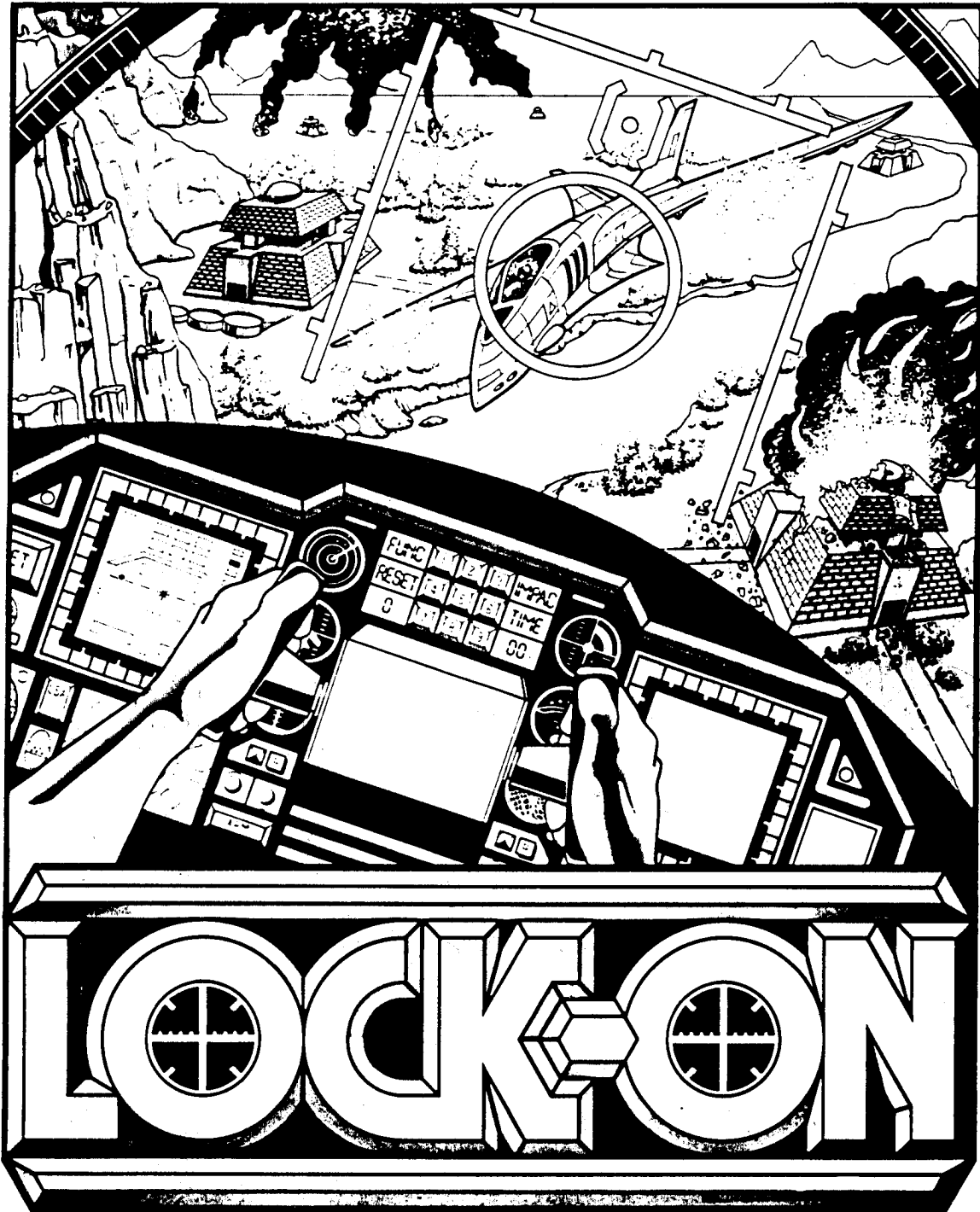


operation & service manual



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

780-0051-00



OPERATION AND SERVICE MANUAL

UPRIGHT CABINET MODEL 1US26U
&
OPTIONAL SEAT UNIT

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1 . W A R R A N T Y I N F O R M A T I O N .

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 Regulators (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.

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 cabinet decals.

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

Remove the rear access door and check the following:

- * Check that all plug-in connectors are firmly plugged in, re-plug 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.

B. Set up and installation.

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.

Place the game in its intended location and stabilize it using the adjustable levelers built into the bottom of the cabinet.

Check the Operator Selectable Options information in section 3b of this manual and switch your game to the desired settings. The game is now ready to operate. If you discover any problems up to this point, contact your distributor immediately.

C. Seat unit installation (optional).

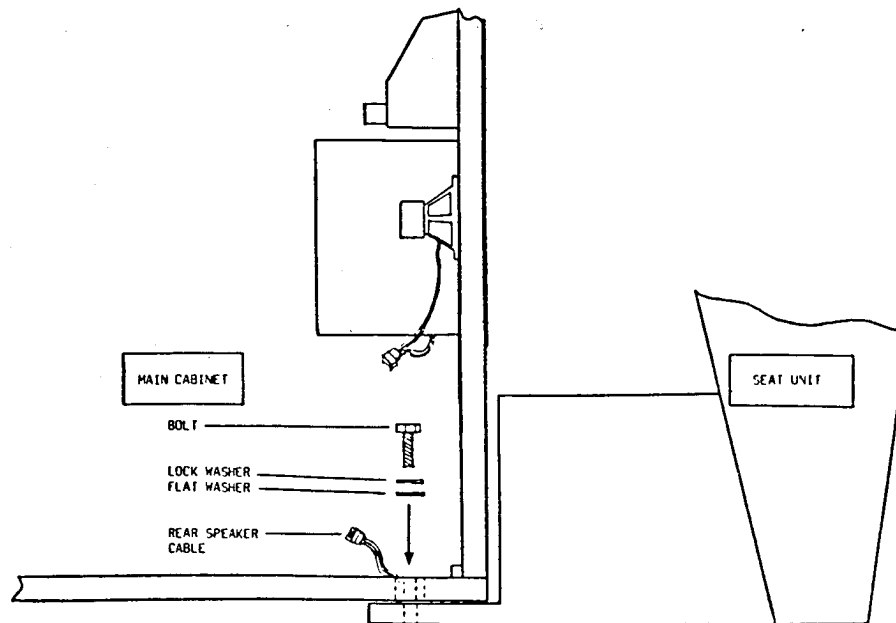
The Lock-On upright has an optional Seat Unit available. This gives the game a cockpit feel and enhances the play appeal of the game. The Seat Unit attaches to the bottom of the upright cabinet with 2 bolts.

NO ATTEMPT SHOULD BE MADE TO MOVE THE GAME WITH THE SEAT UNIT ATTACHED, AS THIS WILL CAUSE DAMAGE TO THE CABINET.

To install the Seat Unit, remove the rear access door of the upright cabinet and locate the three holes in the floor near the front panel, under the coin door. Position the Seat unit up against the upright cabinet so that the lower portion of the seat unit is under the floor of the main cabinet. Be sure the rear speaker receptacle is positioned in the center relief of the seat unit.

Install the two bolts supplied with the seat unit through the main cabinet into the T-nuts in the lower portion of the seat unit.

Disconnect the 6 pin Molex plug from the lower speakers in the main cabinet and plug the it into the receptacle for the rear speakers in the seat unit. Do not attempt to modify the harness to utilize both the lower and the rear speakers as this will damage the Sound Power Amp pcb.



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

A. Self Tests and Adjustments.

AUTOMATIC SELF TEST: The Lock-On game has a self test mode that checks the system hardware for possible failures. This test runs automatically upon power up before allowing the game to enter the Attract Mode. If an error is detected during this test, the proper error message (see table 1) will be displayed on the screen.

MANUAL TEST MODE: Access the Test Mode by flipping the Test Switch (see figure 1) to the ON position. In this mode, you can check the operation of the player controls and view all current option settings. Changes made to the Operator Selectable Options while in the Test Mode will be immediately reflected on the screen. This mode will also display any Hardware Error Status codes in the event there is a failure detected.

TABLE 1 HARDWARE STATUS ERROR CODES

STATUS NO.	PCB	TYPE OF FAILURE	CHECK I.C.:
1	TF011	RAM	69,70
2	TF011	RAM	52,59
3	TF012	RAM	30,31
4	TF011	ROM	95,96
5	TF011	ROM	88,89
6	TF011	ROM	76,77
7	TF011	RAM	33
8	TF011	ROM	24
9	TF013	RAM	31,34
10	TF013	ROM	29,32
11	TF013	ROM	30,33
12	TF014	RAM	29,44
13	TF014	ROM	31,46
14	TF011	INTERRUPT	94
20	TF013	RAM	31,34
21	TF013	ROM	29,32
22	TF013	ROM	30,33
23	TF013	RAM	98,99
24	TF013	RAM	112,113
25	TF013	INTERRUPT	5
29	TF013	CPU ACCESS	5
30	TF014	RAM	29,44
31	TF014	ROM	31,46
32	TF014	RAM	39,54
39	TF014	CPU ACCESS	6

SOUND VOLUME: The sound volume and upper/lower speaker balance is adjustable via two volume control potentiometers (see figure 1). Turn the potentiometer clockwise to increase the sound volume for it's respective speaker.

NOTE: If you have the optional Seat Unit installed, the lower speaker volume control now affects the rear speakers.

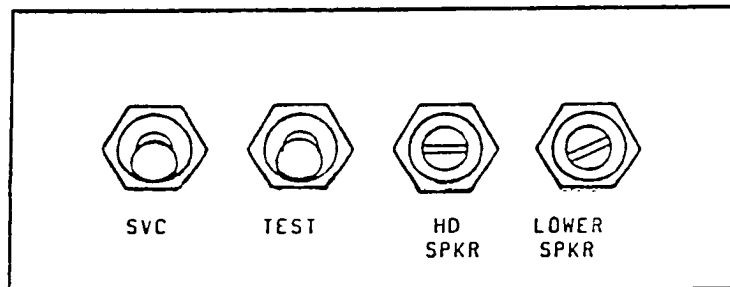


FIGURE 1

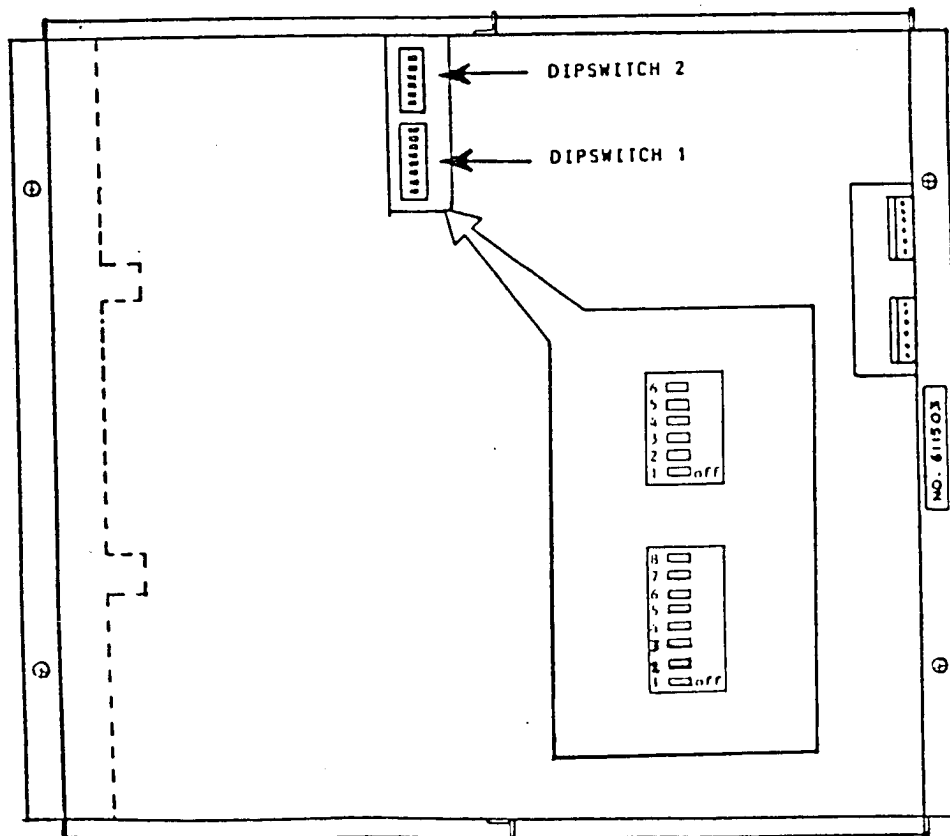


FIGURE 2

B. Operator selectable options.

The Lock-On game contains operator selectable coinage, bonus, etc. These options are accessed by the two dipswitch packages located on the main logic pcb (see figure 2). Tables 2 and 3 show the available options. Factory settings are highlighted.

TABLE 2 DIPSWITCH 1

		1	2	3	4	5	6	7	8
NUMBER OF LIVES	THREE:	ON	ON						
	TWO:	OFF	ON						
	FOUR:	ON	OFF						
	FIVE:	OFF	OFF						
GAME DIFFICULTY LEVELS	NORMAL:			ON	ON				
	EASY:			OFF	ON				
	HARD:			ON	OFF				
	HARDEST:			OFF	OFF				
BONUS LEVEL	150K & EVERY 200K					ON			
	200K & EVERY 200K					OFF			
CONTINUE (BUY-IN) MODE	YES:						ON		
	NO:						OFF		
ATTRACT MODE SOUND	NO:							ON	
	YES:							OFF	

TABLE 3 DIPSWITCH 2

		1	2	3	4	5	6
COIN VS CREDIT COIN 1	1 COIN = 1 CREDIT	ON	ON	ON			
	2 COIN = 1 CREDIT	OFF	ON	ON			
	3 COIN = 1 CREDIT	ON	OFF	ON			
	1 COIN = 2 CREDIT	OFF	OFF	ON			
	1 COIN = 5 CREDIT	ON	ON	OFF			
	1 COIN = 6 CREDIT	OFF	ON	OFF			
	2 COIN = 3 CREDIT	ON	OFF	OFF			
FREE PLAY	OFF	OFF	OFF				
COIN VS CREDIT COIN 2	1 COIN = 1 CREDIT				ON	ON	ON
	2 COIN = 1 CREDIT				OFF	ON	ON
	1 COIN = 2 CREDIT				ON	OFF	ON
	1 COIN = 5 CREDIT				OFF	OFF	ON
	1 COIN = 3 CREDIT				ON	ON	OFF
	1 COIN = 4 CREDIT				OFF	ON	OFF
	4 COIN = 1 CREDIT				ON	OFF	OFF
4 COIN = 3 CREDIT				OFF	OFF	OFF	

C. Power supply information.

POWER SUPPLY: The switching regulator's voltage output is adjustable by turning the potentiometer VR1. This adjustment should only be performed while measuring the voltage with a DIGITAL MULTIMETER at the LOGIC PCB, not at the switching regulator! The tolerance for these voltage measurements equals $\pm 5\%$ respective voltage.

CAUTION: THE ADJUSTMENT PROCEDURE DESCRIBED ABOVE 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 dangerous 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, use only Fast Blow devices with the proper current rating.

- * The 7 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.

D. "Lock-On" indicator lamp information.

To enhance the game play, there is a flashing lamp that indicates when the player is "locked on" to a target and can fire a guided missile. If a replacement is ever required, use only a number 1816, 13 volts at .33 amperes (Data East PN: 165-0008-00).

The red lens and bezel has been glued to prevent theft. To replace the lamp, you must remove the marquee plex and access the lamp from the rear of the lampholder. Remove the retaining nut on the lamp housing and lift up the lampholder. Reverse these steps to re-assemble. NOTE: The operation of this lamp may be checked by pressing the Hover button while in the Test Mode.

FINAL ASSEMBLY, Lock-On U/R, 500-0014-00

ITEM	PART NUMBER	DESCRIPTION
1	365-0009-00	CABINET, GREY
2	510-0093-00	CONTROL PANEL ASSY, LOCK-ON
3	510-0065-00	MONITOR, UNIVERSAL, H/V.
4	510-0004-00	COIN DOOR ASSY.
5	510-0094-00	POWER SUPPLY ASSY, 20 AMP
6	510-0092-00	PCB SET, LOCK-ON
7	510-0052-00	PCB ASSY, SOUND POWER AMP
8	170-0002-00	DUAL LAMPHOLDER ASSY.
9	165-0004-01	LAMP, INCANDESCENT, 40 W.
10	031-0004-00	SPEAKER, 8 OHM, 8 WATT, 4" DIA.
11	535-0028-00	GRILL, SPEAKER
12	535-0009-00	RETAINER, PLEX
13	830-0028-00	PLEX, MARQUEE, LOCK-ON
14	660-0001-01	PLEX, MONITOR, CLEAR, 23.75 X 23.75
15	810-0019-00	UNDERLAY, MONITOR, LOCK-ON
16	380-0002-00	BEZEL, MONITOR, BLACK
17	036-0126-00	HARNESS, MAIN, LOCK-ON
18	780-0051-00	MANUAL, SERVICE & OPERATION
19	820-0037-00	DECAL, LEFT SIDE, LOCK-ON
20	820-0037-01	DECAL, RIGHT SIDE, LOCK-ON
21	225-0002-00	FAN, 117 VAC
22	515-0024-00	SERVICE PANEL, SVC/TEST/VOL.
23	820-0038-00	SIDE DECAL, DATA EAST AIR FORCE, SEAT UNIT
24	165-0008-00	LAMP, INCANDESCENT, 13 V, .33

CONTROL PANEL ASSEMBLY, LOCK-ON, 510-0093-00

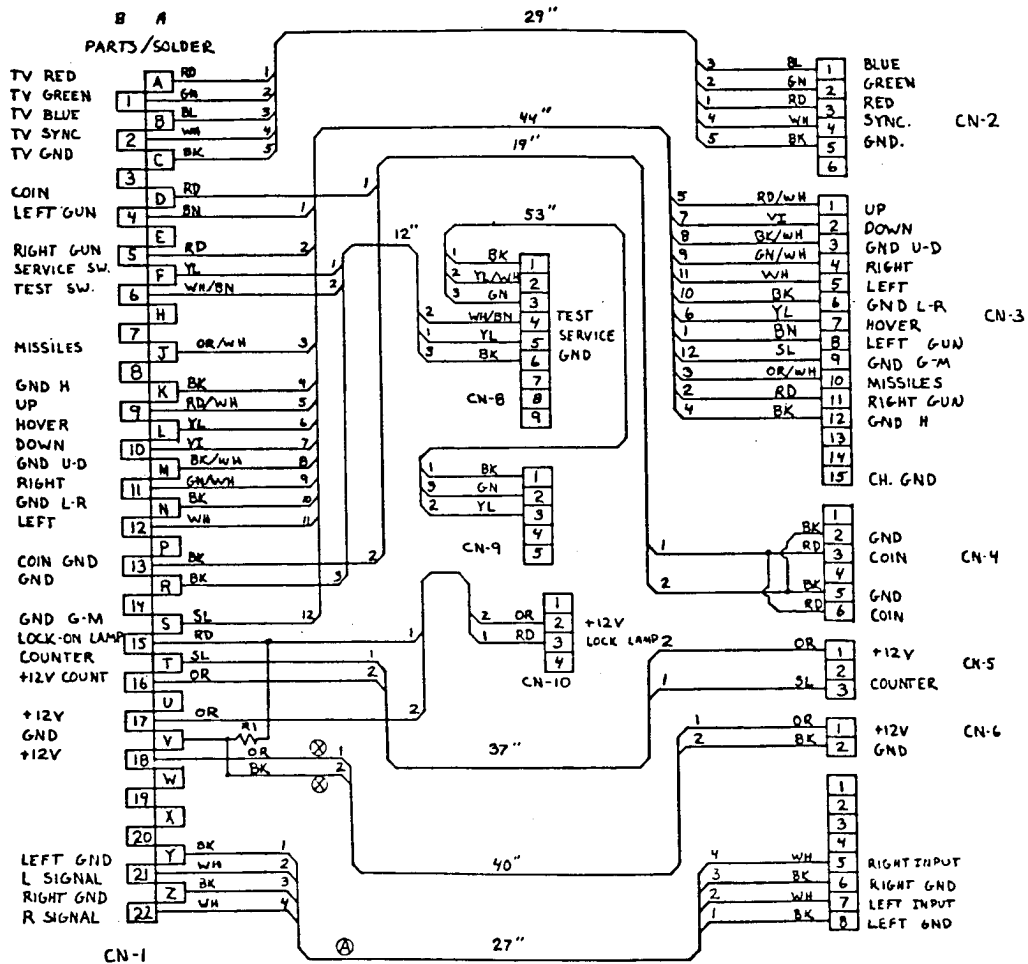
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25	535-0065-02	CONTROL PANEL, BARE
26	800-0024-00	CONTROL PANEL OVERLAY, LOCK-ON
27	515-0023-00	STEERING ASSY, LOCK-ON
28	800-0025-00	OVERLAY, CONTROLLER

POWER SUPPLY ASSEMBLY, 5 VOLT, 20AMP, 510-0002-00

ITEM	PART NUMBER	DESCRIPTION
29	515-0003-00	CHASSIS, WOOD
30	515-0002-00	POWER CORD
31	010-0001-00	TRANSFORMER, ISOLATION
32	001-0007-00	SWITCHING REGULATOR, 5 VOLT @ 20 AMPS
33	001-0008-00	SWITCHING REGULATOR, 12 VOLT @ 4.2 AMPS
34	515-0004-00	SWITCH BRACKET ASSY.
35	150-0001-00	NOISE FILTER

4. WIRING INFORMATION

A. Main Harness wiring diagram.



- CN-1 - HRS-CR7E-4YDA-396
 - CN-2 - MOLEX 1625-06R-1
 - CN-3 - MOLEX 1625-15R-1
 - CN-4 - MOLEX 1625-06R-1
 - CN-5 - MOLEX 1625-03R-1
 - CN-6 - MOLEX 03-09-2032
 - CN-7 - JST-S8P-SHF-1
 - CN-8 - MOLEX 1625-09R-1
 - CN-9 - JST-S5P-SHF-1
 - CN-10 - MOLEX 1625-04R-1
- ALL WIRE 22 AWG STYLE 1007 UNLESS NOTED
 ⊗ - 20 AWG STYLE 1007 WIRE
 ⊕ - SHIELDED CABLE
 R1 - 100 Ω 2 WATT RESISTOR

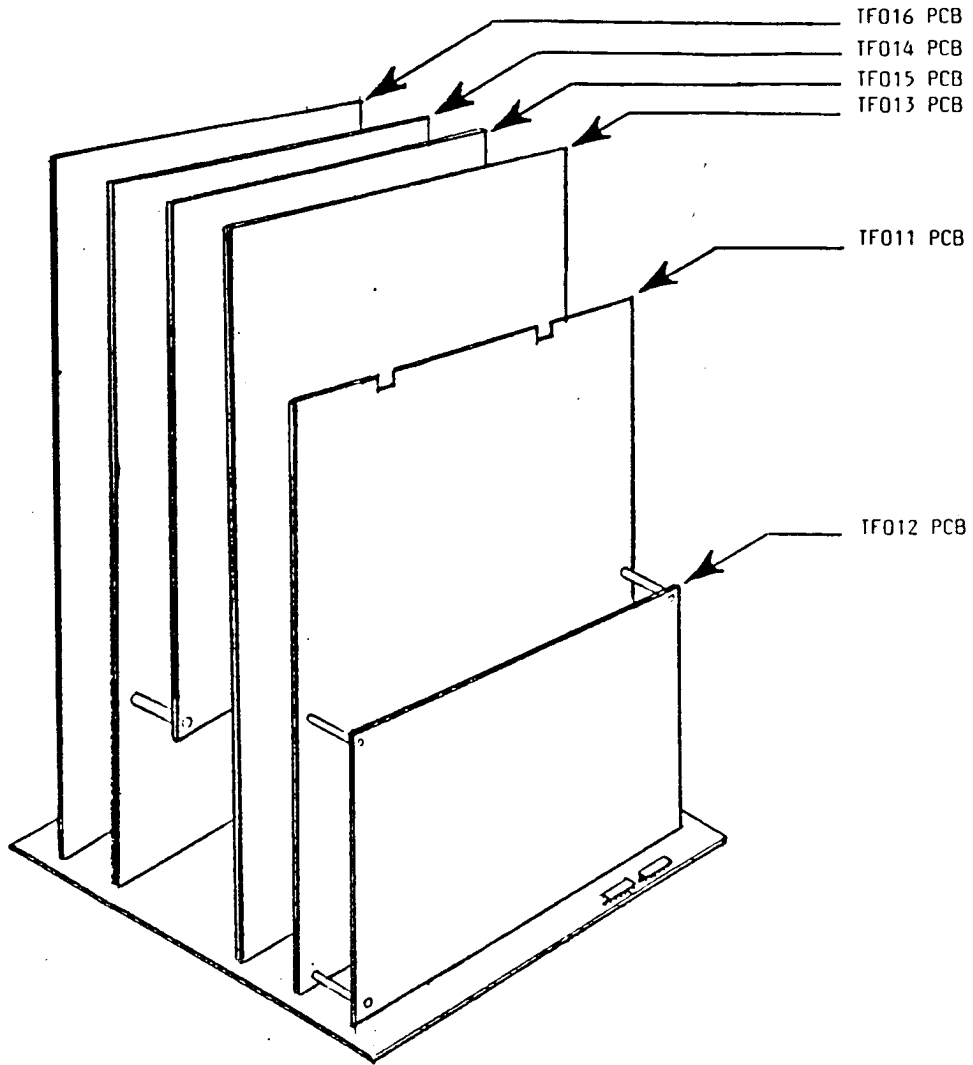
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DR. BY: JOHN NOLAND	DATE: JAN. 3, 1967

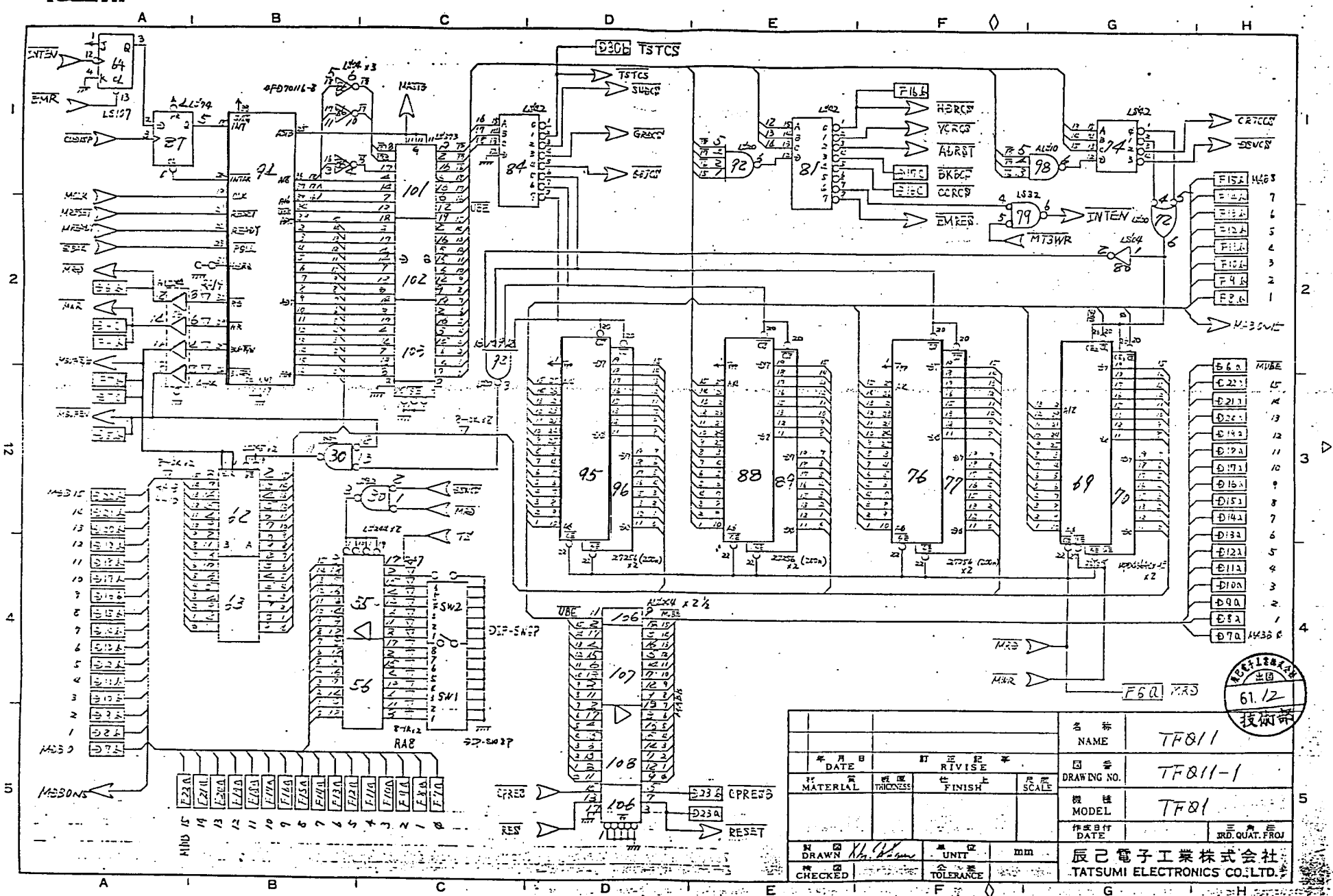
B. Edge connector pin-out.

EDGE CONNECTOR, CN-A, TF011 PCB

SOLDER SIDE	PIN NUMBER		COMPONENT SIDE
CRT RED	A	1	CRT GREEN
CRT BLUE	B	2	CRT CSYNC
CRT GROUND	C	3	
COIN 1	D	4	1P CONTROL LEFT GUN
	E	5	1P CONTROL RIGHT GUN
SERVICE SWITCH	F	6	TEST SWITCH
	H	7	
1P CONTROL MISSILE	J	8	
GROUND	K	9	UP
1P CONTROL HOVER	L	10	DOWN
UP/DOWN COMMON	M	11	RIGHT
LEFT/RIGHT COMMON	N	12	LEFT
GROUND	P	13	COIN GROUND
GROUND	R	14	GROUND
GROUND	S	15	"LOCK-ON" LAMP OUTPUT
COIN COUNTER	T	16	+ 12 VOLTS DC
	U	17	+ 12 VOLTS DC
GROUND	V	18	+ 12 VOLTS DC
	W	19	
	X	20	
LEFT SHIELD	Y	21	LEFT AUDIO OUT
RIGHT SHIELD	Z	22	RIGHT AUDIO OUT

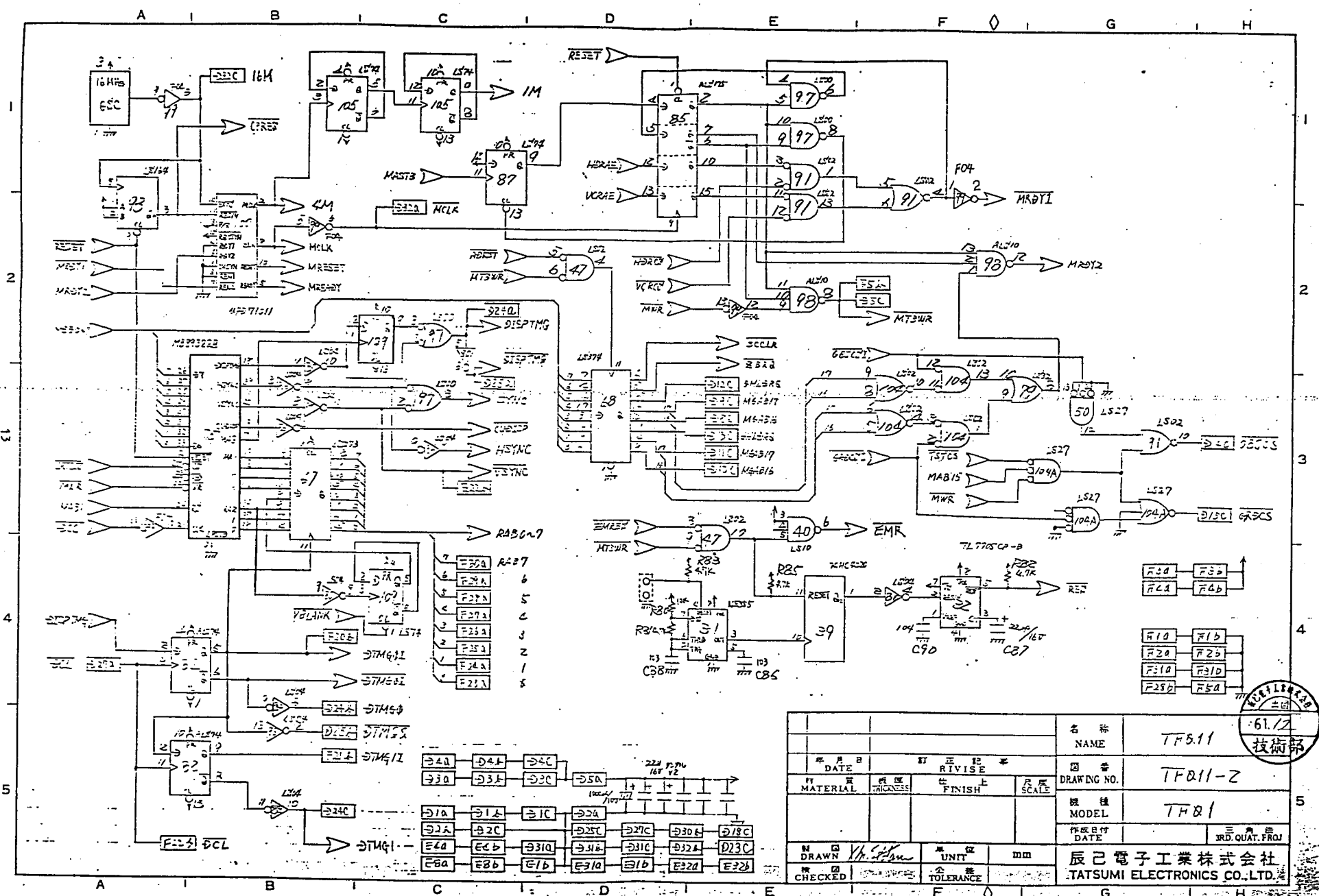
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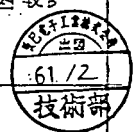
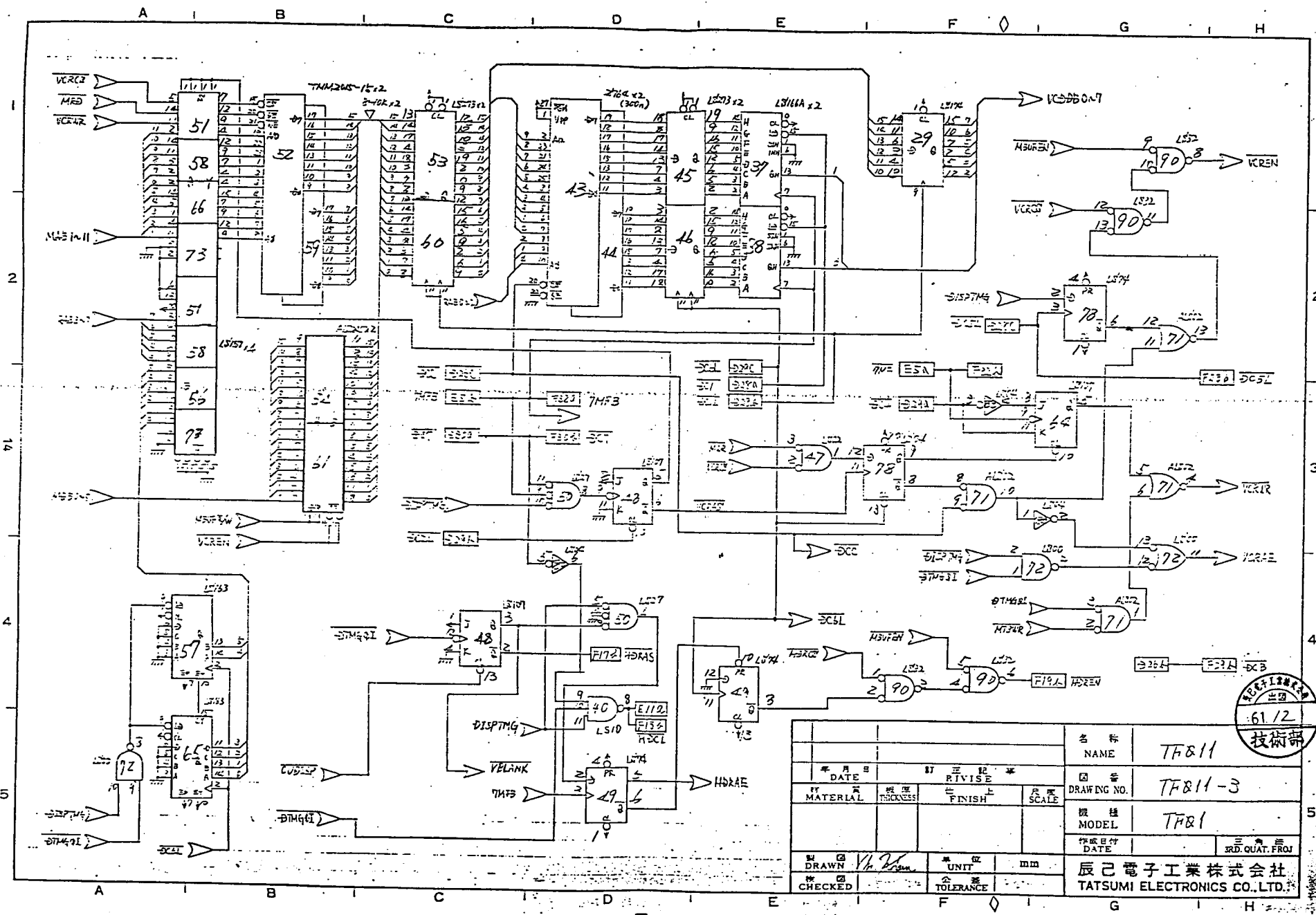


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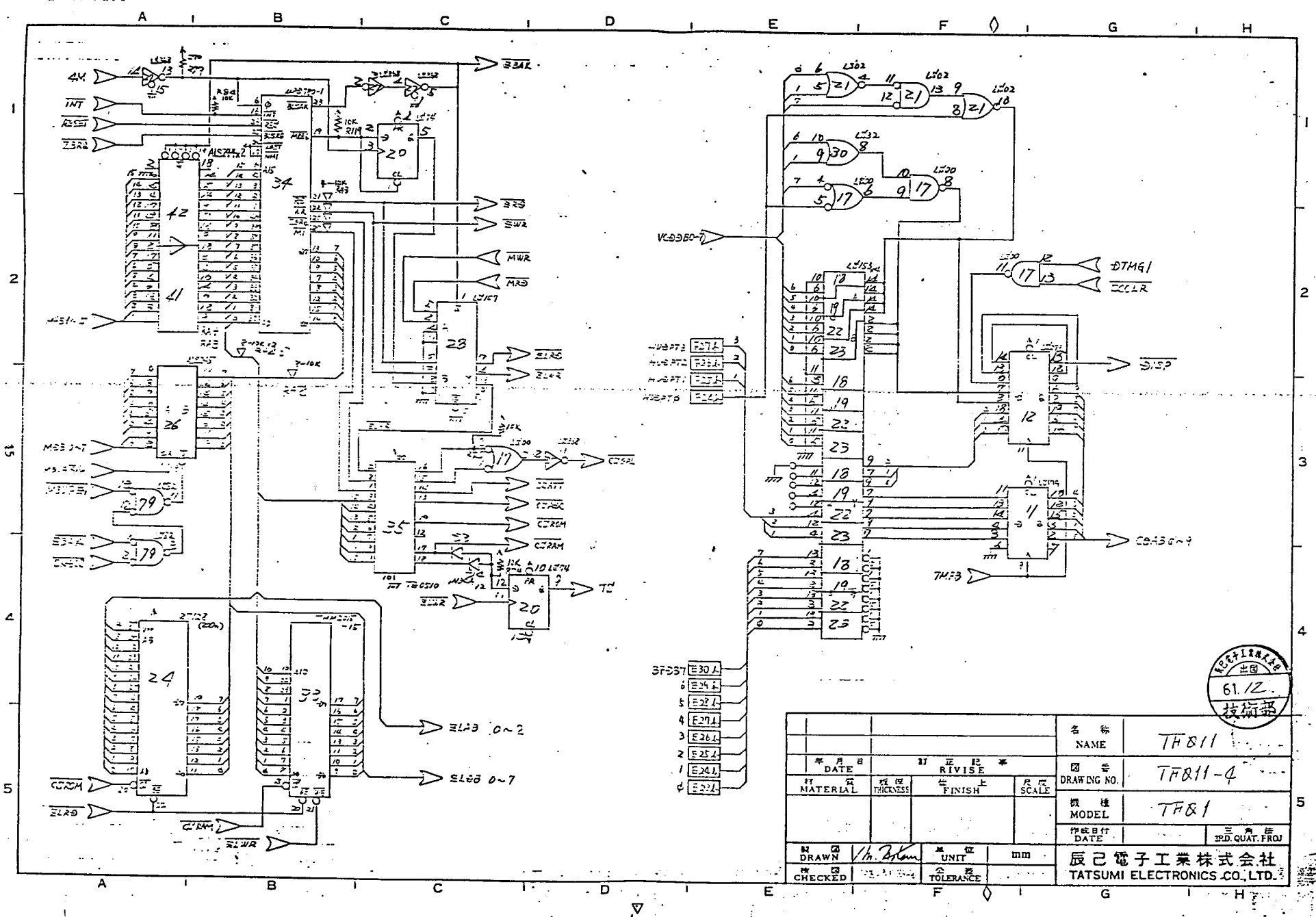




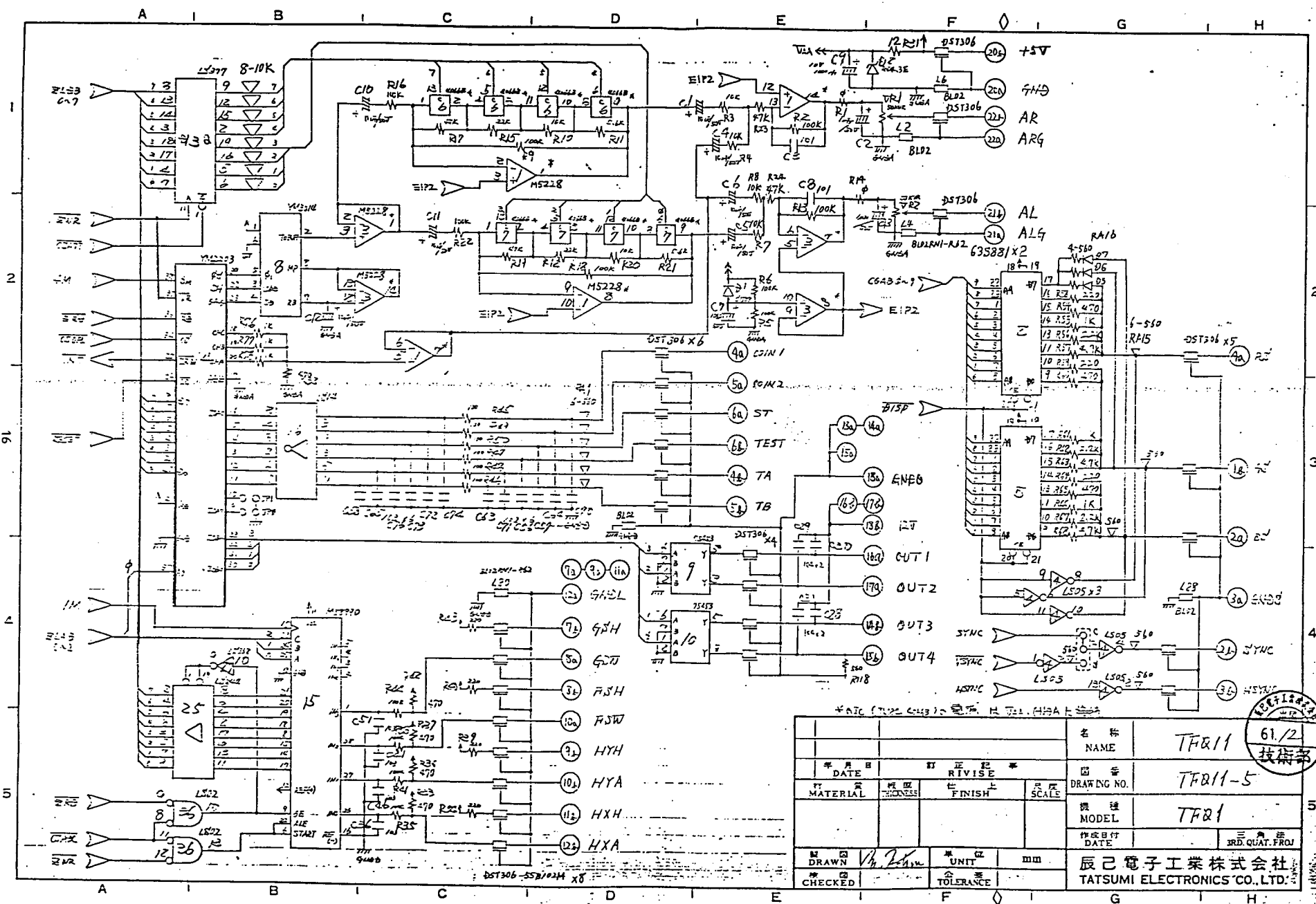
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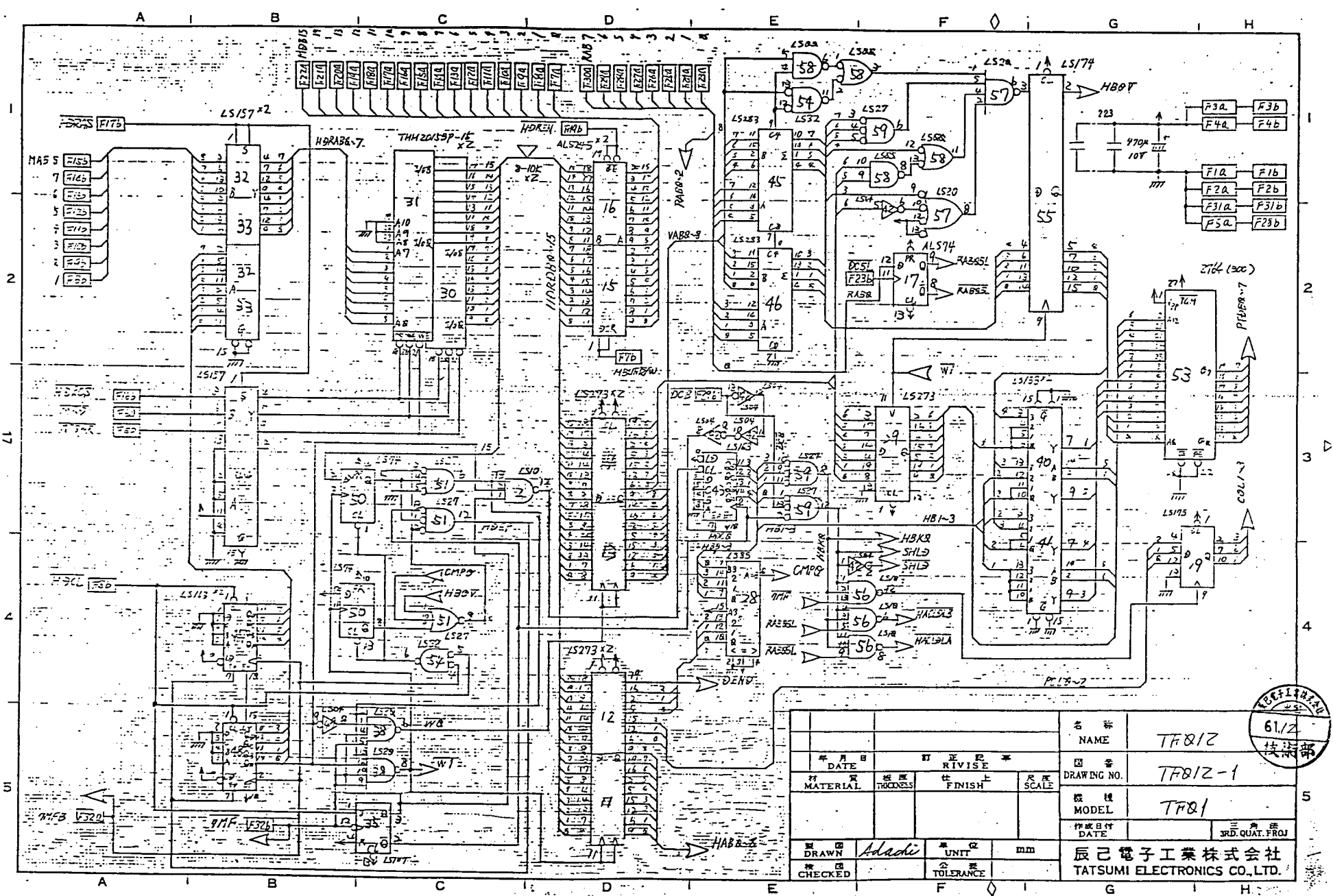
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DATE				DATE	
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CHECKED	TOLERANCE			TATSUMI ELECTRONICS CO., LTD.	



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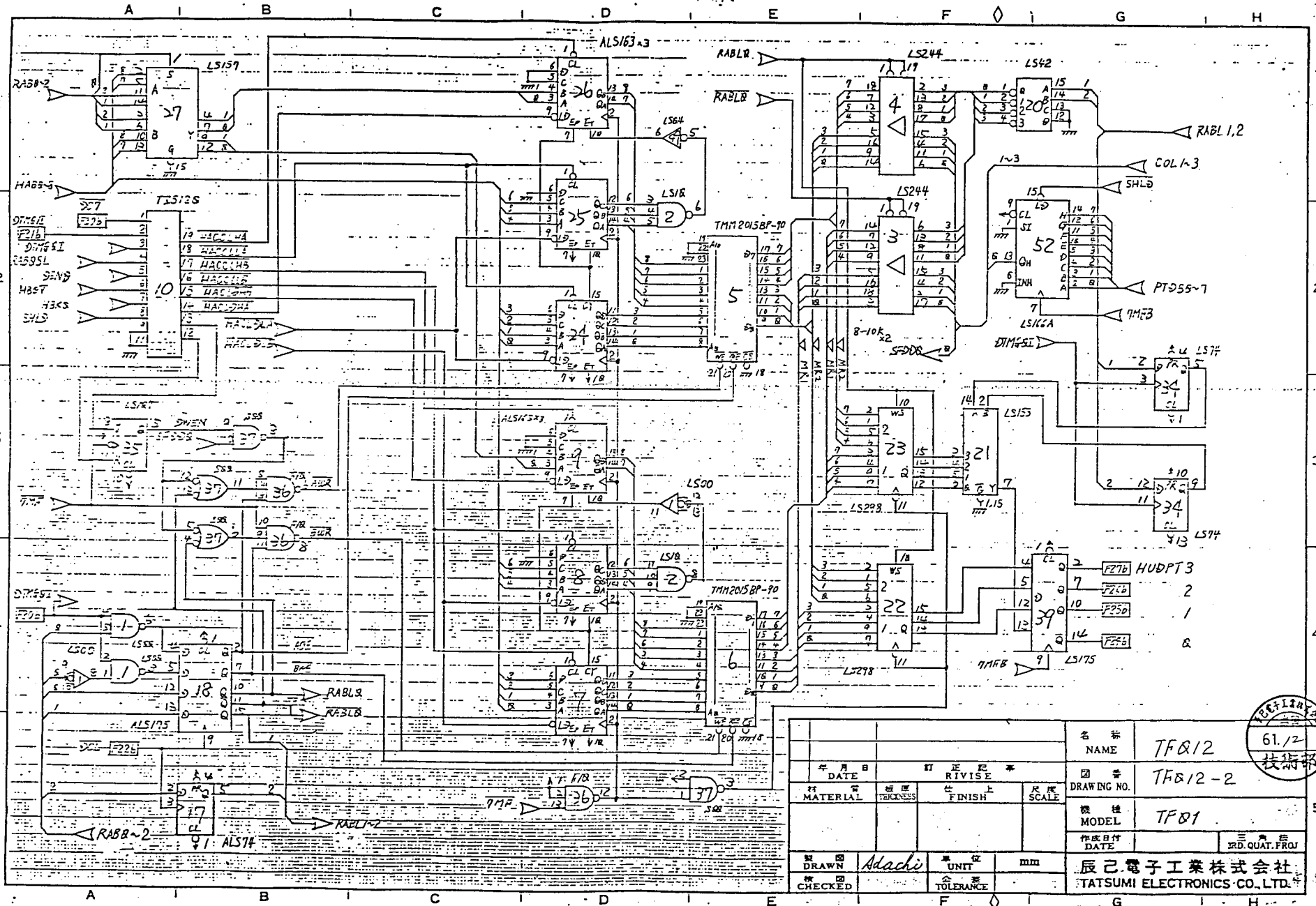
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				TATSUMI ELECTRONICS CO., LTD.	



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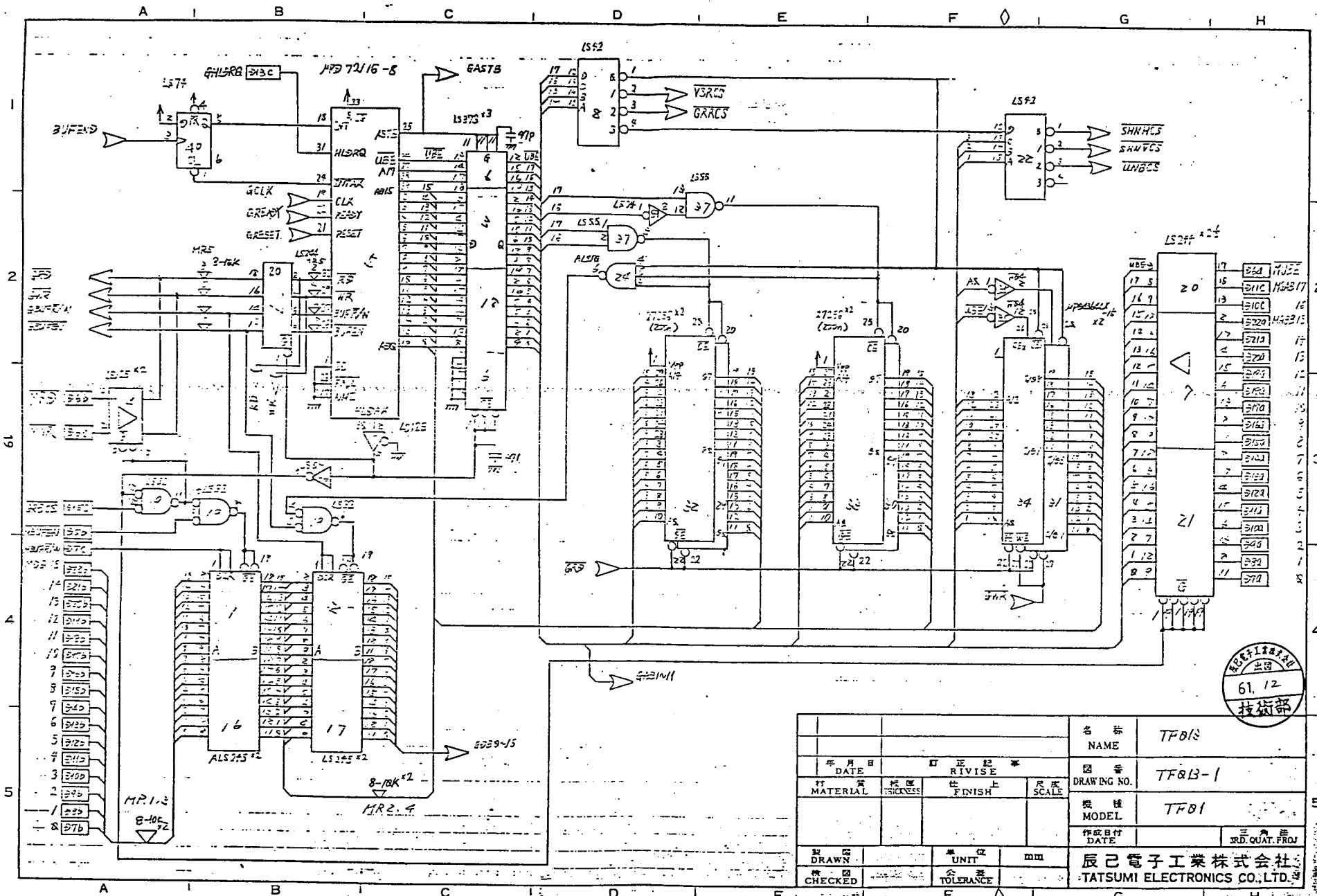


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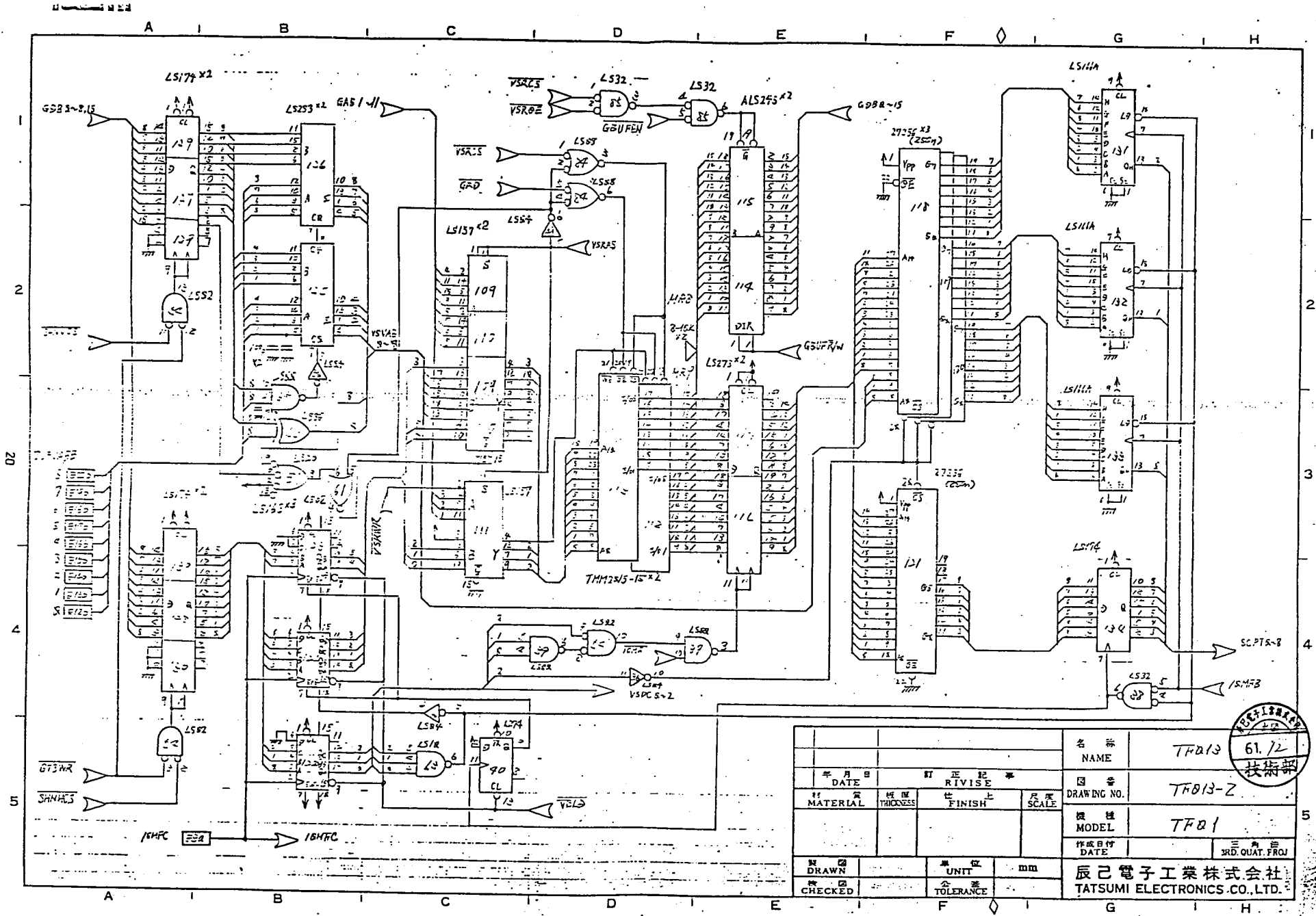


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CHECKED		公差		作図者	三島 俊夫
DRAWN Adachi				辰己電子工業株式会社	
CHECKED				TATSUMI ELECTRONICS CO., LTD.	



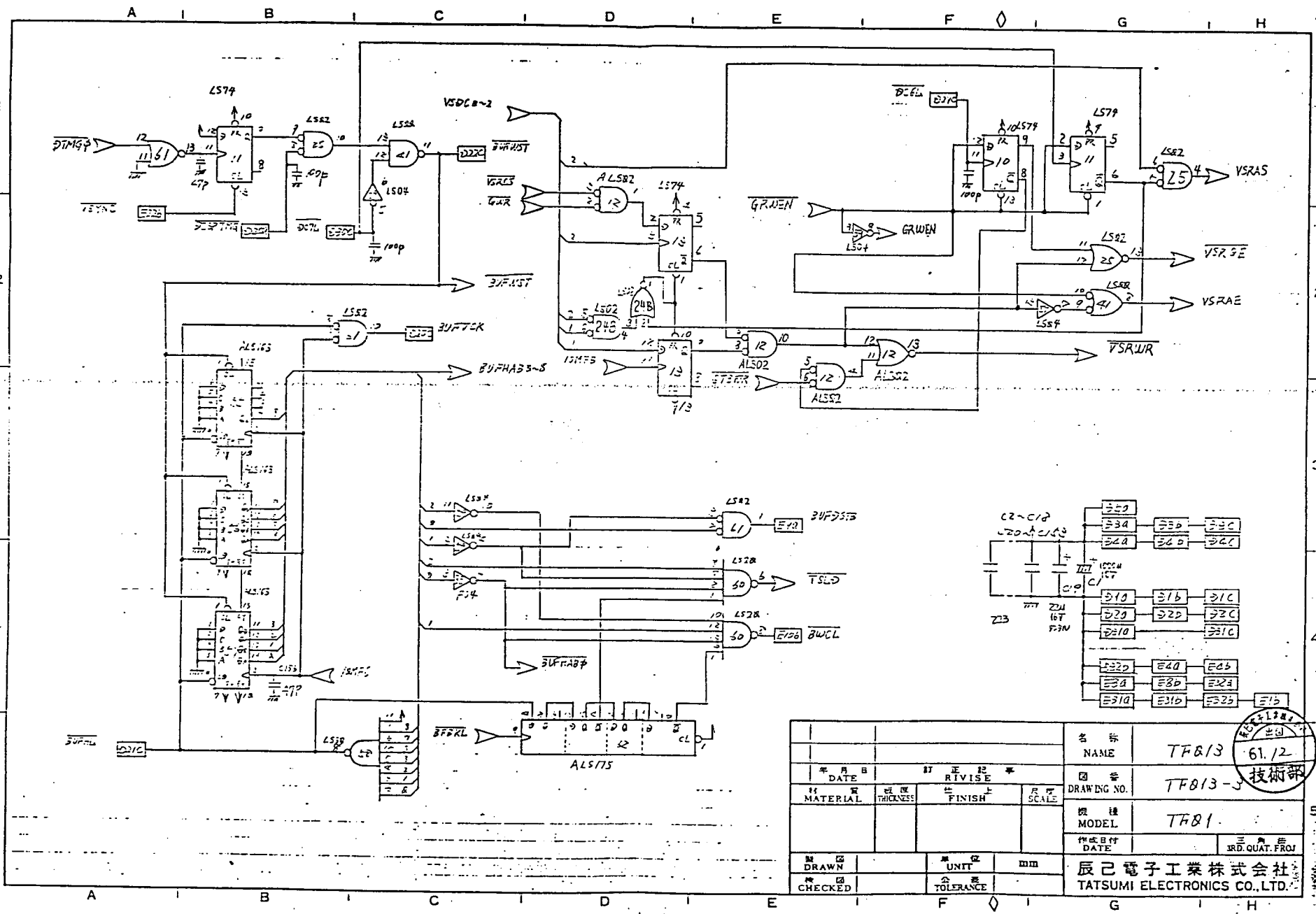


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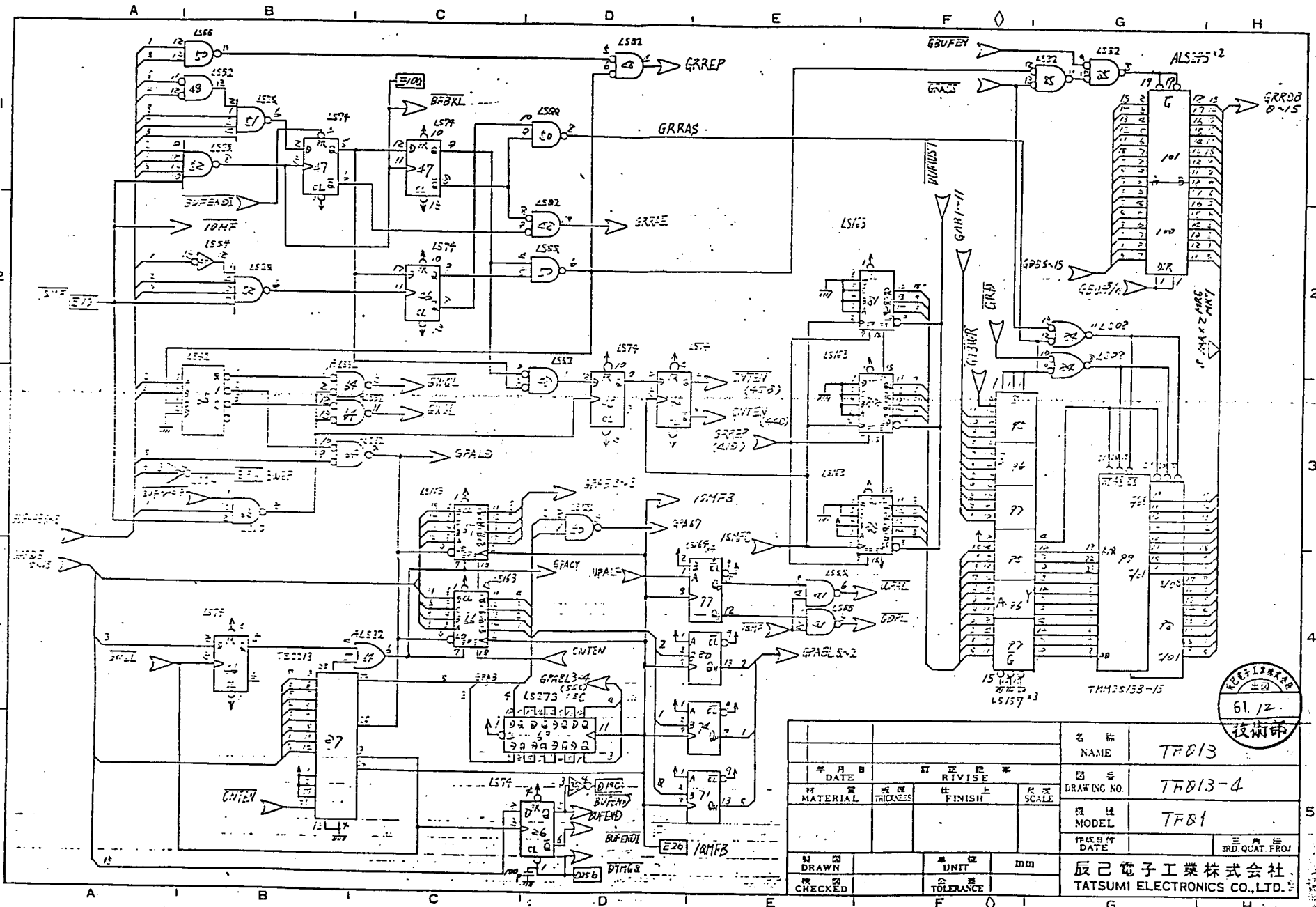
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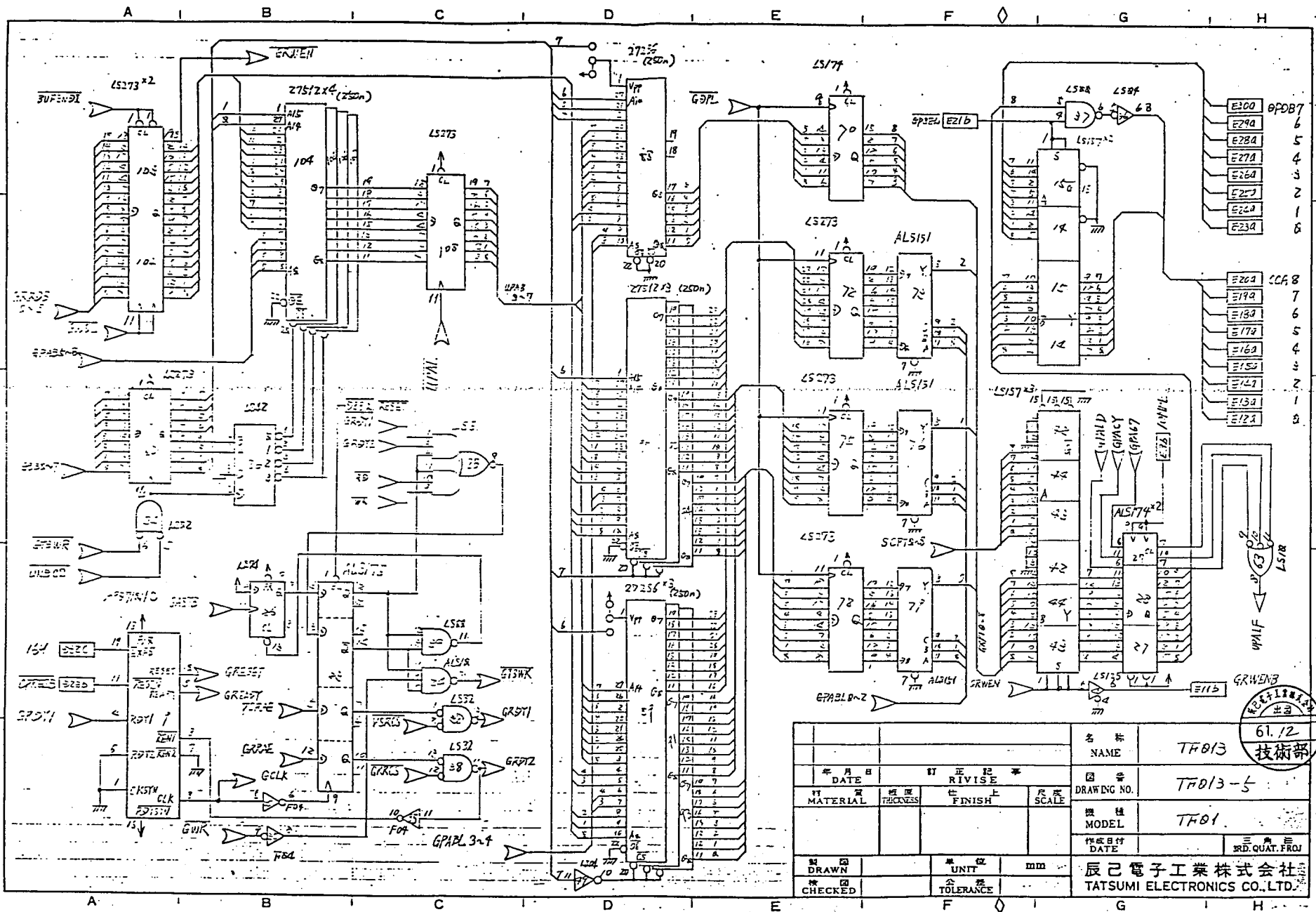
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TATSUMI ELECTRONICS CO., LTD.									



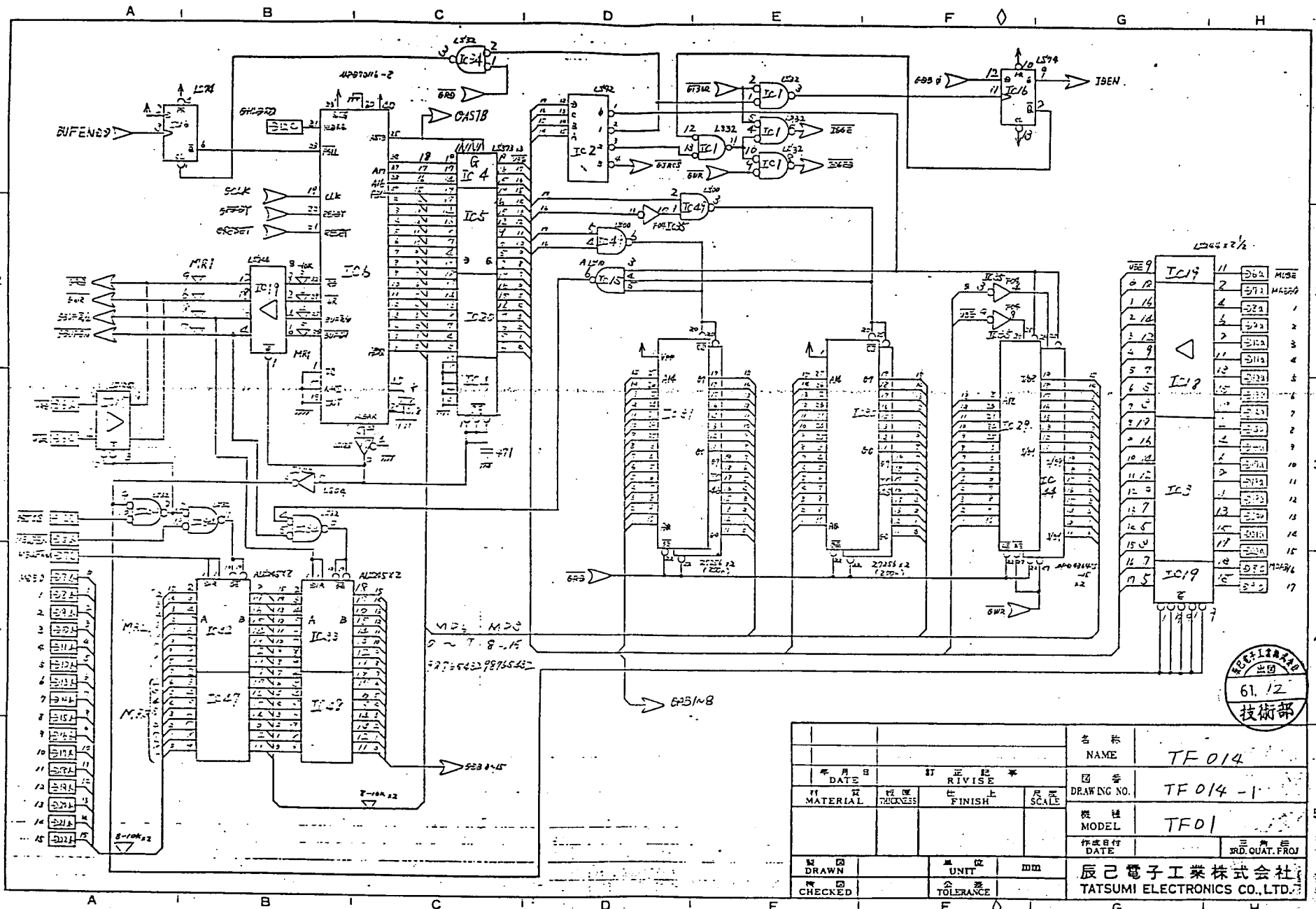
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61/12
技術部



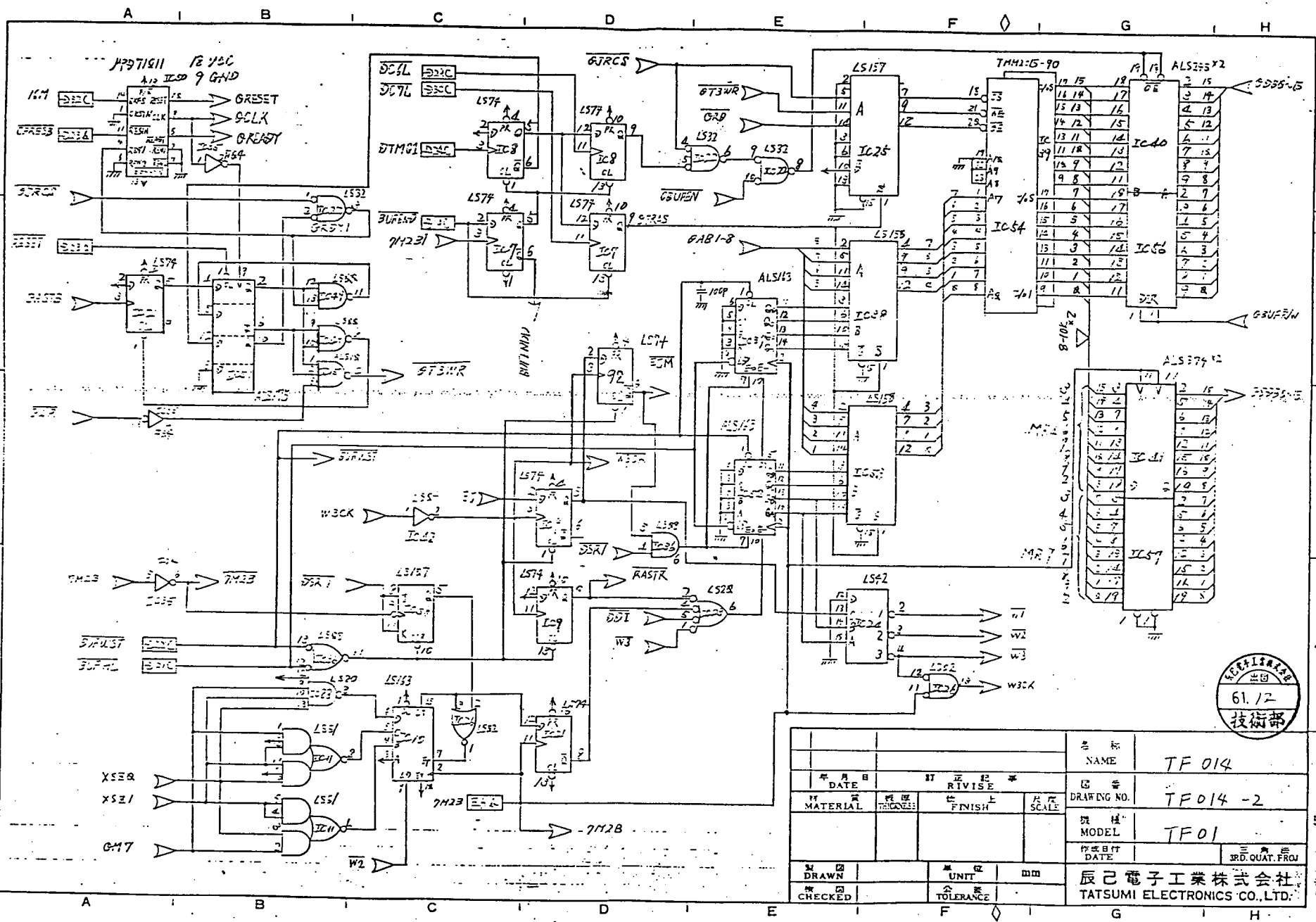
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材料	板厚	仕上	尺度
MATERIAL	THICKNESS	FINISH	SCALE
		機種	T#01
		作成日	
		DATE	
描画	単位	印	
DRAWN	UNIT	IMP	
検閲	公差		
CHECKED	TOLERANCE		
			辰己電子工業株式会社
			TATSUMI ELECTRONICS CO., LTD.





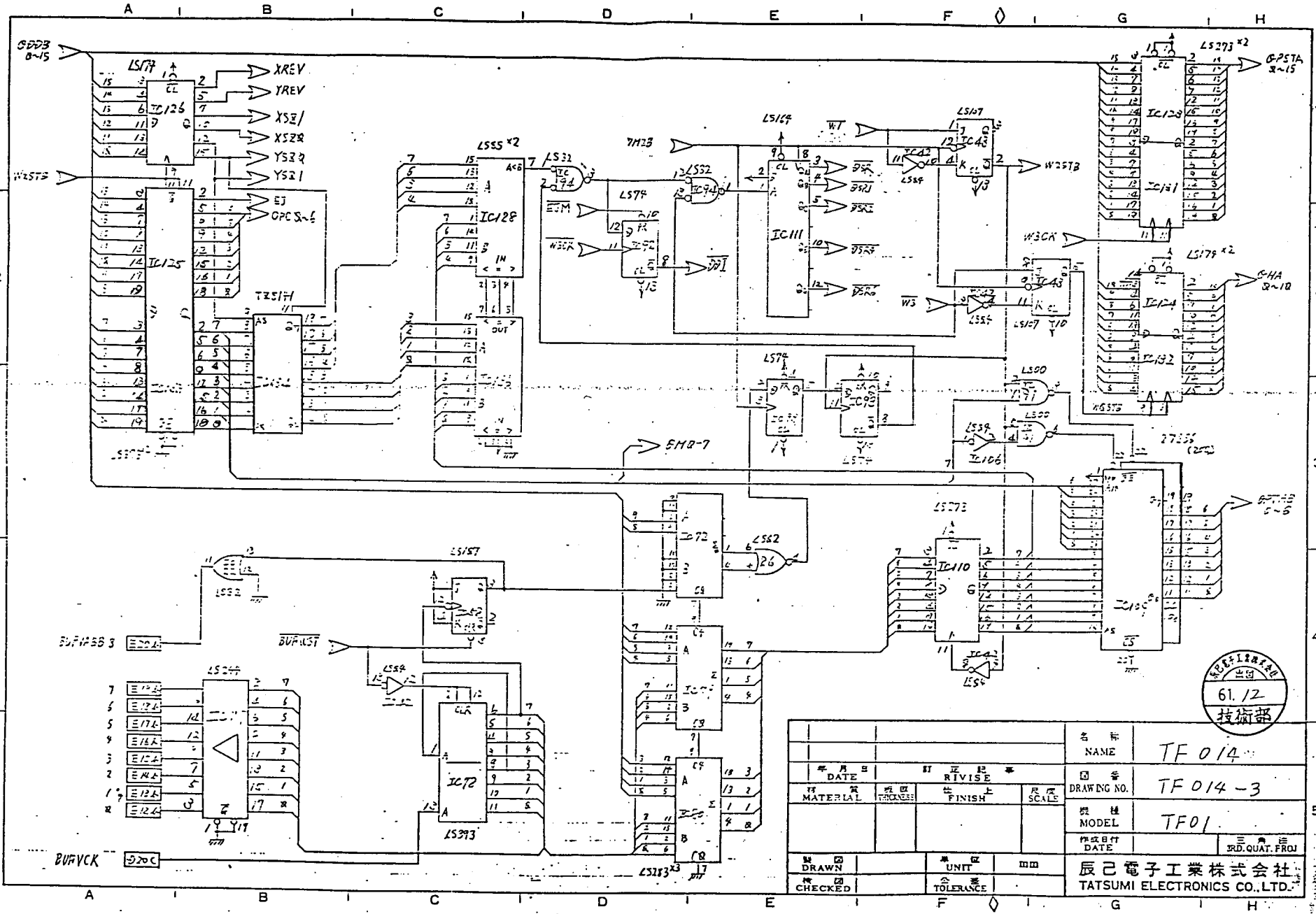
DATE				訂正記号 REVISE		名称 NAME	
MATERIAL				寸法 THICKNESS		図番 DRAWING NO.	
CHECKED				公差 TOLERANCE		機種 MODEL	
DRAWN				UNIT		作成日 DATE	
TATSUMI ELECTRONICS CO., LTD.				TATSUMI ELECTRONICS CO., LTD.		三角后 IND. QUAT. PROJ	

61.12
技術部

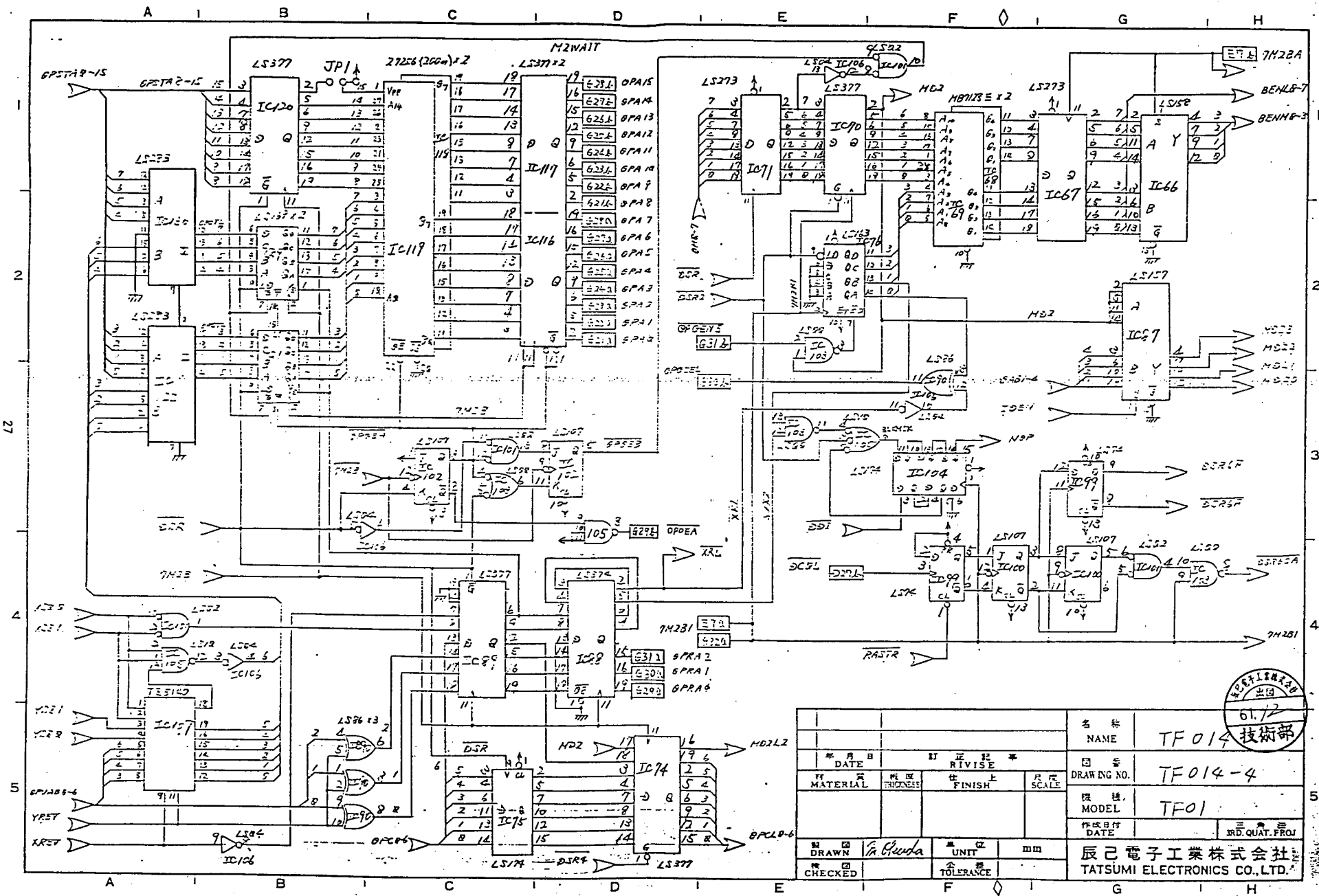


REVISION
61.12
技術部

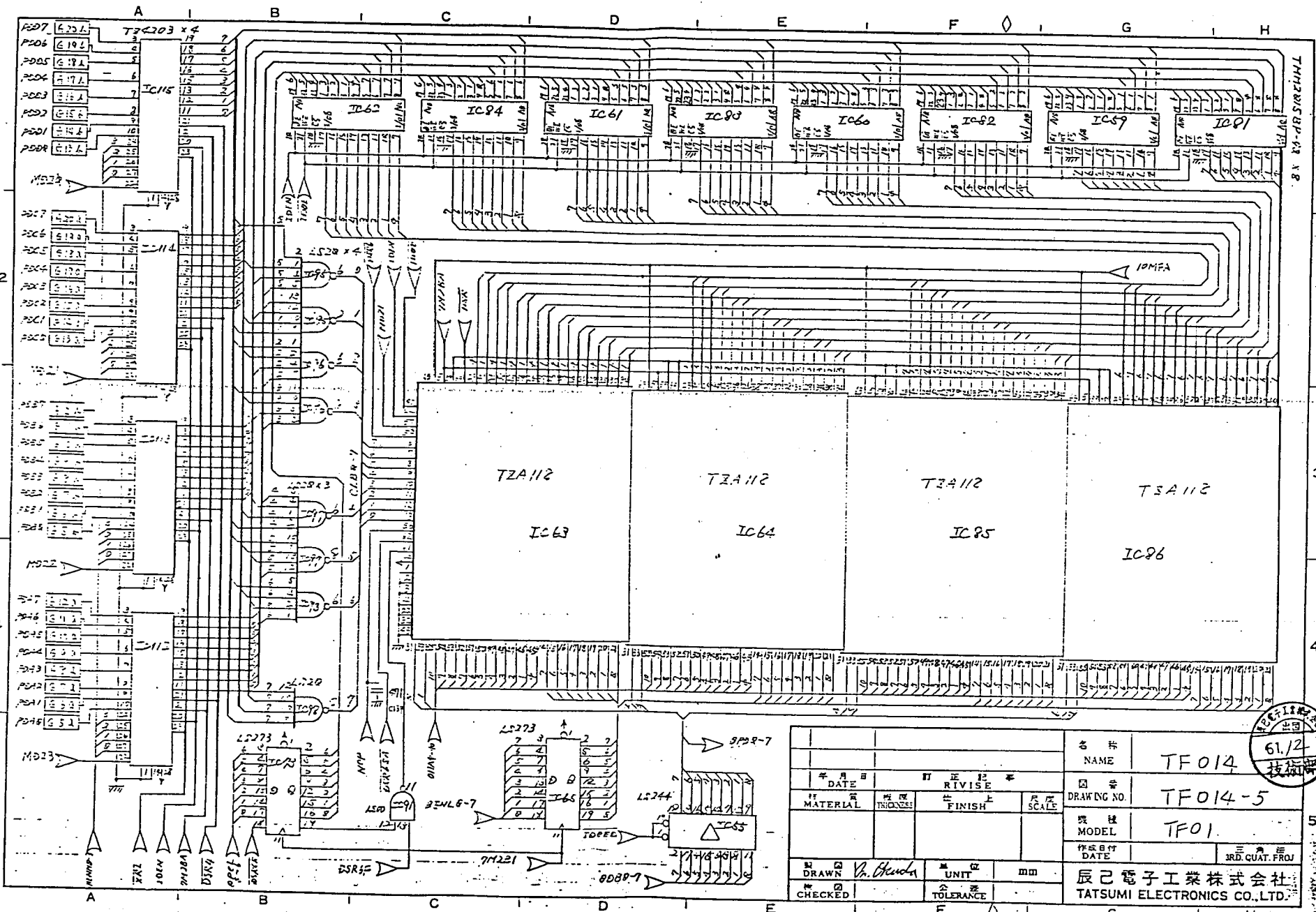
				名称	TF014
				DRAWING NO.	TF014-2
				MODEL	TF01
				DATE	
				UNIT	mm
				TOLERANCE	
				辰己電子工業株式会社 TATSUMI ELECTRONICS CO., LTD.	



DATE				訂正記号				名称	TF014
MATERIAL				FINISH				图番	TF014-3
DRAWN				UNIT				機種	TF01
CHECKED				TOLERANCE				作成日付	DATE
								TATSUMI ELECTRONICS CO., LTD.	



DATE				REVISE				名 称		TF014 技術部	
MATERIAL				FINISH				図 号		TF014-4	
DRAWN				UNIT				模 型		TF01	
CHECKED				TOLERANCE				作成日付		RD. QUAT. PROJ.	
DRAWN				UNIT				DATE		TATSUMI ELECTRONICS CO., LTD.	

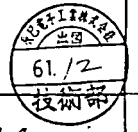
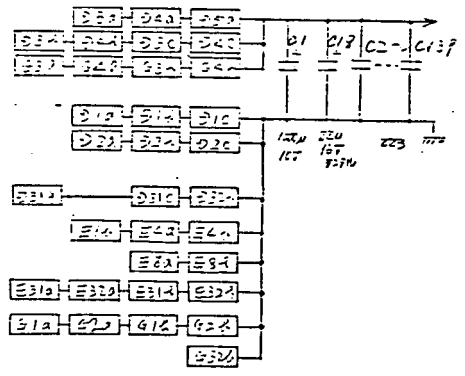
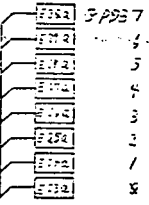
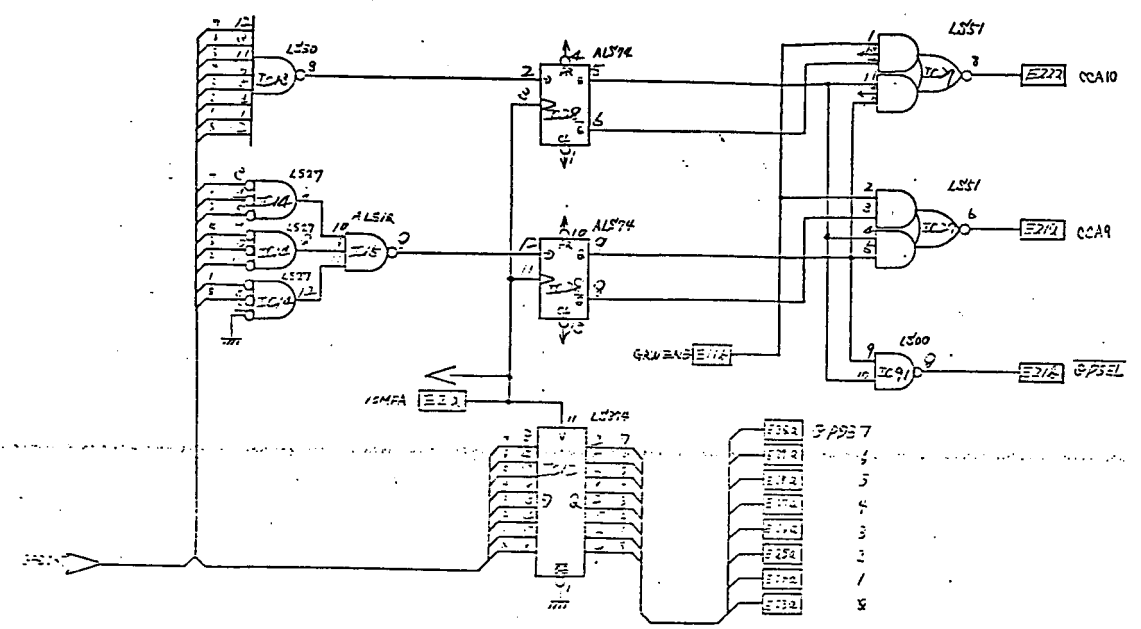


DATE				REVISE				NAME	TF014
MATERIAL				FINISH				DRAWING NO.	TF014-5
DRAWN				UNIT				MODEL	TF01
CHECKED				TOLERANCE				DATE	IRD. QUAT. PROJ
TATSUMI ELECTRONICS CO., LTD.								辰巳電子工業株式会社	



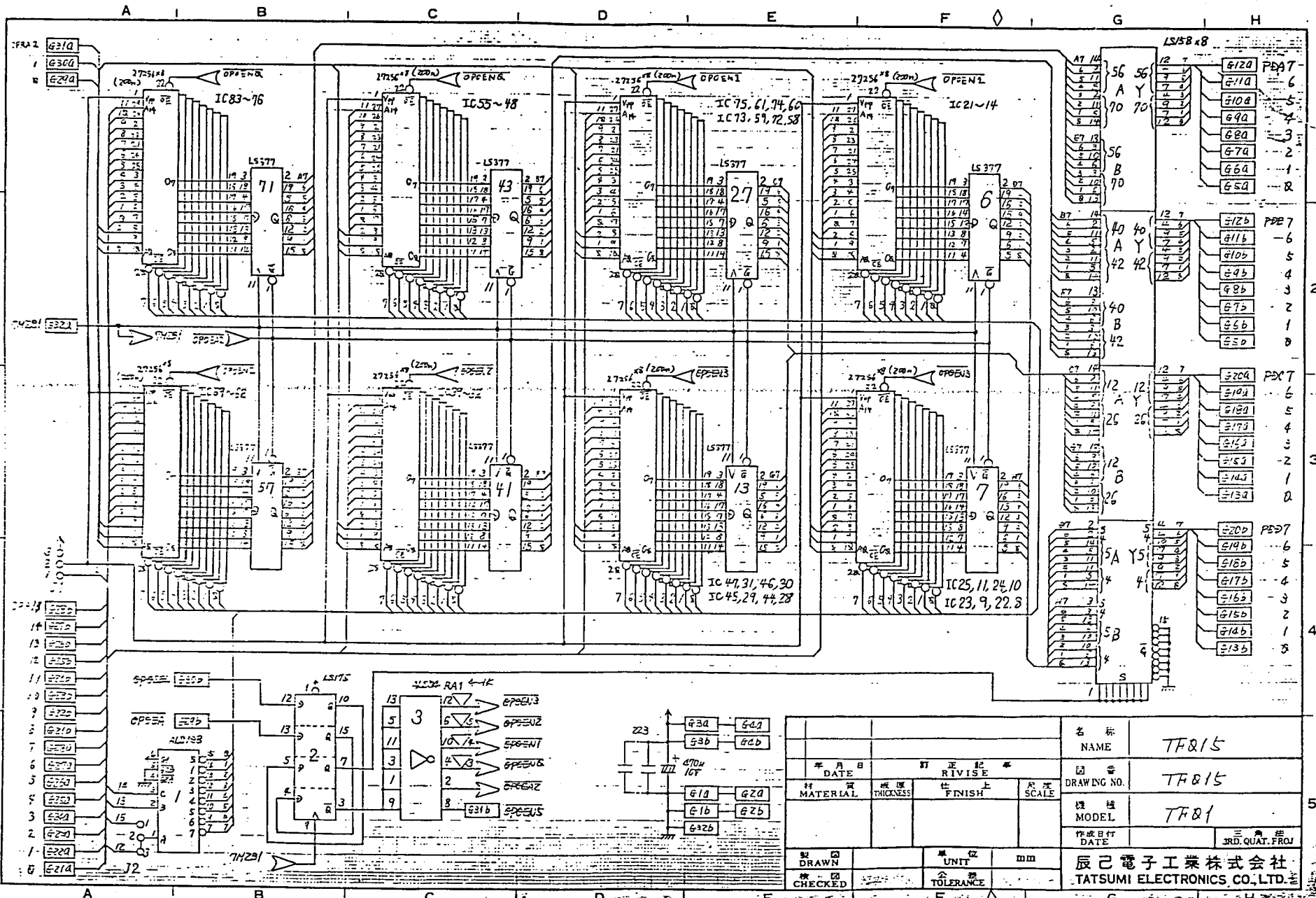
A | B | C | D | E | F | G | H

1
2
3
4
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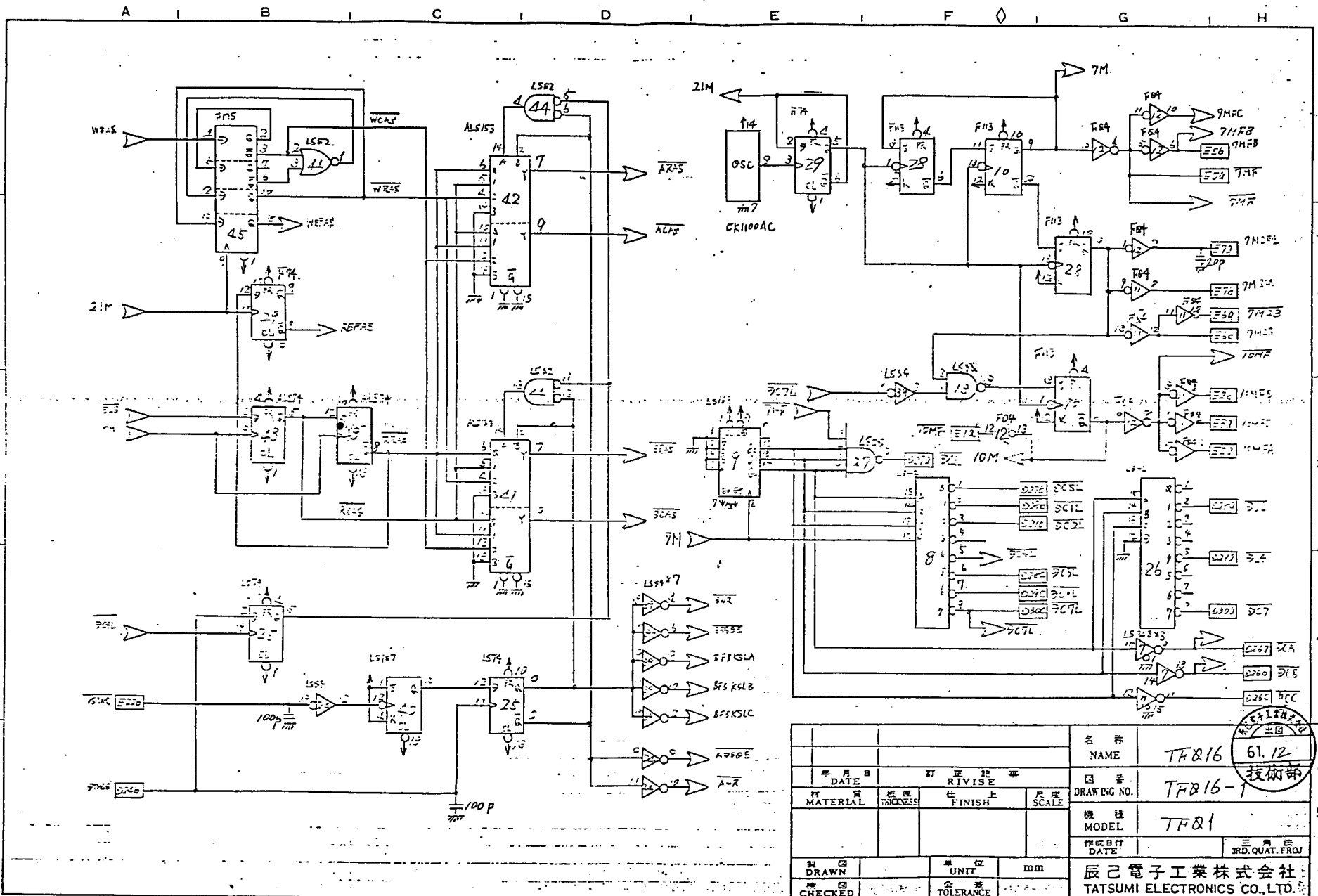


DATE		訂正		REVISE		名称	TF014
MATERIAL		THICKNESS		FINISH		图番	TF014-6
DRAWN		UNIT		印		機模	TF01
CHECKED		TOLERANCE				作成日	
						作成者	MR. QUAT. FROJ
辰己電子工業株式会社							
TATSUMI ELECTRONICS CO., LTD.							

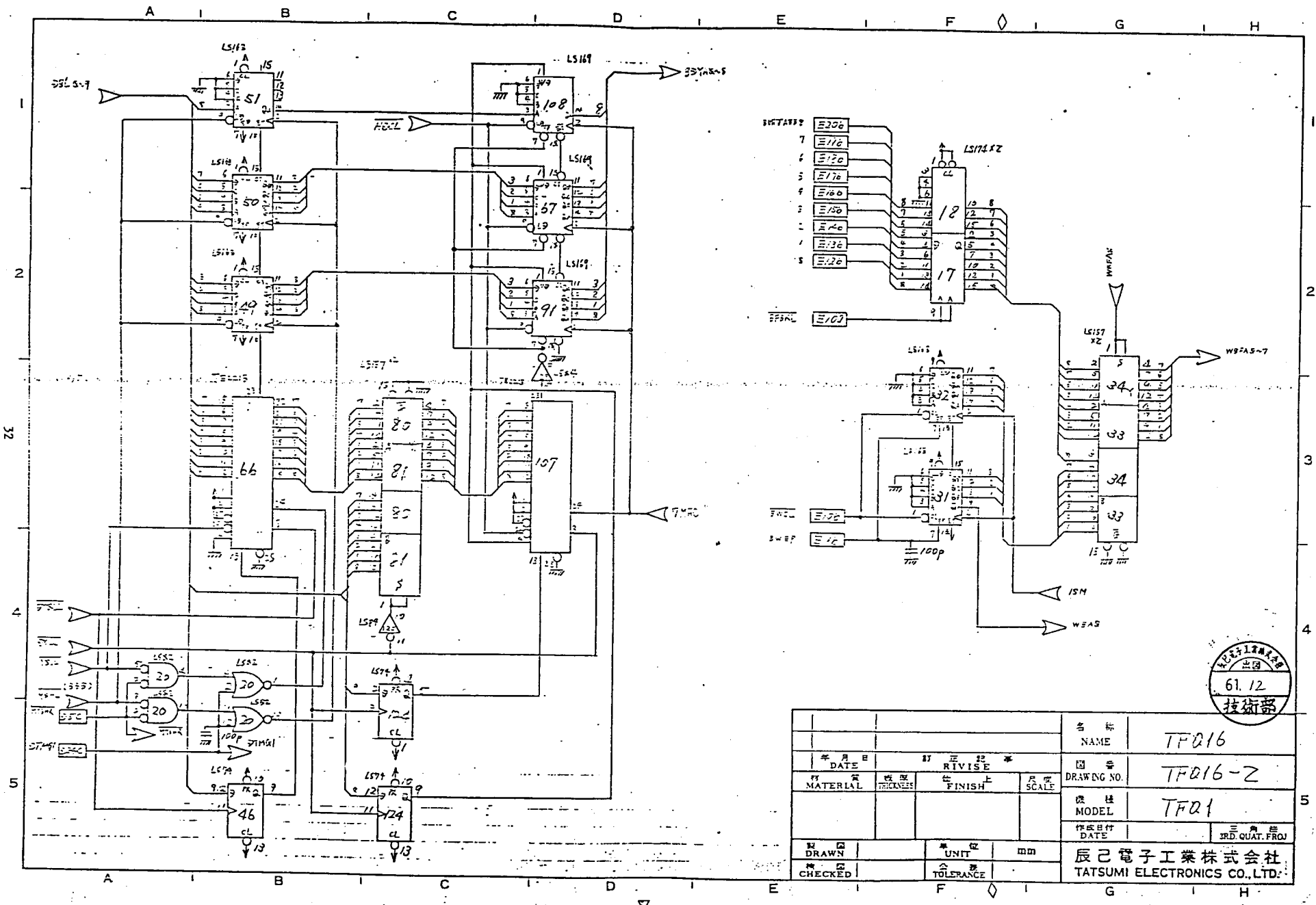
A | B | C | D | E | F | G | H



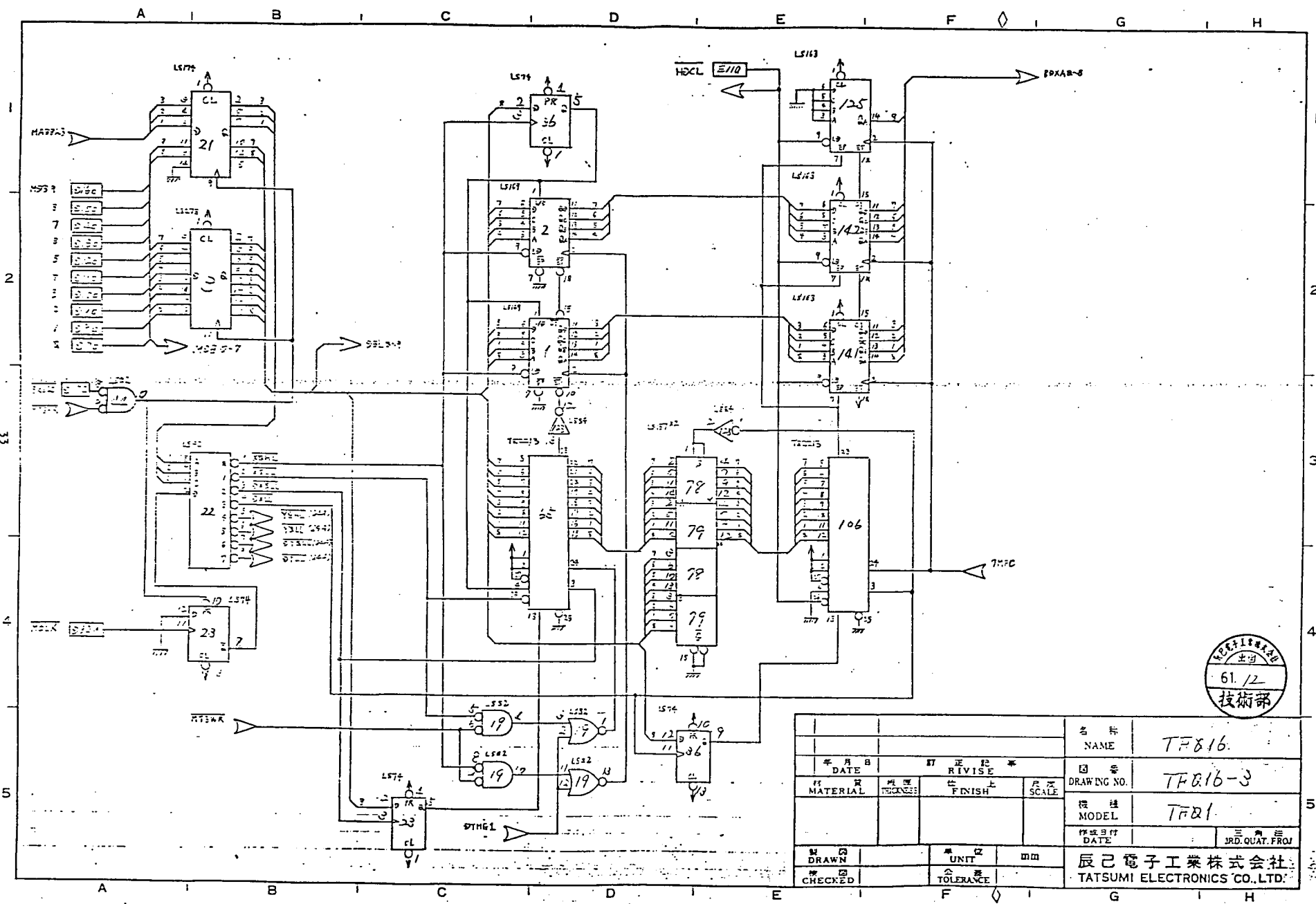
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MATERIAL		THICKNESS		NAME	
FINISH		SCALE		TF&15	
SCALE		SCALE		DRAWING NO.	
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SCALE		SCALE		MODEL	
SCALE		SCALE		TF&1	
SCALE		SCALE		作成日付	
SCALE		SCALE		DATE	
SCALE		SCALE		三 角 柱	
SCALE		SCALE		3RD. QUAT. PROJ.	
SCALE		SCALE		製 図	
SCALE		SCALE		DRAWN	
SCALE		SCALE		UNIT	
SCALE		SCALE		mm	
SCALE		SCALE		檢 査	
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SCALE		SCALE		TOLERANCE	
SCALE		SCALE		TATSUMI ELECTRONICS CO., LTD.	



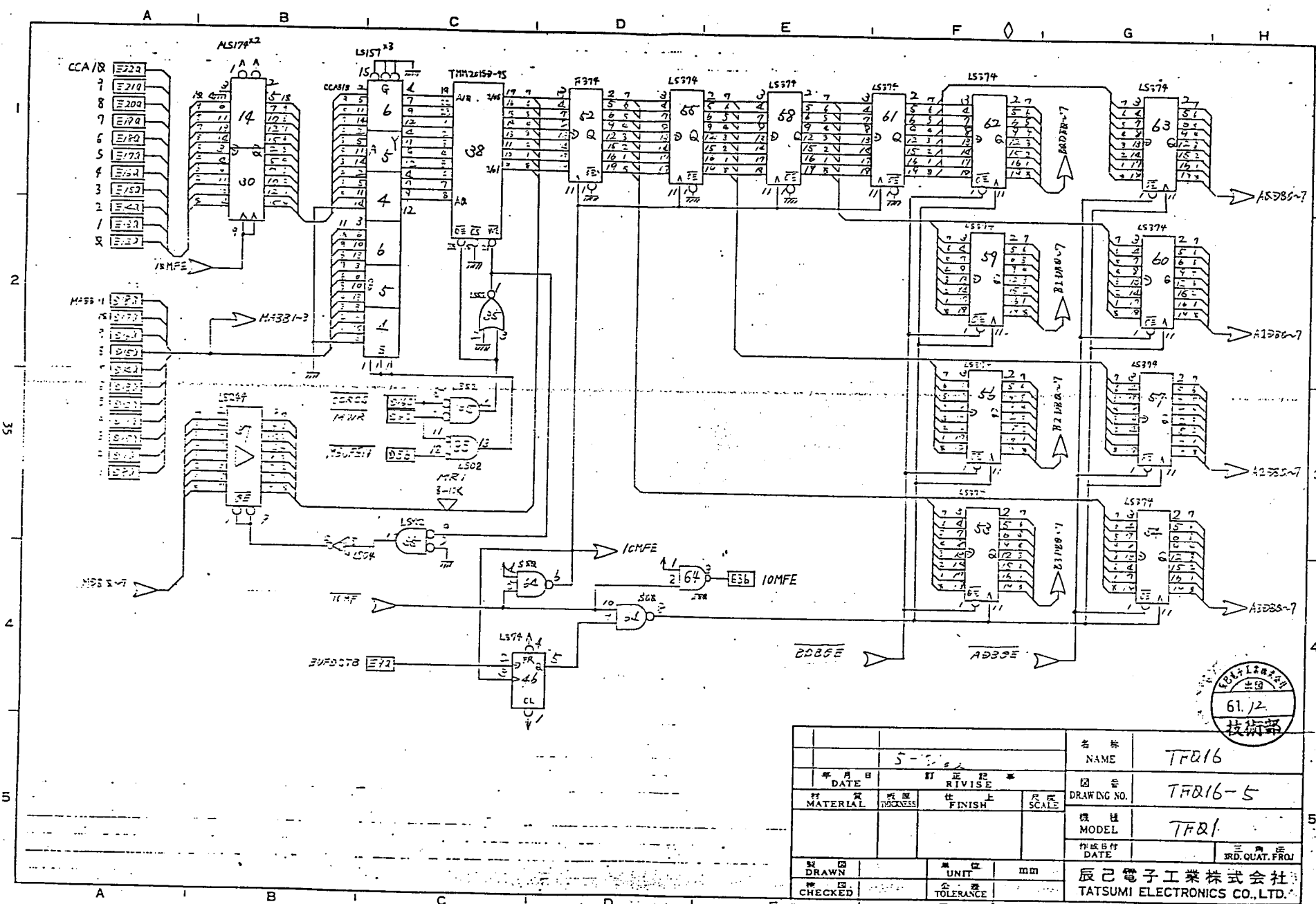
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DATE				訂正		技術部
MATERIAL				REVISE		
THICKNESS				FINISH		
SCALE				DRAWING NO.	TH&16-1	
				機 種	TH&1	
				作成日付		SRD. QUAT. PROJ
DRAWN				UNIT	mm	
CHECKED				TOLERANCE		
辰己電子工業株式会社 TATSUMI ELECTRONICS CO., LTD.						



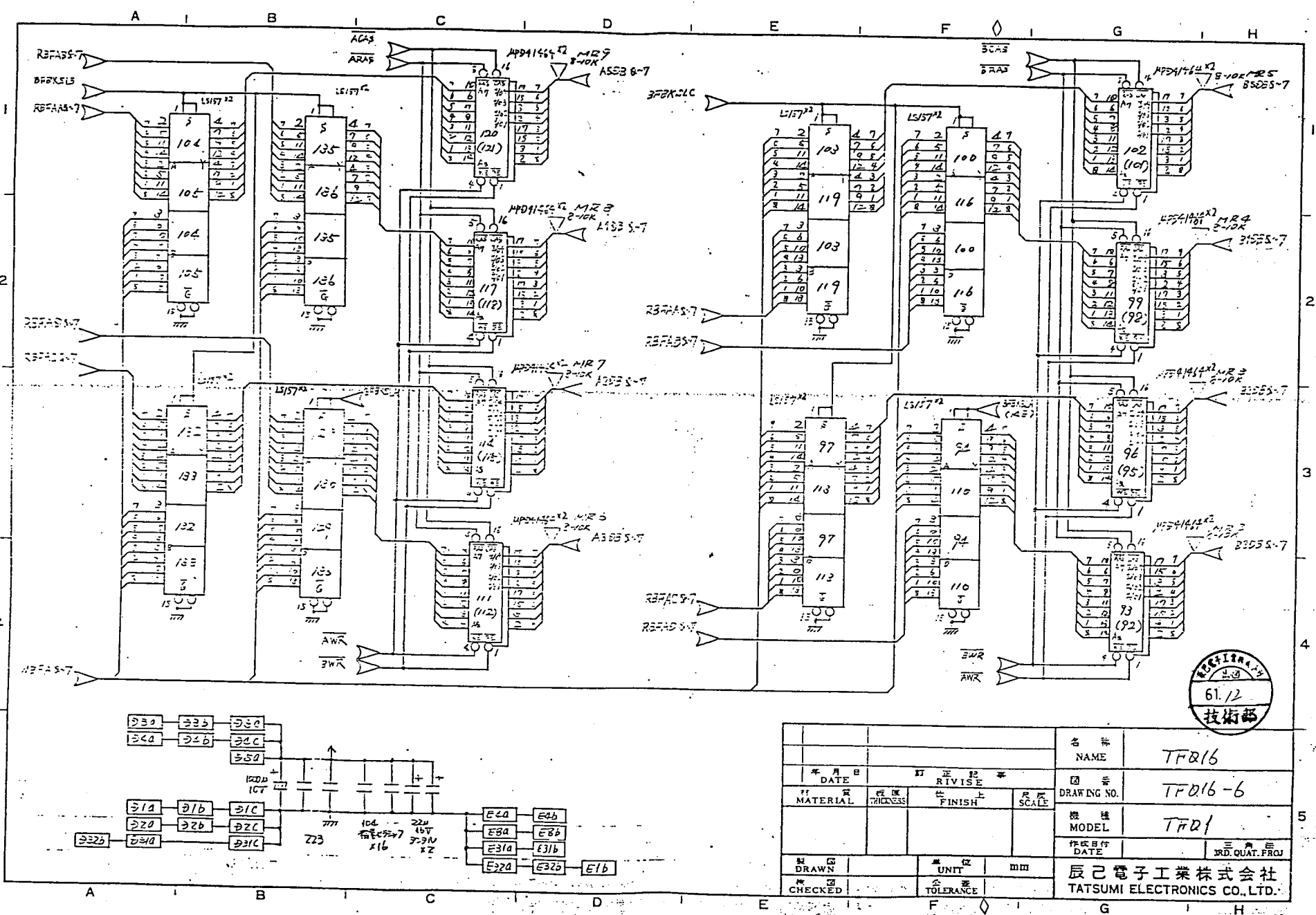
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DATE				訂正	
MATERIAL				図番	TFQ16-2
CHECKED				機種	TFQ1
DRAWN				作成日付	
TOLERANCE				3RD. QUAT. FROM	
辰己電子工業株式会社 TATSUMI ELECTRONICS CO., LTD.					



				名称	TF816
年月日				訂正記号	
DATE				REVISE	
材料	规格	仕上	尺法	图番	TF816-3
MATERIAL	TECHNICAL	FINISH	SCALE	機種	TF81
				作成日付	
				3RD. QUAT. PROJ	
製図	単位	mm		辰己電子工業株式会社	
CHECKED	TOLERANCE			TATSUMI ELECTRONICS CO., LTD.	

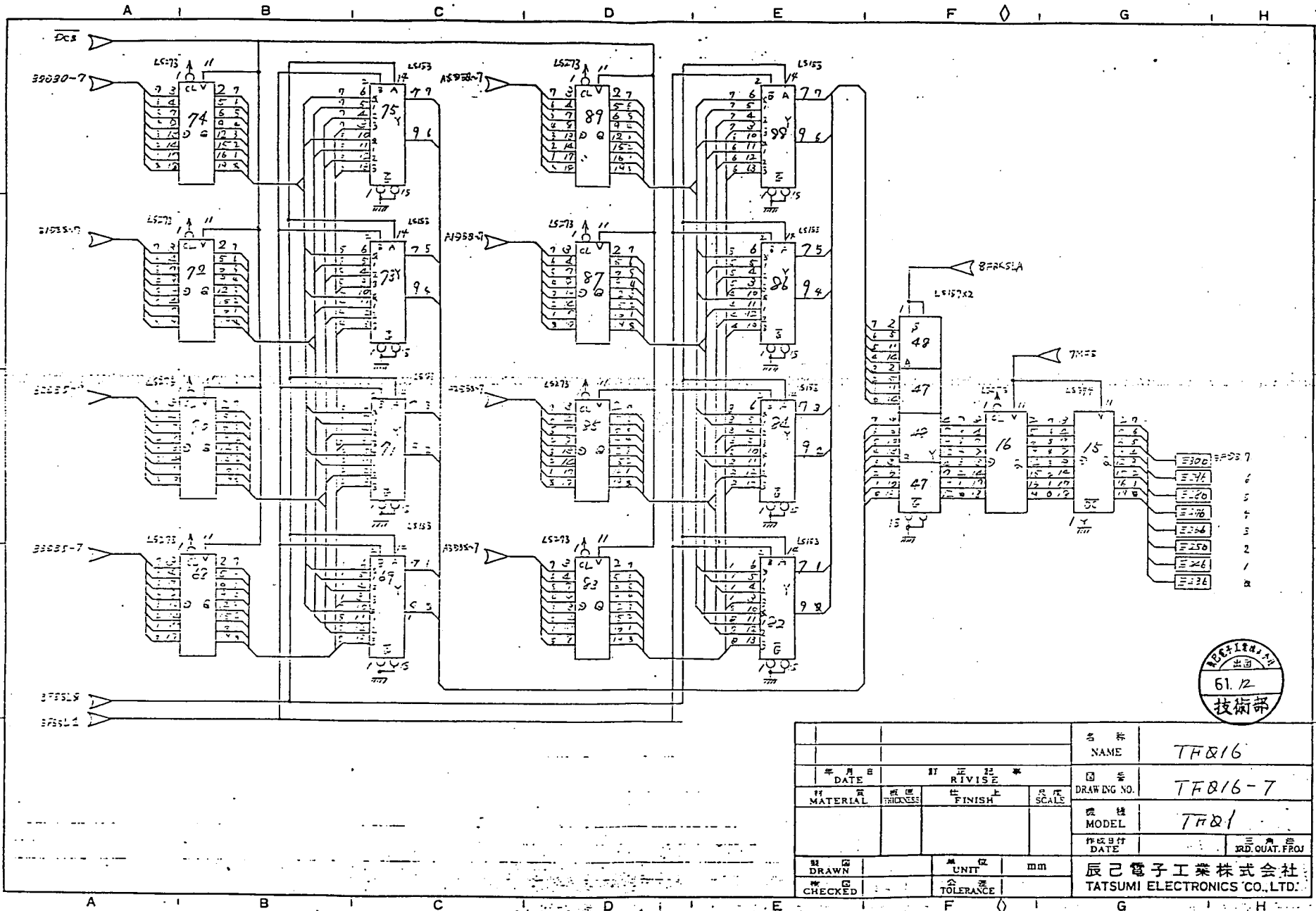


				名称	TRQ16
年月日	訂正記	REVISE		図番	TRQ16-5
MATERIAL	材質	仕上	尺法	DRAWING NO.	
	FINISH		SCALE	機種	TRQ1
				作成日付	三商法
				DATE	IRD. QUAT. FRQ
製図	UNIT	mm		辰巳電子工業株式会社	
CHECKED	TOLERANCE			TATSUMI ELECTRONICS CO., LTD.	



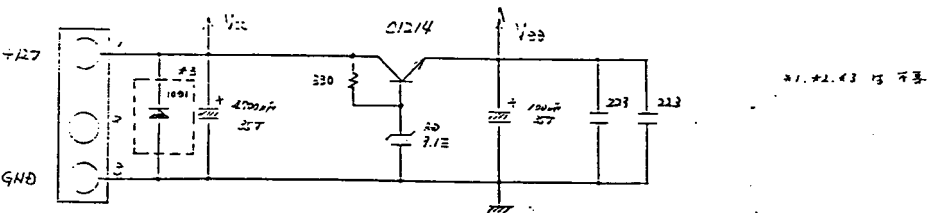
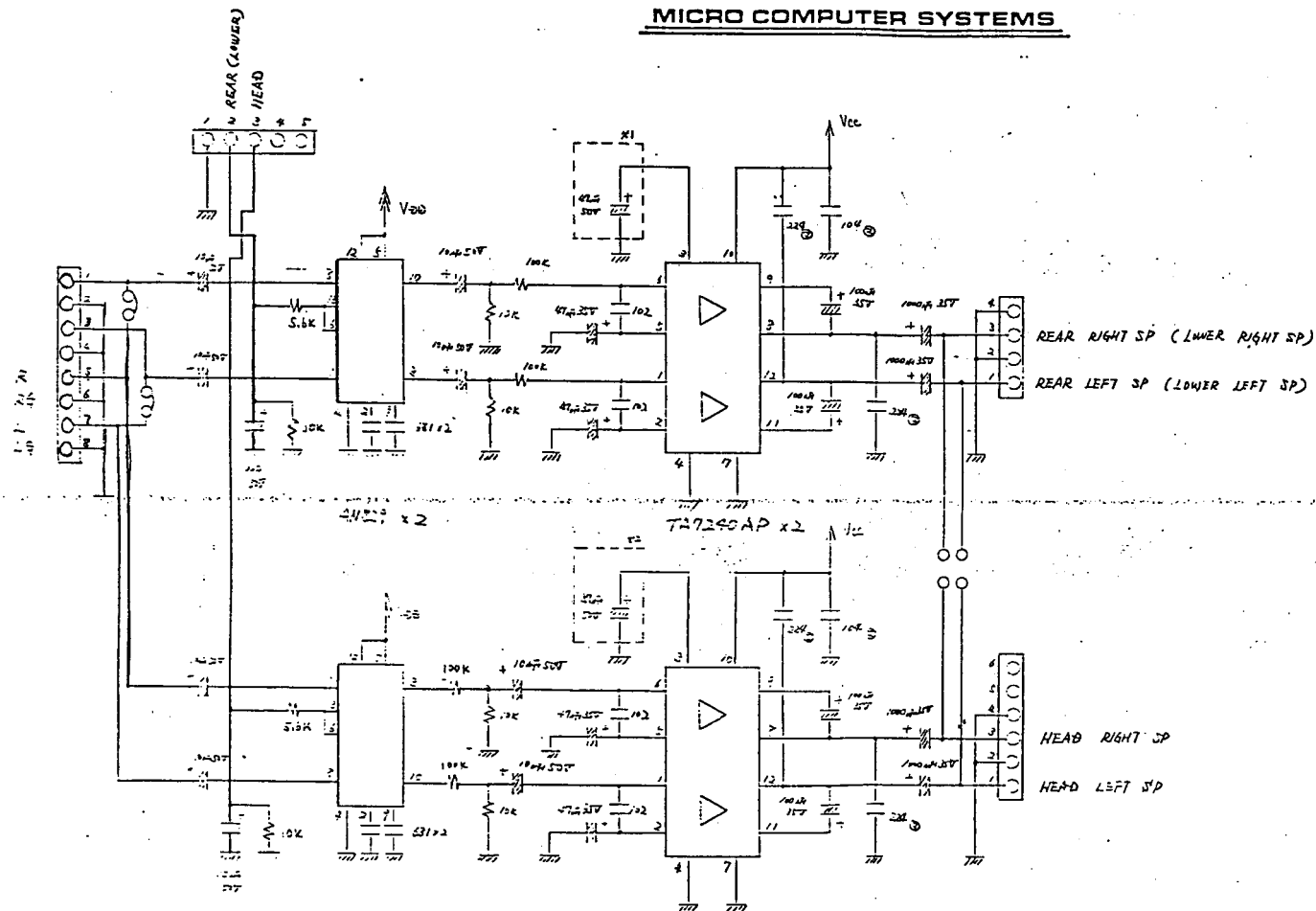
61.12
技術部

DATE		訂正記号		名称	TRQ16
MATERIAL		厚さ	仕上	図号	TRQ16-6
CHECKED		公差	単位	機種	TRQ1
DRAWN		単位		作成日付	3RD. QUAT. PROJ
TOLERANCE		辰己電子工業株式会社 TATSUMI ELECTRONICS CO., LTD.			



DATE		訂正記号		品名	
DATE		REVISE		NAME	
MATERIAL		FINISH		DRAWING NO.	
MATERIAL		FINISH		DRAWING NO.	
SCALE		MODEL		MODEL	
SCALE		MODEL		MODEL	
DATE		DATE		DATE	
DATE		DATE		DATE	
DRAWN		UNIT		辰己電子工業株式会社	
DRAWN		UNIT		辰己電子工業株式会社	
CHECKED		TOLERANCE		TATSUMI ELECTRONICS CO., LTD.	
CHECKED		TOLERANCE		TATSUMI ELECTRONICS CO., LTD.	

MICRO COMPUTER SYSTEMS



変更2	..								
変更1	..								
図番							名称	TC03 PA-B	
尺径	材質						仕上	公差	員数
設計・製図	S. Shinbata						辰巳電子工業株式会社		
検 査 員	S. Shinbata						TATSUMI ELECTRONICS CO., LTD.		