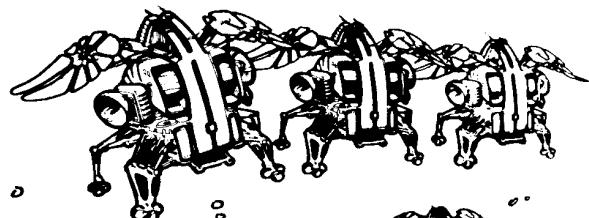
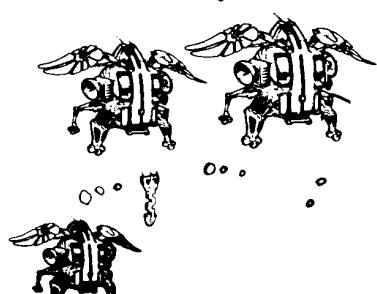


**Gremlin®**

# SUPER SPACE ATTACK



ART NO.  
**420-0272**



MANUFACTURED BY

**Gremlin®**  
Industries, Inc.

**OWNER'S MANUAL**

SUPER SPACE ATTACK  
OPERATING INSTRUCTIONS  
AND  
SERVICE MANUAL

SUPER SPACE ATTACK OWNER'S MANUAL

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## 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:

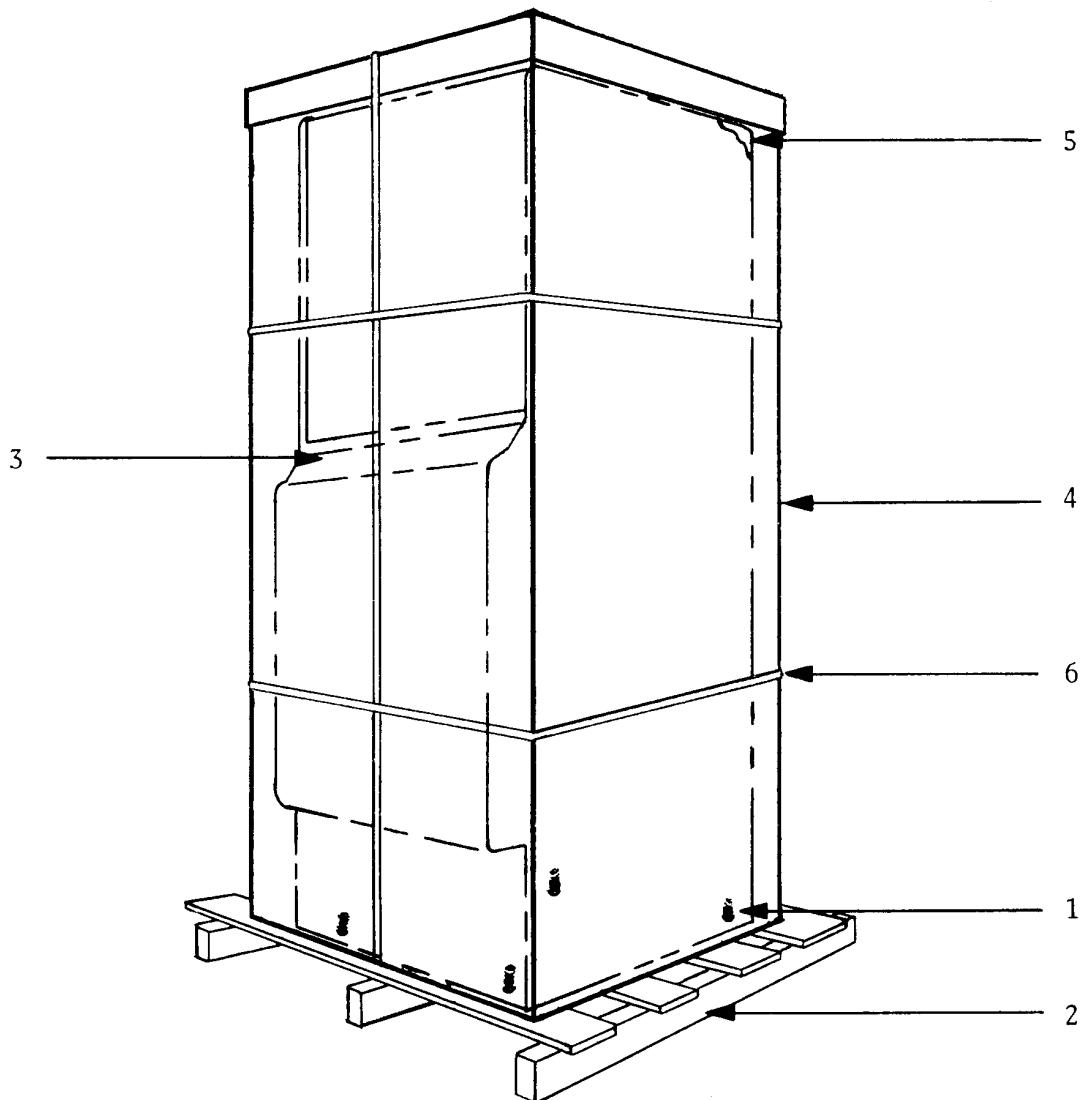
The system reset circuitry described above requires that the coin counter is attached to the system. If there is a coin counter problem and no replacement is available, the game will function properly if a 10K Ohm resistor is connected across the coin counter input pins to the video logic board.

## REPACKAGING INSTRUCTIONS

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

- 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.



## SUPER SPACE ATTACK- GAME CONCEPT

SUPER SPACE ATTACK is a one or two player game, in which players defend their laser bases from the attacking space creatures. When the game begins, five rows of creatures line up on the screen. The lowest row begins firing at the player's laser base which the player moves left or right across the screen. The player positions his base and fires at the creatures above, scoring 100 points for any creature hit in the lower two rows, 200 points for a hit in the third and fourth rows, and 300 points for a hit in the highest row. As more creatures are hit, the rest begin to move faster toward the bottom of the screen. Also, the creatures' missiles are released at a faster rate.

To prevent his base from being hit, the player can move it under the cover offered by four force fields, just above the base. The first few laser bursts penetrate the force field, but do not pass through. Then, when a path is cut through the field, the laser fire can pass. Likewise, the creatures' projectiles destroy part of the force field, until a path is cut for them to pass. Toward the end of a game, the force fields are usually destroyed; the game then becomes even more challenging.

A small enemy UFO floats across the top of the screen during game play, to provide another target. When hit, the UFO explodes, scoring 1000, 1200, 1500, or 1800 points. This first UFO appears only during game play. A second one appears after each time the player clears the screen of creatures. This bonus UFO zig-zags from the top of the screen toward the bottom. If the player hits it, bonus points are awarded and the player gains an additional laser base.

When the player's laser base is destroyed the first time, a new one is added, and the action resumes. Each time all the creatures are destroyed and the screen resets, the five rows of creatures are arranged closer and closer to the player's base. The number of bases with which a player starts is operator adjustable. The game is shipped with the three laser base option selected; four, five, or six bases can be selected by internal jumpers. Also operator selectable is the number of points, 10,000 or 15,000, at which a free laser base is awarded. The game is shipped with the 10,000 point option enabled.

SUPER SPACE ATTACK- GAME CONCEPT- cont'd

A final option is available to display, or not to display, on the screen the number of credits accepted. The maximum number of credits counted by the game is 99. This information is displayed in the bottom right corner of the screen. Instructions for selecting these options are included in this manual.

In the two player mode, the game action is the same as in the one player, except that the game allows players to take turns. The game then remembers where each player leaves off at the end of his turn. It also displays the three highest scores at the top of the screen for players to challenge.

## SELECTING OPTIONS FOR SUPER SPACE ATTACK

The following describes the procedure for selecting any of the game options.

1. Locate the Molex pin connector labelled P3 on the logic board.
2. To select any of the options, simply connect one or both jumper wires, as necessary, to the pin connector. See the chart, below:

### TO SELECT:

3 laser bases at game start  
4 laser bases at game start  
5 laser bases at game start  
6 laser bases at game start  
Extra base awarded when second  
UFO hit  
  
No base awarded  
Bonus (extra base) at 10,000  
points  
  
Bonus at 15,000 points  
Display number of credits  
Do not display credits  
(Ground

### CONNECT JUMPER TO PIN #:

no jumper (game shipped this way)  
2  
3  
4  
no jumper (game shipped this way)  
  
1  
no jumper (game shipped this way)  
  
6  
no jumper (game shipped this way)  
9  
(10)

## MAINTENANCE PROCEDURES- SPACE ATTACK

### 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 capacitor)
  - 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 #826-0002)

1. If no sounds are produced:
  - a) check connections between logic board (labelled "Sound Out") and sound board and between the sound board and power supply.
  - b) If these 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 22. 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
Ship hit	Pin 2	U8, U9, U10
UFO hit	Pin 3	U17, U18, U19, Q9

MAINTENANCE PROCEDURES- cont'd.

Laser	Pin 4	U14, U4, U15, U16, Q5, U9, U10
UFO #1	Pin 6	U1, U2, U3, Q1, Q2
UFO #2	Pin 7	U11, U5, Q3, Q4, U6
Saucer	Pin 8	U24, U25, Q11, U20

III. LOGIC BOARD (refer to drawing #826-0004)

1. Game does not reset at power on: (see sheet 5)
  - a) Check connector pin 3 on logic board for 3V 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 on: (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. Also, pin 5, U11; pin 6, U13.
  - d) If a game is started only occasionally 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 a coin is inserted; 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

MAINTENANCE PROCEDURES- cont'd.

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 first.

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.)

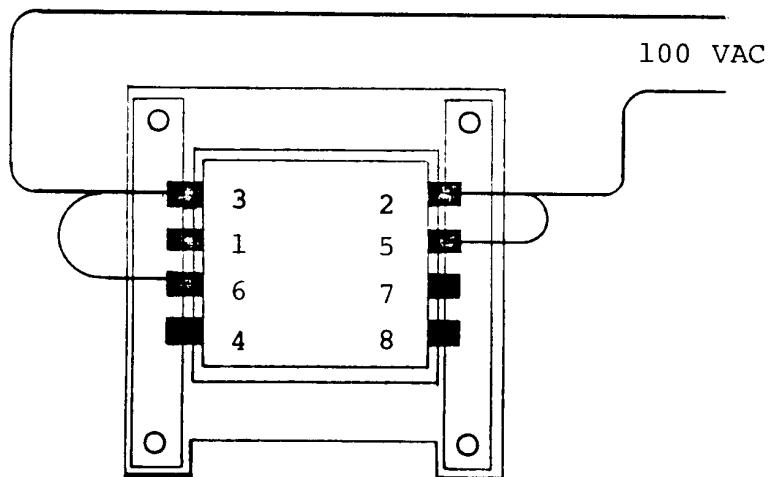
## SPECIAL VOLTAGE CONVERSION INSTRUCTIONS

To operate this game on voltages of 100, 115, or 230 VAC, the following changes must be made in the power supplies of BOTH the game AND video monitor:

### 1. Game Power Supply

First determine which terminal configuration is used on your transformer. There are 3 different configurations, as shown below:

TO CONVERT TO 100 VAC refer to Figures 1, 2, & 3:



(Terminals 9, 10, & 11  
located on far side)

Fig. 1

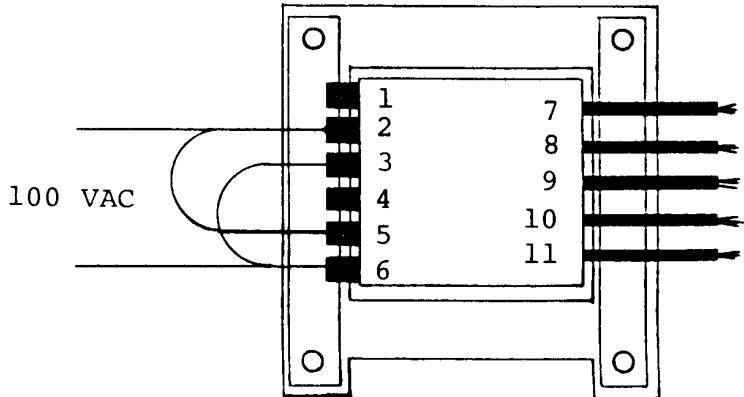


Fig. 2

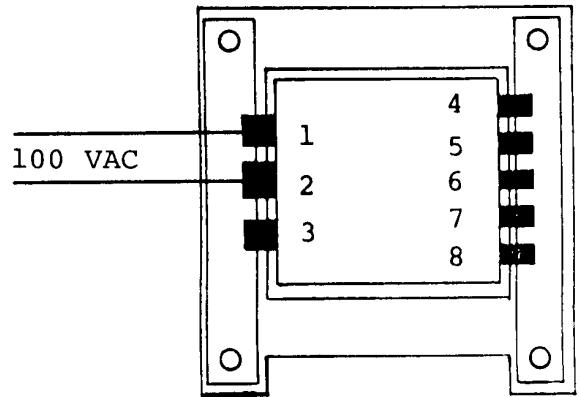
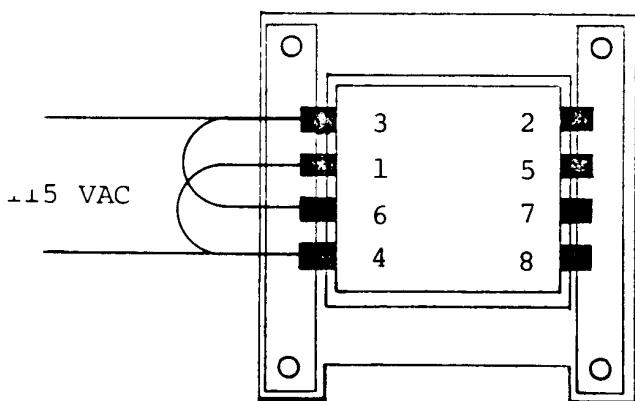


Fig. 3

TO CONVERT TO 115 VAC refer to Figures 4, 5, 6:



(Terminals 9, 10 & 11  
located on far side)

Fig. 4

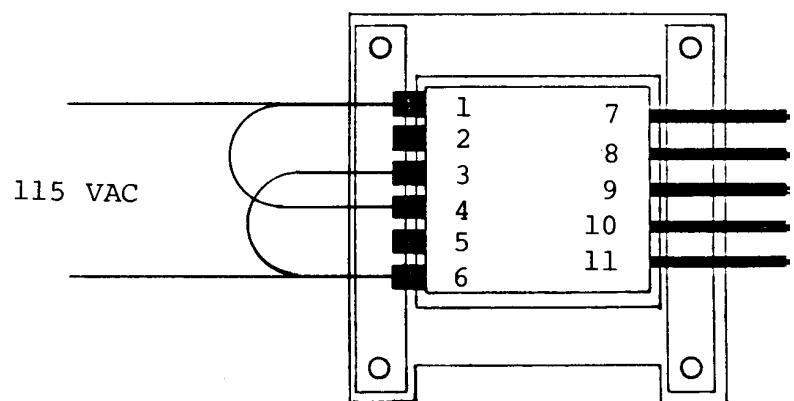


Fig. 5

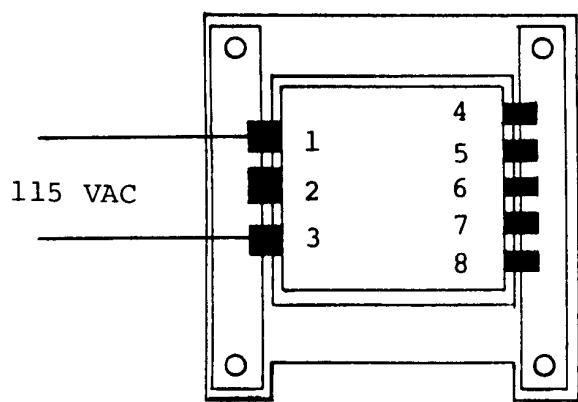


Fig. 6

TO CONVERT TO 230 VAC refer to Figures 7, 8, 9:

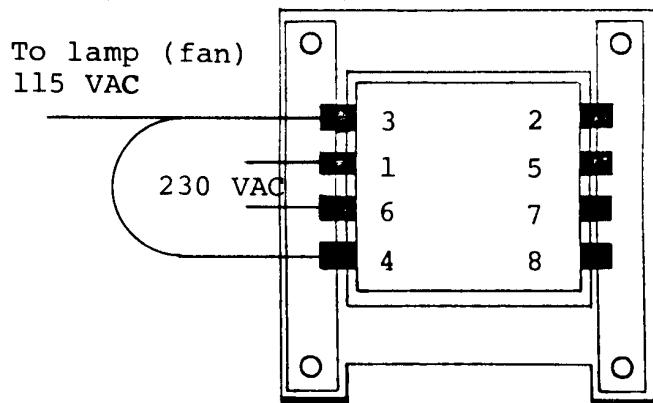
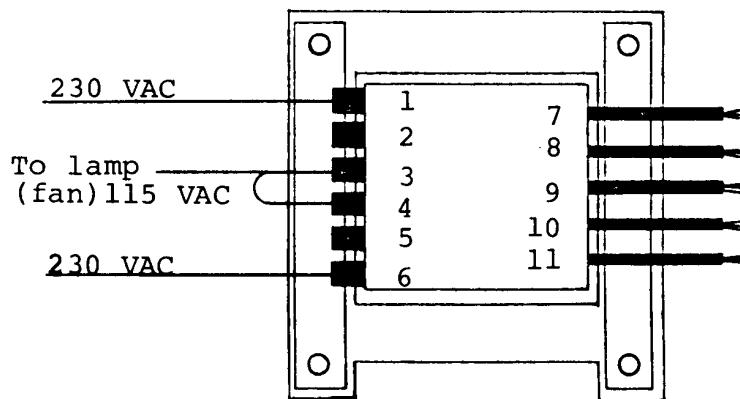


Fig. 7



NOTE: Terminals  
3 & 4 must be  
connected if there  
is no lamp or fan.

Fig. 8

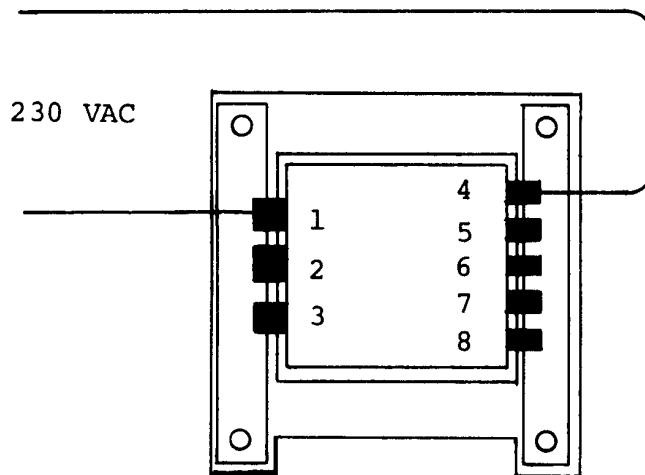


Fig. 9

**2. Video Monitor Power Supply**

In addition to the above changes, the transformer in the video monitor must also be converted to either 100, 115, or 230 VAC. This is done simply by removing the terminal cover in the back of the monitor chassis (located to the side of the power transformer, and labelled "VOLTAGE SELECTION TAPS"). Then, move the jumper wire to the proper voltage terminal.

Gremlin Industries, Inc. San Diego, California 92103		PARTS LIST	TITLE Y-2 SOUND BOARD	DWG NO	826-0002	SH 2 OF 6	F REV
ITEM NO	PART NO	QTY PER ASSY	DESCRIPTION			REF DES	
1	151-0001	10	CAP CER .05 $\mu$ f 50V	C3,13,15,21,28,34,41, 43,45,52			
2	151-0012	12	CAP CER .1 $\mu$ f 50V	C2,14,20,27,33,38, 39,40,44,51,56,50			
3	152-0001	2	CAP FILM .1 $\mu$ f 100V	C5,17			
4	152-0002	1	CAP FILM .22 $\mu$ f 100V	C4			
5	152-0011	2	CAP FILM .15 $\mu$ f 100V	C36,37			
6	152-0007	2	CAP FILM .001 $\mu$ f 250V	C30,31			
7	152-0010	2	CAP FILM .022 $\mu$ f 100V	C18,25			
8	152-0012	1	CAP FILM .047 $\mu$ f 200V	C42			
9	152-0017	1	CAP FILM .33 $\mu$ f 100V	C7			
10	152-0018	1	CAP FILM .01 $\mu$ f 250V	C55			
11	152-0020	1	CAP FILM .47 $\mu$ f 100V	C54			
12	153-0002	4	CAP TANT 1 $\mu$ f 25V	C6,26,32,49			
13	153-0003	1	CAP TANT 2.2 $\mu$ f 25V	C16			
14	153-0004	1	CAP TANT 4.7 $\mu$ f 25V	C9			
15	153-0006	3	CAP TANT 33 $\mu$ f 25V	C11,12,19			
16	170-0110	1	P.C. BOARD				
17	212-0021	1	CONN MALE 10 PIN				
18	212-0031	1	CONN MALE 12 PIN				
19	313-0004	10	1C LM741 EN	U2,3,5-7,9,10,15,16,13			

Gretsch Industries, Inc. See Blueprints for parts		PARTS LIST	TITLE Y-2 SOUND BOARD	DWG NO	SH 3 OF 6	F REV
ITEM NO	PART NO	QTY PER ASSY	DESCRIPTION	REF DES		
20	314-0001	9	1 C TIMER LM 555	U1,8,11,14,17,19,20,24,25		
21	315-0035	1	1 C MM 5837	114		
22	471-0102	10	RES 1K OHM 1/2W 5%	R3,5,9,12,16,30,43,49,		
23	471-0103	15	RES 10K OHM 1/2W 5%	R16,R,13,15,21-25,		
24	471-0104	2	RES 100K OHM 1/2W 5%	44-48,75		
25	471-0153	1	RES 15K OHM 1/2W 5%	R20,80		
26	471-0154	3	RES 150K OHM 1/2W 5%	R2,42,82		
27	471-0183	6	RES 18K OHM 1/2W 5%	R1,19,28,46,53,72		
28	471-0223	4	RES 22K OHM 1/2W 5%	R27,52,60,83		
29	471-0225	1	RES 2.2M OHM 1/2W 5%	R56		
30	471-0272	1	RES 2.7K OHM 1/2W 5%	R62		
31	471-0473	2	RES 47K OHM 1/2W 5%	R50,58		
32	471-0682	1	RES 6.8K OHM 1/2W 5%	K17		
33	471-0683	4	RES 6.8K OHM 1/2W 5%	R4,63,76,54		
34						
35	471-0823	1	RES 82K OHM 1/2W 5%	R29		
36	475-0009	5	POT CARTRIDGE 50K OHM	R10,24,51,61,81		
37	481-0006	9	DIODE IN914/IN4148	D1 - D9		



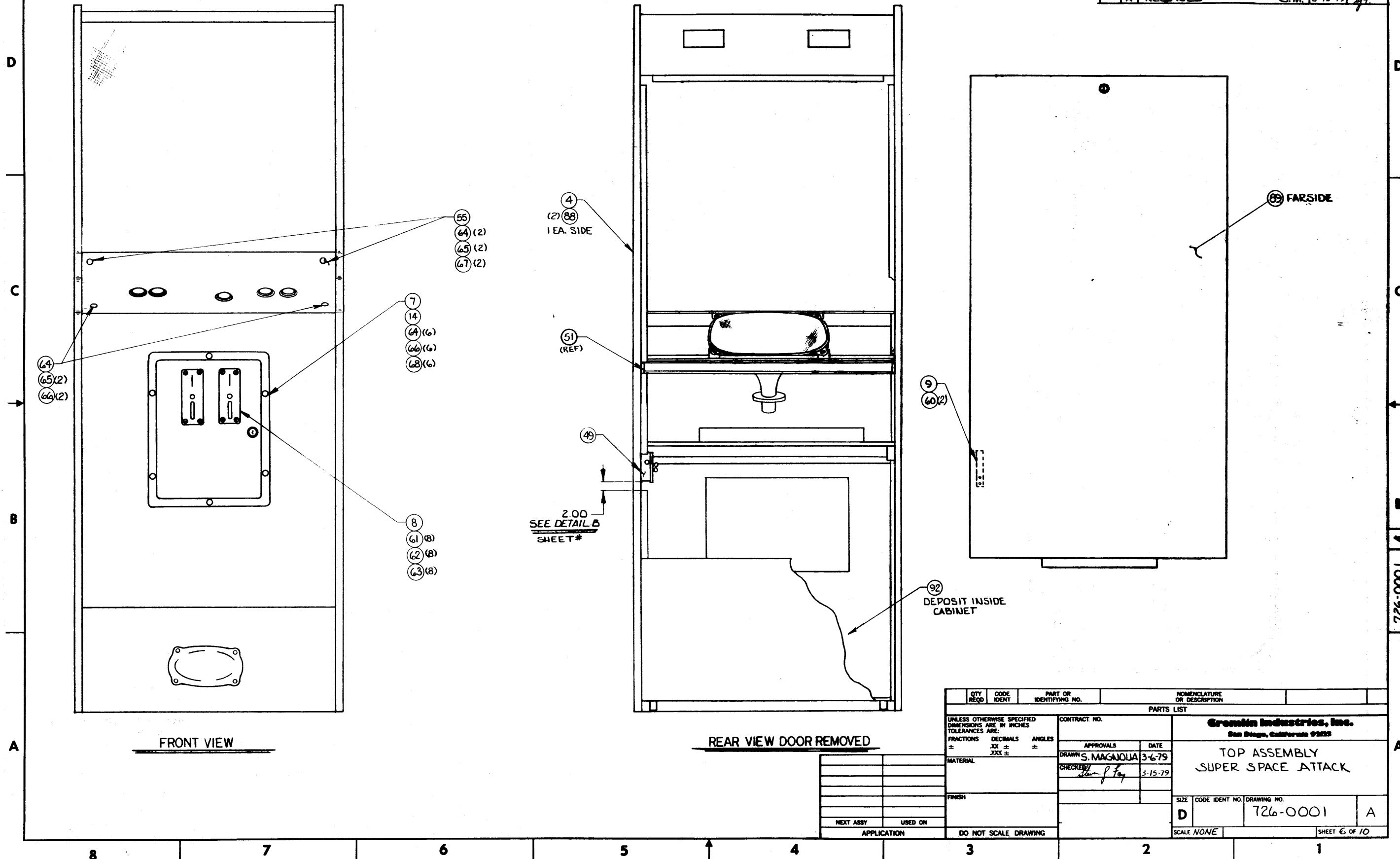
Grenadian Industries, Inc. See Sheet, Drawing 0000000000		PARTS LIST	TITLE ASS'Y BASIC U.I.C.BD.	DWG NO	800-0031	SH 2 OF 5	A REV
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1	151-0005	1	CAP CER 680pf	50V	C39		
2	151-0012	54	CAP CER .1μf	50V	C35,7-11,13-17,22,25, C27-38,C40-67		
3	152-0001	1	CAP FILM .1μf	100V	C4		
4	152-0017	1	CAP FILM .33μf	100V	C24		
5	153-0001	6	CAP TANT 10μf	25V	C12,29,21,23,26,68		
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 NE555	U10,U55			

Creative Industries, Inc. San Diego, California 92108		PARTS LIST	TITLE ASSY BASIC V.1.C.BD.	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 74LS04		U68	
24	314-0053	4	IC 74LS175		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 280 MK 3880		U53	
34	315-0042	1	IC VID INTERFACE		U48	
35	314-0093	1	IC 74LS374		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	

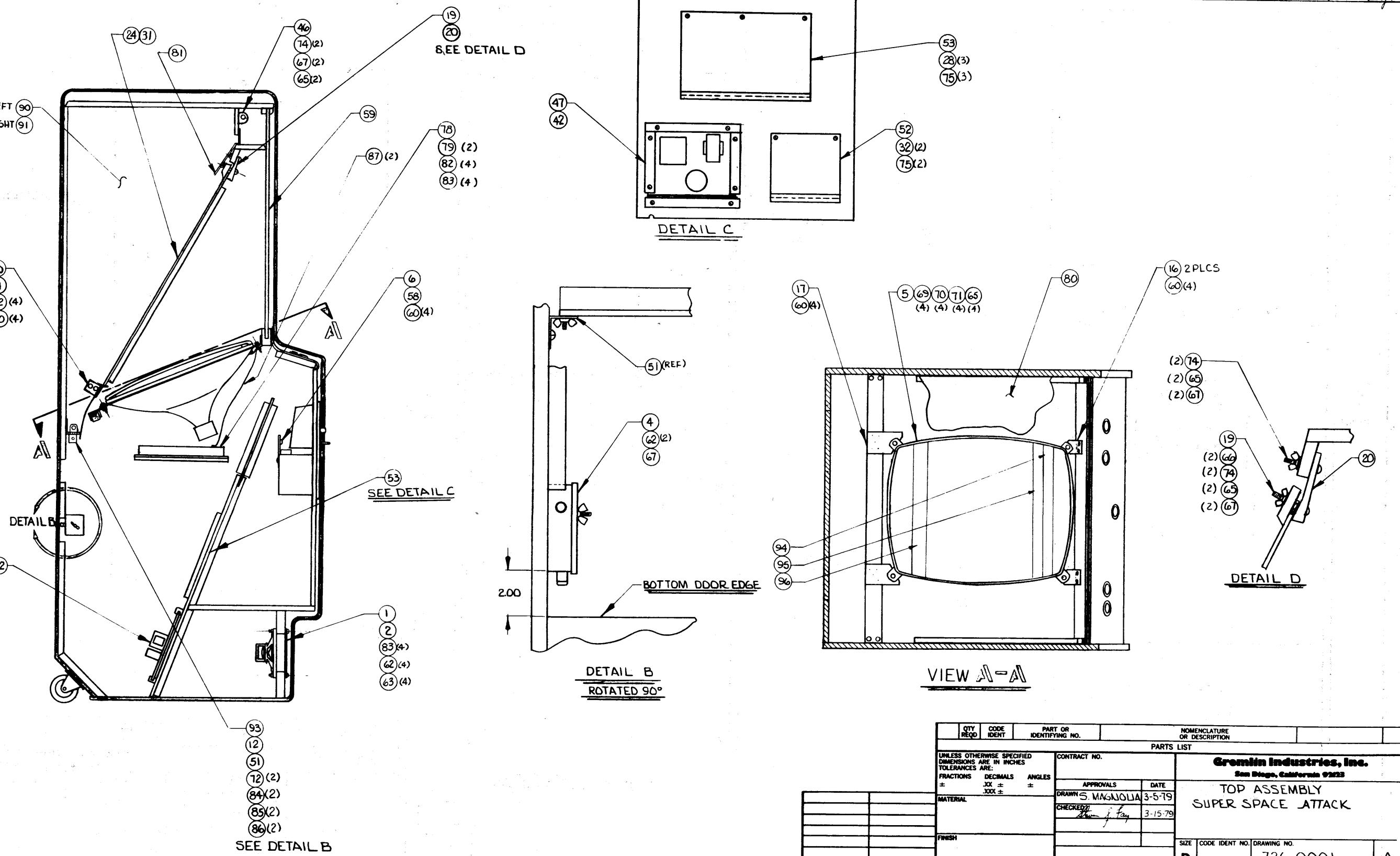


8                    7                    6                    5                    4                    3                    2                    1

REVISIONS				
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REVISIONS		ZONE	LTR	DESCRIPTION	DATE	APPROVED
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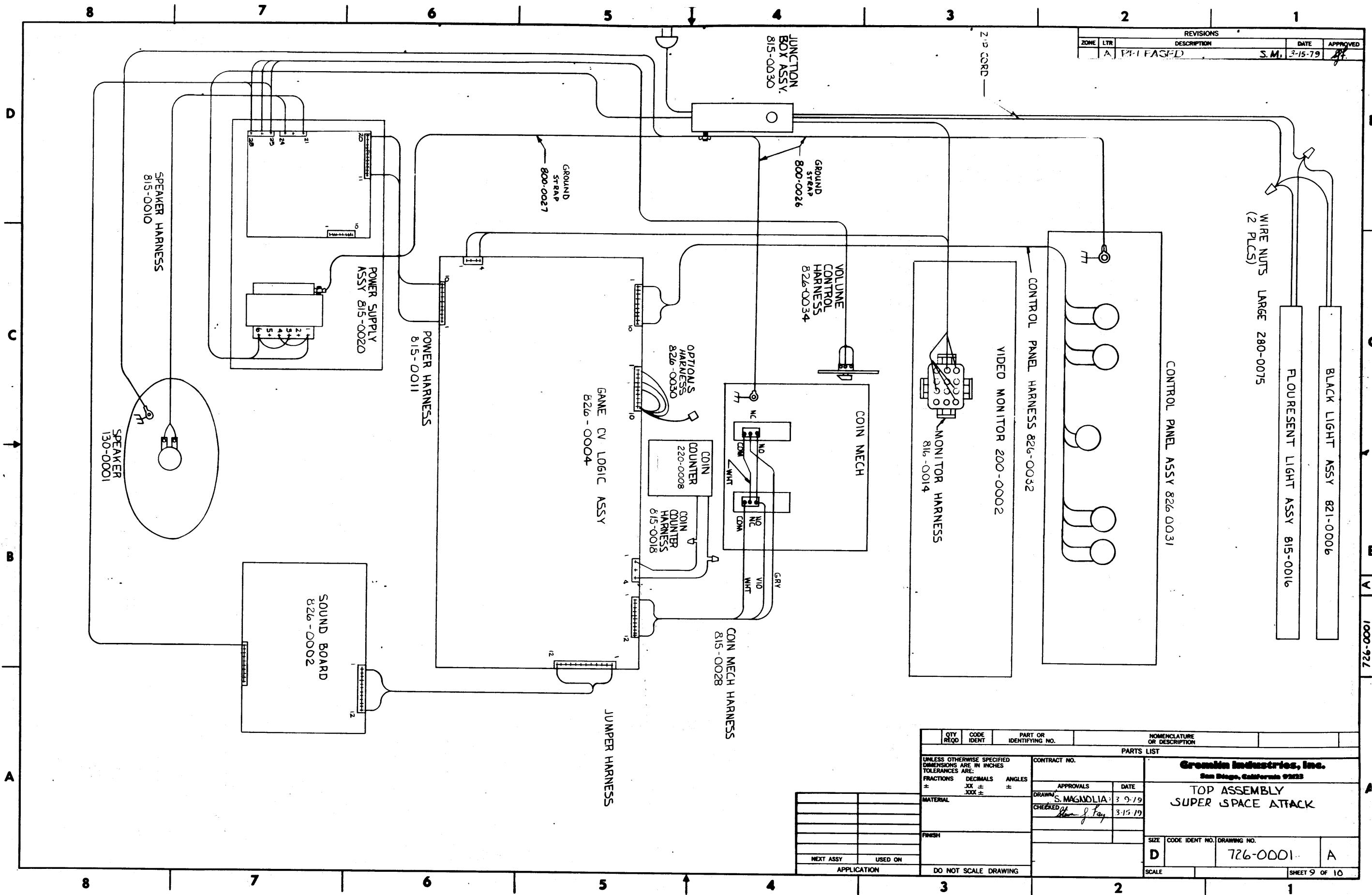


QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	
PARTS LIST				
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES				CONTRACT NO.
$\pm$ JXX $\pm$ XXX				APPROVALS DATE
DRAWN S. MAGNOLIA 3-5-79				CHECKED <i>John F. Fay</i> 3-15-79
MATERIAL				FINISH
NEXT ASBY				SIZE CODE IDENT NO. DRAWING NO.
USED ON APPLICATION				D 726-0001 A
DO NOT SCALE DRAWING				SCALE A-VOC

**Gremlin Industries, Inc.**  
San Diego, California 92123

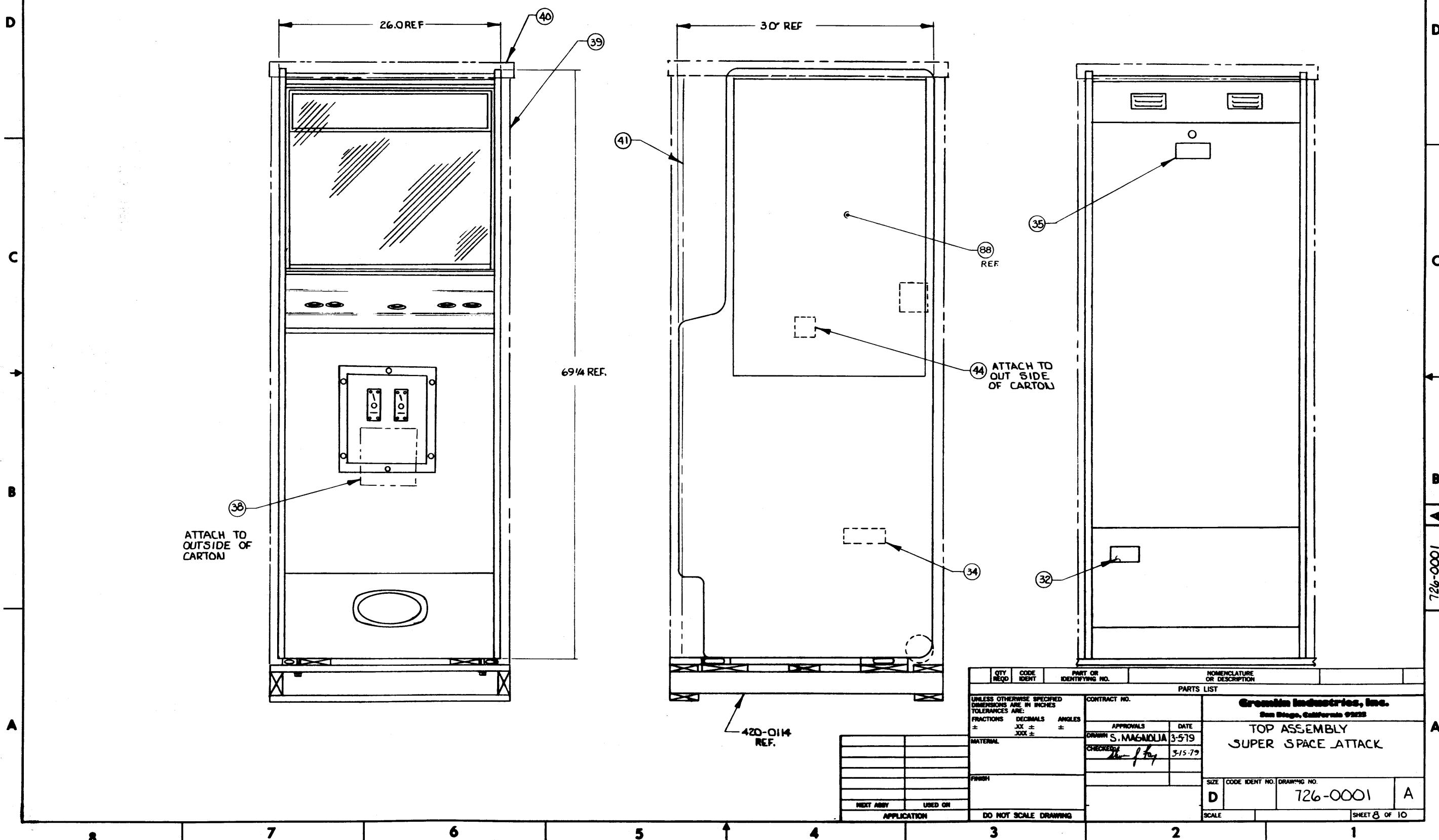
TOP ASSEMBLY  
SUPER SPACE ATTACK

726-0001 A



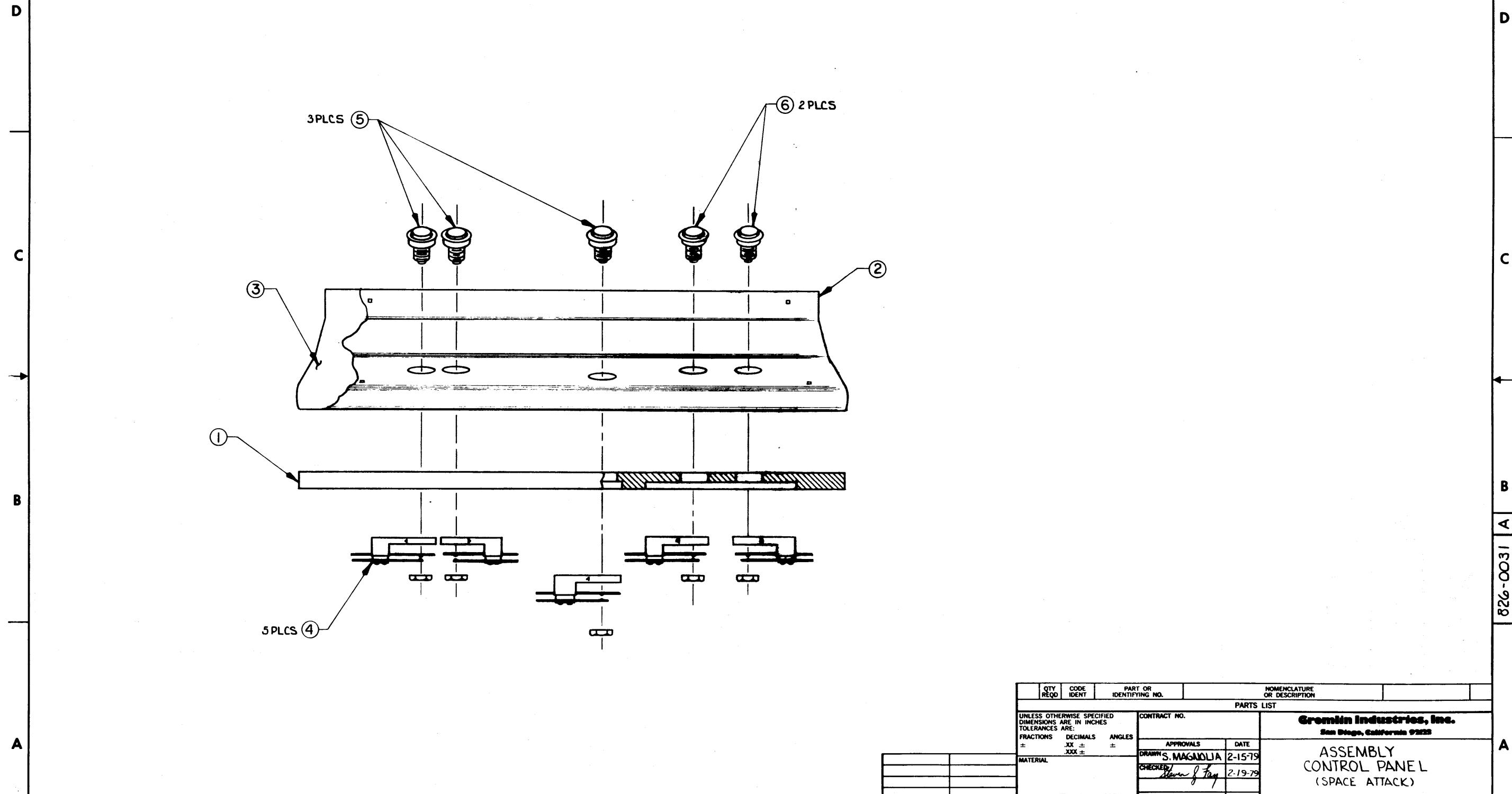
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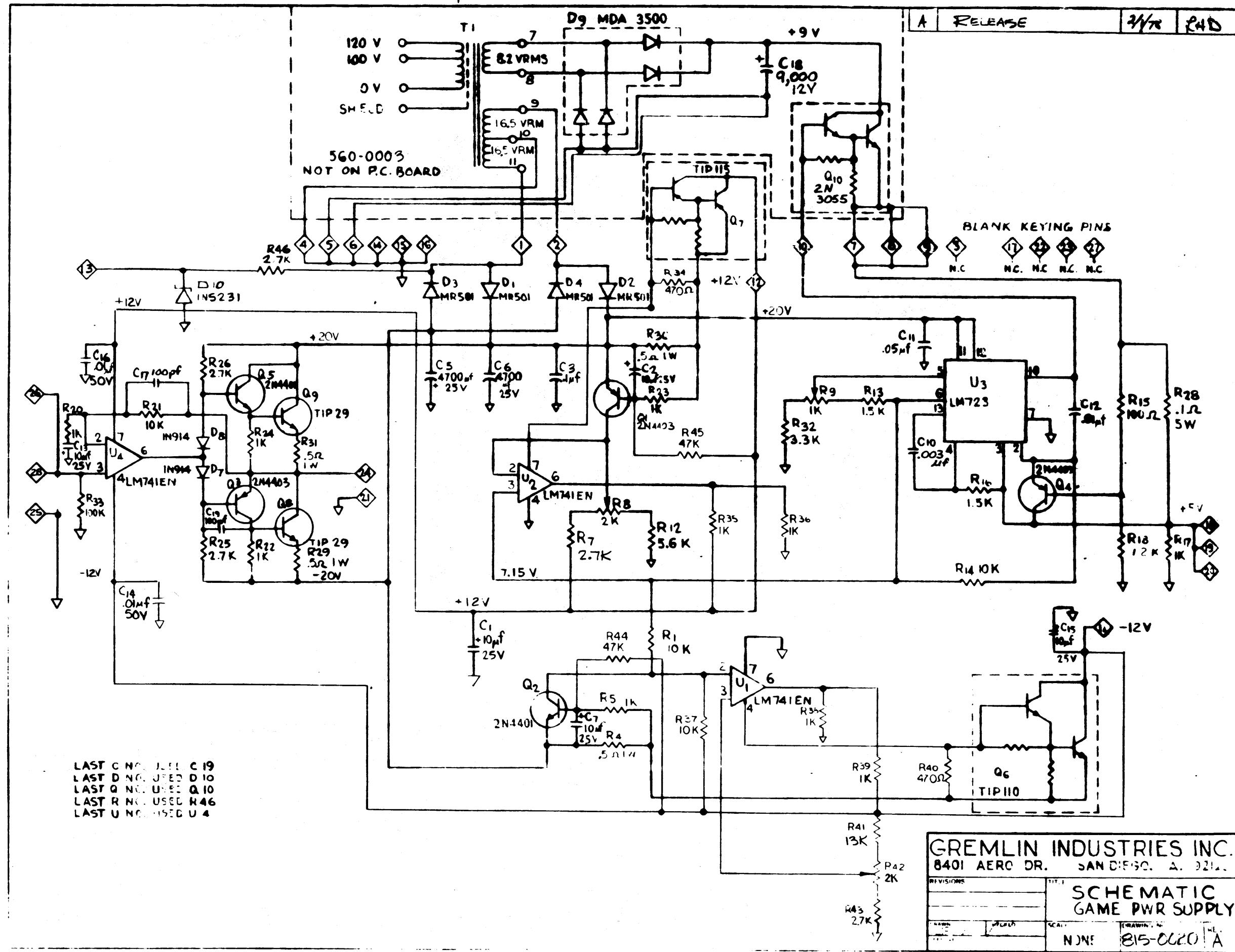


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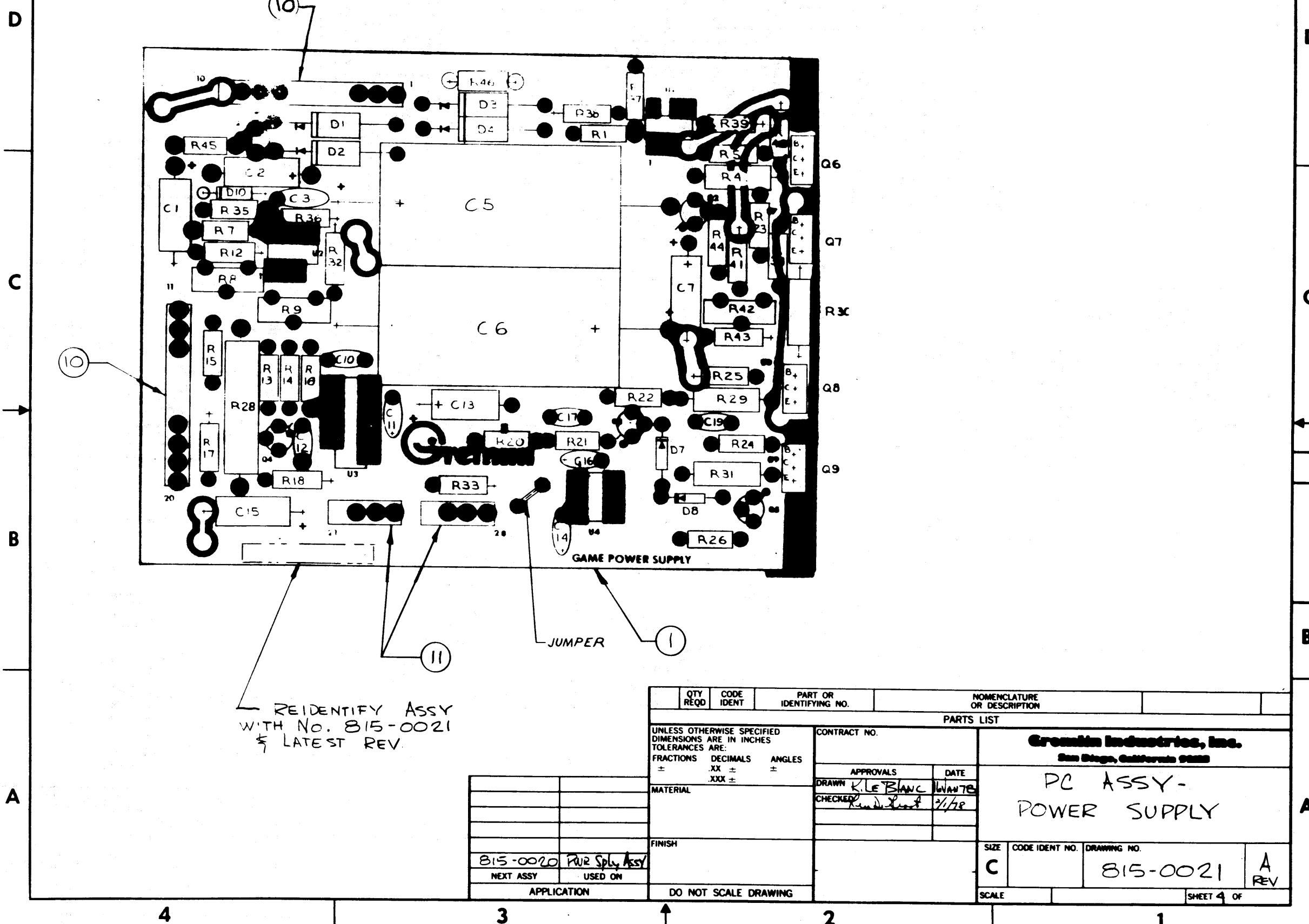


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4 3 2 1

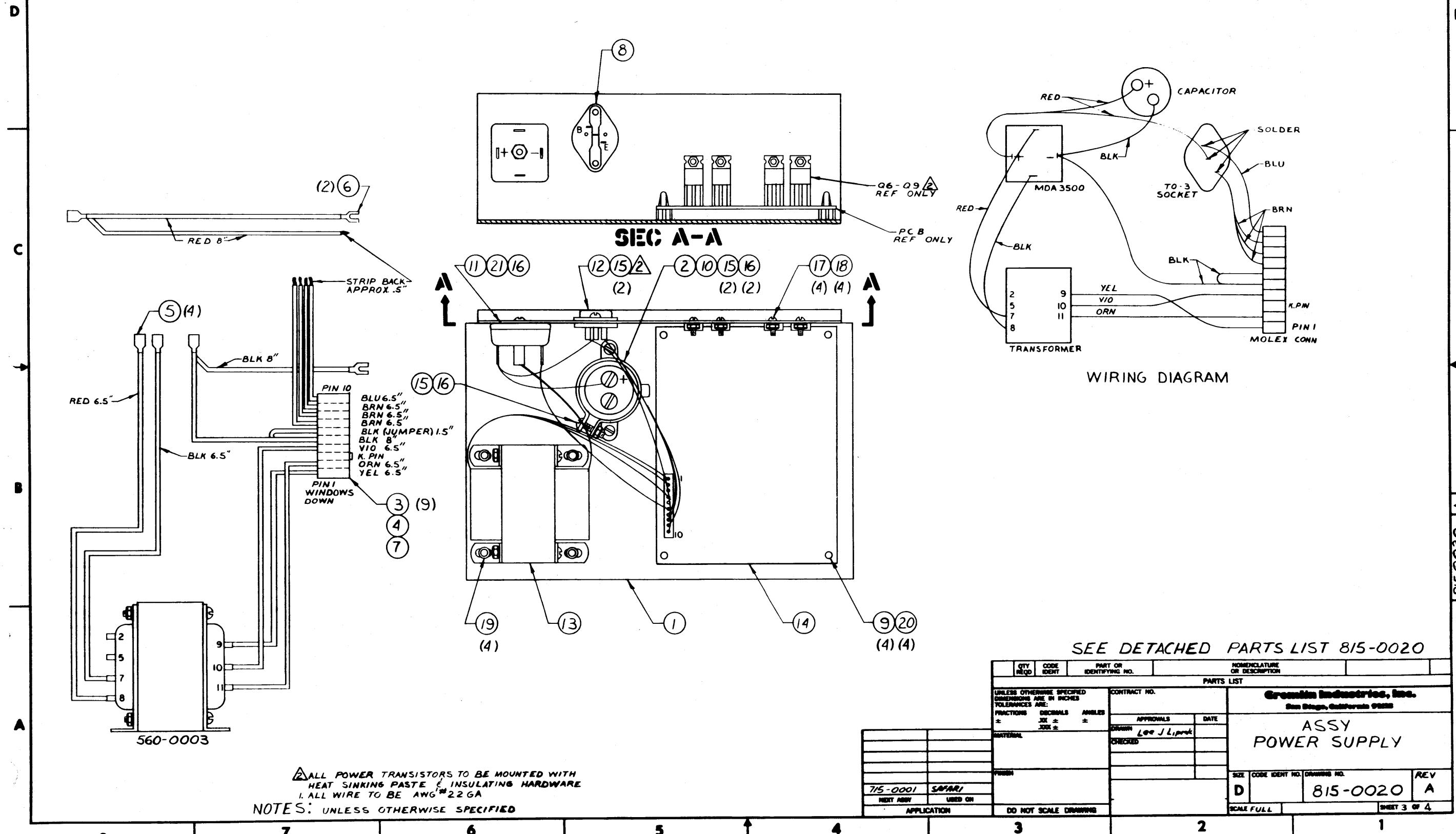
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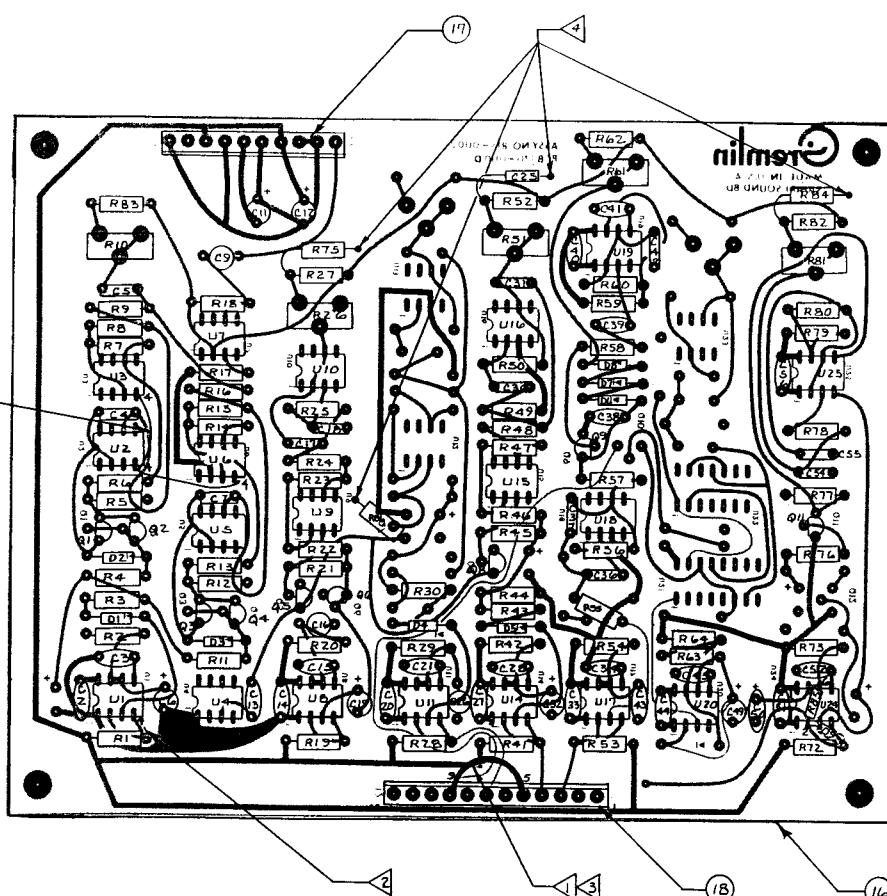
4 3 2 1

8 7 6 5 4 3 2 1

REVISIONS			
ZONE	LTR	DESCRIPTION	DATE APPROVED



8 7 6 5 4 3 2 1



SEE DETACHED PARTS LIST

- 4 SOLDER TO GND PLANE
- 3 INSTALL ON BACK OF BOARD
- 2 CUT CLAD FROM U1, PIN 4 TO R1
- 1 JUMPER

NOTES:

REVISIONS			
ZONE	LTR	DESCRIPTION	DATE APPROVED
	C	REVISED & REDRAWN PER ECN 266	WJB 1-8-79
	D	PER ECN 271	KB 1-15-79
	E	PER ECN 272	WJB 1-16-79
	F	PER ECN 276	KB 1-31-79

D

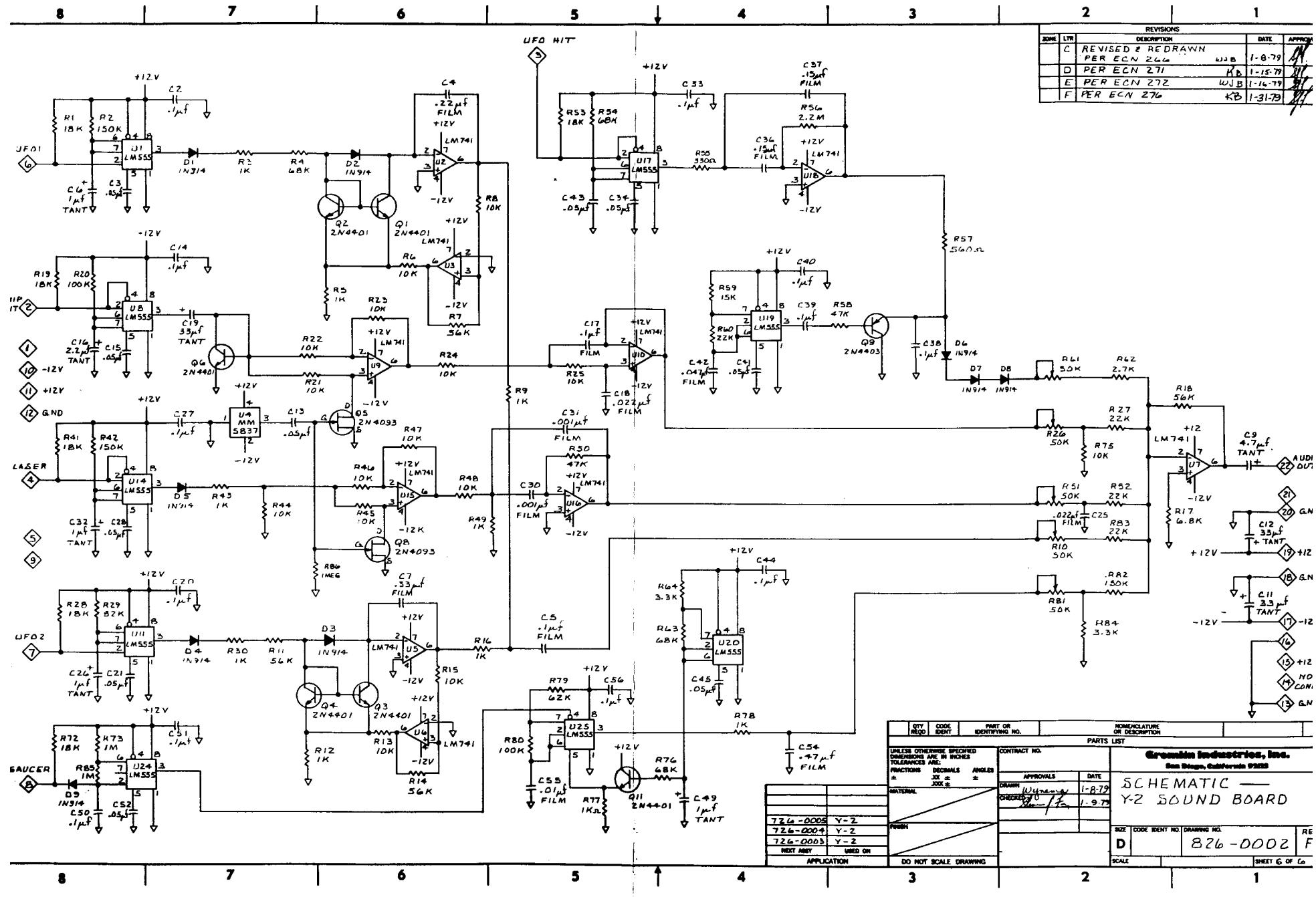
C

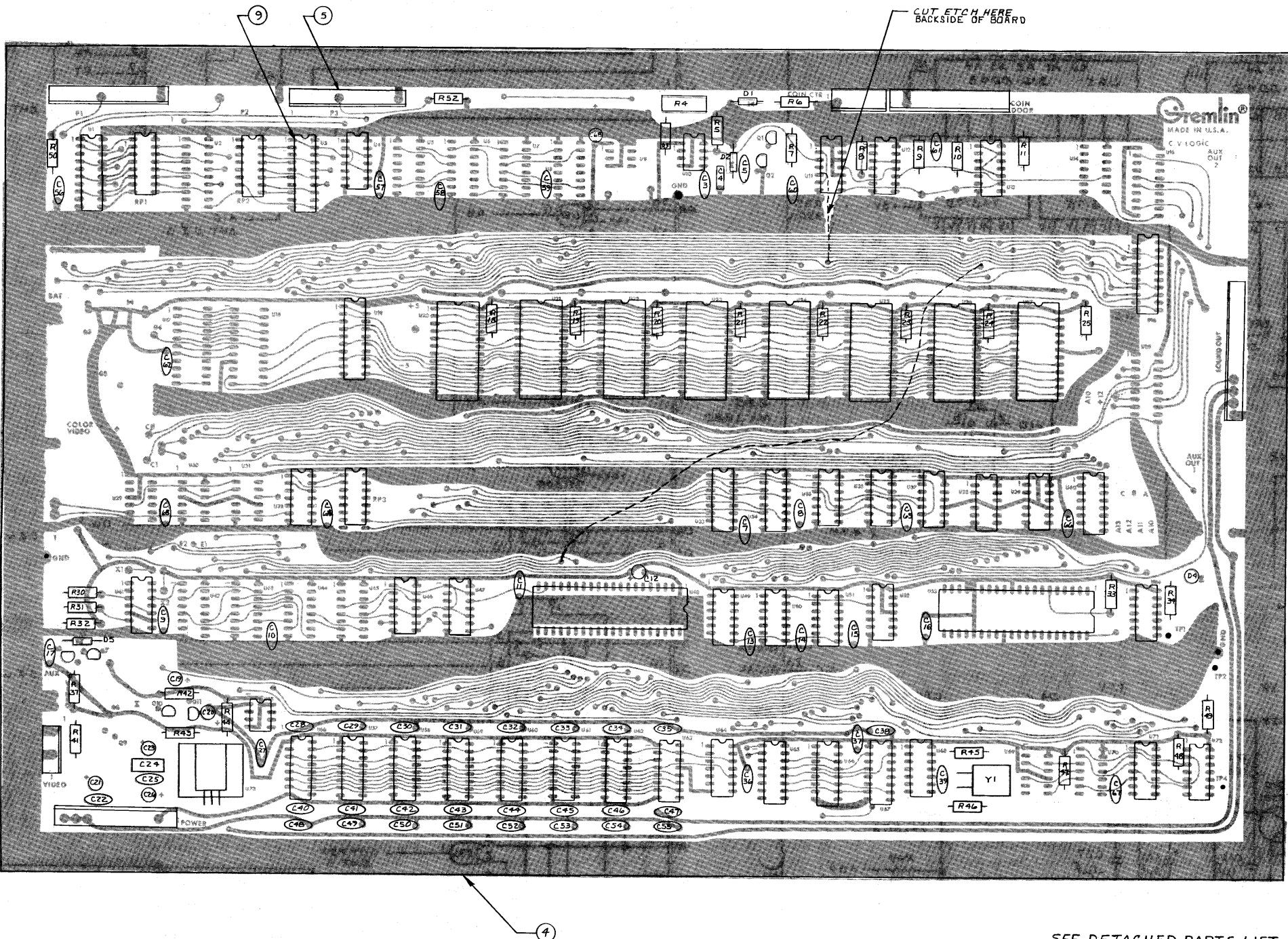
B

826-00022/F

A

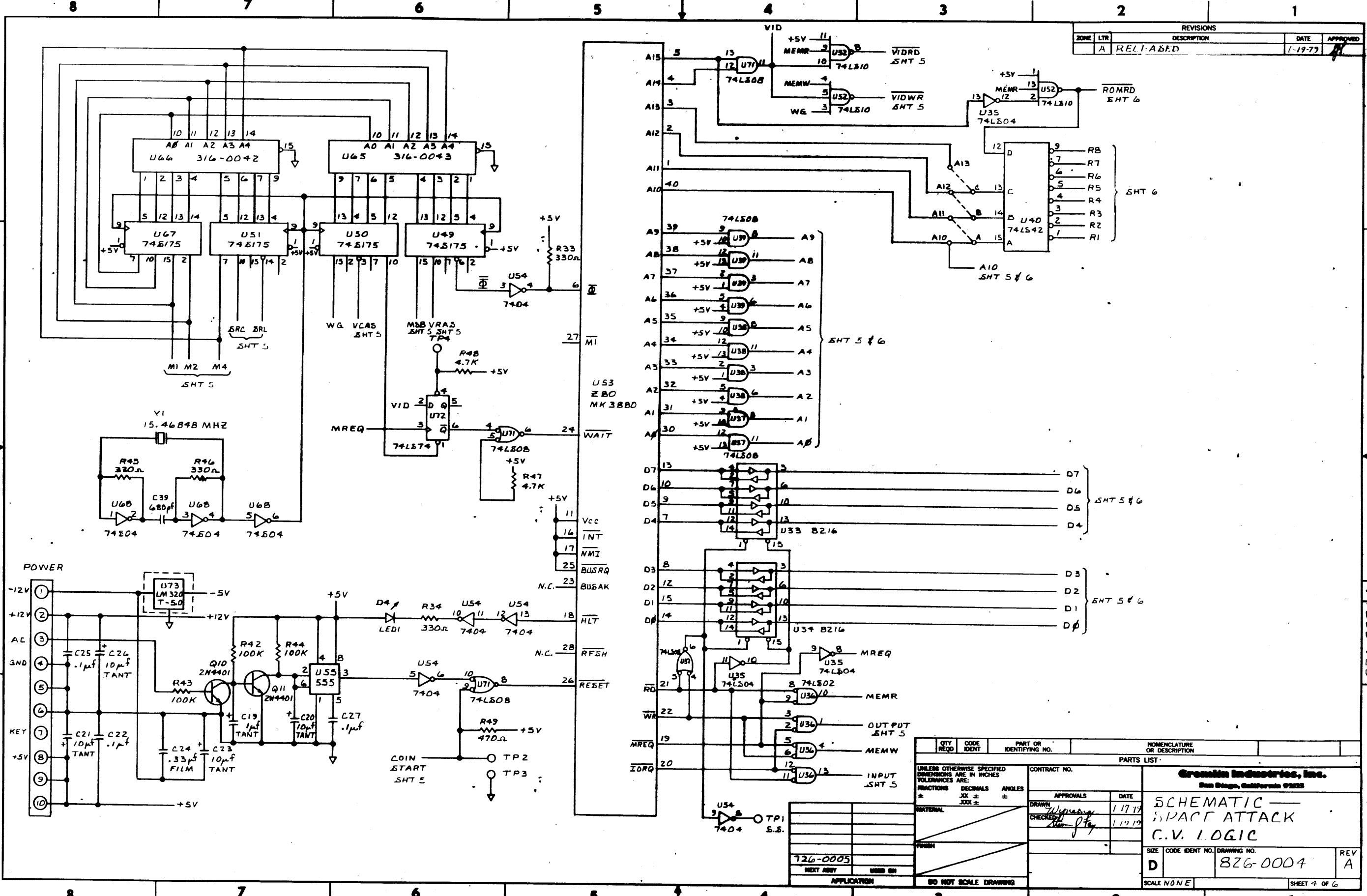
QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	
			PARTS LIST	
			Gremlin Industries, Inc. San Diego, California 92122	
			ASSEMBLY Y-2 SOUND BOARD	
			SIZE	CODE IDENT NO. DRAWING NO. REV
			D	826-0002 F
			SCALE	2 / 1
			SHEET 5 OF 6	
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES $\pm$ $\pm$ $\pm$ INCHES DEGREES JOINTS				
MATERIAL			APPROVALS	DATE
726-0005 Y-2			DRWNS	1-8-79
726-0004 Y-2			CHECKED	1-9-79
726-0003 Y-2				
NEXT ASSY USED ON				
APPLICATION			DO NOT SCALE DRAWING	





*SEE DETACHED PARTS LIST*

QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION		
PARTS LIST					
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		CONTRACT NO.		<b>Groves Industries, Inc.</b> San Diego, California 92126	
TOLERANCES ARE: PRACTICALLY XX ± XX ± XX ±		APPROVALS		DATE	
MATERIAL		DRAWN <i>John</i>	1/18-77	ASSEMBLY —	
		CHECKED <i>John</i>	1/19-77	SPACE ATTACK	
FINISH				C.V. LOGIC	
USED ON		E		REV A	
IN		CODE IDENT NO. DRAWING NO. 826-0004			
DO NOT SCALE DRAWING		SCALE 2/1		SHEET 3 OF 6	



8

7

6

5

4

3

2

1

REVISONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
A		RELEASED	1-19-79	SP

D

D

C

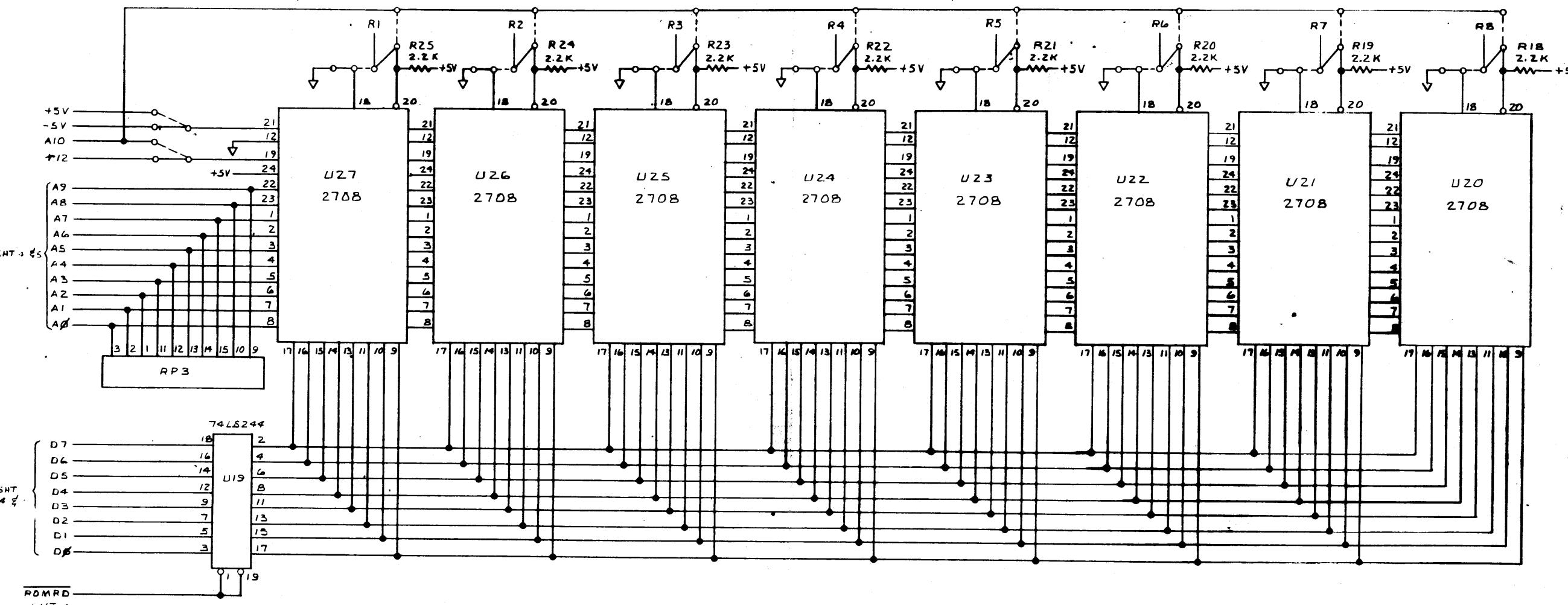
C

B

B

A

A



QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	
PARTS LIST				CONTRACT NO.
Gronline Industries, Inc. San Diego, California 92108				SCHEMATIC
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS   DECIMALS   ANGLES ±   ±   ±				SPACE ATTACK C.V. LOGIC
APPROVALS   DATE				826-0004
MATERIAL   1-19-79				REV A
726-0005				SIZE CODE IDENT NO. DRAWING NO.
DRAWN BY: Wm. M. H. APPROVED BY: J. P. TAYLOR CHECKED BY: USED ON: DATE: 1-19-79				DO NOT SCALE DRAWING
APPLICATON				SCALE N/D ONE SHEET 6 OF 6

8

7

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1

