

operation & service manual



DE DATA EAST USA, INC.
470 Needles Drive
San Jose, CA 95112

780-0050-00

WARNING

This equipment generates and uses radio frequency energy and if not installed and used properly, i.e., in strict accordance with the instructions manual, may cause harmful interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment.

Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

L A S T M I S S I O N
O P E R A T I O N A N D S E R V I C E M A N U A L
U P R I G H T C A B I N E T M O D E L 1 U S 2 5 U

T A B L E O F C O N T E N T S

1. WARRANTY INFORMATION.....	1
2. GAME SET UP PROCEDURES	
A. Inspecting the game.....	2
B. Set up and installation.....	2
3. GENERAL INFORMATION	
A. Self tests & adjustments.....	3
B. Operator selectable options.....	5
3. REPLACEMENT PARTS BREAKDOWN.....	6
4. WIRING INFORMATION	
A. Main harness wiring diagram.....	7
B. Edge connector pin-out.....	8
5. PCB SCHEMATICS.....	10

C 1986 DATA EAST USA, INC.
470 NEEDLES DR.
SAN JOSE, CA. 95112
(408) 286-7074

1st Printing
November 1986

1 . WARRANTY INFORMATION .

DATA EAST LIMITED WARRANTY

Data East USA, Inc., ("Seller"), warrants only to the initial purchaser of its products that the items listed below are free from defects in material and workmanship under normal use and service for the warranty period specified:

- | | |
|---------------------------------------|-----------|
| * Printed Circuit Boards (game logic) | (90) days |
| * Switching Regulator | (30) days |
| * Monitor | (30) days |

No other parts of Seller's product are warranted.

Warranty periods are effective from initial date of shipment from Seller to its authorized distributors.

Seller's sole liability shall be, at its option, to repair or replace products which are returned to Seller during the warranty periods specified, provided:

1. Seller is notified promptly upon discovery by the purchaser that stated products are defective.
2. Such products are properly packaged and then returned freight prepaid, to Seller's plant.

This warranty does not apply to any parts damaged during shipment and/or due to improper handling, or due to improper installation or usage, or alteration. In no event shall the Seller be liable for any anticipated profits, loss of profits, loss of use, accidental or consequential damages or any other losses incurred by the customer in connection with the purchase of a Data East USA, Inc., product.

WARRANTY DISCLAIMER

EXCEPT AS SPECIFICALLY PROVIDED IN A WRITTEN CONTRACT BETWEEN SELLER AND PURCHASER , THERE ARE NO OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

2 . S E T U P & I N S T A L L A T I O N P R O C E D U R E S

A. Inspecting the game.

This new Data East game is shipped from the factory in a reinforced cardboard container. Before signing the delivery receipt, you should inspect the container for any signs of abuse or damage. Do not sign the delivery receipt if you suspect that the contents may be damaged. Open the container in the presence of the delivery driver, note any damage on the delivery receipt, and have the driver initial it before you sign the receipt.

Inspect the exterior of the game for any damage to the cabinet and/or graphics.

Open the coin door with the keys attached to the control panel. The cashbox and rear access door keys are located inside the coin mech door.

Remove the rear access door and check the following:

- * Check that all plug-in connectors are firmly plugged in, replug any connectors found to be loose.
- * Check for secure mounting of the power supply, monitor, and coin door.
- * Remove the power cord from inside the cabinet, insert the strain relief plate into the slot at the power cord opening, and re-install the rear access door. Check the cord thoroughly for any signs of damage.

Plug the game into a 117 VAC grounded outlet and allow 2 to 3 minutes for the monitor CRT to warm up. Check for proper attract mode video on the screen. Insert the proper coinage and start the game. Check for proper operation of all player controls, proper video, and for good, clear sound effects. If you discover any problems at this point, contact your distributor immediately.

3 . G E N E R A L I N F O R M A T I O N

A. Self Tests and Adjustments.

SELF TEST: The Last Mission game has a self test mode that checks out the system Rom and Ram I.C.'s. This test runs automatically upon power up prior to going into the attract mode screens. If an error is detected during this test, the defective I.C.'s location will be displayed on the screen.

SOUND VOLUME: The sound volume level is adjustable by turning the potentiometer VR1 on the main logic pcb (see figure 1) until the desired volume level is attained. Turn the potentiometer clockwise to increase the sound volume.

POWER SUPPLY: The switching regulator's +5 volt output is adjustable by turning the potentiometer VR1. This adjustment should only be performed while measuring the +5 volts with a DIGITAL MULTIMETER at the LOGIC PCB, not at the switching regulator!

CAUTION: THIS PROCEDURE SHOULD ONLY BE ATTEMPTED BY QUALIFIED SERVICE PERSONNEL DUE TO THE EXTREME RISK OF PERSONAL INJURY AND/OR DAMAGE TO THE GAME ELECTRONICS.

POWER SWITCH AND FUSE INFORMATION: The Power Supply assembly features an ON/OFF mounted on the switch bracket and accessible from the lower rear of the cabinet. This switch must be in the OFF position before servicing the game electronics to prevent unwanted electrical shock. There are also two fuses mounted next to the ON/OFF switch. They are labeled as to their required ratings. In the event replacement is required, replace only with fast blow devices.

- * The 3 AMP FAST BLOW fuse is on the 117 VAC line. In the event that this fuse should blow, all power to the game will be removed. Check all harnessing for proper connections and look for obvious damage to monitor, power supply, and logic pcb set before replacing the fuse and applying power.
- * The 1 AMP FAST BLOW fuse is on the +12 VDC line between the switching regulator and the coin door lamps. In the event that this fuse should blow, the lamps will not be illuminated. Check for damaged coin door wiring and/or defective coin door lamps.

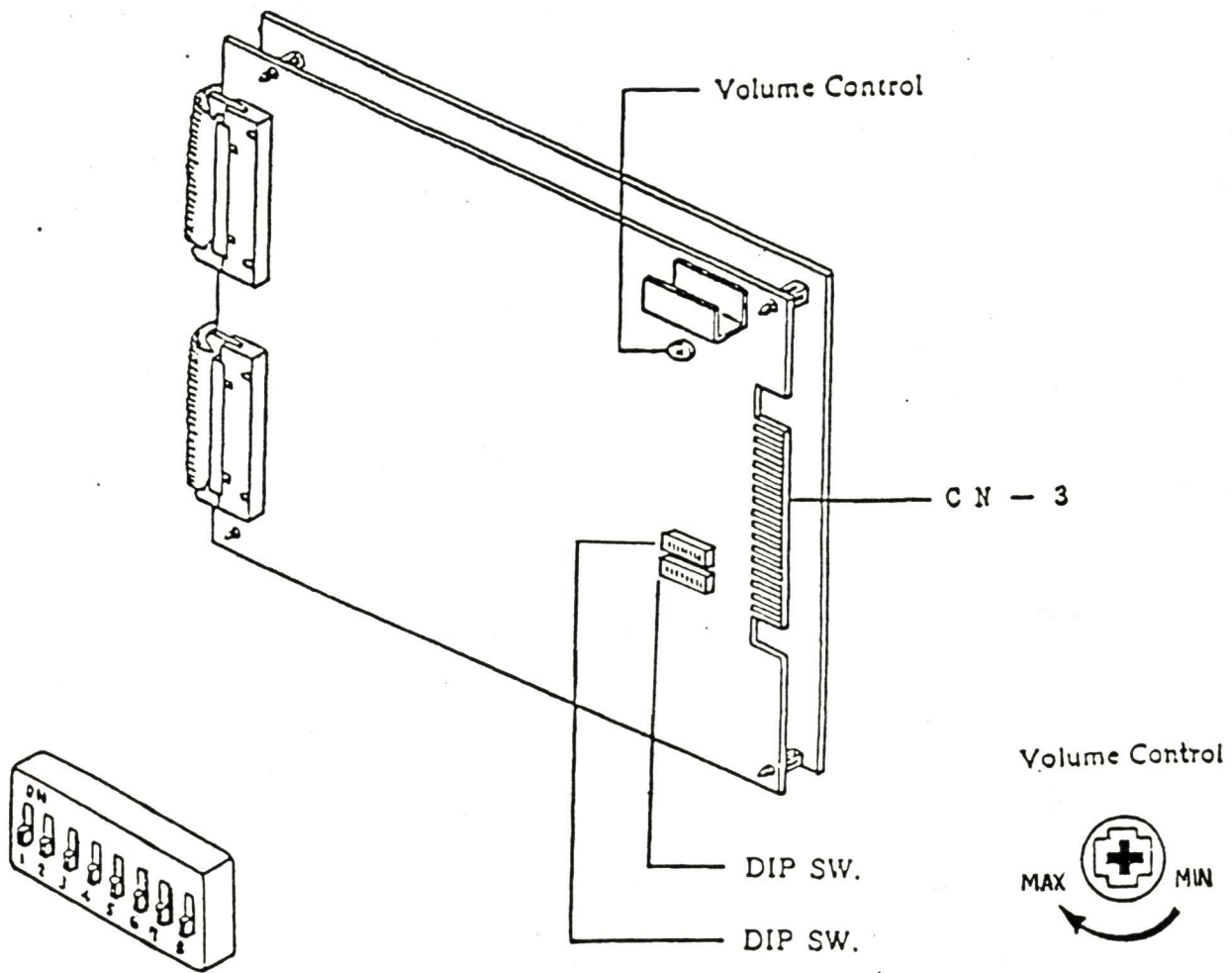


FIGURE 1

B. Operator selectable options.

The Last Mission game contains operator selectable coinage, bonus, etc. These options are accessed by the two 8 position dipswitches located on the main logic pcb (see figure 1). The following tables outline the available options.

DIPSWITCH 1			1	2	3	4	5	6	7	8
COIN	1 COIN = 1 CREDIT		OFF	OFF						
VS	1 COIN = 2 CREDIT		ON	OFF						
CREDIT	1 COIN = 3 CREDIT		OFF	ON						
COIN 1	1 COIN = 5 CREDIT		ON	ON						
COIN	1 COIN = 1 CREDIT				OFF	OFF				
VS	2 COIN = 1 CREDIT				ON	OFF				
CREDIT	3 COIN = 1 CREDIT				OFF	ON				
COIN 2	4 COIN = 1 CREDIT				ON	ON				
ATTRACT MODE	NO:					OFF				
SOUND	YES:					ON				
CABINET	TABLE:							OFF		
STYLE	UPRIGHT:							ON		
SWITCHES 7 AND 8 ARE NOT USED										

DIPSWITCH 2		1	2	3	4	5	6	7	8
NUMBER OF LIVES	THREE:	OFF							
	FIVE:	ON							
BONUS LIVES	30K/70K & EVERY 70K	OFF	OFF						
	40K/70K & EVERY 90K	ON	OFF						
	40K/80K ONLY	OFF	ON						
	50K ONLY	ON	ON						
GAME DIFFICULTY	EASY:	OFF	OFF						
	NORMAL:	ON	OFF						
	DIFFICULT:	OFF	ON						
	MOST DIFFICULT:	ON	ON						
SWITCHES 6 AND 7 ARE NOT USED									
CONTINUE (BUY-IN) MODE	NO:								OFF
	YES:								ON
LAST MISSION OPERATION & SERVICE MANUAL									
PAGE 5									

4 . R E P L A C E M E N T P A R T S B R E A K D O W N

FINAL ASSEMBLY, LAST MISSION U//R, 500-0016-00

ITEM	PART NUMBER	DESCRIPTION
1	365-0008-00	CABINET, GREY
2	510-0088-00	CONTROL PANEL ASSY., LAST MISSION
3	510-0065-00	MONITOR, UNIVERSAL, H/V.
4	510-0004-00	COIN DOOR ASSY.
5	510-0002-00	POWER SUPPLY ASSY., 7 AMP
6	510-0085-00	PCB SET, LAST MISSION
7	520-0083-00	PCB, EMI FILTER, DE-0239
8	170-0002-00	DUAL LAMPHOLDER ASSY.
9	165-0004-01	LAMP, INCANDESCENT, 40 W.
10	031-0002-00	SPEAKER, 8 OHM, 8 WATT, 6 X 9
11	535-0058-00	RETAINER, PLEX
12	830-0025-00	PLEX, MARQUEE, LAST MISSION
13	660-0001-01	PLEX, MONITOR, CLEAR, 23.75 X 23.75
14	810-0017-00	UNDERLAY, MONITOR, LAST MISSION
15	380-0002-00	BEZEL, MONITOR, BLACK
16	036-0116-00	HARNESS, MAIN, STD 1P.
17	780-0050-00	MANUAL, SERVICE & OPERATION
18	820-0036-00	DECAL, SIDE, DE

CONTROL PANEL ASSEMBLY, LAST MISSION, 510-0088-00

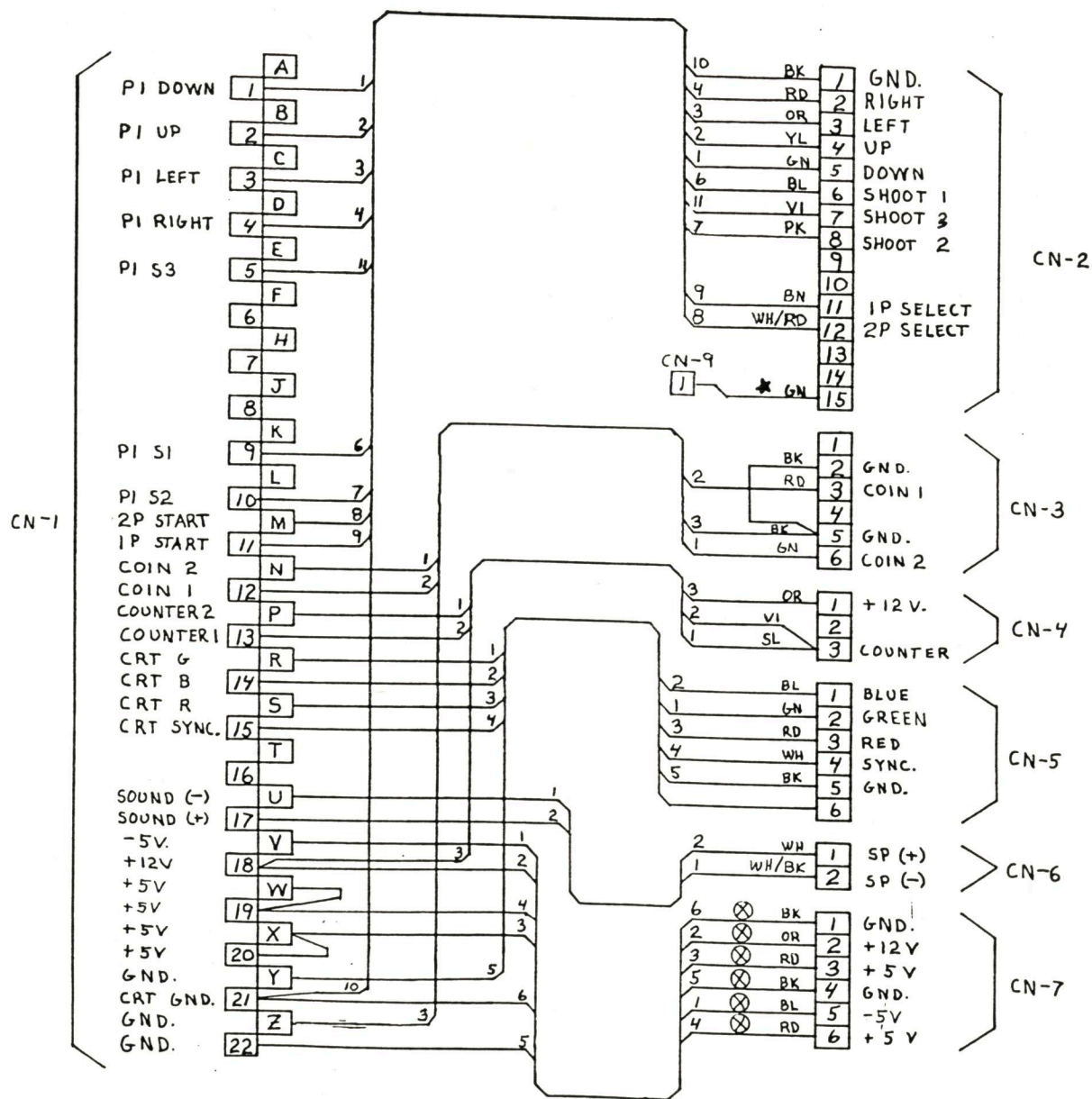
ITEM	PART NUMBER	DESCRIPTION
1	535-0064-02	CONTROL PANEL, BARE
2	800-0021-01	CONTROL PANEL OVERLAY, GENERIC
3	350-0001-00	PUSHBUTTON, SHORT, BLACK
4	350-0001-02	PUSHBUTTON, SHORT, RED
5	350-0001-06	PUSHBUTTON, SHORT, BLUE
6	350-0001-09	PUSHBUTTON, SHORT, WHITE
7	185-0001-00	PUSHBUTTON HOLDER W/SWITCH
8	240-0001-01	NUT, PAL
9	450-0003-00	JOYSTICK ASSY., 8 WAY, CC.
10	036-0115-03	HARNESS, CONTROL PANEL

POWER SUPPLY ASSEMBLY, STANDARD, 510-0002-00

ITEM	PART NUMBER	DESCRIPTION
1	515-0003-00	CHASSIS, WOOD
2	515-0002-00	POWER CORD
3	010-0001-00	TRANSFORMER, ISOLATION
4	001-0001-00	SWITCHING REGULATOR, KAGA
5	515-0004-00	SWITCH BRACKET ASSY.
6	150-0001-00	NOISE FILTER

4. WIRING INFORMATION

A. Main Harness wiring diagram.



B. Edge connector pin-out.

The Last Mission pcb has a 56 pin JAMMA standard edge connector. Data East USA, Inc., supplies a suitable EMI filter pcb with each game to make the game comply with FCC regulations and adapt to the Data East USA, Inc., harness pin-out configuration.

The edge connector pin-out diagram below represents the JAMMA standard used on the actual game pcb, the one on page 9 is the Data East USA, Inc., type harness pin-out used on the EMI filter pcb.

JAMMA EDGE CONNECTOR PIN - OUT

LAST MISSION PCB EDGE CONNECTOR, CN-3

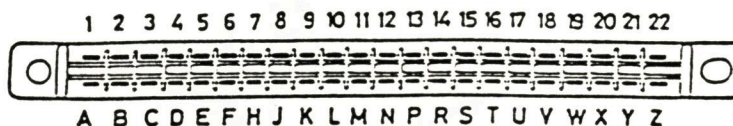
SOLDER SIDE	PIN NUMBER		COMPONENT SIDE
GROUND	A	1	GROUND
GROUND	B	2	GROUND
+ 5 VOLTS	C	3	+ 5 VOLTS
+ 5 VOLTS	D	4	+ 5 VOLTS
- 5 VOLTS N/A	E	5	- 5 VOLTS N/A
+12 VOLTS	F	6	+12 VOLTS
BLOCKING KEY	H	7	BLOCKING KEY
COIN COUNTER 2	J	8	COIN COUNTER 1
	K	9	
SPEAKER (-)	L	10	SPEAKER (+)
	M	11	
VIDEO GREEN	N	12	VIDEO RED
VIDEO SYNC	P	13	VIDEO BLUE
SERVICE SWITCH	R	14	VIDEO GROUND
	S	15	
COIN SWITCH 2	T	16	COIN SWITCH 1
START SWITCH 2	U	17	START SWITCH 1
2P CONTROL 1 UP	V	18	1P CONTROL 1 UP
2P CONTROL 2 DOWN	W	19	1P CONTROL 2 DOWN
2P CONTROL 3 LEFT	X	20	1P CONTROL 3 LEFT
2P CONTROL 4 RIGHT	Y	21	1P CONTROL 4 RIGHT
2P CONTROL 5 PUSH 1	Z	22	1P CONTROL 5 PUSH 1
2P CONTROL 6 PUSH 2	a	23	1P CONTROL 6 PUSH 2
2P CONTROL 7 PUSH 3	b	24	1P CONTROL 7 PUSH 3
	c	25	
	d	26	
GROUND	e	27	GROUND
GROUND	f	28	GROUND

DATA EAST EDGE CONNECTOR PIN - OUT

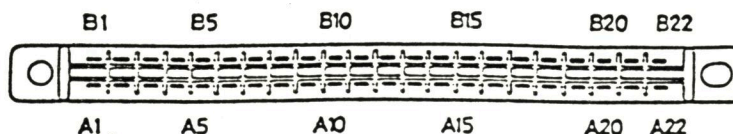
HARNESS CONNECTOR, EMI FILTER PCB: DE-0239-0

SOLDER SIDE	PIN NUMBERS	COMPONENT SIDE
2P CONTROL 2 DOWN	A 1	1P CONTROL 2 DOWN
2P CONTROL 1 UP	B 2	1P CONTROL 1 UP
2P CONTROL 3 LEFT	C 3	1P CONTROL 3 LEFT
2P CONTROL 4 RIGHT	D 4	1P CONTROL 4 RIGHT
2P CONTROL 7 PUSH 3	E 5	1P CONTROL 7 PUSH 3
	F 6	
	H 7	
TEST SWITCH	J 8	SERVICE SWITCH
2P CONTROL 5 PUSH 1	K 9	1P CONTROL 5 PUSH 1
2P CONTROL 6 PUSH 2	L 10	1P CONTROL 6 PUSH 2
2P START SWITCH	M 11	1P START SWITCH
COIN SWITCH 2	N 12	COIN SWITCH 1
COIN COUNTER 2	P 13	COIN COUNTER 1
VIDEO GREEN	R 14	VIDEO BLUE
VIDEO SYNC	S 15	VIDEO RED
	T 16	
SPEAKER (-)	U 17	SPEAKER (+)
- 5 VOLTS	V 18	+ 12 VOLTS
+ 5 VOLTS	W 19	+ 5 VOLTS
+ 5 VOLTS	X 20	+ 5 VOLTS
GROUND	Y 21	GROUND
GROUND	Z 22	GROUND

LT BLUE
RED
BROWN

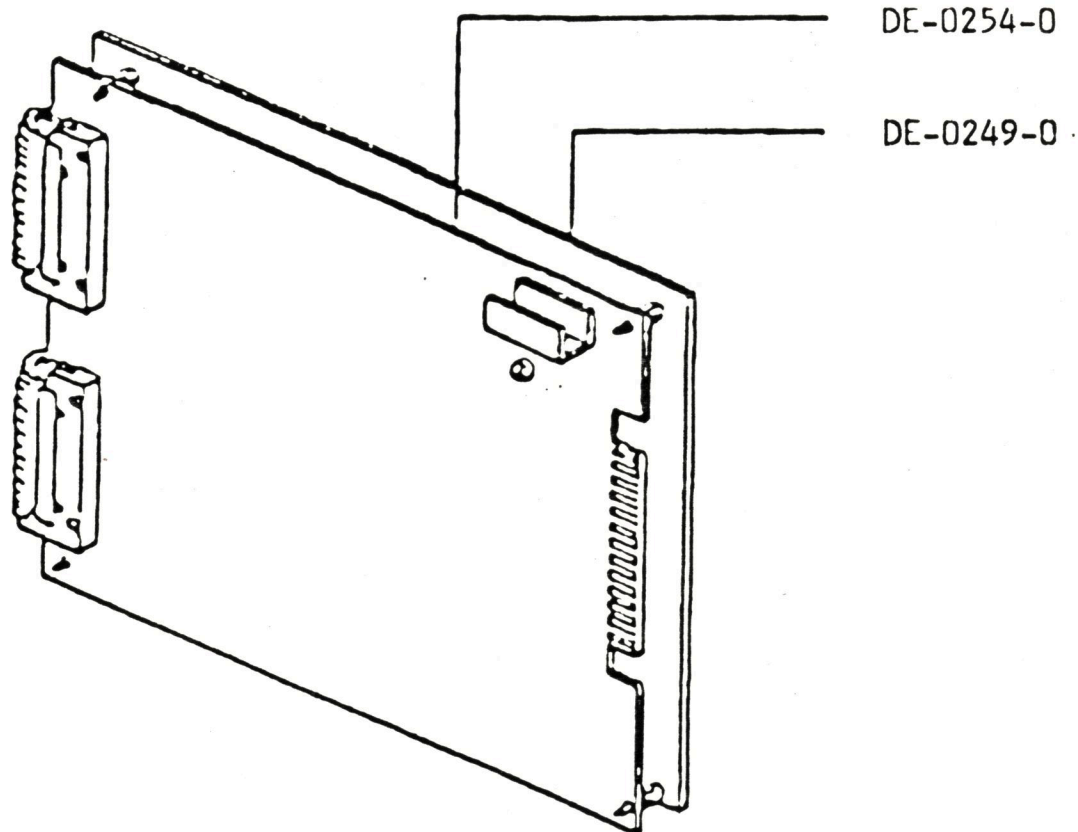


CONNECTOR CR7E-44DA-3.96 E (HIROSE)

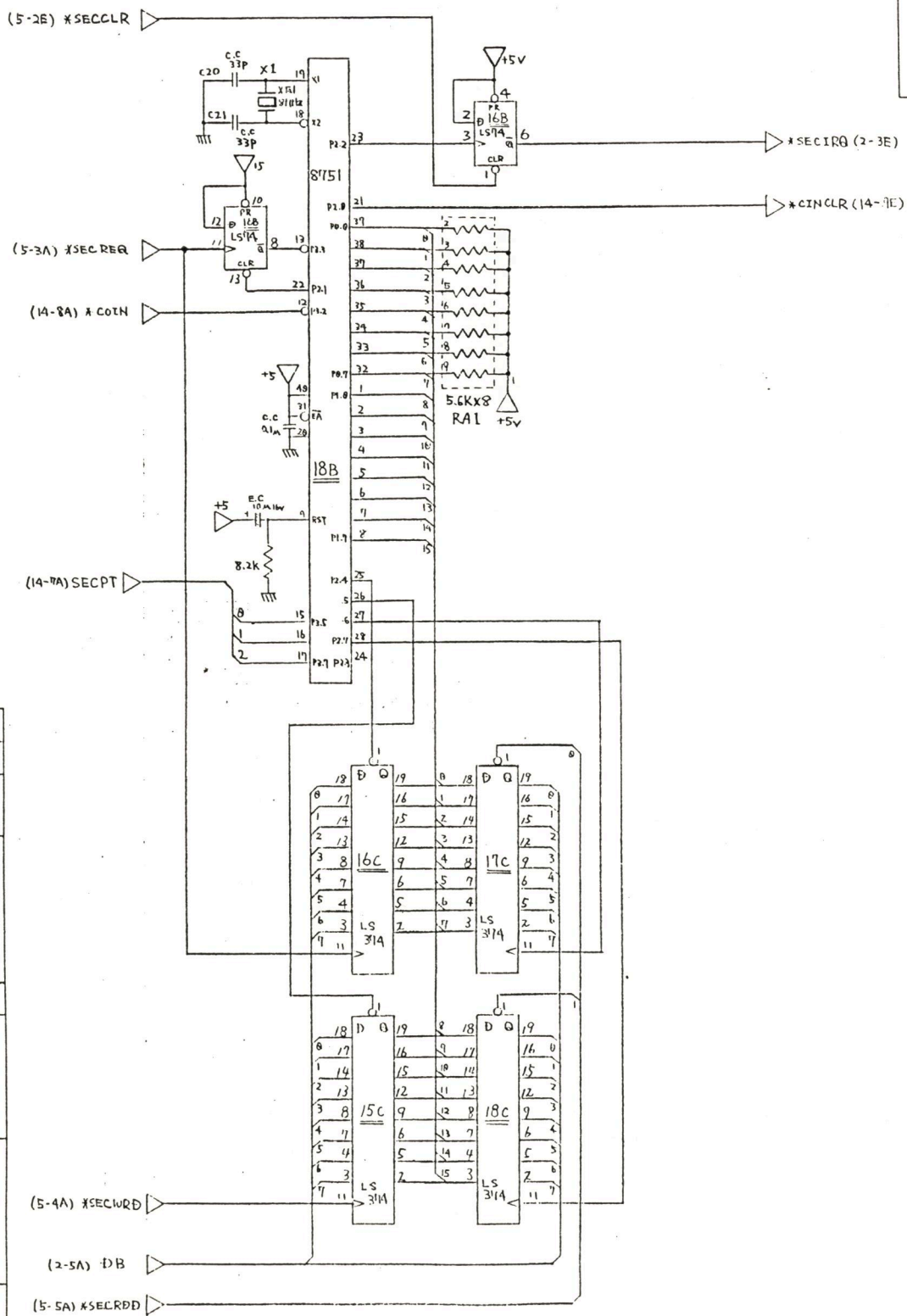


CONNECTOR 1168-044-009 (KEL)

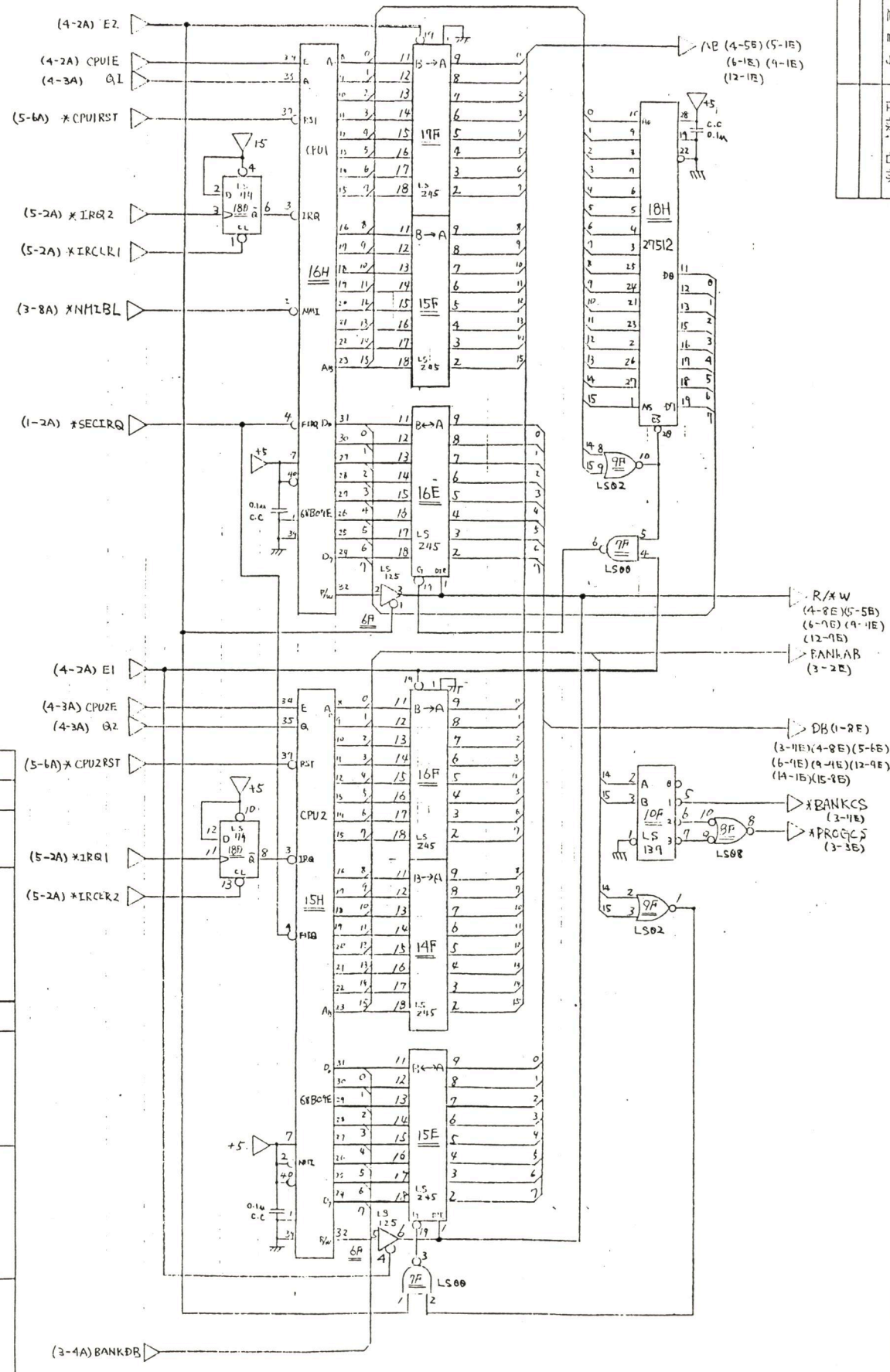
5 . P C B S C H E M A T I C S



姓名	住址	职业	年龄

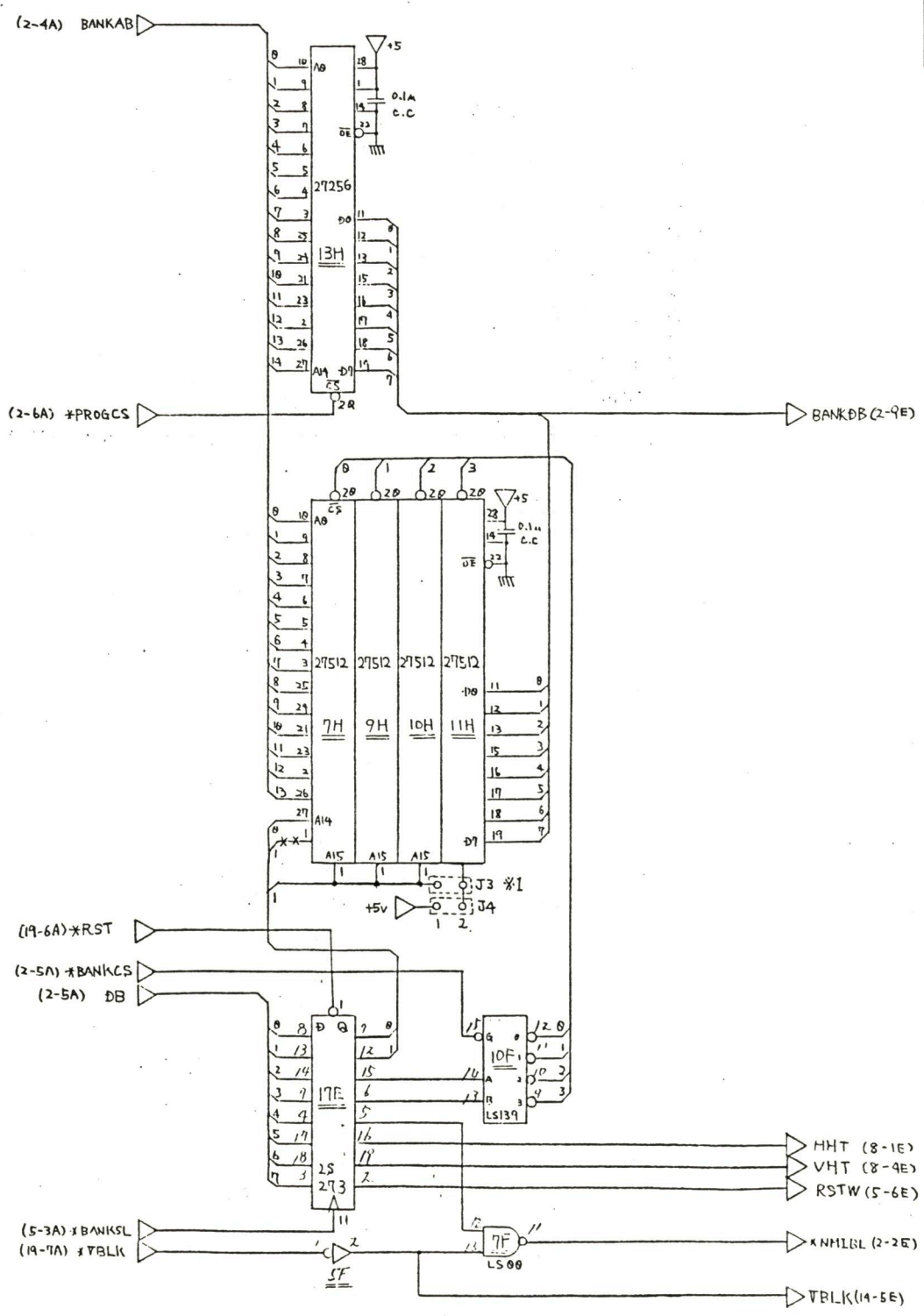


記号
 担当者
 年月日
 改訂
 個所
 品番
 図面番号
 名称
 仕様
 材質

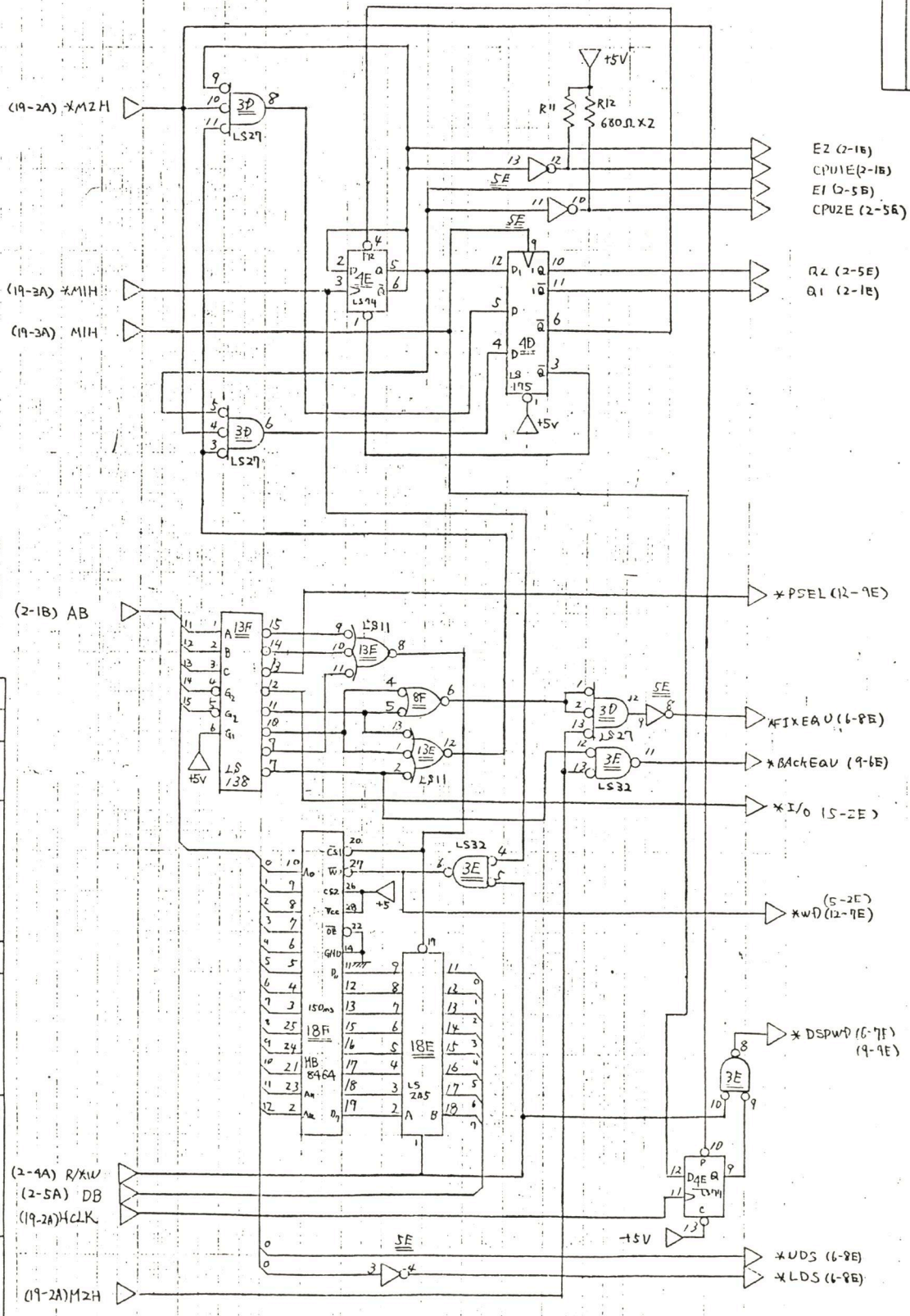


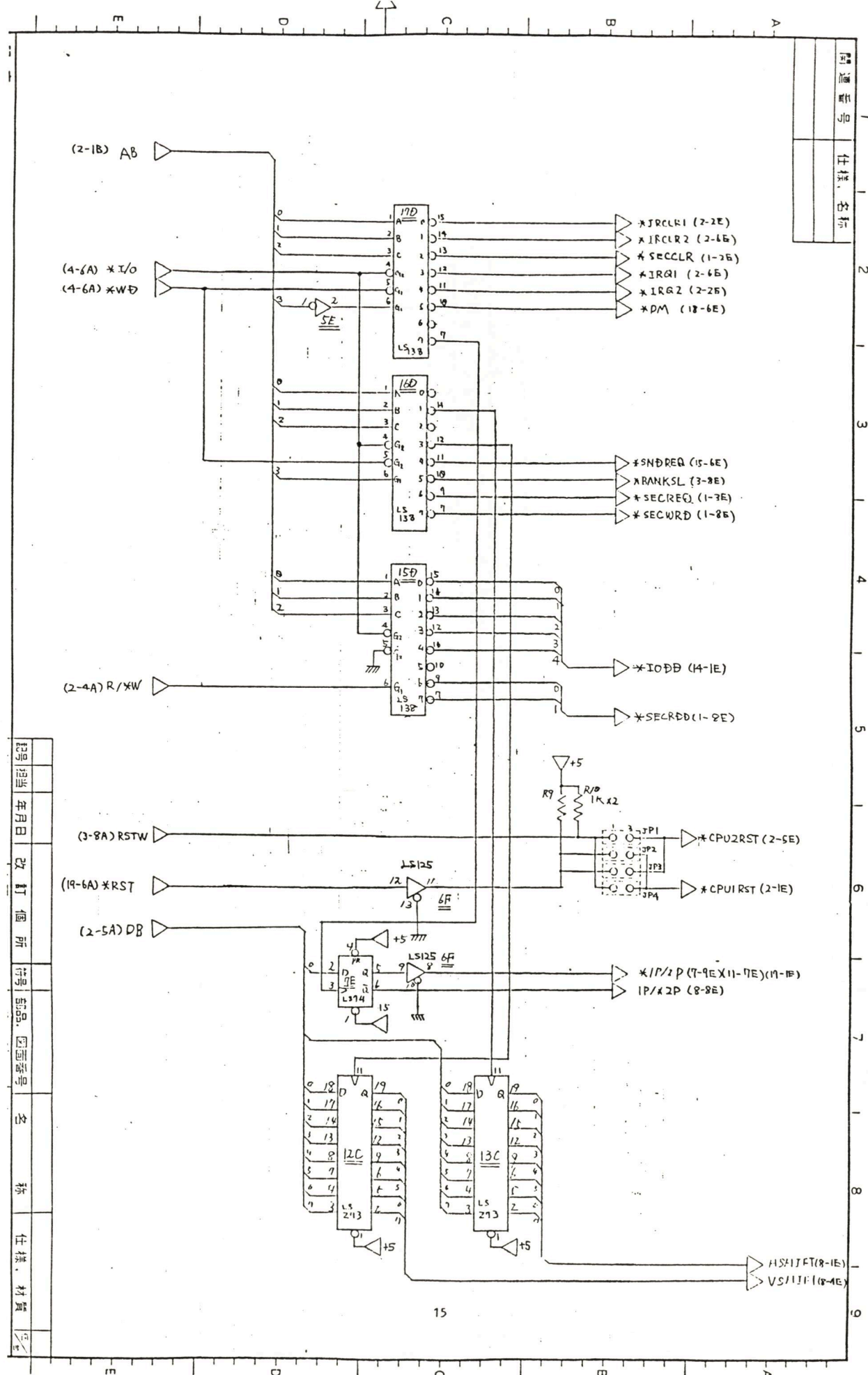
品名	1
仕様	1
部	2
名	3
所	4
記	5
号	6
年	7
月	8
日	9
改	10
訂	11
個	12
所	13
行	14
品	15
名	16
部	17
名	18
仕	19
様	20
材	21
質	22

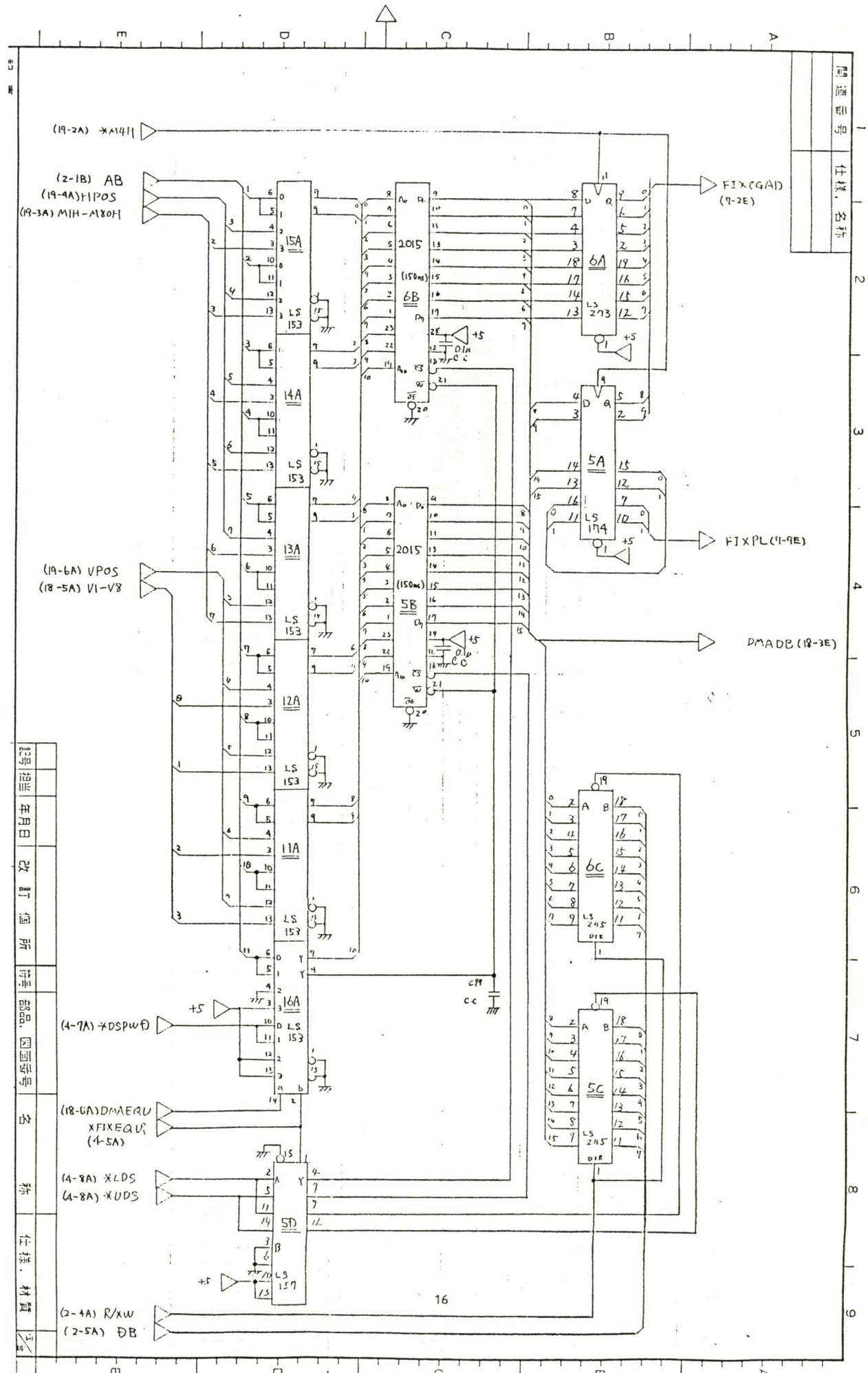
品名	1
仕様	1
部	2
名	3
所	4
記	5
号	6
年	7
月	8
日	9
改	10
訂	11
個	12
所	13
行	14
品	15
名	16
部	17
名	18
仕	19
様	20
材	21
質	22



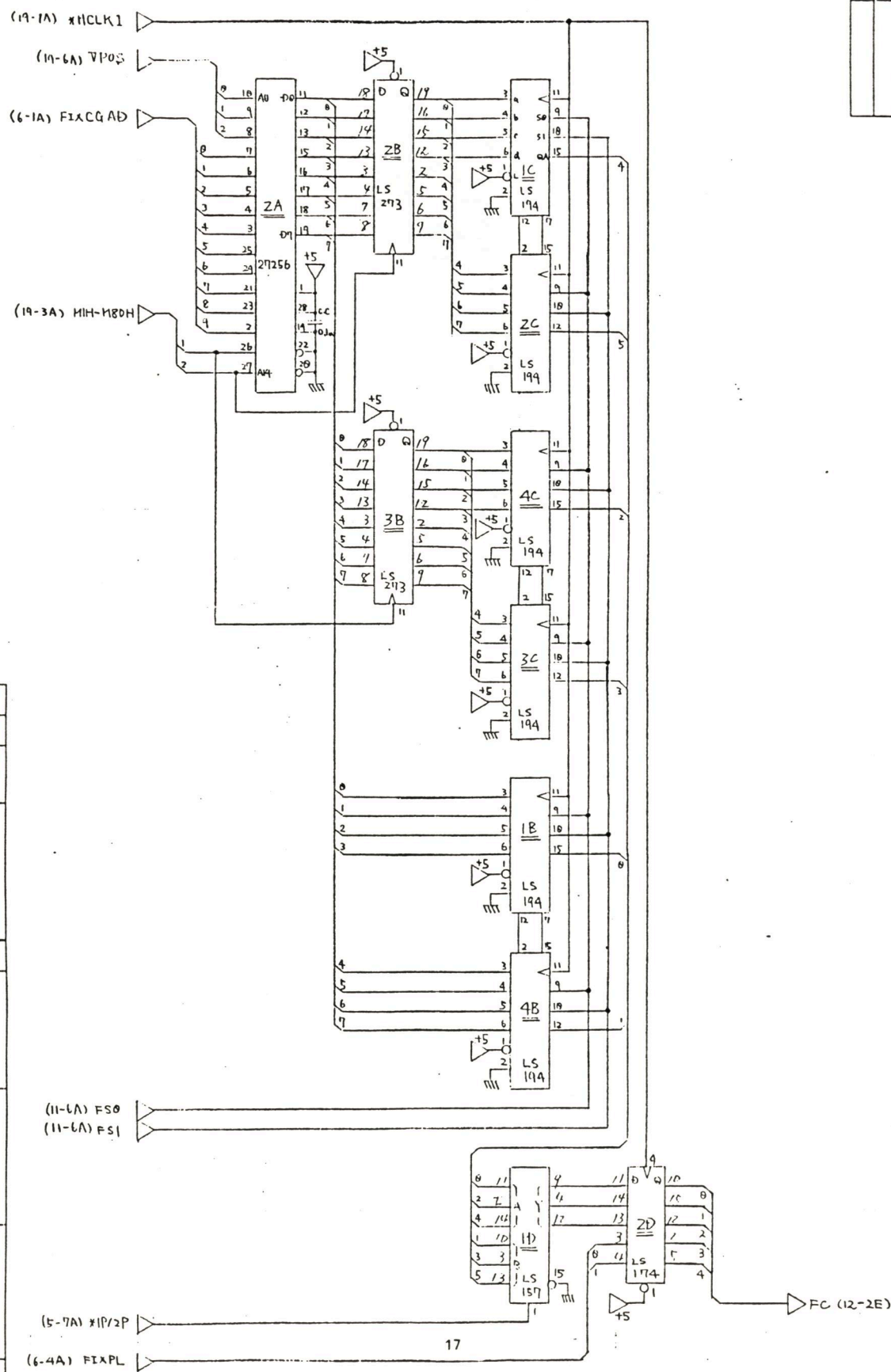
記号	年月日	改訂	場所	符号	部品	図面番号	名	仕様	材質







品名	年月日	改訂個所	符号	部品	図面番号	名	称	仕組	材料



品名	年月日	改訂個所	符号	部品	図面番号	名	称	仕組	材料

1
2
3
4
5
6
7
8
9
10

記号	相当	年月日	改訂	個所	符号	部品	図面番号	名	仕様	材質

(18-6A) VCUNT
(3-10) HHT
(19-2A) XHCLK
(5-8A) HSHIFT

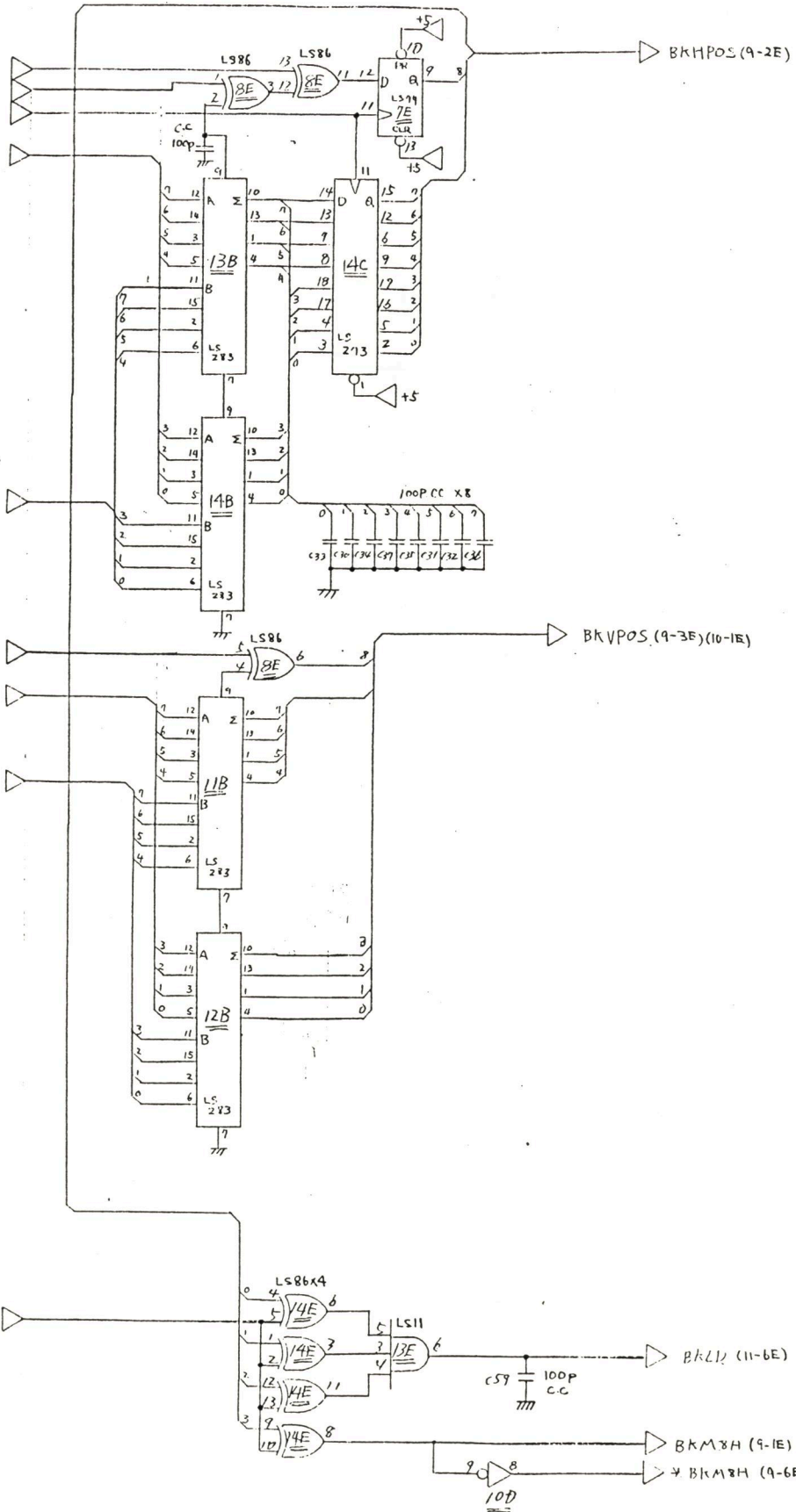
(19-4A) HPOS

(3-8A) VHT

(5-9A) VSHIFT

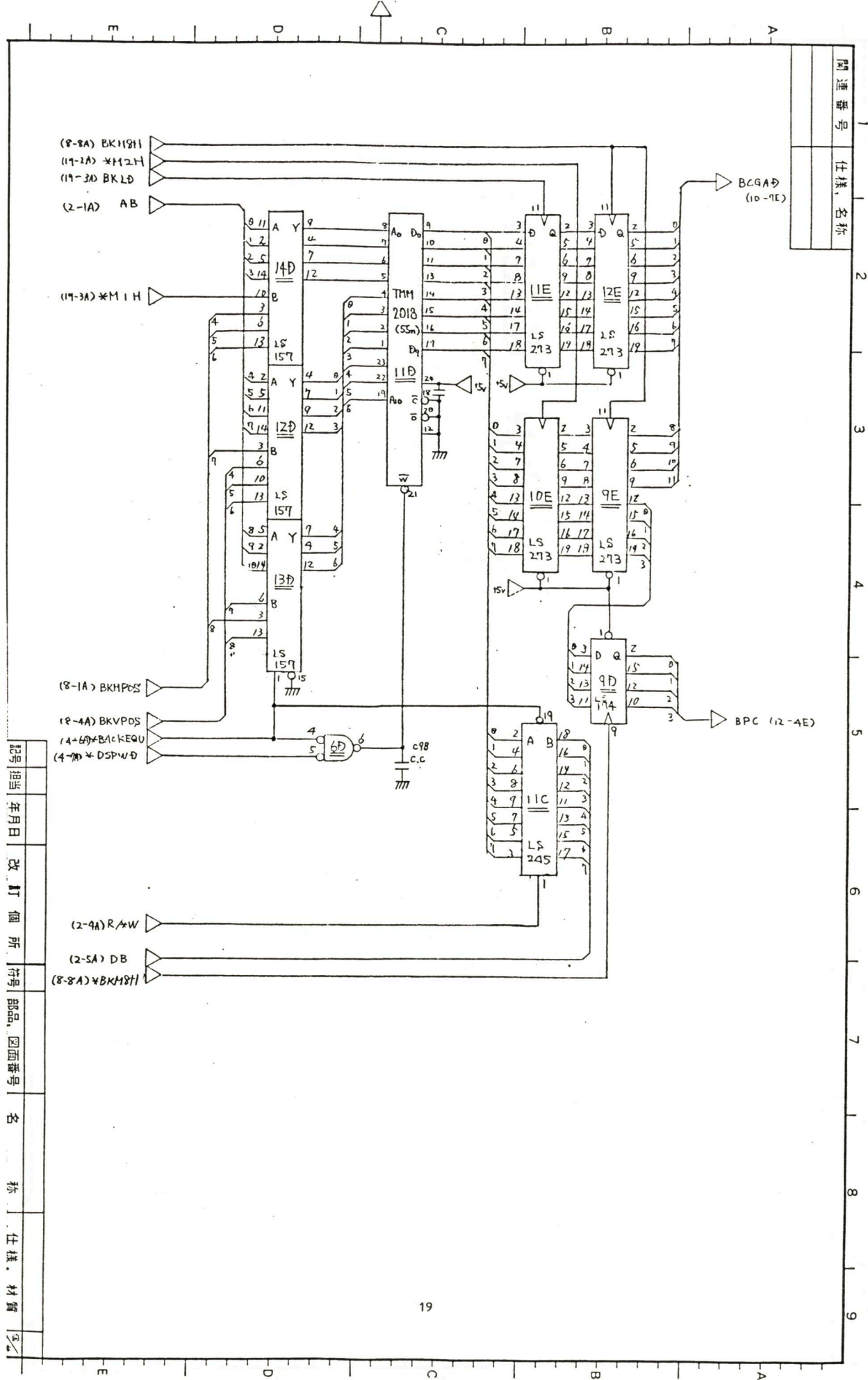
(19-6A) VPOS

(5-7A) P/K2P



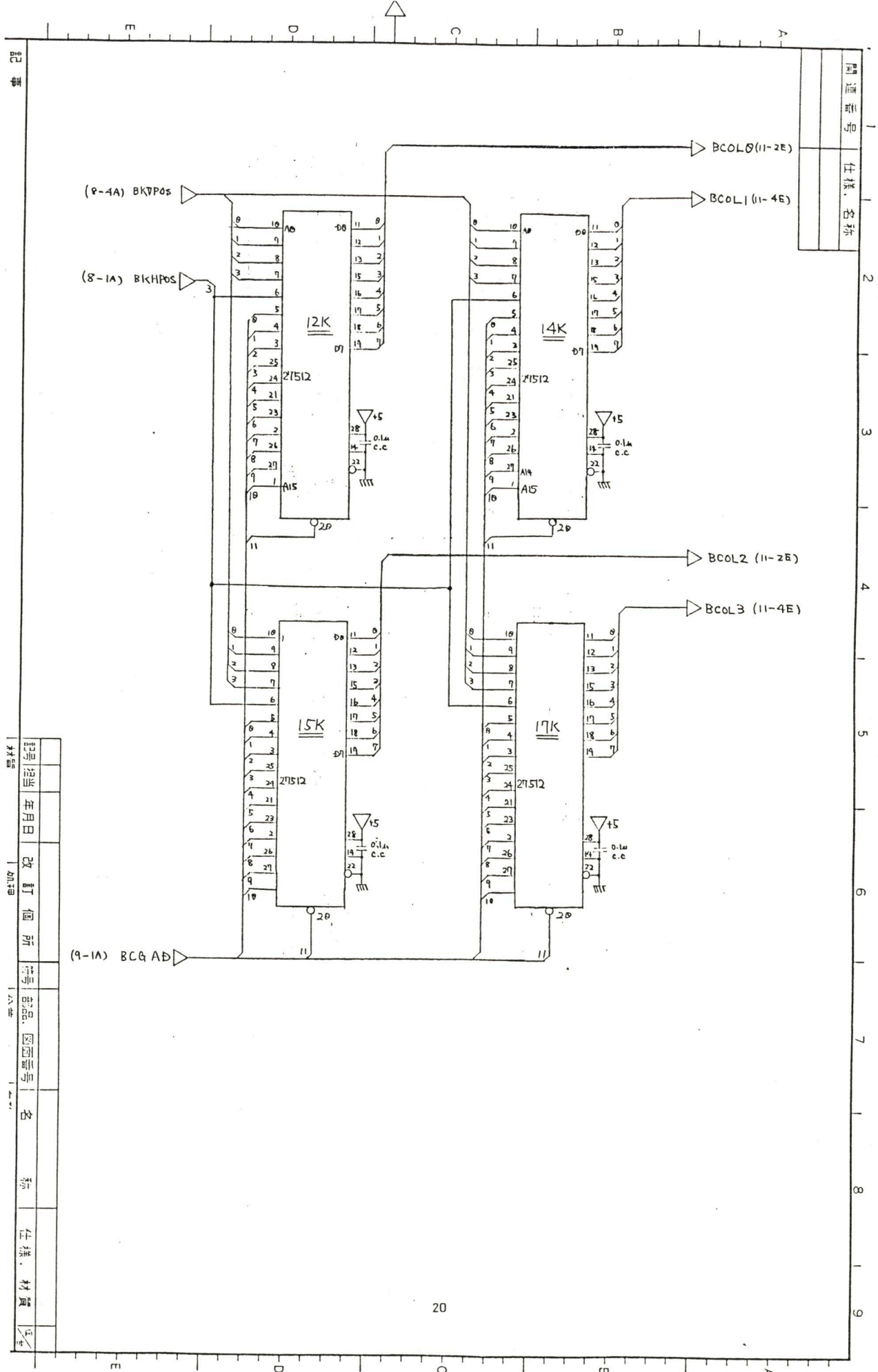
図面番号	仕様	名称

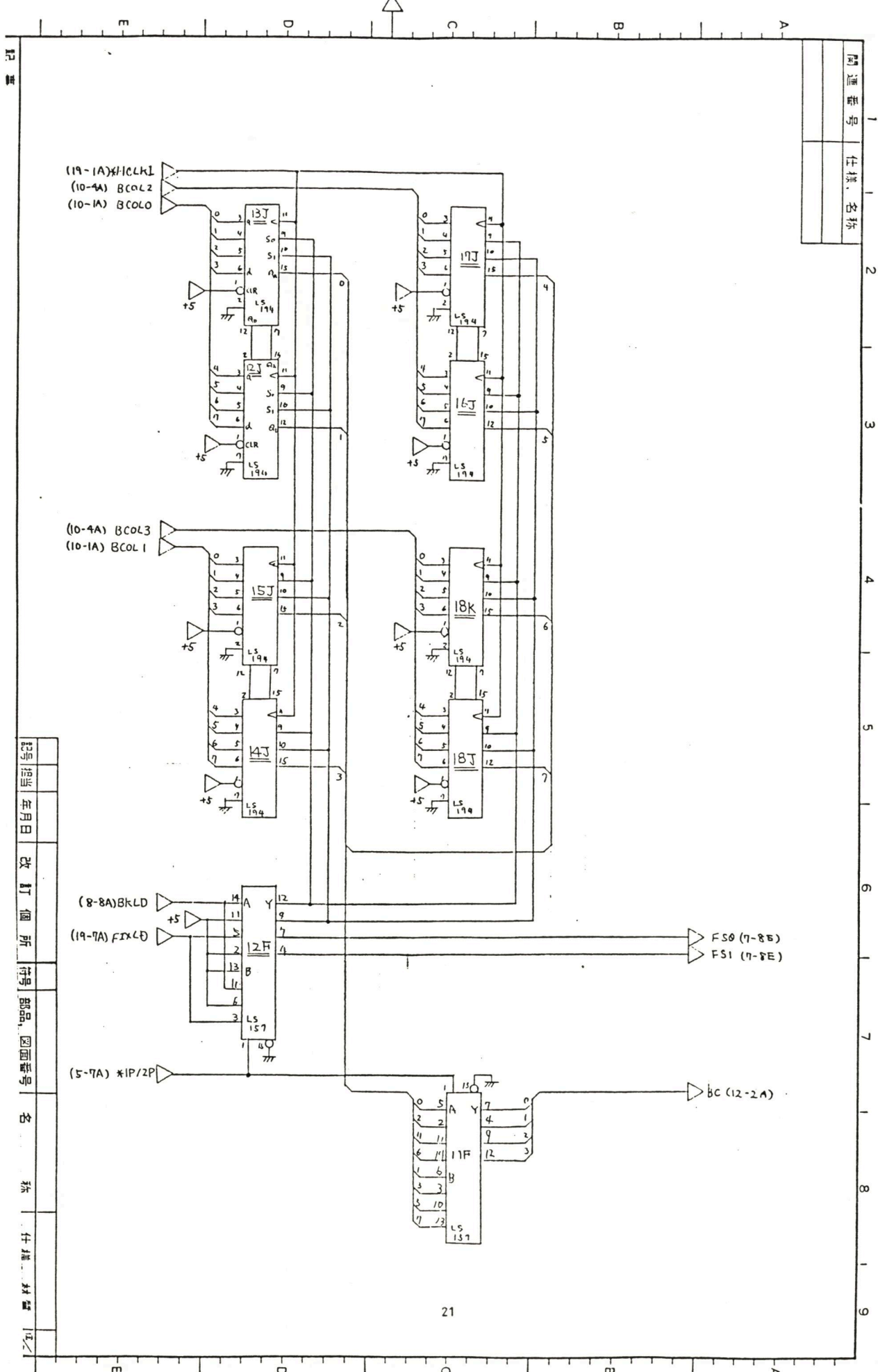
1
2
3
4
5
6
7
8
9



開連番号 仕様、名称

記号	相当	年月日	改訂個所	符号	部品、図面番号	名	称	仕様、材質	②
----	----	-----	------	----	---------	---	---	-------	---





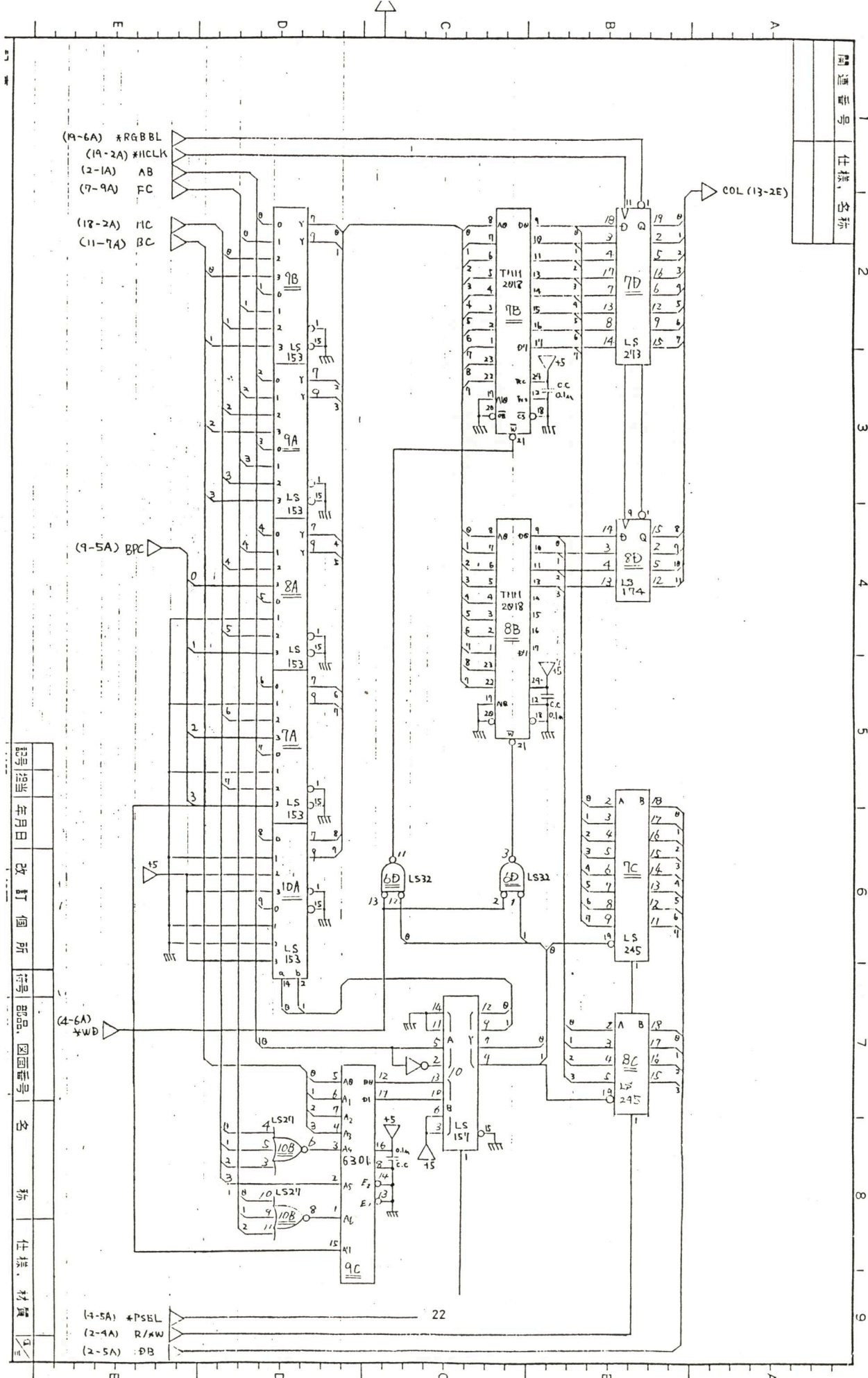
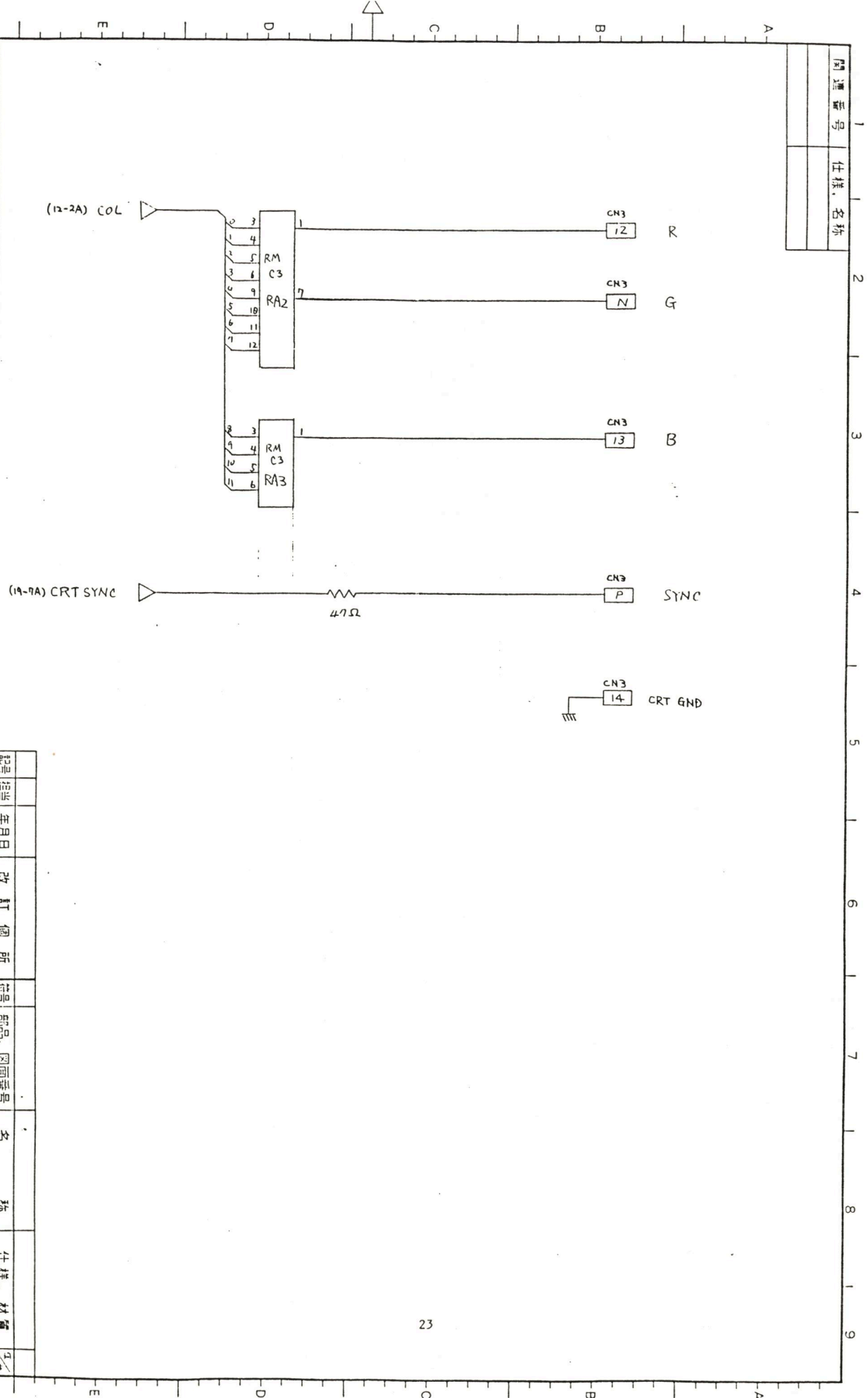


圖	號	1
圖	號	2
圖	號	3
圖	號	4
圖	號	5
圖	號	6
圖	號	7
圖	號	8
圖	號	9
圖	號	10

圖	號	1
圖	號	2
圖	號	3
圖	號	4
圖	號	5
圖	號	6
圖	號	7
圖	號	8
圖	號	9
圖	號	10

記事



承認	年月日	改訂	個所	信号	部品	図面番号	名	称	仕様	材質	1/1
----	-----	----	----	----	----	------	---	---	----	----	-----

11 10 9 8 7 6 5 4 3 2 1

(15-5A) *I0DD
(2-5A) DB

CN3x4
*1PUP 13
*1PDW 14
*1PLT 20
*1PRT 21

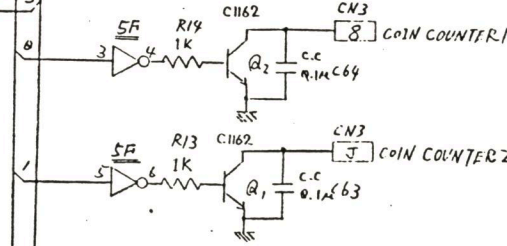
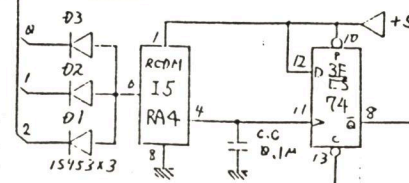
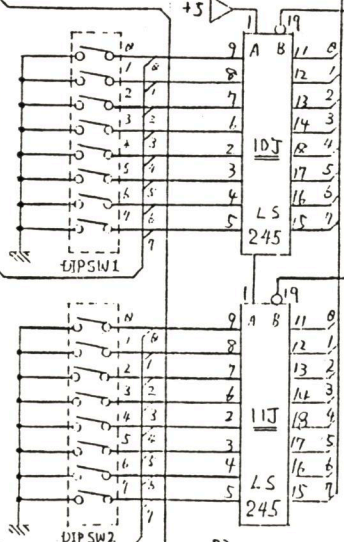
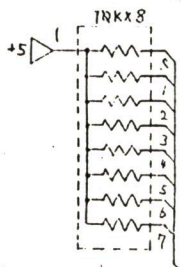
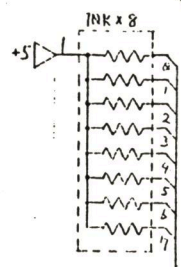
CN3x4
*1PSW1 22
*1PSW2 23
*1PSW3 24
*1PSW4 25

CN3x4
*2PUP 26
*2PDW 27
*2PLT 28
*2PRT 29

CN3x4
*2PSW1 30
*2PSW2 31
*2PSW3 32
*2PSW4 33

CN3x4
*1PSW5 34
*2PSW5 35
*1PSEL 36
*2PSEL 37

(16-18) VBLK
*COIN1 16
*COIN2 17
*SERVICE 18



SECPT (1-4E)

*COIN (1-3E)

(1-2A) *CINCL R

1 2 3 4 5 6 7 8 9

1 2 3 4 5 6 7 8 9

1 2 3 4 5 6 7 8 9

1 2 3 4 5 6 7 8 9

1 2 3 4 5 6 7 8 9

1 2 3 4 5 6 7 8 9

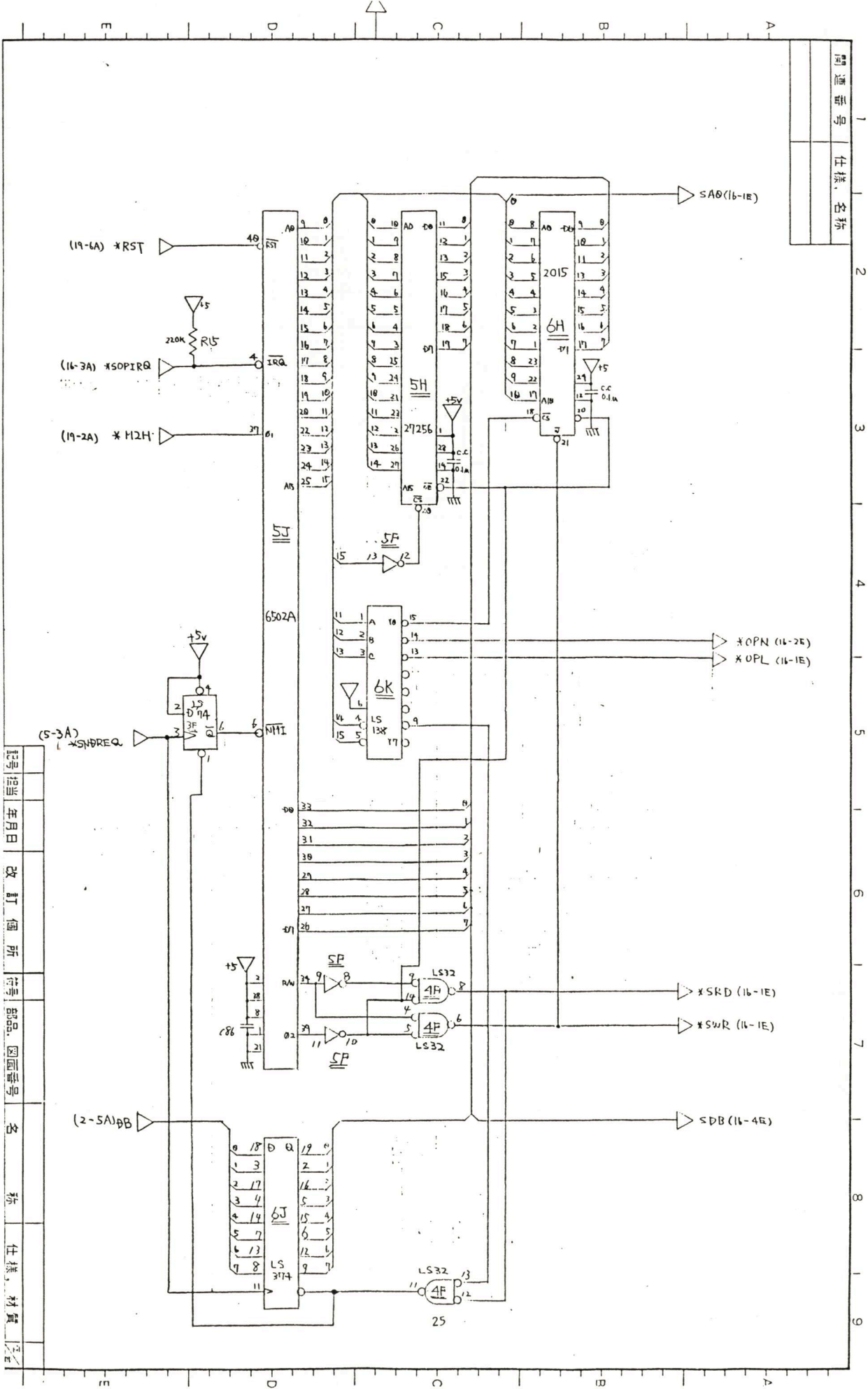
1 2 3 4 5 6 7 8 9

1 2 3 4 5 6 7 8 9

1 2 3 4 5 6 7 8 9

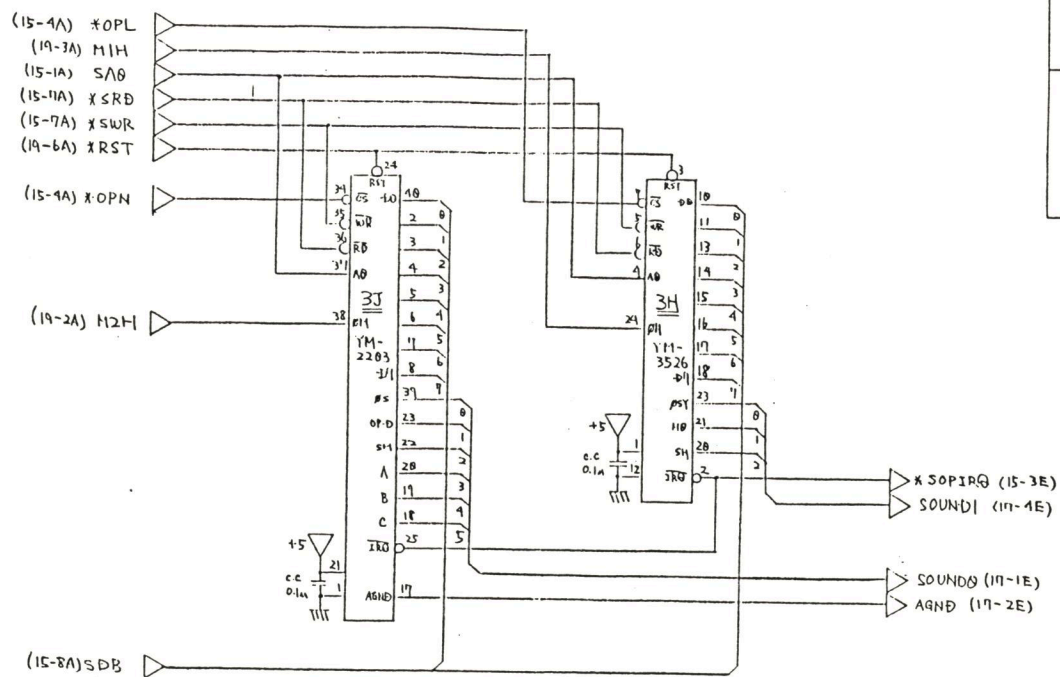
1 2 3 4 5 6 7 8 9

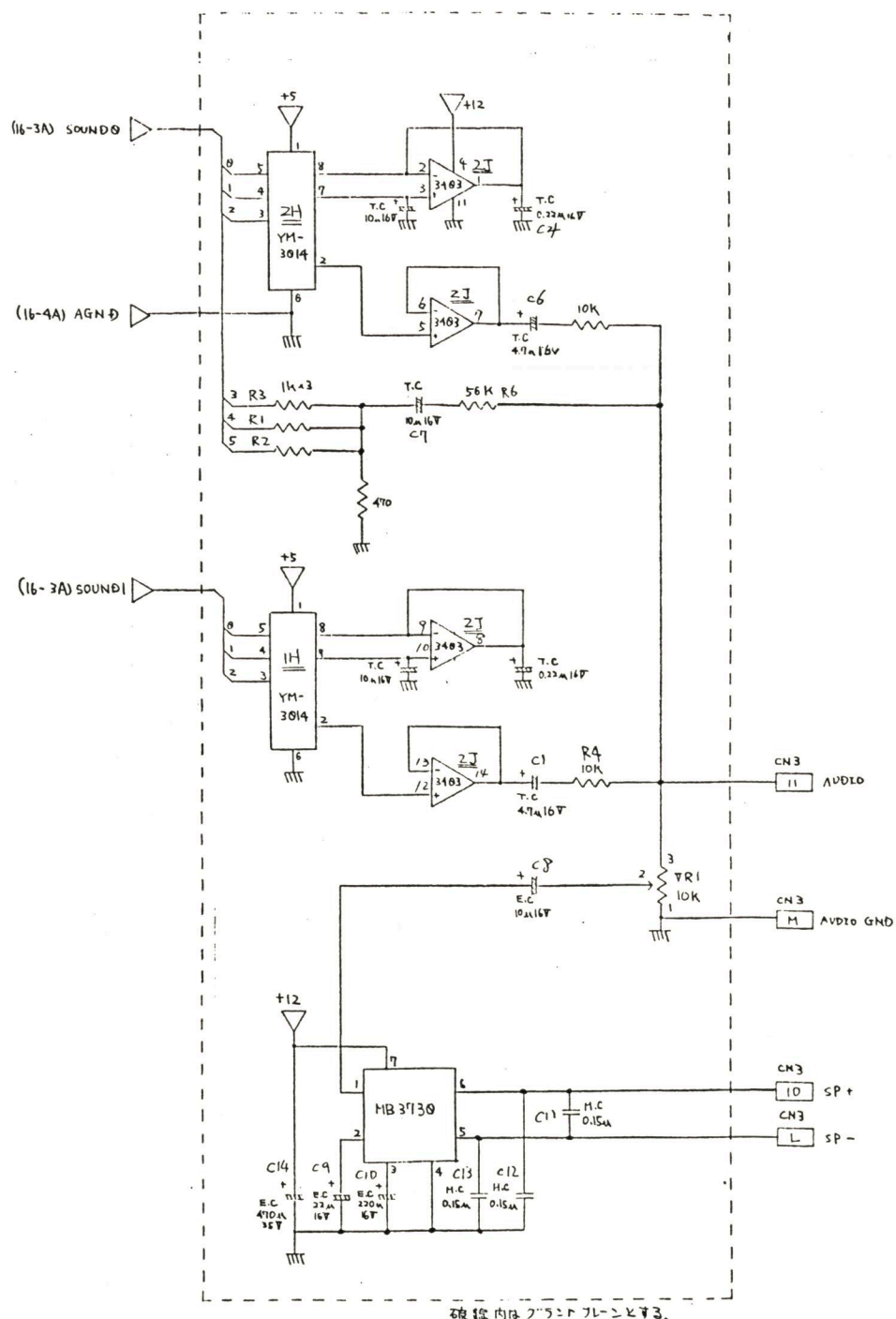
图例	说明
名称	说明

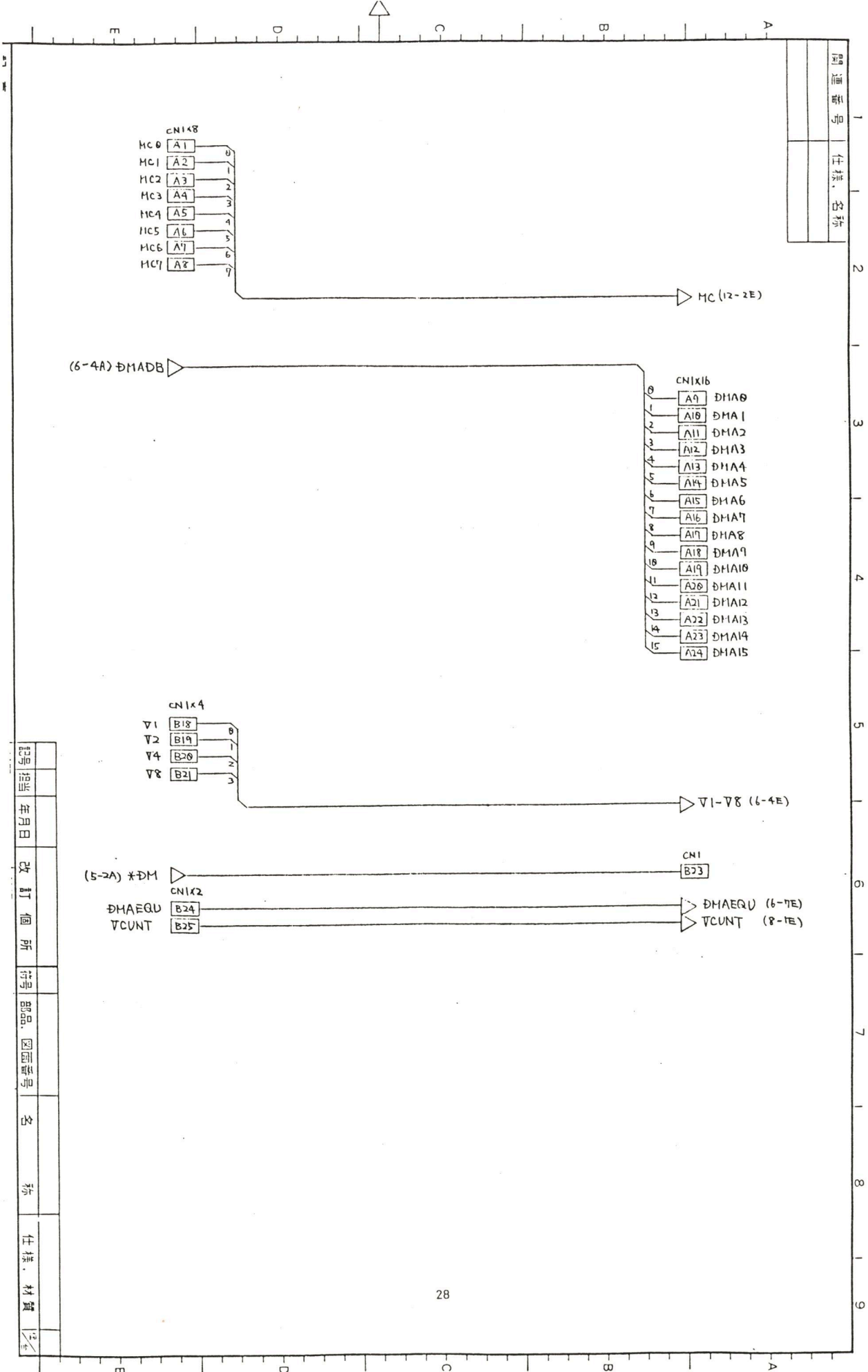


图例	说明
名称	说明

記号	年月日	改訂	箇所	部品	図面番号	文	社	仕様	材料	17
----	-----	----	----	----	------	---	---	----	----	----

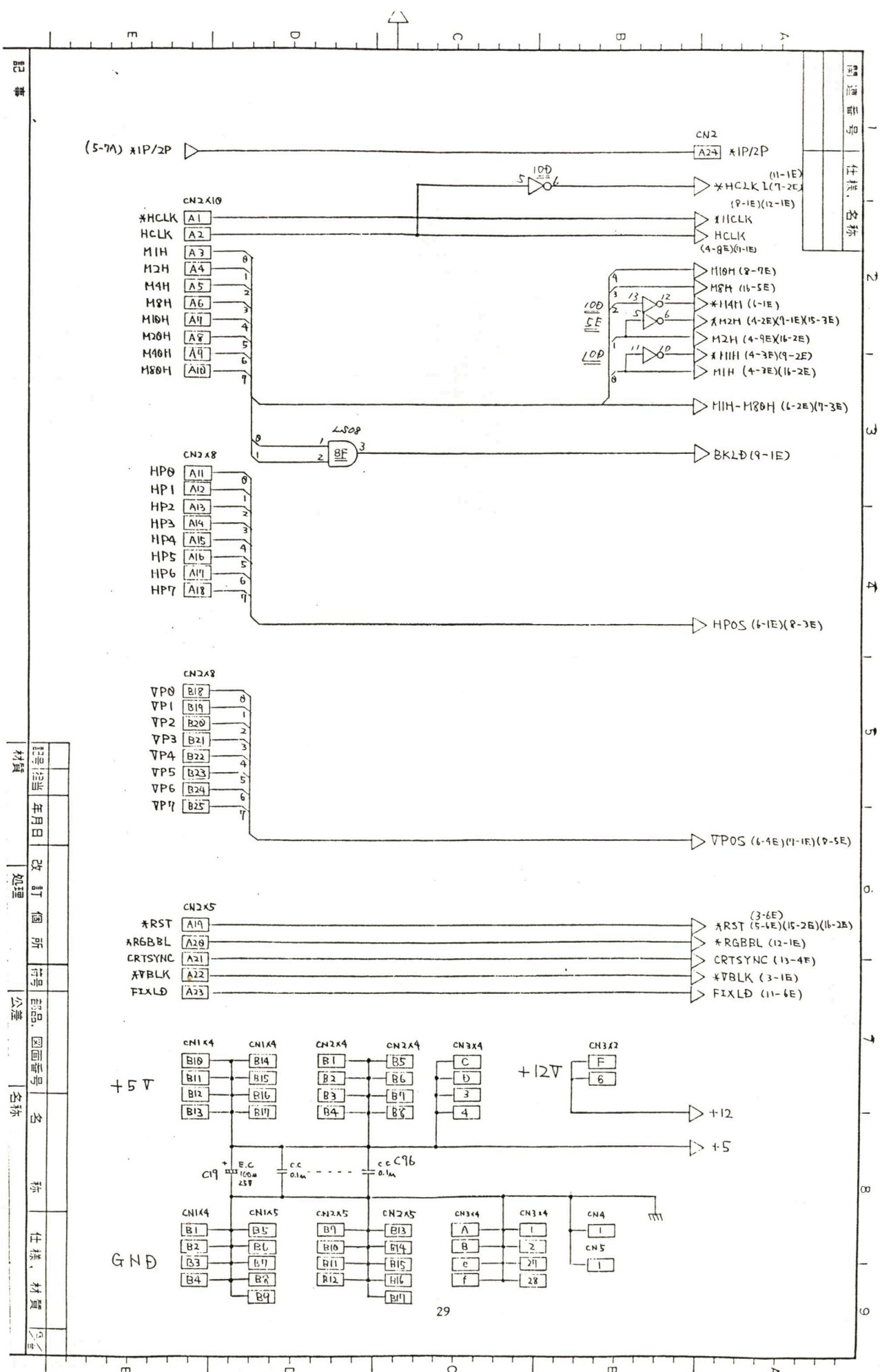


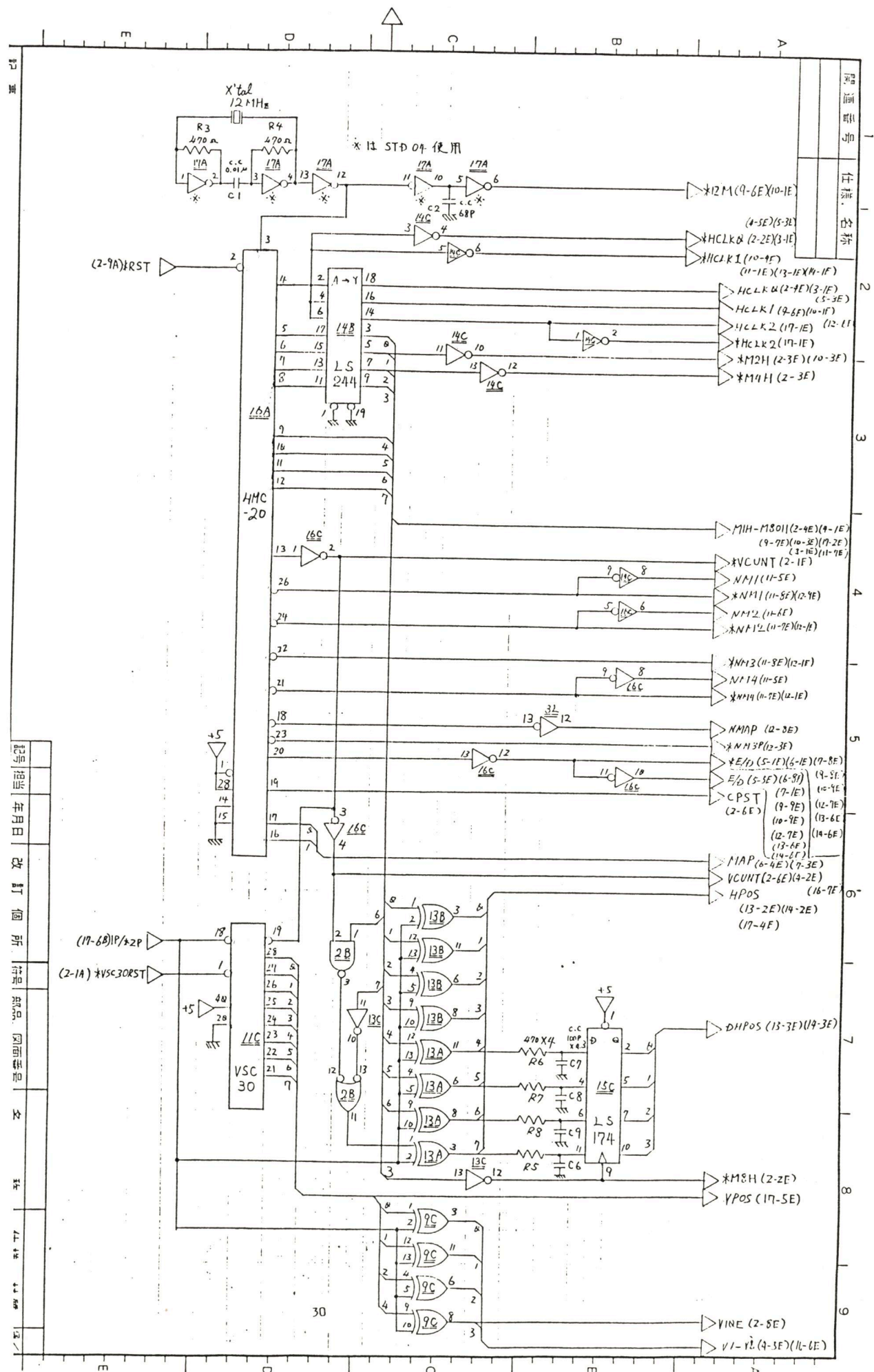




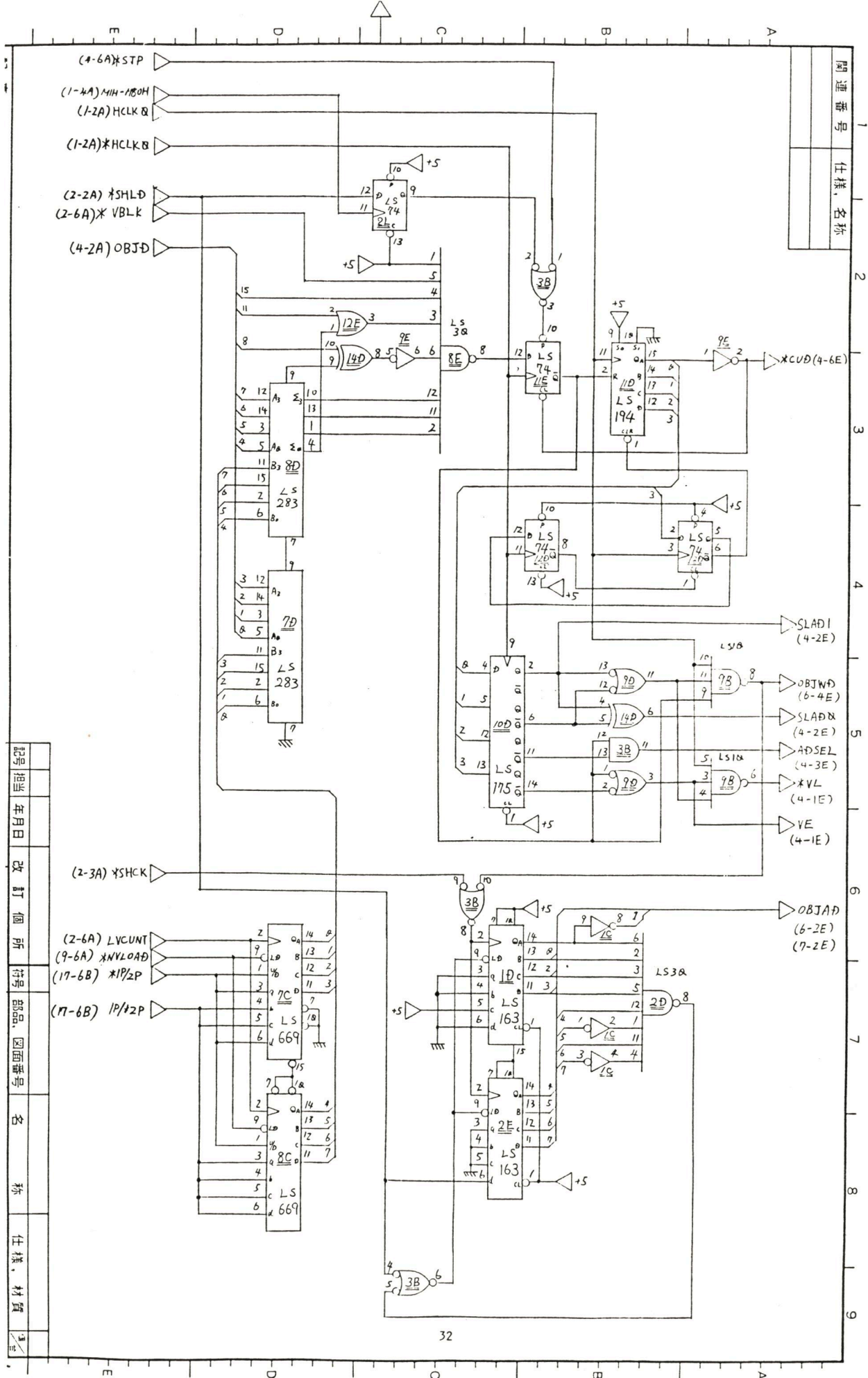
品名	仕様・名称
品番	
数量	

記号	品番	年月日	改訂	個所	符号	部品	図面番号	名	称	仕様	材質

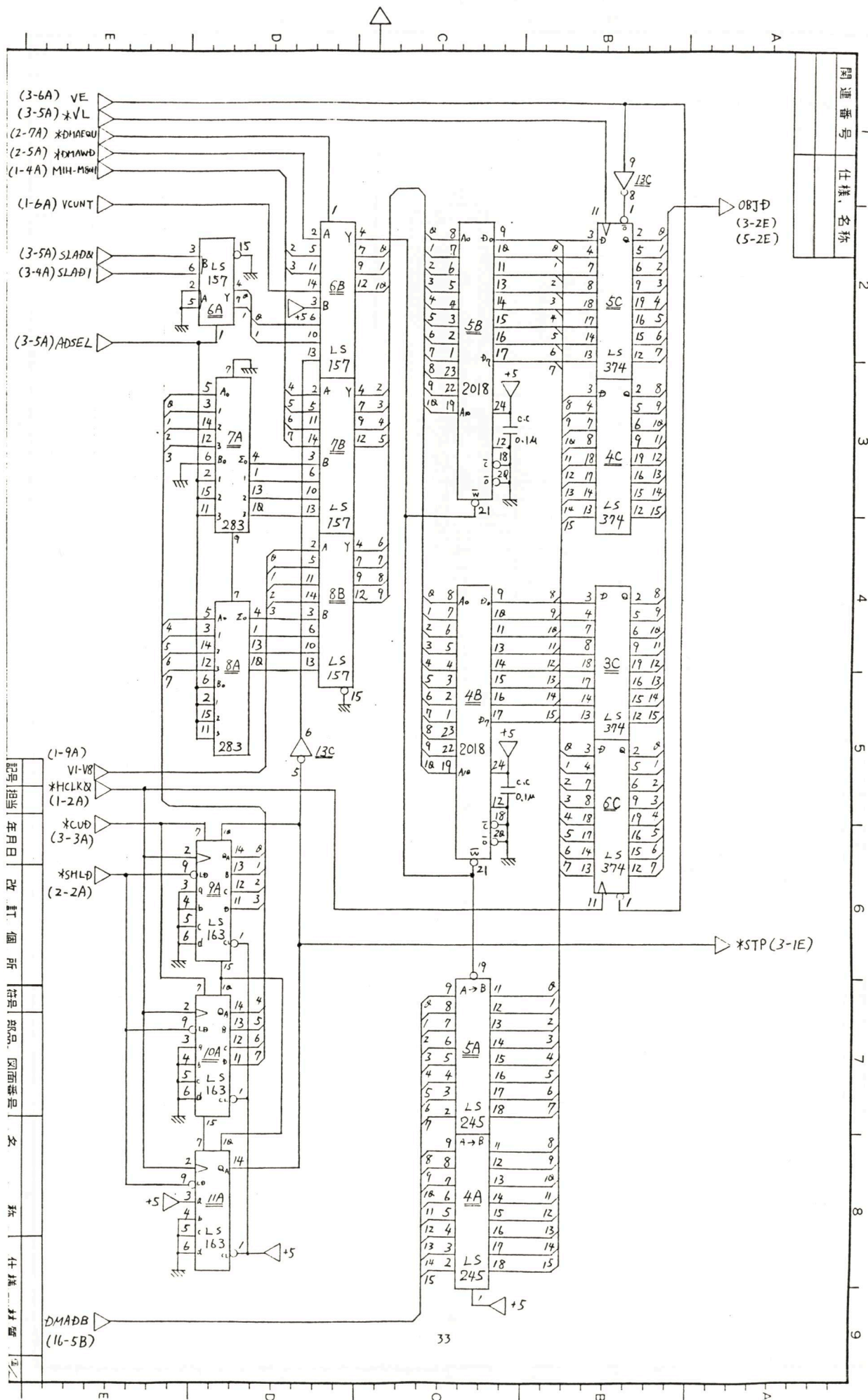




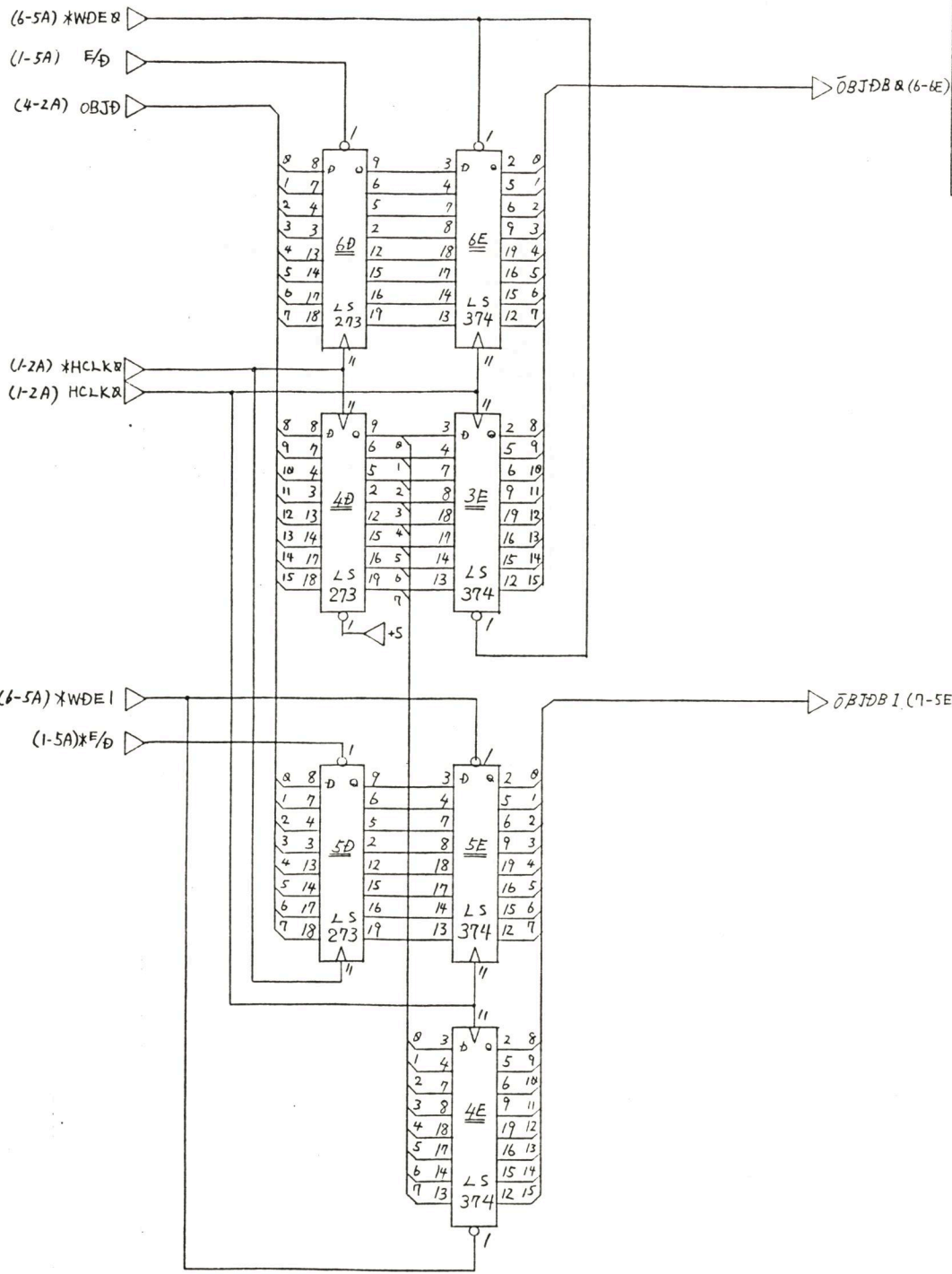


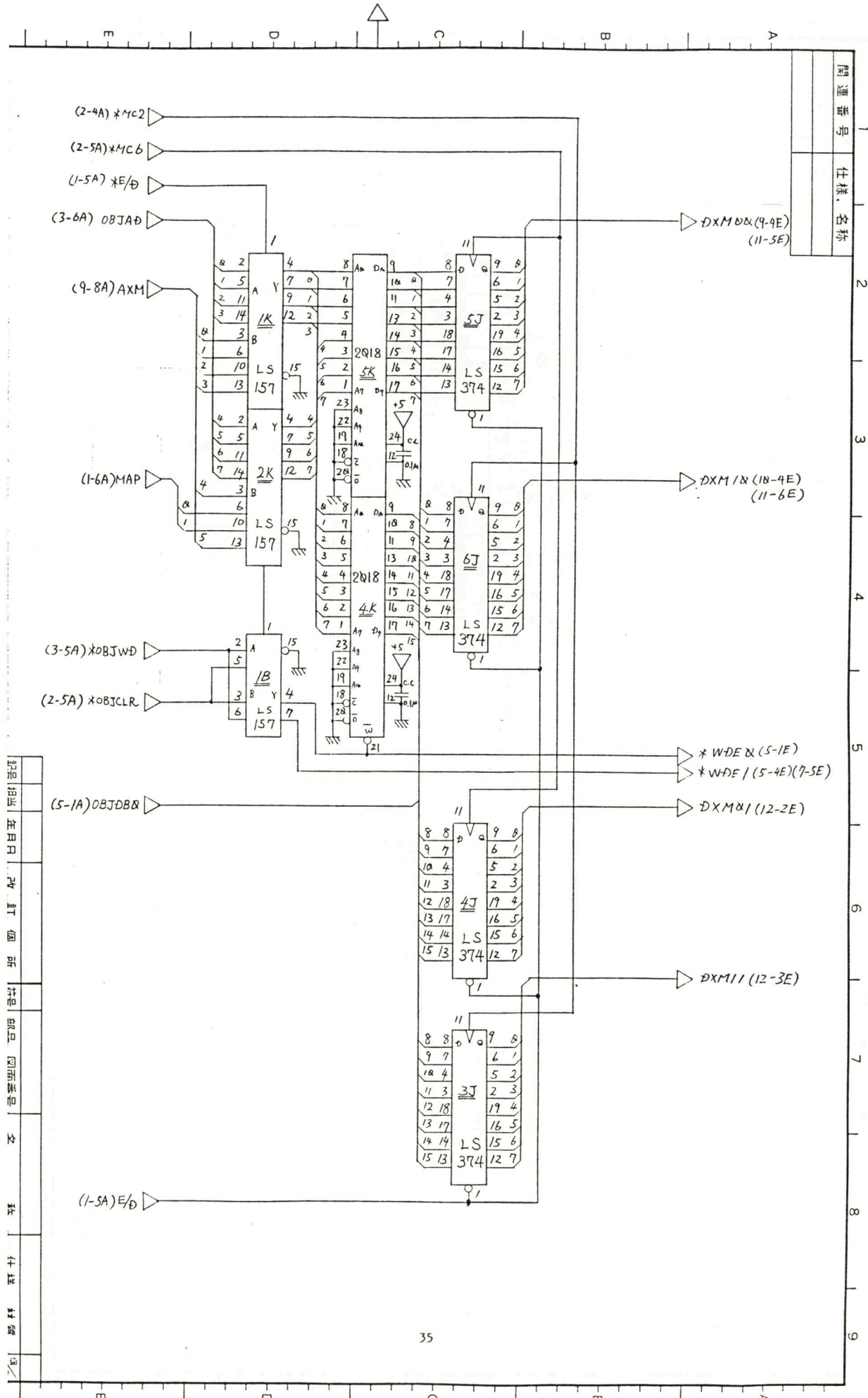


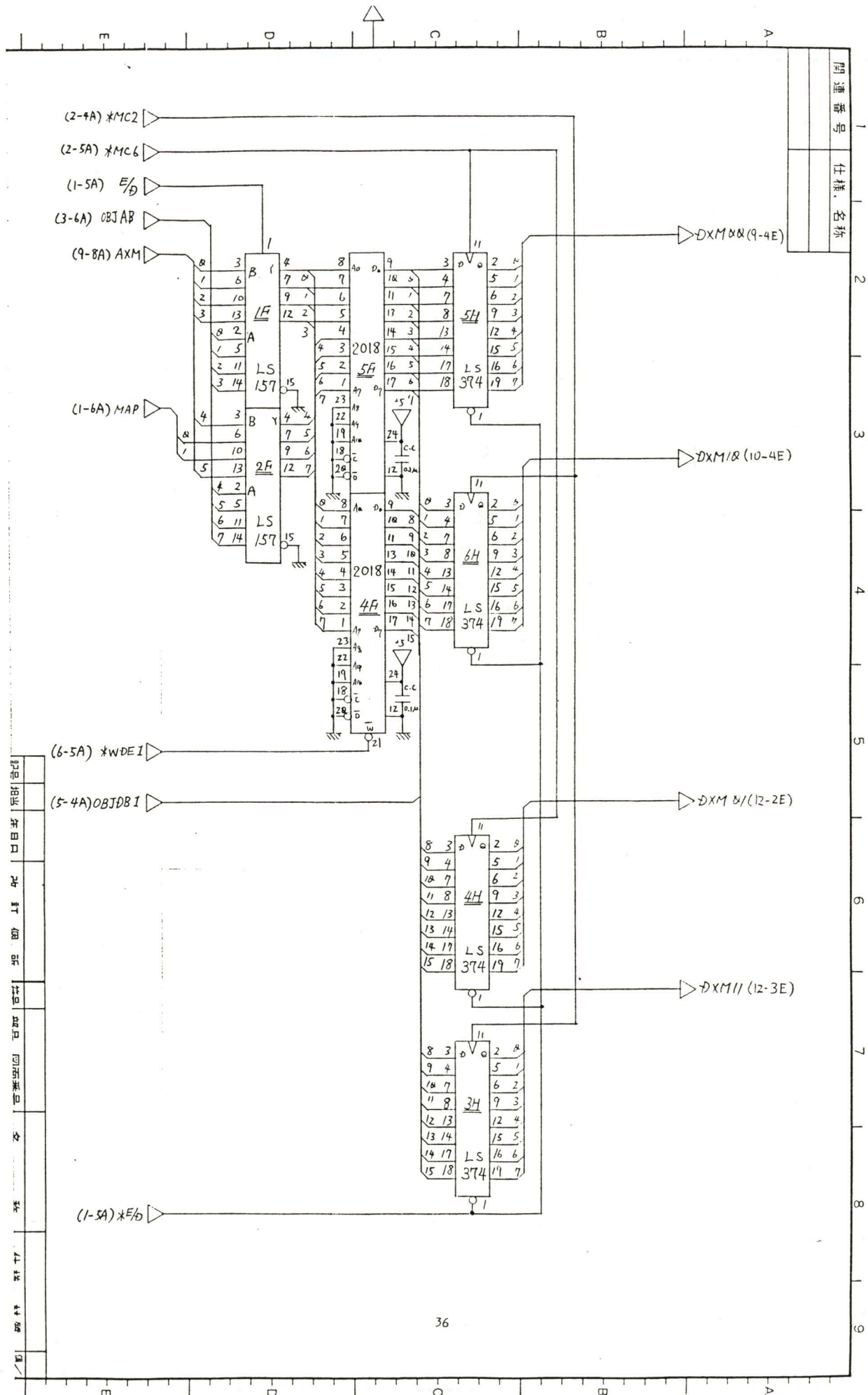
記号	担当	年月日	改訂	個所	符号	部品	図面番号	名	仕様	材質

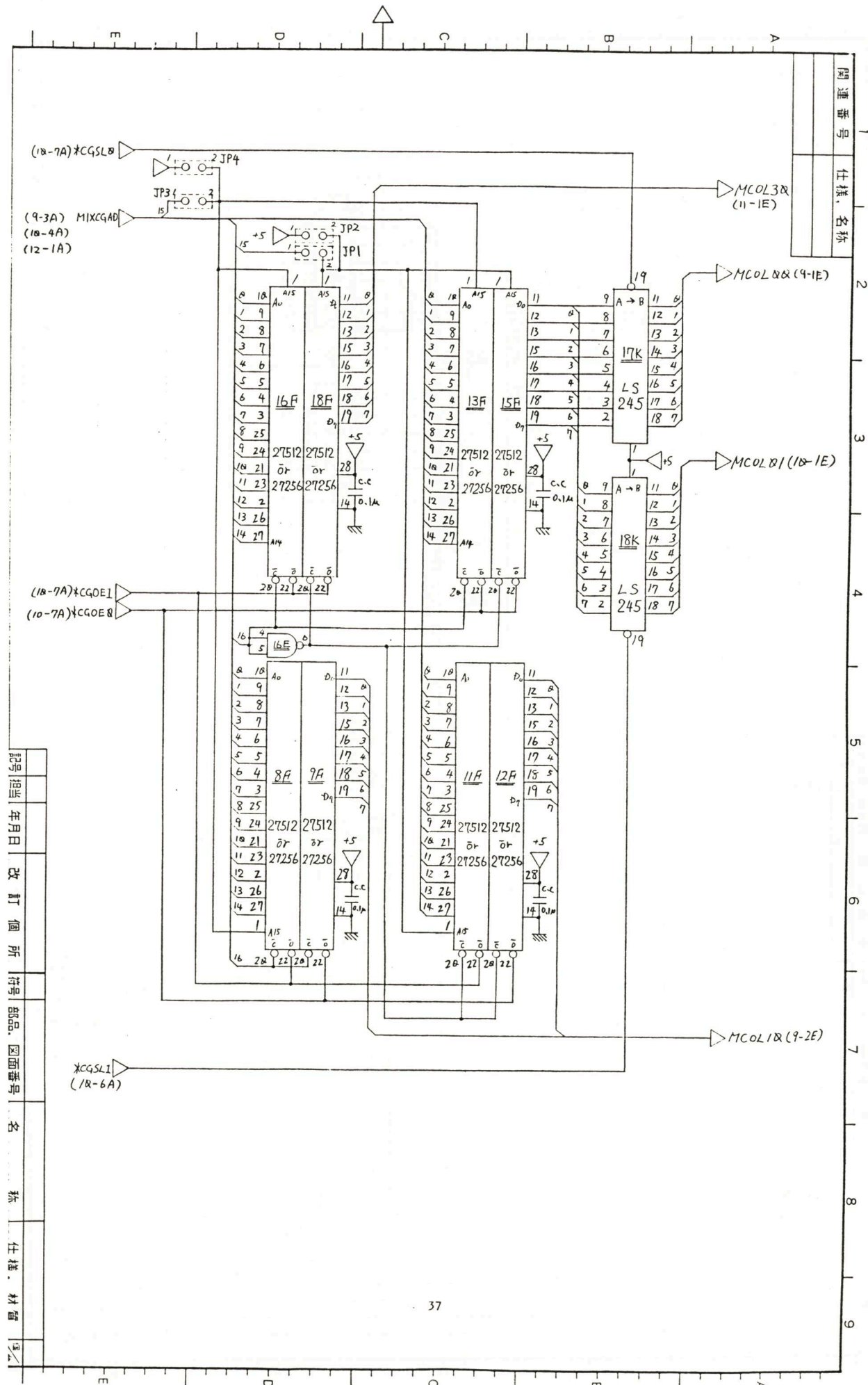


記号	担当	年月日	改訂	個所	符号	部品	図面番号	名	称	仕様	材質	1/31
----	----	-----	----	----	----	----	------	---	---	----	----	------









品名

材料

年月日

改訂

個所

符号

部品

図面番号

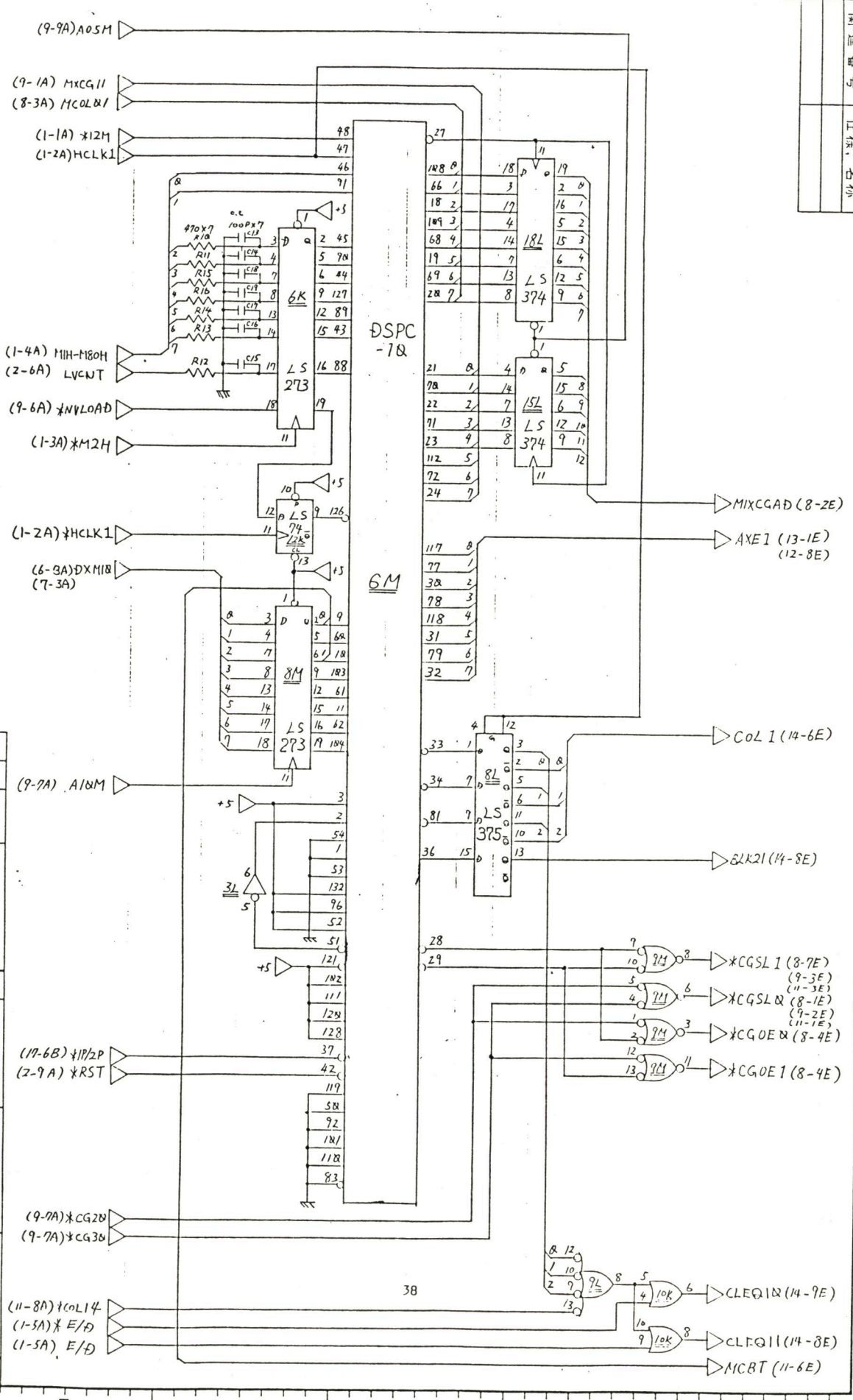
名

称

仕様

材質

12



1
仕様、名称

2

3

4

5

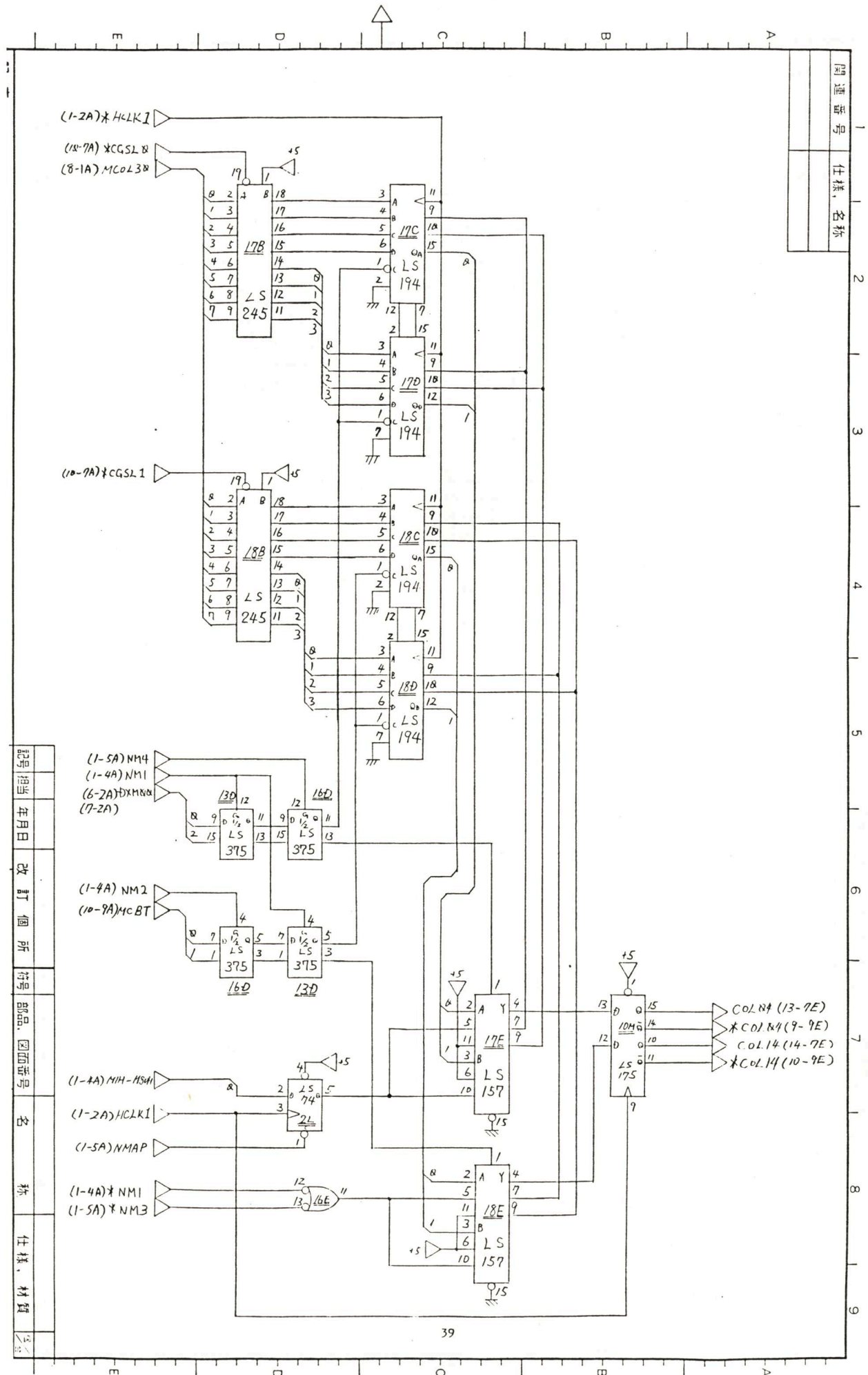
6

7

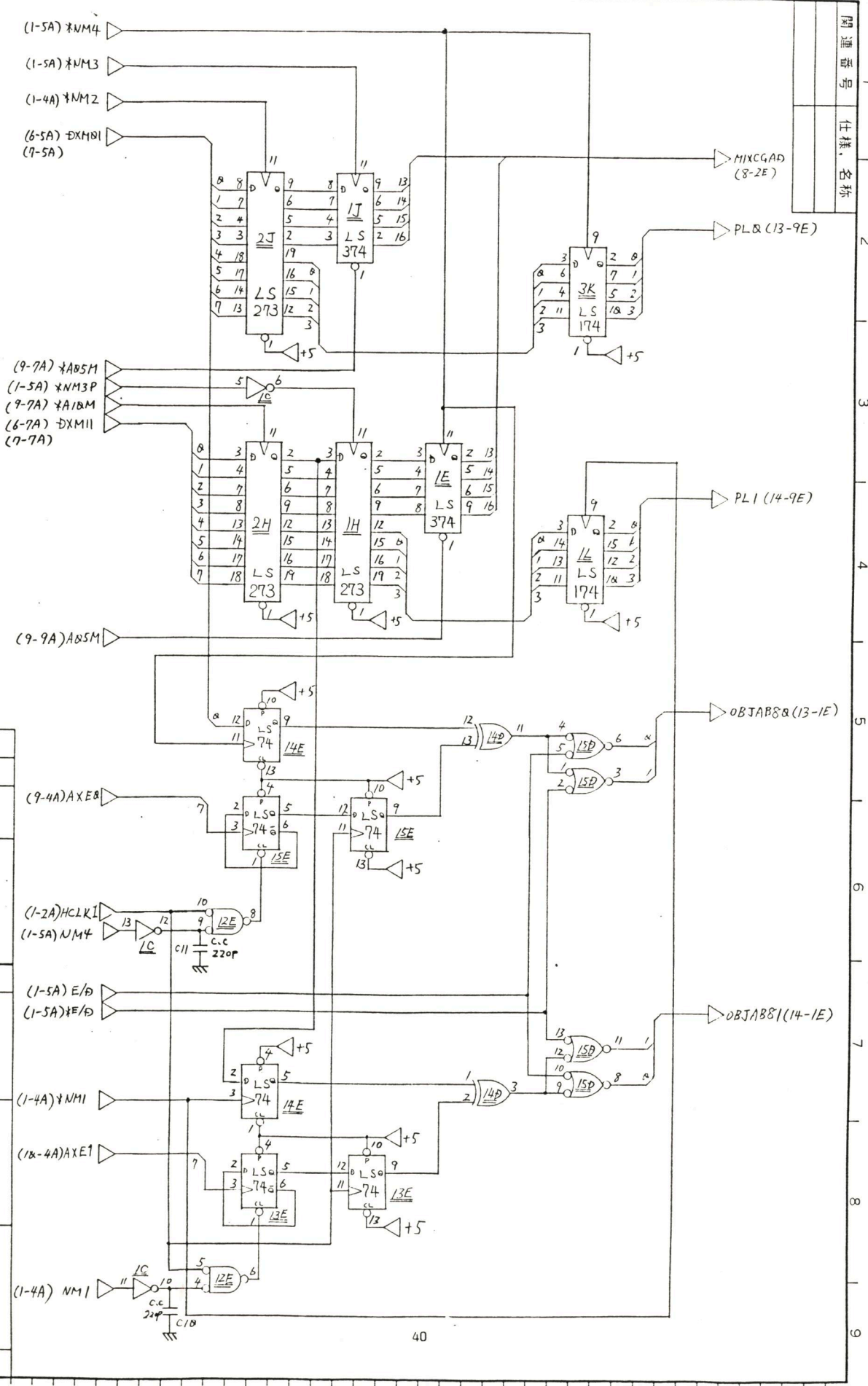
8

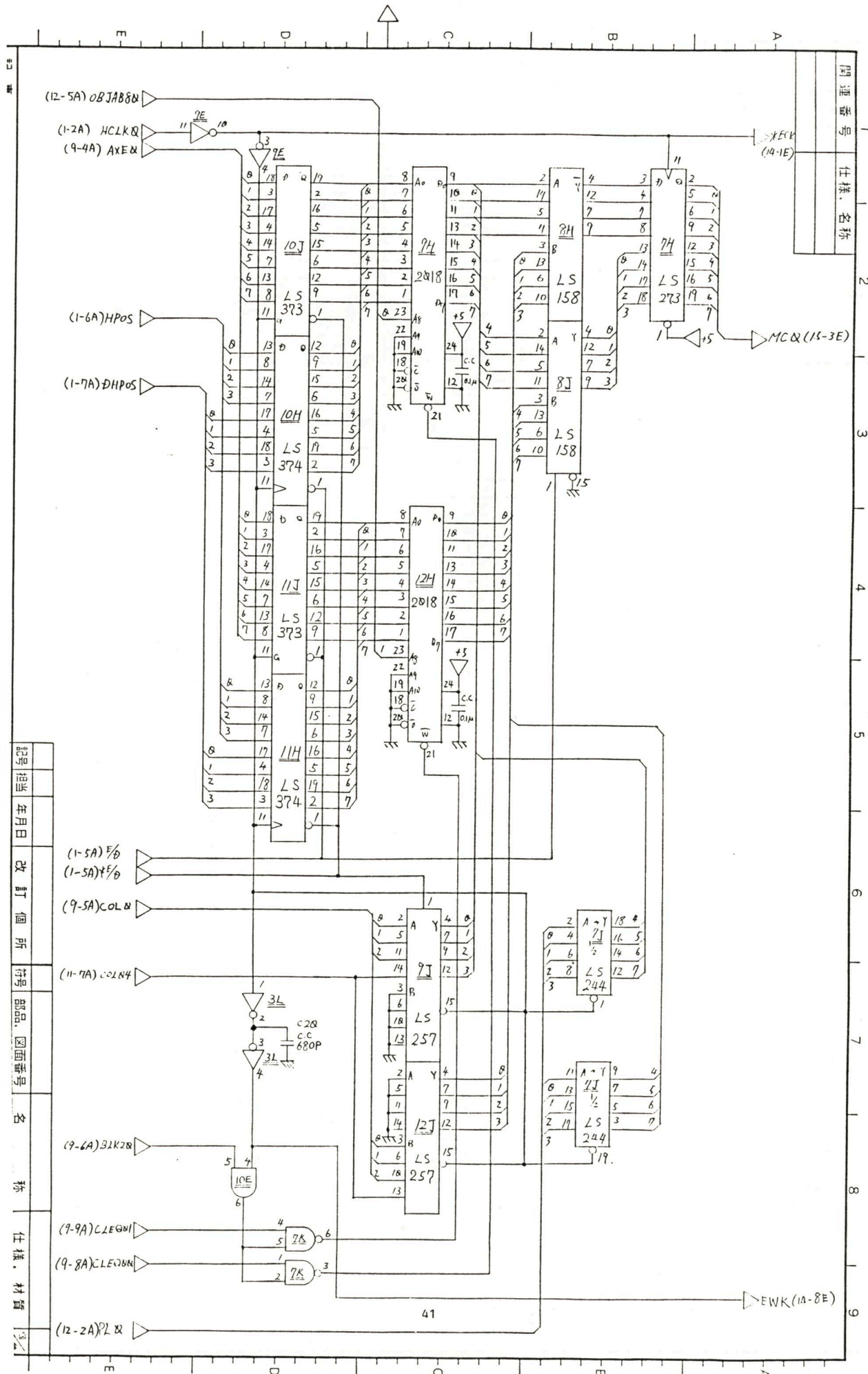
9

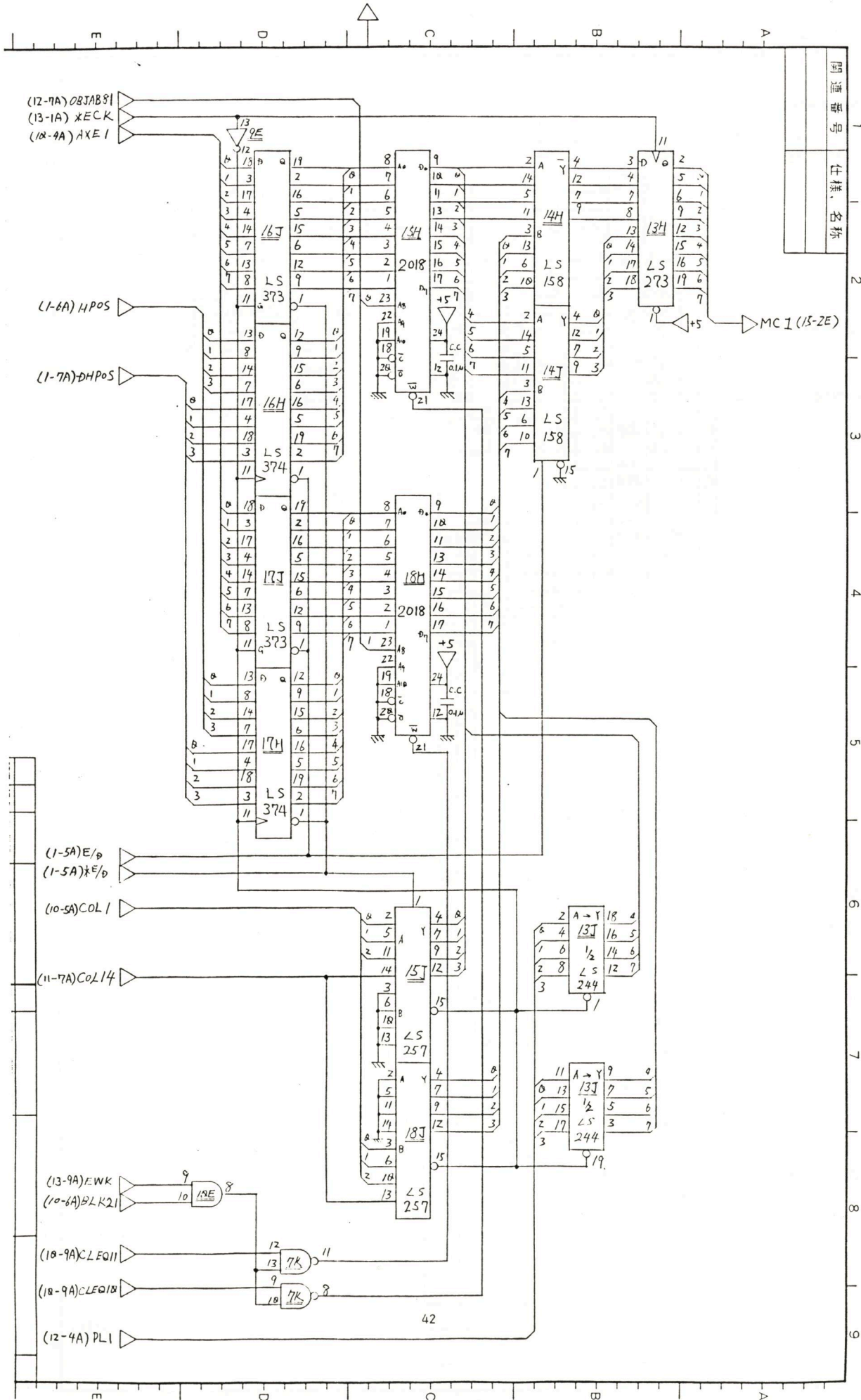
10



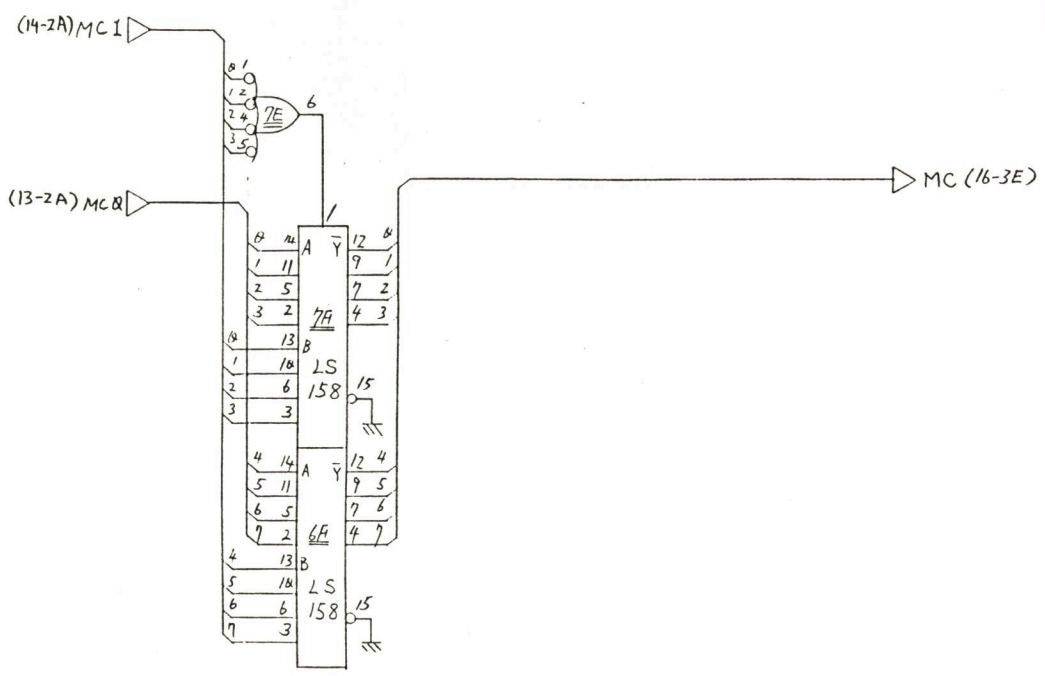
記号 年 月 日 改 訂 個 所 符 号 部 品 図 面 番 号 名 称 仕 様 材 質







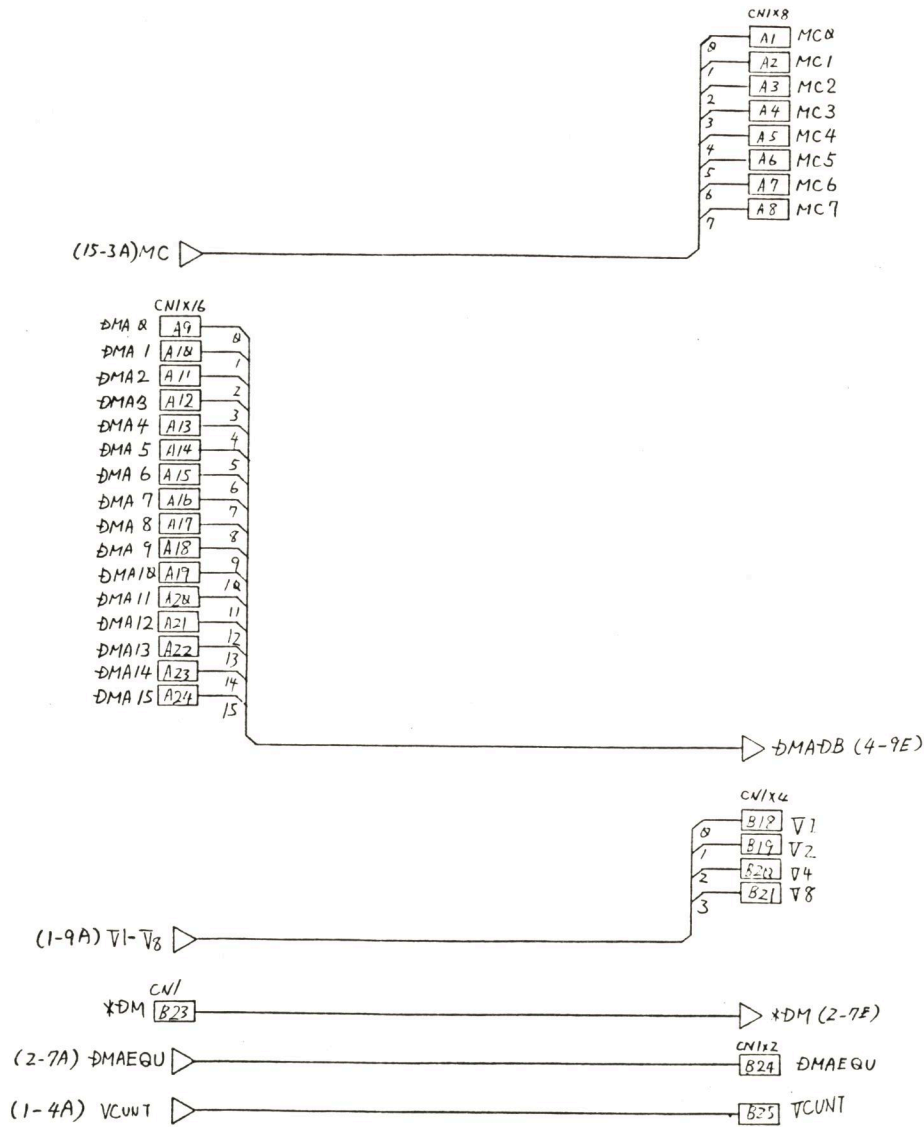
開運番号	仕様名称



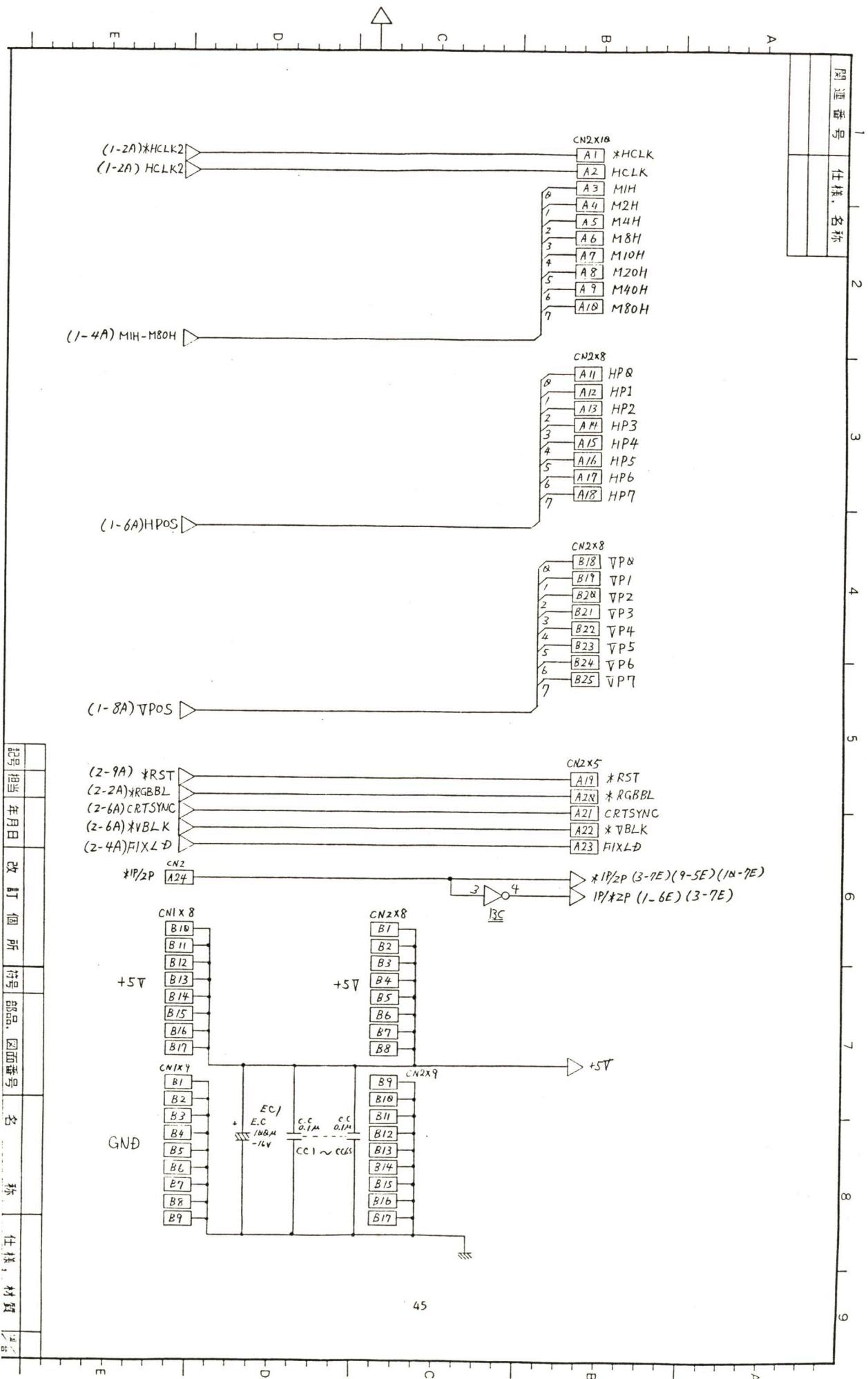
記号	担当	年月日	改訂	個所	符号	部品	図面番号	名	仕様	材料

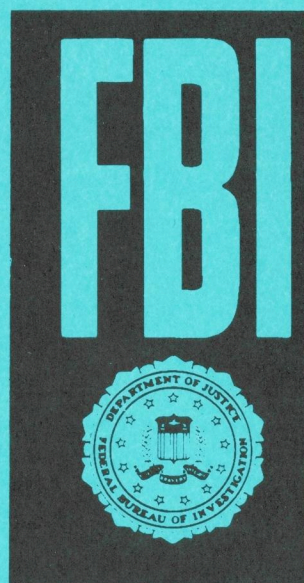
記号

記号	担当	年月日	改訂個所	符号	部品	図面番号	名	仕様	材質	3/4
----	----	-----	------	----	----	------	---	----	----	-----



記号	担当	年月日	改訂個所	符号	部品	図面番号	名	称	仕様	材質	備考





WARNING

Federal law provides severe civil and criminal penalties for the unauthorized reproduction, distribution, or exhibition of copyrighted audiovisual works and video games.

The Federal Bureau of Investigation investigates allegations of criminal copyright infringement.

