TRON

PART NO.
420-0193

MANUFACTURED BY

Gremlin®
Industries, inc.

OWNER'S MANUAL

HEAD ON

OPERATING INSTRUCTIONS

AND

SERVICE MANUAL

HEAD ON OWNER'S MANUAL

Copyright (C) 1979 by Gremlin Industries, Inc. All Rights Reserved
All the information contained herein is the exclusive proprietary property of GREMLIN INDUSTRIES and is disclosed in confidence and may not be duplicated nor copied in whole or part, nor be used for any purposes other than that for which disclosed.

ADDENDA: HEAD ON MANUAL 5/24/79

The following description of HEAD ON game play updates the previous version found in the manual:

The player begins each game with a preselected number of cars, located in the track infield. The number of cars is operator adjustable; see OPTIONS following this section.

Refer to manual, page 4, middle of page:

Play continues in this manner, with the player continually trying to predict where the computer car will go, so that the two cars won't crash. If they do, the game resets the cars to the starting line, the lane markers reappear, and one less player car appears in the infield. The player again tries to clear all the lane markers by avoiding a crash. If the player clears all the lane markers with his first car, he wins the BONUS of 300 points. The game resets, and the player continues to clear the lane markers; he does not lose one of his cars. However, the single computer car now becomes more challenging, and harder to beat, than the first computer car. If the player clears all the markers again, he wins another 300 point BONUS; then, he is challenged by 2 computer cars. The game continues in this way, so that if the player beats the first pair of computer cars, he then races against 2 harder computer cars. The player wins the BONUS each time he clears all the lane markers without crashing. Finally, 3 computer cars appear when the player beats the 2 harder cars. As long as the player avoids a collision, he does not lose any of his game cars. The game ends only when all of the player's cars have crashed.

The Points Per Dot value is 5 at the start of the game. This amount increases by 5 each time there is a change in the number of computer cars. So, at three computer cars, each lane marker is worth 15 points. During game play, one of the computer cars occassionally lays down a row of diamond-shaped markers. These are worth 5 extra points each when the player's car clears them. The diamond lanes will change back to dots after a few seconds, so the player must clear them as soon as possible. Also, the player wins an extra car at a score of 5000 points.

OPTIONS:

The operator may select the number of cars with which a player begins a game: 3,4,5, or 6 cars are selectable. A jumper (at GROUND potential) is installed to select the desired number of cars, as follows:

Locate the 10-pin connector on the logic board (the large board) where the CONTROL PANEL wires are attached; it's in the upper left corner of the board. To select 5 cars, attach one of the black jumpers from the control panel wires to PIN 1 of the female connector block (PIN 1 is labelled "1" next to the connector). This grounds PIN 1. To select 4 cars, ground PIN 2, in the same way. For 3 cars, ground PINS 1 and 2, using both black jumpers. The game is shipped with no jumpers connected, so that 6 cars would be selected.

©Copyright 1979 Gremlin Ind., INC.

TABLE OF CONTENTS

INTRODUCTION

This is an electronic game that makes extensive use of digital integrated circuitry and television monitor circuitry. This manual assumes the maintenance technician possesses a general knowledge of solid state circuitry, microprocessor, TTL digital integrated circuitry and T.V. monitor concepts. Any individual NOT knowledgeable in these areas SHOULD NOT attempt repair of the electronic portion of this game. IT SHOULD BE NOTED THAT ANY ATTEMPT TO REPAIR THE GAME IN THE FIELD WITHOUT EXPRESS CONSENT OF THE FACTORY WILL IMMEDIATELY VOID THE WARRANTY!!!

IMPORTANT NOTES:

NEVER	replace any components with anything other than exact replacement parts. (See Parts List located on Service Schematics.
NEVER	remove circuit boards/connections while power is on.
DO NOT	replace the fuse with anything other than the proper value. A blown fuse indicates an overload condition within the game. Replacing the fuse with a higher value can cause severe damage to internal components if an overload occurs.
ALWAYS	consult the manual before attempting repairs.
CORRESPONDENCE	regarding this game should be addressed to:

GREMLIN INDUSTRIES, INC.

8401 Aero Drive

San Diego, California 92123

(714) 277-8700

IMPORTANT NOTE

An important service note is posted in this game and is repeated here for emphasis:

IF AT ANY TIME THE T. V. SCREEN SHOWS A MEANINGLESS DISPLAY

OR THE GAME OTHERWISE MALFUNCTIONS, SIMPLY DROP A COIN INTO

THE COIN MECHANISM. THIS SHOULD CORRECT THE PROBLEM. IF

NOT, THE GAME REQUIRES SERVICE.

The circuitry in this game has been arranged so that the insertion of a quarter through the coin mechanism will reset the system.
This clears up temporary problems caused by power line disturbances, static, etc.

SERVICE TECHNICIAN NOTE:

The system reset circuitry described above requires that the coin counter is attached to the system. If there is a coin counter problem and no replacement is available, the game will function properly if a 10K Ohm resistor is connected across the coin counter input pins to the video logic board.

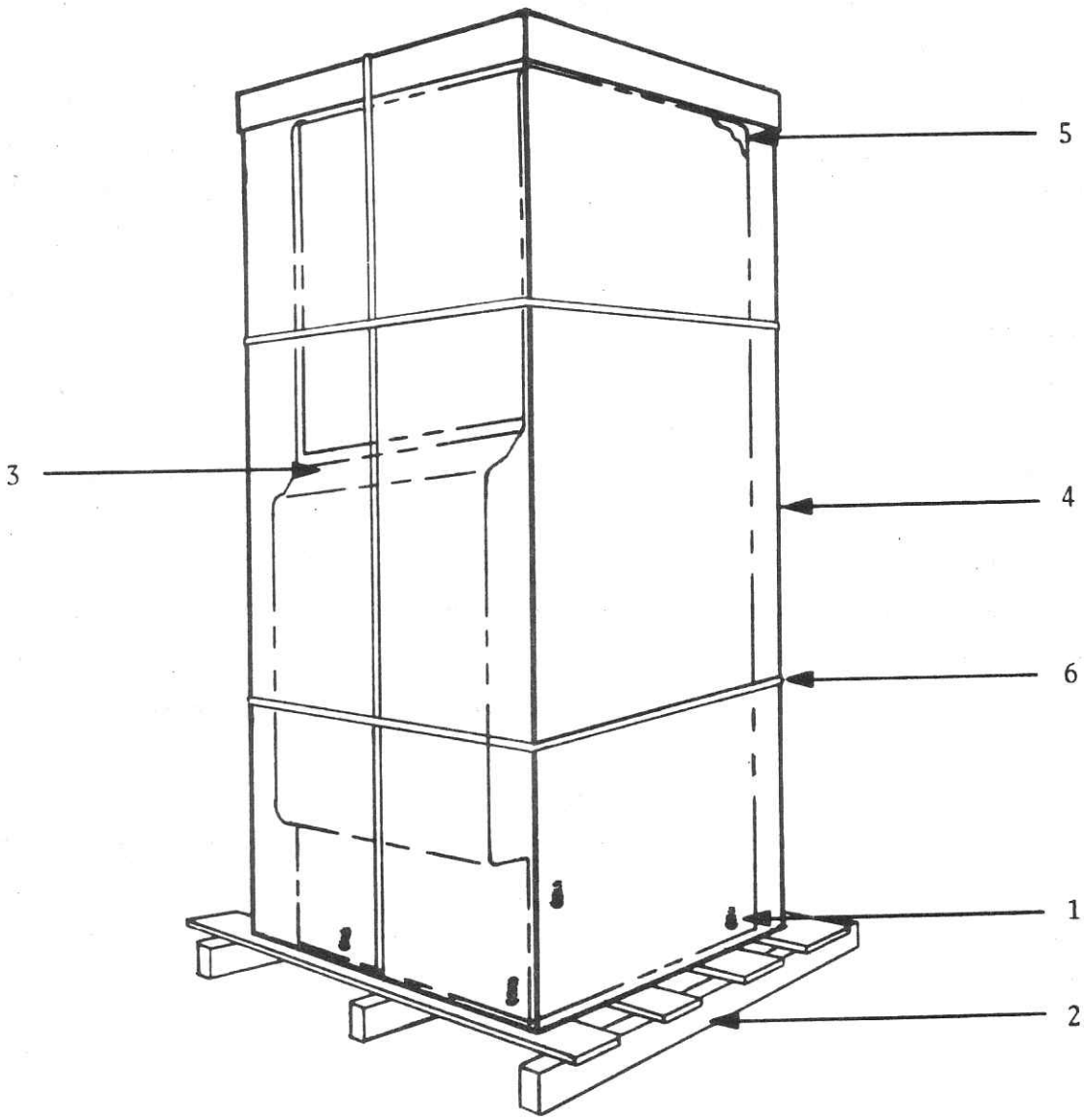
REPACKAGING INSTRUCTIONS

Should it be necessary to ship this game, follow the instructions below for game recrating:

A) If the original shipping bolts have been discarded (Ref.1), obtain four 5/16-18x1 3/4" hex head bolts with 5/16" flat washers. Carefully lay the game on its side and attach skid (Ref.2).

B) Place game upright. Tape game keys to upper flange of operator's panel (Ref.3). Crate the game using appropriate shock-absorbent packing material (Ref.4). Include padding on all four corners of the game (Ref.5). After crating is completed, secure package with strapping (Ref.6).

NOTE: If the game is to be shipped to GREMLIN for service or repair, attach a tag identifying the distributor and indicate the service or repair to be made; include the full serial number of the game. GAME MUST BE SHIPPED PREPAID.



GAME CONCEPT - HEAD ON

HEAD ON is a single-player video driving game. A player steers his car around the screen track, gaining as many points as possible in the time allotted. By maneuvering his car through the lanes, the player erases the markers in each lane for high score. But, the game has an additional element of challenge- the computer's car. It also moves around the track, in the opposite direction, and presents a test of skill by challenging the player to outsmart its moves and avoid a crash.

Both the player's car and the computer's car (it's the hollow one) start at the bottom of the screen. As the player moves his car around the track, he clears the lane markers and adds points to his score. He must judge which lane to stay in or move to, depending on where the computer's car is. With the control panel joystick and accelerator button, the player controls not only his car's speed, either fast or slow, but also the number of lane changes he can make. For example, the player sees he can avoid the other car by making a lane change. Depending on how fast he is moving, the player can maneuver his car to change one or two lanes. If the car is moving fast, the player can make only one lane change; at slow speed, two lane changes are possible. Play continues in this manner, with the player continually trying to predict where the computer car will go, so that the two cars won't crash. If they do, the game resets the cars to the starting line and the lane markers reappear. The player again tries to clear as many lane markers as possible before time runs out. While game time is 90 seconds, play continues after that time to allow the player a last chance to clear any remaining lane markers. If he does this, the game gives a bonus time of 30 seconds. If he crashes, the game ends. The bonus time is awarded any time the player clears all the lane markers without crashing.

Each lane is given a point value, as shown in the track infield. At game start, each lane is worth 5 points. This value increases by 5 points each time the player clears all the lane markers. Also, the three highest scores to date are displayed on the track infield.

GAME CONCEPT cont'd.

As mentioned above, the computer's car adds challenge to the game action. At first, the player may have no difficulty avoiding the computer's car; but, as the game progresses, and the player's score increases, predicting which way the computer car will go becomes harder. This feature allows for a variety of player skill levels.

HEAD ON is played with two controls- a joystick and push button. The joystick allows the player to make a lane change up, down, or left or right, depending on which part of the track his car is located. The push button controls the speed: Push down to move the car faster; release it to slow the car down.

HEAD ON has a complete set of sounds to highlight the action. Each car has its own engine sound; both the player's car and computer's car have different sounds for fast and slow speeds. Also, both cars produce a screech sound at each corner of the track, and when changing lanes. A sensational explosion occurs whenever the cars collide.

There are two options in HEAD ON: The number of coins per game (1,2,3,or 4) and, sound off during advertising. To select 2, 3, or 4 coins per game (the game is shipped in the 1 coin per game mode) a jumper is connected from ground (pin 10 on the player control connector on the logic board) to pin 3 for 2 coins per game, or to pin 4 for 3 coins. Both pins 2 and 3 are grounded for 4 coins per game. To turn off the advertising sound, simply turn the sound switch, located inside the coin door, to "OFF".

MAINTENANCE PROCEDURES- HEAD ON

I. POWER SUPPLY (refer to drawing #815-0020, sheet 4)

1. Remove output connectors from power supply.
2. Make these initial tests: (GND to BLACK lead on c18, 9000 mfd cpacitor)
   a) +9 V DC on POSITIVE terminal of C18
   b) +17-19 V on C6 (4700 mfd. cap.)
   c) -17-19 V on C5 (4700 mfd. cap.)
   d) -12 V at pin 11 (adjustable by trim pot R42)
   e) +12 V at pin 12 (adjustable by trim pot R8)
   f) +5 V at pins 18-20 (adjustable by trim pot R9)
   g) GND (ground, 0 V) at pins 14-16
   h) 2-3 V AC at pin 13 (Don't forget to change meter scale to AC)
3. Check these voltages again with the logic board connected. If any are wrong, a loading problem exists in the logic board, most likely. Possible causes of a short on the logic board could be: U73, C21, C25, or C26.

II. SOUND BOARD (refer to drawing #822-0002, sheet 6)

1. If no sounds are produced:
   a) check connections between logic board (labelled "Sound Out") and Sound board (pins 1 through 14) and between the Sound board and the Power Supply.
   b) If they are good, check IC U16 on the logic board, pins 2,5,6,9,12, 15,16,and 19 for outputs when each sound is produced.
   c) If the outputs are present, check the output of the sound board, pin 5. If the signals are present here (use an oscilloscope for best results) check the amplifier circuit on the power supply, specifically, U4, Q8, and Q9.

2. If some sounds are produced, but not all:
   a) repeat steps a and b, above.
   b) If these prove OK, check the specific circuit for each sound:

SOUND TYPE:	SOUND BOARD PIN #:	CHECK THESE PARTS:
Crash	Pin 1	Q2, U2, U1, U13
High Speed (computer car)	Pin 2	Q8, U9, U8, U7
Car on	Pin 3	Q9, Q6, U9, U12, Q10, U6, U5

High Speed (player car)	Pin 4	Q12, Q10, U12, U6, U5
Screech #1	Pin 6	Q14, U10, D7
Screech #2	Pin 7	Q13, U10, D6
Bonus	Pin 8	Q5, U4, U10, D8, C19

III. LOGIC BOARD (refer to drawing #822-0001, sheets 4,5, and 6)

1. Game does not reset at power on: (see sheet 5)
   a) check connector pin 3 on logic board for 3 V AC signal. Also, check Q10, Q11, U55, U54, and U71.
2. No video: (see sheet 5)
   a) check U48 (part #315-0042)for video signals. Also, check U41, Q6 and Q7 for the video signals.
3. Game does not coin: (see sheet 5)
   a) Check coin switch connections to the logic board; make sure the coin switch is wired correctly.
   b) Check U12, pins 3 and 11 for a pulse each time the coin switch is activated. Also, check U11 and U13.
   c) Check also for the 4 msec. pulses at pin 7 of U10. These pulses serve as timing for the video circuit. Check also pin 5 of U11; pin6, U13.
   d) If a game is started only occas ionally when a coin is deposited, the coin switch wire may need to be adjusted for a lighter, or heavier, tension.
   e) If the coin counter does not activate, check U12, pin 3 for a pulse each time the coin switch is activated; also, check Q1 and Q2. (see sheet 5)

4. No Ø1 clock pulses to the microprocessor:(see sheet 4)
   a) check for pulses at the crystal, Y1.
   b) check for pulses at pin 6 of U68; at pin 6 of U49; and at pin 4 of U54.

5. No player control: (see sheet 5)
   a) make sure the player control connections from the switches to the

logic board are intact. Ensure that each switch is connected.

b) If these are good, check for an output from U1 as you push each switch.

6. Random display on the screen:

a) If the screen shows what appears to be a meaningless display, and it cannot be cleared by activating the coin switch, several different parts of the circuit should be considered:

One or more RAM's, U56 through U63 (sheet 5)

One of the programmed IC's, or EPROM's (sheet 6)Check their sockets.

The reset circuit is not working.(see #1, above)

The microprocessor is bad. (sheet 4)

Data or address bus problem (e.g. U33 or U34, sheet 4, could be bad)

TRANSFORMER VOLTAGE CONVERSION INSTRUCTIONS:

To convert the game transformer to 100, 115, or 230 VAC, refer to the following chart:

For 100 Volts: Connect the voltage INPUT lines to terminals 1 and 2 on the transformer.

For 115 Volts: Connect the voltage INPUT lines to terminals 1 and 3.

For 230 Volts: Connect the voltage INPUT lines to terminals 1 and 4, with terminal 3 connected to the LAMP circuit.

Also, the TV monitor must be converted to the same voltage input as the game transformer. Refer to the monitor manual included in the game.

Gremlin Industries, Inc. San Diego, California 92123	PARTS LIST	TITLE TOP ASSY HEAD ON	722-0001 DWG NO	SH 1 OF 8	A REV
		DRAWN G. LLOYD	ENGR		
		CHECK Steve S. Fay	APPR		

LTR	DATE	REVISION DESCRIPTION	DRAFT	CHECK	APPR
A		RELEASED 3-2-79	G.LLOYD	S Fay	SF

Gremlin Industries, Inc. San Diego, California 92123	PARTS LIST	TITLE TOP ASSY. HEAD ON	722-0001 DWG NO	SH 2 OF 8	A REV

ITEM NO	PART NO	QTY PER ASSY	DESCRIPTION	REF DES
1	722-0001		TOP ASSY HEAD ON.	
2	130-0001	1	SPEAKER GAME	
3	130-0002	1	SPEAKER COVE	
4	140-0021	1	COVER J-BOX	
5	140-0033	1	CABINET HEAD-ON	
6	200-0002	1	MONITOR 19"	
7	220-0035	1	LOCK	
8	220-0066	2	COIN MECH.	
9	250-0032	1	BEZEL	
10	250-0034	1	SPRING RETAINER	
11	250-0038	1	MOULDING	
12	250-0048	1	CLIP SWITCH	
13	250-0285	1	FRNT. CASH DOOR MOD.	
14	253-0092	1	PANEL MON. SCR.	
15	253-0093	1	PANEL LOGO	
16	280-0004	25	CLIP WIRE	
17	280-0005	5	CABLE TIE	
18	280-0010	2	NUT WIRE	
19	390-0011	1	LAMP FLOR.	
20	390-0012	1	LAMP FIX.	
21	420-0028	1	DECAL S/N	
22	420-0030	1	DECAL CAUTION 115V	
23	420-0038	2	DECAL IMPORTANT NOTE	
24	420-0040	1	DECAL RECYCLE	

Gremlin Industries, Inc. San Diego, California 92123	PARTS LIST	TITLE TOP ASSY HEAD-ON	722-0001 DWG NO	SH 3 OF 8	A REV

ITEM NO	PART NO	QTY PER ASSY	DESCRIPTION	REF DES
25	420-0041	1	DECAL S/N SM.	
26	420-0060	1	DECAL TIP N TELL	
27	420-0071	1	INST CRATING	
28	420-0116	1	WRAP AROUND SIDE	
29	420-0117	1	TOP COVER	
30	420-0124	4	CORN. STRIP.	
31	420-0158	1	MANUAL WELLS GARDNER.	
32	420-0189	1	GRAPHIC SIDE LEFT	
33	420-0190	1	GRAPHIC SIDE RIGHT	
34	420-0191	1	GRAPHIC INTERIOR.	
35	420-0192	1	DECAL CARTON	
36	420-0193	1	MANUAL HEAD-ON	
37	250-0327	1	BRKT SUPPORT CRT.	
38	807-0009	1	J-BOX	
39	807-0010	1	SPKR HARNESS	
40	815-0020	1	PWR SUPPLY	
41	815-0028	1	COIN MECH HARNESS	
42	822-0001	1	VID LOGIC BD.	
43	822-0002	1	SOUND BD.	
44	822-0004	1	ASSY. CONTROL PNL.	
45	822-0005	1	HARNESS CONTROL PNL.	
46	822-0006	1	HARNESS PWR./SOUND	
47	822-0007	1	JUMPER HARNESS	
48	822-0008	1	MONITOR HARNESS	
49	822-0010	1	HARNESS COIN CTR.	

Gremlin Industries, Inc. San Diego, California 92123	PARTS LIST	TITLE TOP ASSY. HEAD-ON	722-0001 DWG NO	SH 4 OF 8	A REV

ITEM NO	PART NO	QTY PER ASSY	DESCRIPTION	REF DES
50		1	PALET HEAD-ON	
51	220-0008	1	COUNTER DIGITAL	
52				
53		4	SCR PHL PAN HD # 6 X 3/8 SHT MTL	
54		7	SCR, #6 SHT, RD. HD. CRS REC. 1/2 16	
55				
56		4	SCR, #8 X 1/2 SHT RD. HD PHL	
57		2	NUT HEX # 10-32	
58		4	MACH SCR, #8-32 X 1 1/2 SLOT HD	
59		14	BOLT, CARRIAGE 10-24 X 1 3/4	
60		6	MACH. SCR, #10-32 X 1.0 PHL PAN	
61		6	WASHER, LOCK, SPLIT #10	
62				
63				
64		4	WASHER, FLAT # 8	
65		12	WASHER, LOCK, SPLIT #8	
66		12	WASHER, FLAT # 10	
67		6	NUT, HEX # 10-24	
68		12	NUT, HEX # 8-32	
69		8	NUT, WING 10-24	
70		8	8-32 X 3/4 CRES TAMPER PROOF	

FORM NO. 001-1501

Gremlin Industries, Inc. San Diego, California 92123	PARTS LIST	TITLE CONTROL PANEL ASSY	822-0004 DWG NO	SH 1 OF 3	A REV
Sheet 3 'D' size		DRAWN G. LLOYD 12-7-78	ENGR		
		CHECK Steve Fay 12-22-78	APPR		

LTR	DATE	REVISION DESCRIPTION	DRAFT	CHECK	APPR
A	12-7-78	INITIAL RELEASE	G. LLOYD.	SF	SF

FORM NO. 001-1500

Gremlin Industries, Inc. San Diego, California 92123	PARTS LIST	TITLE CONTROL PANEL ASSY.	822-0004 DWG NO	SH 2 OF 3	A REV

ITEM NO	PART NO	QTY PER ASSY	DESCRIPTION	REF DES
1			CONTROL PANEL ASSY.	
2	250-0317	1	CONTROL PANEL / HEAD-ON	
3	240-0007	1	BUTTON PLUNGER BLK.	
4	510-0023	1	SW. ASSY WICO	
5	819-0031	1	SW. ASSY JOY STICK	
6	253-0094	1	GRAPHIC CONTROL PANEL	
7		4	CARG. BOLT 8-32 x 1/2 BLK OZIDE	
8		4	WASHER FLAT #8	
9		4	NUT STD. HEX. 8-32	
10	280-0117	1	TAB RIVET	
11	253-0031	2	SPACER WICO SW.	

FORM NO. 001-1501

GREMLIN IND INC SAN DIEGO CA. 92123	PARTS LIST	TITLE ASSY, POWER SUPPLY	815-0020 DWG NO	SH 1 OF 4	A REV
RELEASED		DRAWN LEE J. LIPTAK	ENGR		
DESIGN		CHECK Ken DeHart	APPR		

LTR	AUTH	REVISION DESCRIPTION	DRAFT	CHECK	APPR
A		RELEASED		2/1/78	E.H.D.
		SHT 3 IS "D" SIZE SHT 4 IS 'C' SIZE			

GREMLIN IND. INC. SAN DIEGO CA. 92123	PARTS LIST	TITLE ASSY, POWER SUPPLY	815-0020 DWG NO	SH 2 OF 3	A REV

ITEM NO	PART NO	QTY PER ASSY	DESCRIPTION	REF DES
1	140-0015	1	CHASSIS, POWER SUPPLY	
2	150-0022	1	CAP, E, 9000 MF 12V	
3	211-0005	9	CONN CRIMP LOCK	
4	211-0007	1	CONN, KEY, POLARIZING	
5	211-0017	4	CONN, QUICK, 1/4" FEM	
6	211-0019	2	CONN, SPADE LUG 1/4"	
7	212-0016	1	CONN FEM 10 PIN	
8	213-0006	1	SOCKET, TO-3	
9	280-0014	4	STAND-OFFS, CLIPS	
10	280-0056	1	CLAMP, CAP. VR4 1 1/2"	
11	481-0009	1	DIODE, MDA 3500	
12	482-0007	1	XISTOR, 2N3055	
13	560-0003	1	XFMR. MODEL 9-10345B	
14	815-0021	1	POWER SUPPLY ASSY (PCB)	
	815-0020		SCHEM. ASSY. PWR. SUPP.	(REFERANCE)
15		5	SCREW-MACH P.HD #6-32 X.5	
16		4	NUT HEX #6-32	
17		4	SCREW-MACH RD. HD #4-40 X.37	
18		4	NUT HEX #4-40	
19		4	RIVET, POP 3/16	
20		4	SCR, MACH, HEX, WAS, HD 1/4-20 X	5/8"
21		1	SCR, MACH, P.HD. #6-32 x 1.0"	

Gremlin Industries, Inc. San Diego, California 92123	PARTS LIST	TITLE PC ASSY - POWER SUPPLY	815-0021 DWG NO	SH 1 OF	B REV

ITEM NO	PART NO	QTY PER ASSY	DESCRIPTION	REF DES
1	170-0082	1	PCB - POWER SUPPLY	
2	150-0019	2	CAP E 4700 uF, 25V	C5, C6
3	151-0001	1	CAP. CER .05 uF, 50V	C11
4	151-0002	2	CAP. CER 100 PF, 50V	C17, C19
5	151-0008	1	CAP. CER .001 uF, 50V	C10
6	151-0011	3	CAP. CER .01 uF, 50V	C12, C14, C16
7	151-0012	1	CAP. CER. .1 uF, 50V	C3
8	153-0001	5	CAP. TANT 10 uF, 25V	C1, C2, C7, C13, C15
9				
10	212-0003	2	CONN M 10 PIN	
11	212-0004	2	CONN M 4 PIN	
12				
13	313-0001	1	IC LM723	U3
14	313-0004	3	IC LM741 EN	U1, U2, U4
15				
16	471-0101	1	RES 100 Ω, 1/2 W, 5%	R15
17	471-0102	10	RES 1K Ω, 1/2W, 5%	R5, 17, 20, 22-24, 35, 36, 38, 39
18	471-0103	4	RES 10K Ω, 1/2W, 5%	R1, R14, R21, R37
19	471-0104	1	RES 100K Ω, 1/2W, 5%	R33
20	471-0122	1	RES 1.2K Ω, 1/2W, 5%	R18
21	471-0152	2	RES 1.5K Ω, 1/2W, 5%	R13, R16
22	471-0272	5	RES 2.7K Ω, 1/2W, 5%	R7, R25, R26, R43, R46
23	471-0332	1	RES 3.3K Ω, 1/2W, 5%	R32
24	471-0471	2	RES 470 Ω, 1/2W, 5%	R34, 40
25	471-0473	2	RES 47K Ω, 1/2W, 5%	R44, R45

Granville Industries, Inc. San Diego, California 92123	PARTS LIST	TITLE PC ASSY- POWER SUPPLY	815-0021 DWG NO	SH 3 OF	B REV

ITEM NO	PART NO	QTY PER ASSY	DESCRIPTION	REF DES
26	471-0562	1	RES 5.6K Ω, 1/2W, 5%	R12
27	472-00R5	4	RES 0.5, 1W, 5%	R4, R29-R31
28	473-00R1	1	RES 0.1, 5W, 3%	R28
29				
30	475-0004	1	POT 1K TRIMMER	R9
31	475-0005	2	POT 2K TRIMMER	R8, R42
32				
33	481-0004	4	DIODE MR501	D1-D4
34	481-0006	2	DIODE 1N914	D7, D8
35	481-0008	1	DIODE ZENER 1N5231	D10
36				
37	482-0006	3	TRANSISTOR 2N4403	Q1, Q3, Q4
38	482-0013	1	TRANSISTOR TIP 110	Q6
39	482-0014	2	TRANSISTOR 2N4401	Q2, Q5
40	482-0015	1	TRANSISTOR TIP 115	Q7
41	482-0016	2	TRANSISTOR TIP 29	Q8, Q9
42				
43	471-0133	1	RES 13K OHMS 1/2W 5%	R41
44				
45	815-0020	REF	SCHEMATIC	
46				
47				
48				
49				
50				

Gremlin Industries, Inc. San Diego, California 92123	PARTS LIST	TITLE HEAD ON SOUND	822-0002 DWG NO	SH 1 OF 6	B REV
SHT 5 & 6 "D" SIZE		DRAWN Wynarra 11-9-78		ENGR	
		CHECK Steven L Fry 12-22-78		APPR	

LTR	DATE	REVISION DESCRIPTION	DRAFT	CHECK	APPR
A	1-8-79	RELEASED	WJB	SLF	SLF
B	1-25-79	ECN 273 ADDENDUM 273 2-12-79 SLF 2-12-79	KB	SLF	SLF

FORM NO 001-1502

Gremlin Industries, Inc. San Diego, California 92123	PARTS LIST	TITLE HEAD ON SOUND	822-0002 DWG NO	SH 2 OF 6	B REV

ITEM NO	PART NO	QTY PER ASSY	DESCRIPTION	REF DES
1				
2	151-0011	6	CAP CER .01 µf 50V	C8,13,17,32,21,22
3	151-0012	4	CAP CER .1 µf 50V	C5,C12,C26,C27
4	152-0001	3	CAP FILM .1 µf 100V	C31,C20,C25
5				
6	152-0012	3	CAP FILM .047 µf 200V	C2, C23, C24
7	152-0018	3	CAP FILM .01 µf 250V	C3,C6,C19
8	152-0020	3	CAP FILM .47 µf 100V	C1, C18, C16
9	153-0001	7	CAP TANT 10 µf 25V	C10,C11,C28-C30,C33,C34
10	153-0002	2	CAP TANT 1 µf 25V	C4,C9
11	153-0003	2	CAP TANT 2.2 µf 25V	C14, 15
12	153-0004	1	CAP TANT 4.7 µf 25V	C7
13	170-0154	1	PCB HEAD ON SOUND	
14	212-0031	1	CONN M 12 PIN	P1
15	313-0004	1	IC LM741 EN DIP	U3
16	313-0008	1	IC LM348 DIP	U1
17	314-0001	5	IC NE555 DIP	U2,U4,U9,U12,U14
18	315-0005	4	IC 4013	U5-U8
19	315-0009	1	IC 4081	U11
20	315-0035	1	IC MM5837	U13
21	315-0043	1	IC 4069	U10

Gremlin Industries, Inc. San Diego, California 92123	PARTS LIST	TITLE HEAD ON SOUND	822-0002 DWG NO	SH 3 OF 6	B REV

ITEM NO	PART NO	QTY PER ASSY	DESCRIPTION	REF DES
22	471-0101	2	RES 100 OHM 1/2W 5%	R23, R32
23	471-0102	10	RES 1K OHM 1/2W 5%	R4, R5, R8, R14, R22, R35,
				R45, R55, R72, R48
24	471-0103	16	RES 10K OHM 1/2W 5%	R10, R12, R13, R25,
				R43, R46, R50, R56-R60,
				R64, R67, R68, R75
25	471-0104	17	RES 100K OHM 1/2W 5%	R15-R21, R24, R34, R38
				R41, R42, R62, R65, R69,
				R71, R76
26	471-0105	3	RES 1 MEG OHM 1/2W 5%	R3, R70, R77
27	471-0124	4	RES 120K OHM 1/2W 5%	R47, R51, R63, R66
28	471-0153	2	RES 15K OHM 1/2W 5%	R1, R2
29	471-0154	1	RES 150K OHM 1/2W 5%	R39
30	471-0220	1	RES 22 OHM 1/2W 5%	R49
31	471-0224	1	RES 220K OHM 1/2W 5%	R40
32	471-0394	8	RES 390K OHM 1/2W 5%	R26-R31, R44, R73
33	471-0472	3	RES 4.7K OHM 1/2W 5%	R36, R52, R74
34	471-0473	1	RES 47K OHM 1/2W 5%	R33
35	471-0474	2	RES 470K OHM 1/2W 5%	R9, R11
36	471-0682	2	RES 6.8K OHM 1/2W 5%	R53, R54
37	475-0006	2	POT 100K	R6, R7
38	481-0006	8	DIODE IN914/IN4148	D1-D8

Gremlin Industries, Inc. San Diego, California 92123	PARTS LIST	TITLE HEAD ON SOUND	822-0002 DWG NO	SH 4 OF 6	B REV

ITEM NO	PART NO	QTY PER ASSY	DESCRIPTION	REF DES
39	482-0006	2	XSTR 2N4403	Q6, Q10
40	482-0014	9	XSTR 2N4401	Q2, Q5, Q7-Q9, Q11-Q14
41	482-0023	2	XSTR 2N4093	Q3, Q4
42	471-0223	1	RES 22K OHM 1/2W 5%	R37
43				

FORM NO. 001-1501

Cromlin Industries, Inc. San Diego, California 92123	PARTS LIST	TITLE ASSEMBLY C.V. LOGIC BD.	822-0001 DWG NO	SH 1 OF 6	A REV
SHT 3 "E" SIZE SHT 4,5,6 "D" SIZE		DRAWN Wynema 11-20-78	ENGR		
		CHECK Steven S. Fay 12-22-78	APPR		

LTR	DATE	REVISION DESCRIPTION	DRAFT	CHECK	APPR

FORM NO. 001-1500

Gremlin Industries, Inc. San Diego, California 92123	PARTS LIST	TITLE ASSEMBLY C.V. LOGIC BD.	822-0001 DWG NO	SH 2 OF 6	A REV

ITEM NO	PART NO	QTY PER ASSY	DESCRIPTION	REF DES
1	315-0019	6	IC EPROM 2708	U22-U27
2	800-0031	1	ASSY BASIC V.I.C. BOARD	

FORM NO. 001-1501

Cronin Industries, Inc. San Diego, California 92123	PARTS LIST	TITLE ASSY BASIC V.I.C. BD.	800-0031 DWG NO	SH 1 OF 5	A REV
SHT 5 "E" SIZE		DRAWN Wynema 11-20-78	ENGR		
		CHECK Steve L. Fay 12-22-78	APPR		

LTR	DATE	REVISION DESCRIPTION	DRAFT	CHECK	APPR
A	12-22-79	RELEASED	WJB	SLF.	SLF.

FORM NO. 001-1502

Gremlin Industries, Inc. San Diego, California 92123	PARTS LIST	TITLE ASSY BASIC V.I.C.BD.	800-0031 DWG NO	SH 2 OF 5	A REV

ITEM NO	PART NO	QTY PER ASSY	DESCRIPTION	REF DES
1	151-0005	1	CAP CER 680pf 50V	C39
2	151-0012	54	CAP CER .1 µf 50V	C3,5,7-11,13-17,22,25,
				C27-38, C40-67
3	152-0001	1	CAP FILM .1 µf 100V	C4
4	152-0017	1	CAP FILM .33µf 100V	C24
5	153-0001	6	CAP TANT 10 µf 25V	C12,20,21,23,26,68
6	153-0002	1	CAP TANT 1µf 25V	C19
7	170-0150	1	PCB C.V. LOGIC	
8	211-0004	6	CONN PIN TEST PT	TP1-TP4, GND
9	212-0004	2	CONN M 4 PIN	
10	212-0021	3	CONN M 10 PIN	
11	212-0031	1	CONN M 12 PIN	
12	213-0001	6	SKT 24 PIN DUAL INLN	XU22-XU27
13	213-0004	12	SKT 16 PIN DUAL INLN	XU33, XU34, XU56-XU63,
				XU65, XU66
14	213-0005	2	SKT 40 PIN DUAL INLN	XU48, XU53
15	213-0008	3	SKT 20 PIN DUAL INLN	XU1, XU16, XU19
16	230-0009	1	XTAL CLK 15.46848	Y1
17	313-0023	1	IC 320T-5.0	U73
18	314-0001	2	IC NE 555	U10, U55

FORM NO. 001-1501

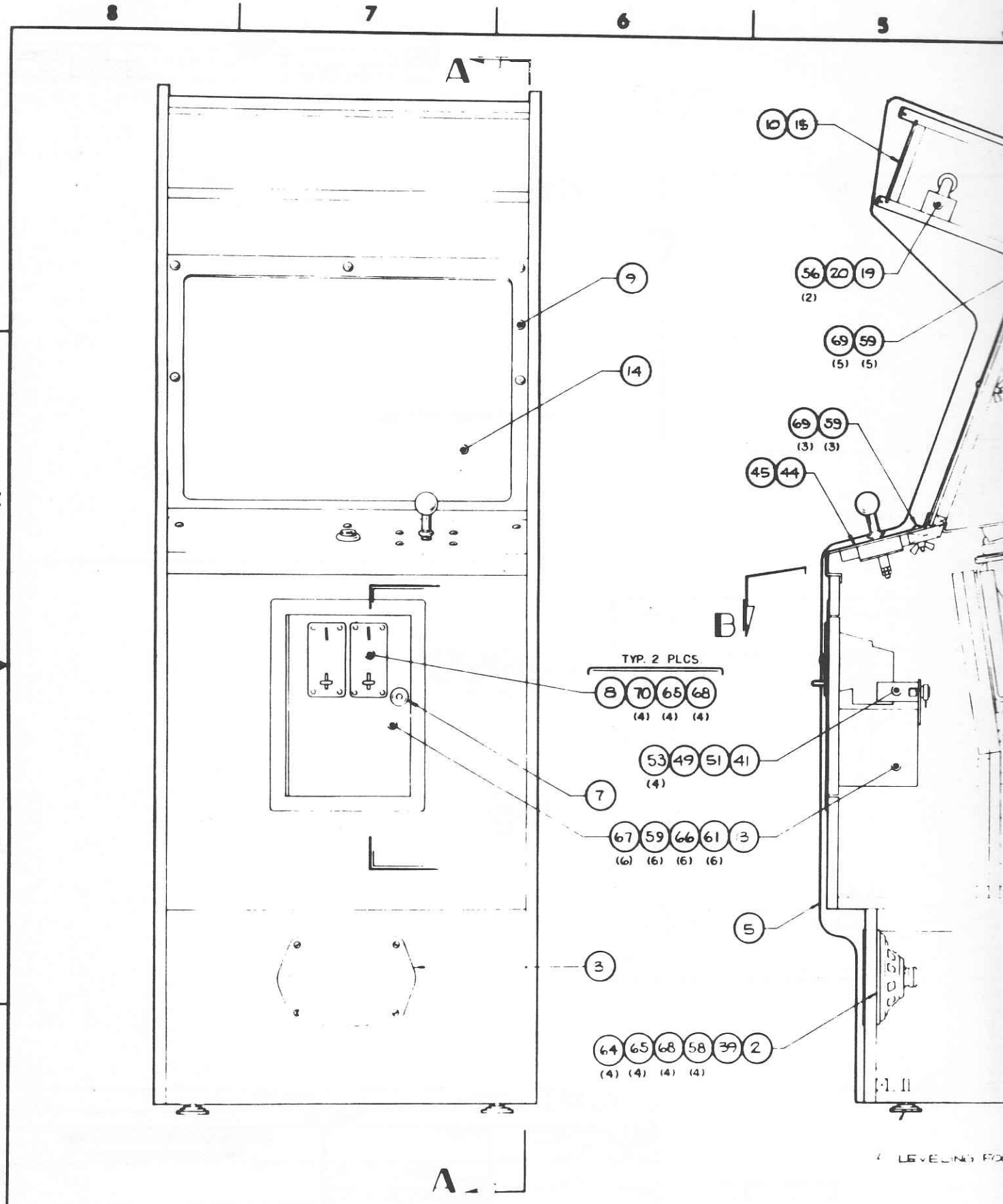
Gremlin Industries, Inc. San Diego, California 92123	PARTS LIST	TITLE ASSY BASIC V.I.C.BD.	800-0031 DWG NO	SH 3 OF 5	A REV

ITEM NO	PART NO	QTY PER ASSY	DESCRIPTION	REF DES
19	314-0015	1	IC 7404	U54
20	314-0018	3	IC 74LS00	U4, U12, U32
21	314-0019	2	IC 74LS04	U35, U64
22	314-0040	3	IC 74LS125	U13, U46, U47
23	314-0046	1	IC 74S04	U68
24	314-0053	4	IC 74 S175	U49-U51, U67
25	314-0055	2	IC 74LS244	U1, U19
26	314-0058	5	IC 74LS08	U37-U39, U41, U71
27	314-0059	1	IC 74LS10	U52
28	314-0061	1	IC 74LS42	U40
29	314-0062	2	IC 74LS74	U11, U72
30	314-0078	1	IC 74LS02	U36
31	314-0092	2	IC 8216	U33, U34
32	315-0039	8	IC 4K RAM 12V	U56-U63
33	315-0031	1	IC Z80 MK 3880	U53
34	315-0042	1	IC VID INTERFACE	U48
35	314-0093	1	IC 74LS 374	U16
36	316-0042	1	IC PROM 32X8 SEQ	U66
37	316-0043	1	IC PROM 32X8 CTL	U65
38	390-0003	1	LED RED	D4
39	471-0011	1	RES 10 OHM 1/2W 5%	R50
40	471-0102	7	RES 1K OHM 1/2W 5%	R7-R11, R32, R37
41	471-0103	1	RES 10K OHM 1/2W 5%	R6

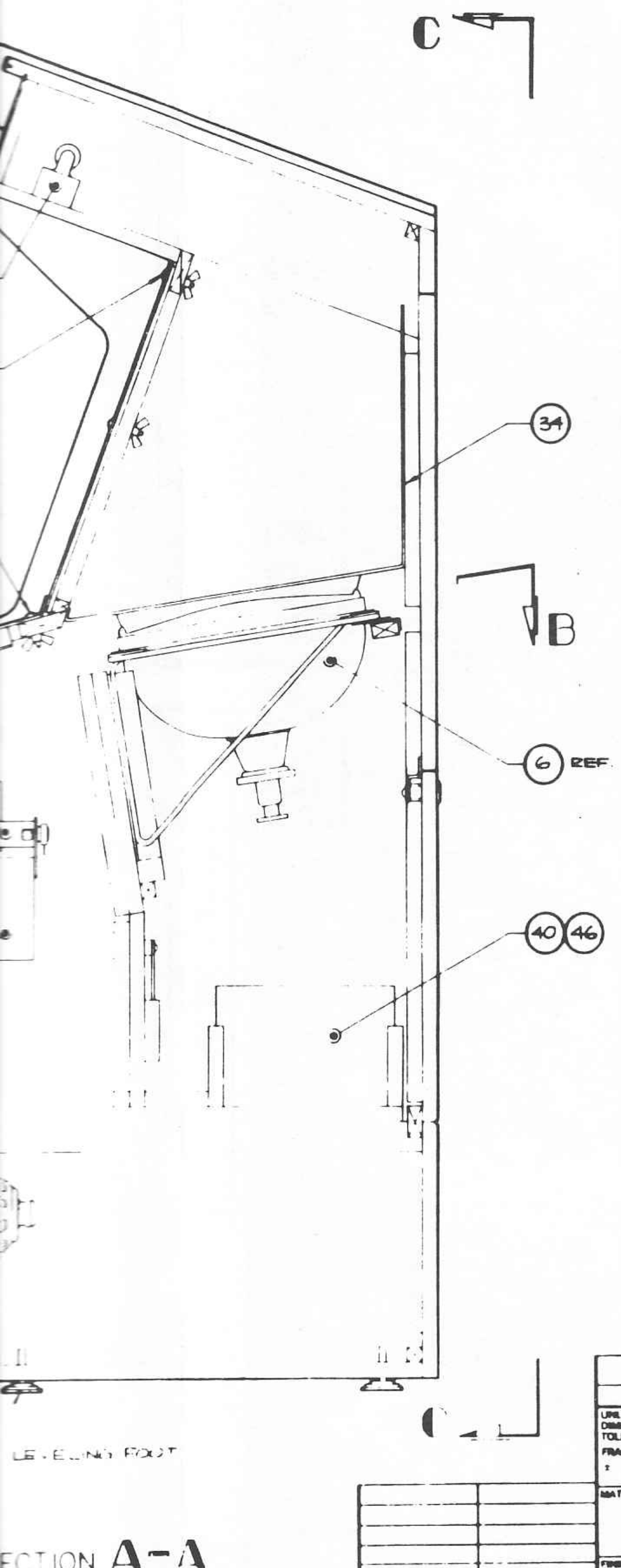
Gremlin Industries, Inc. San Diego, California 92123	PARTS LIST	TITLE ASSY BASIC V.I.C.BD.	800-0031 DWG NO	SH 4 OF 5	A REV

ITEM NO	PART NO	QTY PER ASSY	DESCRIPTION	REF DES
42	471-0104	3	RES 100K OHM 1/2W 5%	R42 – R44
43	471-0222	6	RES 2.2K OHM 1/2W 5%	R20 – R25
44	471-0223	1	RES 22K OHM 1/2W 5%	R3
45	471-0331	6	RES 330 OHM 1/2W 5%	R30, R31, R33, R34, R45,
				R46
46	471-0471	1	RES 470 OHM 1/2W 5%	R49
47	471-0472	3	RES 4.7K OHM 1/2W 5%	R5, R47, R48
48	471-0750	1	RES 75 OHM 1/2W 5%	R41
49	475-0001	1	POT 10K PC MTV	R4
50	477-0002	2	RES PACK 15 X 2.2K	RP1, RP3
51	481-0006	3	DIODE IN914/IN4148	D1, D2, D5
52	482-0006	1	XSTR 2N4403	Q6
53	482-0010	1	XSTR PE8050	Q2
54	482-0014	4	XSTR 2N4401	Q1, Q7, Q10, Q11
55	530-0006	1	HEATSINK 295-1	

FORM NO. 001-1501


8
7
6
5
D
C
B
A
A
B
A
9
14
10
15
56
20
19
(2)
69
59
(5)
(5)
69
59
(3)
(3)
45
44
TYP. 2 PLCS
8
70
65
68
(4)
(4)
(4)
53
49
51
41
(4)
7
67
59
66
61
3
(6)
(6)
(6)
(6)
5
3
64
65
68
58
39
2
(4)
(4)
(4)
(4)

SECTION A



REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	RELEASED SM	1.79	

	QTY REQD	CODE IDENT	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION		

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE
FRACTIONS ± DECIMALS XX ± XXX ± ANGLES ±

MATERIAL

FINISH

DO NOT SCALE DRAWING

NEXT ASSY	USED ON

APPLICATION

CONTRACT NO

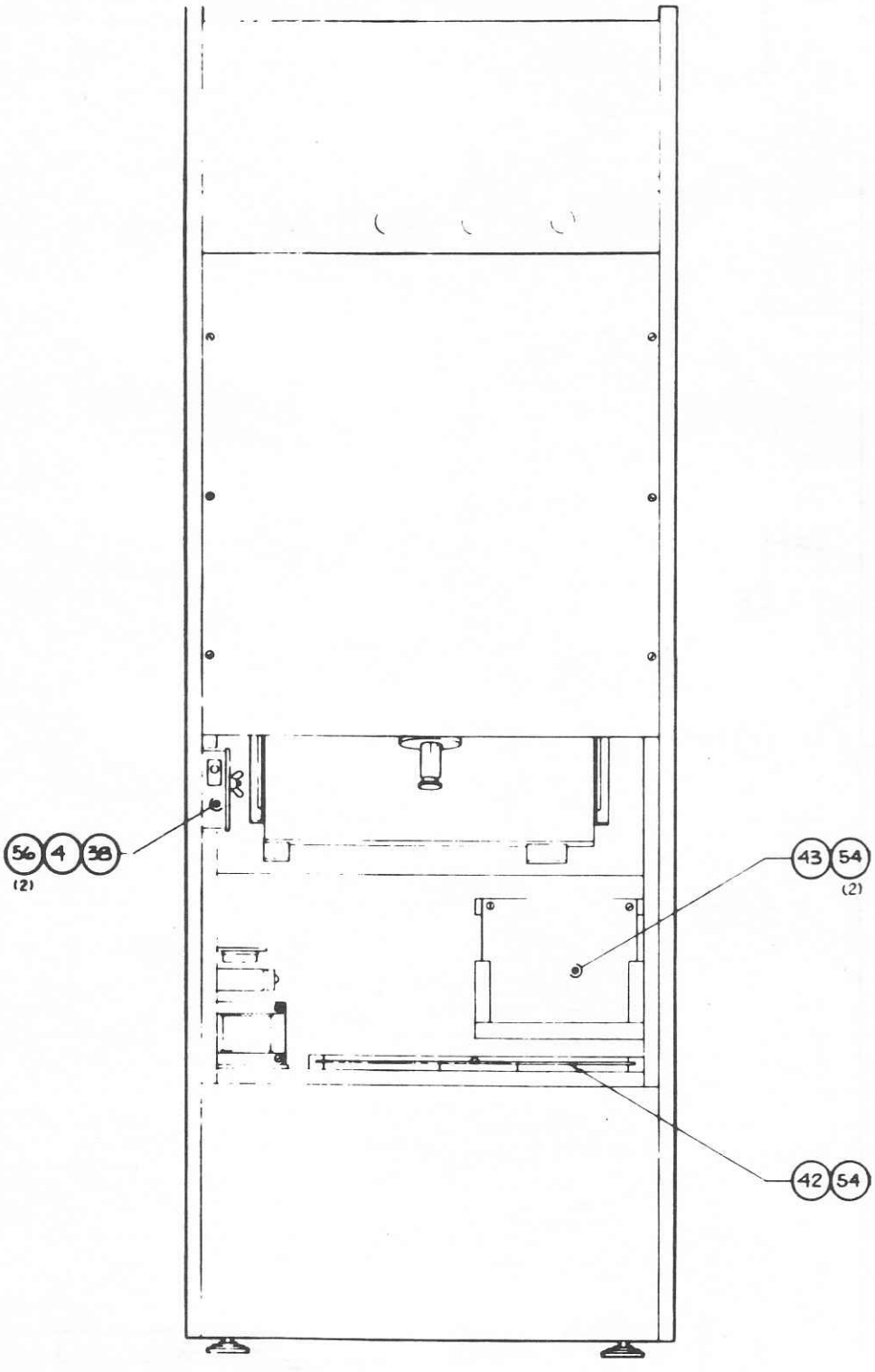
APPROVALS	DATE
DRAWN G LLOYD	24 79
CHECKED	79

Gremlin Industries, Inc.
San Diego, California

TOP ASSEMBLY HEAD-ON

SIZE	CODE IDENT NO	DRAWING NO	REV
D		722-0001	

SCALE 4

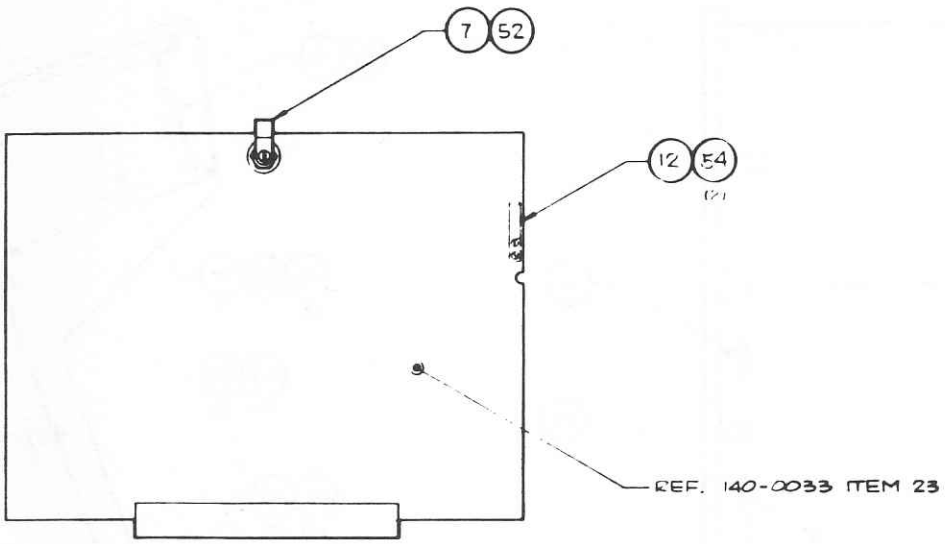


VIEW C-C

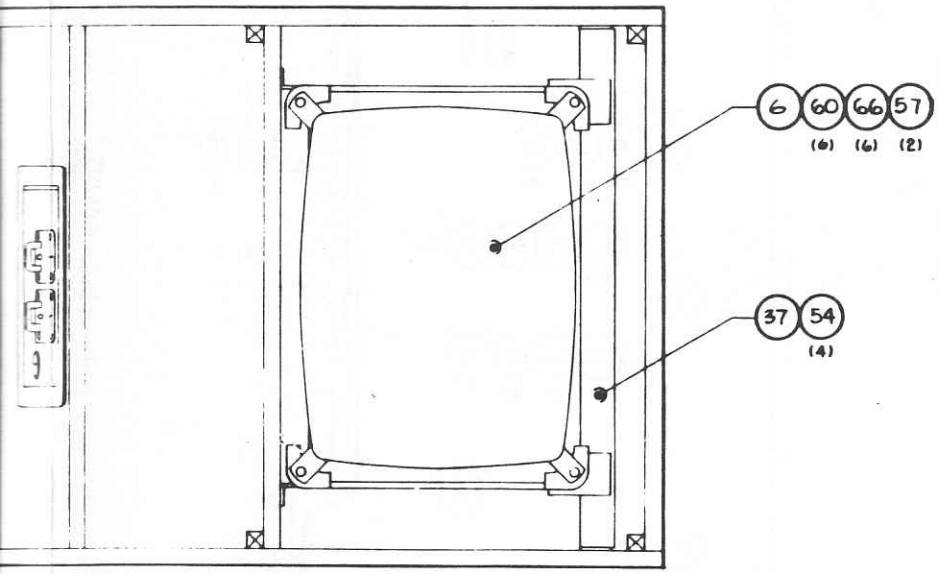
REA

SECTION

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	RELEASED S M	3-2-79	



REAR DOOR



SECTION B - B

QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
			PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS ± DECIMALS .XX ± .XXX ± ANGLES ±

MATERIAL

FINISH

DO NOT SCALE DRAWING

CONTRACT NO.

APPROVALS	DATE
DRAWN G. LLOYD	1-26-79
CHECKED	3-2-79

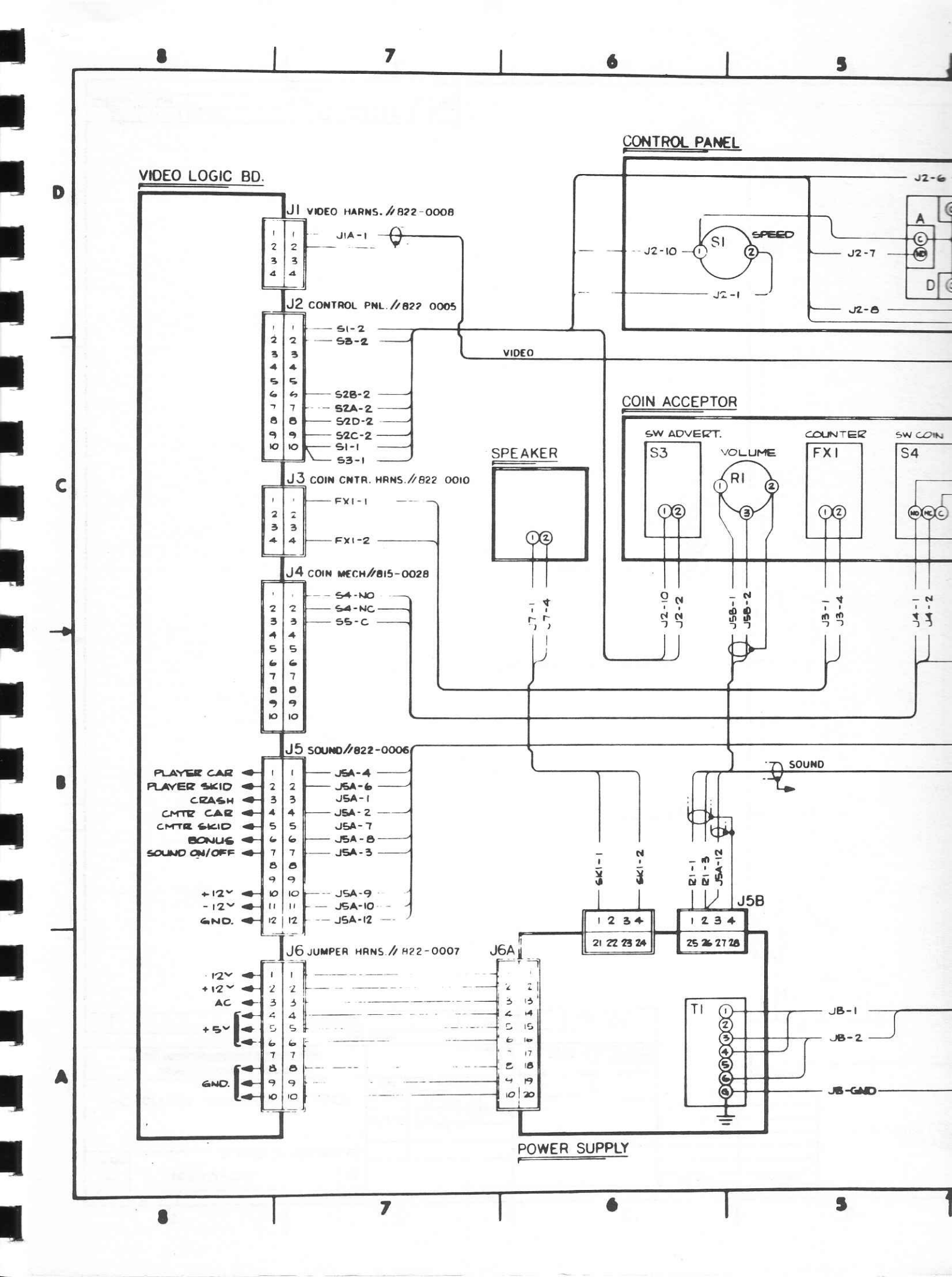
NEXT ASSY | USED ON
APPLICATION

Gremlin Industries, Inc.
San Diego, California 92123

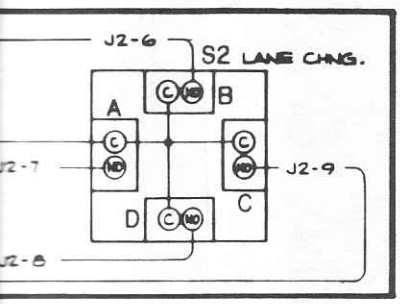
TOP ASSEMBLY HEAD-ON

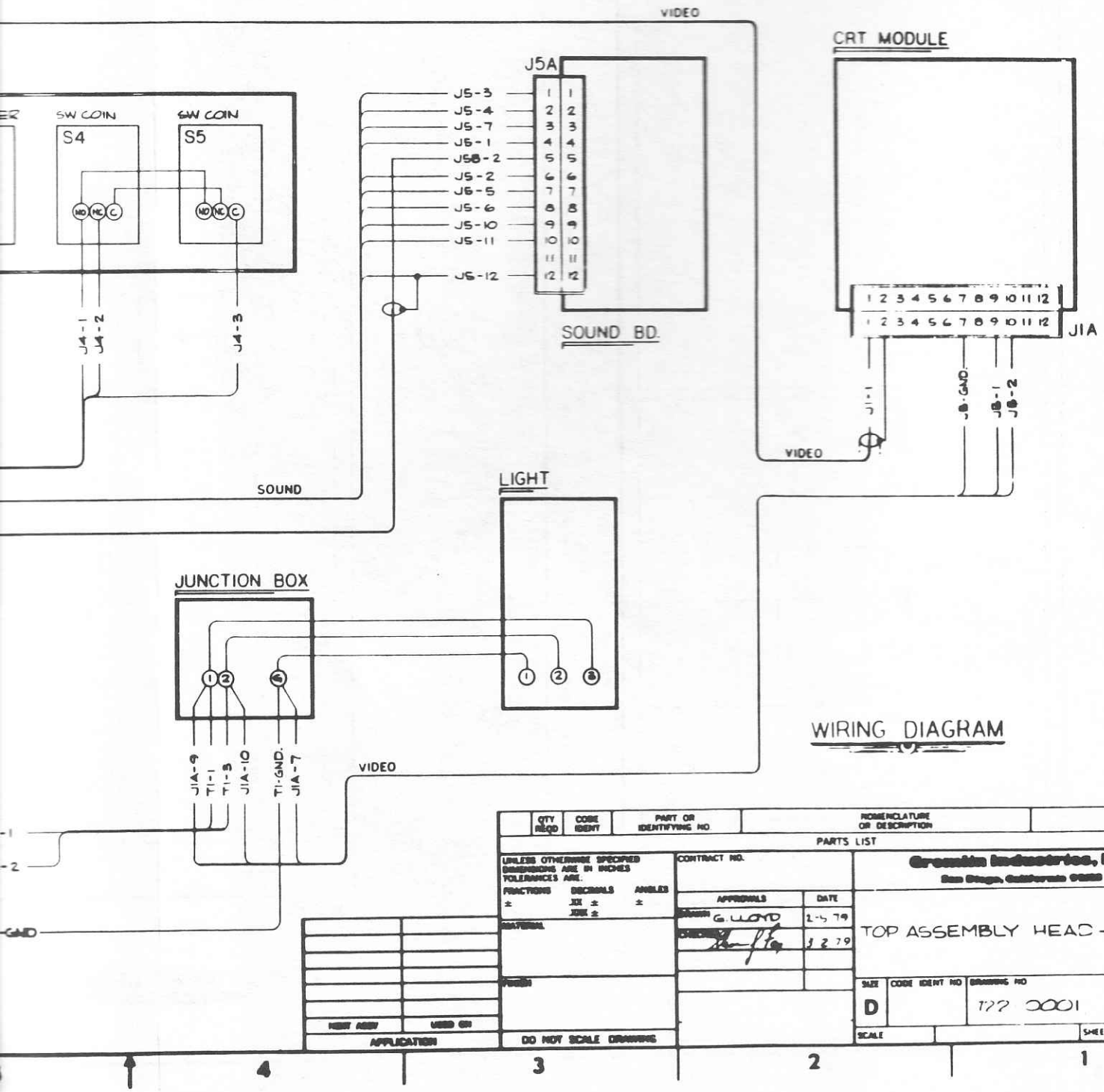
SIZE	CODE IDENT NO.	DRAWING NO.	REV.
D		722-0001	A

SCALE 1/4 SHEET 6 OF 8


VIDEO LOGIC BD.
CONTROL PANEL
J1 VIDEO HARNS. // 822-0008
J1A-1
J2 CONTROL PNL. // 822 0005
S1-2
S2B-2
S2A-2
S2D-2
S2C-2
S1-1
S3-1
VIDEO
J2-6
J2-10
S1
SPEED
J2-7
J2-1
J2-8
A
D
COIN ACCEPTOR
SW ADVERT.
S3
VOLUME
R1
COUNTER
FX1
SW COIN
S4
SPEAKER
J3 COIN CNTR. HRNS. // 822 0010
FX1-1
FX1-2
J4 COIN MECH // 815-0028
S4-NO
S4-NC
S5-C
J7-1
J7-4
J2-10
J2-2
J5B-1
J5B-2
J3-1
J3-4
J4-1
J4-2
J5 SOUND // 822-0006
PLAYER CAR
PLAYER SKID
CRASH
CMTR CAR
CMTR SKID
BONUS
SOUND ON/OFF
+12V
-12V
GND.
J5A-4
J5A-6
J5A-1
J5A-2
J5A-7
J5A-8
J5A-3
J5A-9
J5A-10
J5A-12
SOUND
SK1-1
SK1-2
R1-1
R1-3
J5A-12
J5B
1 2 3 4
21 22 23 24
25 26 27 28
J6 JUMPER HRNS. // 822-0007
J6A
12V
+12V
AC
+5V
GND.
T1
J8-1
J8-2
J8-GND
POWER SUPPLY

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	RELEASED S.M.	3-2-79	





QTY REQD	CODE IDENT	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION
			PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:
FRACTIONS ± DECIMALS .XX ± .XXX ± ANGLES ±

CONTRACT NO.

APPROVALS	DATE
DRAWN G. LLOYD	2-5-79
CHECKED	3 2 79

MATERIAL

FINISH

NEXT ASSY | USED ON

APPLICATION

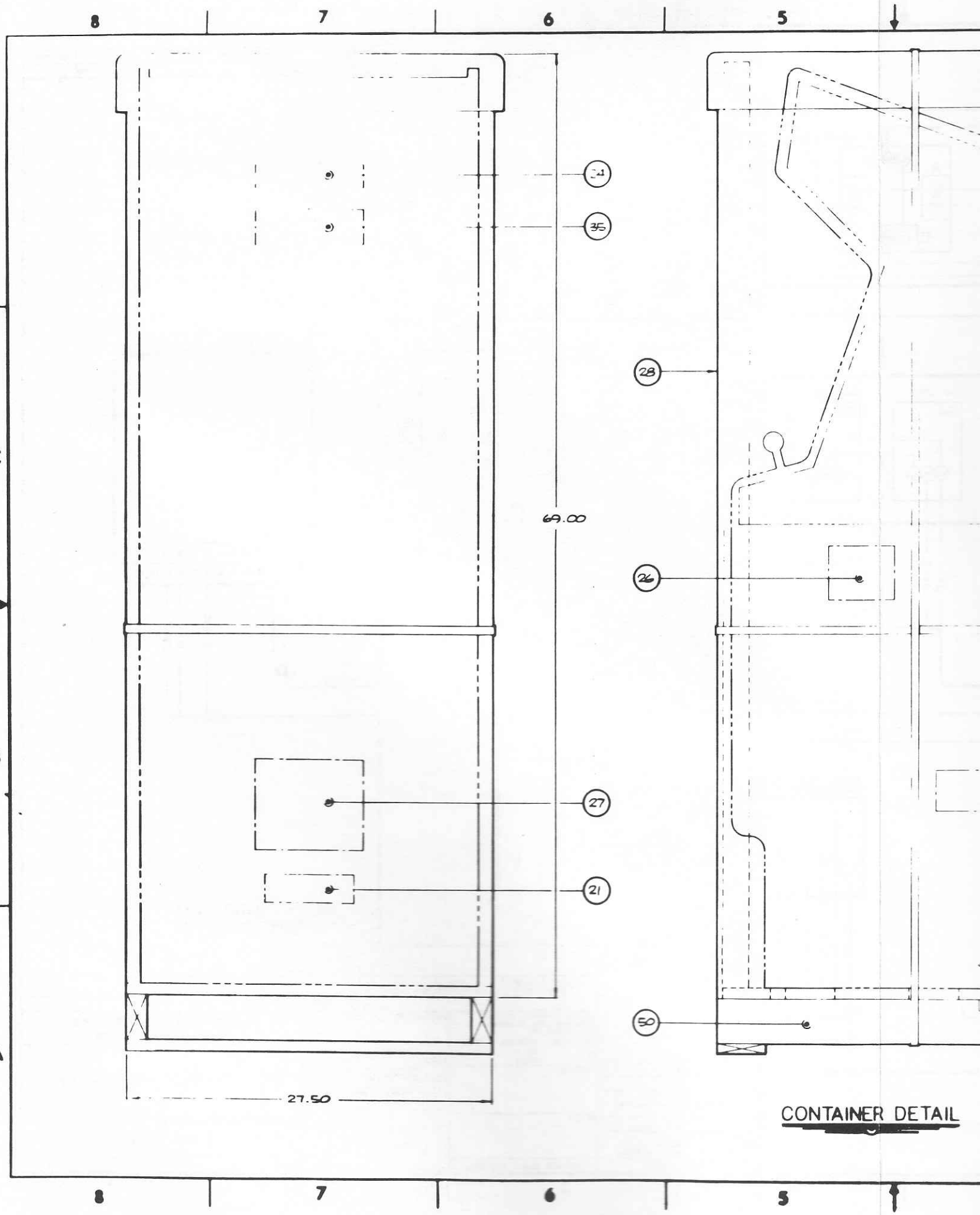
DO NOT SCALE DRAWING

Gremlin Industries, Inc.
San Diego, California 92123

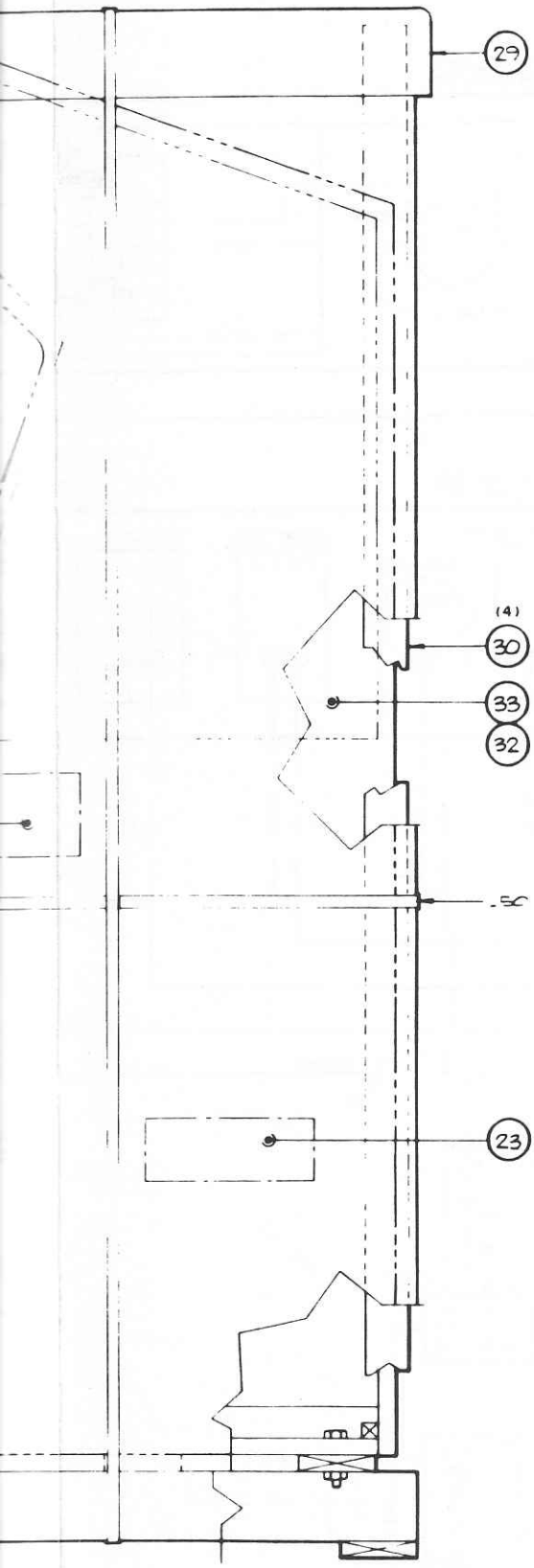
TOP ASSEMBLY HEAD-ON

SIZE	CODE IDENT NO	DRAWING NO	REV
D		122 0001	A

SCALE | SHEET 1 OF 8


8
7
6
5
21
35
28
69.00
26
27
21
50
27.50
CONTAINER DETAIL

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	RELEASED S.M.	3-2-79	



AINER DETAIL

QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
			PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS ± DECIMALS .XX ± .XXX ± ANGLES ±

MATERIAL

FINISH

DO NOT SCALE DRAWING

CONTRACT NO.

APPROVALS	DATE
DRAWN G. LLOYD	1-24-79
CHECKED	3-2-79

Gremlin Industries, Inc.
San Diego, California 92123

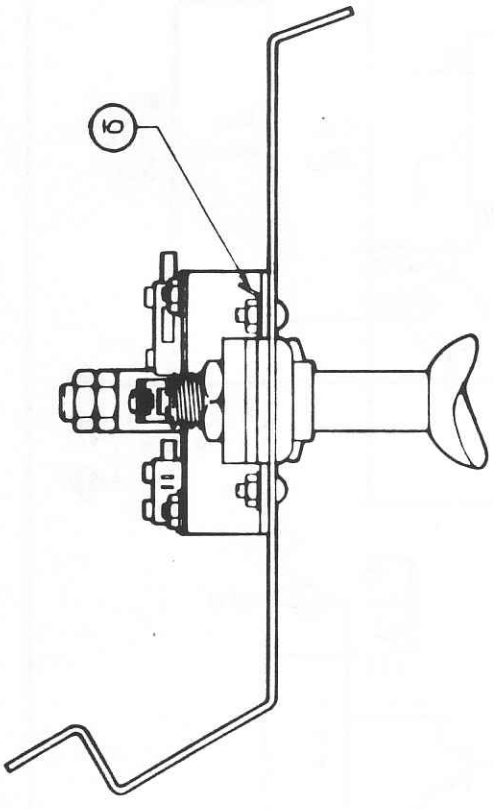
TOP ASSEMBLY HEAD-ON

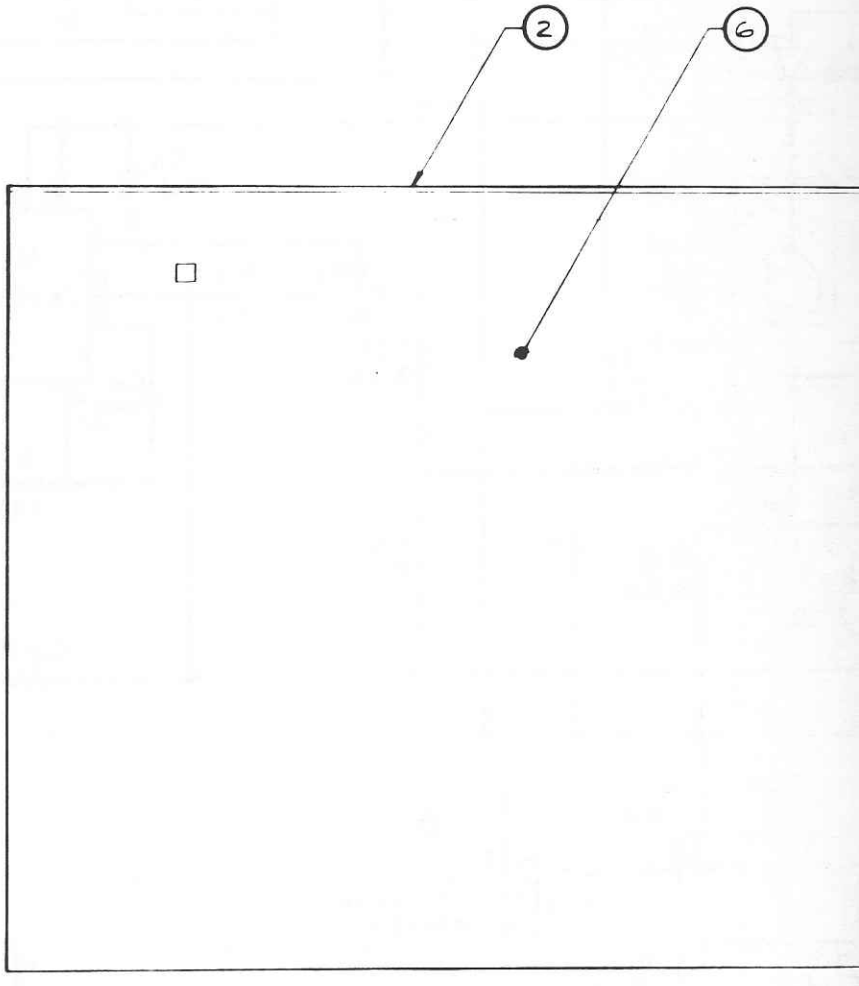
SIZE	CODE IDENT NO.	DRAWING NO.	REV.
D		722-0001	A

SCALE 1/4 SHEET 1 OF 1

NEXT ASSY	USED ON
APPLICATION	

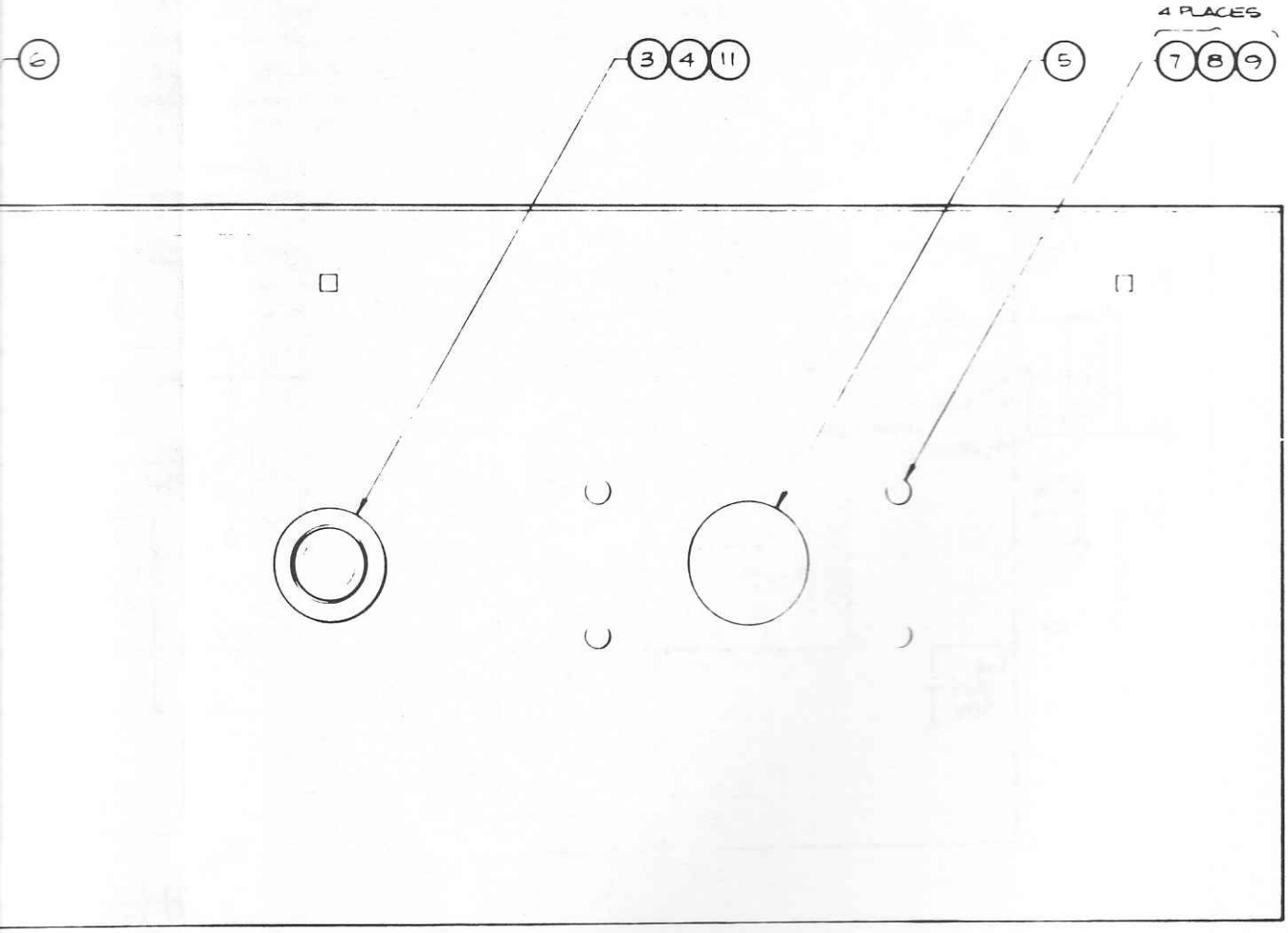
722-0001





ASSY (ITEM 1)

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED



QTY REQD	CODE IDENT	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION
			PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE
FRACTIONS ± DECIMALS .XX ± .XXX ± ANGLES ±

MATERIAL: SEE PARTS LIST.

FINISH:

DO NOT SCALE DRAWING

CONTRACT NO.

APPROVALS	DATE
DRAWN G. LLOYD	12 7 78
CHECKED	12 22 78

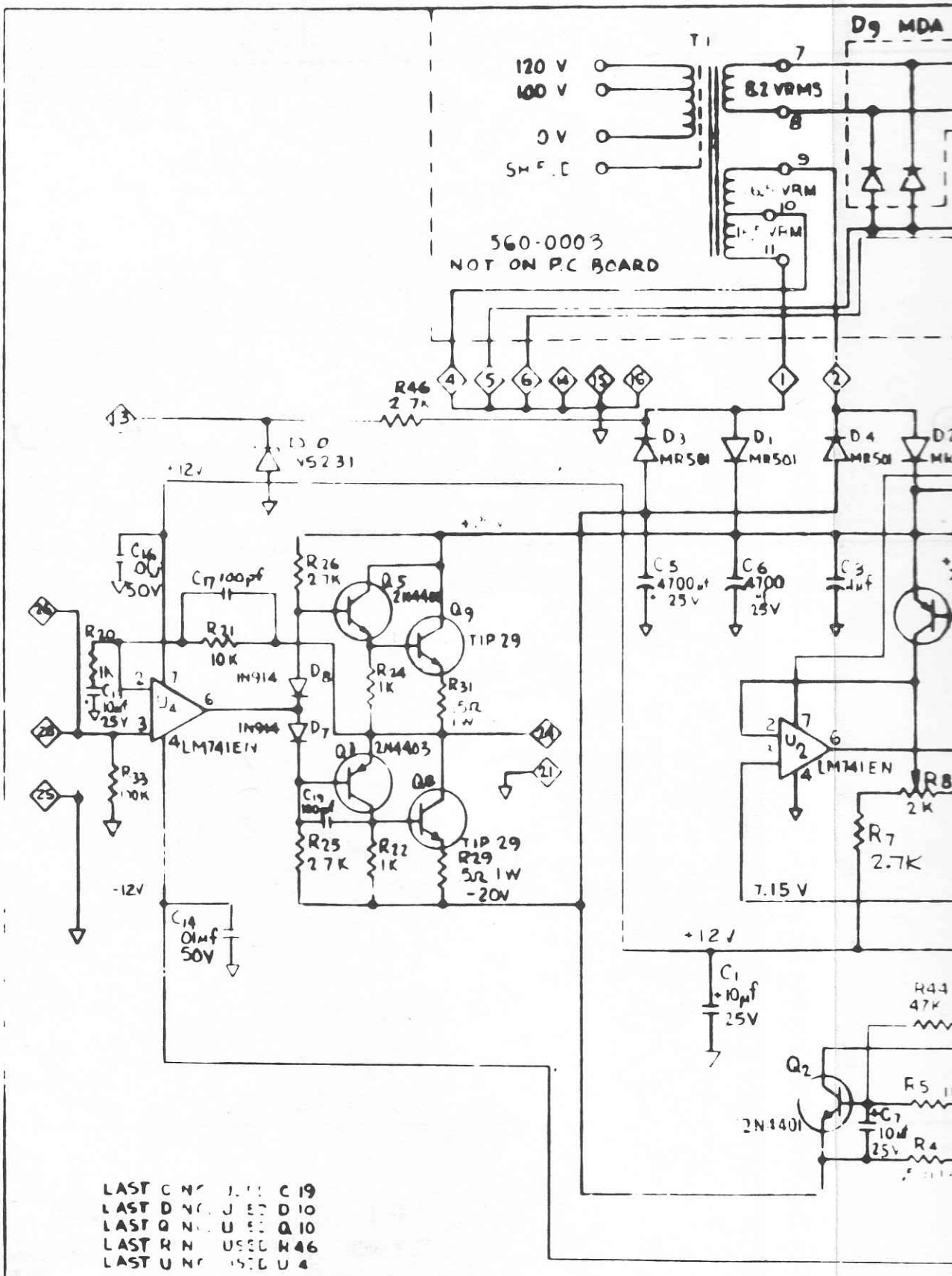
Gremlin Industries, Inc.
San Diego, California 92123

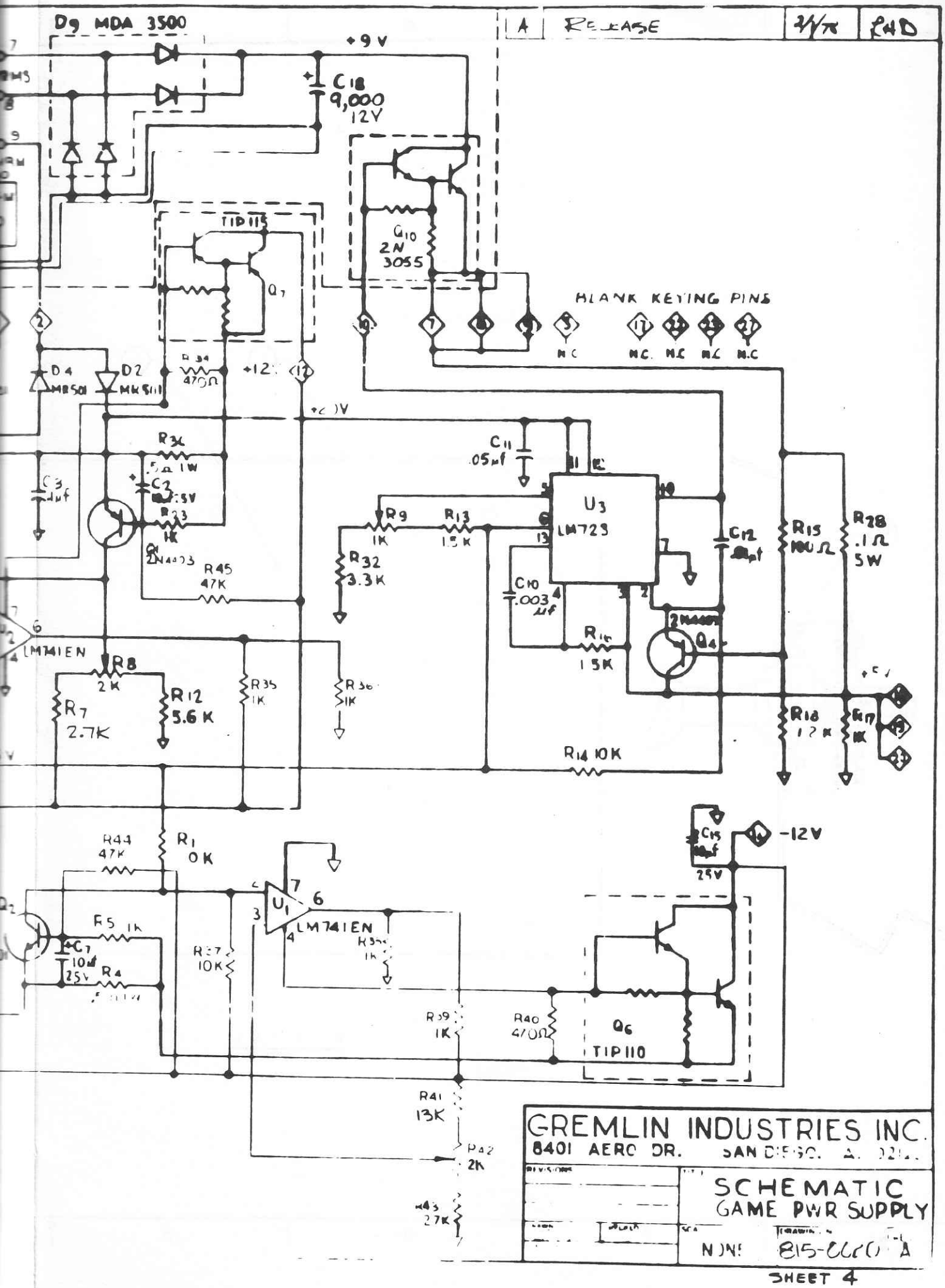
CONTROL PANEL ASSY.

SIZE	CODE IDENT NO	DRAWING NO	
D		422-0004	A

SCALE 1 SHEET 3 OF 3

NEXT ASSY	USED ON
APPLICATION	


D9 MDA
T1
120 V
100 V
0 V
82 VRMS
560-0003
NOT ON P.C BOARD
R46
2.7K
D3
MR501
D1
MR501
D4
MR501
+12V
C5
4700μf
25V
C6
4700
25V
C3
1μf
C17 100pf
R26
2.7K
Q5
2N4403
Q9
TIP 29
R20
1K
R21
10K
IN914
D8
R24
1K
R31
5Ω
1W
U4
LM741EN
D7
Q1
2N4403
Q8
C19
100
R25
2.7K
R22
1K
TIP 29
R29
5Ω 1W
-20V
R33
10K
-12V
C14
01mf
50V
U2
LM741EN
R8
2K
R7
2.7K
7.15 V
+12V
C1
10μf
25V
R44
47K
Q2
2N3401
R5
C7
10μf
25V
R4
LAST C NO. USED C 19
LAST D NO. USED D 10
LAST Q NO. USED Q 10
LAST R NO. USED R 46
LAST U NO. USED U 4



GREMLIN INDUSTRIES INC.
8401 AERO DR. SAN DIEGO, CA. 92123

SCHEMATIC
GAME PWR SUPPLY

NONE 815-0000 A

SHEET 4

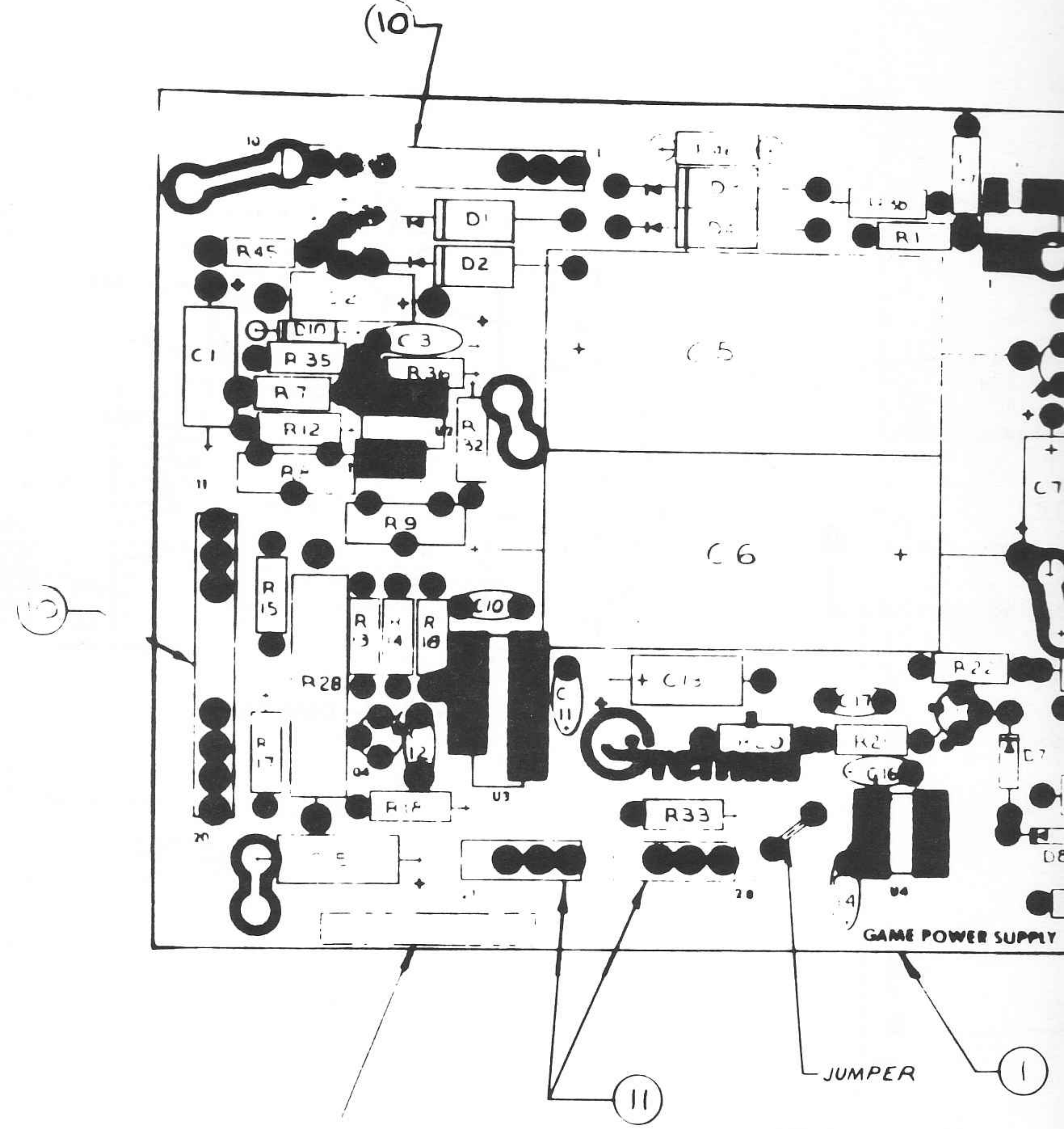
4 3

D

C

B

A



— REIDENTIFY ASSY
WITH No. 815-0021
& LATEST REV

815-0020	Pwr Sply Assy
NEXT ASSY	USED ON
APPLICATION	

QTY REQ

UNLESS OT… DIMENSION… TOLERANCE… FRACTIONS…

MATERIAL

FINISH

DO N…

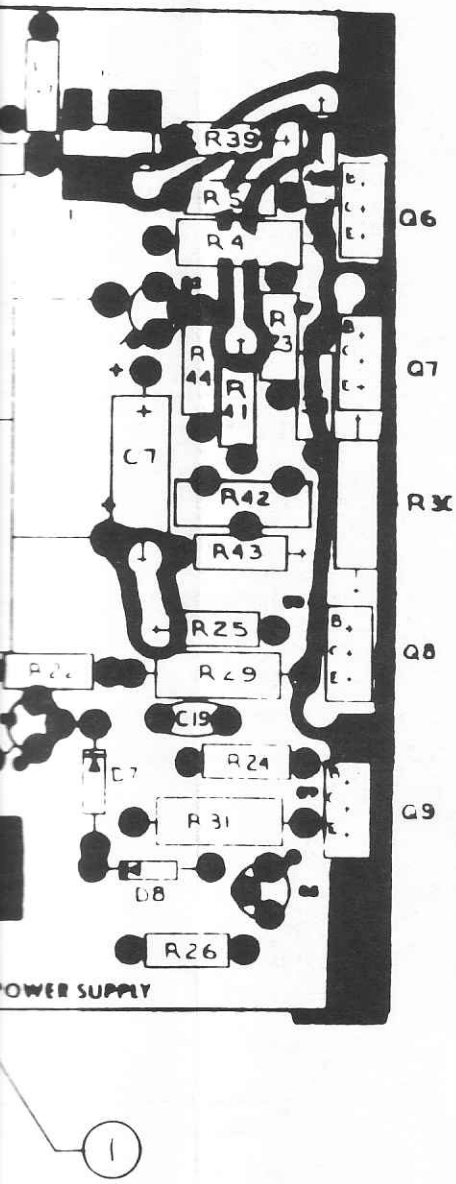
4 3

2 | 1

REVISIONS

ZONE	LTR	DESCRIPTION	DATE	APPROVED

D



C

B

QTY REQD	CODE IDENT	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION		

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE
FRACTIONS ± DECIMALS ANGLES ±
XX ±
XXX ±

MATERIAL

FINISH

DO NOT SCALE DRAWING

CONTRACT NO

APPROVALS		DATE
DRAWN	LE BLANC	6 JAN 78
CHECKED		1/4/78

Gremlin Industries, Inc.
San Diego, California

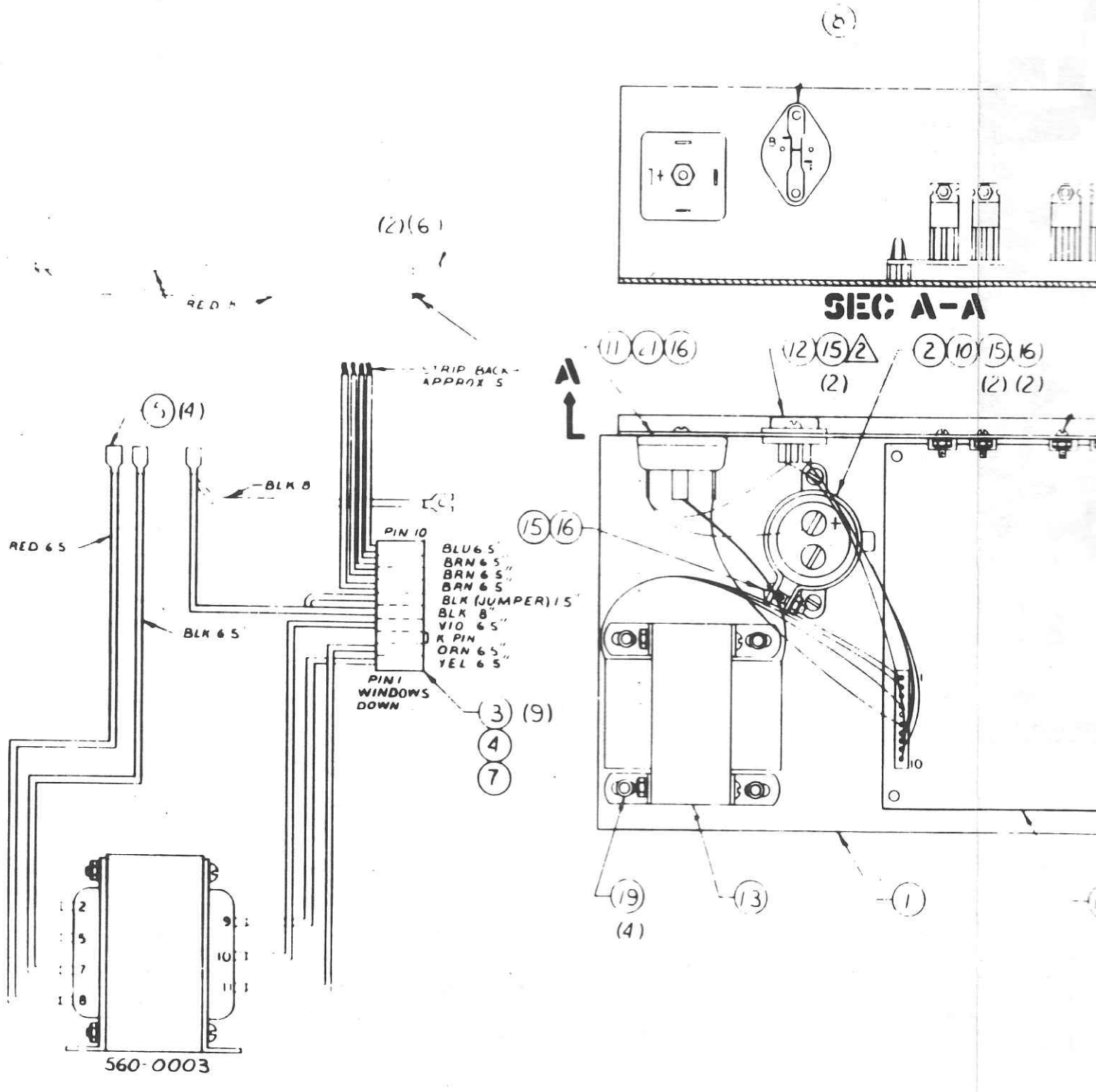
PC ASSY - POWER SUPPLY

SIZE	CODE IDENT NO	DRAWING NO	REV
C		515-0021	A

SCALE | SHEET 4 OF

A

2 | 1

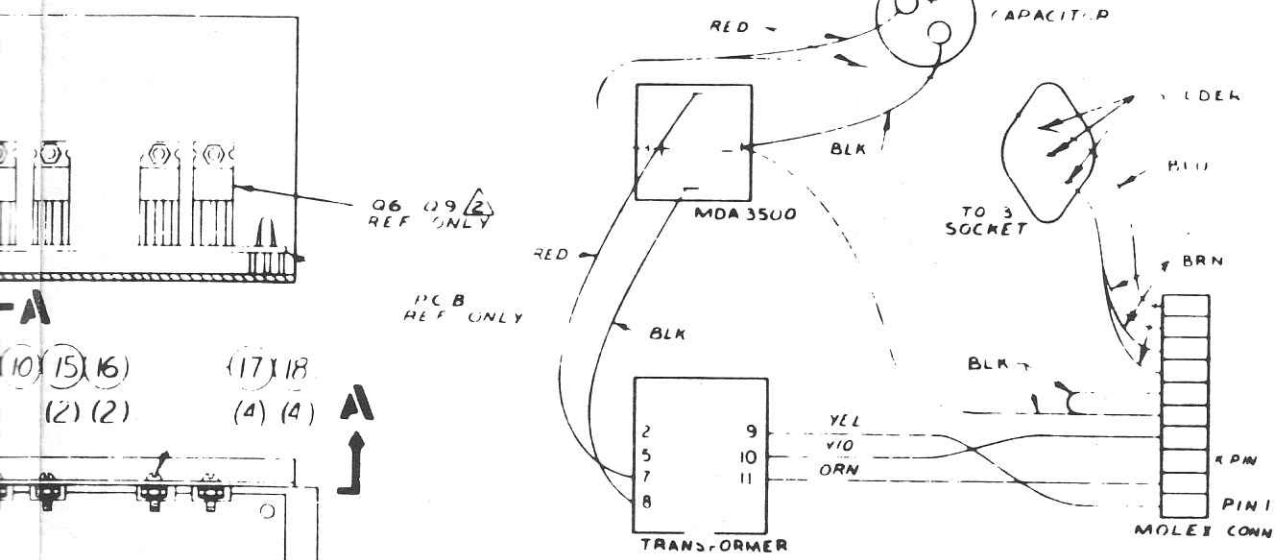


△2 ALL POWER TRANSISTORS TO BE MOUNTED WITH HEAT SINKING PASTE & INSULATING HARDWARE

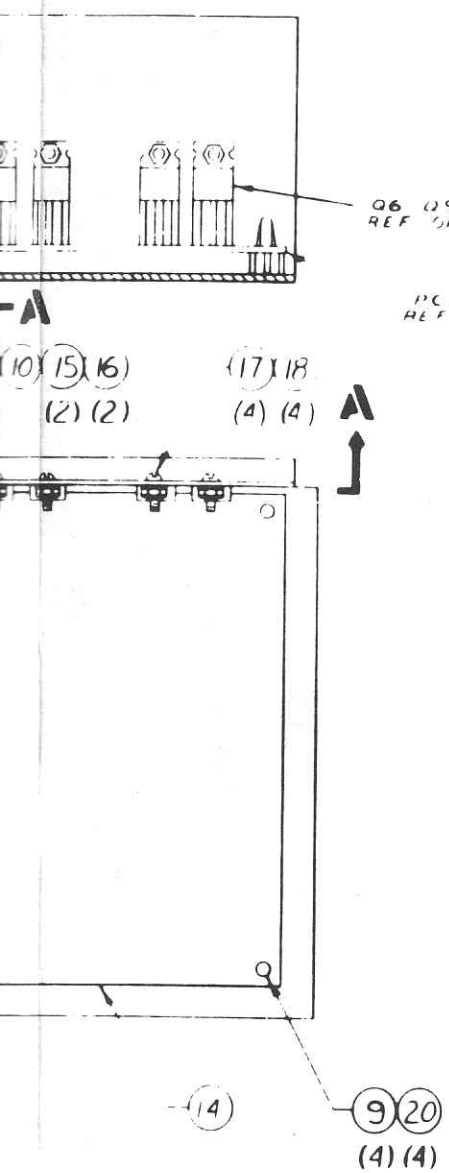
ALL WIRE TO BE AWG 22 GA

NOTES: UNLESS OTHERWISE SPECIFIED

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED



WIRING DIAGRAM



SEE DETACHED PARTS LIST 815-0020

QTY REQD	CODE IDENT	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION
			PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE
FRACTIONS ± DECIMALS ± ANGLES ±
.XX ± .XXX ±

MATERIAL

FINISH

DO NOT SCALE DRAWING

CONTRACT NO

APPROVALS	DATE
Drawn Lee J Lippert	
Checked	

Gremlin Industries, Inc.
San Diego, California 92123

ASSY
POWER SUPPLY

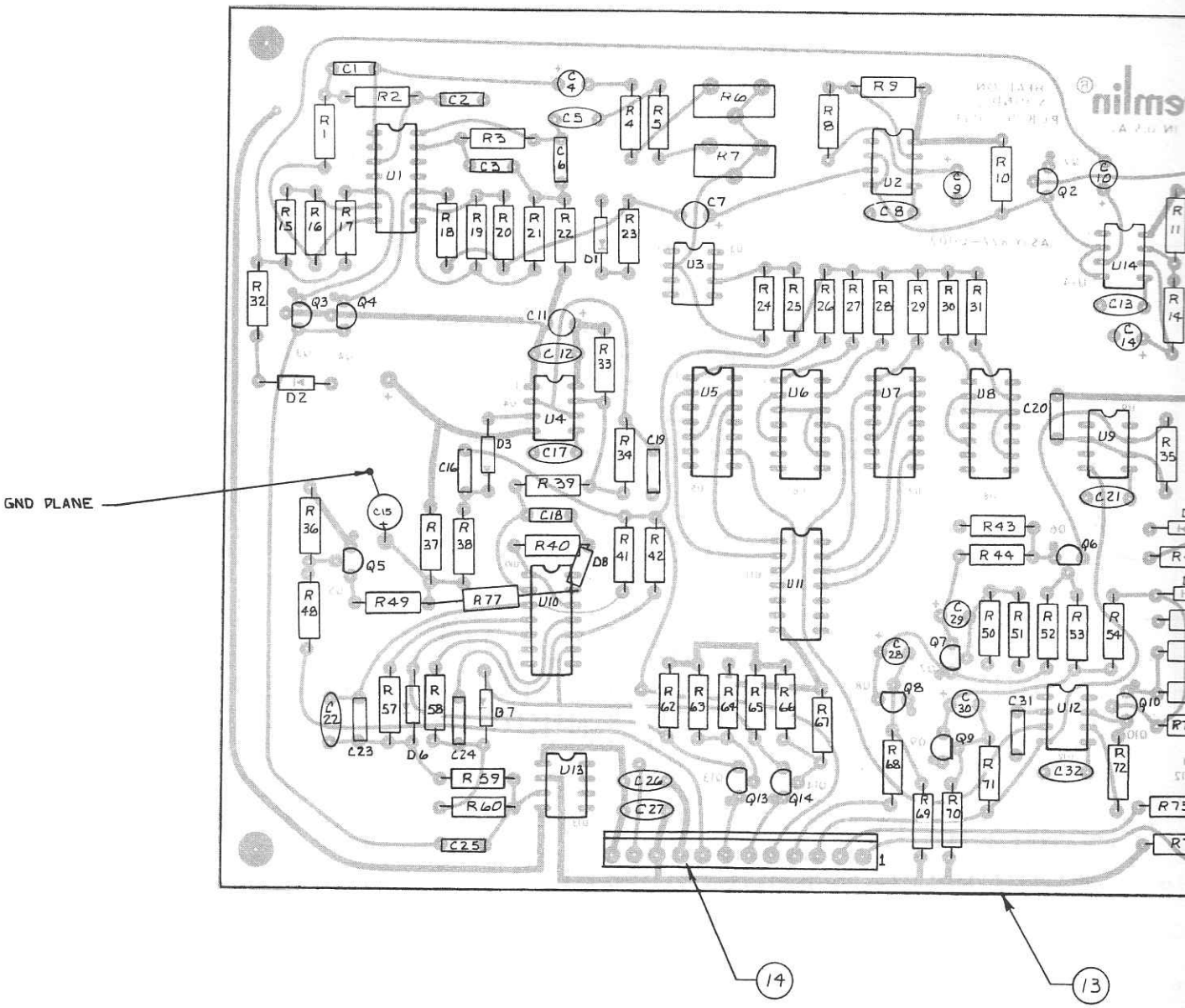
SIZE	CODE IDENT NO	DRAWING NO	REV
D		815-0020	A

SCALE FULL SHEET 3 OF 4

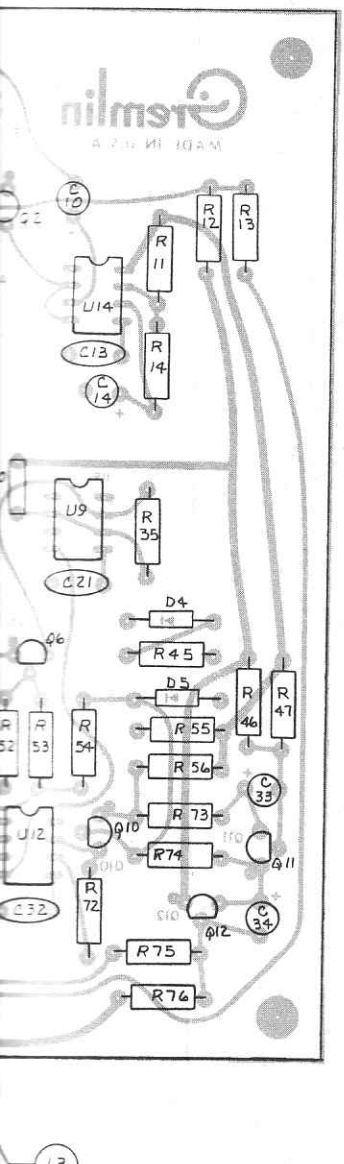
715-0001	SAMARI
NEXT ASSY	USED ON

APPLICATION

815-0020


8
7
6
5
D
C
B
A
GND PLANE
C1
R2
C2
C4
C5
R3
C3
C6
R1
U1
R4
R5
R6
R7
R8
R9
U2
C9
C8
R10
Q2
C10
R11
U14
C13
C14
R14
R15
R16
R17
R18
R19
R20
R21
R22
D1
R23
C7
U3
R24
R25
R26
R27
R28
R29
R30
R31
R32
Q3
Q4
C11
C12
R33
D2
U4
U5
U6
U7
U8
C20
U9
R35
C21
C17
D3
C16
R34
C19
R39
C18
R40
D8
R41
R42
U10
R36
C15
Q5
R37
R38
R49
R77
R48
U11
R43
R44
Q6
C29
R50
R51
R52
R53
R54
C28
Q7
Q8
C30
C31
U12
Q10
Q9
R68
R71
R72
C32
R69
R70
C22
C23
D6
C24
D7
R57
R58
R59
R60
C25
U13
C26
C27
Q13
Q14
R62
R63
R64
R65
R66
R67
1
14
13

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	RELEASED	1-8-79	
	B	ECN 273 1-25-79 ADDENDUM 275	1-25-79	



SEE DETACHED PARTS LIST

QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS ± DECIMALS .XX ± .XXX ± ANGLES ±

MATERIAL

FINISH

DO NOT SCALE DRAWING

CONTRACT NO.

APPROVALS	DATE
DRAWN Wynema	11-10-78
CHECKED Steve J. Fay	12-22-78

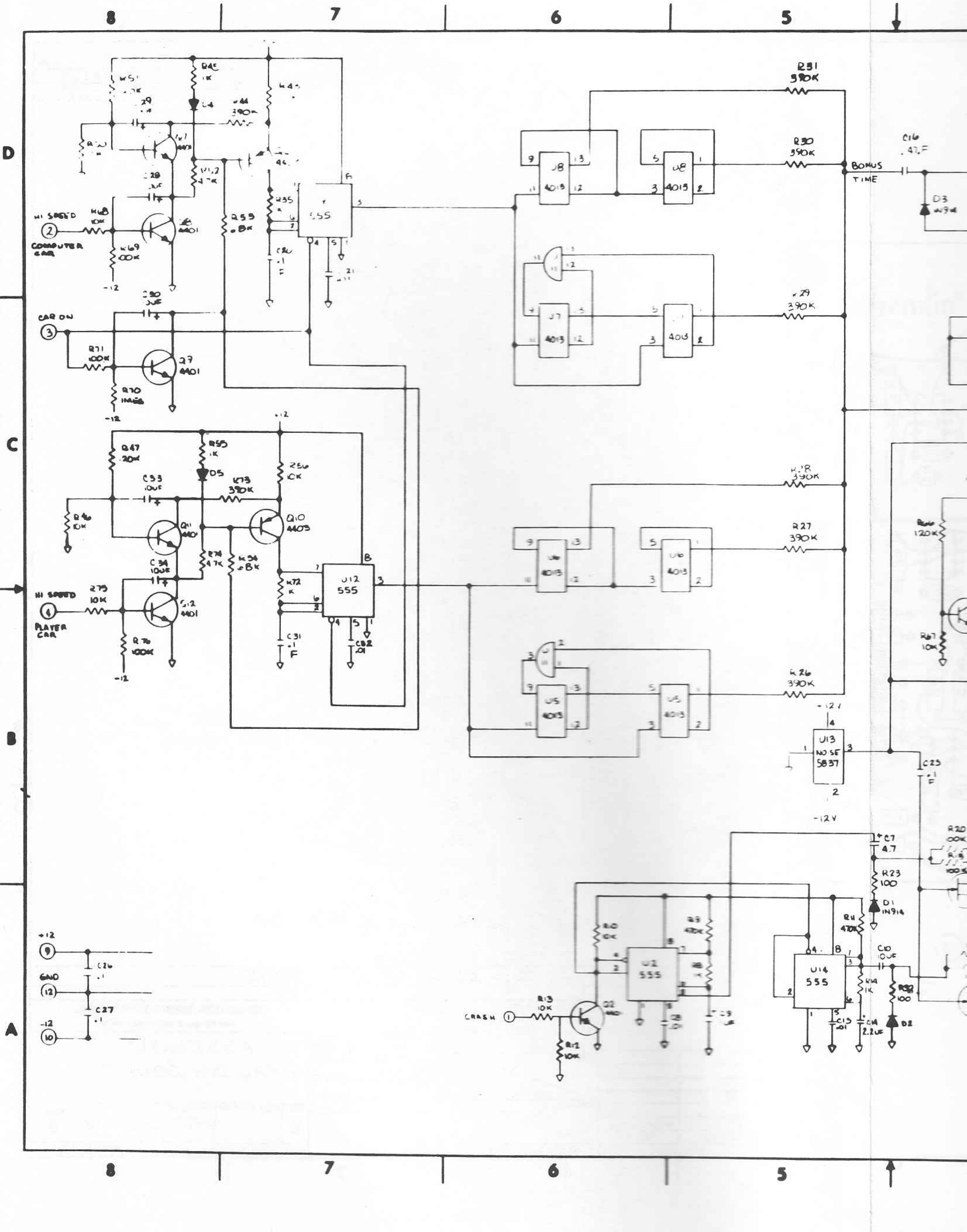
Gremlin Industries, Inc.
San Diego, California 92123

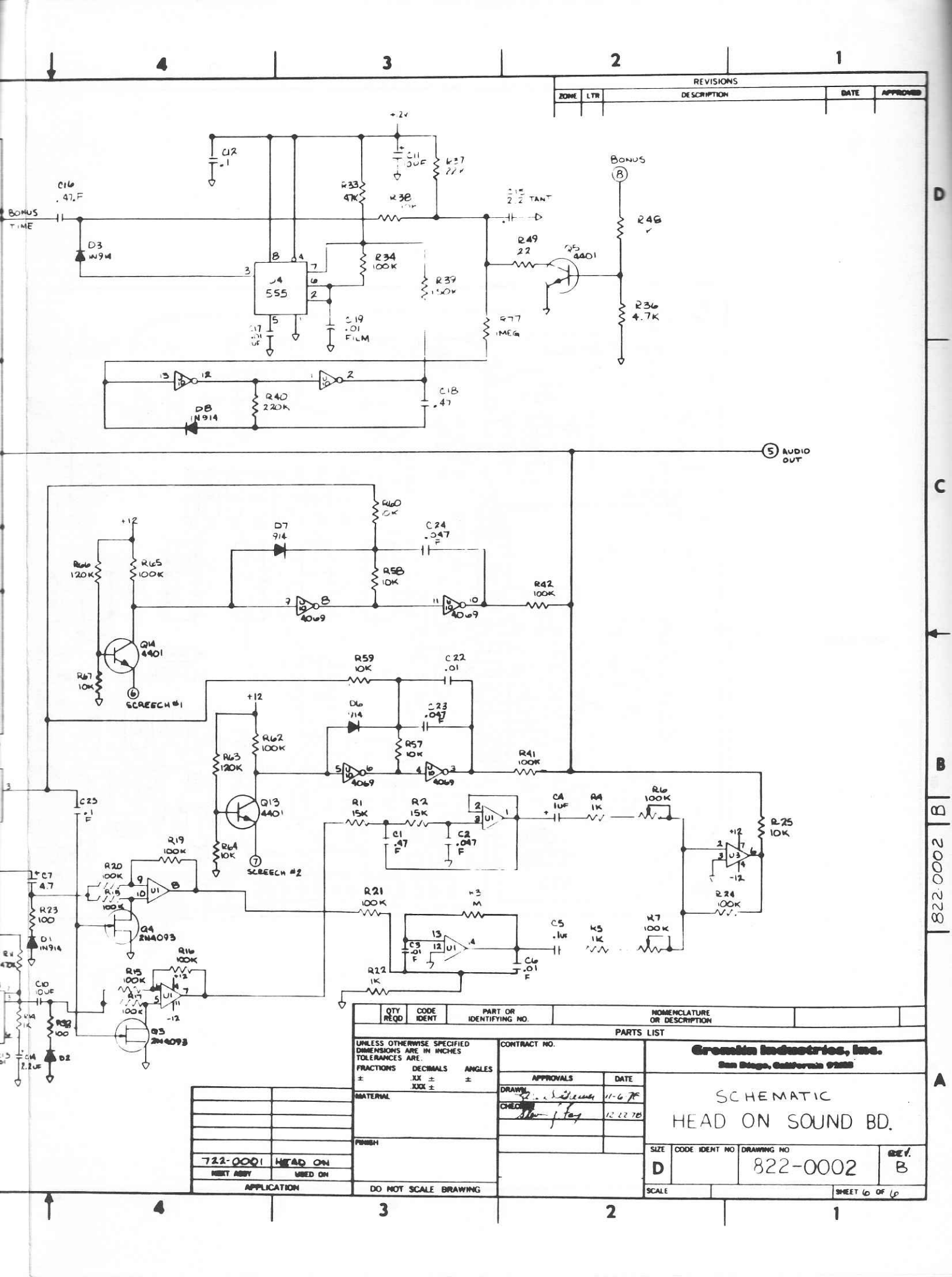
PC ASSEMBLY
HEAD ON SOUND

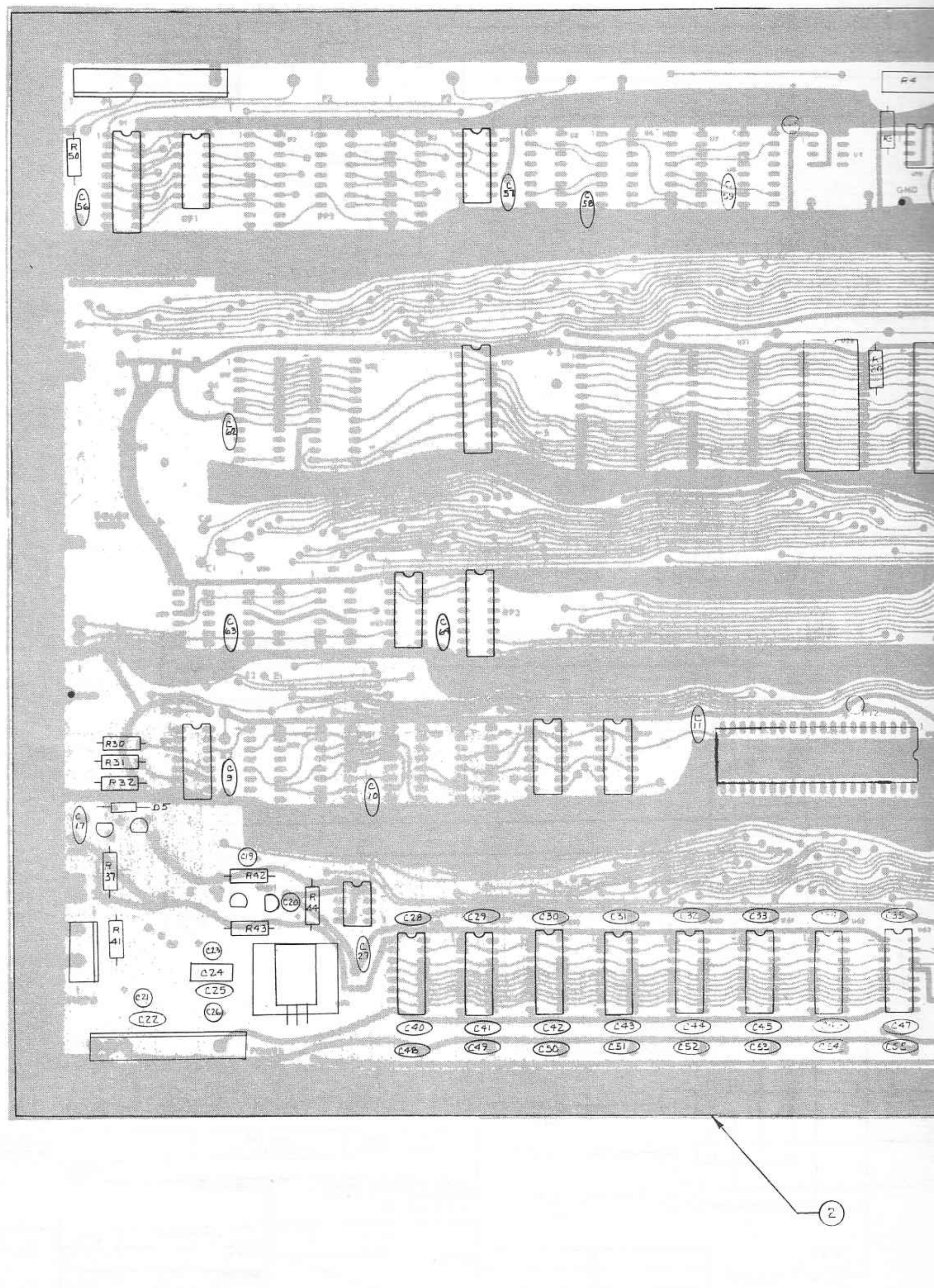
SIZE	CODE IDENT NO.	DRAWING NO.	REV
D		822-0002	B

SCALE 2/1 SHEET 5 OF 6

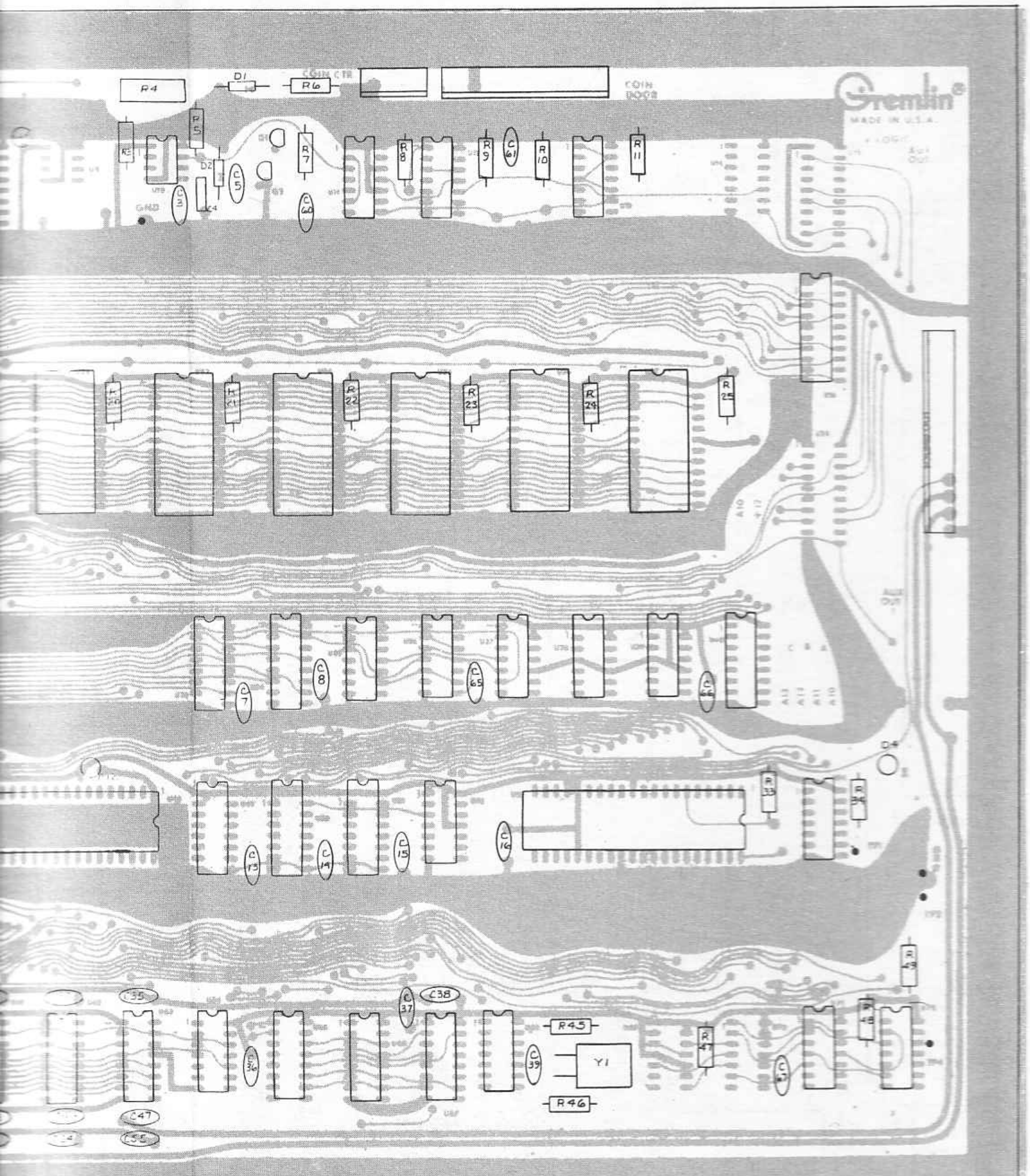
722-0001	HEAD ON
NEXT ASSY	USED ON
APPLICATION	


8
7
6
5
D
C
B
A
R51
390K
R50
390K
BONUS
TIME
C16
U8
4013
R29
390K
J7
4013
R48
R27
390K
4013
R26
390K
U5
4013
U13
NOISE
5837
+12V
-12V
C23
HI SPEED
COMPUTER
CAR
CAR ON
R71
100K
Q7
4401
R70
-12
+12
R47
R55
1K
D5
R56
10K
C33
10UF
R73
390K
R46
10K
Q11
4401
Q10
4403
C34
10UF
R74
4.7K
R54
6.8K
R72
U12
555
HI SPEED
PLAYER
CAR
R75
10K
Q12
4401
R76
100K
C31
.1
F
C32
.01
C7
4.7
R23
100
D1
IN914
R11
470K
R10
10K
R9
470K
U2
555
R8
1K
R13
10K
CRASH
Q2
4401
R12
10K
U14
555
C10
10UF
R14
1K
R32
100
D2
C13
.01
C14
2.2UF
R66
120K
R67
10K
C26
.1
GND
C27
.1
-12


REVISIONS
ZONE
LTR
DESCRIPTION
DATE
APPROVED
+2V
C12 .1
C11 10UF
R37 22K
R33 47K
R38
C16 .47F
BONUS TIME
D3 IN914
U4 555
R34 100K
R39 150K
C17 .01 UF
C19 .01 FILM
C15 2.2 TANT
R49 22
Q5 4401
R48
R36 4.7K
R77 1MEG
BONUS
C18 .47
D8 IN914
R40 220K
5 AUDIO OUT
+12
R60
D7 914
C24 .047 F
R66 120K
R65 100K
R58 10K
R42 100K
4069
Q14 4401
R67 10K
6 SCREECH #1
R59 10K
C22 .01
D6 914
C23 .047 F
R62 100K
R63 120K
R57 10K
R41 100K
Q13 4401
R64 10K
7 SCREECH #2
C25 .1 F
R19 100K
R20 100K
R18 100K
Q4 2N4093
R16 100K
R15 100K
R17 100K
Q3 2N4093
C7 4.7
R23 100
D1 IN914
C10 10UF
R22 100
D2
C14 2.2UF
R1 15K
R2 15K
C1 .47 F
C2 .047 F
C4 1UF
R4 1K
R6 100K
R25 10K
R21 100K
C3 .01 F
C5 .1UF
K5 1K
K7 100K
C6 .01 F
R22 1K
R24 100K
QTY REQD
CODE IDENT
PART OR IDENTIFYING NO.
NOMENCLATURE OR DESCRIPTION
PARTS LIST
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE.
FRACTIONS
DECIMALS
ANGLES
CONTRACT NO.
APPROVALS
DATE
DRAWN
CHECKED
11-6-78
12-22-78
MATERIAL
FINISH
722-0001 HEAD ON
NEXT ASSY
USED ON
APPLICATION
DO NOT SCALE DRAWING
Cromlin Industries, Inc.
San Diego, California 92123
SCHEMATIC
HEAD ON SOUND BD.
SIZE
D
CODE IDENT NO
DRAWING NO
822-0002
REV.
B
SCALE
SHEET 6 OF 6
822-0002 B



R50
C56
C57
C58
C59
R4
GND
C62
C63
C64
R30
R31
R32
C9
C10
C11
D5
C17
R37
C19
R42
C20
R44
R43
R41
C23
C24
C25
C21
C22
C26
C27
C28
C29
C30
C31
C32
C33
C35
C40
C41
C42
C43
C44
C45
C47
C48
C49
C50
C51
C52
C53
C55
2



SEE DETACHED PARTS LIST

QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:
FRACTIONS ± DECIMALS XX ± XXX ± ANGLES ±

MATERIAL

FINISH

DO NOT SCALE DRAWING

CONTRACT NO.

APPROVALS		DATE
DRAWN	Wynema	11-10-78
CHECKED	[signature]	12-27-78

Gremlin Industries, Inc.
San Diego, California 92123

PC ASSEMBLY —
C.V. LOGIC B/W

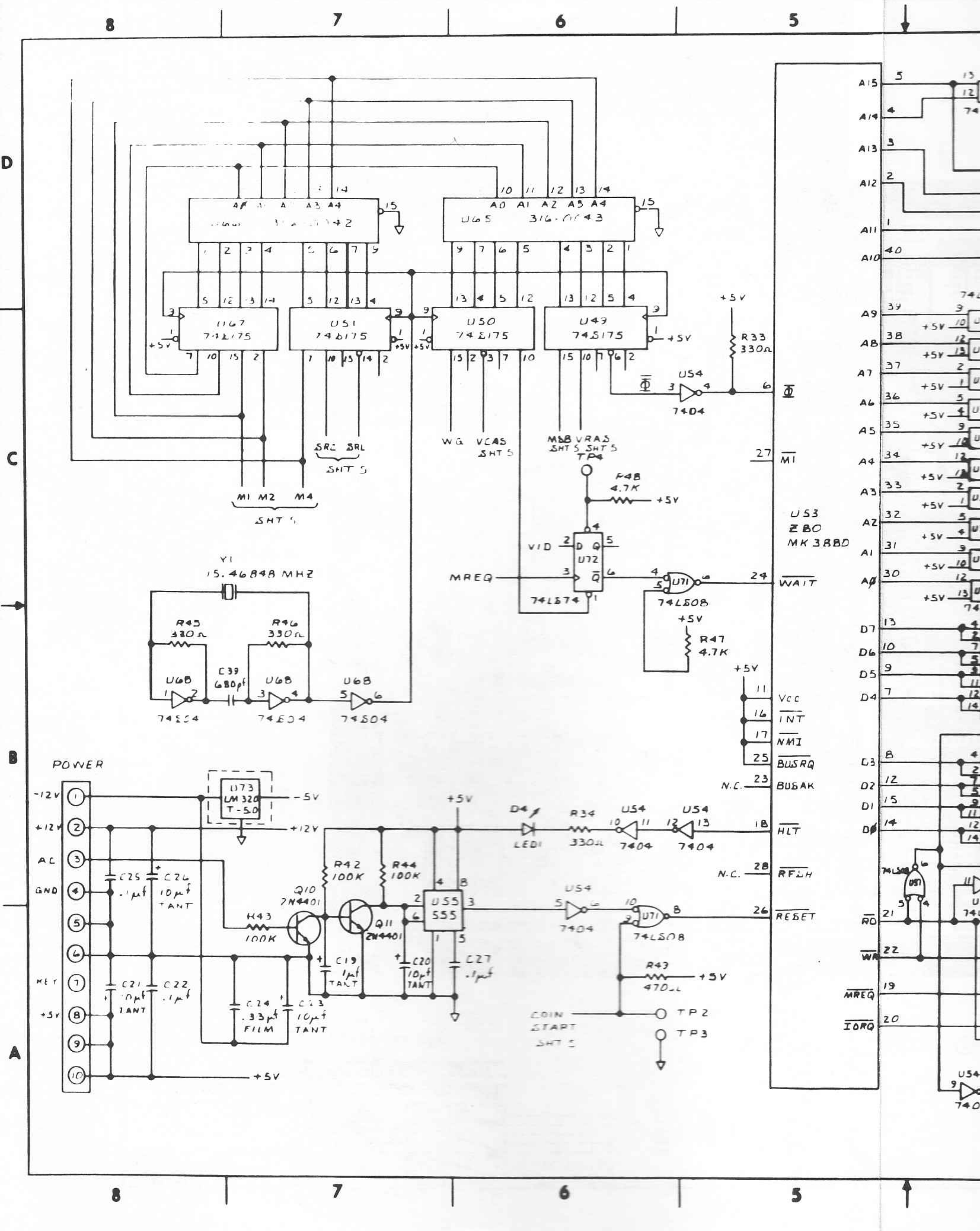
SIZE	CODE IDENT NO.	DRAWING NO.	REV
E		822-0001	A

SCALE 2/1 SHEET 3 OF 6

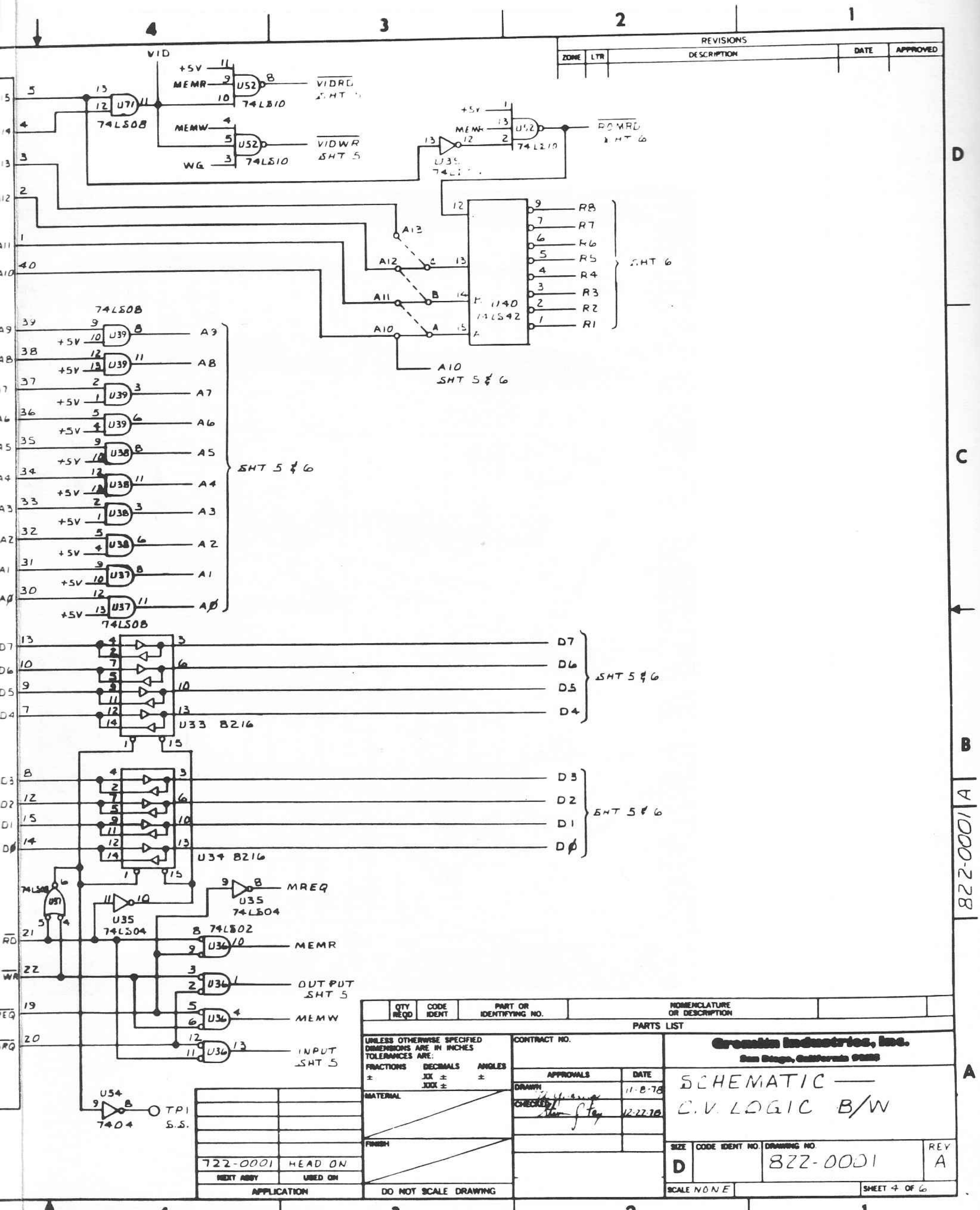
NEXT ASSY	USED ON
722-0001	HEAD ON

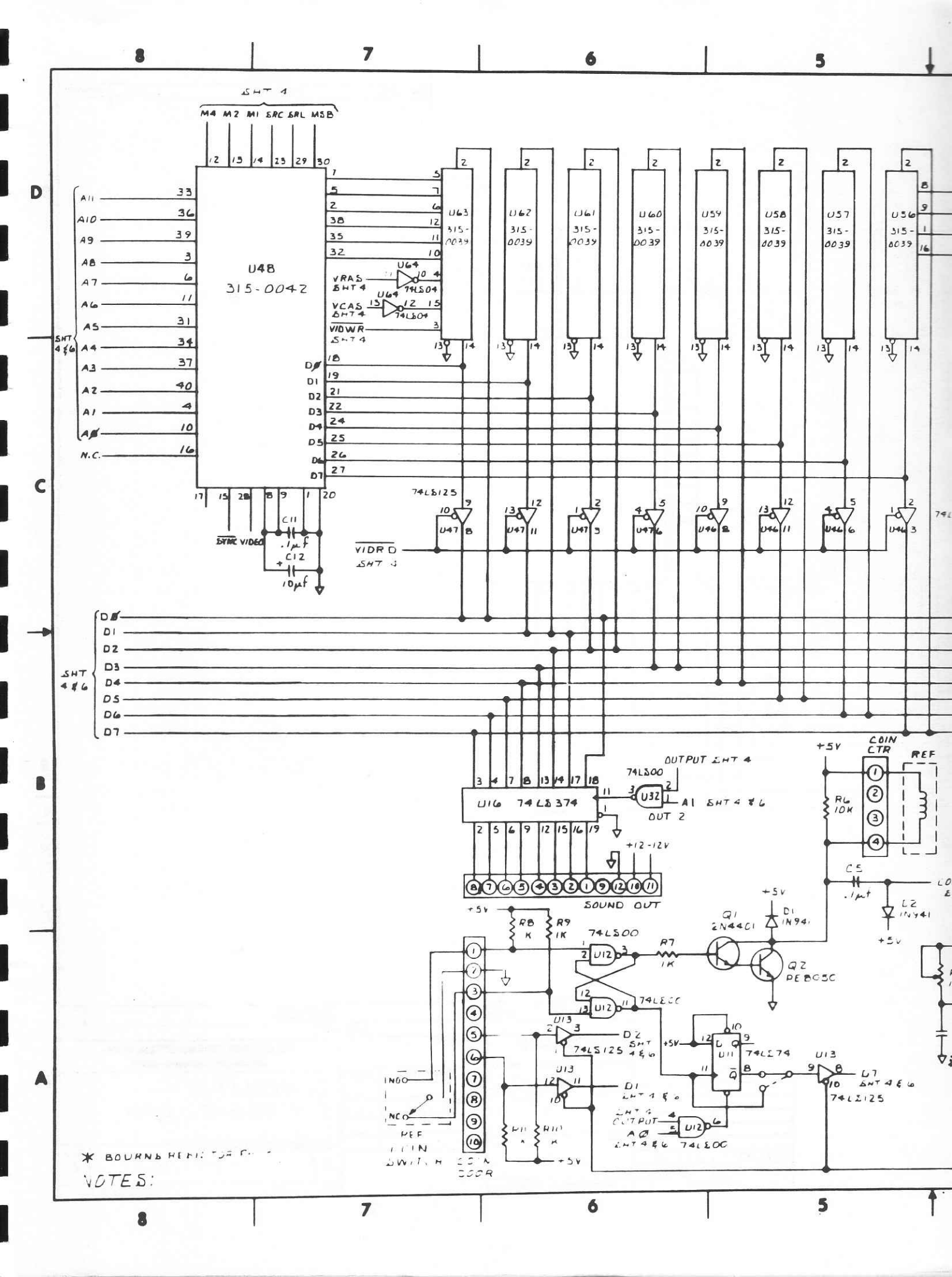
APPLICATION

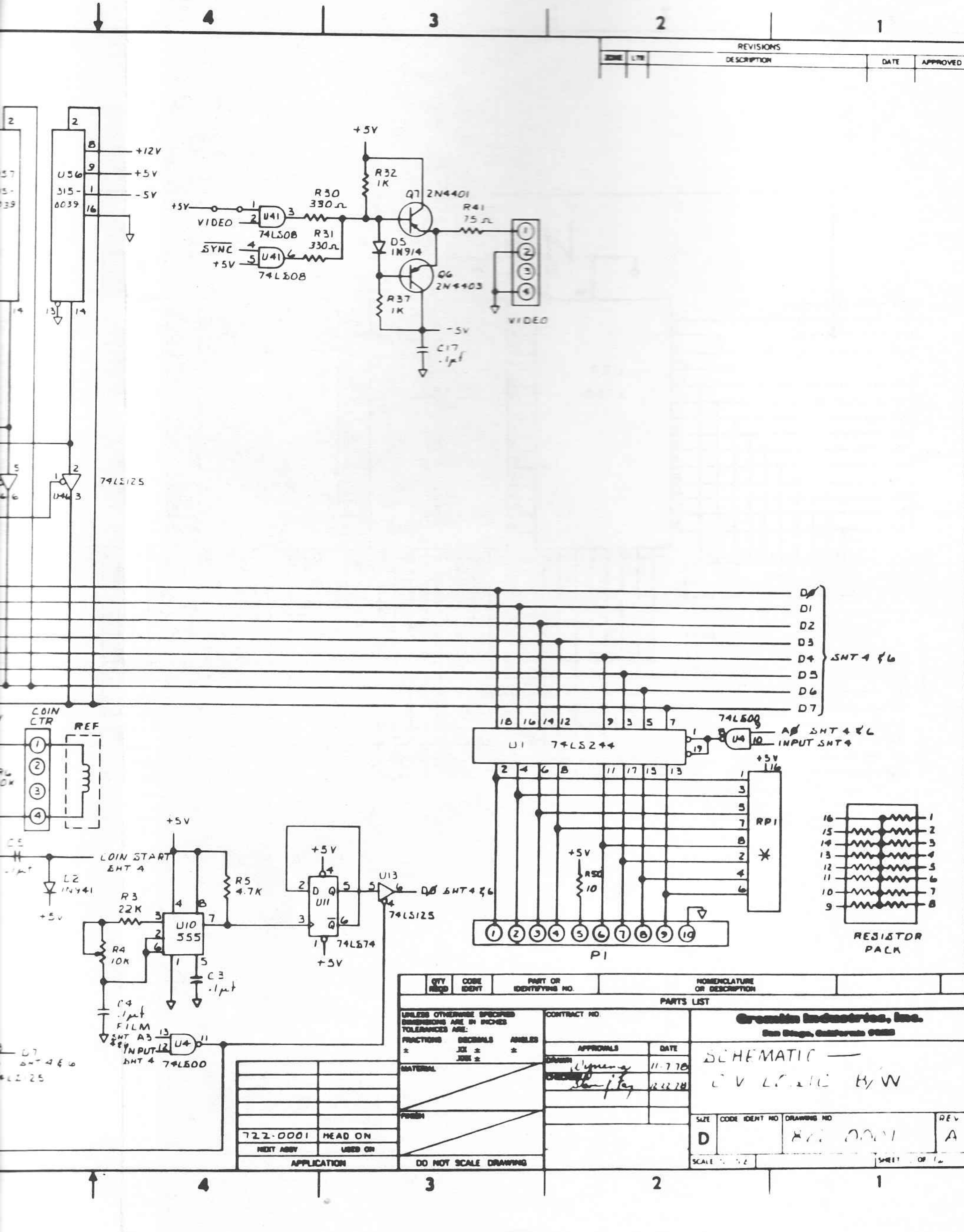
2 1



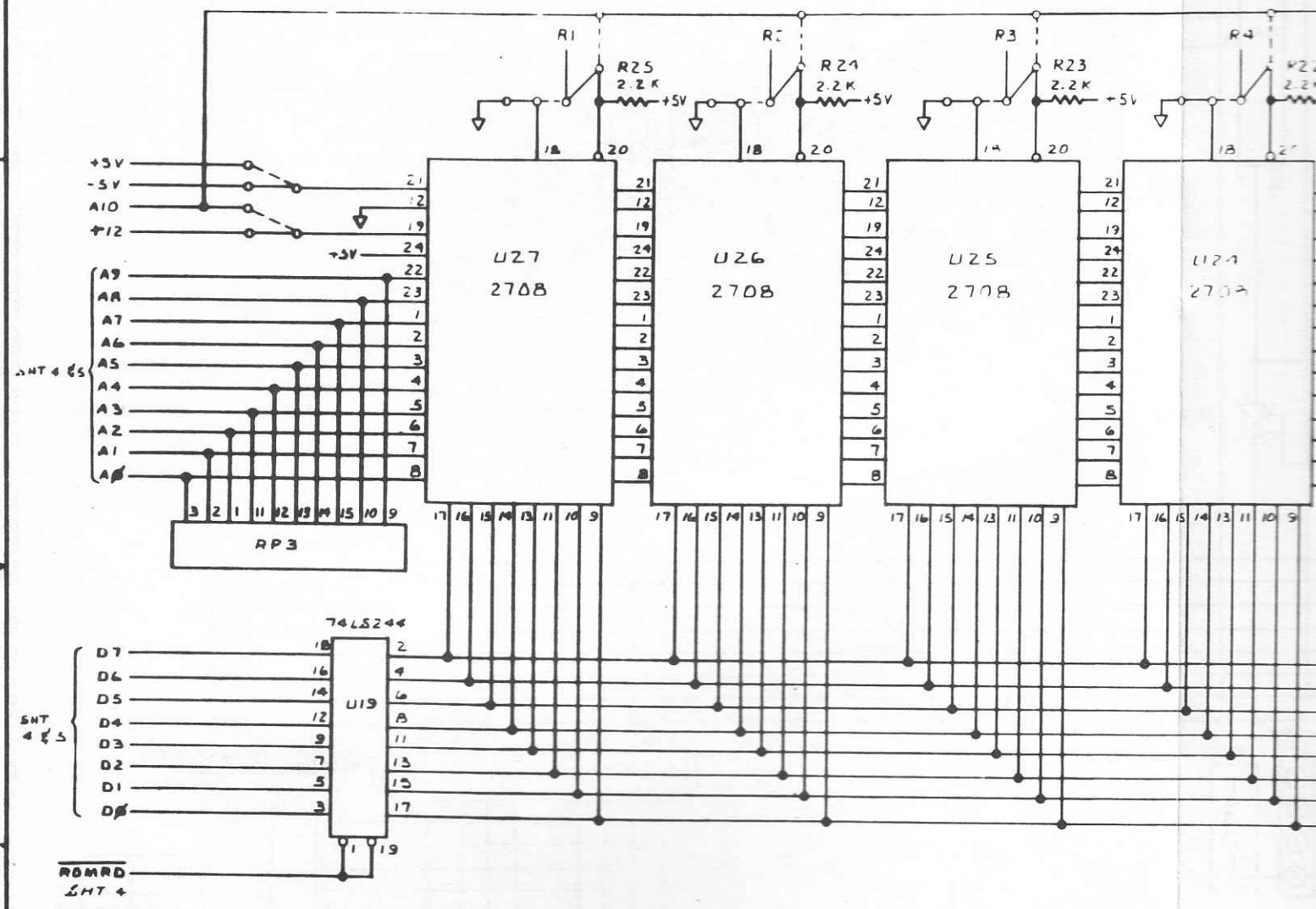
8
7
6
5
D
C
B
A
U65
316-0143
U67
74LS175
U51
74LS175
U50
74LS175
U49
74LS175
U54
7404
R33
330Ω
+5V
M1 M2 M4
SHT 5
SRC SRL
SHT 5
WG
VCAS
SHT 5
MSB VRAS
SHT 5 SHT 5
TP4
R48
4.7K
VID
U72
74LS74
MREQ
U71
74LS08
R47
4.7K
Y1
15.46848 MHZ
R45
330Ω
R46
330Ω
C39
680pf
U68
74LS04
U53
Z80
MK 3880
A15
A14
A13
A12
A11
A10
A9
A8
A7
A6
A5
A4
A3
A2
A1
AØ
D7
D6
D5
D4
D3
D2
D1
DØ
M1
WAIT
Vcc
INT
NMI
BUSRQ
BUSAK
HLT
RFSH
RESET
RD
WR
MREQ
IORQ
N.C.
POWER
-12V
+12V
AC
GND
KEY
+5V
U73
LM 320
T-5.0
-5V
D4
LED1
R34
330Ω
R42
100K
R44
100K
Q10
2N4401
Q11
2N4401
R43
100K
U55
555
C25
.1µf
C26
10µf
TANT
C21
10µf
TANT
C22
.1µf
C24
.33µf
FILM
C23
10µf
TANT
C19
1µf
TANT
C20
10µf
TANT
C27
.1µf
R49
470Ω
COIN
START
SHT 5
TP2
TP3


REVISIONS
ZONE
LTR
DESCRIPTION
DATE
APPROVED
PARTS LIST
QTY REQD
CODE IDENT
PART OR IDENTIFYING NO.
NOMENCLATURE OR DESCRIPTION
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:
FRACTIONS
DECIMALS
ANGLES
CONTRACT NO.
APPROVALS
DATE
DRAWN
11-8-78
CHECKED
12-22-78
MATERIAL
FINISH
Gremlin Industries, Inc.
San Diego, California 92126
SCHEMATIC —
C.V. LOGIC B/W
SIZE
D
CODE IDENT NO.
DRAWING NO.
822-0001
REV
A
SCALE NONE
SHEET 4 OF 6
722-0001
HEAD ON
NEXT ASSY
USED ON
APPLICATION
DO NOT SCALE DRAWING
822-0001 A

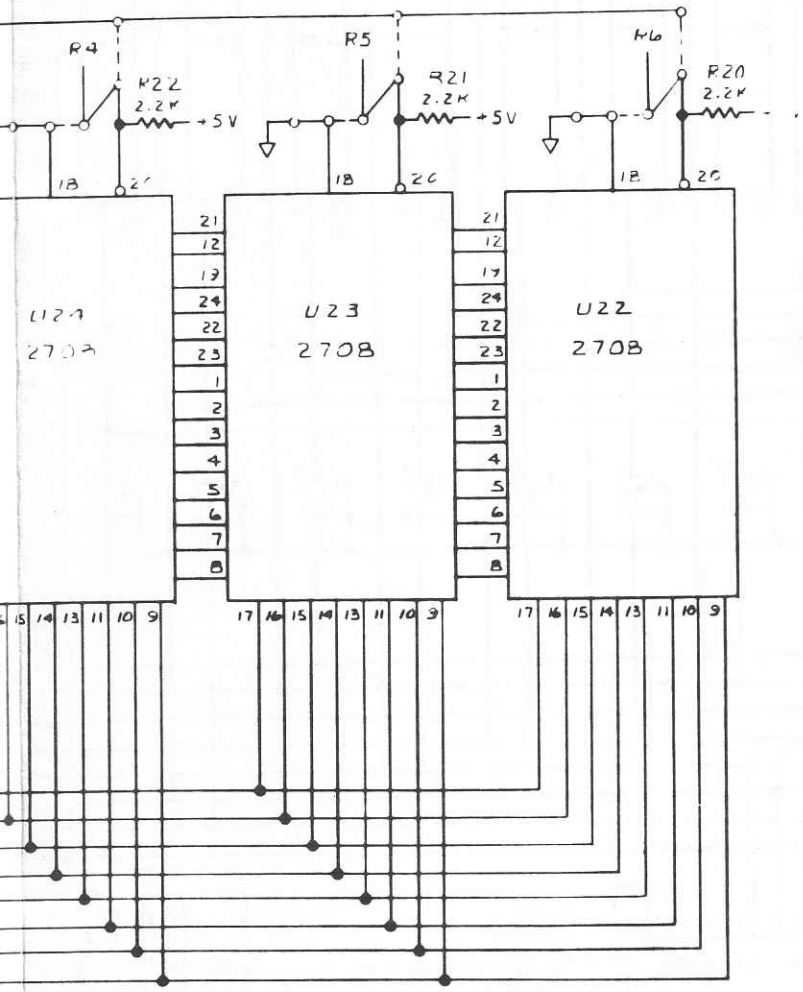

SHT 4
M4 M2 M1 SRC SRL MSB
U48
315-0042
U63 315-0039
U62 315-0039
U61 315-0039
U60 315-0039
U59 315-0039
U58 315-0039
U57 315-0039
U56 315-0039
VRAS SHT 4
VCAS SHT 4
VIDWR SHT 4
74LS04
74LS125
SYNC VIDEO
C11 .1µf
C12 10µf
VIDRD SHT 3
SHT 4 & 6
U16 74LS374
OUTPUT SHT 4
74LS00
U32
A1 SHT 4 & 6
OUT 2
+12 -12V
SOUND OUT
+5V
COIN CTR
REF
R6 10K
C5 .1µf
D2 IN941
Q1 2N4401
D1 IN941
Q2 PE8050
R8 K
R9 1K
R7 1K
74LS00
74LS00
U13
D2 SHT 4 & 6
74LS125
U11 74LS74
D1 SHT 4 & 6
SHT 4 OUTPUT A0
SHT 4 & 6 74LS00
D7 SHT 4 & 6
74LS125
INDO
NCO
REF
COIN SWITCH DOOR
R11 K
R10 K
* BOURNS REF
NOTES:



REVISIONS
ZONE
LTR
DESCRIPTION
DATE
APPROVED
U56
315-
0039
+12V
+5V
-5V
74LS125
+5V
R32
1K
Q7 2N4401
R30
330 Ω
R41
75 Ω
VIDEO
74LS08
R31
330 Ω
SYNC
D5
1N914
Q6
2N4403
R37
1K
-5V
C17
.1µf
VIDEO
D0
D1
D2
D3
D4
D5
D6
D7
SHT 4 & 6
COIN
CTR
REF
U1 74LS244
74LS00
U4
A0 SHT 4 & 6
INPUT SHT 4
RP1
RESISTOR
PACK
+5V
R50
10
P1
COIN START
SHT 4
L2
1N941
R3
22K
R4
10K
U10
555
R5
4.7K
C3
.1µf
U11
74LS74
U13
74LS125
D0 SHT 4 & 6
C4
.1µf
FILM
SHT A3
INPUT
SHT 4
74LS00
QTY REQD
CODE IDENT
PART OR IDENTIFYING NO.
NOMENCLATURE OR DESCRIPTION
PARTS LIST
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:
FRACTIONS
DECIMALS
ANGLES
CONTRACT NO.
Gremlin Industries, Inc.
San Diego, California
APPROVALS
DATE
DRAWN
11-7-78
CHECKED
MATERIAL
FINISH
SCHEMATIC —
722-0001
HEAD ON
NEXT ASSY
USED ON
APPLICATION
DO NOT SCALE DRAWING
SIZE
CODE IDENT NO
DRAWING NO
REV
D
A
SCALE
SHEET
OF


R1
R2
R3
R4
R25
2.2K
+5V
R24
2.2K
+5V
R23
2.2K
+5V
+5V
-5V
A10
+12
+5V
A9
A8
A7
A6
A5
A4
A3
A2
A1
A0
SHT 4 &5
RP3
U27
2708
U26
2708
U25
2708
U24
2708
74LS244
U19
D7
D6
D5
D4
D3
D2
D1
D0
SHT 4 & 5
ROMRD
SHT 4

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED



QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS ± DECIMALS .XX ± .XXX ± ANGLES ±

MATERIAL

FINISH

DO NOT SCALE DRAWING

CONTRACT NO.

APPROVALS	DATE
DRAWN	12-30-76
CHECKED	12-22-76

Cromemco Industries, Inc.
San Diego, California

SCHEMATIC —
C.V. LOGIC B/W

SIZE	CODE IDENT NO.	DRAWING NO.	REV
D		822-0001	A

SCALE NONE | SHEET 6 OF 6

722-0001	HEAD ON
NEXT ASSY	USED ON
APPLICATION	

822-0001 A