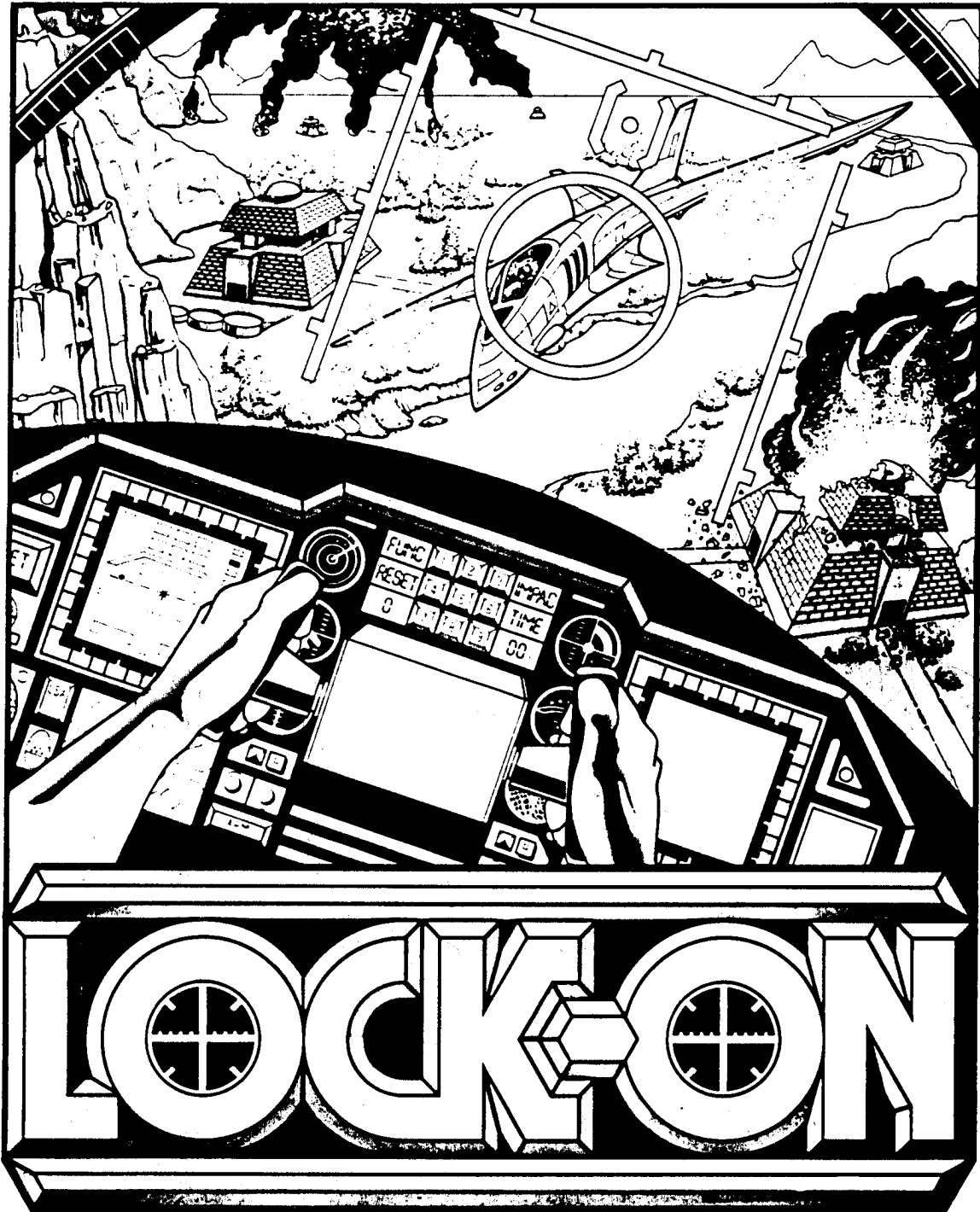


operation & service manual



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).

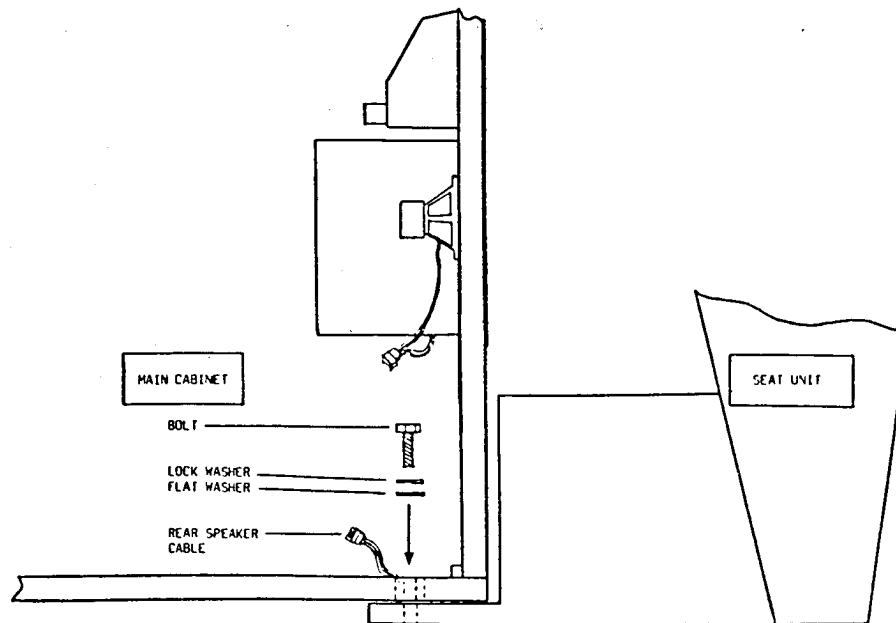
The Lock-On upright has an optional Seat Unit available. This gives the game a cockpit feel and enhances the play appeal of the game. The Seat Unit attaches to the bottom of the upright cabinet with 2 bolts.

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 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.

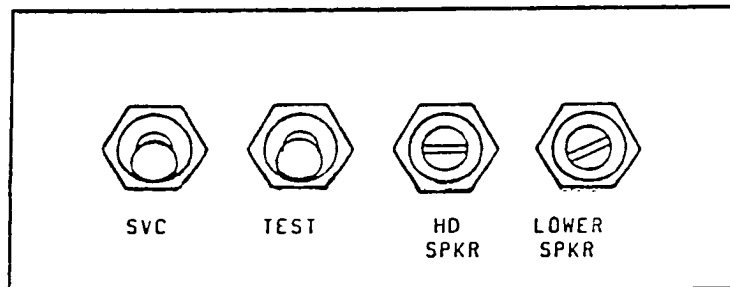


FIGURE 1

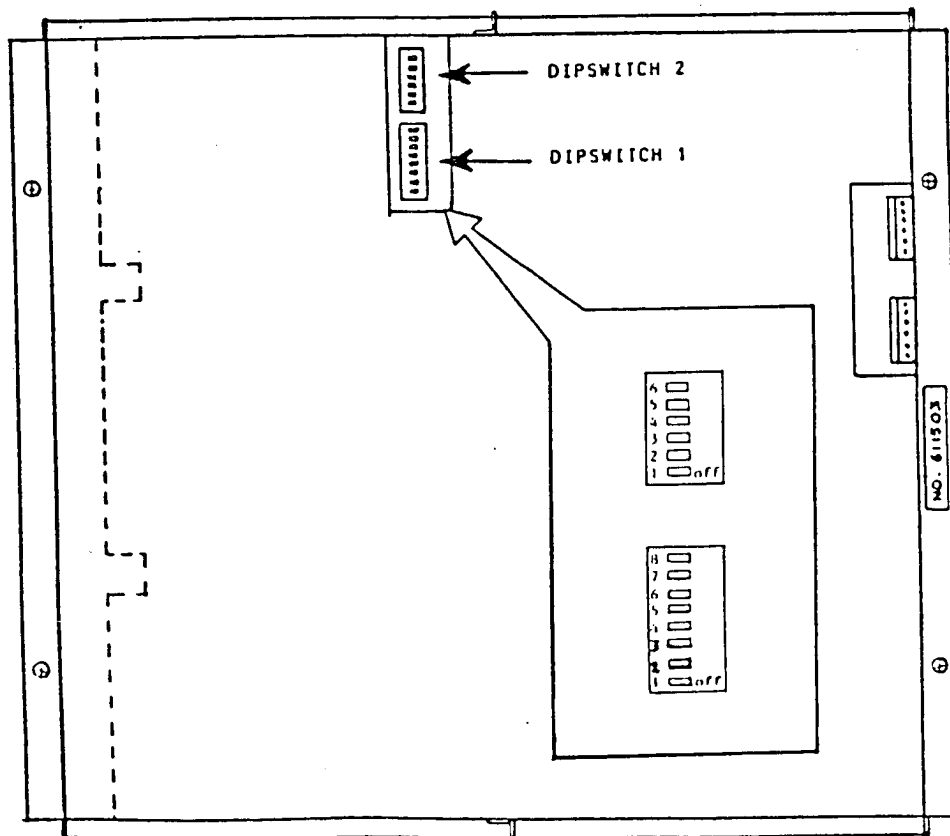


FIGURE 2

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

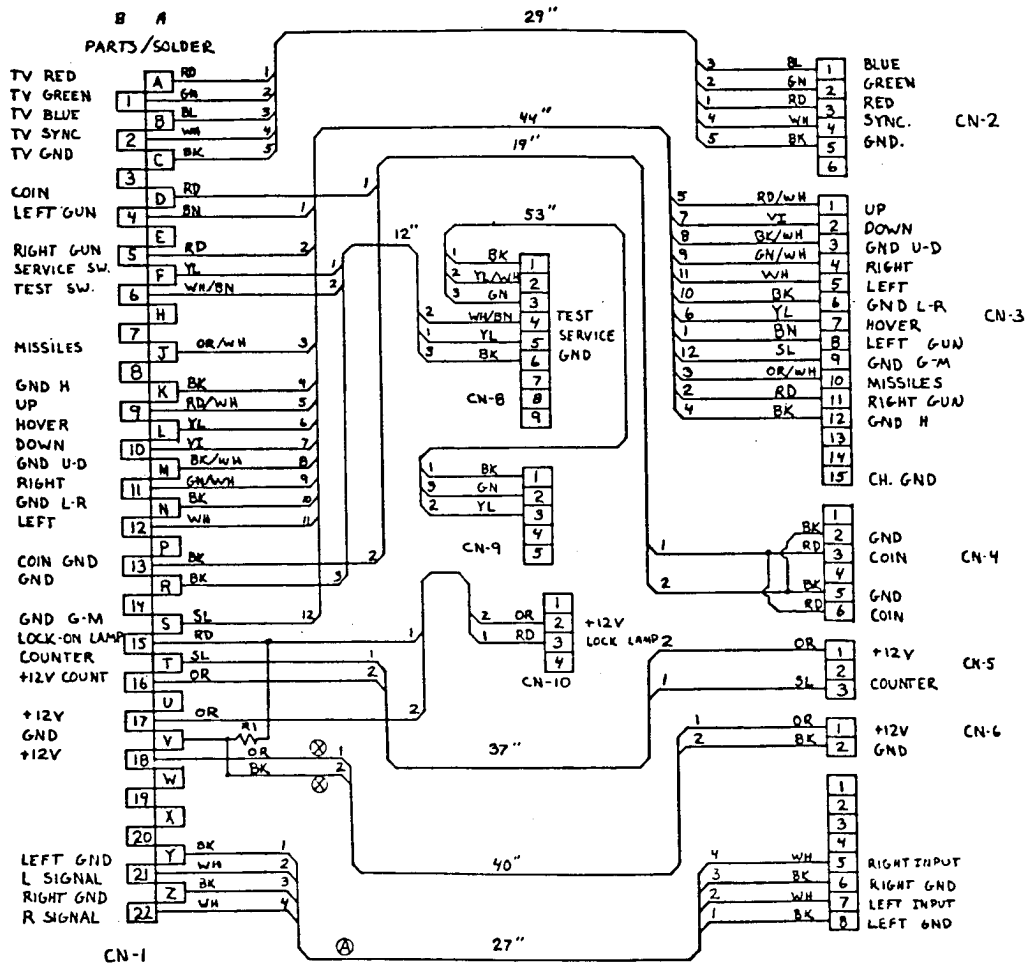
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25	535-0065-02	CONTROL PANEL, BARE
26	800-0024-00	CONTROL PANEL OVERLAY, LOCK-ON
27	515-0023-00	STEERING ASSY, LOCK-ON
28	800-0025-00	OVERLAY, CONTROLLER

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

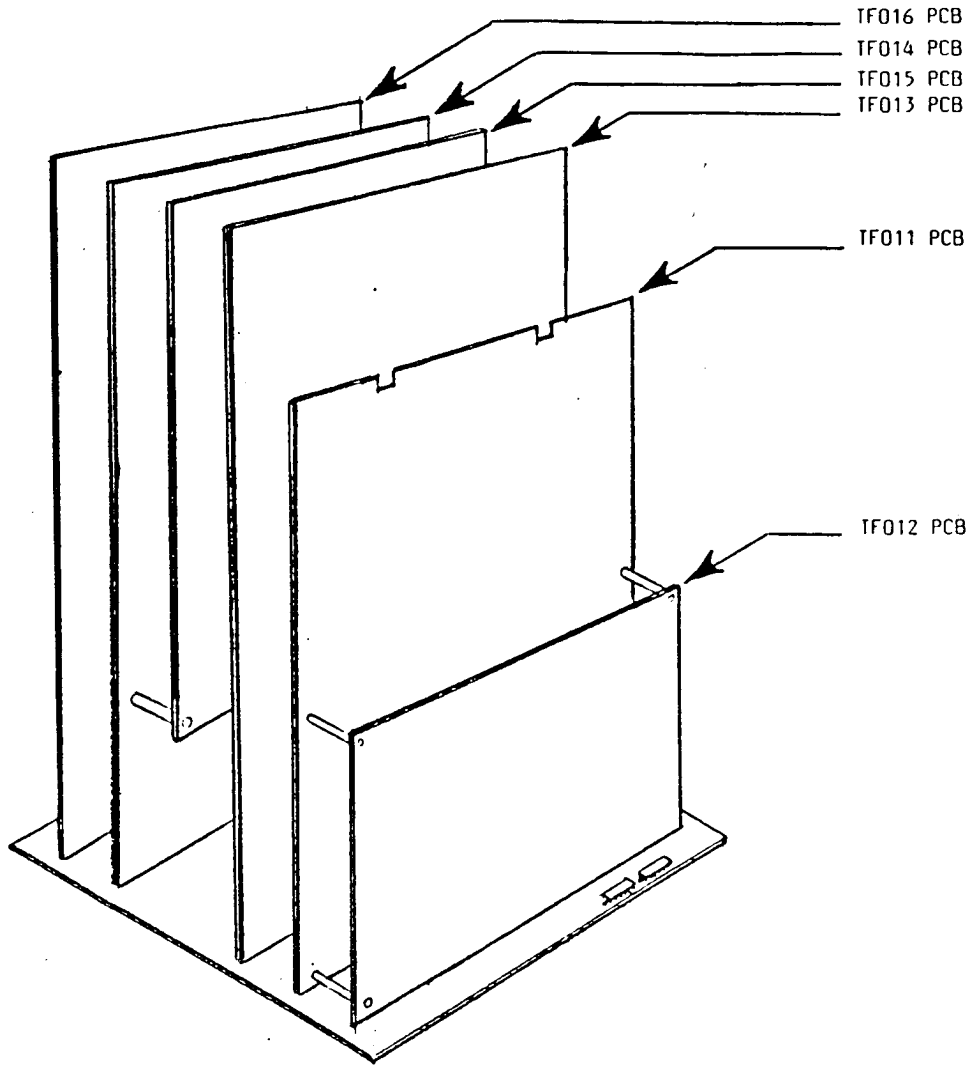
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DR. BY: JOHN NOLAND	DATE: JAN. 3, 1967

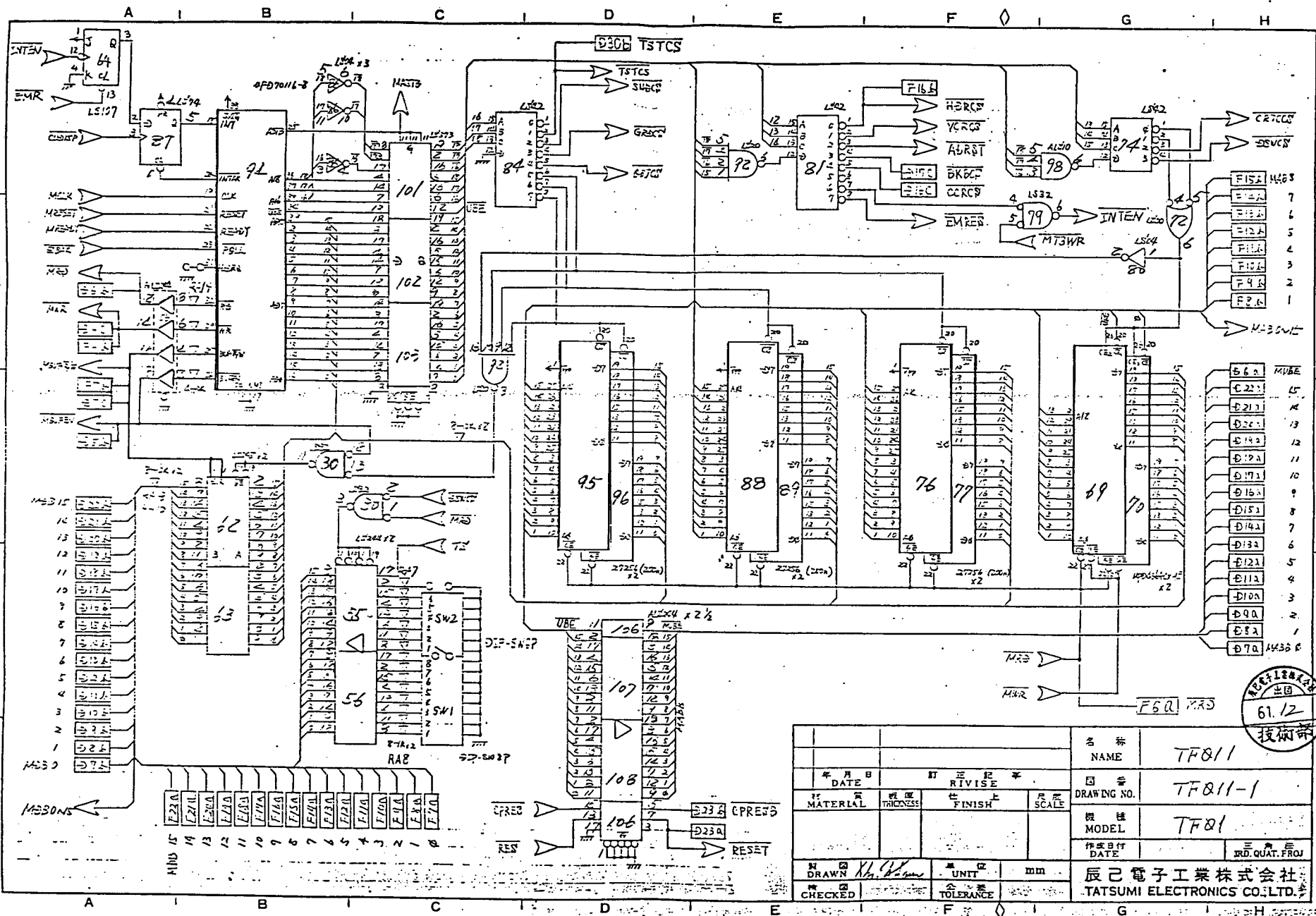
B. Edge connector pin-out.

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

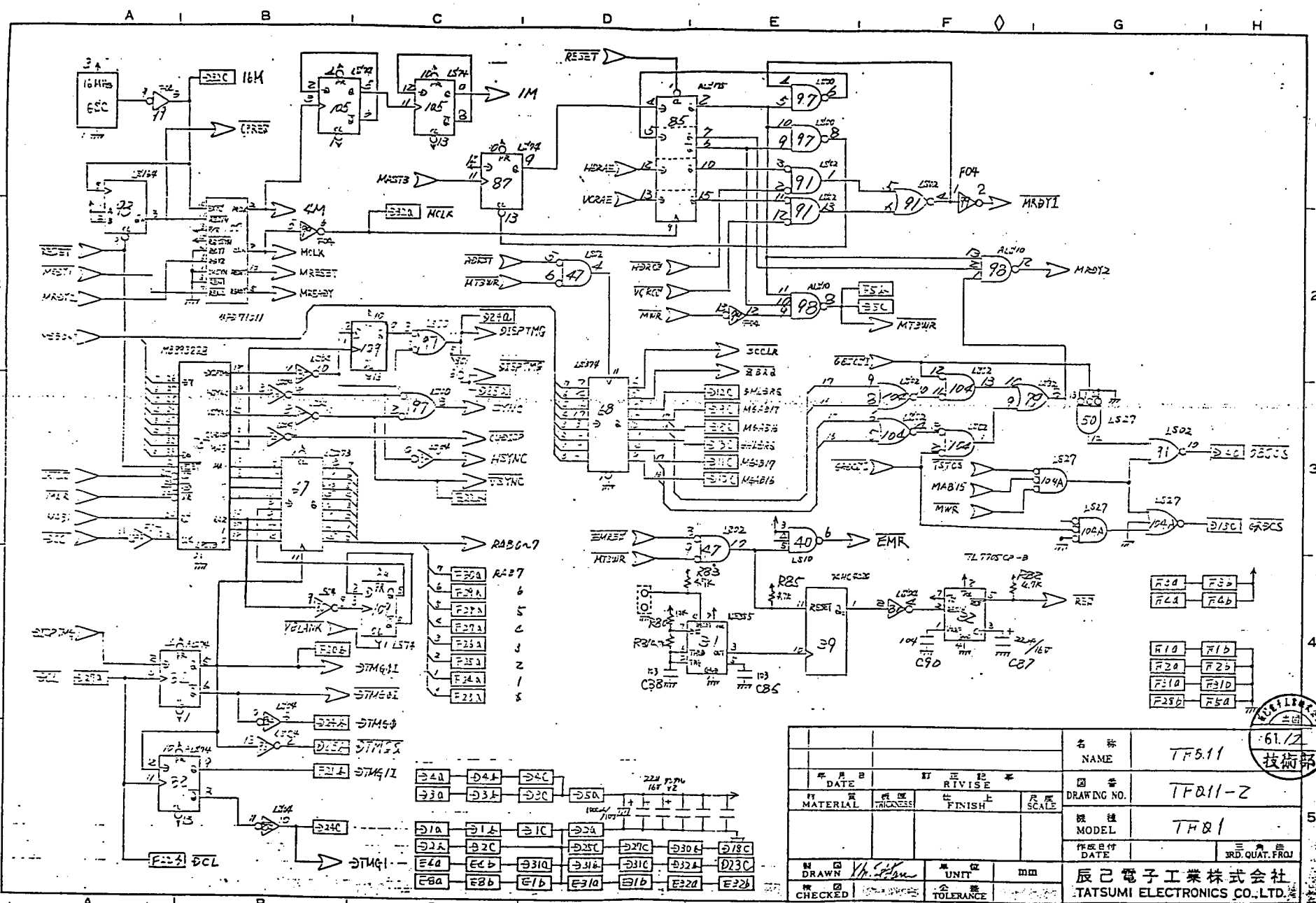
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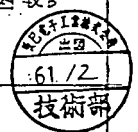
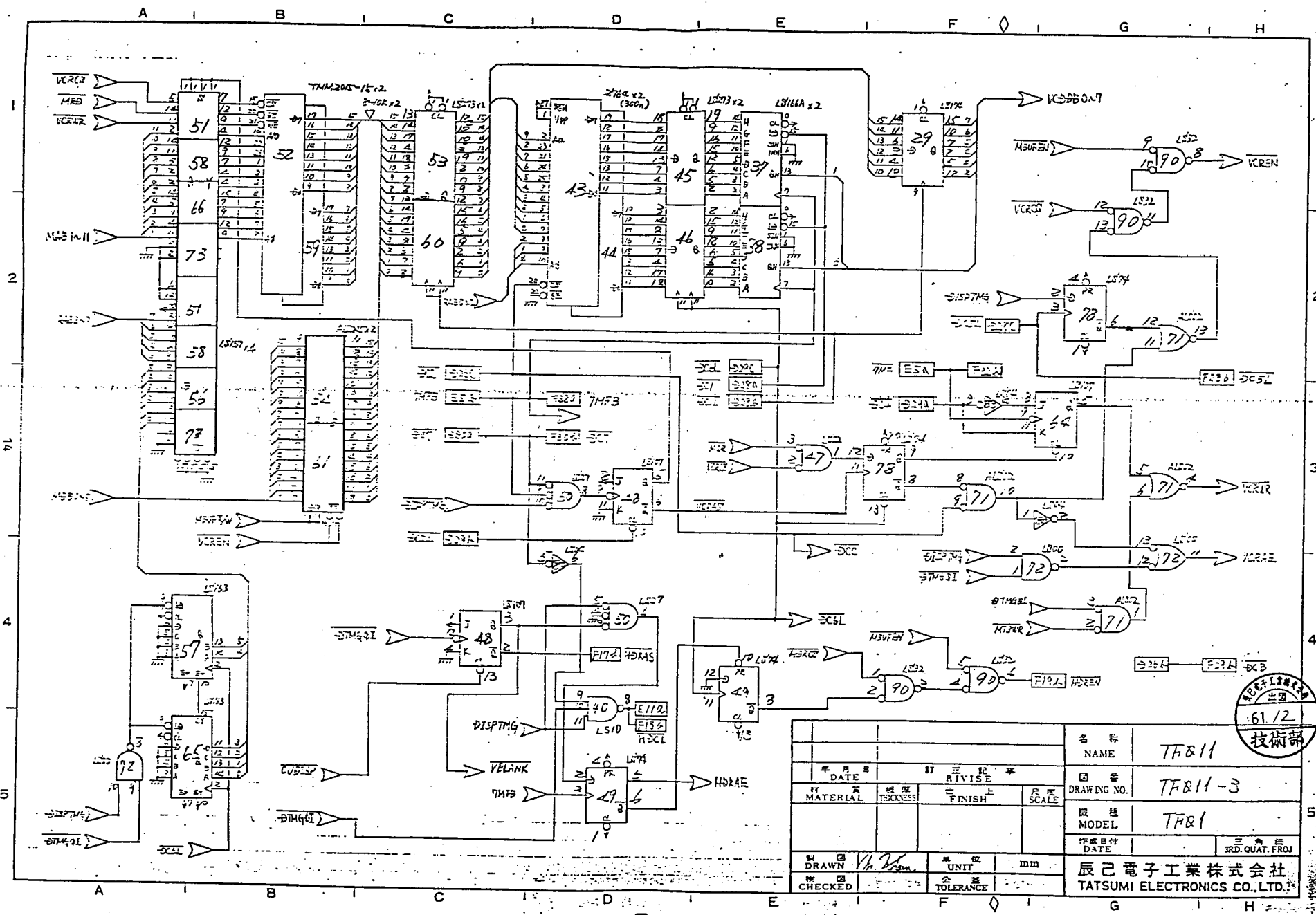


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MODEL			TF81		
作 成 日 付			製 造 部 門		
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辰己電子工業株式会社 TATSUMI ELECTRONICS CO.,LTD.					

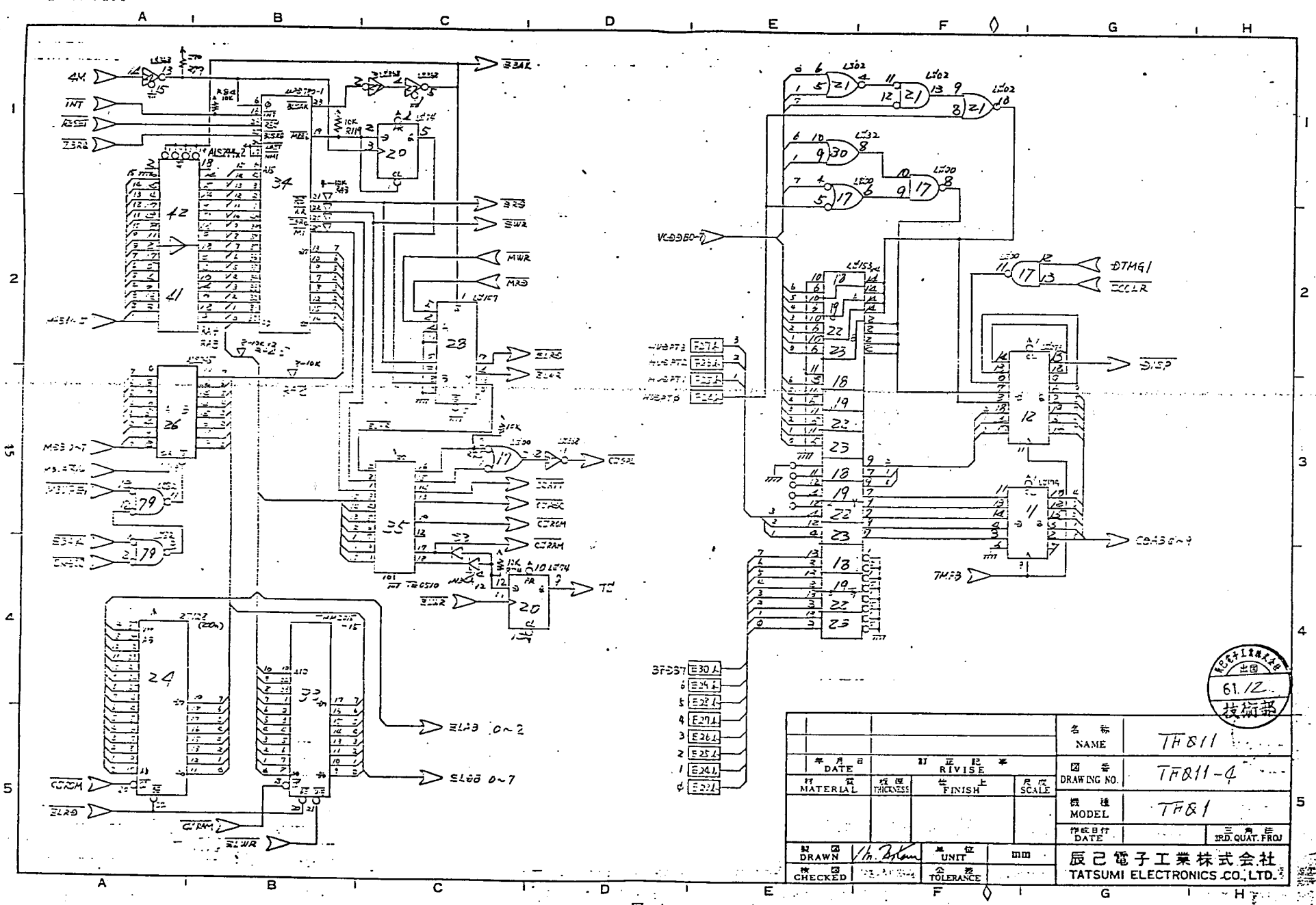




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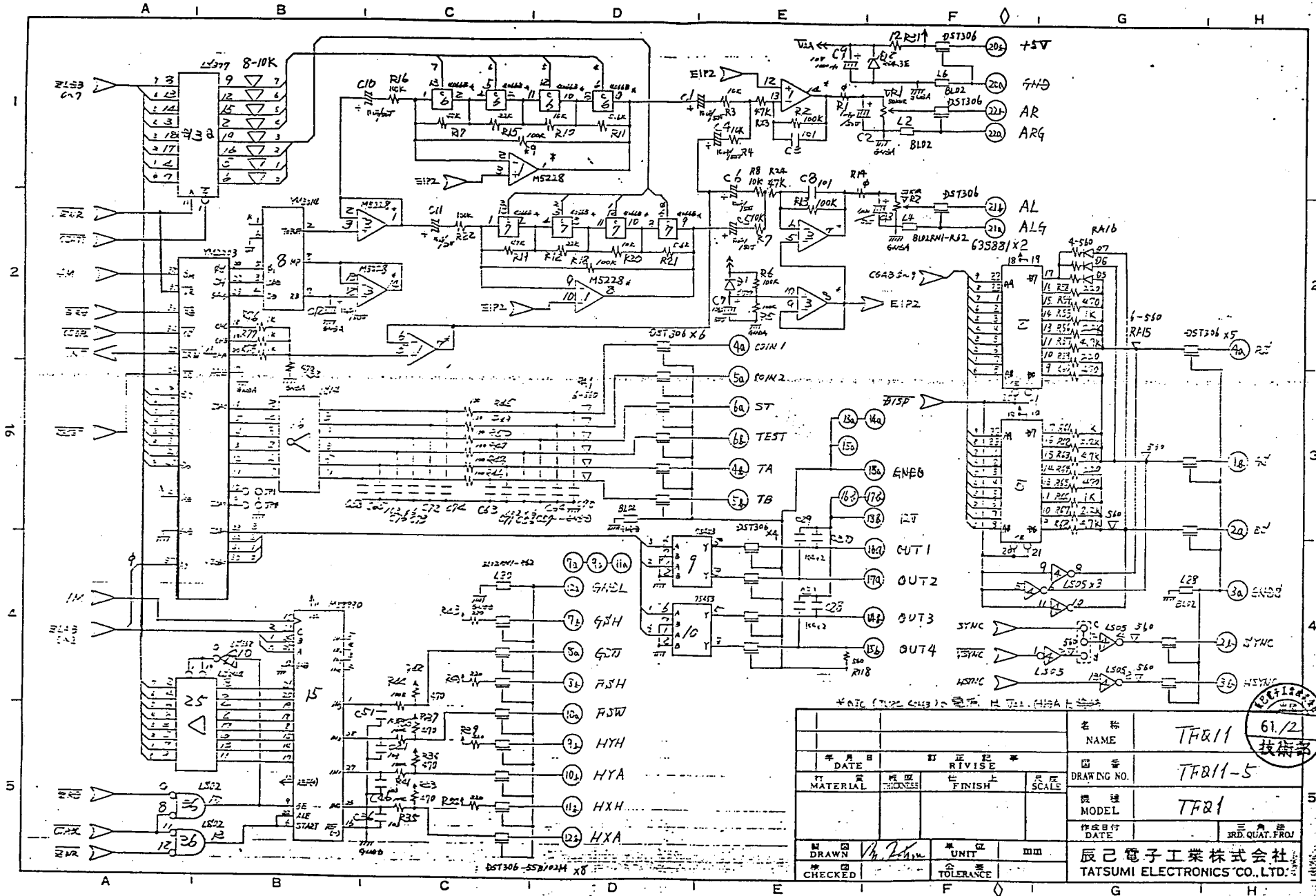
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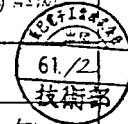
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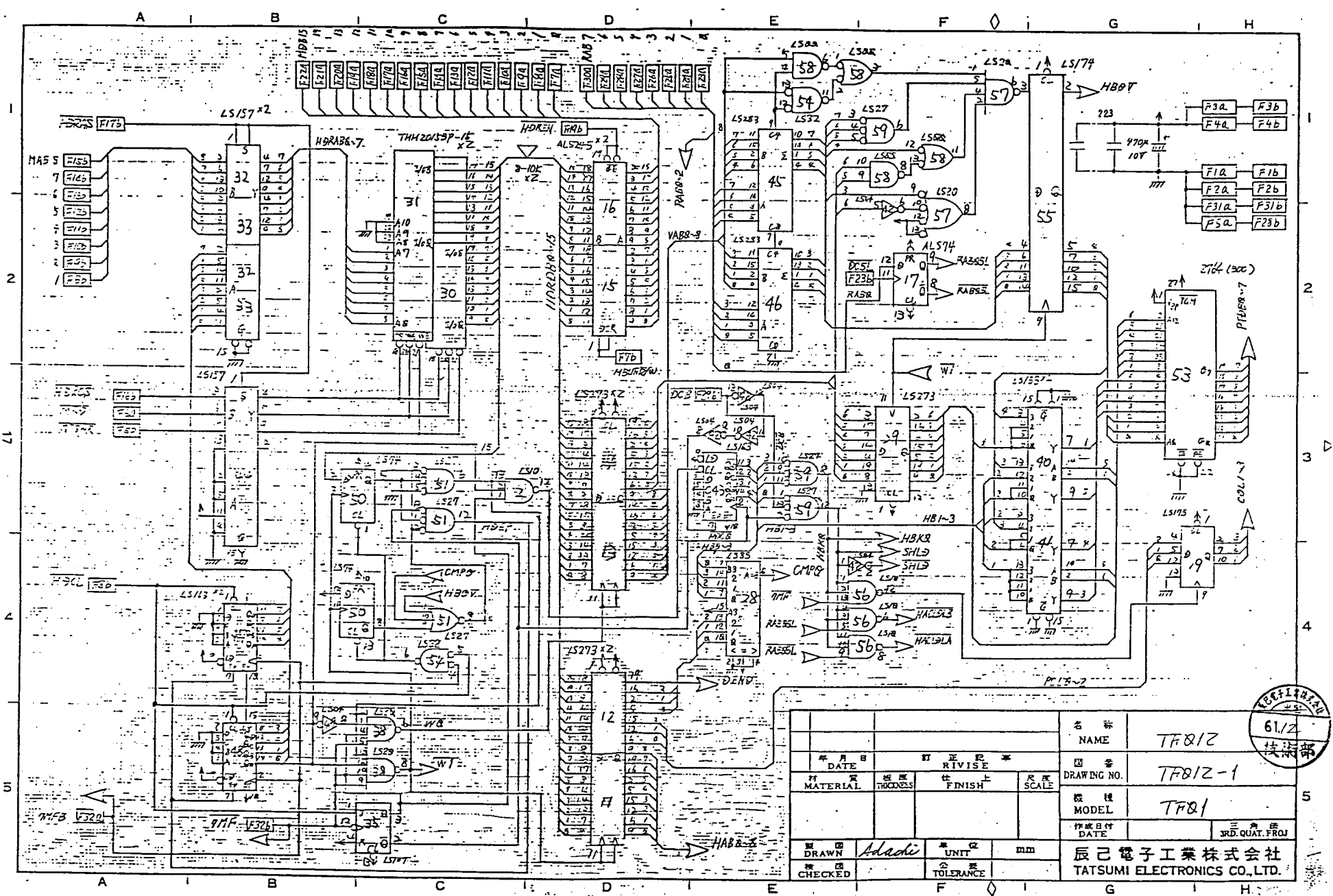
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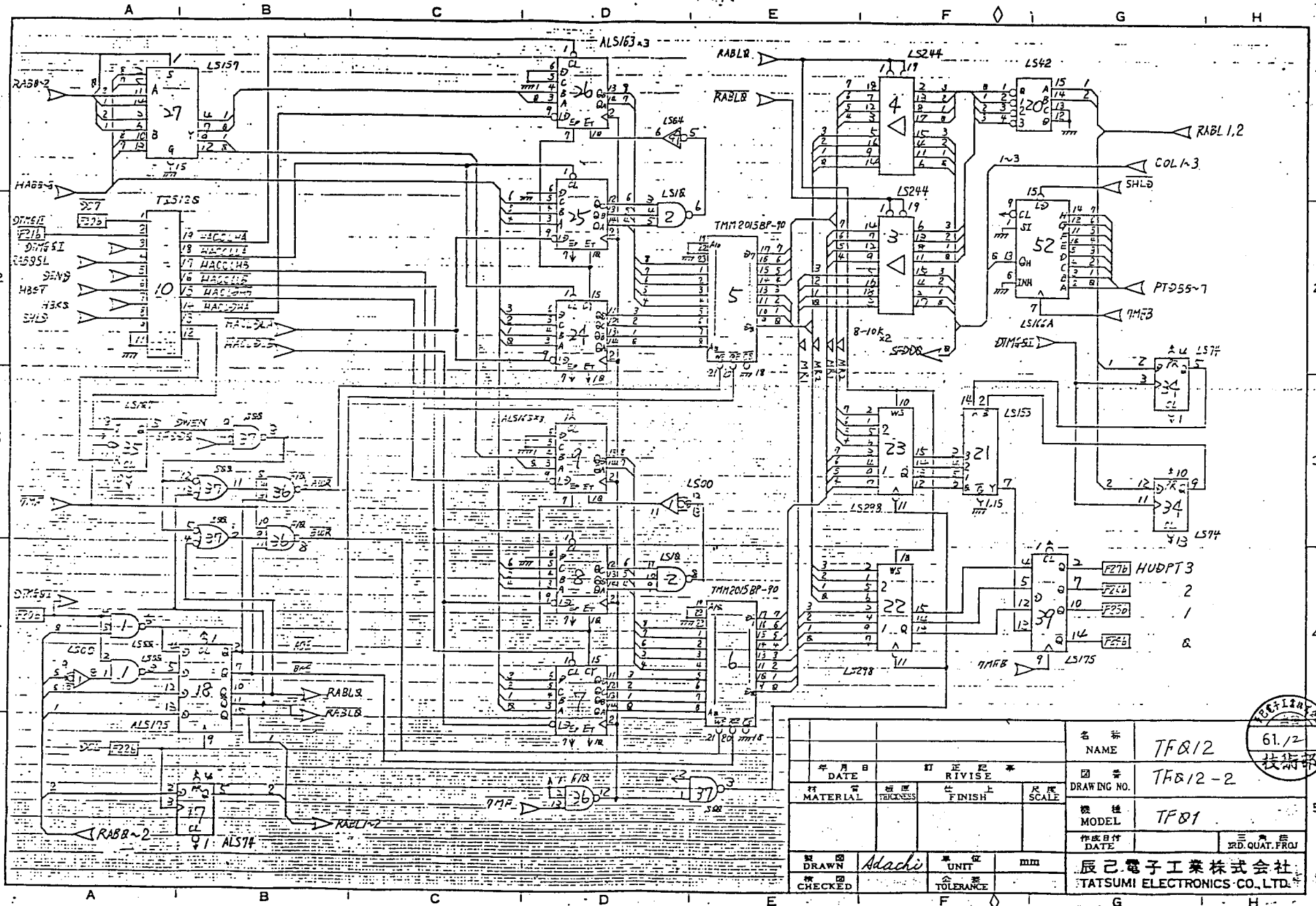




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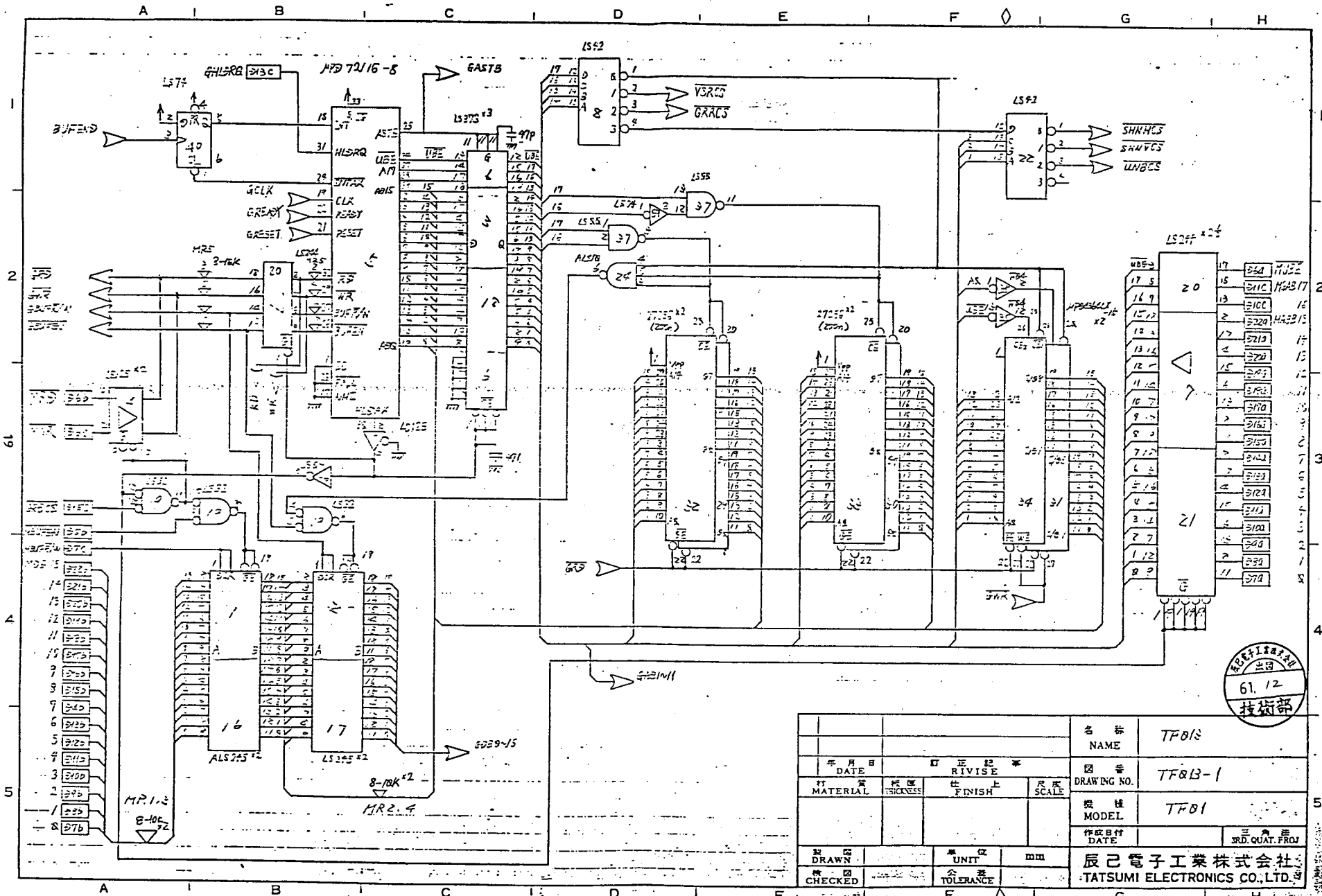


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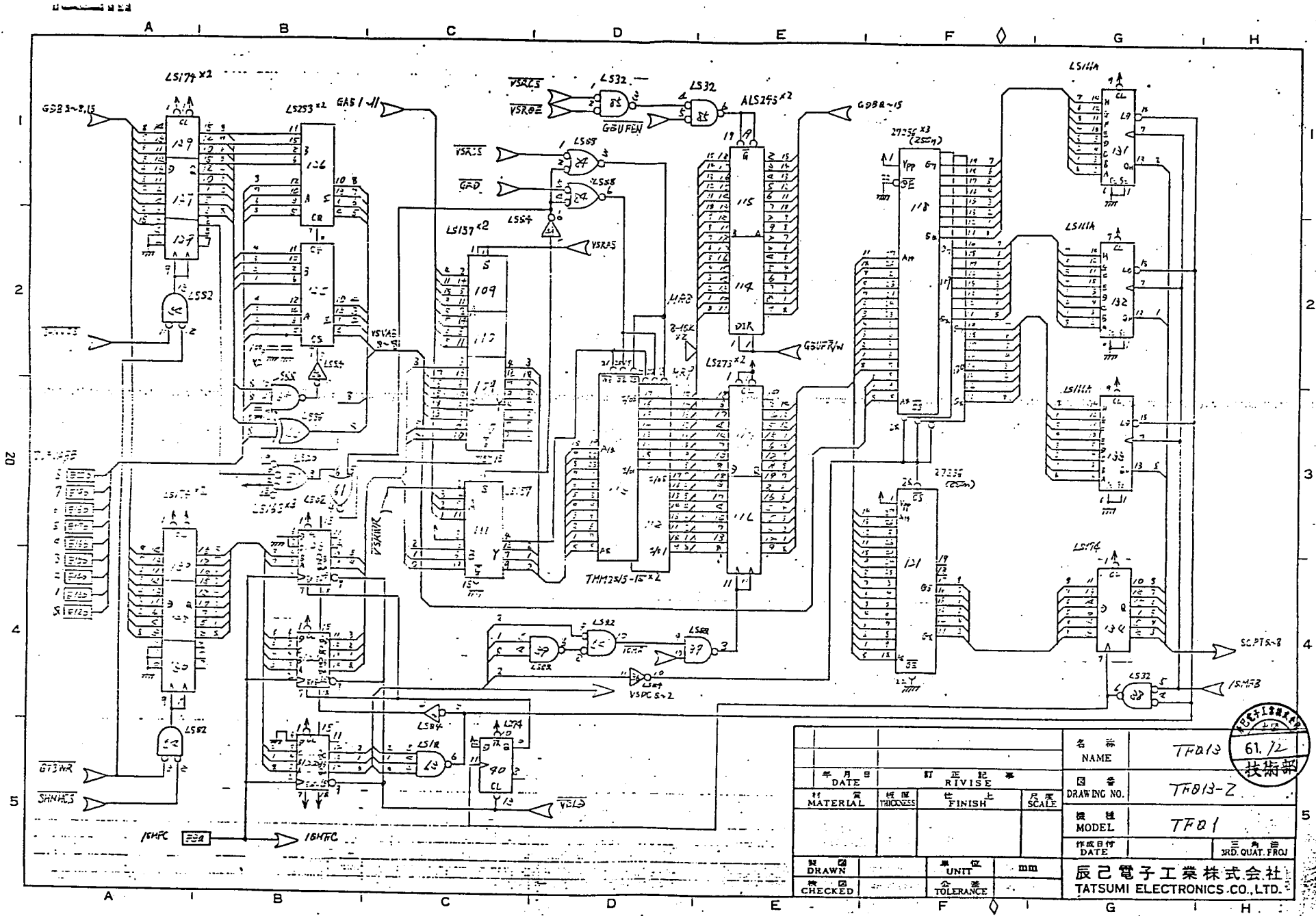
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DRAWN Adachi				辰己電子工業株式会社	
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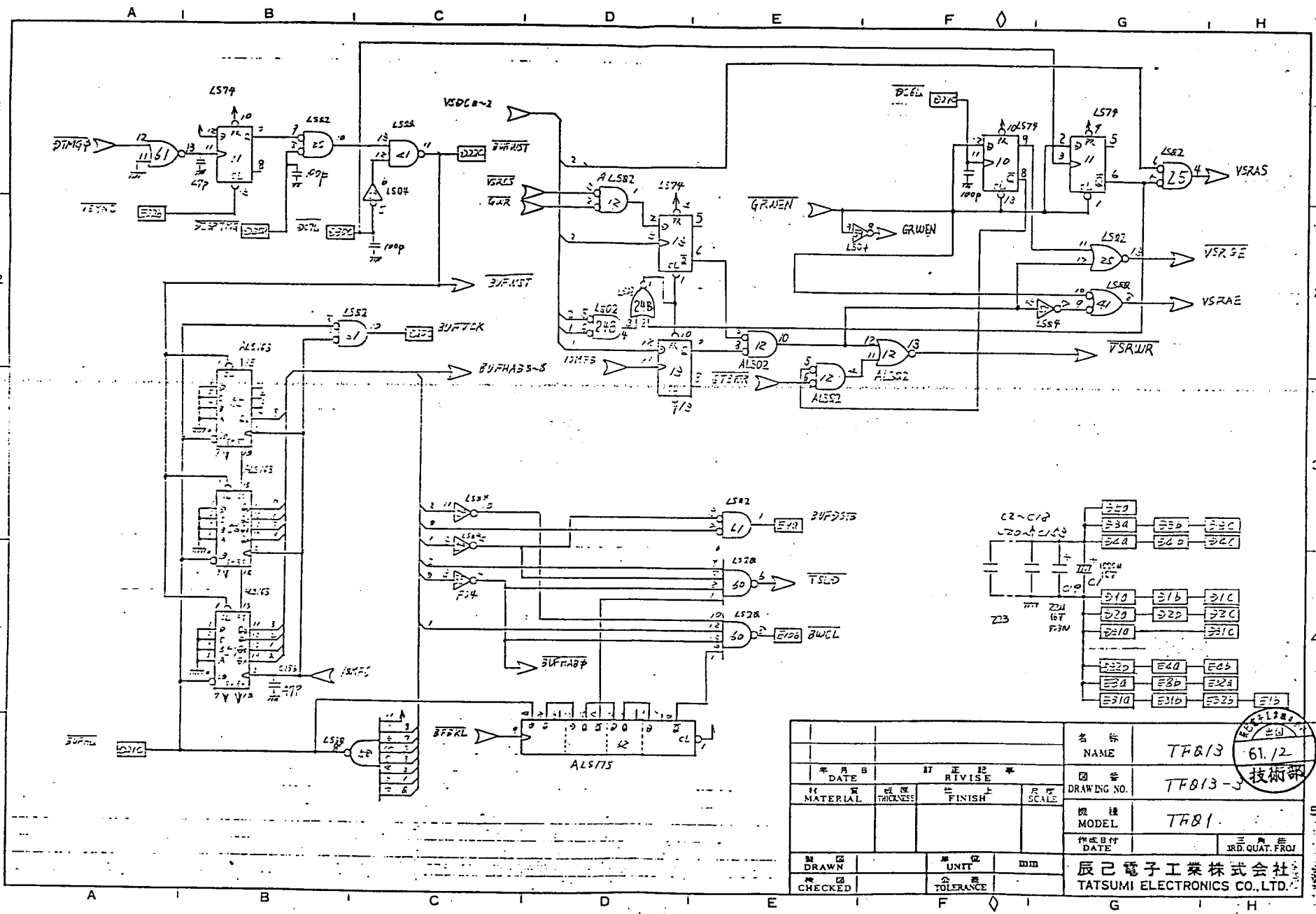


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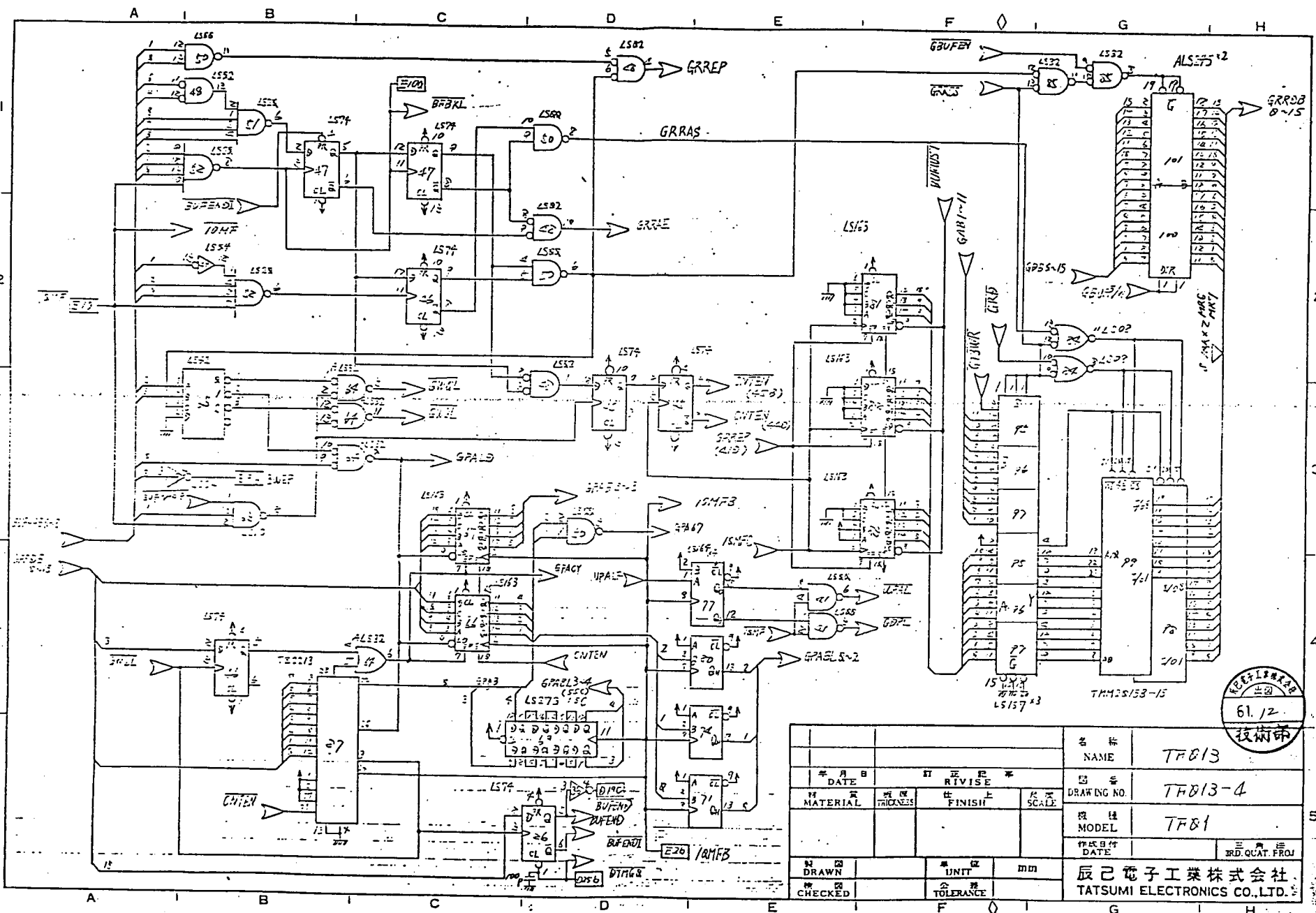
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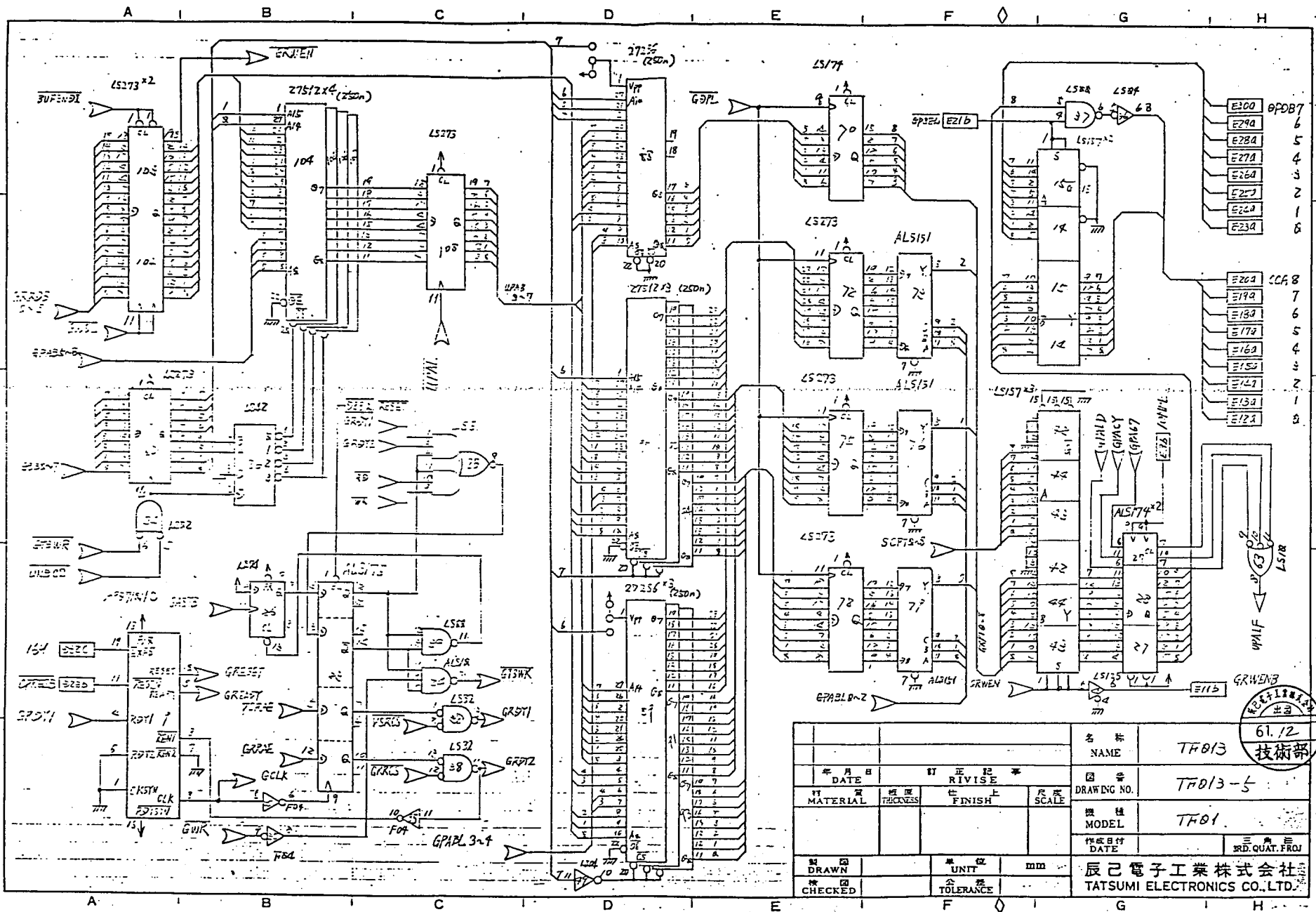
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TATSUMI ELECTRONICS CO., LTD.				TOLERENCE				辰己電子工業株式会社	



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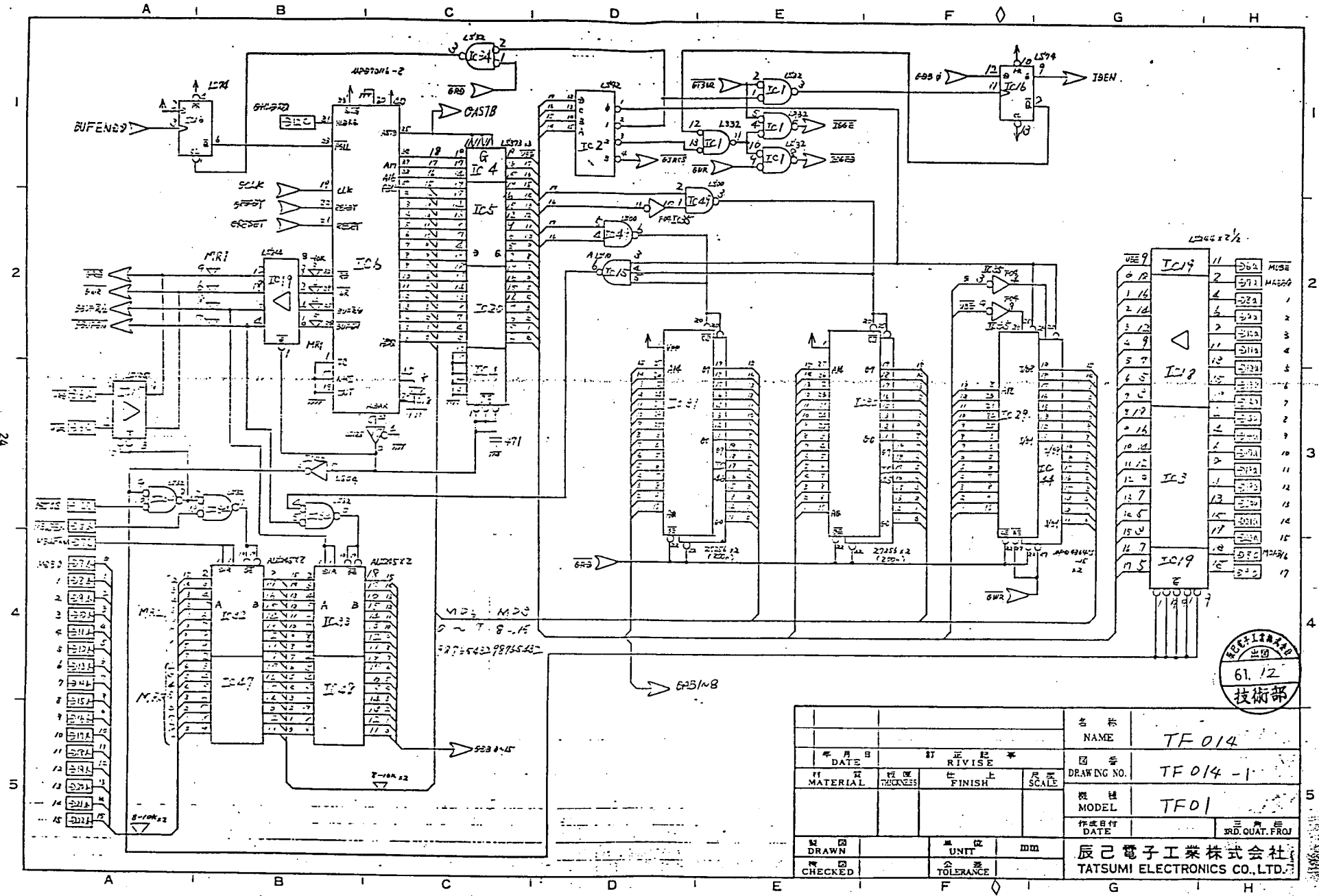
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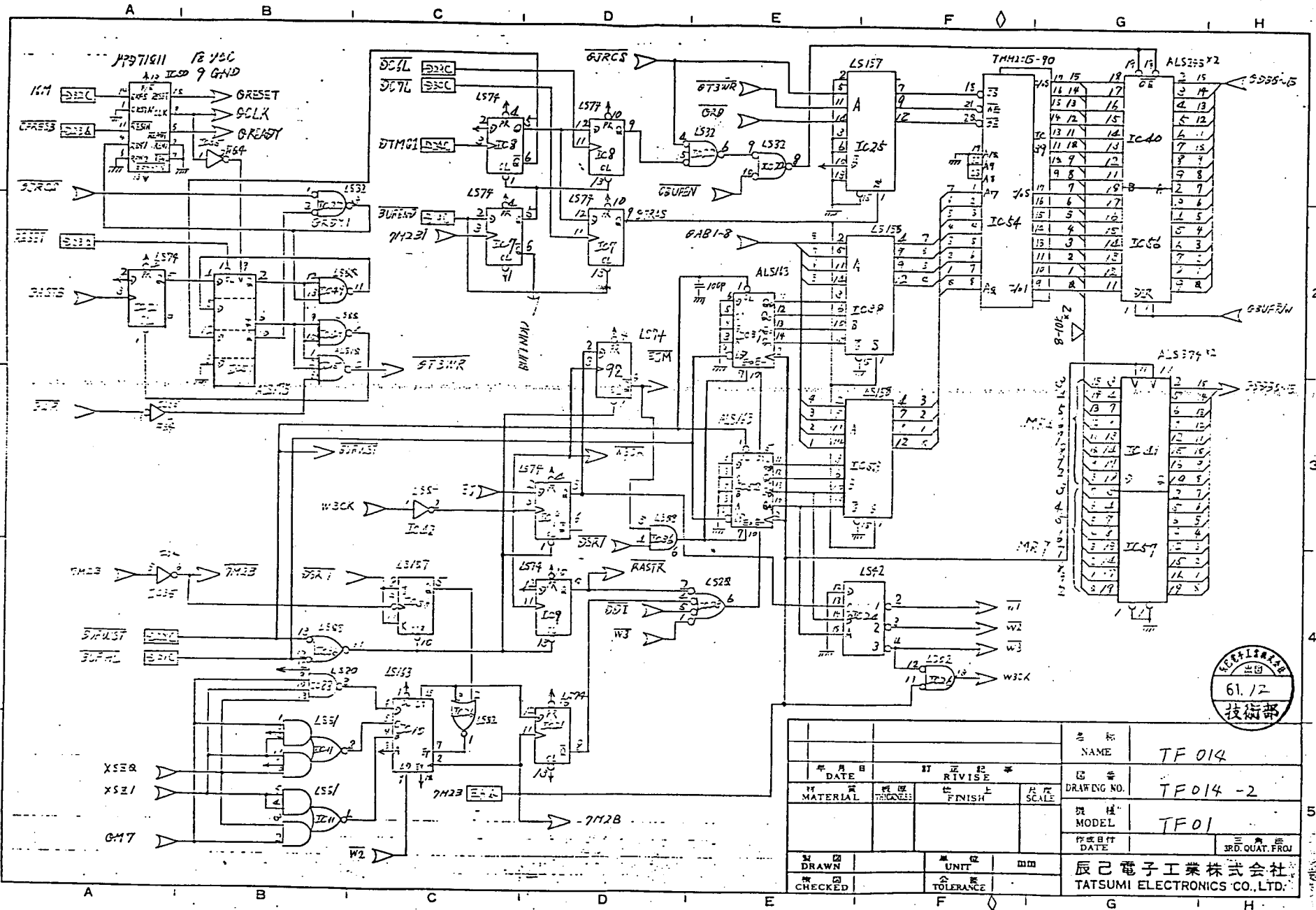
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				製 作 日 付	
製 図	単 位	材 質	辰己電子工業株式会社		
CHECKED	TOLERANCE		TATSUMI ELECTRONICS CO., LTD.		



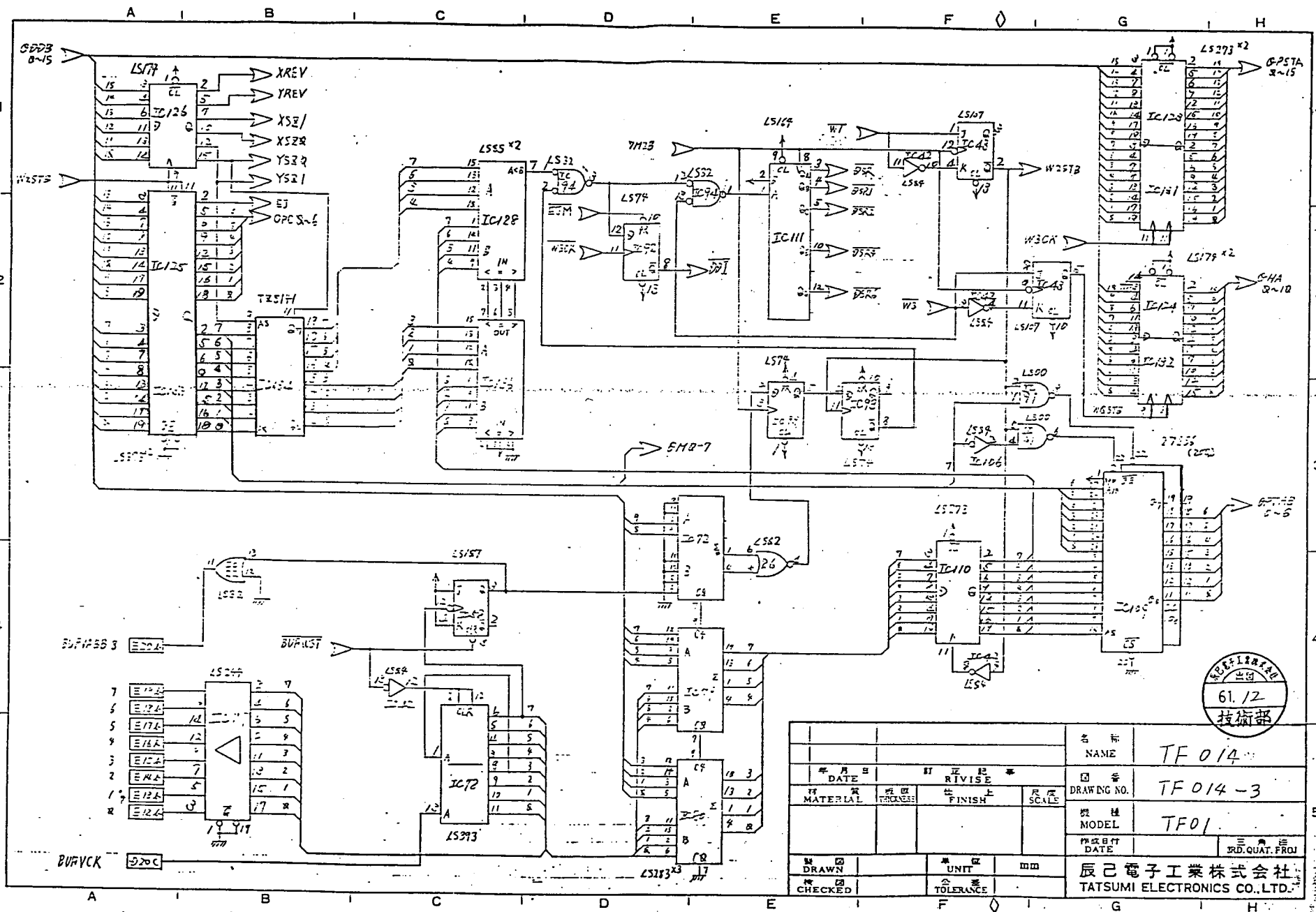


DATE				訂正記号 REVISE		名称 NAME	
MATERIAL				仕様 THICKNESS		図番 DRAWING NO.	
CHECKED				公差 TOLERANCE		機種 MODEL	
DRAWN				UNIT		作成日付 DATE	
TATSUMI ELECTRONICS CO., LTD.				TATSUMI ELECTRONICS CO., LTD.		三角后 TRD. QUAT. PROJ	

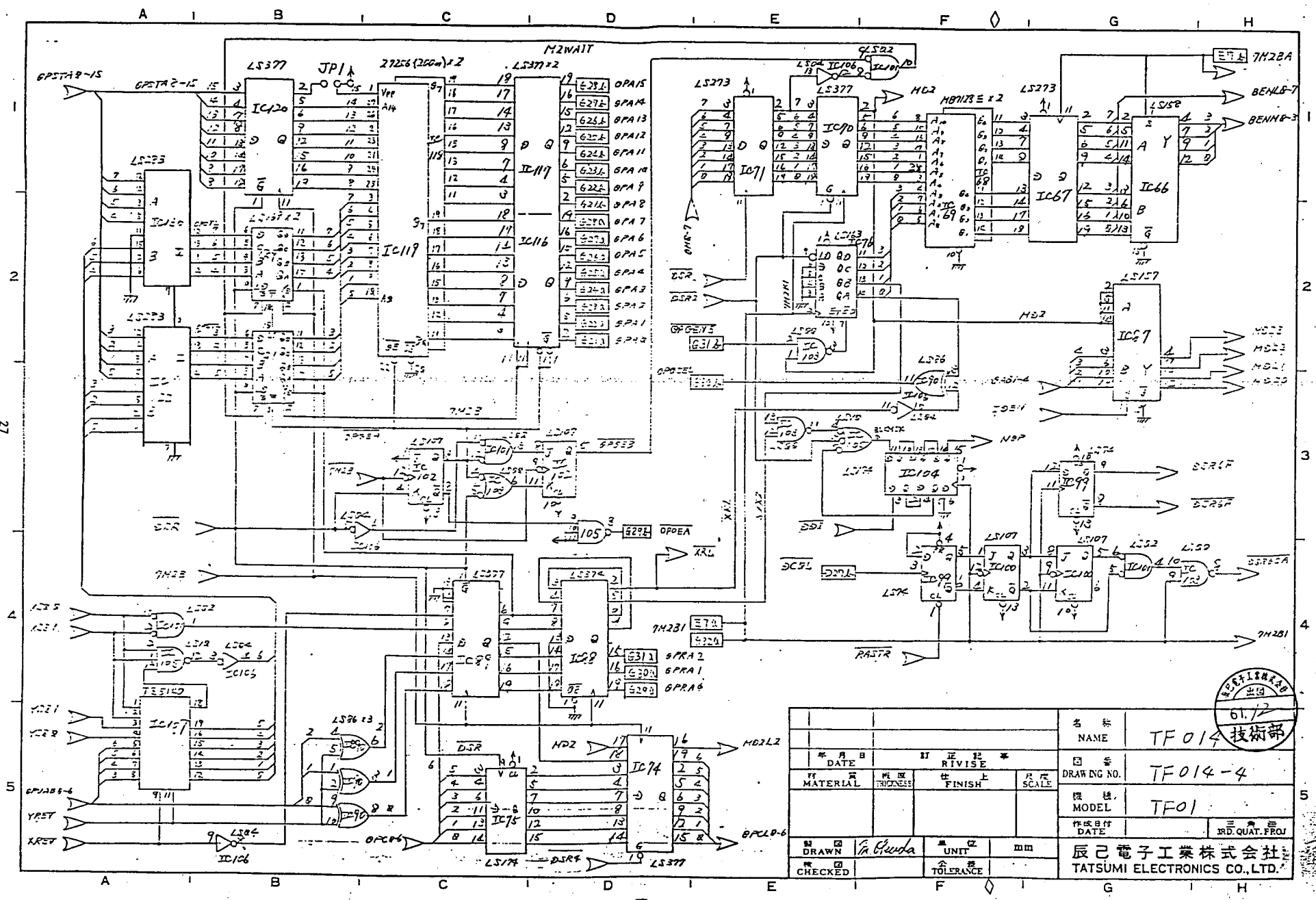





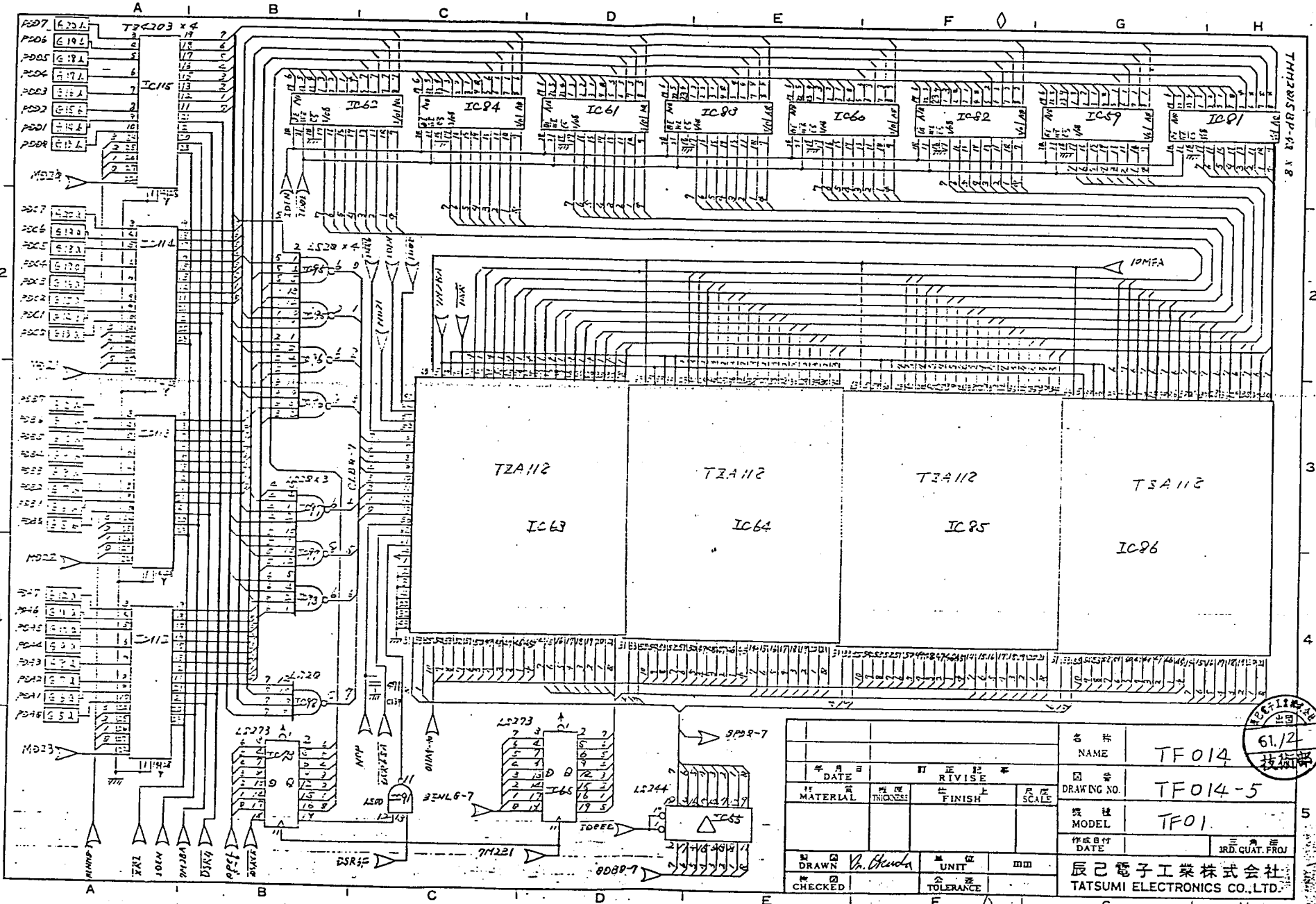
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DATE				訂正記号 REVISE		図番 DRAWING NO.	
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DATE				D.R. QUAT. PROJ.			
DRAWN				UNIT		TATSUMI	
CHECKED				TOLERANCE		TATSUMI ELECTRONICS CO., LTD.	



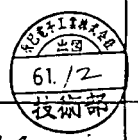
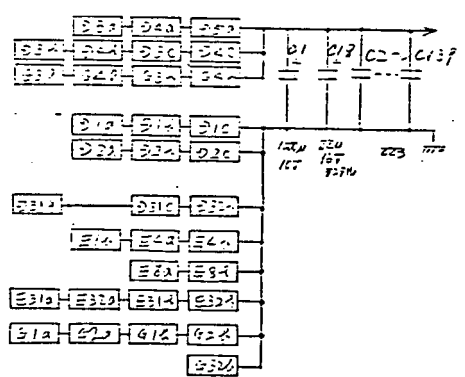
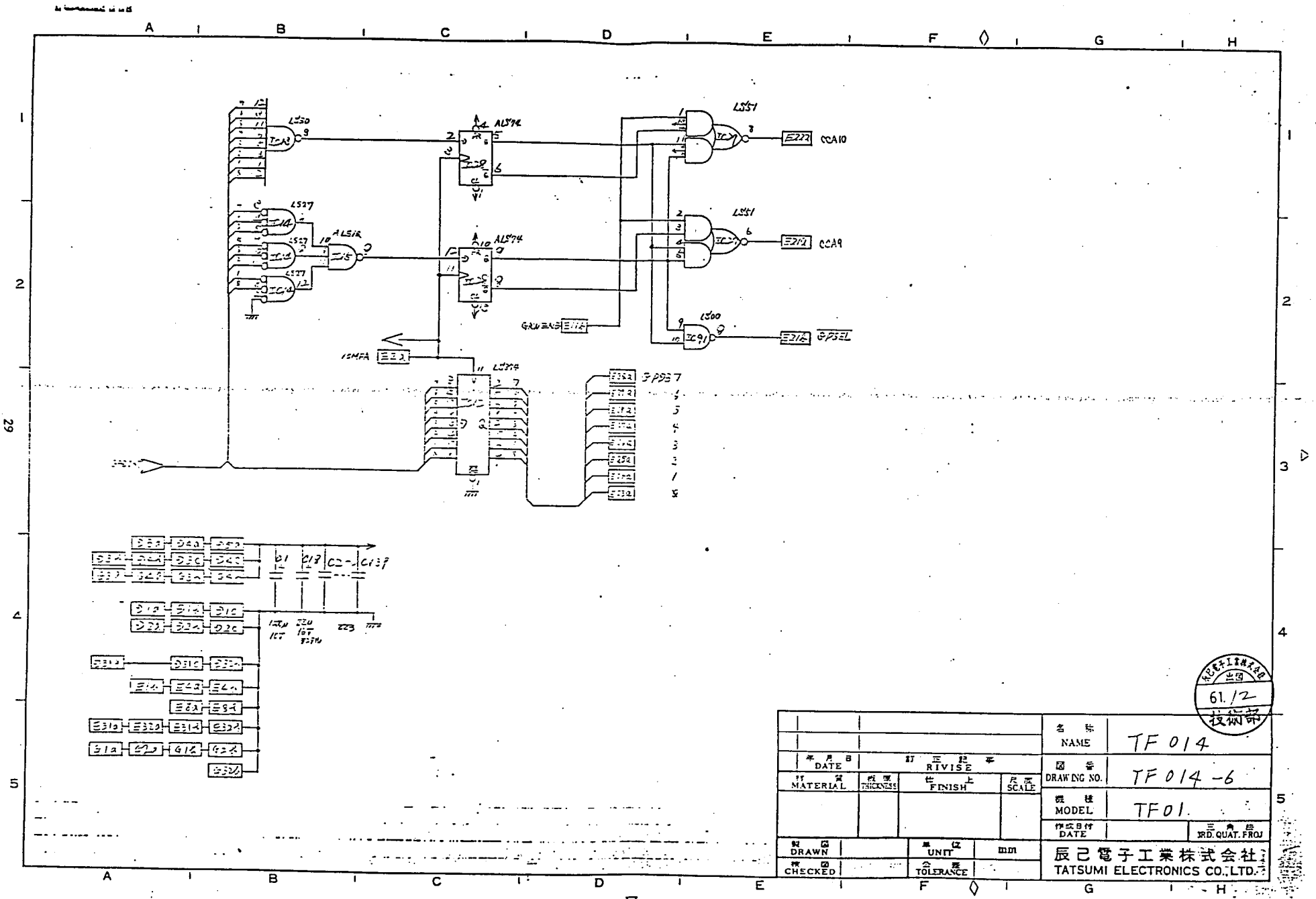
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				DATE	
				訂正記号	
				REVISE	
				図番	TF014-3
材料	公差	仕上げ	尺度	SCALE	
				機種	TF01
				作成日	
				DATE	
				三角注	TRD. QUAT. PROJ
				辰巳電子工業株式会社	
				TATSUMI ELECTRONICS CO., LTD.	
製図	単位	単位			
DRAWN	UNIT	UNIT			
検査	公差	公差			
CHECKED	TOLERANCE	TOLERANCE			



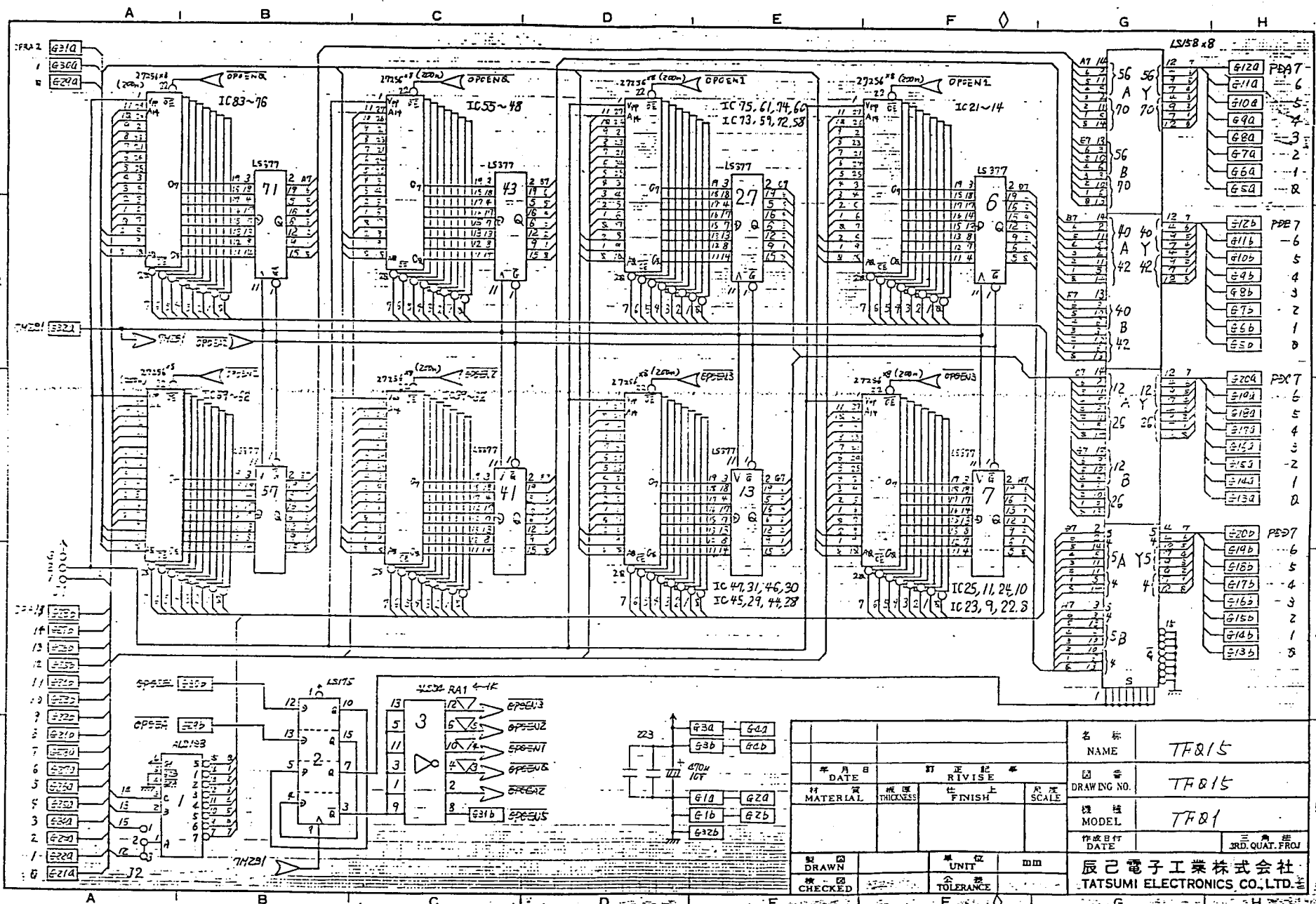
					
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DATE	DATE	訂正	記号	図号	TF014-4
MATERIAL	厚さ	仕上	尺法	機種	TF01
				作成日付	製図者
				DATE	RD. QUAT. PROJ.
DRAWN <i>In Beuda</i>		UNIT		mm	
CHECKED		TOLERANCE		辰己電子工業株式会社 TATSUMI ELECTRONICS CO., LTD.	



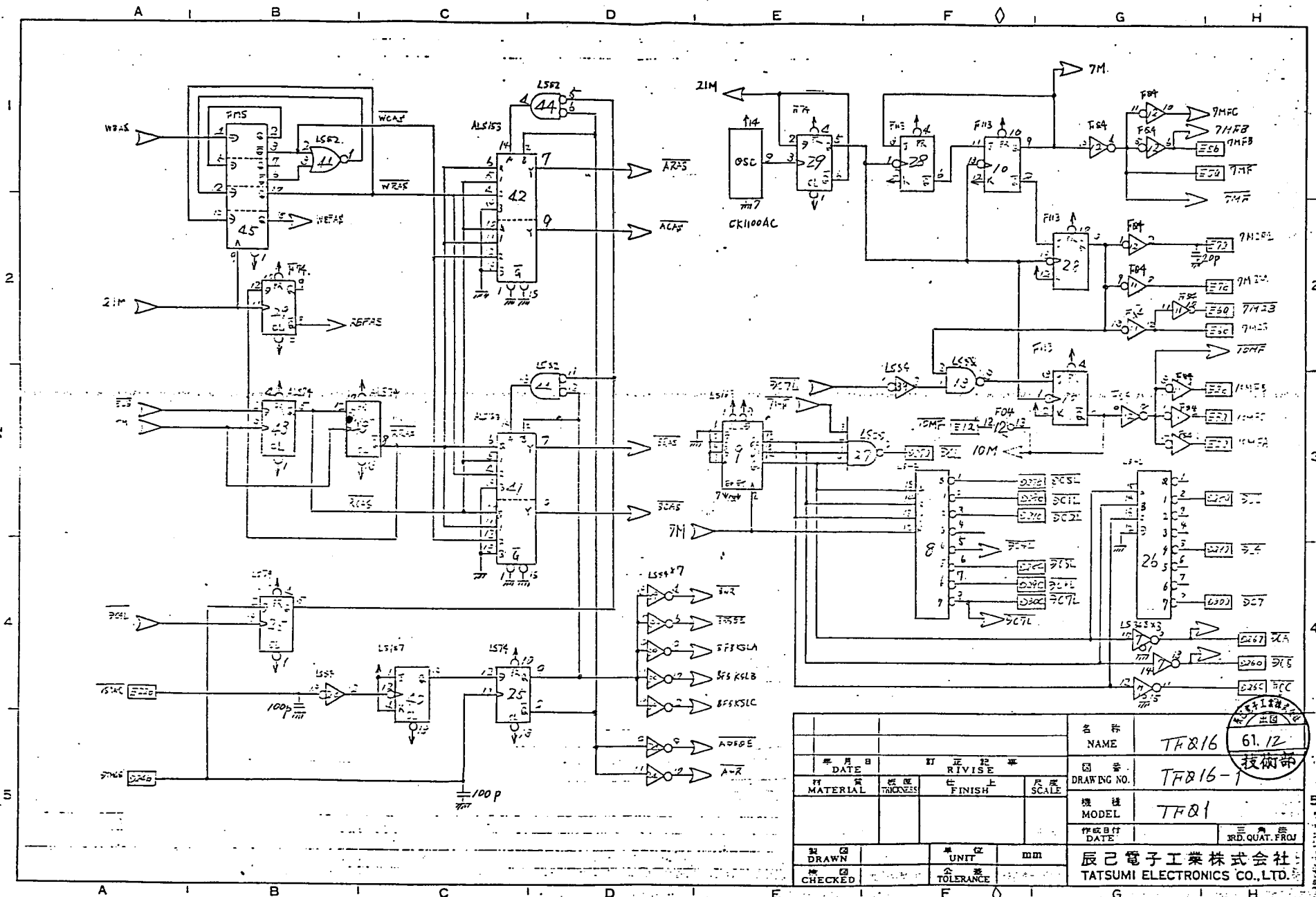
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MATERIAL				FINISH		DRAWING NO.		TF014-5
DRAWN <i>Ch. Otsuka</i>				UNIT		MODEL		TF01
CHECKED				TOLERANCE		DATE		3RD. QUAT. PROJ
辰己電子工業株式会社 TATSUMI ELECTRONICS CO., LTD.								61/2 技術部



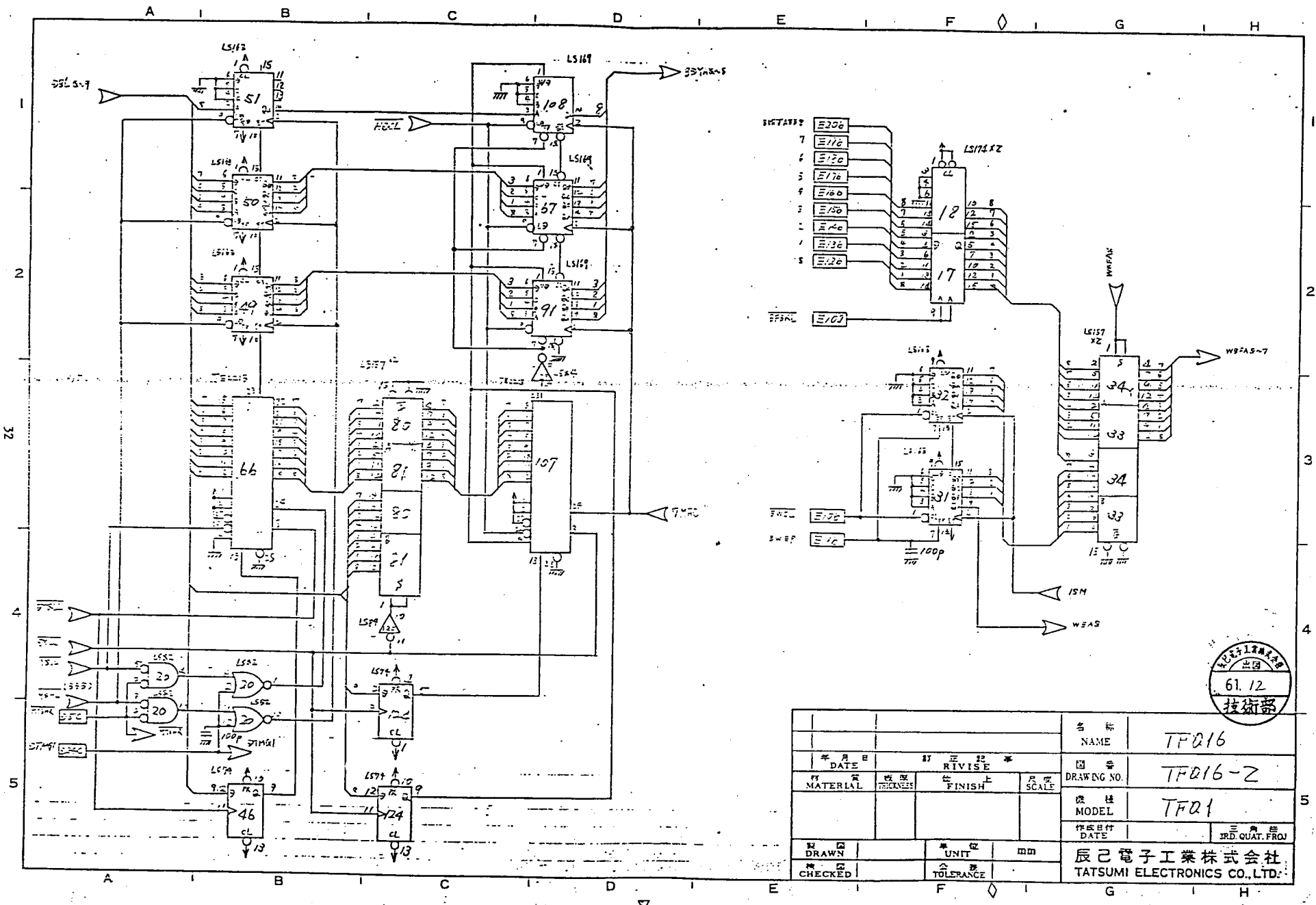
DATE		訂正		名称	TF014
MATERIAL		RIVISE		图番	TF014-6
THICKNESS		FINISH		機模	TF01
SCALE		TOLERANCE		作成日	
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CHECKED		TOLERANCE		辰己電子工業株式会社	
				TATSUMI ELECTRONICS CO., LTD.	



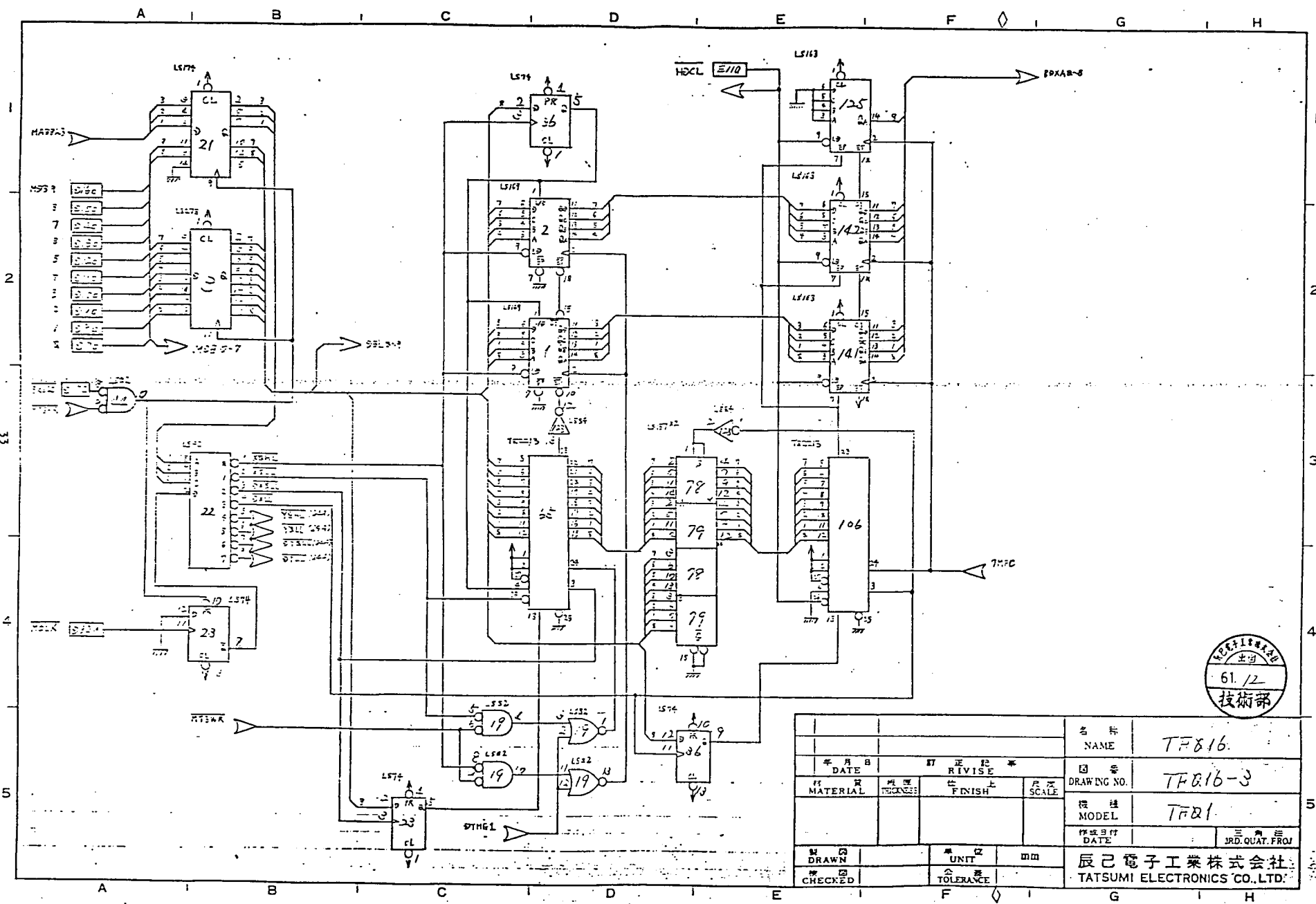
年月日		訂正記号		名 称	TF&15
DATE		REVISE		图 番	TF&15
材 質	厚 度	仕 上	尺 寸	機 種	TF&1
MATERIAL	THICKNESS	FINISH	SCALE	MODEL	
作 成 日 付				三 角 註	
DATE				3RD. QUAT. PROJ	
製 図 単 位 出 力					
DRAWN UNIT 1/100					
檢 査 公 認 允 差					
CHECKED TOLERANCE					
版己電子工業株式会社					
TATSUMI ELECTRONICS CO., LTD.					



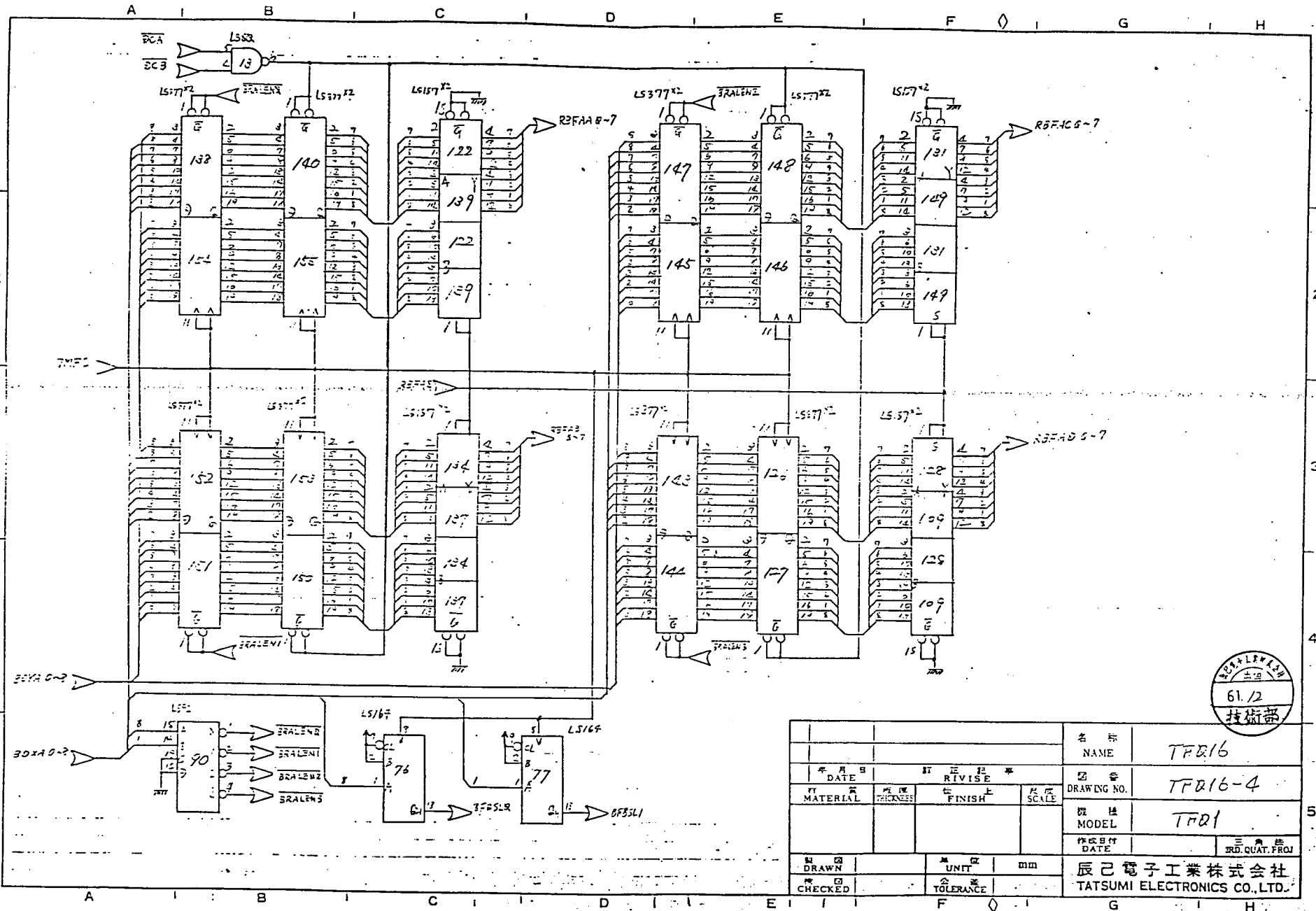
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MATERIAL				FINISH				REVISE		图号		技術部	
THICKNESS				SCALE				DRAWING NO.		TH&16-1			
DRAWN				UNIT				MODEL		TH&1		5	
CHECKED				TOLERANCE				作成日付		DATE		JRD. QUAT. PROJ	
辰己電子工業株式会社												TATSUMI ELECTRONICS CO., LTD.	



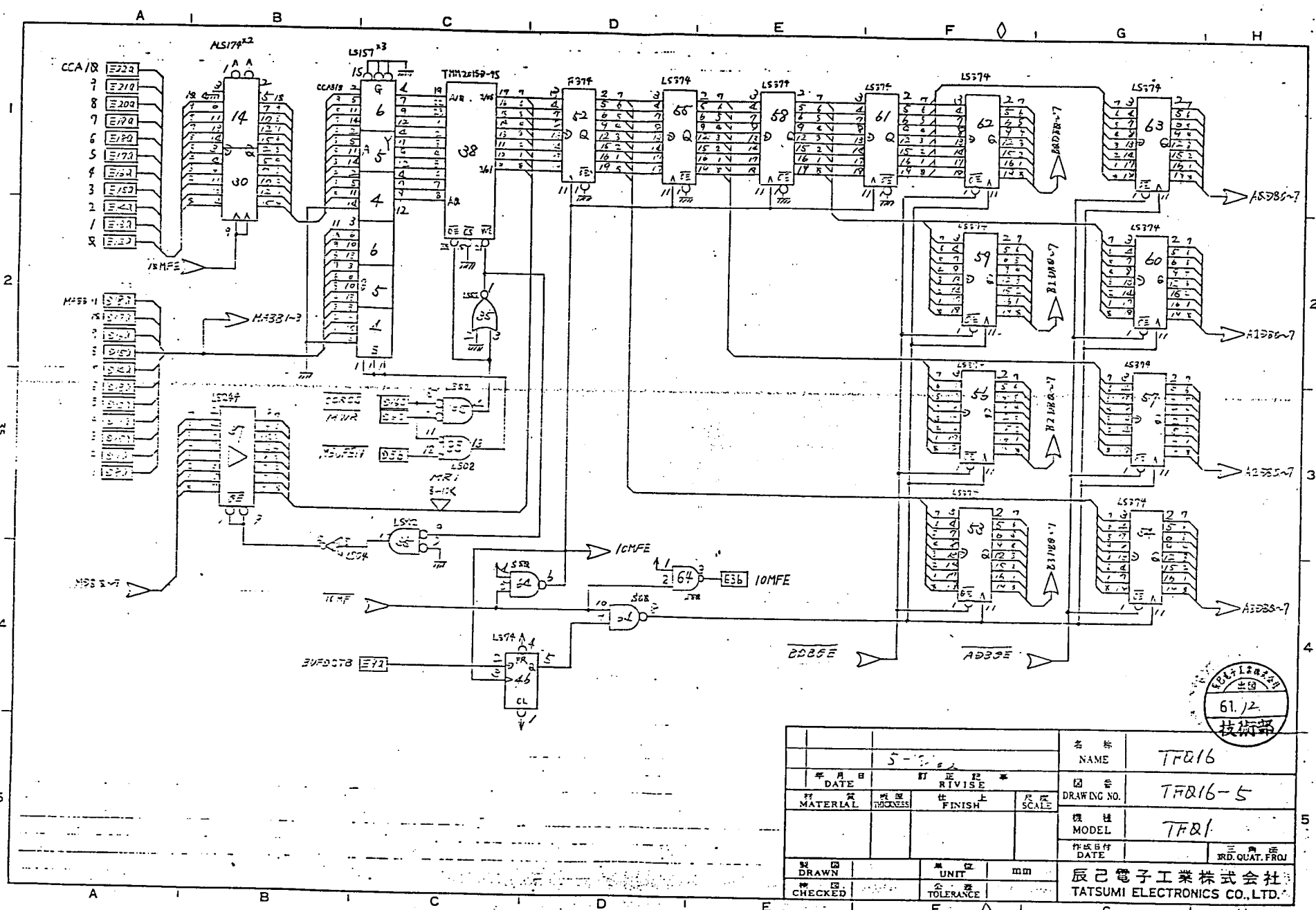
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年月日				訂正	図番
DATE				RIVISE	TFQ16-2
材	厚	性	上	尺	5
MATERIAL	THICKNESS	FINISH	SCALE		
				機種	TFQ1
				作成日付	
				DATE	3RD. QUAT. PROJ.
製	単	合	同	辰己電子工業株式会社	
DRAWN	UNIT	TOLERANCE		TATSUMI ELECTRONICS CO., LTD.	
檢	合				
CHECKED	TOLERANCE				



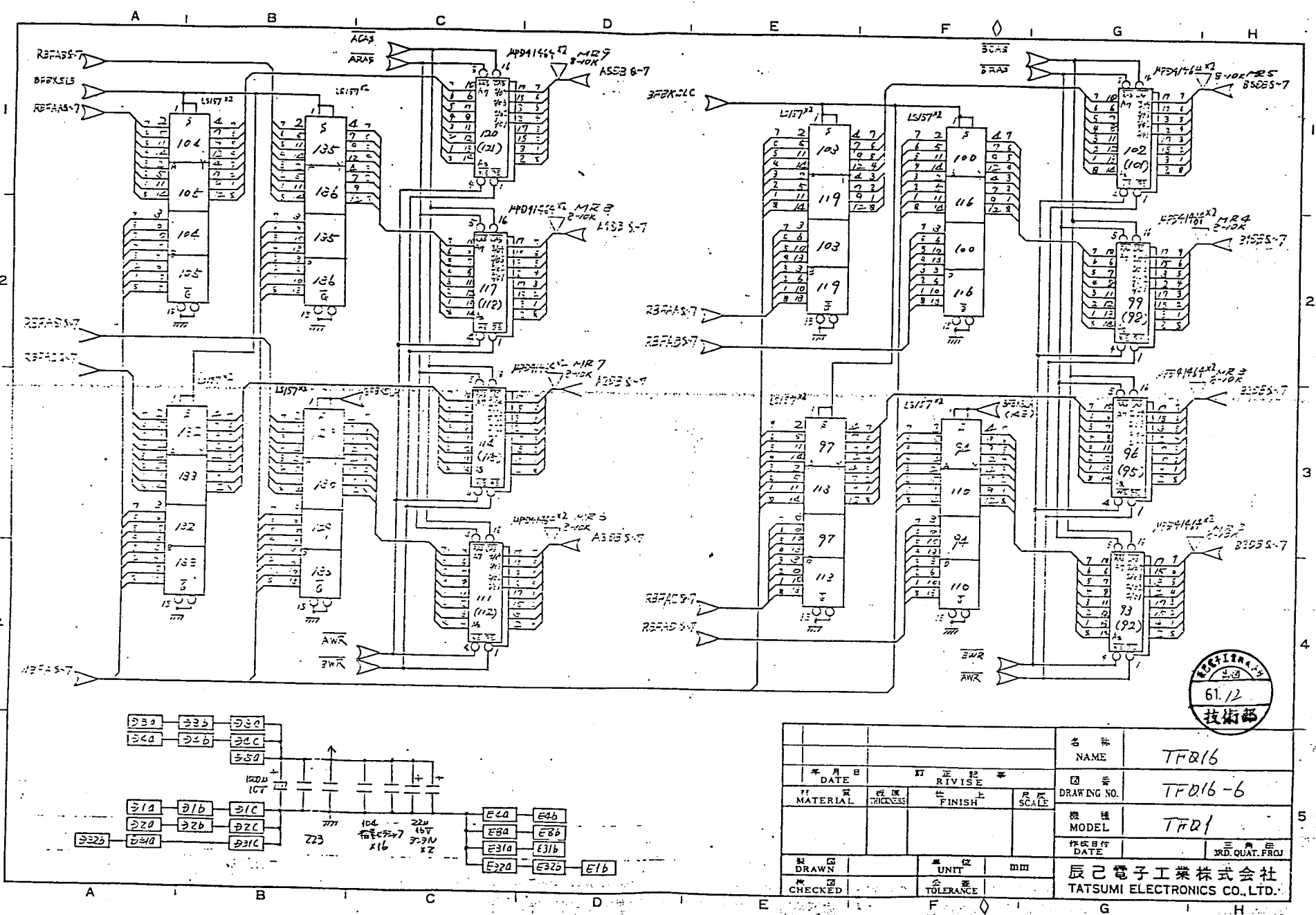
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MATERIAL				TECHNESS				图号 DRAWING NO.	TF816-3	
FINISH				SCALE				機種 MODEL	TF81	
DRAWN				UNIT				作成日付 DATE		3RD. QUAT. PROJ
CHECKED				TOLERANCE				辰己電子工業株式会社 TATSUMI ELECTRONICS CO., LTD.		



				名称	TFB16
DATE				訂正記号	REVISE
MATERIAL	厚み	仕上	尺法	図番	TFB16-4
	THICKNESS	FINISH	SCALE	機種	TFB1
				作成日	DATE
				三角標	TRD. QUAT. PROJ.
DRAWN	UNIT	単位	辰巳電子工業株式会社		
CHECKED	公差	TOLERANCE	TATSUMI ELECTRONICS CO., LTD.		



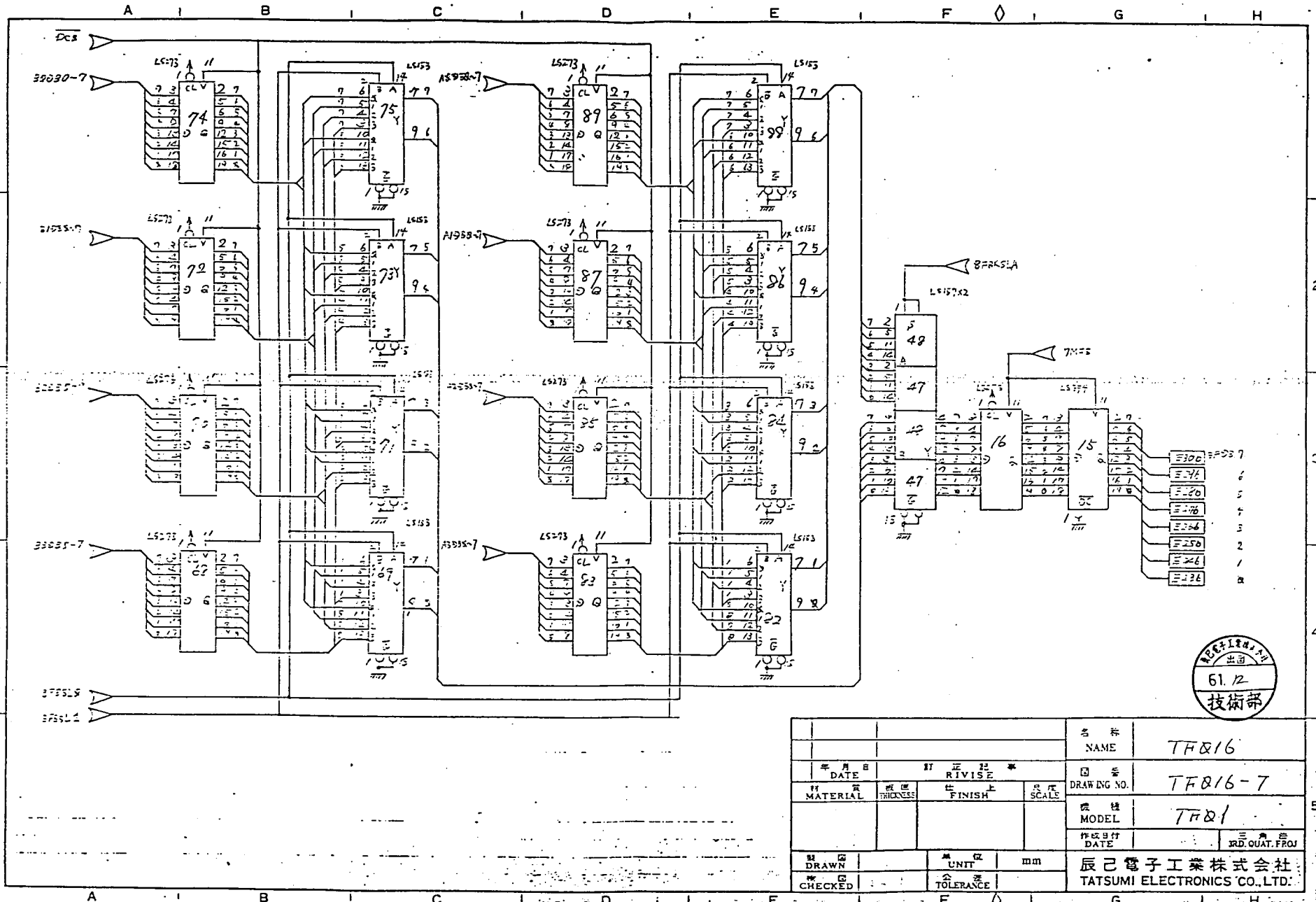
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年月日	訂正記号	图号	TRQ16-5	
MATERIAL	厚さ	仕上	尺法	SCALE
		機種	TRQ1	
		作成日	DATE	
製図	UNIT	mm	JRD. QUAT. FRQJ	
CHECKED	公差		TATSUMI ELECTRONICS CO., LTD.	



61.12
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DATE		訂正記号		名称	TRQ16
MATERIAL		FINISH		図号	TRQ16-6
THICKNESS		SCALE		機種	TRQ1
DRAWN		UNIT		作成日付	3RD. QUAT. PROJ
CHECKED		TOLERANCE		辰己電子工業株式会社 TATSUMI ELECTRONICS CO., LTD.	

PCB



61.12
技術部

年 月 日				訂 正 記 号		名 称	TF&16
材 質				材 質		图 号	TF&16-7
厚 度				上 下		模 型	TF&1
材 質				材 質		作 业 日 付	
材 質				材 質		出 品 日 付	
材 質				材 質		辰己電子工業株式会社 TATSUMI ELECTRONICS 'CO., LTD.	

