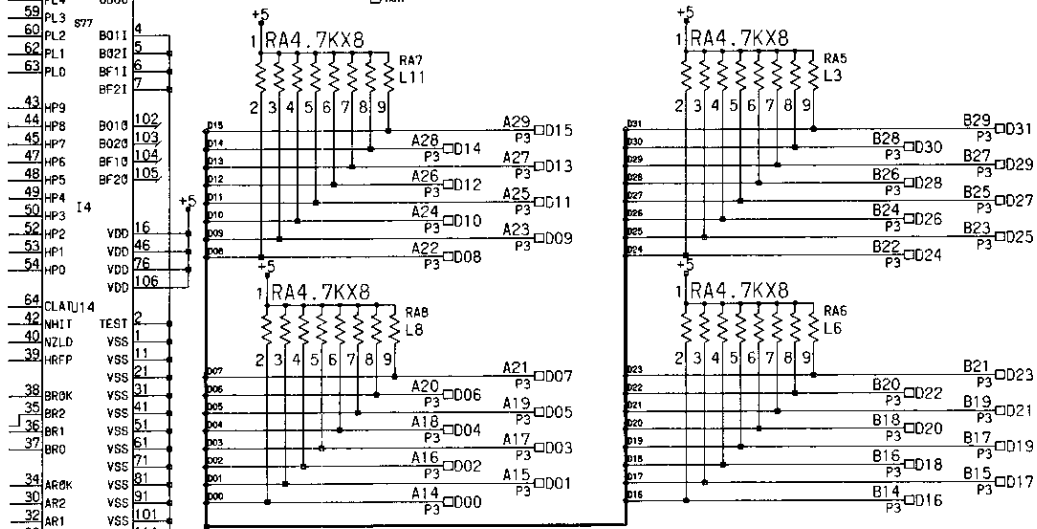




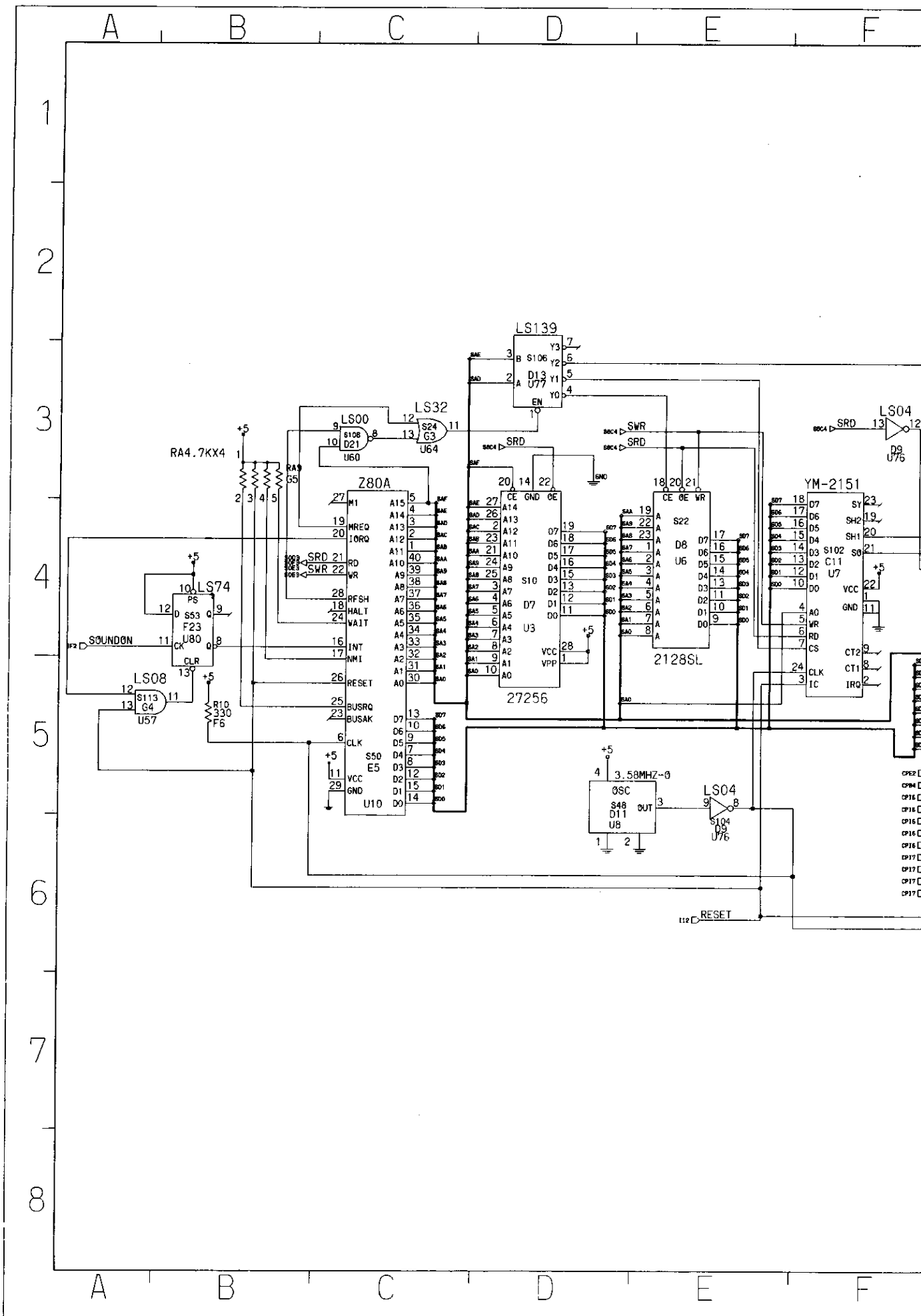
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- B11 P3 □CAH
- B10 P3 □CAG
- B9 P3 □CAF
- B8 P3 □CAE
- B7 P3 □CAD
- B6 P3 □CAC
- B5 P3 □CAB
- B4 P3 □CAA
- A13 P3 □CA9
- A12 P3 □CA8
- A11 P3 □CA7
- A10 P3 □CA6
- A9 P3 □CA5
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- A5 P3 □CA1
- A4 P3 □CA0

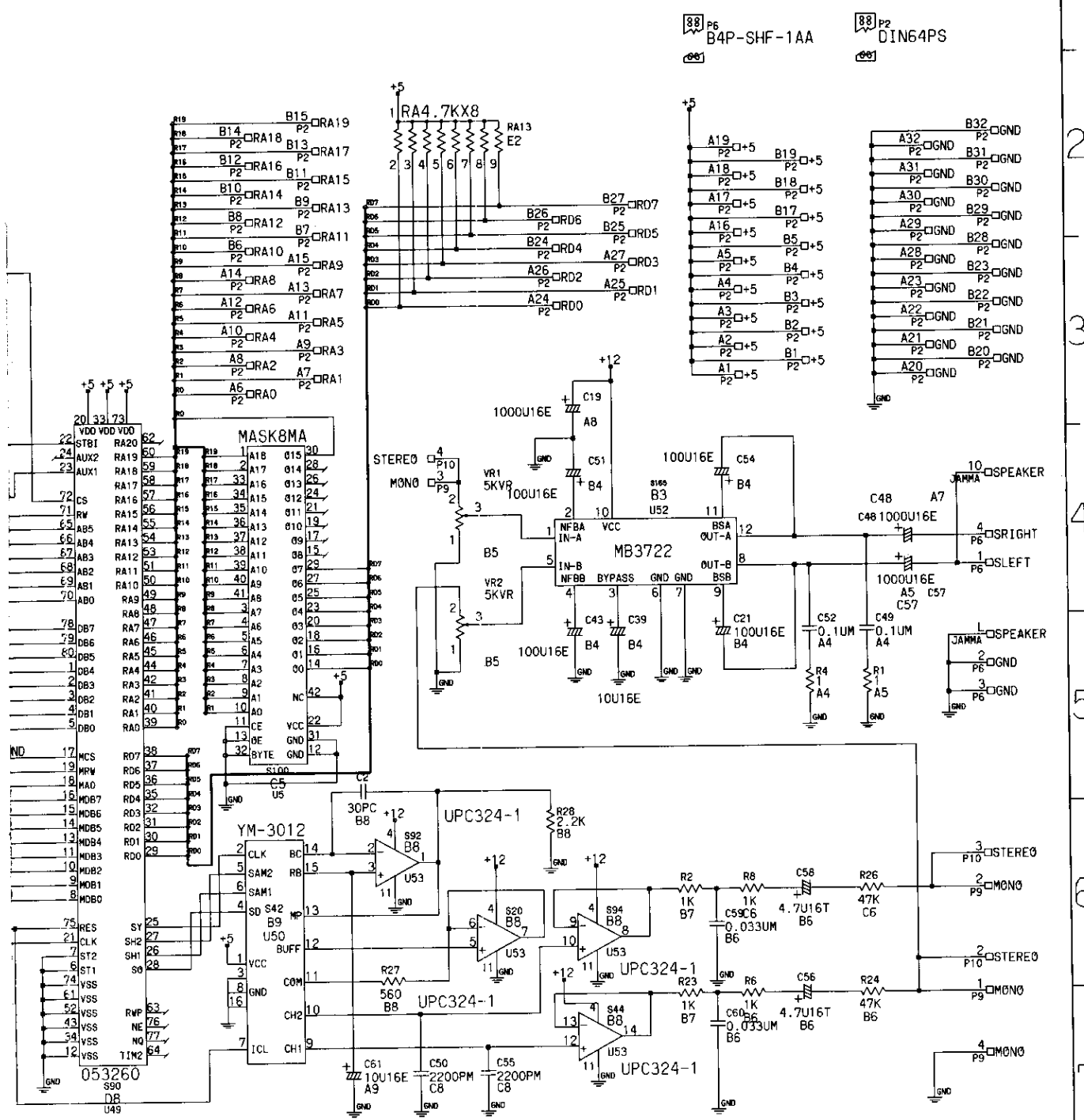


88 P3 DING6PS



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 P2 DIN64PS

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				KONAMI INDUSTRY CO., LTD.		REG. TYPE	SOUND SCHEMATIC DIAGRAM	
DESIGN	DRAW	CHECK	APPROVE	RELEASE DATE	89.10.30	NAME	GX939 PWB351905A	
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