

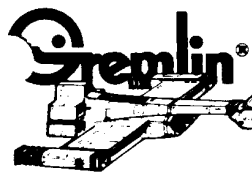
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SUPER

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:

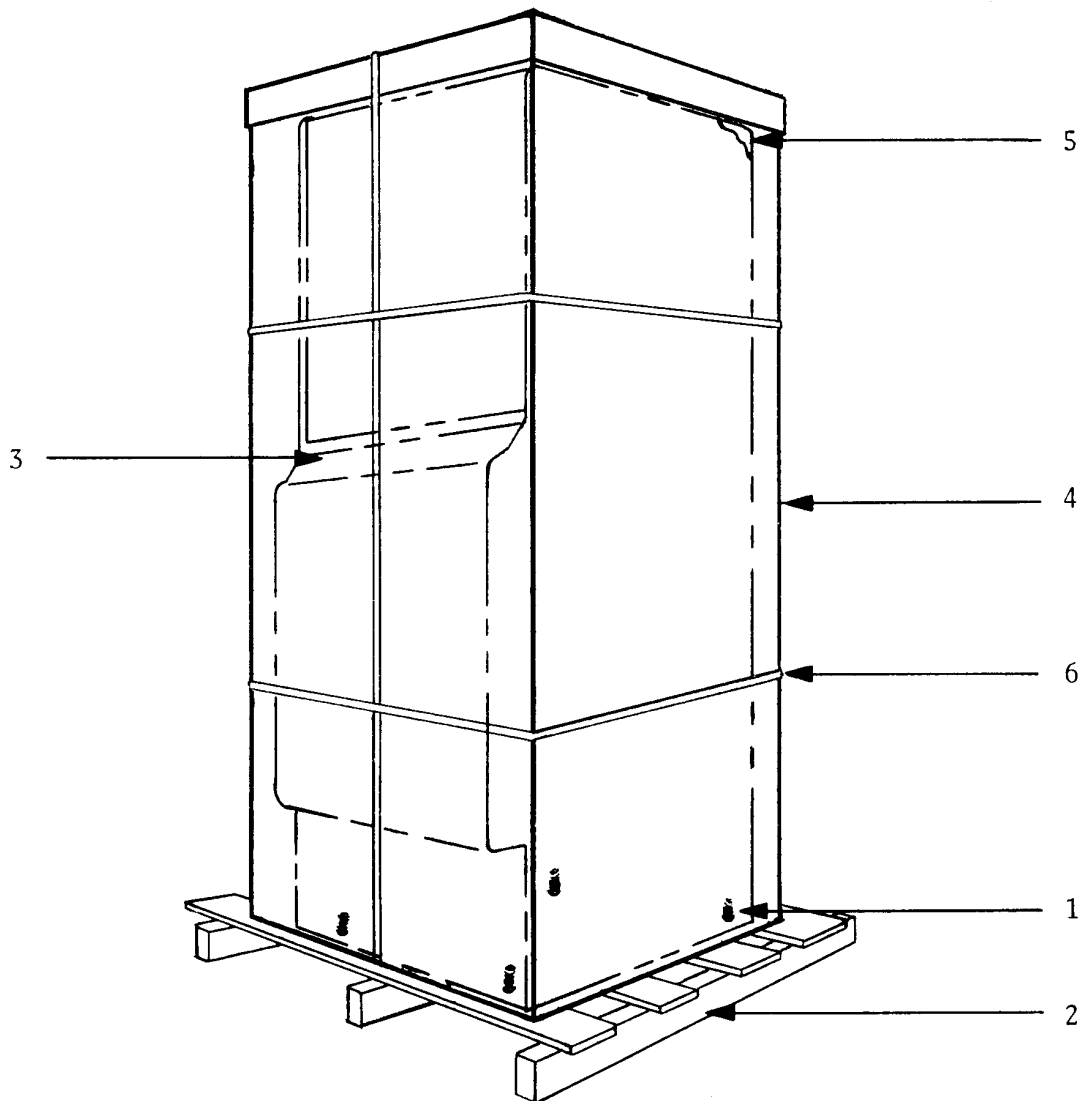
The system reset circuitry described above requires that the coin counter is attached to the system. If there is a coin counter problem and no replacement is available, the game will function properly if a 10K Ohm resistor is connected across the coin counter input pins to the video logic board.

REPACKAGING INSTRUCTIONS

Should it be necessary to ship this game, follow the instructions below for game re-crating:

- 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.)

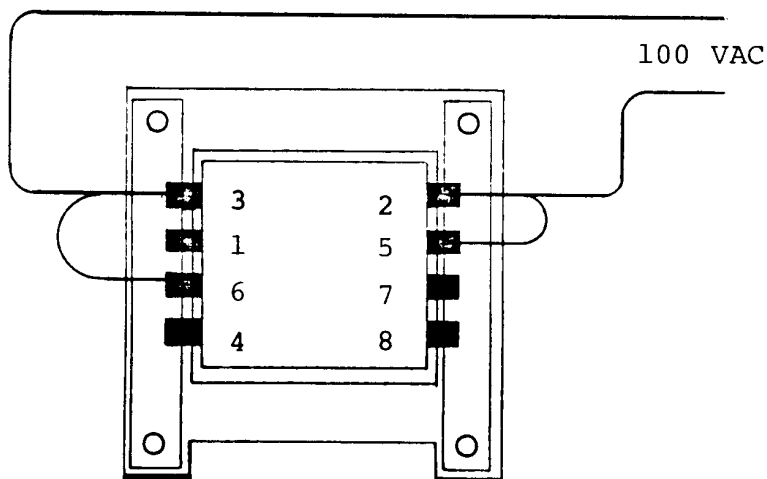
SPECIAL VOLTAGE CONVERSION INSTRUCTIONS

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

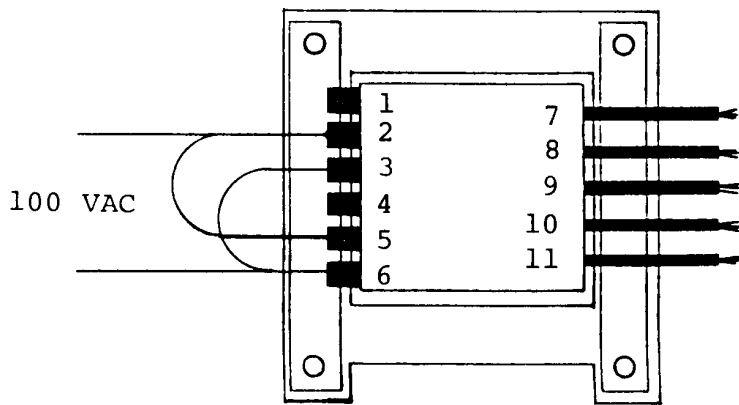


Fig. 2

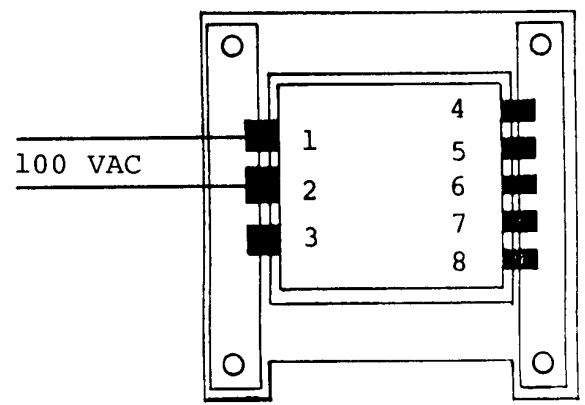
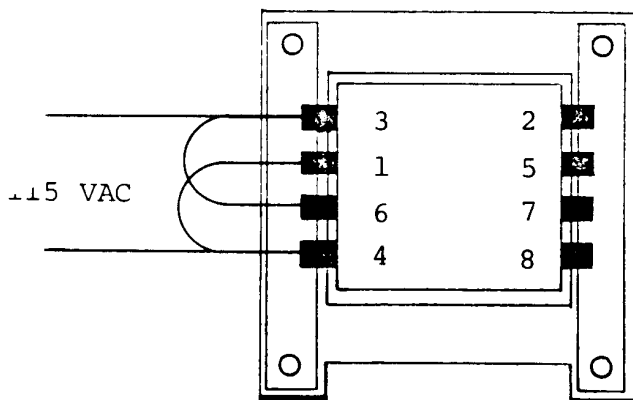


Fig. 3

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



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

Fig. 4

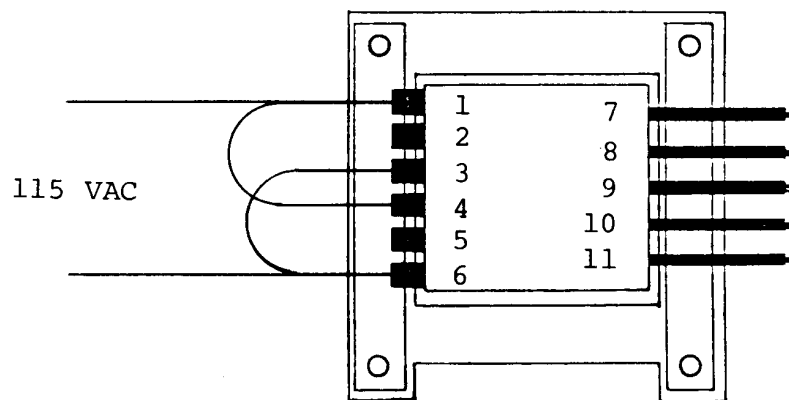


Fig. 5

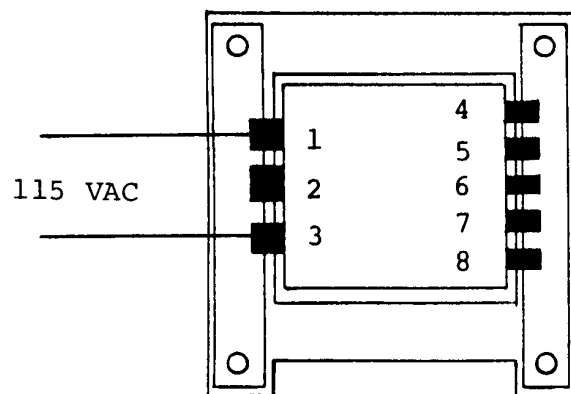
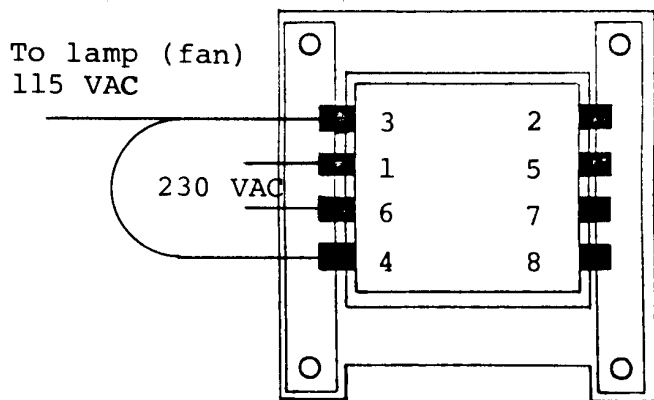
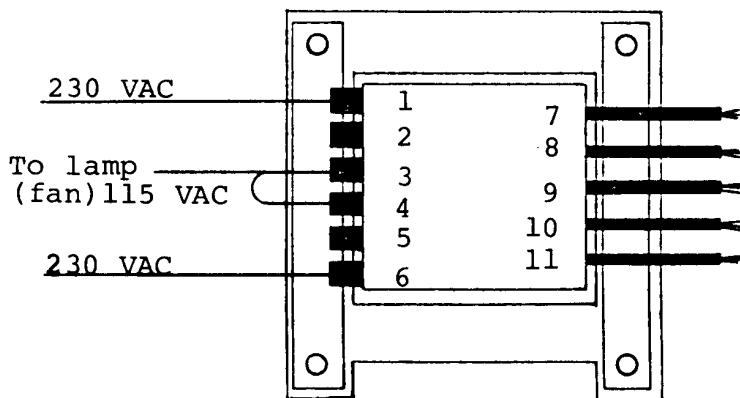


Fig. 6

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



(Terminals 9, 10 & 11 located on far side)
Fig. 7



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

Fig. 8

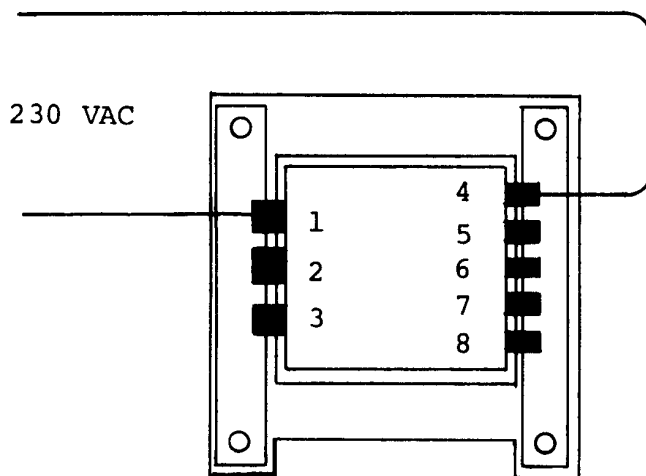


Fig. 9

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.

Gromlin Industries, Inc. San Diego, California 92123			PARTS LIST	TITLE Y-2 SOUND BOARD	826-0002 DWG NO		SH 2 OF 6	F REV
ITEM NO	PART NO	QTY PER ASSY		DESCRIPTION	REF DES			
1	151-0001	10		CAP CER .05 μ f 50V	C3,13,15,21,28,34,41,43,45,52			
2	151-0012	12		CAP CER .1 μ f 50V	C2,14,20,27,33,38,39,40,44,51,56,50			
3	152-0001	2		CAP FILM .1 μ f 100V	C5,17			
4	152-0002	1		CAP FILM .22 μ f 100V	C4			
5	152-0011	2		CAP FILM .15 μ f 100V	C36,37			
6	152-0007	2		CAP FILM .001 μ f 250V	C30,31			
7	152-0010	2		CAP FILM .022 μ f 100V	C18,25			
8	152-0012	1		CAP FILM .047 μ f 200V	C42			
9	152-0017	1		CAP FILM .33 μ f 100V	C7			
10	152-0018	1		CAP FILM .01 μ f 250V	C55			
11	152-0020	1		CAP FILM .47 μ f 100V	C54			
12	153-0002	4		CAP TANT 1 μ f 25V	C6,26,32,49			
13	153-0003	1		CAP TANT 2.2 μ f 25V	C16			
14	153-0004	1		CAP TANT 4.7 μ f 25V	C9			
15	153-0006	3		CAP TANT 33 μ 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		1 C LM741 EN	U2,3,5-7,9,10,15,16,18			

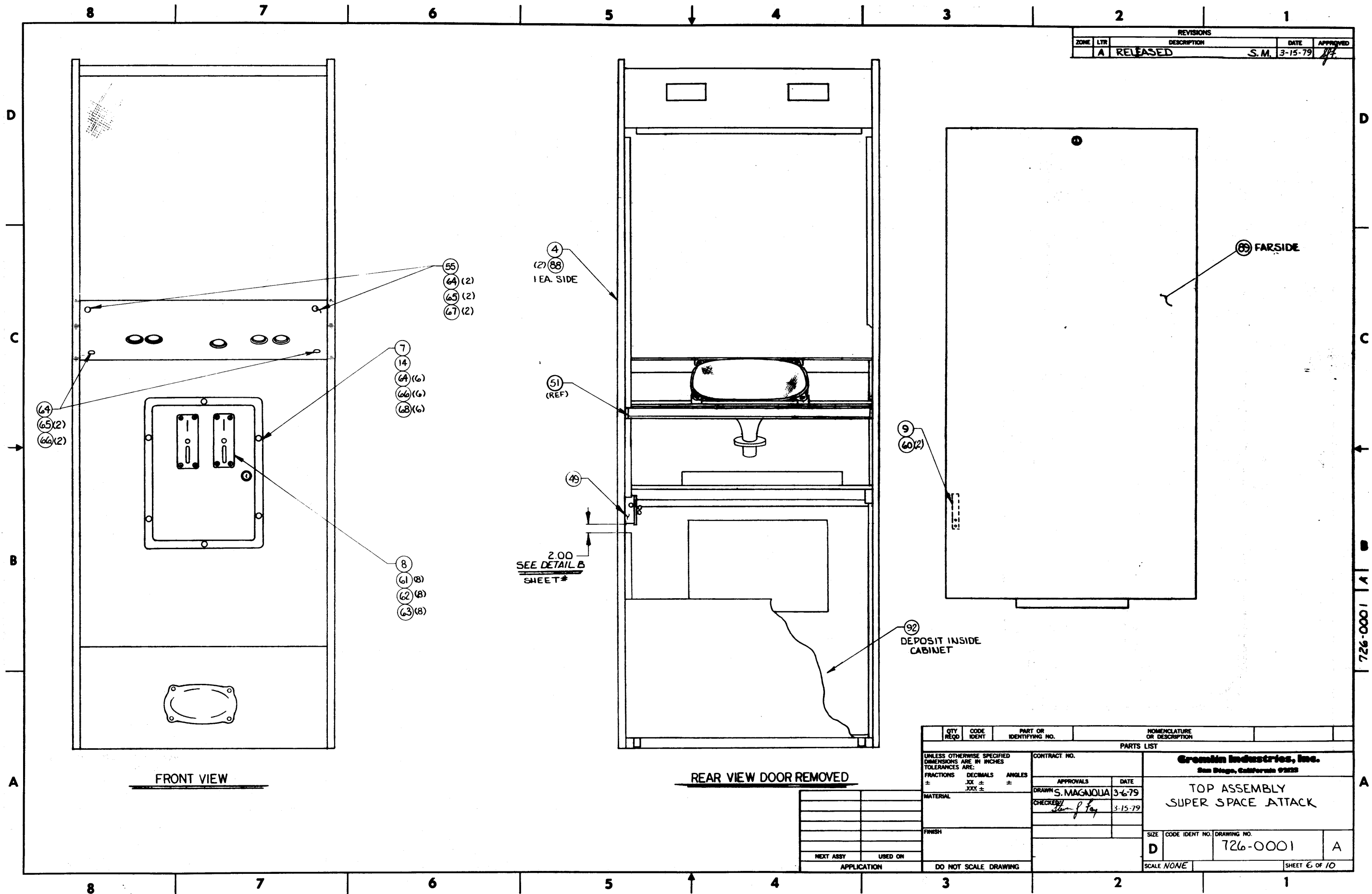
Grossman Industries, Inc. San Diego, California 92123			PARTS LIST		TITLE Y-2 SOUND BOARD		826-0002 DWG NO		SH 3 OF 6	F REV
ITEM NO	PART NO	QTY PER ASSY	DESCRIPTION		REF DES					
20	314-0001	9	1 C TIMER LM 555		U1,8,11,14,17,19,20,24,25					
21	315-0035	1	1 C MM 5837		114					
22	471-0102	10	RES 1K OHM 1/2W 5%		R3,5,9,12,16,30,43,49,78,77					
23	471-0103	15	RES 10K OHM 1/2W 5%		R6,8,13,15,21-25,44-48,75					
24	471-0104	2	RES 100K OHM 1/2W 5%		R20,80					
25	471-0153	1	RES 15K OHM 1/2W 5%		R59					
26	471-0154	3	RES 150K OHM 1/2W 5%		R2,42,82					
27	471-0183	6	RES 18K OHM 1/2W 5%		R1,19,28,41,53,72					
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	475-0008	5	POT CARBON 50K OHM		R10,26,51,61,81					
37	481-0006	9	DIODE 1N914/1N4148		D1-D9					

[illegible]

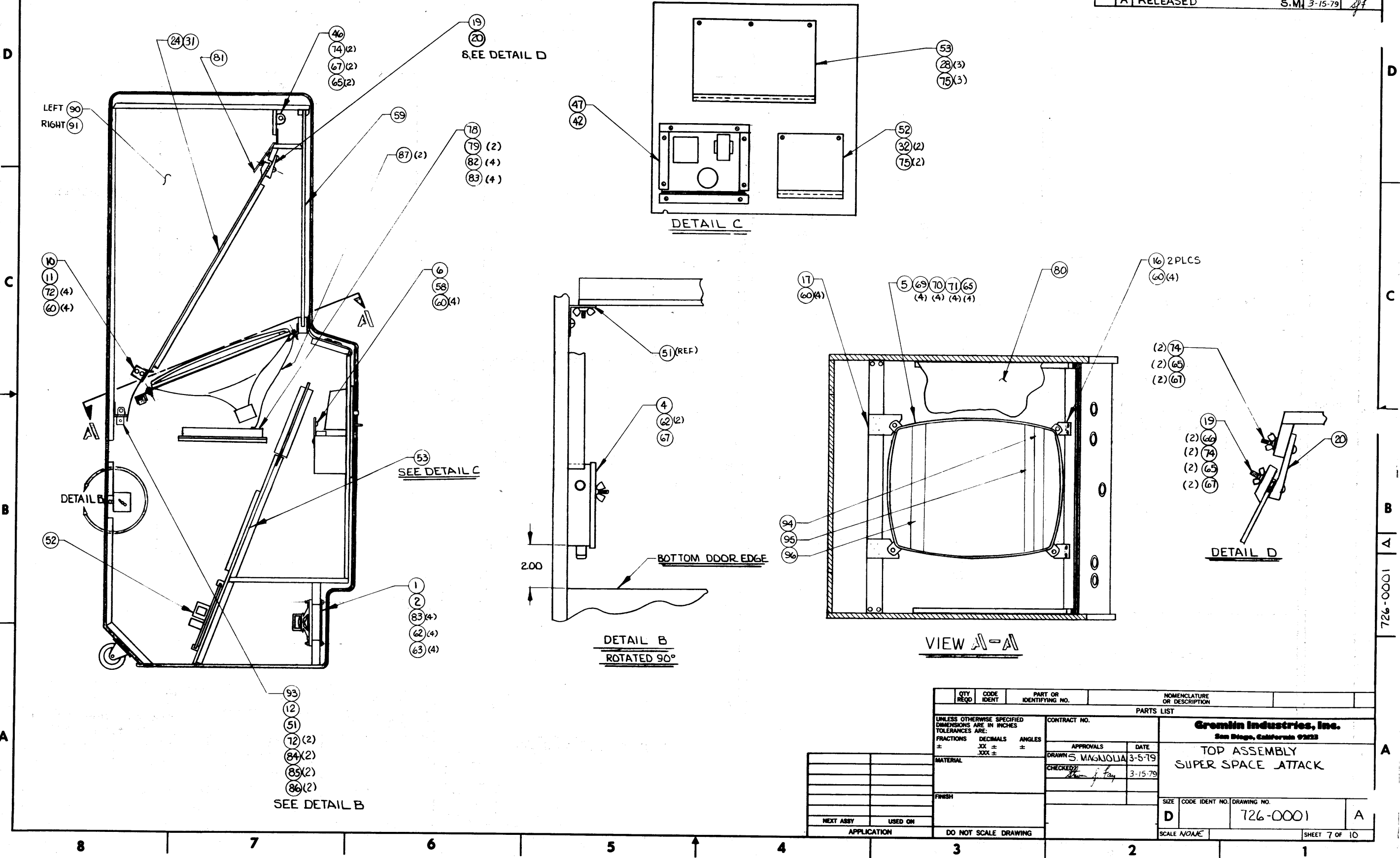
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ITEM NO	PART NO	QTY PER ASSY				DESCRIPTION	REF DES					
1	151-0005	1				CAP CER 680 pf 50V	C39					
2	151-0012	54				CAP CER .1 pf 50V	C3,5,7-11,13-17,22,25, C27-38,C40-67					
3	152-0001	1				CAP FILM .1 pf 100V	C4					
4	152-0017	1				CAP FILM .33 pf 100V	C24					
5	153-0001	6				CAP TANT 10 pf 25V	C12,20,21,23,26,68					
6	153-0002	1				CAP TANT 1 pf 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					

Grossman Industries, Inc. San Diego, California 92123			PARTS LIST		TITLE ASSY BASIC V.I.C.B.D.		800-0031 DWG NO		SH 3 OF 5		A REV	
ITEM NO	PART NO	QTY PER ASSY			DESCRIPTION	REF DES						
19	314-0015	1			1C 7404	U54						
20	314-0018	3			1C 74LS00	U4, U12, U32						
21	314-0019	2			1C 74LS04	U35, U64						
22	314-0040	3			1C 74LS125	U13, U46, U47						
23	314-0046	1			1C 74LS04	U68						
24	314-0053	4			1C 74LS175	U49-U51, U67						
25	314-0055	2			1C 74LS244	U1, U19						
26	314-0058	5			1C 74LS08	U37-U39, U41, U71						
27	314-0059	1			1C 74LS10	U52						
28	314-0061	1			1C 74LS42	U40						
29	314-0062	2			1C 74LS74	U11, U72						
30	314-0078	1			1C 74LS02	U36						
31	314-0092	2			1C 8216	U33, U34						
32	315-0039	8			1C 4K RAM 12 V	U56-U63						
33	315-0031	1			1C Z80 MK3880	U53						
34	315-0042	1			1C VID INTERFACE	U48						
35	314-0093	1			1C 74LS374	U16						
36	316-0042	1			1C PROM 32X8 SEQ	U66						
37	316-0043	1			1C 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.B.D.		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 1N914/1N4148	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				HEAT SINK 295-1						

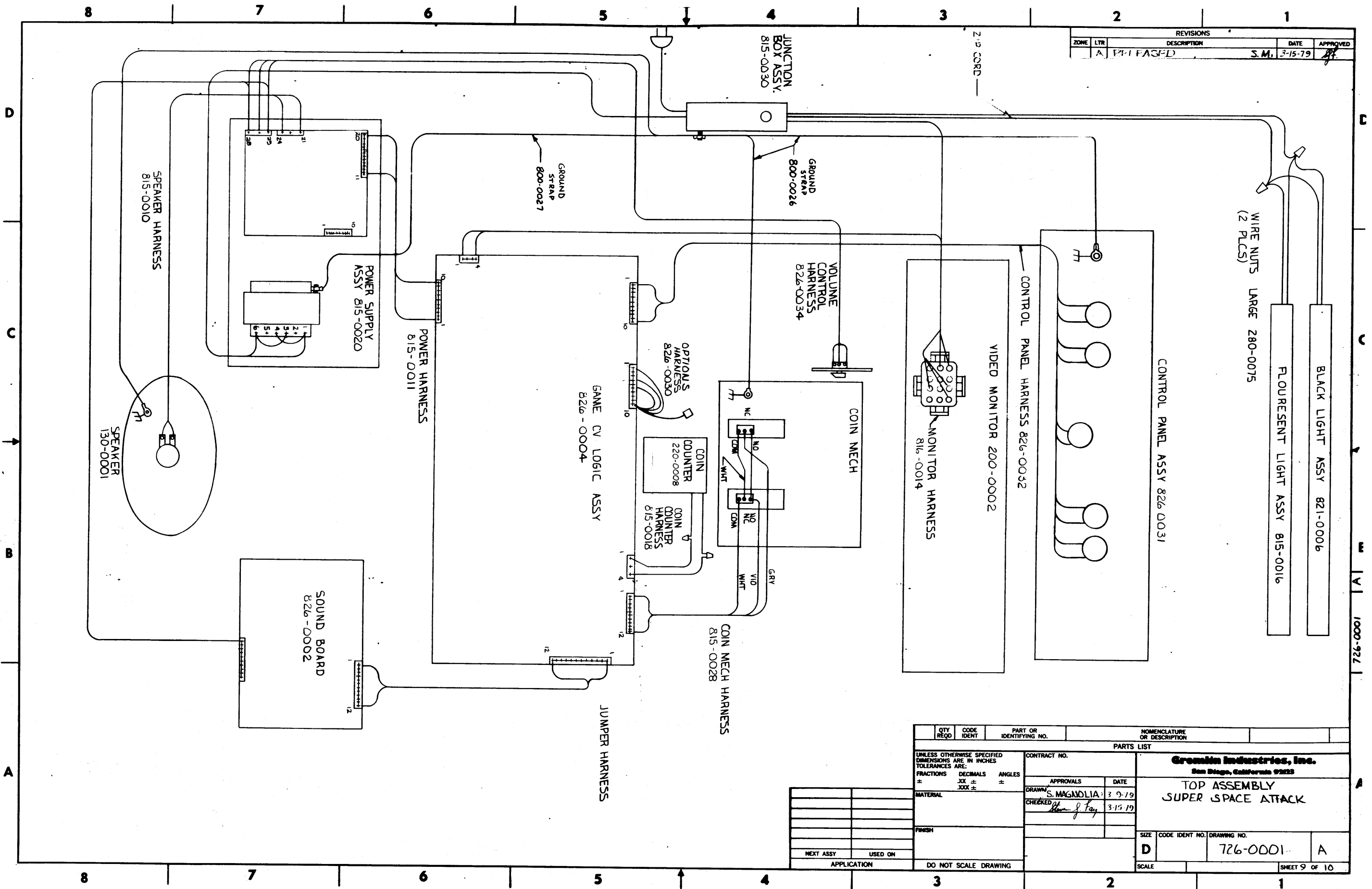


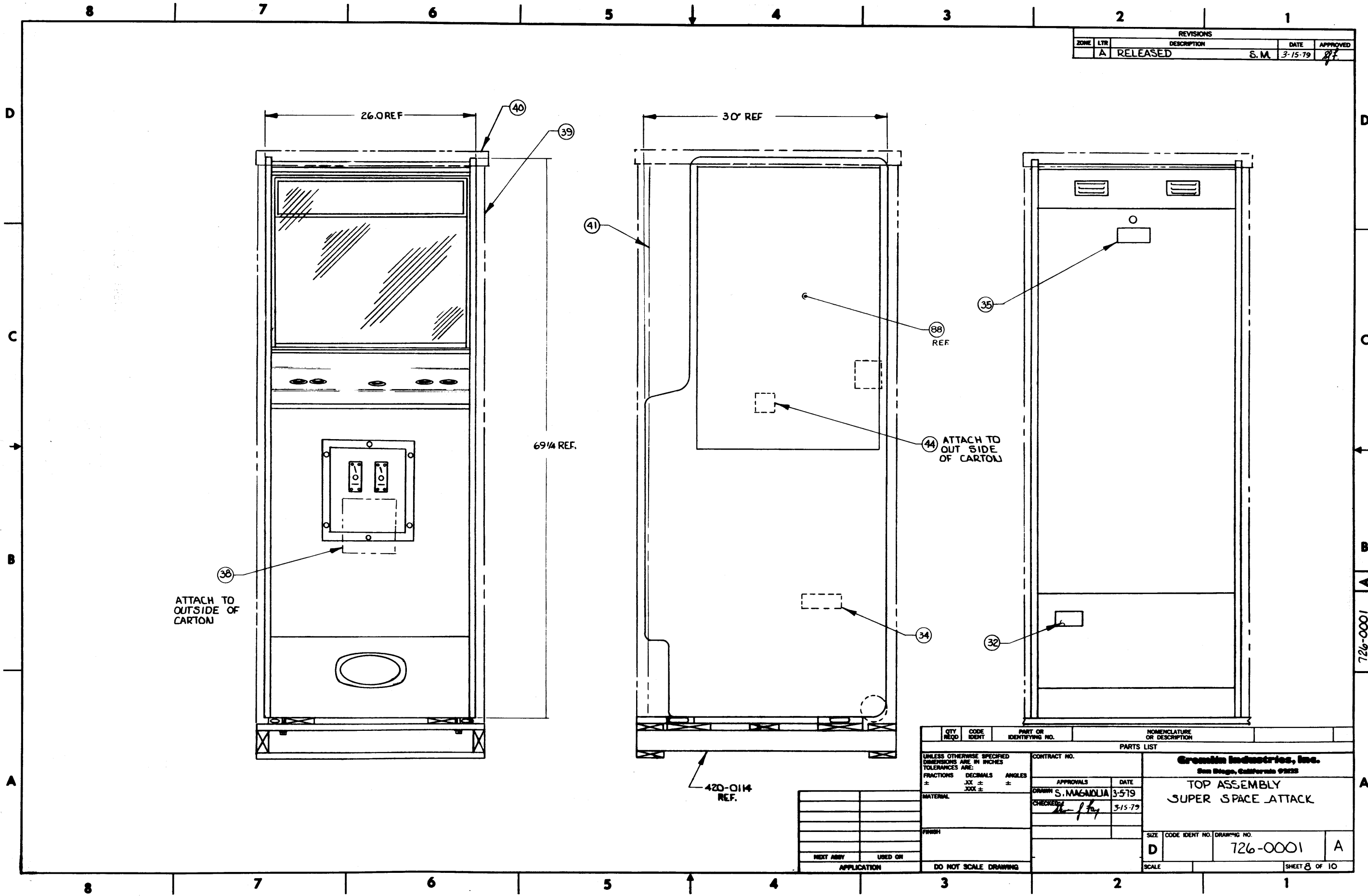
REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
A		RELEASED	S.M. 3-15-79	<i>[Signature]</i>



QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
PARTS LIST			
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:		CONTRACT NO.	
FRACTIONS	DECIMALS	ANGLES	DATE
±	XXX ±	±	3-5-79
MATERIAL		DRAWN S. MAGNOLIA	
FINISH		CHECKED <i>[Signature]</i>	
NEXT ASSY		USED ON	
APPLICATION		DO NOT SCALE DRAWING	
SIZE		CODE IDENT NO. DRAWING NO.	
D		726-0001	
SCALE		SHEET 7 OF 10	

Gremlin Industries, Inc.
 San Diego, California 92123
**TOP ASSEMBLY
 SUPER SPACE ATTACK**

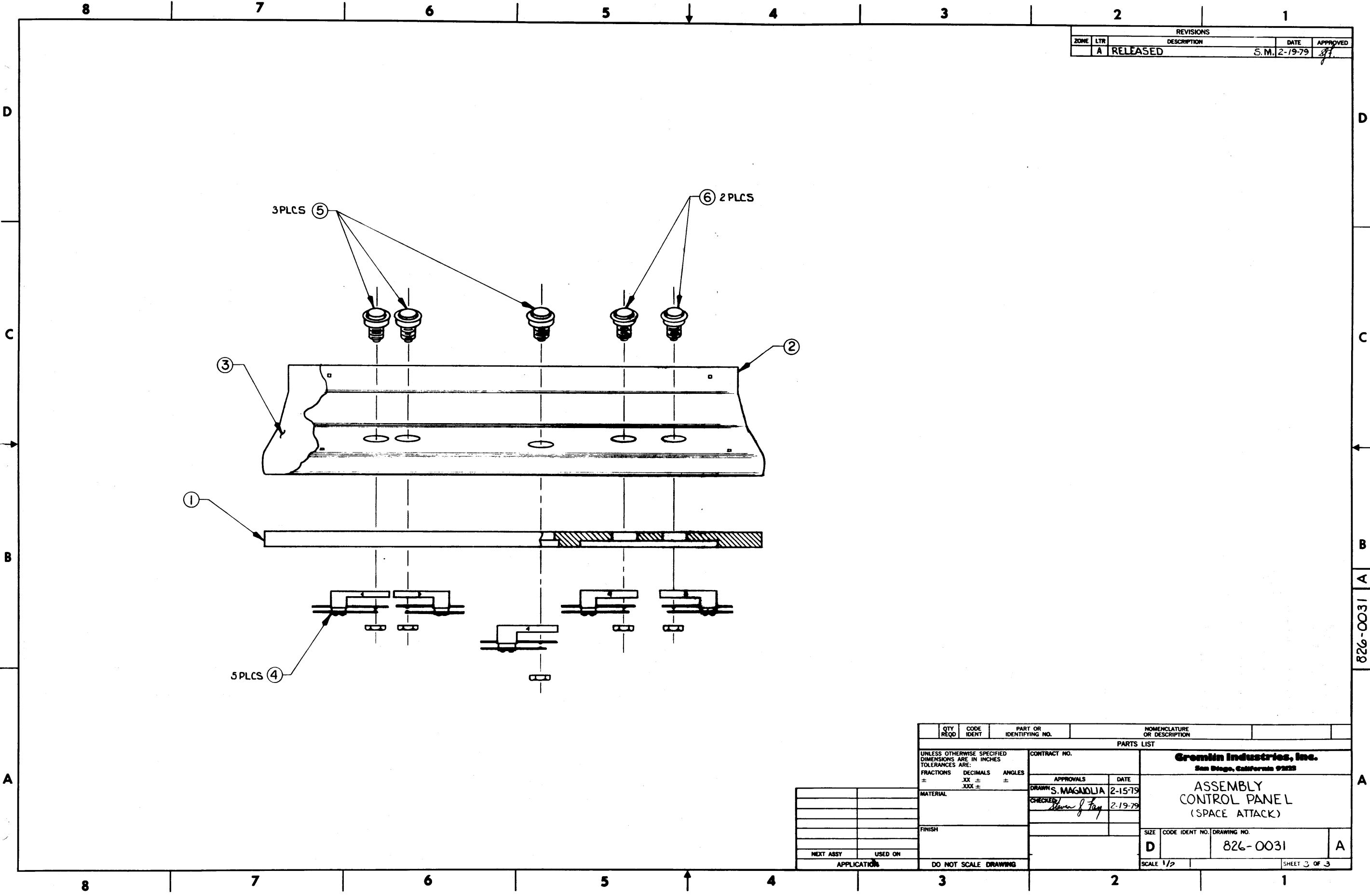




REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
A	RELEASED		S.M. 3-15-79	<i>[Signature]</i>

QTY REQD		CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:				PARTS LIST	
FRACTIONS		DECIMALS	ANGLES	CONTRACT NO.	
±	XX ±	XXX ±	±	DRAWN S. MAGNOLIA 3-579	
MATERIAL				CHECKED <i>[Signature]</i> 3-15-79	
FINISH				APPROVALS	
NEXT ARMY USED ON				DATE	
APPLICATION				DO NOT SCALE DRAWING	
				DRAWING NO. 726-0001	
				SIZE D	
				SCALE	
				SHEET 8 OF 10	

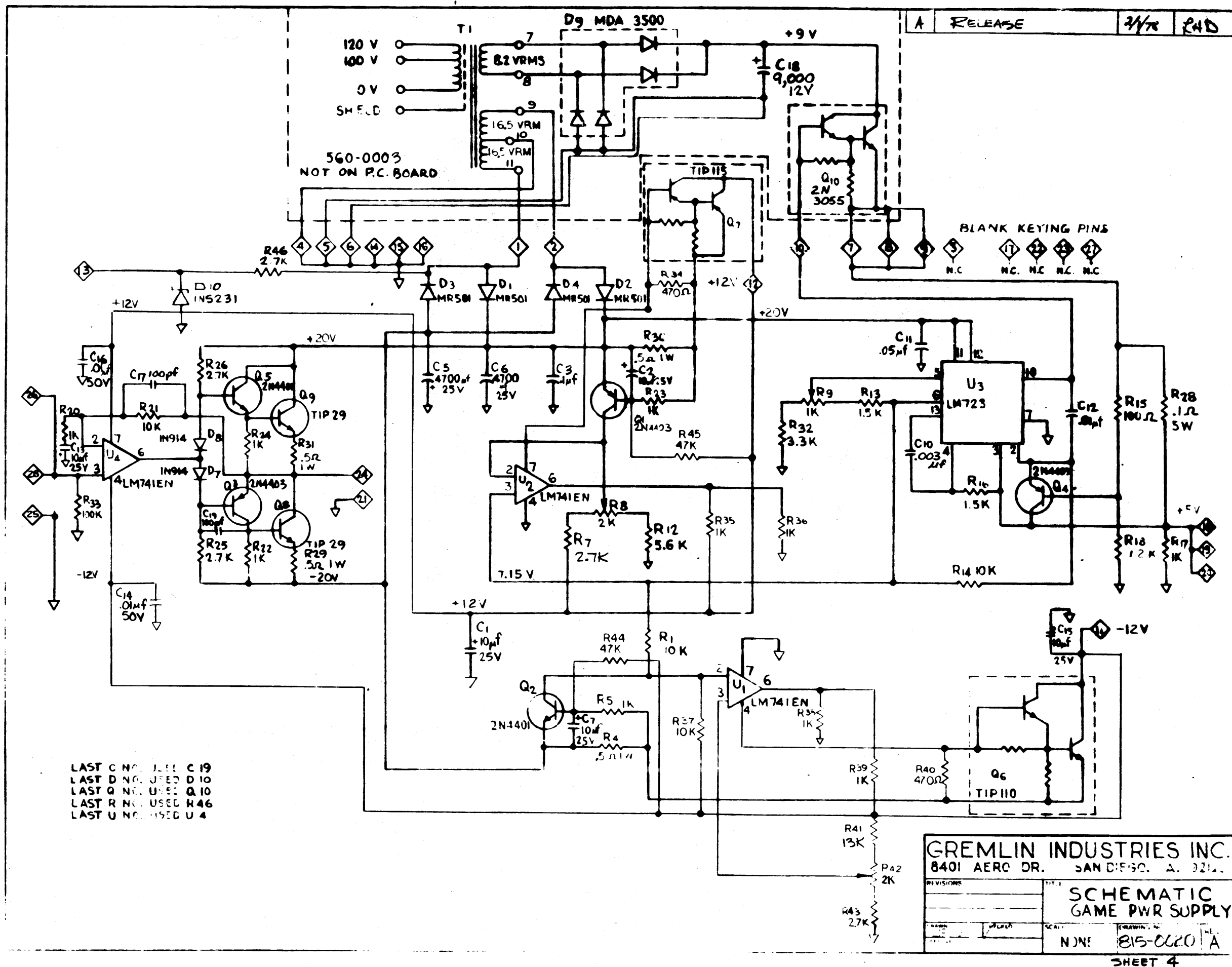
726-0001

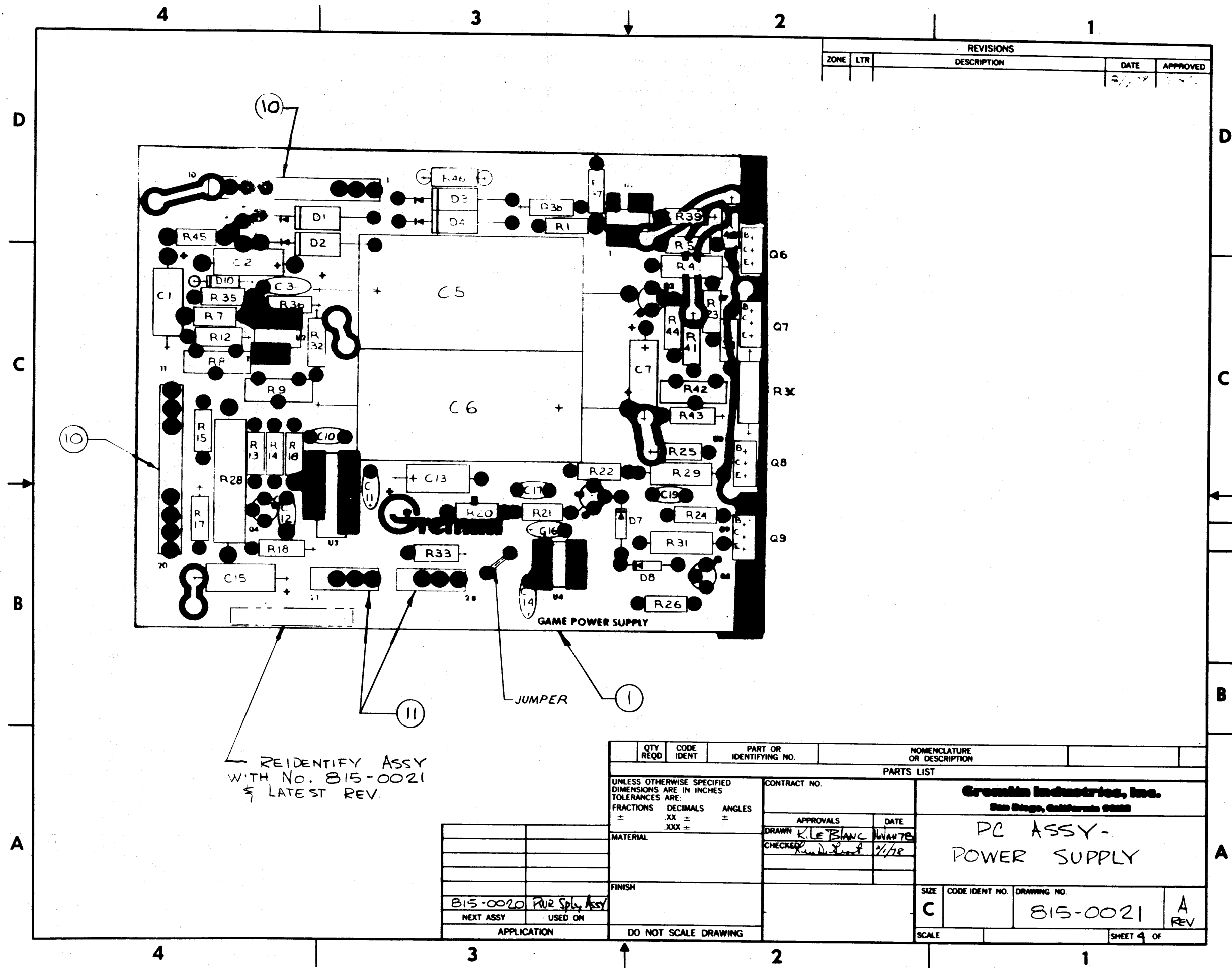


REVISIONS			
ZONE	LTR	DESCRIPTION	DATE
A	RELEASED		S.M. 2-19-79

QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
PARTS LIST			
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:		CONTRACT NO.	
FRACTIONS	DECIMALS	ANGLES	
±	.XX ±	±	
	.XXX ±		
MATERIAL	APPROVALS		
	DRAWN S. MAGALIA 2-15-79		
	CHECKED <i>[Signature]</i> 2-19-79		
FINISH	DATE		
NEXT ASSY	USED ON	SIZE	CODE IDENT NO. DRAWING NO.
APPLICATION		D	826-0031 A
DO NOT SCALE DRAWING		SCALE 1/2	SHEET 3 OF 3

826-0031 A



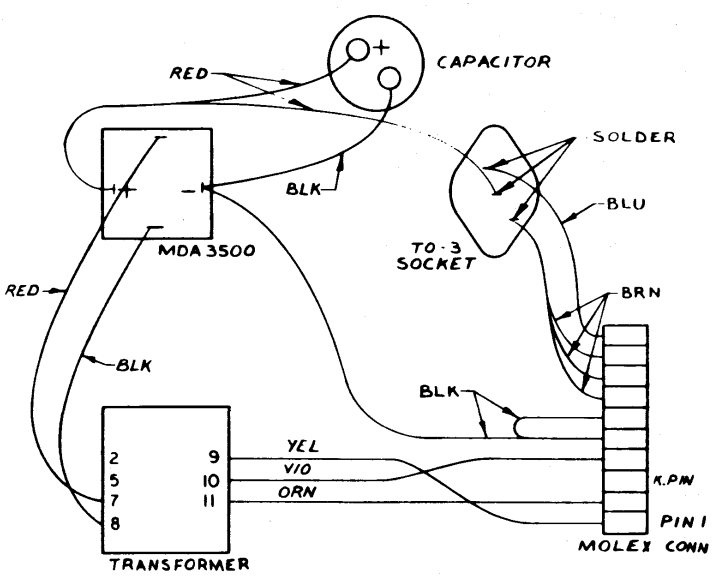
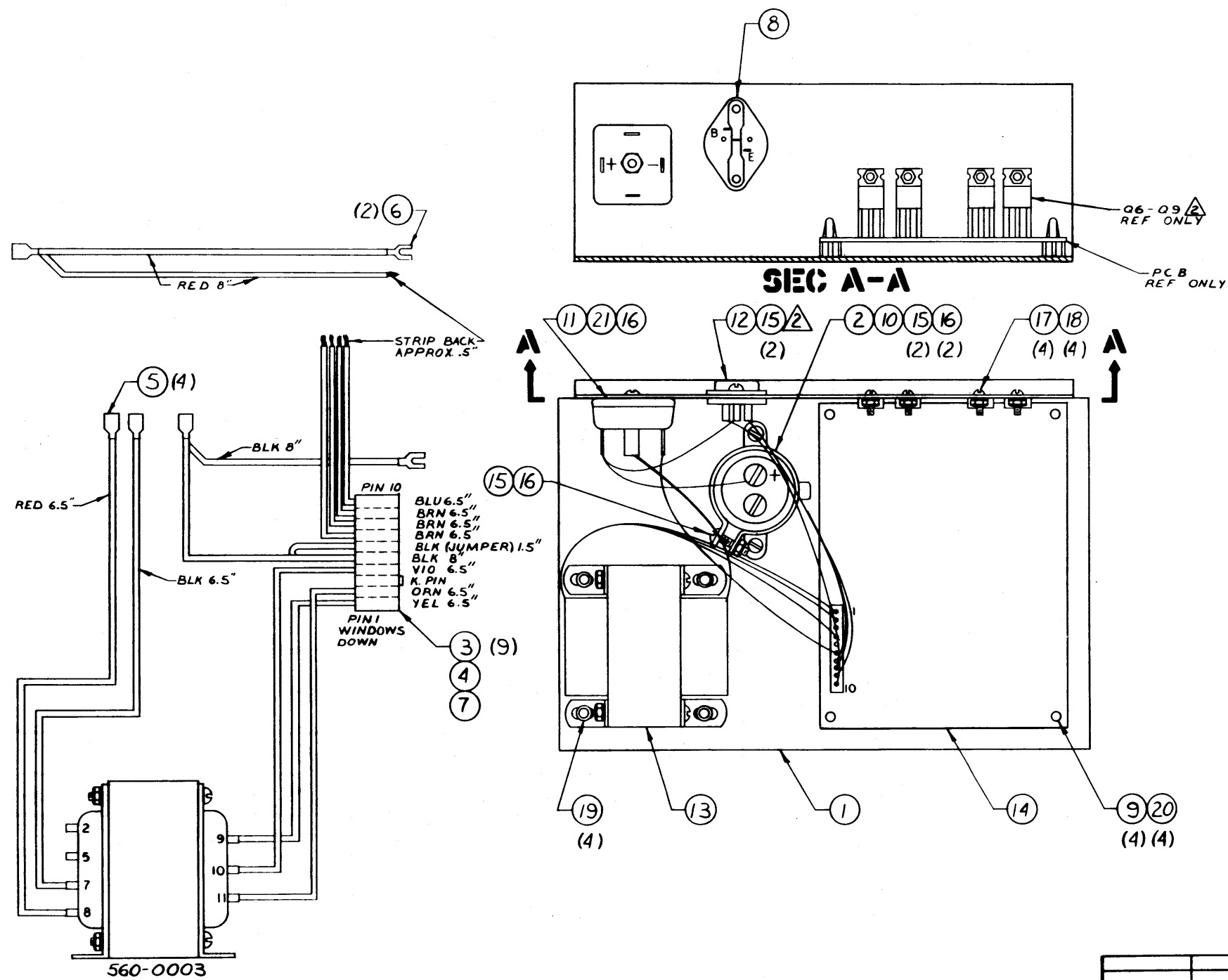


REIDENTIFY ASSY
WITH NO. 815-0021
& LATEST REV.

815-0020	PC Power Sply. Assy
NEXT ASSY	USED ON
APPLICATION	

QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:			CONTRACT NO.	
FRACTIONS DECIMALS ANGLES			APPROVALS DATE	
± .XX ± .XXX ±			DRAWN K. LE BLANC 1/1/78	
MATERIAL			CHECKED [Signature] 2/1/78	
FINISH			SIZE CODE IDENT NO. DRAWING NO.	
			C 815-0021 A REV	
DO NOT SCALE DRAWING			SCALE SHEET 4 OF	

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED



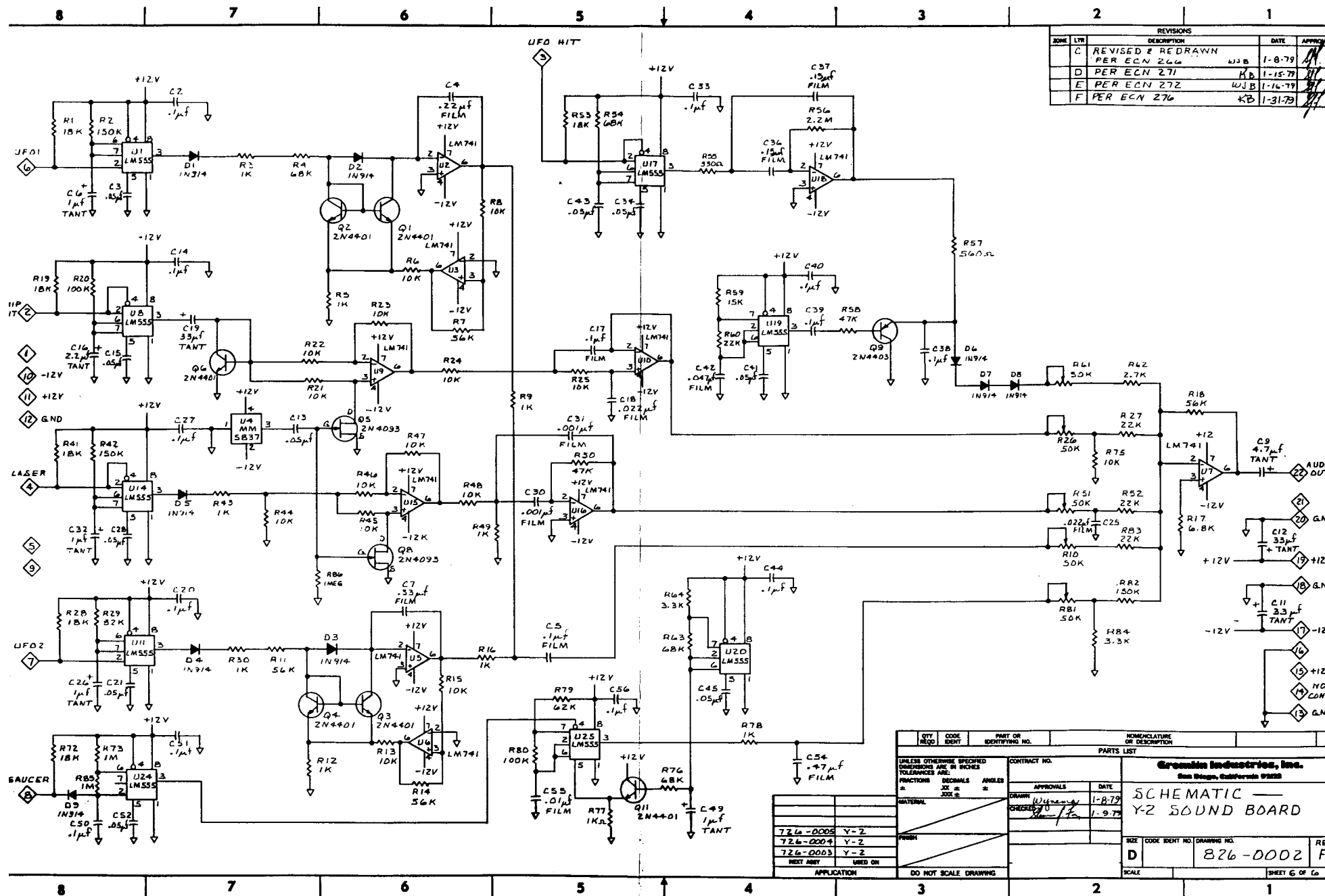
WIRING DIAGRAM

NOTES:
 1. ALL POWER TRANSISTORS TO BE MOUNTED WITH HEAT SINKING PASTE & INSULATING HARDWARE
 2. ALL WIRE TO BE AWG #22 GA
 3. UNLESS OTHERWISE SPECIFIED

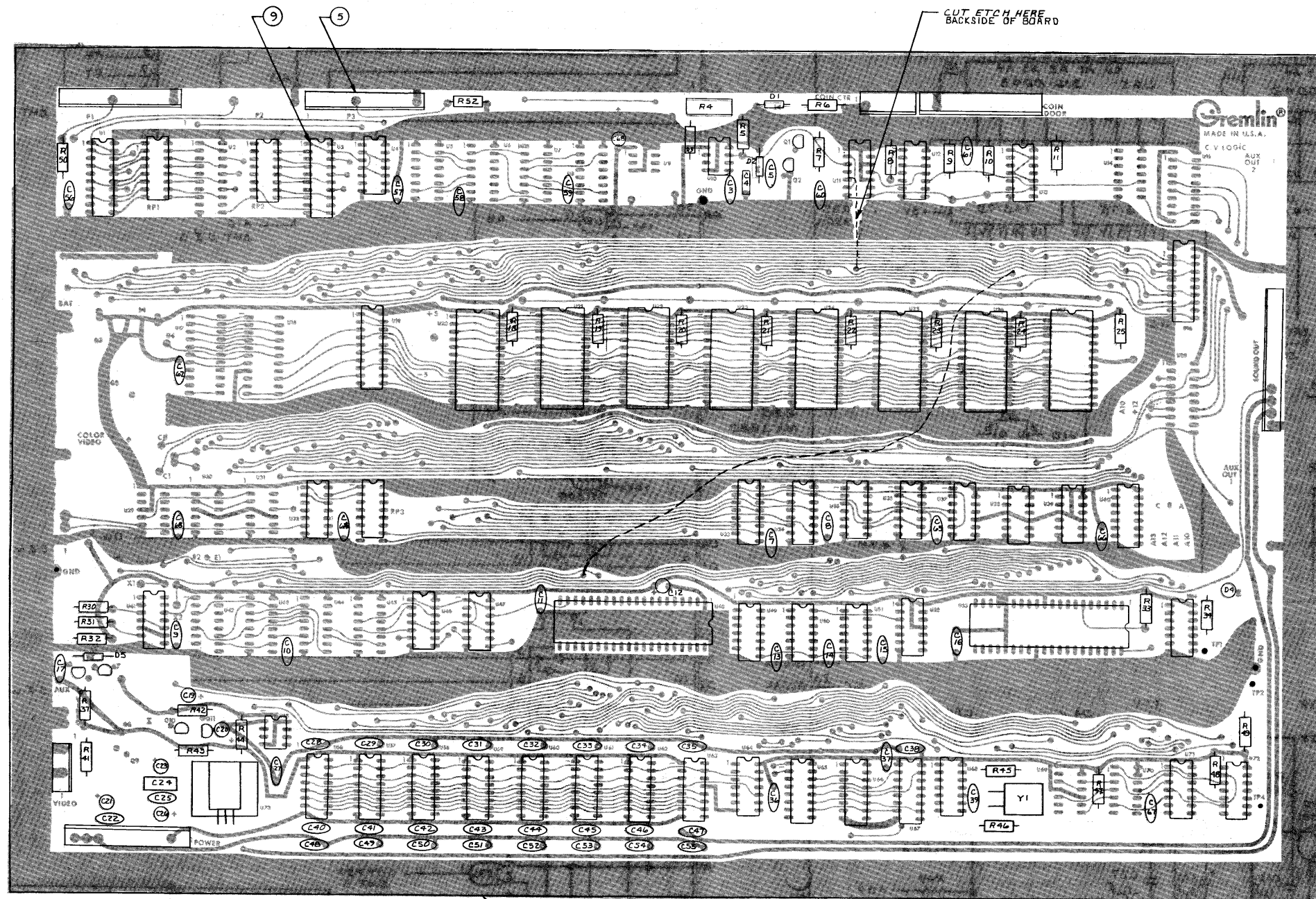
SEE DETACHED PARTS LIST 815-0020

QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
PARTS LIST			
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:		CONTRACT NO.	
FRACTIONS	DECIMALS	ANGLES	APPROVALS
±	±	±	DATE
MATERIAL		DRAWN Lee J. Lipink	
FINISH		CHECKED	
715-0001 SAFARI		SIZE CODE IDENT NO. DRAWING NO.	
NEXT ASSY USED ON		D 815-0020	
APPLICATION		DO NOT SCALE DRAWING	
SCALE FULL		SHEET 3 OF 4	

Growth Industries, Inc.
 San Diego, California 92108
ASSY POWER SUPPLY

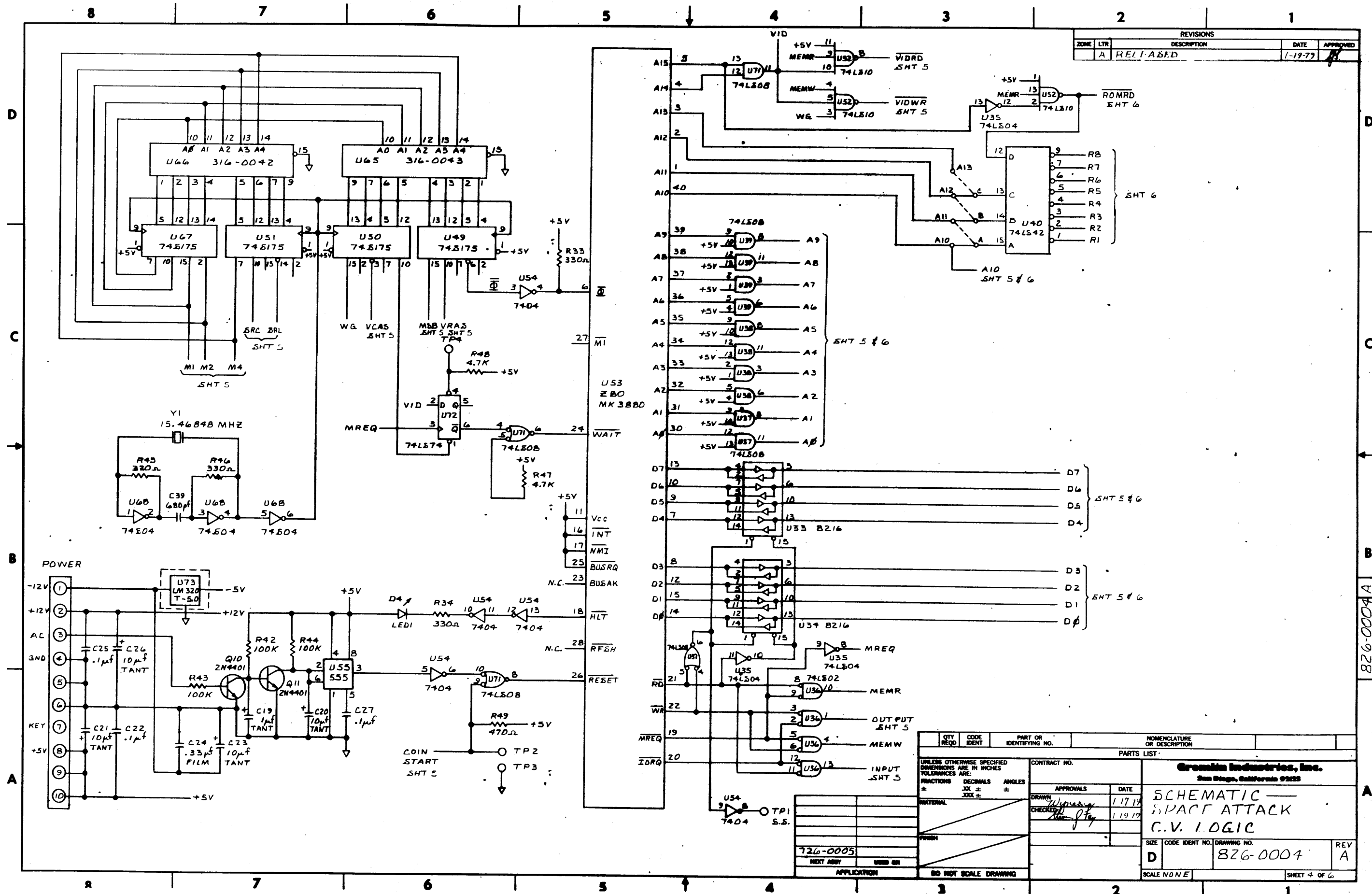


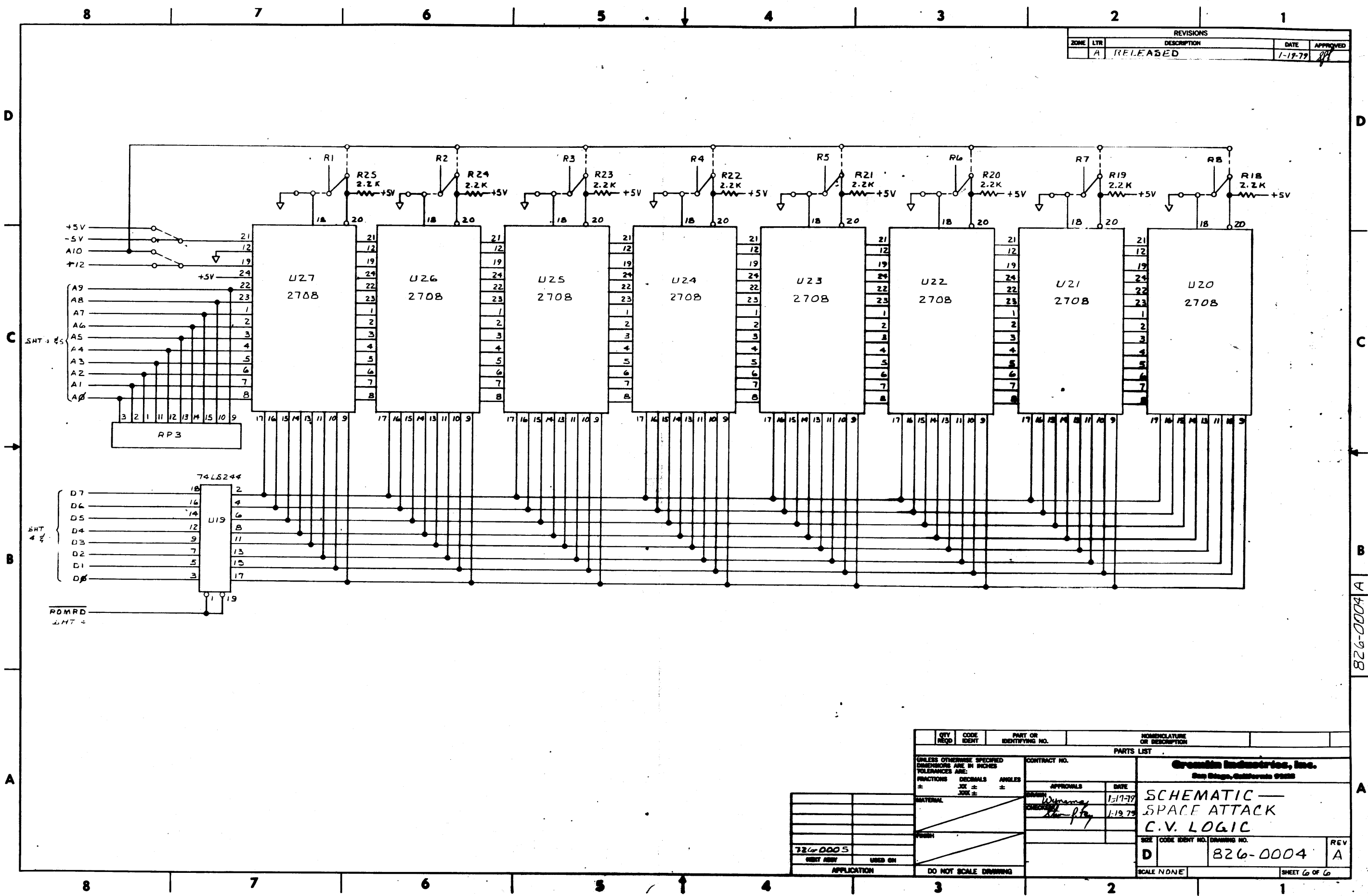
REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROV
	C	REVISED 2 REDRAWN PER ECN 266	WJB 1-8-79	AK
	D	PER ECN 271	KB 1-15-79	AK
	E	PER ECN 272	WJB 1-16-79	AK
	F	PER ECN 276	KB 1-31-79	AK



SEE DETACHED PARTS LIST

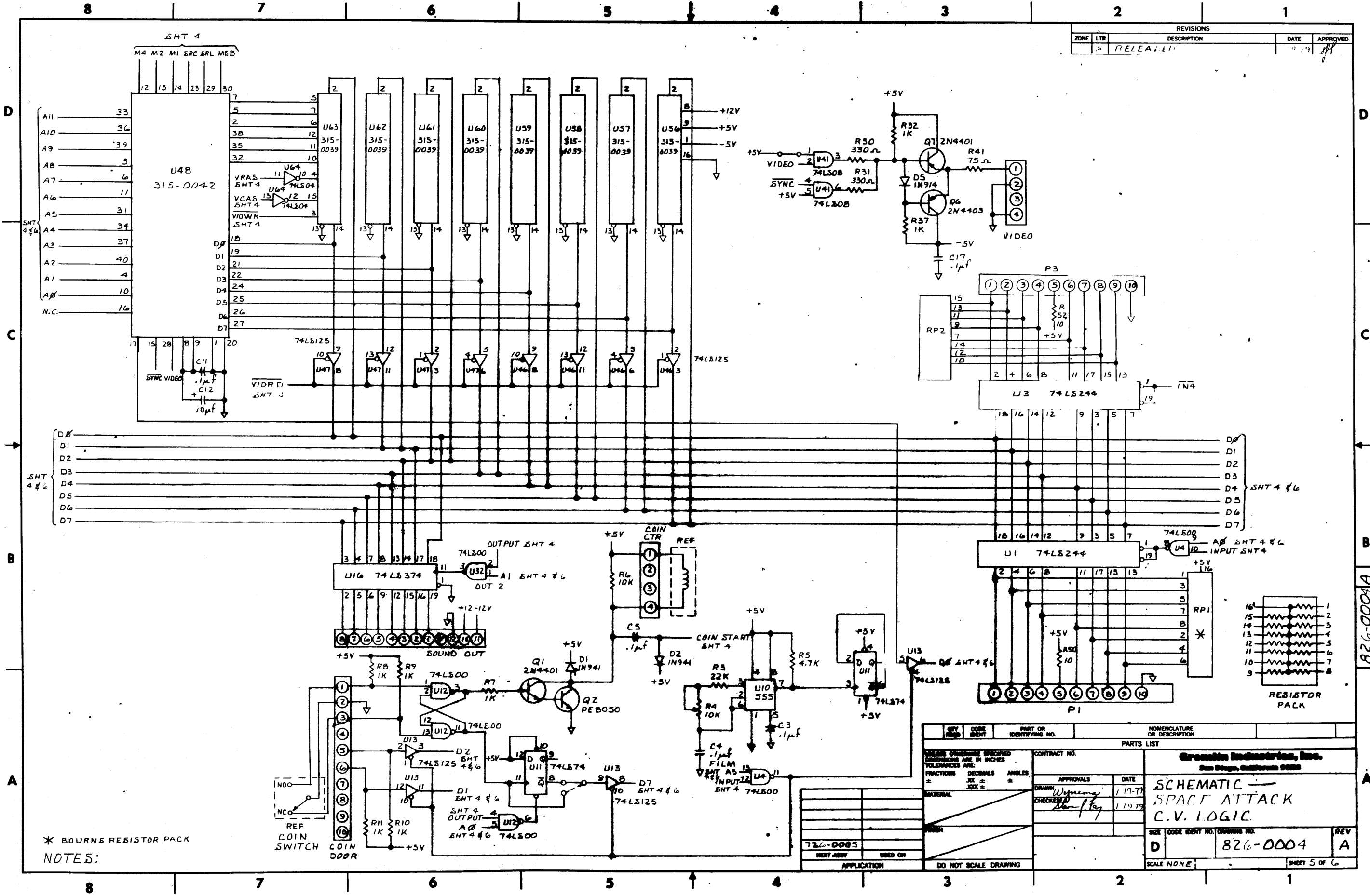
QTY	CODE	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES 1/16 ± .005 1/16 ± .005 1/16 ± .005			
APPROVALS		DATE	
DESIGNED BY: <i>[Signature]</i>		1-18-77	
CHECKED BY: <i>[Signature]</i>		1-19-77	
CONTRACT NO. Gremlin Industries, Inc. San Diego, California 92121			
ASSEMBLY SPACE ATTACK C.V. LOGIC			
REV		DRAWING NO.	
E		876-0004	
SCALE 2/1		SHEET 3 OF 6	





REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
A		RELEASED	1-19-79	

QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
PARTS LIST			
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ± .01 ± .005 ±			CONTRACT NO. DATE 1-17-79 1-19-79
MATERIAL			APPROVALS W. W. W. W. 1-19-79
FINISH			
826-0005			
USED ON			
APPLICATION			
DO NOT SCALE DRAWING			
CREAMER INDUSTRIES, Inc. San Diego, California 92108			
SCHEMATIC — SPACE ATTACK C.V. LOGIC			
SIZE CODE IDENT NO. DRAWING NO.			REV
D 826-0004			A
SCALE NONE			SHEET 6 OF 6



REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
2		RELEASE	11/79	

QTY	CODE	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
1	0005	726-0005	SCHEMATIC SPACE ATTACK C.V. LOGIC
APPROVALS		DATE	
DRAWN		11/79	
CHECKED		11/79	
MATERIAL			
FINISH			
DO NOT SCALE DRAWING			
SCALE NONE			
SHEET 5 OF 6			

* BOURN5 RESISTOR PACK
NOTES:

826-0004A