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Owner's Manual

DIGGER
Operating Instructions
and
Service Manual

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 the express consent of the factory will immediately void the warranty!!!**

IMPORTANT NOTES ...

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 restart in 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.

ALSO ...

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:



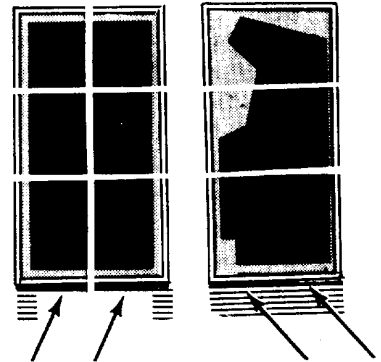
8401 Aero Drive
San Diego, California 92123
(714) 277-8700

REPACKAGING INSTRUCTIONS . . .

Arcade
25¼" W x 87" H x 28" D
64.77cm W x 170.18cm H x 71.12cm D
290 lbs./132 kg.

Arcade Version

1. Carefully lay game on its side.
2. Attach pallet with **four** 5/16" - 18 x 1-3/4" bolts, as shown.
3. See Final Reccrating Instructions, below.



Mini-Video Version

1. Place game upright inside bottom cover.
2. Slide cover over game. Add protective packing material.
3. Place top cover over side cover.
4. See Final Reccrating Instructions, below.

MiniVideo
22" H x 21" W x 20" D
55.88cm H x 53.34cm W x 50.8cm D
80 lbs./36 kg.



Cocktail Version

1. Place game inside carton.
2. Add protective packing material.
3. Place inside protective top cover over unit.
4. Close flaps and secure with shipping tape.
5. See Final Reccrating Instructions, below.

Cocktail
22" W x 34" L x 24¼" H
55.88cm W x 93.98cm L x 62.23cm H
80 lb./36 kg.



FINAL RECCRATING INSTRUCTIONS . . .

Place game upright. Tape down game keys. Then, crate the game using appropriate shock-absorbent packing material. Include packing on edges of game. **Secure package with strapping.**

Note . . . If the game is to be shipped to Gremlin Industries for service or repair, attach a tag identifying the distributor and indicate the service or repair to be done. Include the full serial number of the game.

All items must be shipped prepaid.

GAME CONCEPT...

DIGGER is a new Gremlin/SEGA game that requires you to dig strategically placed holes within a maze format so you can capture and fill in over the invading creatures before they can attack and destroy your man.

You maneuver your man around the maze with a four-directional joystick. Two push-button controls are used for your shoveling action: one, for the DIG function and another for the FILL function. The maze format changes with every round played.

DIGGER is a Gremlin Multi-Phasetm game that becomes increasingly challenging as your skills improve, as you will see.

The creatures are confined behind a wall. In the first of three rounds of game play, four creatures are let out of the holding area through a gate. You must conquer these four before advancing to the next round, where you face six creatures. Your third round has you battling eight creatures. This process is repeated and the point value increased with each three-round victory. Also, the creatures' speed increases each round. Any contact at all with the creatures will be fatal to your man.

While you are busy digging holes and entrapping creatures, the rest are behind the retaining wall scurrying back and forth. After about three minutes, the gates at each end will open and all of the remaining creatures will stream into the play area at once. However, a skillful player will conquer all of the creatures of each round and the gate will not be a threat.

A DOUBLE SCORE BONUS is awarded if you capture and fill in over the RED creature before any of the GREEN ones. But, this must be the FIRST creature defeated, or the RED creature becomes GREEN and no bonus is awarded.

The point value per creature increases with each three-round phase. The first phase awards 300 points per creature, decreasing to 100 points if not filled over promptly. The second phase awards 500 points per creature, decreasing to 300. And, the third phase awards 700 points, decreasing to 500 points.

A 1000 POINT BONUS is given if you capture four creatures in a row at full point value during any one round.

An EXTRA MAN is given at 5000 points.

When a creature is captured, eight squeaking sounds are heard before the creature escapes from the hole. Five squeaks are required to cover a creature, so you must hurry to the hole and FILL before the fourth squeak, or the creature will emerge and devour your man.

If your FILL is incomplete and another creature passes along the same path, it will pull the other out and your man may be eaten. If a hole is incomplete, it will delay creatures somewhat, depending on the size of the partially dug hole.

On the DIGGER upright and Mini-Video games, two players alternate turns. A player loses his turn when the round is complete, not just when he loses a man.

On the slimline and cocktail tables, DIGGER can be a two-player SIMULTANEOUS PLAY, or ALTERNATE PLAY, as described above. In the SIMULTANEOUS PLAY option, the sum of Player 1 and Player 2 scores are used as one final score. The game play is the same as one-player and either man may FILL a hole, regardless which one dug it. If you select ALTERNATE PLAY action, it is the same as the upright or Mini-Video.

A unique feature of Gremlin/SEGA's DIGGER game is the personalization of HI SCORES. At the end of the game in which the highest score of the machine is topped, the player uses the DIG and FILL buttons to run through the alphabet selecting his three initials. These will remain until that score is topped by another player. In SIMULTANEOUS PLAY, Player 1 enters his initials first, and then Player 2 enters his. Both initials are displayed until their score is beat.

DIGGER SOUNDS

BACKGROUND SOUND is used anytime creatures are present in the maze.

This sound speeds up with the creatures' speed.

An ESCAPE SOUND is used as the creatures rush through the gate into the maze area.

A DOUBLE BONUS SOUND is used when the red creature is the first captured.

Another BONUS SOUND is heard when the 1000 POINT BONUS is awarded.

A beeping CREATURE SOUND that squeaks when a creature falls into a hole.

A SCORING SOUND accompanies the flashing score display after a creature is buried.

A SCREECH SOUND is used when your man is eaten by a creature.

A RELEASE SOUND is used when a creature leaves a hole.

A GAME-OVER BOOM is heard at the end of the game.

OPTIONS SELECT...

	DIP SWITCH #		
	<u>1</u>	<u>2</u>	<u>No. of Men</u>
UPRIGHT	off	off	3
	on	off	4
	off	on	5
	on	on	6

	DIP SWITCH #		
	<u>1</u>	<u>2</u>	<u>No. of Men</u>
COCKTAIL	off	off	5
	on	off	4
	off	on	3
	on	on	2

NEW GAME BOARDS AND NEW EPROMS...

The following chart shows the two kinds of logic boards Gremlin will use in future games. These will be either a SINGLE VIC board or a DUAL VIC board. Also shown are the possible combinations of Eprom types that Gremlin will be using. The 2 Eprom types are:

- 1) 2708 (holds 8K of memory)
- 2) 2716 (holds 16K of memory).

Obviously, the 2716 holds twice as much information as the 2708, **but the 2 Eproms are not directly compatible**—in other words, you have to replace a 2716 with another 2716, and a 2708 with another 2708. In addition, the 2716 Eprom socket is modified slightly to accept the 2716 Eprom. If it is ever necessary to replace a new Eprom, be sure to specify **2708** or **2716**. These numbers are printed on the Eprom package.

Logic Board Type	Possible Eprom Types Used	Where Used
SINGLE VIC board	1) All 2708's	HEAD-ON 1 HEAD-ON 2 Future games
	2) 2708's and one 2716 (used in combination)	INVINCO DEEP SCAN Future games

The two Eprom types are used since some game programs require a larger memory than that provided with a set of 2708's. Usually, one 2716 provides enough additional memory space to hold a longer program.

POWER SUPPLY MODIFICATIONS . . .

For VIC Logic Boards Only

In order to supply - 5 volts to the VIC logic board, it was necessary to modify the game power supply. The modification simply adds a 7905 - 5 volt regulator (Gremlin part #313-0023) to the power supply chassis; the 7905 is connected into the - 12 volt line at pin 11 of the power supply output connector. **PIN 17 OF THIS CONNECTOR NOW BECOMES THE - 5 VOLT OUTPUT.** The other pins remain the same:

pin 11 = - 12v
pin 12 = + 12v
pin 13 = 2-3 V AC signal
pins 14, 15, 16 = GROUND
pin 17 = - 5v
pins 18, 19, 20 = + 5v

Also, a 8900 ufd filter capacitor has been added to the power supply to provide better + 12 volt regulation.

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 transformer terminals 1 and 2.
- * For 115 volts: Connect the voltage INPUT lines to transformer terminals 1 and 3.
- * For 230 volts: Connect the voltage INPUT lines to transformer terminals 1 and 4. The fluorescent lamp line must be connected to transformer terminal 3.

ALSO, THE TV MONITOR MUST BE CONVERTED TO THE SAME VOLTAGE INPUT AS THE GAME TRANSFORMER. REFER TO THE MONITOR MANUAL IN THE GAME.

MAINTENANCE PROCEDURES

SINGLE games

I. Power Supply (Refer to drawing #800-0072, sheet 4)

1. Remove output connectors from power supply.
2. Make these initial tests: (GND to BLACK lead on C18, 9000 ufd capacitor)
 - a. +9 VDC on POSITIVE terminal of C18
 - b. +17-19 V on C6 (4700 ufd cap.)
 - c. -17-19 V on C5 (4700 ufd cap.)
 - d. -12 V at output pin 11 (adjustable by trim pot R42)
 - e. +12 V at output pin 12 (adjustable by trim pot R8)
 - f. +5 V at output pins 18,19,20 (adjustable by trim pot R9)
 - g. GND (ground, 0 V) at pins 14,15,16
 - h. 2-3 V AC at pin 13 (Don't forget to change meter scale to AC)
 - i. -5 V at pin 17
3. Check these voltages again with the logic board connected. If any are wrong, a loading condition exists in the logic board, most likely.

II. Logic Board

The following instructions will help you trace down and find most problems associated with the logic board. The procedures are listed by the more common kinds of problems that could arise. Read through all the steps first, then apply them one at a time. The necessary equipment are an oscilloscope and AC/DC voltmeter.

1. NO PICTURE: TV TUBE AND FLUORESCENT LAMP ARE OFF

- a. Plug the game in and check to see that it is receiving 115 (230) VAC. Measure 115 VAC at the input terminals of the game transformer. If it is not present here, proceed to next step.
- b. Check the fuse; if it is good, proceed to next step.
- c. Remove the cover of the junction box in back of the game. Measure 115 VAC on the output of the line filter. If it is not present, the line filter may be bad. Or, one of the AC line connections in the junction box may be loose. UNPLUG the game and re-check these connections.
- d. If the fluorescent lamp still does not operate, turn off game and on again. This usually re-starts the lamp. If it doesn't, turn the lamp in its socket; this will re-seat it for a better connection. Sometimes the lamp works loose during shipment.
- e. An ON/OFF switch for the TV monitor is located on the TV chassis, below the neck of the picture tube. Make sure it is ON.

2. NO PICTURE: TV TUBE AND FLUORESCENT LAMP ARE ON. SCREEN BLACK.

- a. First, make a quick check of the monitor-to-logic board connections: Are all wires making contact with the pin connector? Are the wires secure on the monitor plug-in connector?

- b. Check to be sure U65 is seated in its socket properly, and that no pins are bent. This IC is a Prom that develops the necessary video timing sequences. Usually, if one pin on the chip is out of the circuit, the screen will appear black. Proceed to the next step if this chip is seated correctly.
- c. Inspect the high-voltage lead coming off the monitor's high-voltage transformer. This lead attaches directly to the TV tube. Sometimes, during shipment, this wire is jostled out of contact with the transformer. Turn off the game, and carefully push the wire down toward the transformer to reseat it. Now, check to see if the picture comes on. If it doesn't, proceed to step d.
- d. Using a voltmeter, measure the three voltages powering the logic board. These voltages are: +5v, -5v, +12v, and can be easily measured at the power supply-to-logic board connection. If all voltages are present, go to the next step.
- e. Using an oscilloscope, test for clock signals at the points listed below. For the moment, don't worry about what each signal should look like. We're concerned with finding floating signals, and/or signals that are not present when they should be...and why they are not. The scope setting is .2v/div. @ 5usec with a 10:1 probe. All clock signals, except the video signal, are about 5 volts in amplitude.

* Check pins 8, 11 of U41. Look for a 1½ volt video signal. If not there, check pin 12 of U41. If it is there, U41 is probably bad.

* If the signal is not at pin 12 of U41, suspect U48, U42 and U32.

* Check the following IC's and pins for any floating, or missing signals:

U68 pin 6	U65 pins 1-7,9
U67 pin 5	U49 pins 2,6,10,15
U60 pins 11,12,13,14	U50 pins 2,7,10,14,15.

These chips make up the video timing circuit. Make sure there are no floating, or missing, signals on any of these chips. If there are, suspect the chip is bad.

3. PICTURE APPEARS: COLOR IS DISTORTED; SOME COLORS MISSING

Check the red, blue and green output signals on U42, pins 4,7, and 9, respectively. If no signals are present, suspect U67, U49, U43, U45, U44, U30 or U66.

4. INCOMPLETE PICTURE: RANDOM DISPLAY

Sometimes the game appears on the screen with parts of the picture showing incorrect information. For example, the "HI SCORE" listings display jumbled information, while the rest of the picture is normal. The most likely cause of this problem is one of the 8 RAM IC's U56 through U63. The quickest way to find the bad RAM is simply to replace each IC, one at a time, with a RAM that is known to be good. Be sure not to bend any pins when replacing the IC's. Also, don't overlook the possibility that one of the RAM sockets is bad.

5. RANDOM DISPLAY WHEN GAME IS TURNED ON

- a. Activate the coin switch a few times to see if this clears the picture. If not, turn the game off, then on again. If the jumbled display still appears, proceed to step b.

- b. Check the reset circuit on the logic board (Refer to the schematic). When power is first applied to the game, a reset circuit consisting of Q10, Q11, U55 and U71 is triggered on to reset the microprocessor. This reset signal forces the microprocessor to start at the beginning of the game program. If the microprocessor is not reset, it will still operate...it just won't operate on the right program instructions or data, and will continually display a jumbled pattern on the screen. So, begin by checking for a 3-4 VAC signal at pin 3 of the power supply-to-logic board connector. Follow the signal through Q10 where, at the collector, a sawtooth wave appears. Then, when power is first applied, observe pin 2 of U55 as capacitor C20 slowly discharges to about 3 volts. When this level is reached, U55 is triggered to change states, causing pin 3 to go high, then low. This change is inverted by U54 and, finally, reaches pin 26 of the Z80. Check pin 26 of the Z80 for a low-to-high signal change. If not present, one or more of the reset circuit components are bad. If it is present, proceed to step c.
- c. The following lists some probable causes of the jumbled display pattern:
 - *one or more RAM's
 - *one of the Eproms, U1-8, U20-27
 - *the microprocessor, U53, is bad
 - *U33 or U34 (74LS245) is bad
 - *U19 is bad
 - *check the three operating voltages, +5v, -5v and +12v VDC.

6. GAME DOES NOT COIN UP

- a. A common problem with a game that does not coin up is that the coin switch trip wire is out of adjustment. Usually, all that is necessary is to bend the trip wire up or down, depending on whether a heavier or lighter tension is needed.
- b. There may be a problem in the coin circuit on the logic board. Check U12, pins 3,11, for pulses each time the coin switch is tripped. Also, U11 and/or U12 may be bad. Suspect U45, also.
- c. It is possible that one of the coin counter transistors, Q1 and Q2, is bad. Determine whether or not the counter advances each time the coin switch is tripped.
- d. Don't overlook the possibility of an incorrect, or faulty, coin switch-to-logic board connection; sometimes, these wires work loose from the coin switches.

7. PLAYER CONTROLS NOT WORKING

- a. Check first to be sure all control switch connections are secure. This includes checking the black wires, or ground leads.
- b. If these connections are good, make sure the control panel leads are intact inside the Molex tm connector to the logic board.
- c. If the controls still do not work, suspect U1 on the logic board. However, U1 could be good but might not be receiving the activating pulses from U36, pin 13, or U4, pin 8.

8. GAME SOUNDS NOT HEARD

- a. Check to be sure the sound board output lead is making good contact with the power supply/amplifier connector. Refer to the game wiring schematic.
- b. If these connections are good, check the power supply/amplifier board for any audio signals. Specifically, check U4, Q8 and Q9 on the amplifier board for any game sounds.
- c. If there are none there, suspect U16 on the logic board. Also, check U32 for the pulses that turn on U16.
- d. If these chips appear good, the sound boards are probably bad. Refer to the sound board schematics for each sound's circuit.

RECOMMENDED SPARE PARTS for SINGLE games

<u>GREMLIN PART NO.</u>	<u>WHERE USED</u>	<u>DESCRIPTION</u>	<u>QTY. PER 10 GAMES</u>
130-0001	a	speaker	1
130-0002	a	speaker cover	1
200-0014	u	19" color monitor	1
200-0015	s	color monitor	1
200-0013	c	13" color monitor	1
253-0104	u	plexi, front monitor panel	1
390-0011	u	fluorescent lamp	2
220-0035	u	coin door lock & key	2
220-0097	s	cylinder lock	2
117-0126	s	coin entry plate, USA	1
220-0066	u	coin mechanism, complete	2
800-0103	cs	coin mechanism, complete	2
220-0071	u	coin reject button & spring	3
240-0097	s	reject button assy.	3
220-0072	u	coin return stop (u-bolt)	3
800-0076	a	photo-coin accumulator assy.	1
270-0008	a	coin counter	1
510-0014		slide switch	1
220-0148	s	cash box	1
	u	cash box	1
601-0546	s	tv mask	1
601-0032	s	color mask	1
103-0043	c	leg arm	1
601-0504	c	leg	1
104-0005	c	handle	1
504-0118	cs	switch, micro (joystick)	5
109-0032	cs	handle ball, black	3
109-0033	cs	handle ball, red	3
509-0048	cs	switch (l-r)	5
509-0052	cs	switch (fr/acc)	5
240-0107	c	push button, acc.	1
510-0041	u	switch, joystick	5
510-0023	u	push button mounting/contacts	3
240-0009	u	yellow push button plunger	3
240-0109	u	orange push button plunger	3
240-0105	s	pushbutton switch	3
240-0106	s	push button knob	3
509-0119	s	push button, red	3
800-0056	u	complete joystick	2
240-0091	u	joystick knob	3
250-0289	u	threaded rod	3
250-0291	u	upper sleeve	3
601-0158	cs	switching regulator	1
560-0052	c	power transformer	1
560-0053	s	power transformer	1
270-0001	u	line filter, junction box	1
514-0001	a	fuse, 2A slo	5

a = all versions
u = upright
c = cocktail
s = slimline

600-0001	a	ac power cord	1
800-0072	a	dual power supply	1
482-0013	a	xstr TIP 110	5
482-0014	a	2N4401	10
482-0015	a	xstr TIP 115	5
482-0016	a	xstr TIP 29	5
313-0001	a	LM 723 DIP	5
313-0004	a	LM 741 DIP	5
315-0019	a	2708 EPROM, blank	
		specify number on EPROM	1 set
315-0050	a	2716 EPROM, blank	
		specify number on EPROM	1 set
316-0507	a	color prom DIGGER	1
314-0001	a	555IC	5
314-0093	a	74 LS 374 IC	3
314-0099	a	74 LS 245 IC	3
314-0104	a	74 LS 138 IC	3
314-0105	a	74 LS 253 IC	3
315-0031	a	Z80 microprocessor	2
315-0039	a	RAM IC	10
315-0042	a	video interface chip (VIC)	3
316-0206	a	video timing prom.	3
475-0002	a	resistor pack	3
482-0010	a	PE 8050 transistor	3
510-0043	a	6-position DIP switch	2
314-0042	a	7406 IC	5
481-0006	a	1N914 diode	10
481-0008	a	1N5231 Zener diode	10
482-0006	a	2N4403 transistor	10
482-0023	a	2N4093 transistor	10
312-0145	a	CMOS 4006 IC	2
312-0146	a	CMOS 4070 IC	2
312-0069	a	LM3900	2
312-0147	a	94560 IC	2

Gremlin Industries, Inc. San Diego, California 92123		PARTS LIST	TITLE ASSY, DIGGER COCKTAIL ENGLISH	700-0015 DWG NO	SH 2 OF 8	A REV
ITEM NO	PART NO	QTY PER ASSY			DESCRIPTION	REF DES
1	420-0446	2			TABLE GRAPHIC	
2	420-0370	1			DECAL COIN ENTRY	
3	420-0371	1			DECAL COIN INFO	
4	253-0163	1			PLAYER SELECT PANEL	
5	253-0164	2			CONTROL PANEL GRAPHIC	
6	252-0082	2			BLOCK, STANDOFF	
7	560-0051	1			TRANSFORMER, ISOLATION	
8	800-0072	1			ASSY POWER SUPPLY	
9	800-3043	1			ASSY HARN SOUND DIGGER	
10	800-3033	1			ASSY DIGGER SOUND BD	
11	800-0103	1			COIN MECH (MODIFIED)	
12						
13	834-0010	1			ASSY SPCL DL JAPAN	
14	800-3056	1			ASSY POWER HARNESS	
15	800-3044	1			ASSY HARN CONT PANEL #1	
16	800-3045	1			ASSY HARN CONT PANEL #2	
17						
18	370-0002	1			TIL 139 OPTO ISOLATOR	
19	800-3049	1			ASSY PHOTO COIN CALC MOUNT	
20	280-0005	10			CABLE TIE	
21	800-3051	1			ASSY HARN VIDED	
22	800-3048	1			ASSY LOGIC DIGGER ENG	
23	280-0064	2			SPAGER 3/8" LNG PVC	
24	800-3055	1			ASSY GROUND CABLE	
25	420-0453	1			MANUAL DIGGER	

Gremlin Industries, Inc.
San Diego, California 92123

PARTS LIST

TITLE ASSY DIGGER
COCKTAIL ENGLISH

700-0015
DWG NO

SH 3
OF 8

A

REV

ITEM NO	PART NO	QTY PER ASSY		DESCRIPTION	REF DES
26	800 - 0076	1		PHTO GN CALC BOARD	
27	800 - 3054	1		ASSY SPEAKER HARN	
28	211 - 0045	1		CONN PLUG AMP 6 PIN	
29	211 - 0042	5		CONN SOCKET AMP	
30	250 - 0412	1		PS LOCKING BRACKET	
31	800 - 3064	1		ASSY VOL CONTROL BLOCK	
32	270 - 0001	1		EMI FILTER	
33	800 - 3026	1		ASSY FUSE BLOCK	
34	211 - 0038	2		CONN QUICK 3/16"	
35		8		SCREW PHL.PN HD 6 X 1/2 SH MTL	
36	250 - 0048	1		CLIP SWITCH	
37		1		PNHD SCREW 4-40, 1/2"	
38		2		# 4 WASHER FLAT	
39		1		# 4 WASHER SPLIT	
40		1		# 4-40 NUT	
41		10		# 6 PHL 3/4" PAN SHT METAL	
42		4		# 8 FLAT WASHER	
43		2		# 6-32 X 1/4 FLT HD PHL SCREW	
44		2		# 10 X 1/2" PHILPS RND HD SCREW	
45		4		# 8 x 1/2" PAN SHT METAL	
46	252 - 0083	3		SUPPORT BLOCK POWER SUPPLY	
47		6		# 10 X 1/4" PHILPS FLT HD SCREW	
48	280 0075	4		NUT WIRE LARGE	
49	280 0010	7		NUT WIRE SMALL	
50		2		# 10 x 3/8" PN HD 5H MTL SCREW	

Gremlin Industries, Inc. San Diego, California 92123		PARTS LIST		TITLE ASSEMBLY BASIC COIN MECH - DUAL		800-0074 DWG NO		SH 1 OF 3		A REV	
SHEET 3 IS "D" SIZE				DRAWN <i>Tom Kline</i>		ENGR					
				CHECK <i>Tom Kline</i>		APPR					
LTR	DATE	REVISION DESCRIPTION		DRAFT	CHECK	APPR					
A	1-24-80	RELEASED		<i>BA</i>	<i>[Signature]</i>	<i>[Signature]</i>					

ITEM NO	PART NO	QTY PER ASSY			DESCRIPTION	REF DES
1	250-0285	1			CASH DOOR MODIFIED	
2	220-0066	2			COIN MECHANISM	
3	220-0035	1			LOCK FORT LOCK IR	
4	370-0002	2			OPTO-ISOLATOR 7IL139	
5	800-0085	1			ASSY. PHOTO CALCULATOR	
6	240-0001	1			KNDB. VOL. CONTROL	
7	250-0068	1			BRACKET	
8	420-0046	1			DECAL, VOLUME CONTROL	
9	475-0007	1			POTENTIOMETER 10KΩ CAR. PALMT.	
10	510-0014	1			SWITCH, SLIDE, SPDT	
11		8			SCREW 8-32 x 1/2" TAMPER-PROOF	
12		2			SCREW, MACH. PH. PHL 4-40 x 1/2"	
13		4			SCREW, SHT. MTL. PH. PHL #6	
14		2			SCREW, MACH. P.H. PHL 6-32 x 1/2"	
15		2			WASHER, FLAT #6	
16		2			WASHER, LOCK SPLIT #6	
17		2			WASHER, LOCK #4	
18		8			WASHER, LOCK SPLIT #8	
19		8			NUT HEX 8-32	
20		2			NUT HEX 6-32	
21		2			NUT HEX 4-40	
22		4			ALUMINUM RIVETS 1/8"	
23	510-0051	1			SWITCH PUSH BUTTON SLIDE	
24		2			WASHER, FLAT #4	

Gremlin Industries, Inc.
San Diego, California 92123

PARTS LIST

TITLE ASSY
PHOTO COIN CALC.

DWG NO
800-0076

SH 2 OF 5
B REV

ITEM NO	PART NO	QTY PER ASSY			DESCRIPTION	REF DES
1	151-0008	1			CAP CER .001 μ f 50V C9	
2	151-0011	5			CAP CER .01 μ f 50V C1,C3,C5,C7,C8	
3	153-0001	1			CAP TANT 10 μ f 25V C6	
4	152-0001	1			CAP FILM .1 μ f 100V C4	
5	153-0003	1			CAP TANT 2.2 μ f 25V C2	
6	170-0179	1			P C BOARD	
7						
8	314-0001	3			IC NE555 DIP U1,U5,U7	
9	314-0062	1			IC 74LS74 U2	
10	314-0074	2			IC 74LS191 U3,U6	
11	314-0078	1			IC 74LS02 U4	
12	471-0103	1			RES 10K OHM 1/2W 5% R9	
13	471-0102	3			RES 1K OHM 1/2W 5% R3,R6,R8	
14	471-0105	2			RES 1MEG OHM 1/2W 5% R1,R12	
15	471-0221	1			RES 220 OHM 1/2W 5% R7	
16	471-0331	2			RES 330 OHM 1/2W 5% R2,R5	
17	471-0334	1			RES 330K OHM 1/2W 5% R4	
18	471-0820	2			RES 82 OHM 1/2W 5% R10,R11	

ITEM NO	PART NO	QTY PER ASSY		DESCRIPTION	REF DES
1	150-0019	2		CAP E 4700 μ f 25V	C5, C6
2	151-0001	1		CAP CER .05 μ f 50V	C11
3	151-0002	2		CAP CER 100 pf 50V	C17, C19
4	151-0008	1		CAP CER .001 μ f 50V	C10
5	151-0011	3		CAP CER .01 μ f 50V	C12, C14, C16
6	151-0012	1		CAP CER .1 μ f 50V	C3
7	153-0001	6		CAPTANT 10 μ f 25V	C1, C2, C7, C13, C15, C20
8	170-0082	1		PCB POWER SUPPLY	
9	211-0056	3		CONN CRIMP	
10	212-0004	2		CONN M 4 PIN	
11	212-0021	2		CONN M 10 PIN	
12	212-0085	1		CONN 3 CIR XSTR	
13	313-0001	1		IC LM723	U3
14	313-0004	3		IC LM741EN	U1, U2, U4
15	471-0101	1		RES 100 OHM 1/2W 5%	R15
16	471-0102	10		RES 1K OHM 1/2W 5%	R5, 17, 20, 22-24, 35, 36, 38, 39
17	471-0103	4		RES 10K OHM 1/2W 5%	R1, R4, R21, R37
18	471-0104	1		RES 100K OHM 1/2W 5%	R33
19	471-0122	1		RES 1.2K OHM 1/2W 5%	R18
20	471-0133	1		RES 13K OHM 1/2W 5%	R41
21	471-0152	2		RES 1.5K OHM 1/2W 5%	R13, R16

ITEM NO	PART NO	QTY PER ASSY			DESCRIPTION	REF DES
22	471-0272	5			RES 2.7K OHM 1/2W 5%	R7, R25, R26, R43, R46
23	471-0332	1			RES 3.3K OHM 1/2W 5%	R32
24	471-0471	2			RES 470 OHM 1/2W 5%	R34, R40
25	471-0473	1			RES 47K OHM 1/2W 5%	R44
26	471-0562	1			RES 5.6K OHM 1/2W 5%	R12
27	472-00R5	4			RES 0.5 OHM 1W 5%	R4, R29-R31
28	473-00R1	1			RES 0.1 OHM 5W 5%	R28
29	475-0004	1			POT 1K CAR PCMTV	R9
30	475-0005	2			POT 2K CAR PCMTV	R8, R42
31	481-0004	4			DIODE MR501	D1-D4
32	481-0006	2			DIODE IN914	D7, D8
33	481-0008	1			DIODE ZENER IN5231	D10
34	482-0006	3			XSTR 2N4403	Q1, Q3, Q4
35	482-0013	1			XSTR TIP110	Q6
36	482-0014	2			XSTR 2N4401	Q2, Q5
37	482-0015	1			XSTR TIP115	Q7
38	482-0016	2			XSTR TIP29	Q8, Q9
39	800-0072	REF			SCHEMATIC	

Gremlin Industries, Inc.
 San Diego, California 92123

PARTS LIST

TITLE ASSY
 POWER SUPPLY DUAL

DWG NO 800-0072

SH 1
OF 4

REV D

DRAWN *[Signature]* 11-25-79 **ENGR**

CHECK *[Signature]* 12-3-79 **APPR**

LTR	DATE	REVISION DESCRIPTION	DRAFT	CHECK	APPR
A	12-3-79	RELEASED	WJB	<i>[Signature]</i>	<i>[Signature]</i>
B	1-4-80	PER ECN 367	WJB	<i>[Signature]</i>	<i>[Signature]</i>
C	4-21-80	CHG'D PER ECN 390	SD	<i>[Signature]</i>	<i>[Signature]</i>
D	6-6-80	CHG'D PER ECN 414 AND 414 A	SD	<i>[Signature]</i>	<i>[Signature]</i>

ITEM NO	PART NO	QTY PER ASSY		DESCRIPTION	REF DES
1	140-0015	1		CHASSIS, POWER SUPPLY	
2	150-0022	2		CAP E 9000 μ f 12V	C1B, C21
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	5		CONN SPADE LUG 1/4"	
7	212-0016	1		CONN FEM 10 PIN	
8	213-0006	1		SOCKET, TD-3	
9	280-0014	4		STAND-OFF, CLIPS	
10	280-0056	2		CLAMP CAP VR4 1 1/2"	
11	313-0023	1		IC 320-T5	U5
12	481-0009	1		DIODE MDA 3500	D9
13	482-0007	1		X15TOR 2N3055	Q10
14	800-0072	REF		SCHEM. ASSY PWR. SUPP.	
15	800-0073	1		POWER SUPPLY ASSY (PCB)	
25		3		WASHER FLAT #10	
16		8		SCREW-MACH PHD #6-32 X.5	
17		7		NUT HEX #6-32	
18		5		SCREW-MACH RD HD #4-40 X.37	
19		5		NUT HEX #4-40	
20		4		RIVET POP 3/16	
21		4		SCR #6 X 1/2 SHT METAL	
22		1		SCR MACH PHD #6-32 X 1"	
23	280-0117	2		TAB RIVET	
24	560-0003	1		TRANSFORMER POWER 10345B	T1

LIST

ASSY BASIC V.I.C.B.D.

DWG NO

OF 8

REV

E

ITEM NO	PART NO	QTY PER ASSY			DESCRIPTION	REF DES
26	314-0015	1			IC 7404	U54
27	314-0018	3			IC 74LS00	U4, U12, U32
28	314-0019	2			IC 74LS04	U35, U64
29	314-0040	3			IC 74LS125	U13, U46, U47
30	314-0046	1			IC 74S04	U68
31	314-0073	3			IC 74LS175	U45, U49, U50
32	314-0055	3			IC 74LS244	U1, U3, U19
33	314-0058	5			IC 74LS08	U37-39, 41, 71
34	314-0059	1			IC 74LS10	U52
35	314-0061	1			IC 74LS42	U40
36	314-0062	4			IC 74LS74	U11, U31, U67, U72
37	314-0078	1			IC 74LS02	U36
38	314-0092	2			IC 8216	U33, U34
39	315-0039	8			IC 4K RAM 12V	U56 - U63
40	315-0031	1			IC Z80 MK3880	U53
41	314-0086	1			IC 74LS163	U66
42	314-0093	2			IC 74LS374	U16, U28
43						
44	316-0206	1			IC PROM 32X8 CTL	U65
45						
46	390-0003	1			LED RED	D4
47	471-0220	3			RES 22 OHM 5%	R26-28
48	471-0011	5			RES 10 OHM 1/2 W 5%	R50-53, R29
49	471-0102	10			RES 1K OHM 1/2 W 5%	R7-11, 32, 37, 56-58
50	471-0103	1			RES 10K OHM 1/2 W 5%	R6

Gremlin Industries, Inc.
San Diego, California 92123

PARTS LIST

TITLE

ASSY BASIC V.I.C. B.D.

800-0031

DWG NO

SH 1

OF 8

REV

SHT 5,6,7,8 "D" 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	<i>[Signature]</i>	<i>[Signature]</i>
B	5-10-79	CHG'D PER ECN 310	SB	<i>[Signature]</i>	<i>[Signature]</i>
C	7-5-79	CHG'D PER ECN 310 & 321	WJB	<i>[Signature]</i>	<i>[Signature]</i>
—	9-9-79	CHG'D RES. FROM 22K TO 18K, ITEM *53 (ECN 326)	SB	<i>[Signature]</i>	<i>[Signature]</i>
D	11-13-79	CHG'D PER ECN 354 U3 & RP2 ADDED FOR OPTION	WJB	<i>[Signature]</i>	<i>[Signature]</i>
E	4-30-80	CHG'D PER ECN 394	SD	<i>[Signature]</i>	<i>[Signature]</i>

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
4	152-0001	1			CAP FILM .1 pf 100V	C4
5	152-0017	1			CAP FILM .33 pf 100V	C24
6	153-0001	6			CAP TANT 10 pf 25V	C12,20,21,23,26,68
7	153-0002	1			CAP TANT 1 pf 25V	C19
8	151-0011	2			CAP CER .01 pf 50V	C69, C70
9	170-0150	1			PCB C.V. LOGIC	
10						
11	211-0004	7			CONN PIN TEST PT	TP1 - TP4, GND
12	212-0063	4			CONN M 4 PIN PLZD	
13	212-0021	7			CONN M 10 PIN	
14	212-0031	2			CONN M 12 PIN	
15	213-0003	5			SKT 14 PIN DIP	XU14, 30, 69, 70, 29
16	213-0001	8			SKT 24 PIN DUAL INLN	XU20 - XU27
17	213-0004	20			SKT 16 PIN DUAL INLN	XRP2, XU5-8, 33, 34, 44, 49, XU56-63, 65, 66, 50
18						
19	213-0005	2			SKT 40 PIN DUAL INLN	XU43, XU53
20	213-0008	7			SKT 20 PIN DUAL INLN	XU1-3, 15, 16, 19, 28
21	213-0011	2			SKT 22 PIN DUAL INLN	XU17, XU18
22	213-0010	1			SKT 8 PIN DIP	XU9
23	230-0009	1			XTAL CLK 15.46845	Y1
24	313-0023	1			IC 320T-5.0	U73
25	314-0001	2			IC NE 555	U10, U55

ITEM NO	PART NO	QTY PER ASSY			DESCRIPTION	REF DES
51	471-0104	3			RES 100K OHM 1/2W 5%	R42-R44
52	471-0222	8			RES 2.2K OHM 1/2W 5%	R18-R25
53	471-0183	1			RES 18K OHM 1/2W 5%	R3
54	471-0331	8			RES 330 OHM 1/2W 5%	R30,31,33,34,45,46,59,60
55	471-0221	1			RES 220 OHM 5%	R55
56	471-0471	1			RES 470 OHM 1/2W 5%	R49
57	471-0472	3			RES 4.7K OHM 1/2W 5%	R5, R47, R48
58	471-0750	1			RES 75 OHM 1/2W 5%	R41
59						
60	475-0001	1			POT 10K PC MTV	R4
61						
62	477-0002	3			RES PACK 15 X 2.2K	RP1, RP2, RP3
63						
64	481-0006	4			DIODE 1N914/1N4148	D1, D2, D5, D6
65						
66	482-0006	1			XSTR 2N4403	Q6
67	482-0010	1			XSTR PE8050	Q2
68	482-0014	4			XSTR 2N4401	Q1, Q7, Q10, Q11
69	510-0049	1			SWITCH 8 POS DIP SPST	SW1
70	530-0006	1			HEAT SINK 295-1	
71						
72						
73	314-0072	1			IC 74LS174	U43
74						
75	314-0076	1			IC 74LS157	U42



PARTS LIST

TITLE
ASSY LOGIC DIGGER
TABLE

800 - 3048
DWG NO

SH 1
OF 2

A

REV

DRAWN MAHDNEY

ENGR

CHECK *Volume Ah* 4-22-80 APPR

REVISION DESCRIPTION

DRAFT

CHECK

APPR

A 4-22-80 RELEASED

J.M.

A.A.

A.A.

Gremlin Industries, Inc.
San Diego, California 92123

PARTS
LIST

TITLE ASSEMBLY
DIGGER SOUND

800-3033

DWG NO

SH 1

OF 6 REV

A

SHT 5, 6 ARE "D" SIZE

DRAWN Wynne 3-21-80

ENGR

CHECK *[Signature]* 5-6-80

APPR *[Signature]*

LTR DATE

A 4-14-80

REVISION DESCRIPTION

RELEASED

DRAFT

WJB

CHECK

A.A.

APPR

[Signature]

Gremlin Industries, Inc.
San Diego, California 92123

PARTS
LIST

TITLE ASSEMBLY
DIGGER SOUND

800-3033

SH 1
OF 6
REV

SHT 5, 6 ARE "D" SIZE

DRAWN Wynne 3-21-80

ENGR

CHECK *[Signature]* 5-6-80

APPR *[Signature]*

LTR DATE

A 4-14-80

REVISION DESCRIPTION

RELEASED

DRAFT

WJB

CHECK

A.A.

APPR

[Signature]

Greenline Industries, Inc.
San Diego, California 92123

PARTS LIST

TITLE ASSEMBLY
DIGGER SOUND

DWG NO
800-3033

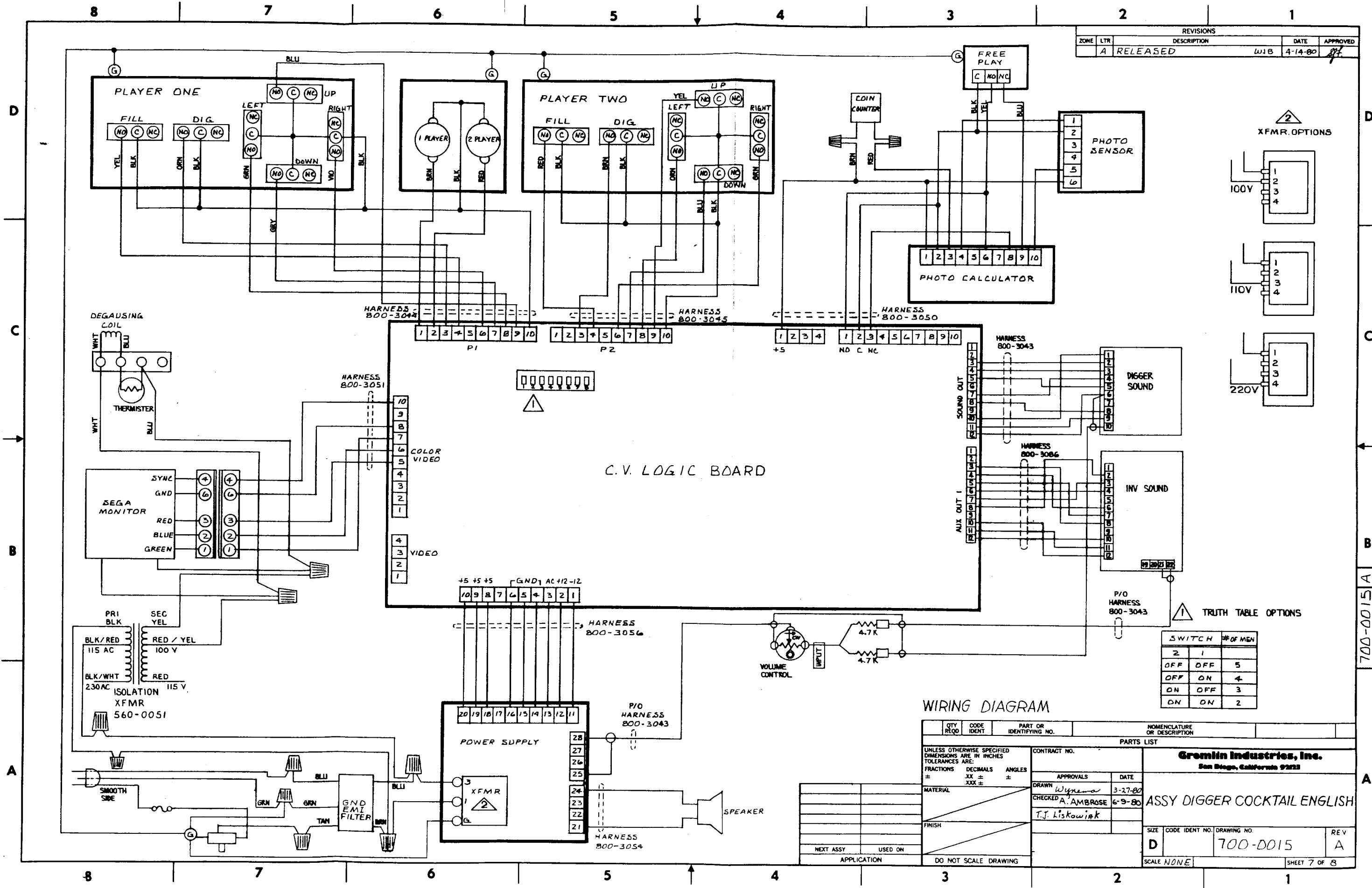
SH 2 OF 6

A REV

ITEM NO	PART NO	QTY PER ASSY			DESCRIPTION	REF DES
1	151-0001	2			CAP CER .05 μ f 50V	C9, C18
2	151-0005	1			CAP CER 680 pf 50V	C8
3	151-0012	4			CAP CER .1 μ f 50V	C12, C19, C22
4	152-0001	2			CAP FILM .1 μ f 100V	C3, C17
5	152-0005	3			CAP FILM .0047 μ f 50V	C4, C6, C15
6	152-0012	2			CAP FILM .047 μ f 200V	C11, C16
7	152-0018	1			CAP FILM .01 μ f 250V	C5
8	152-0020	1			CAP FILM .47 μ f 100V	C12
9	150-0004	2			CAP E 10 μ f 25V	C20, C21
10	153-0002	1			CAP TANT 1 μ f 25V	C13
11	153-0003	1			CAP TANT 2.2 μ f 25V	C7
12	153-0007	2			CAP TANT 6.8 μ f 25V	C10, C14
13	170-0187	1			PC BOARD	
14	212-0021	1			CONN 10PIN M PL2D	
15	280-0317	4			SELF RETAINING SPACER	
16	313-0008	2			IC LM 348	U1, U4
17	315-0007	2			IC CD 4011	U2, U9
18	315-0035	1			IC MM 5837	U7
19	315-0043	4			IC CD 4069	U3, U5, U6, U8
20	471-0101	2			RES 100 OHM 1/2W 5%	R44, R50
21	471-0102	4			RES 1K OHM 1/2W 5%	R7, R37, R55, R63
22						

ITEM NO	PART NO	QTY PER ASSY			DESCRIPTION	REF DES
23	471-0103	10			RES 10K OHM 1/2W 5%	R9, R11, R13, R15, R17, R21, R54, R64, R65, R68
24	471-0104	7			RES 100K OHM 1/2W 5%	R2-R4, R10, R12, R14, R61
25	471-0105	7			RES 1 MEG OHM 1/2W 5%	R31-R33, R35, R39, R62, R67
26	471-0154	1			RES 150K OHM 1/2W 5%	R56
27	471-0205	1			RES 2 MEG OHM 1/2W 5%	R48
28	471-0224	1			RES 220K OHM 1/2W 5%	R18
29	471-0225	1			RES 2.2 MEG OHM 1/2W 5%	R41
30	471-0272	1			RES 2.7K OHM 1/2W 5%	R8
31	471-0274	1			RES 270K OHM 1/2W 5%	R19
32	471-0275	1			RES 2.7 MEG OHM 1/2W 5%	R6
33	471-0374	2			RES 390K OHM 1/2W 5%	R30, R51
34	471-0472	1			RES 4.7K OHM 1/2W 5%	R57
35	471-0473	3			RES 4.7K OHM 1/2W 5%	R22, R36, R16
36	471-0474	1			RES 470K OHM 1/2W 5%	R40
37	471-0512	4			RES 5.1K OHM 1/2W 5%	R38, R46, R53, R58
38	471-0563	2			RES 56K OHM 1/2W 5%	R20, R66
39	471-0754	9			RES 750K OHM 1/2W 5%	R23, R24, R26, R27, R29, R42, R52, R59, R60
40	471-0694	1			RES 680K OHM 1/2W 5%	R47
41	471-0833	1			RES 82K OHM 1/2W 5%	R34
42	181-0006	16			DIODE 1N914 / IN4148	D1-D16
43	082-0014	11			XSTR 2N4401	Q1-Q11

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
A		RELEASED	4-14-80	[Signature]



TRUTH TABLE OPTIONS

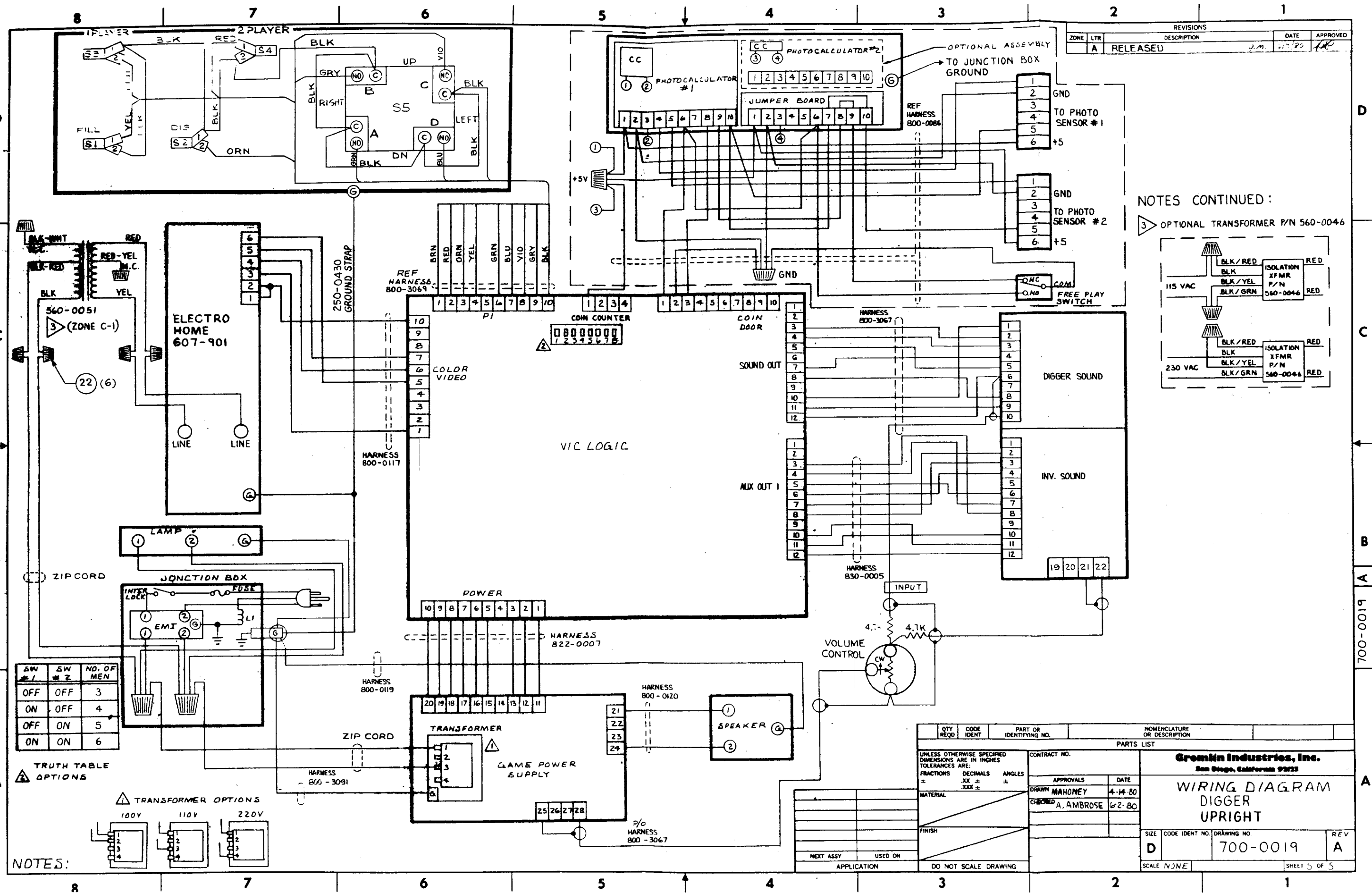
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2	1	5
OFF	OFF	5
OFF	ON	4
ON	OFF	3
ON	ON	2

WIRING DIAGRAM

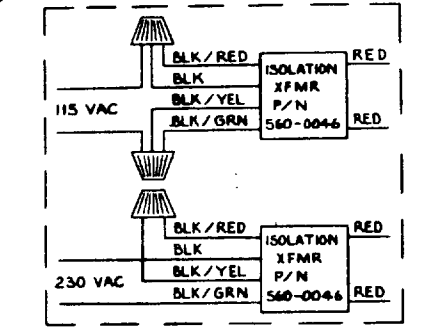
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PARTS LIST			
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:			
FRACTIONS	DECIMALS	ANGLES	
±	.XX ±	±	
	.XXX ±		
MATERIAL		CONTRACT NO.	
FINISH		APPROVALS	
NEXT ASSY		USED ON	
APPLICATION		DO NOT SCALE DRAWING	
Gremlin Industries, Inc. San Diego, California 92122			DATE
DRAWN <i>Wyena</i>			3-27-80
CHECKED <i>A. Ambrose</i>			6-9-80
T.J. Liskowick			
SIZE	CODE IDENT NO.	DRAWING NO.	REV
D		700-0015	A
SCALE NONE			SHEET 7 OF 8

700-0015 A

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
A	RELEASED		J.M. 11/7/80	

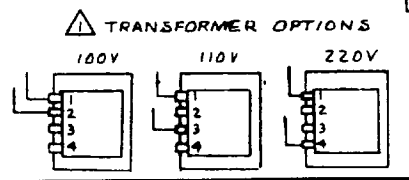


NOTES CONTINUED:
 3 OPTIONAL TRANSFORMER P/N 560-0046



SW #1	SW #2	NO. OF MEN
OFF	OFF	3
ON	OFF	4
OFF	ON	5
ON	ON	6

TRUTH TABLE OPTIONS

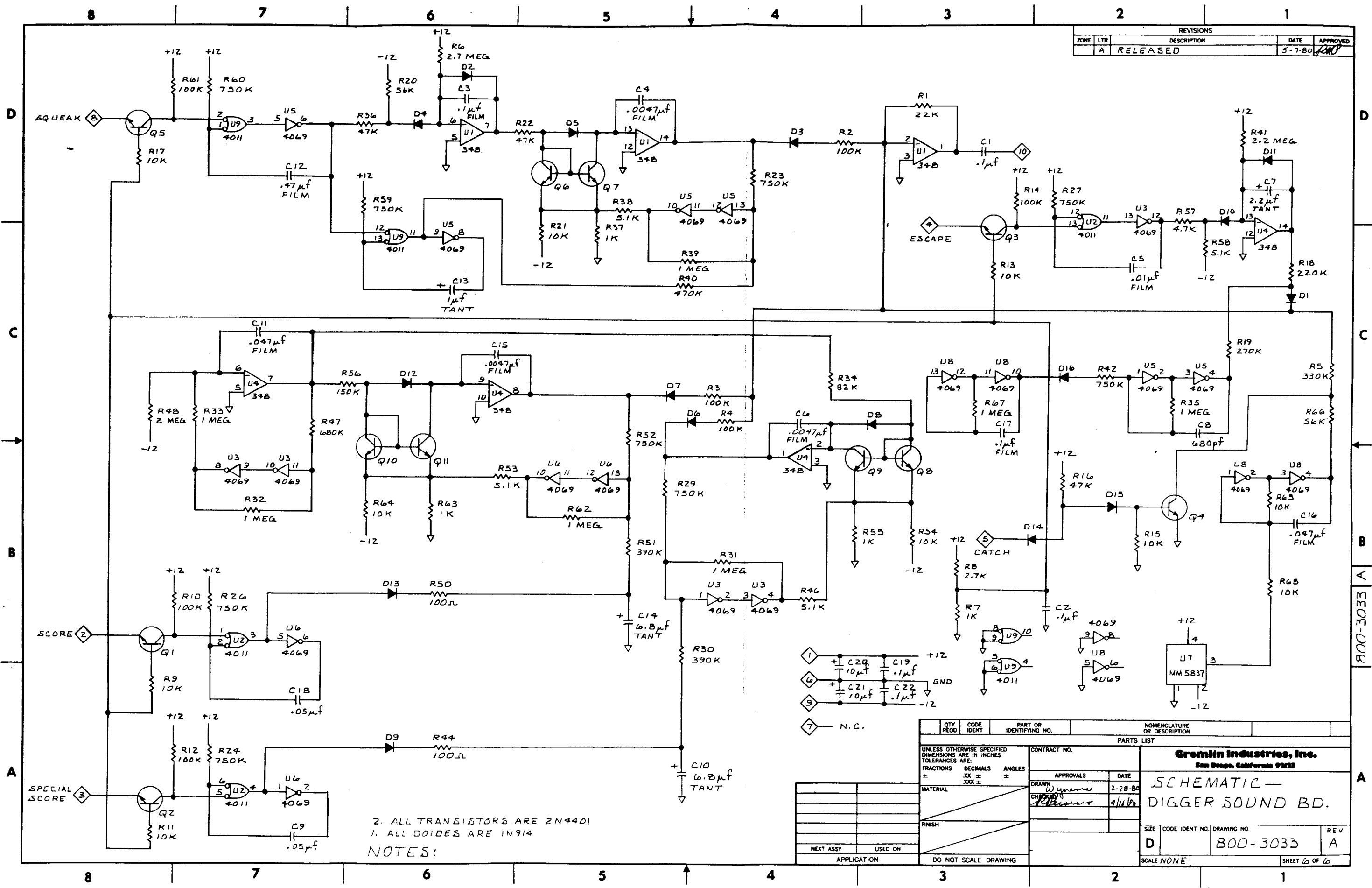


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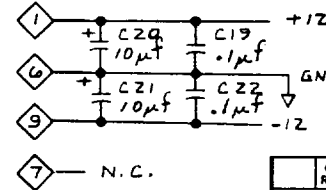
QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
PARTS LIST			
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS ± DECIMALS ± ANGLES ±			
CONTRACT NO.		Grenlin Industries, Inc. San Diego, California 92123	
APPROVALS		DATE	
DRAWN MAHONEY		4-14-80	
CHECKED A. AMBROSE		6-2-80	
SIZE	CODE IDENT NO.	DRAWING NO.	REV
D		700-0019	A
SCALE N3/16			SHEET 5 OF 5

700-0019

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
A	RELEASED		5-7-80	LMO



NOTES:
 2. ALL TRANSISTORS ARE 2N4401
 1. ALL DIODES ARE 1N914



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	
±	±	±	
±	±	±	
MATERIAL		CONTRACT NO.	
FINISH		APPROVALS	
NEXT ASSY		DATE	
USED ON		DRAWN	
APPLICATION		CHECKED	
DO NOT SCALE DRAWING		SCALE NONE	

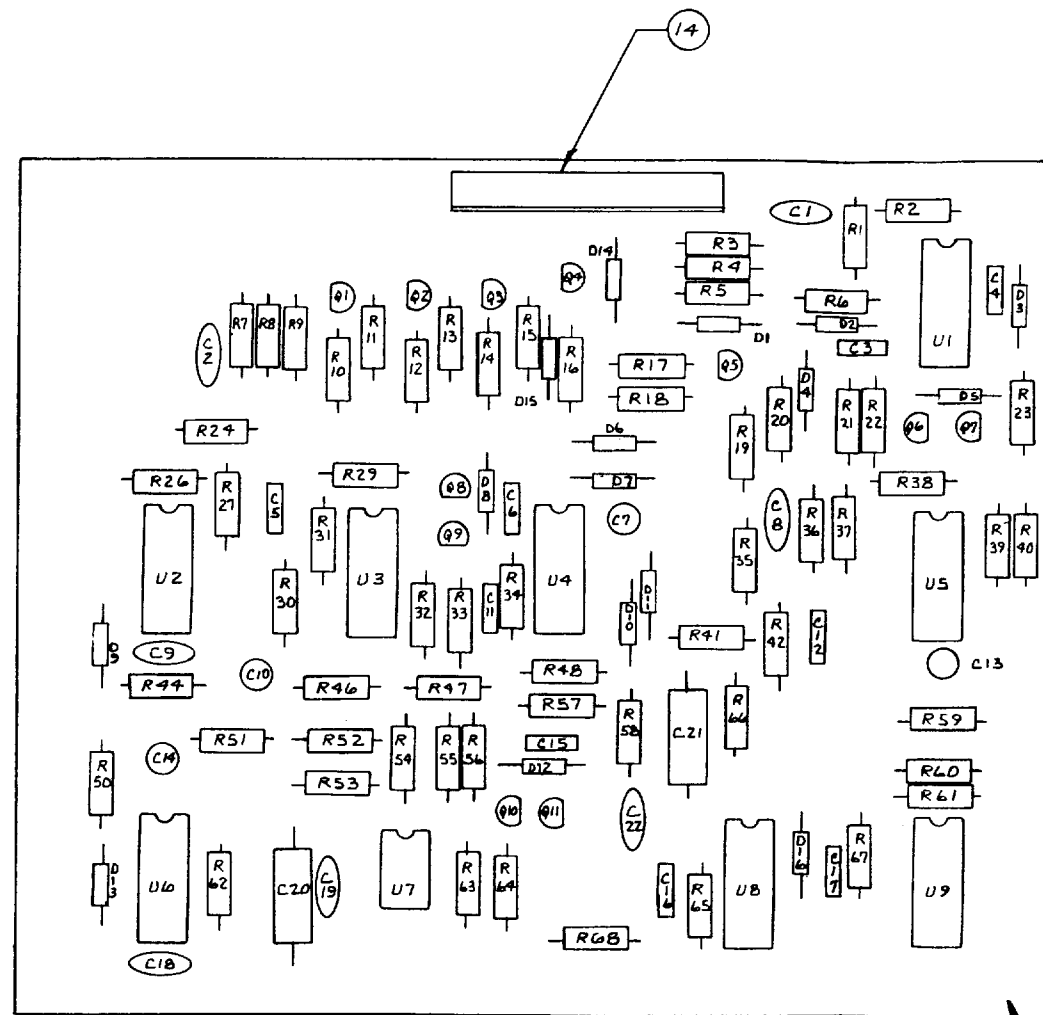
Grenlin Industries, Inc.
 San Diego, California 92123

**SCHEMATIC —
 DIGGER SOUND BD.**

SIZE: **D** CODE IDENT NO: **800-3033** DRAWING NO: **800-3033** REV: **A**

SHEET 6 OF 6

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
A		RELEASED	WJB 1-15-80	RP

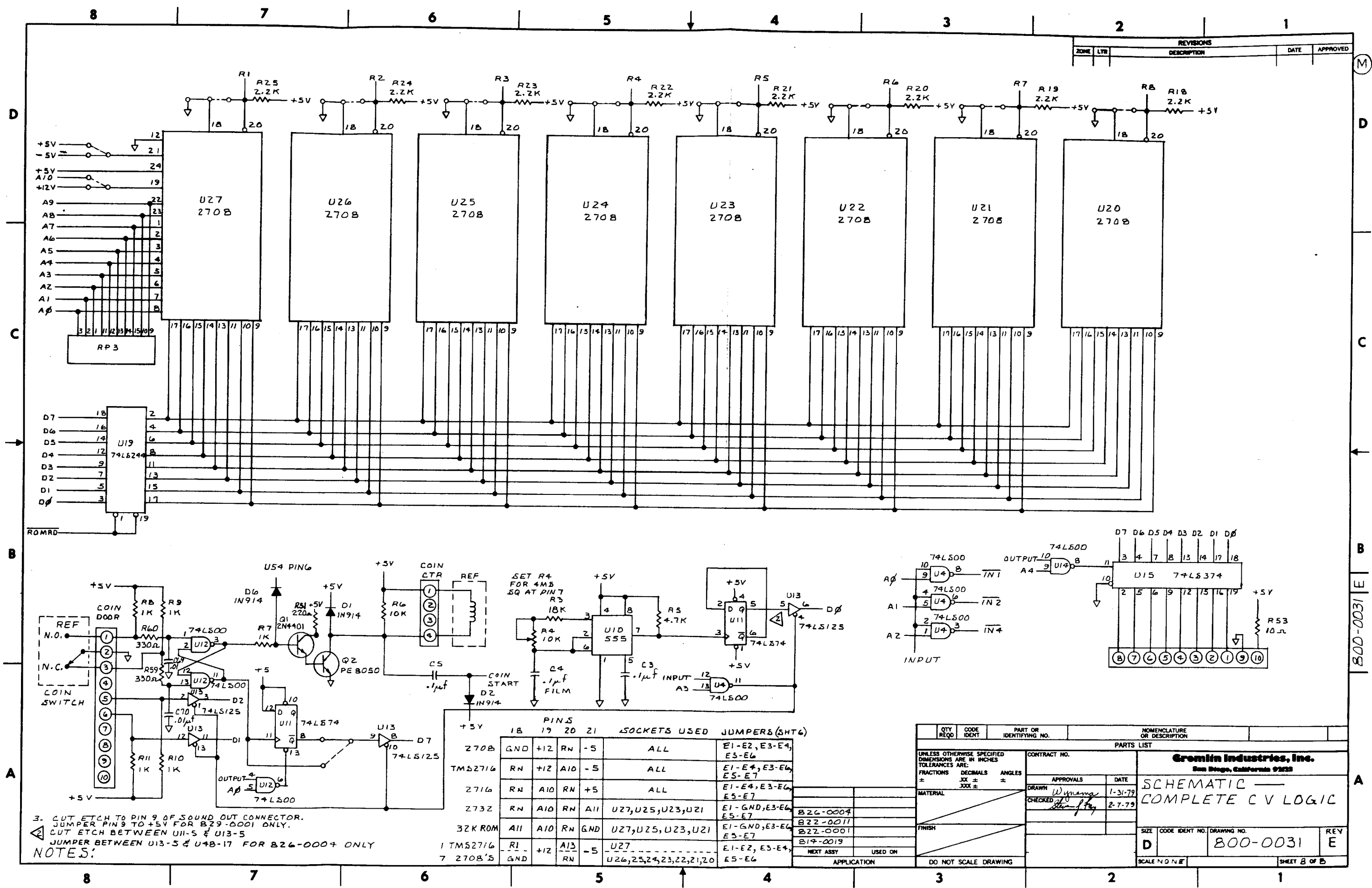


SEE DETACHED PARTS LIST

QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	
PARTS LIST				
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:			Gremlin Industries, Inc. San Diego, California 92123	
FRACTIONS	DECIMALS	ANGLES	APPROVALS	DATE
±	XX ±	±	<i>[Signature]</i>	3-24-80
±	.XXX ±	±	<i>[Signature]</i>	1/15/80
MATERIAL			CONTRACT NO.	
FINISH			DRAWING NO.	
NEXT ASSY			USED ON	
APPLICATION			DO NOT SCALE DRAWING	
SCALE 2/1			SHEET 5 OF 6	

- 3 INSTALL FROM CIRCUIT SIDE.
 2. LAST USED USED
 C22, U9, R63, D16, Q11
 1. R25 R28 R43 R45 R49 NOT USED
 NOTES:

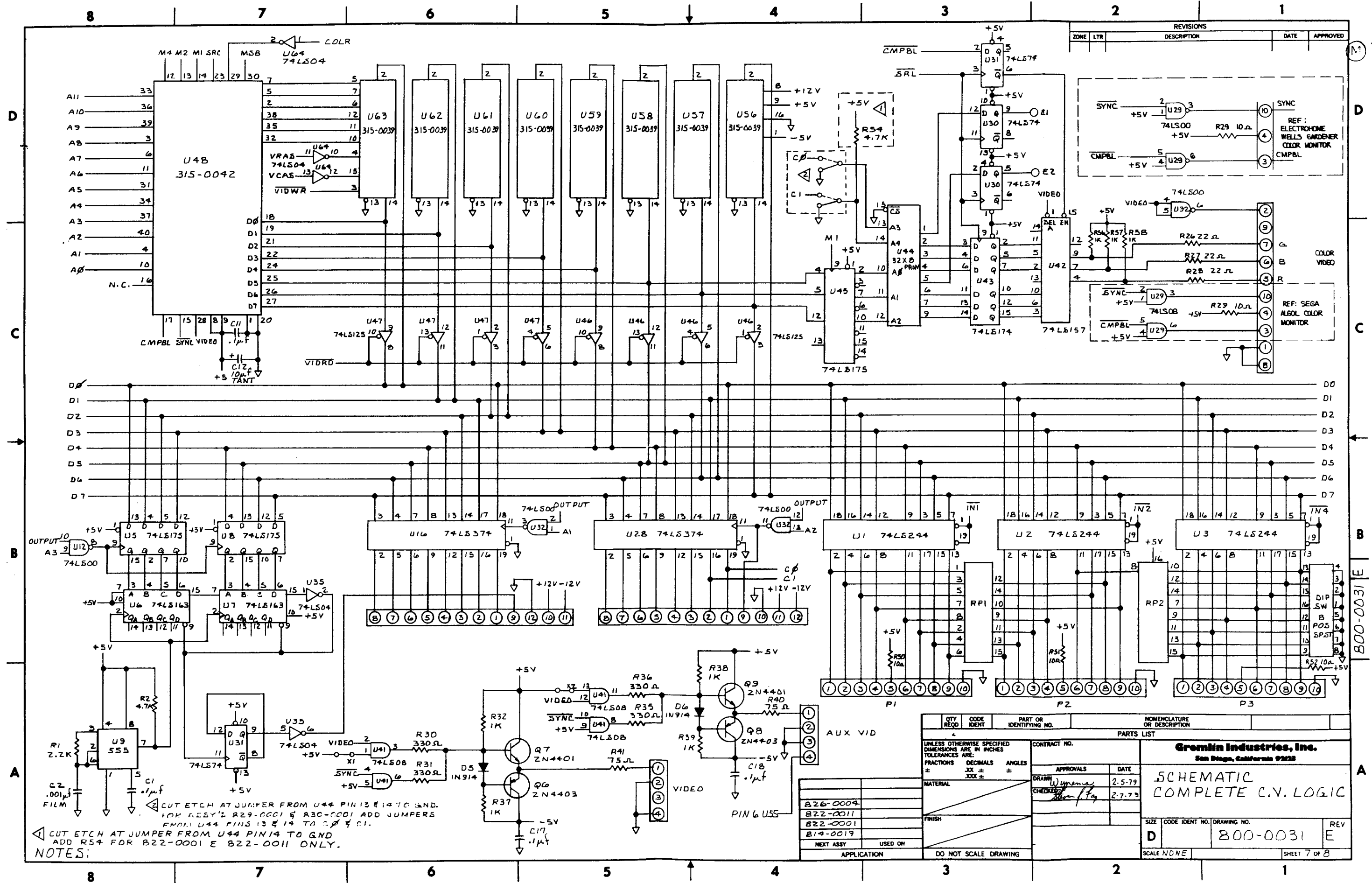
800-3033 A



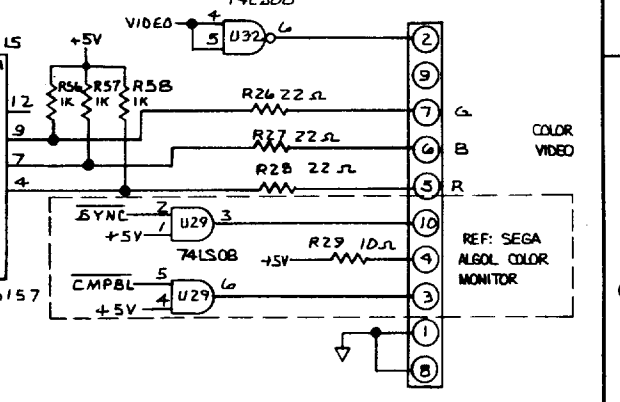
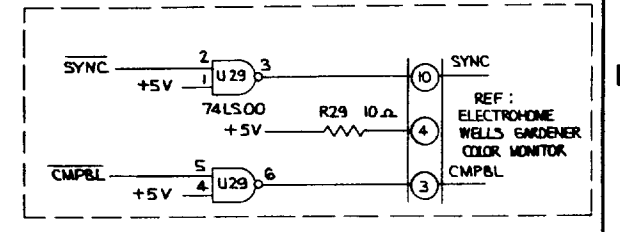
NOTES:
 3. CUT ETCH TO PIN 9 OF SOUND OUT CONNECTOR.
 JUMPER PIN 9 TO +5V FOR B29-0001 ONLY.
 CUT ETCH BETWEEN U11-5 & U13-5
 JUMPER BETWEEN U13-5 & U4B-17 FOR B26-0007 ONLY

	PINS				SOCKETS USED		JUMPERS (SHT6)	
	18	19	20	21				
2708	GND	+12	RN	-5	ALL		E1-E2, E3-E4, E5-E6	
TMS2716	RN	+12	A10	-5	ALL		E1-E4, E3-E6, E5-E7	
2716	RN	A10	RN	+5	ALL		E1-E4, E3-E6, E5-E7	
2732	RN	A10	RN	A11	U27, U25, U23, U21		E1-GND, E3-E6, E5-E7	
32K ROM	A11	A10	RN	GND	U27, U25, U23, U21		E1-GND, E3-E6, E5-E7	
1 TMS2716	R1	+12	A13	-5	U27		E1-E2, E3-E4, E5-E6	
7 2708'S	GND	+12	RN	-5	U26, 25, 24, 23, 22, 21, 20		E1-E2, E3-E4, E5-E6	

QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
			74LS00
			74LS125
			74LS126
			74LS127
			74LS128
			74LS129
			74LS130
			74LS131
			74LS132
			74LS133
			74LS134
			74LS135
			74LS136
			74LS137
			74LS138
			74LS139
			74LS14
			74LS15
			74LS16
			74LS17
			74LS18
			74LS19
			74LS20
			74LS21
			74LS22
			74LS23
			74LS24
			74LS25
			74LS26
			74LS27
			74LS28
			74LS29
			74LS30
			74LS31
			74LS32
			74LS33
			74LS34
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			74LS38
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			74LS40
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			74LS43
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			74LS62
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			74LS64
			74LS65
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			74LS68
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			74LS70
			74LS71
			74LS72
			74LS73
			74LS74
			74LS75
			74LS76
			74LS77
			74LS78
			74LS79
			74LS80
			74LS81
			74LS82
			74LS83
			74LS84
			74LS85
			74LS86
			74LS87
			74LS88
			74LS89
			74LS90
			74LS91
			7



REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED



NOTES:
 CUT ETCH AT JUMPER FROM U44 PIN 13 TO GND.
 FOR RESY'S R29-0001 & R30-0001 ADD JUMPERS
 FROM U44 PINS 13 & 14 TO C1 & C1.
 CUT ETCH AT JUMPER FROM U44 PIN 14 TO GND.
 ADD R54 FOR B22-0001 & B22-0011 ONLY.

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

APPROVALS		DATE
DRAWN	W...	2-5-79
CHECKED	...	2-7-79

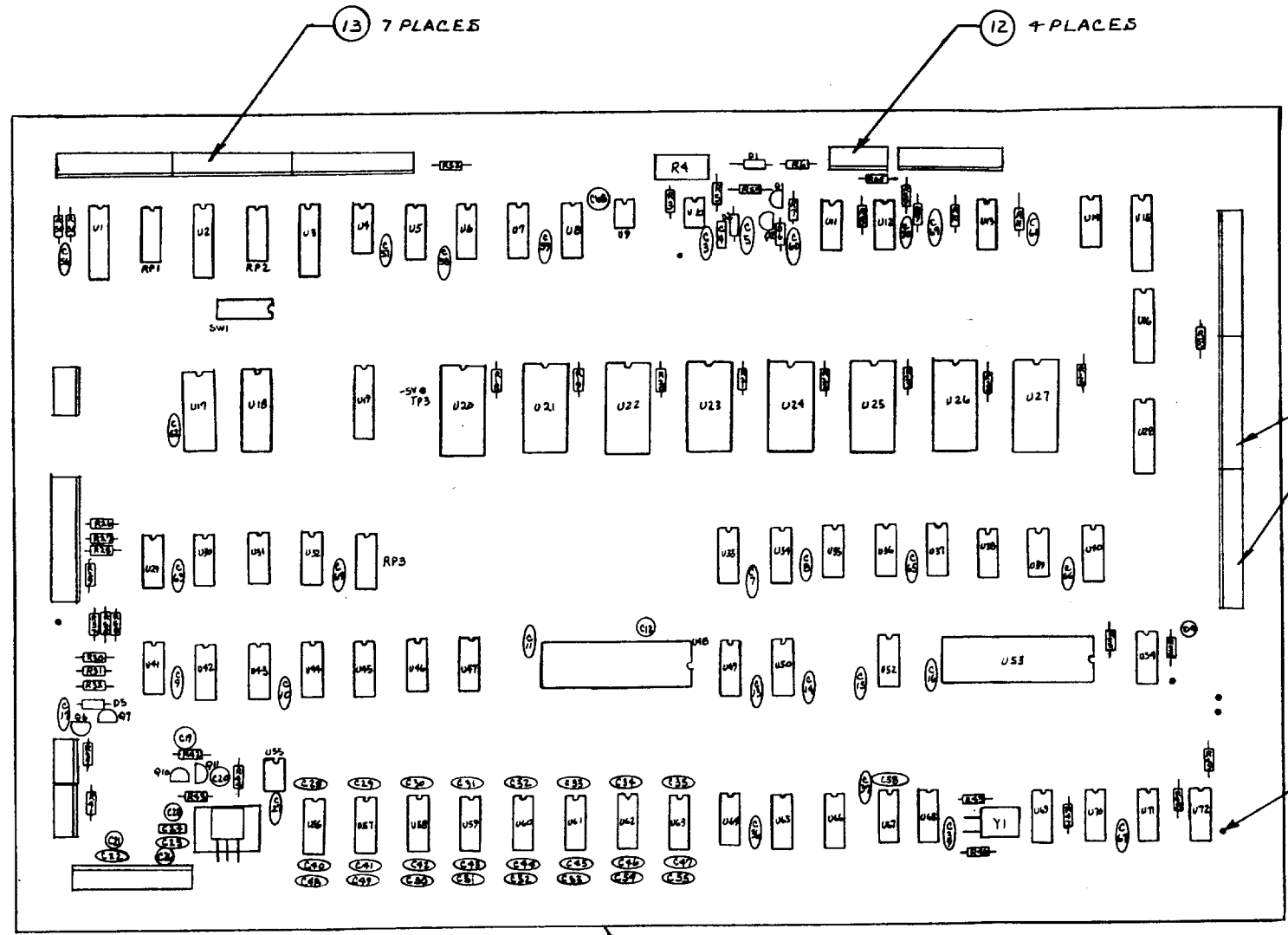
SIZE	CODE IDENT NO.	DRAWING NO.	REV
D		800-0031	E

800-0031 E

A

SHEET 7 OF 8

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
A		RELEASED	12-22-78	[Signature]
B		PER ECN 310	5-29-78	[Signature]
C		PER ECN 318 & 321	8-8-79	[Signature]
		PER ECN 326 (SEE P/L)	SD 9-4-79	[Signature]
D		PER ECN 354	WJD 11-13-79	[Signature]
E		PER ECN 394	SD 4-30-80	[Signature]



13 7 PLACES

12 4 PLACES

14

11 7 PLACES

9

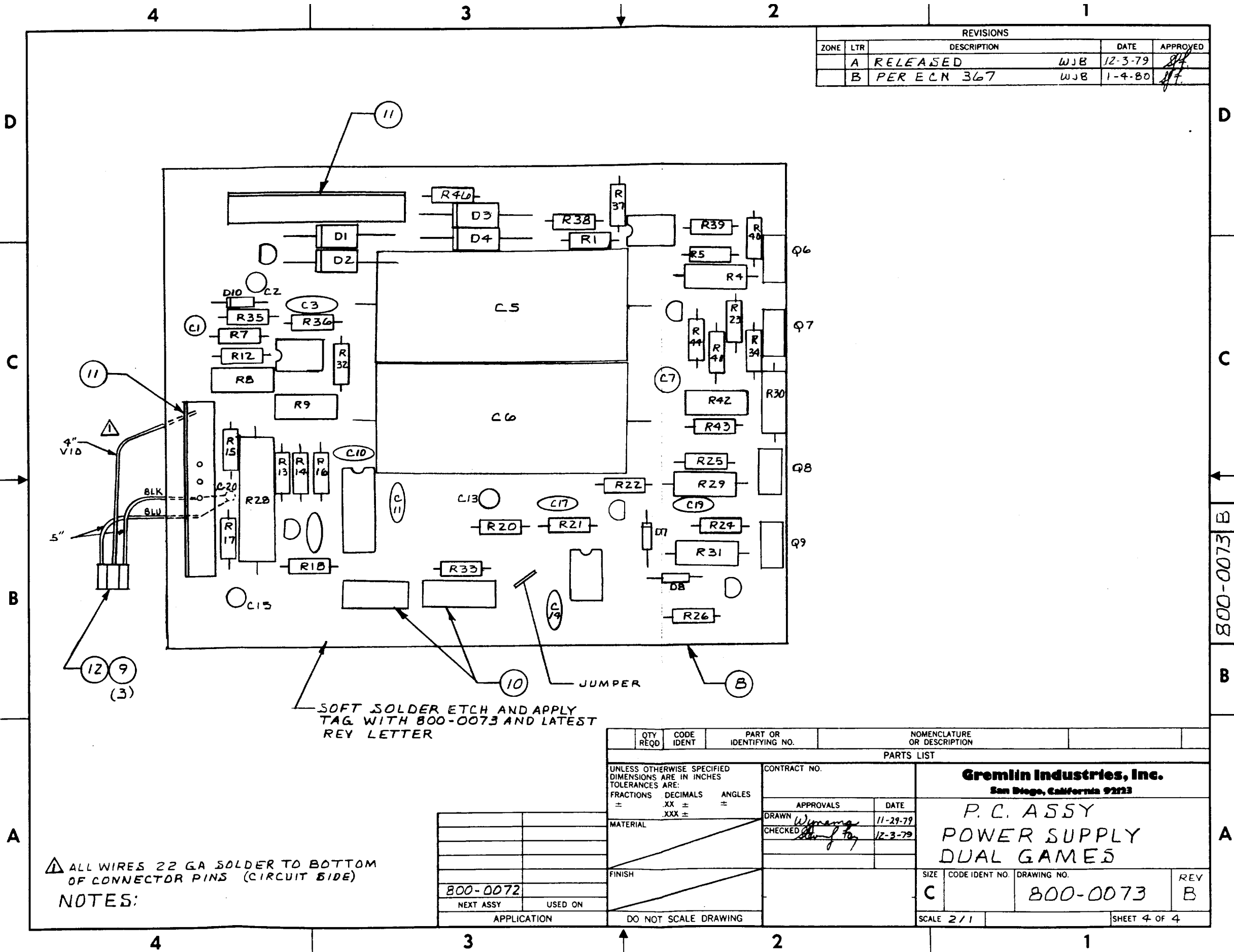
SEE DETACHED PARTS LIST

QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
PARTS LIST			
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:		CONTRACT NO.	
FRACTIONS	DECIMALS	ANGLES	
±	.XX ±	±	
	.XXX ±		
MATERIAL		APPROVALS	DATE
FINISH		DRAWN <i>Dynamis</i>	11-20-78
NEXT ASSY		CHECKED <i>W. J. Fay</i>	12-22-78
USED ON		ASSEMBLY — BASIC V.I.C. BOARD	
APPLICATION		SIZE	CODE IDENT NO. DRAWING NO. REV
DO NOT SCALE DRAWING		D	800-0031 E
		SCALE 1/1	SHEET 5 OF 5

826-0004	
814-0019	
822-0011	
822-0001	
NEXT ASSY	USED ON
APPLICATION	DO NOT SCALE DRAWING

800-0031 E

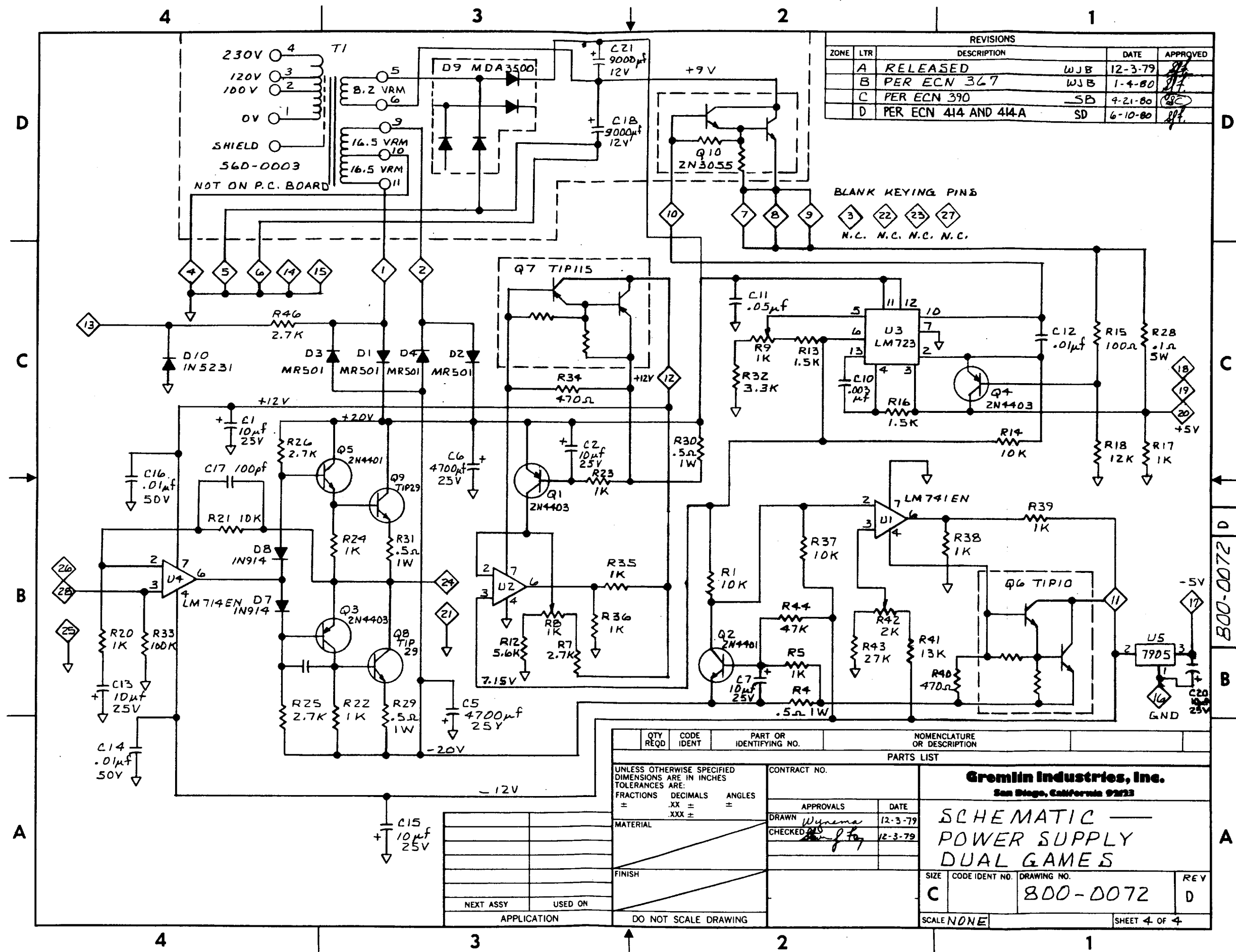
REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
A		RELEASED	WJB 12-3-79	<i>[Signature]</i>
B		PER ECN 367	WJB 1-4-80	<i>[Signature]</i>



▲ ALL WIRES 22 GA SOLDER TO BOTTOM OF CONNECTOR PINS (CIRCUIT SIDE)
 NOTES:

SOFT SOLDER ETCH AND APPLY TAG WITH 800-0073 AND LATEST REV LETTER

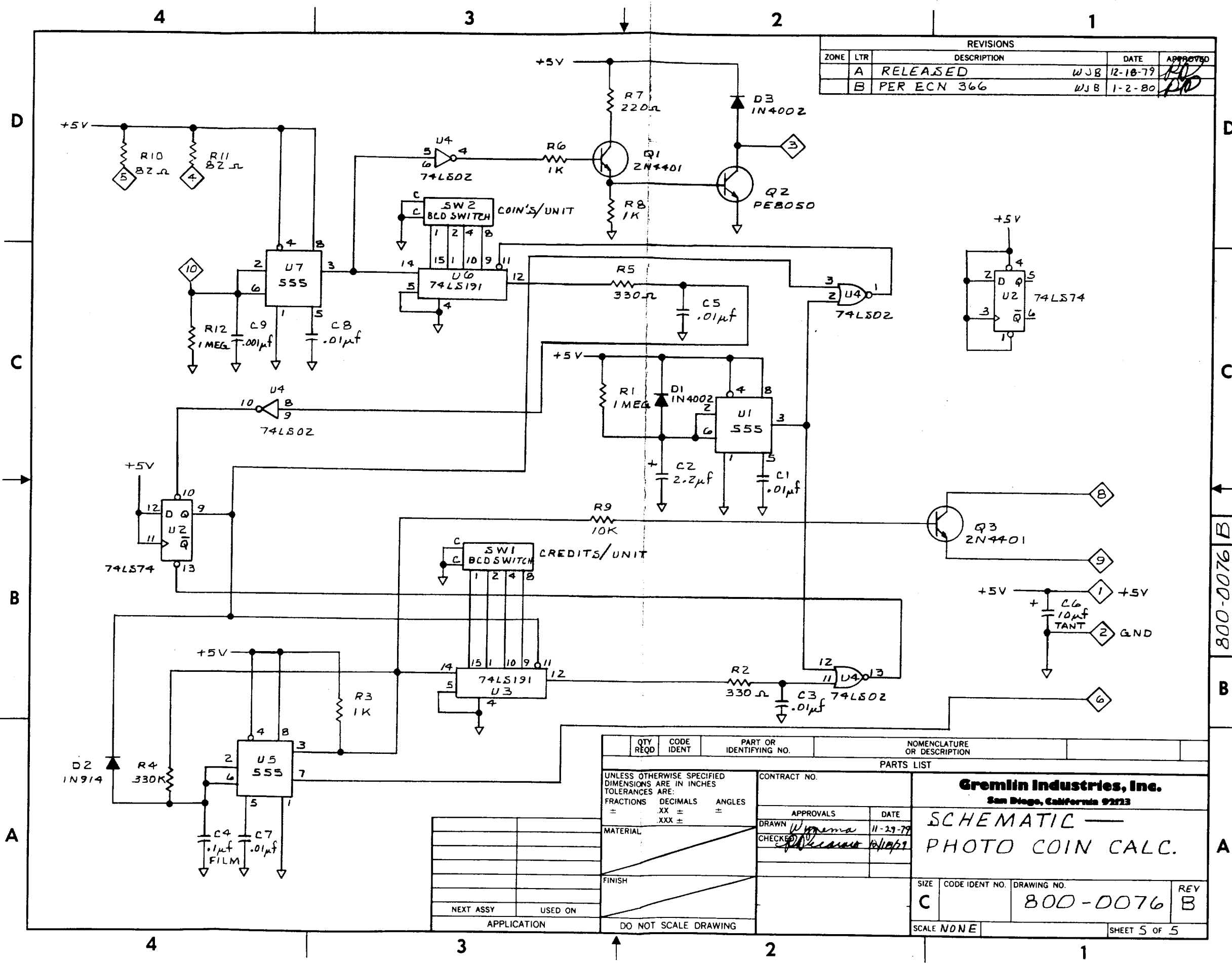
QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
PARTS LIST			
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:		CONTRACT NO.	
FRACTIONS	DECIMALS	ANGLES	
±	.XX ±	±	
	.XXX ±		
MATERIAL		APPROVALS	
FINISH		DATE	
NEXT ASSY		DRAWN <i>Wymona</i> 11-29-79	
USED ON		CHECKED <i>[Signature]</i> 12-3-79	
APPLICATION		Gremlin Industries, Inc. San Diego, California 92123 P. C. ASSY POWER SUPPLY DUAL GAMES	
800-0072		SIZE C	CODE IDENT NO. 800-0073
		DRAWING NO.	REV B
		SCALE 2/1	SHEET 4 OF 4



REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
A		RELEASED	WJB 12-3-79	<i>[Signature]</i>
B		PER ECN 367	WJB 1-4-80	<i>[Signature]</i>
C		PER ECN 390	SB 4-21-80	<i>[Signature]</i>
D		PER ECN 414 AND 414-A	SD 6-10-80	<i>[Signature]</i>

BLANK KEYING PINs
 3 22 23 27
 N.C. N.C. N.C. N.C.

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	
		DATE	
		DRAWN <i>Wynema</i> 12-3-79	
		CHECKED <i>[Signature]</i> 12-3-79	
FINISH		Gremlin Industries, Inc. San Diego, California 92123 SCHEMATIC — POWER SUPPLY DUAL GAMES	
NEXT ASSY			
USED ON		SIZE	CODE IDENT NO.
APPLICATION		C	800-0072
DO NOT SCALE DRAWING		DRAWING NO.	REV
		800-0072	D
		SCALE NONE	SHEET 4 OF 4

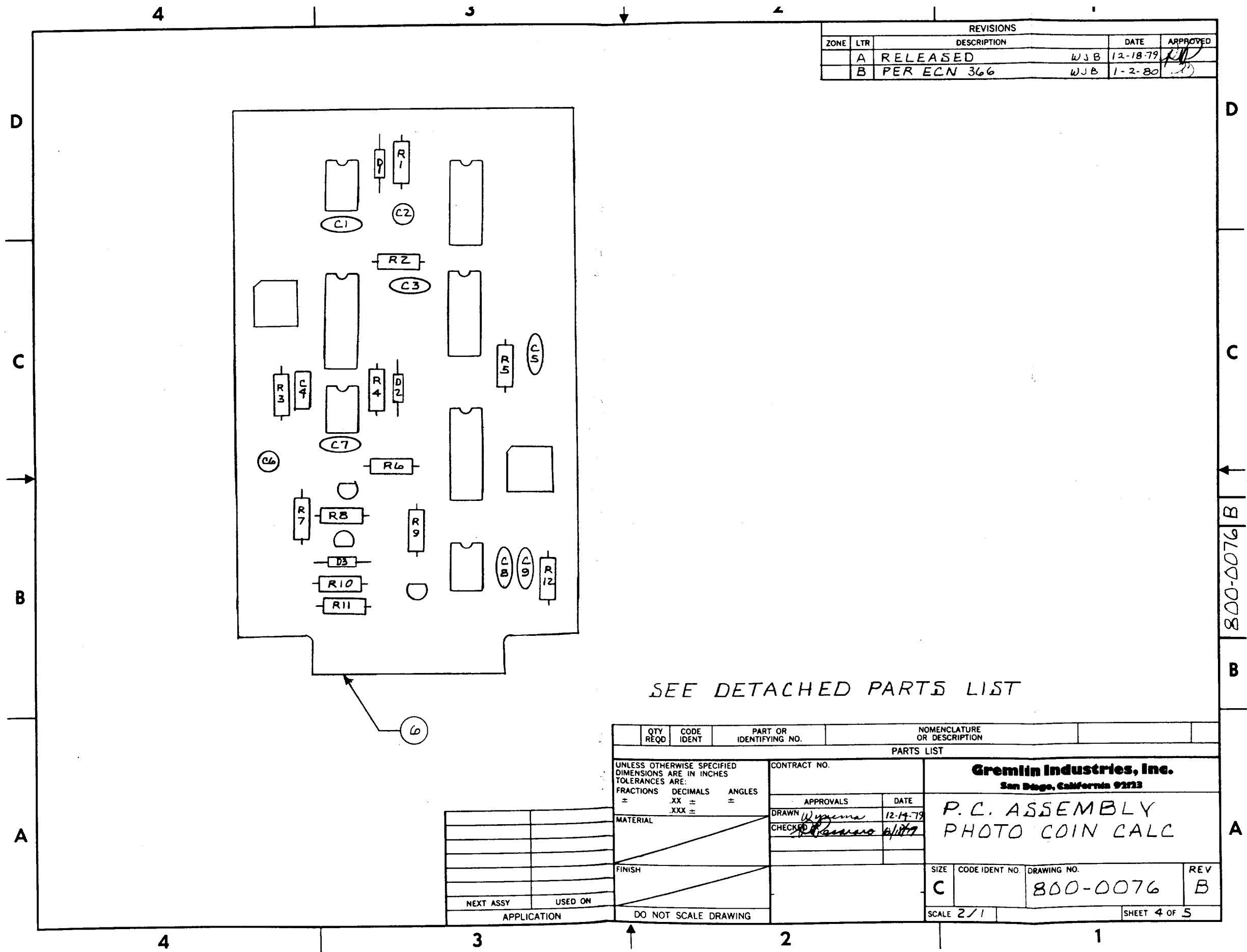


REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
A		RELEASED	WJB 12-18-79	<i>[Signature]</i>
B		PER ECN 366	WJB 1-2-80	<i>[Signature]</i>

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 XX ±	Gremlin Industries, Inc. San Diego, California 92123	
ANGLES =	XXX ±		
MATERIAL		APPROVALS	DATE
FINISH		DRAWN <i>[Signature]</i> 11-29-79 CHECKED <i>[Signature]</i> 12/1/79	
NEXT ASSY		SIZE	CODE IDENT NO.
USED ON		DRAWING NO. 800-0076	
APPLICATION		SCALE	REV B
DO NOT SCALE DRAWING		SHEET 5 OF 5	

800-0076

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
A		RELEASED	WJB 12-18-79	<i>[Signature]</i>
B		PER ECN 366	WJB 1-2-80	<i>[Signature]</i>

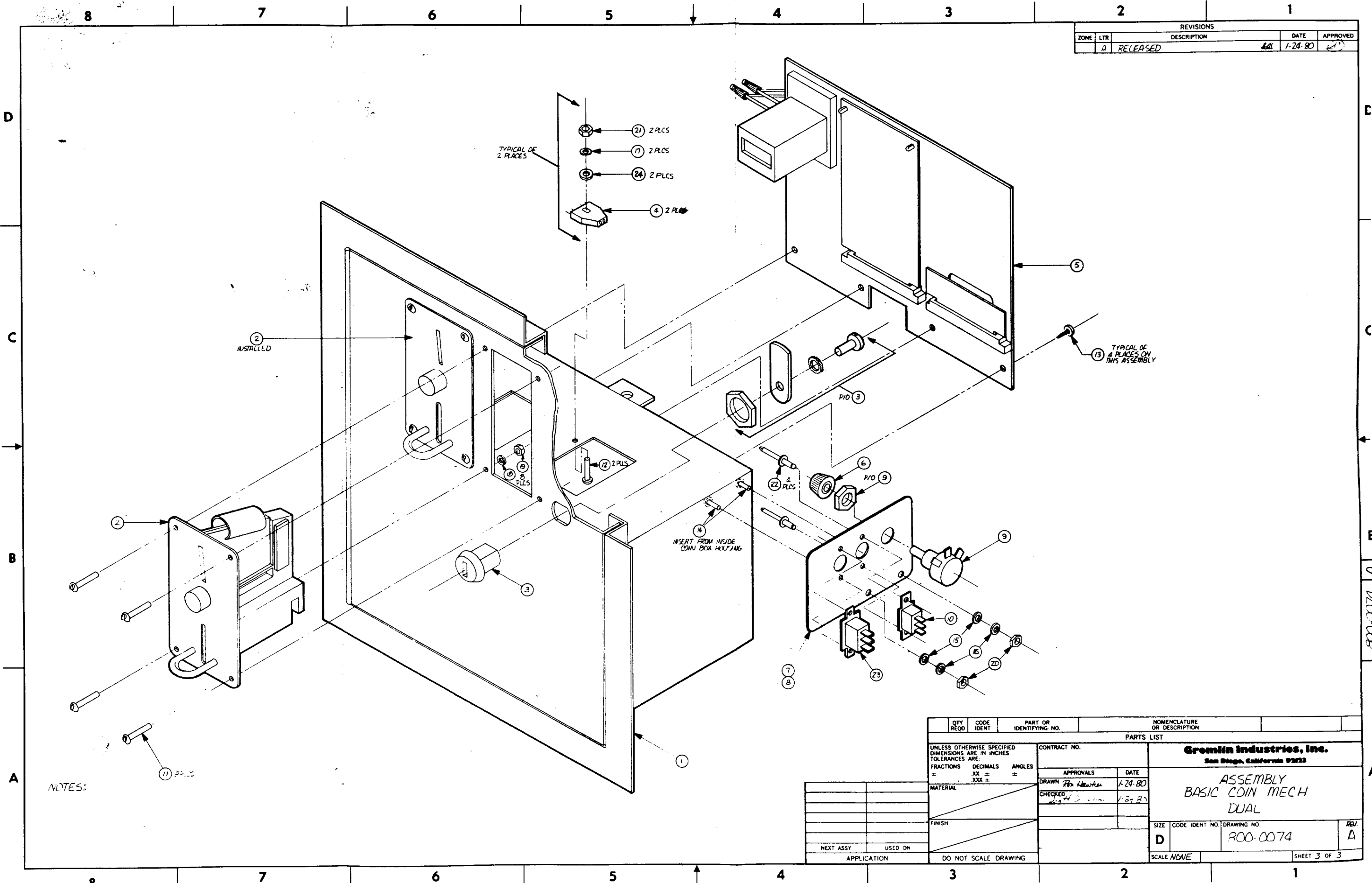


SEE DETACHED PARTS LIST

QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
PARTS LIST			
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:		CONTRACT NO.	
FRACTIONS =	DECIMALS .XX =	Gremlin Industries, Inc. San Diego, California 92123	
ANGLES .XXX =			
MATERIAL	FINISH	APPROVALS	DATE
		DRAWN <i>Wynema</i>	12-14-79
		CHECKED <i>[Signature]</i>	6/1/77
NEXT ASSY	USED ON	SIZE	CODE IDENT NO
APPLICATION		C	800-0076
		DRAWING NO.	REV
		800-0076	B
		SCALE 2/1	SHEET 4 OF 5

800-0076/B

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
D		RELEASED	1-24-80	



NOTES:

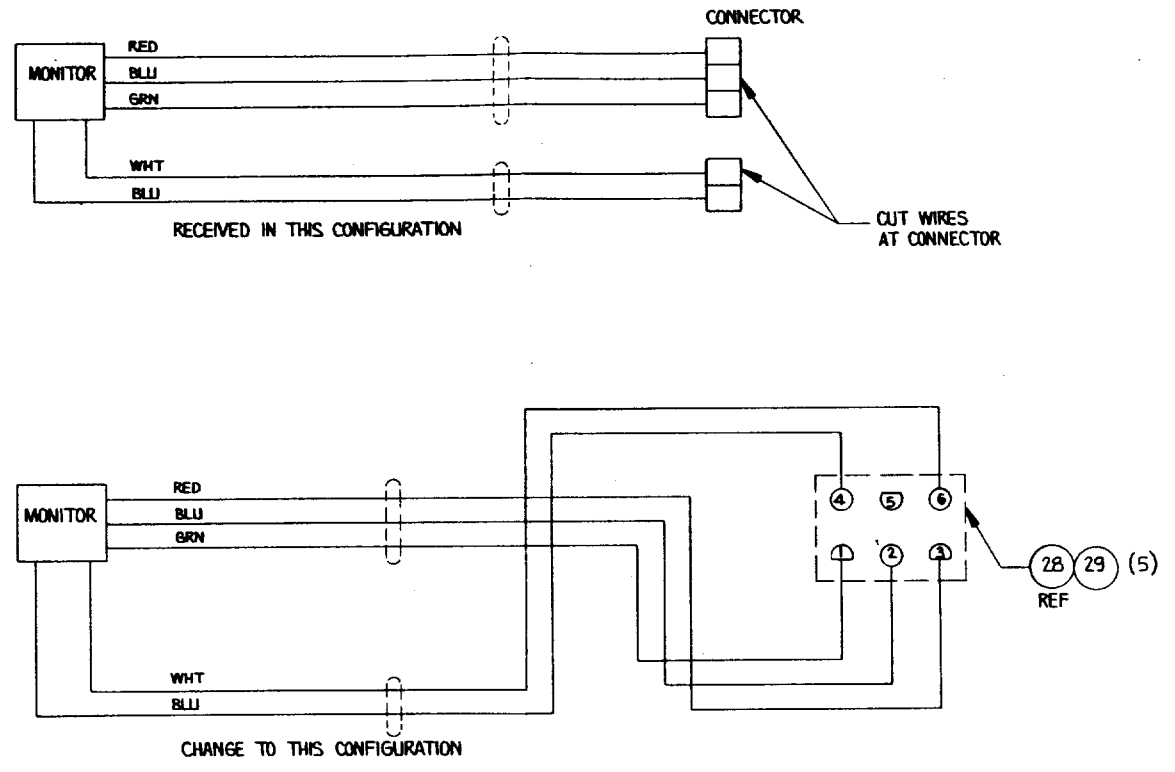
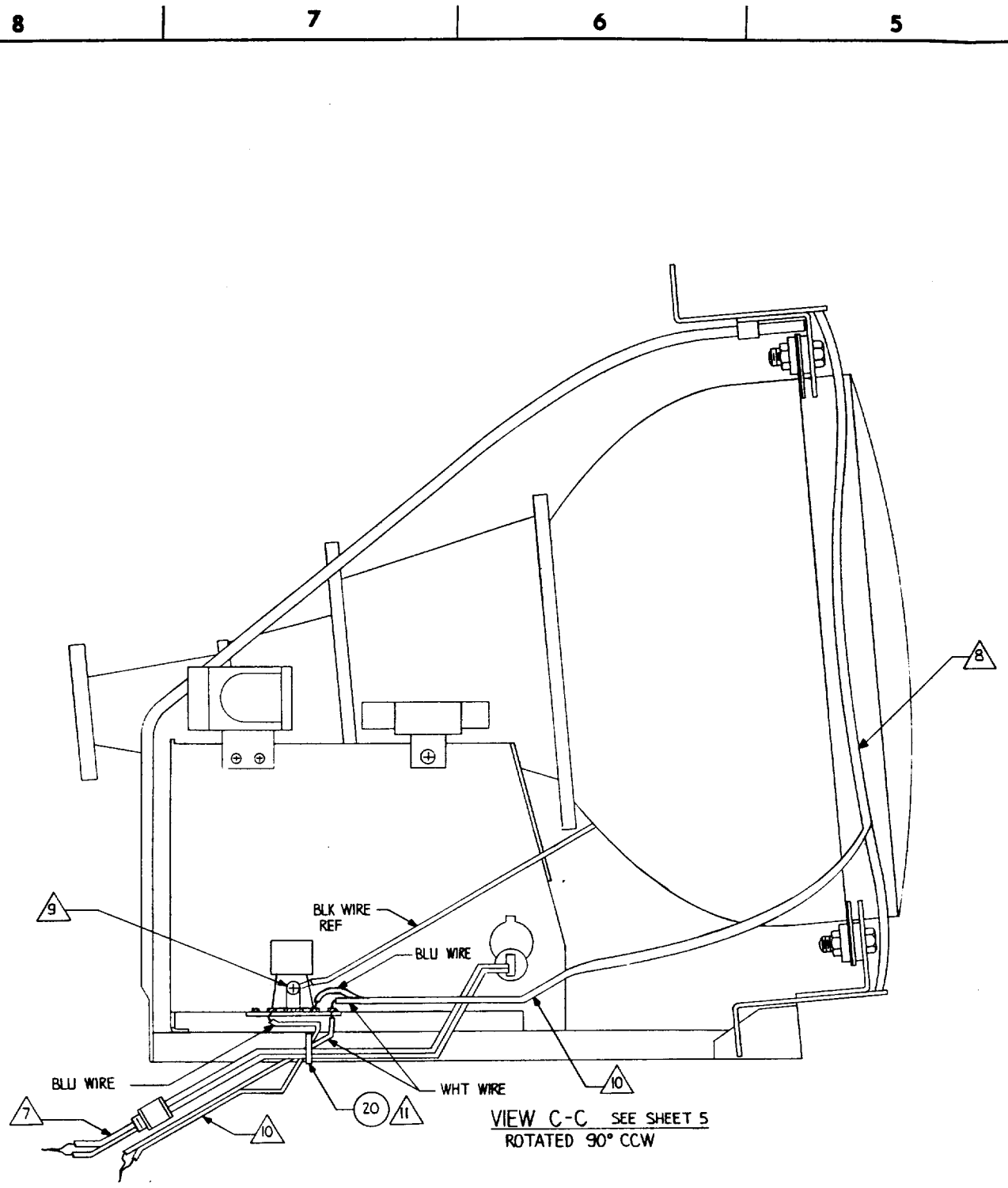
QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
PARTS LIST			
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:		CONTRACT NO.	
FRACTIONS	DECIMALS	ANGLES	APPROVALS
±	XX ±	±	DATE
	XXX ±		
MATERIAL		DRAWN <i>Tom Stewart</i> 1-24-80	
FINISH		CHECKED <i>John H. ...</i> 1-27-80	
NEXT ASSY		USED ON	
APPLICATION		DO NOT SCALE DRAWING	
SIZE		CODE IDENT NO.	DRAWING NO.
D			800-0074
SCALE		SHEET 3 OF 3	
NONE		REV. A	

Grenin Industries, Inc.
San Diego, California 92123

ASSEMBLY
BASIC COIN MECH
DUAL

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
A		RELEASED	SD	6-9-80

D
C
B
A



D
C
B
A
700 - 0015

12. USE CABLE TIES, ITEM 20, TO DRESS WIRING AS NEEDED.
- ▲11 CLAMP WIRE TO CHASSIS USING CABLE TIE, ITEM 20, THRU EXISTING HOLE.
 - ▲10 CUT WIRES TO LENGTHS SHOWN ON SHEET 8 AND SOLDER TO TERMINAL STRIP.
 - ▲9 USE HARDWARE HOLDING BLK WIRE TO CHASSIS TO MOUNT THERMISTOR TERMINAL STRIP WITH THERMISTER.
 - ▲8 REMOVE DEGAUSSING COIL, ROTATE 180° AND RESECURE.
 - ▲7 CUT POWER CORD TO LENGTH SHOWN ON SHEET 8.
- NOTES: CONTINUED FROM SHEET 5

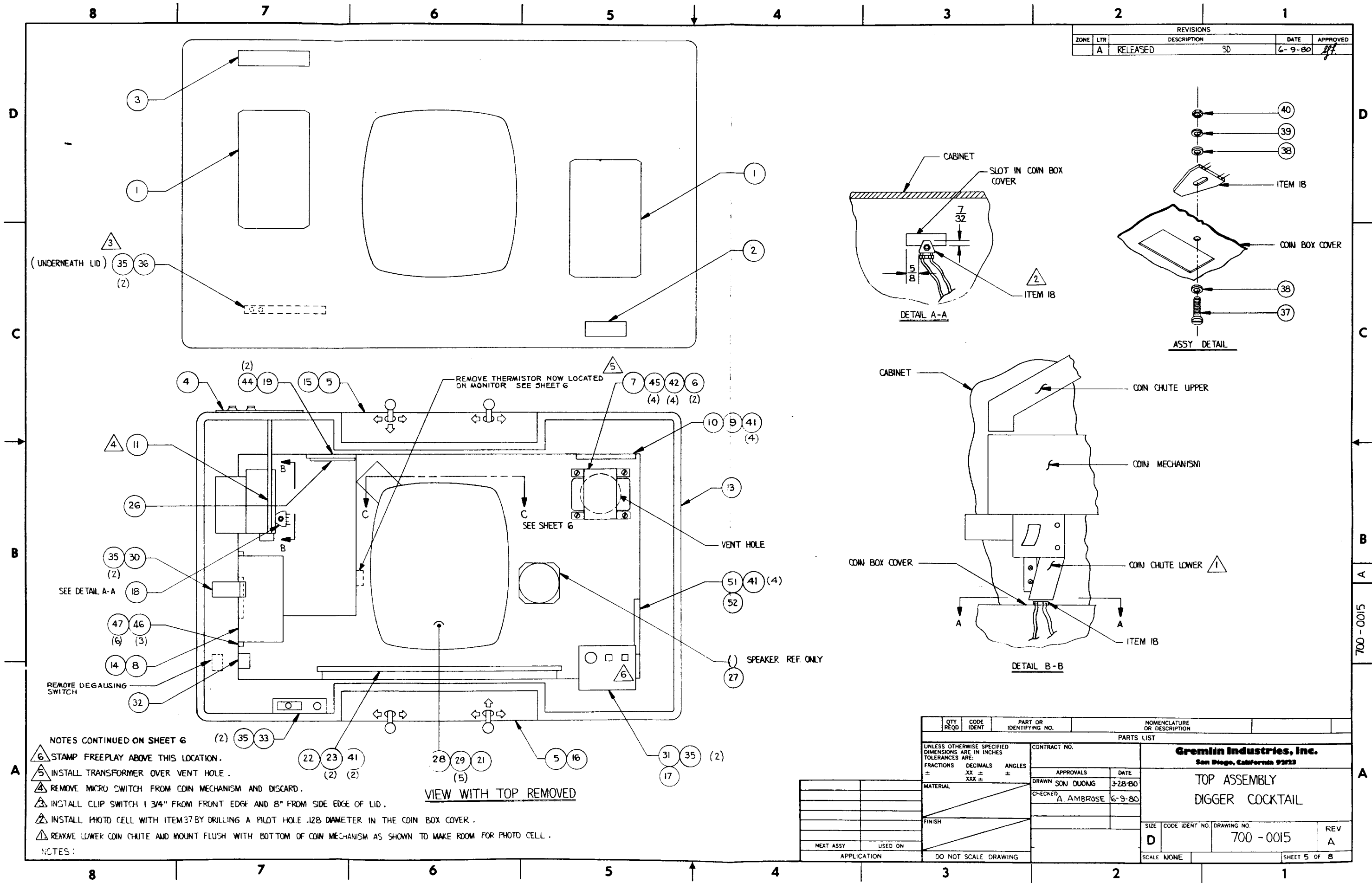
MONITOR MODIFICATION

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
±	.XX ±	±	DATE
	.XXX ±		
MATERIAL	DRAWN SON DUONG 5-30-80		
FINISH	CHECKED A. AMBROSE 6-9-80		
NEXT ASSY	USED ON	SIZE CODE IDENT NO. DRAWING NO. REV.	
APPLICATION	DO NOT SCALE DRAWING	D 700 - 0015 A	
		SCALE NONE	SHEET 3 OF 8

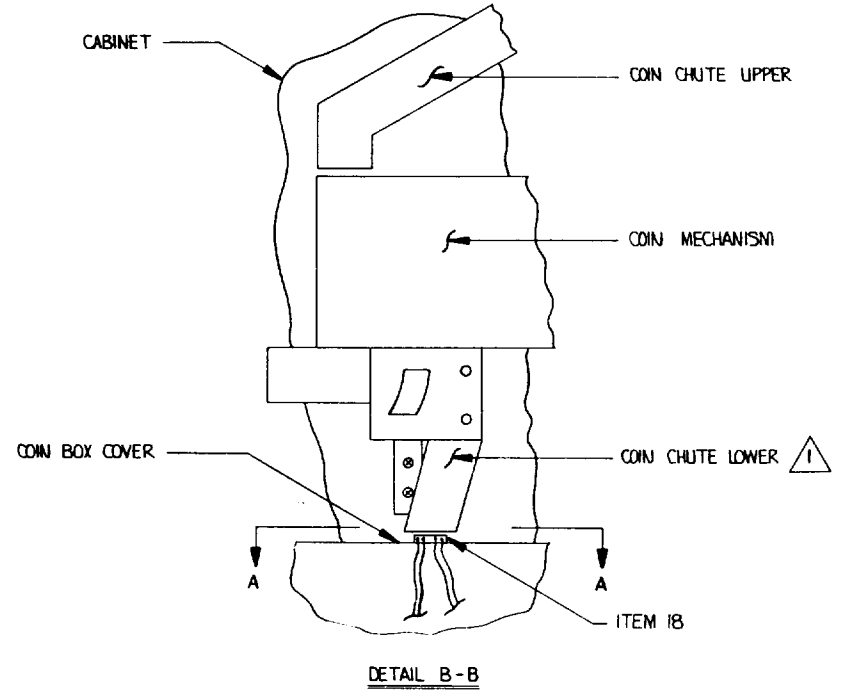
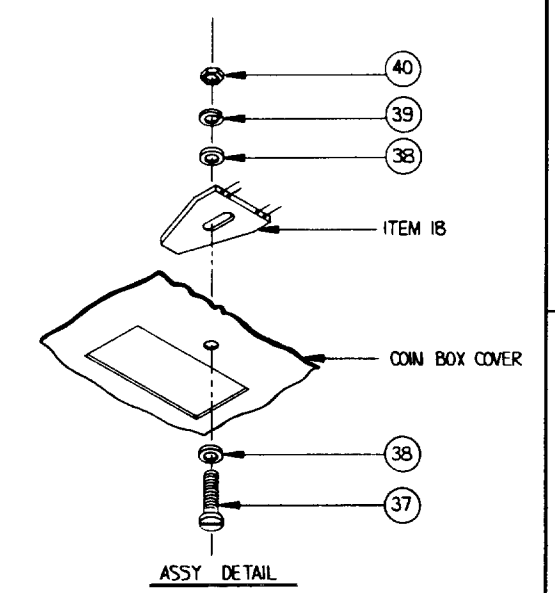
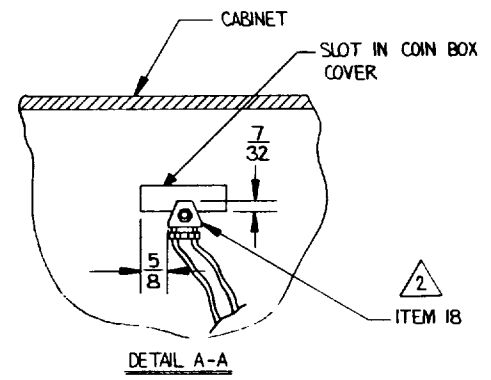
A

8 7 6 5 4 3 2 1

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
A		RELEASED	30	6-9-80



- NOTES CONTINUED ON SHEET 6
- △ STAMP FREEPLAY ABOVE THIS LOCATION.
 - △ INSTALL TRANSFORMER OVER VENT HOLE.
 - △ REMOVE MICRO SWITCH FROM COIN MECHANISM AND DISCARD.
 - △ INSTALL CLIP SWITCH 1 3/4" FROM FRONT EDGE AND 8" FROM SIDE EDGE OF LID.
 - △ INSTALL PHOTO CELL WITH ITEM 37 BY DRILLING A PILOT HOLE .128 DIAMETER IN THE COIN BOX COVER.
 - △ REMOVE LOWER COIN CHUTE AND MOUNT FLUSH WITH BOTTOM OF COIN MECHANISM AS SHOWN TO MAKE ROOM FOR PHOTO CELL.
- NOTES:



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
±	.XX ±	±	DATE
	.XXX ±		3-28-80
MATERIAL			CHECKED
			A. AMBROSE
FINISH			DATE
			6-9-80
NEXT ASSY	USED ON		SIZE
APPLICATION	DO NOT SCALE DRAWING		D
			CODE IDENT NO.
			700-0015
			DRAWING NO.
			700-0015
			REV
			A
			SCALE
			NONE
			SHEET
			5 OF 8

700-0015

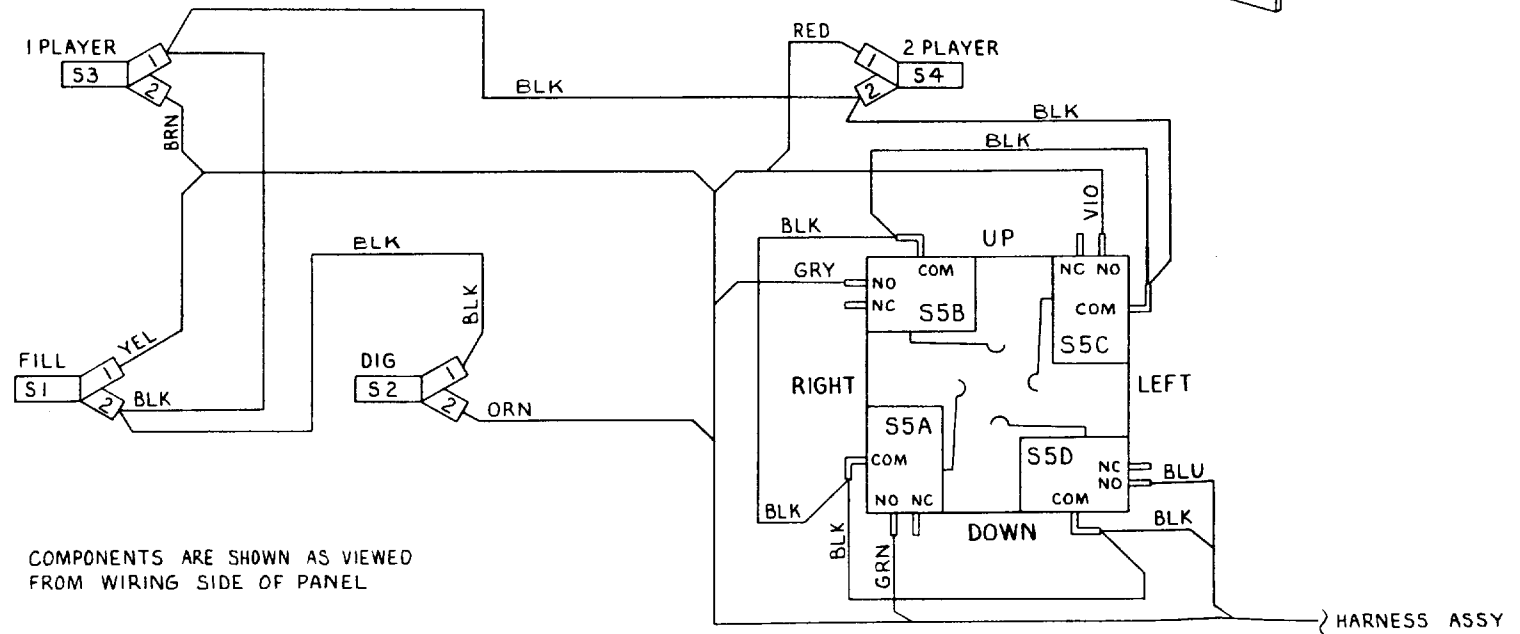
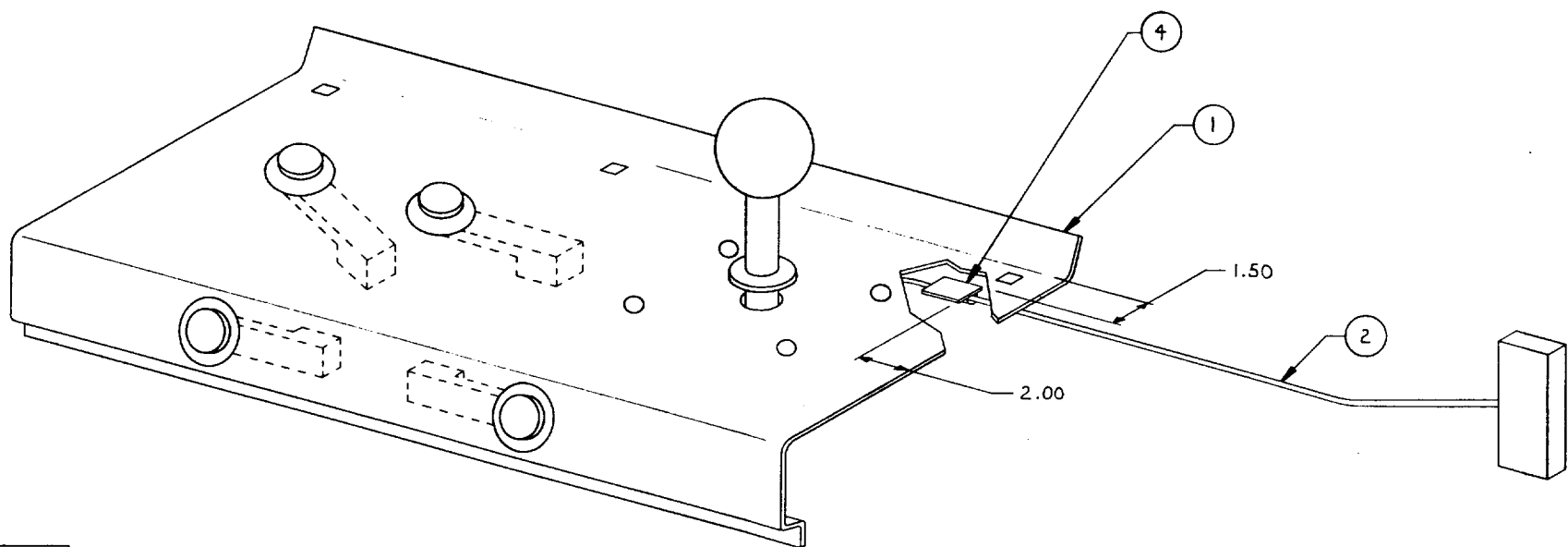
Gremlin Industries, Inc.
San Diego, California 92123

TOP ASSEMBLY
DIGGER COCKTAIL

700-0015

SHEET 5 OF 8

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
A	RELEASED		J.M. 6-9-80	RFA



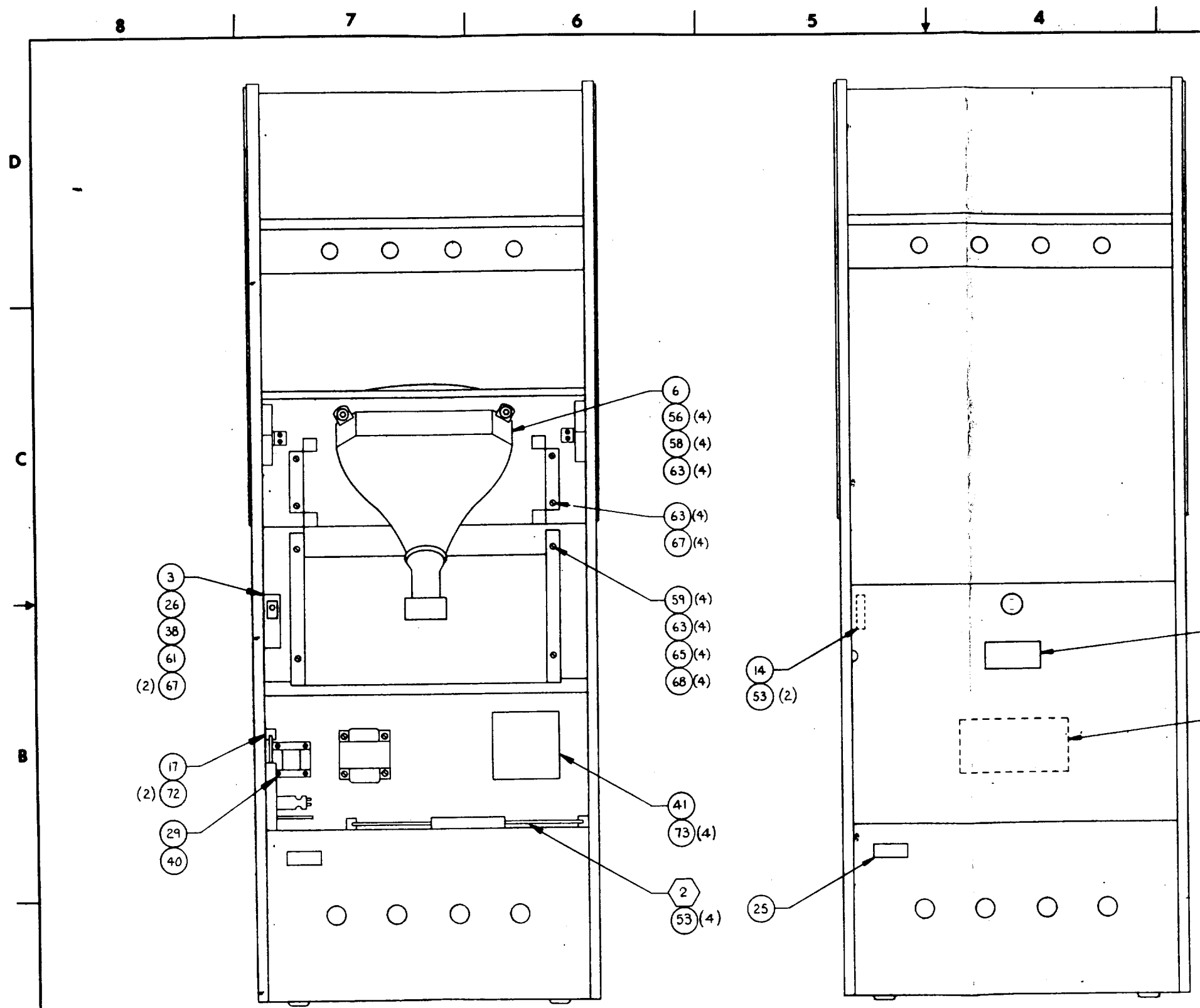
COMPONENTS ARE SHOWN AS VIEWED FROM WIRING SIDE OF PANEL

ITEM NO.	QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
4	1		280-0004	CLIP, WIRE HOLD DOWN
3				
2	1		800-3069	HARNESS ASSY
1	1		800-3068	CONTROL PANEL ASSY

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:		CONTRACT NO.		PARTS LIST
FRACTIONS	DECIMALS	APPROVALS	DATE	
±	.XX ±	DRAWN MAHONEY	5-12-80	Gremlin Industries, Inc. San Diego, California 92123 CONTROL PANEL COMPLETE, DIGGER UPRIGHT
±	.XXX ±	CHECKED A. AMBROSE	5-23-80	
MATERIAL		FINISH		SIZE CODE IDENT NO. DRAWING NO
800-3070 DIGGER		DO NOT SCALE DRAWING		D 800-3074
NEXT ASSY USED ON		APPLICATION		REV A
				SCALE NAME SHEET 1 OF 1

800-3074 A

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
A		RELEASED	J.M. 6-9-80	AFB



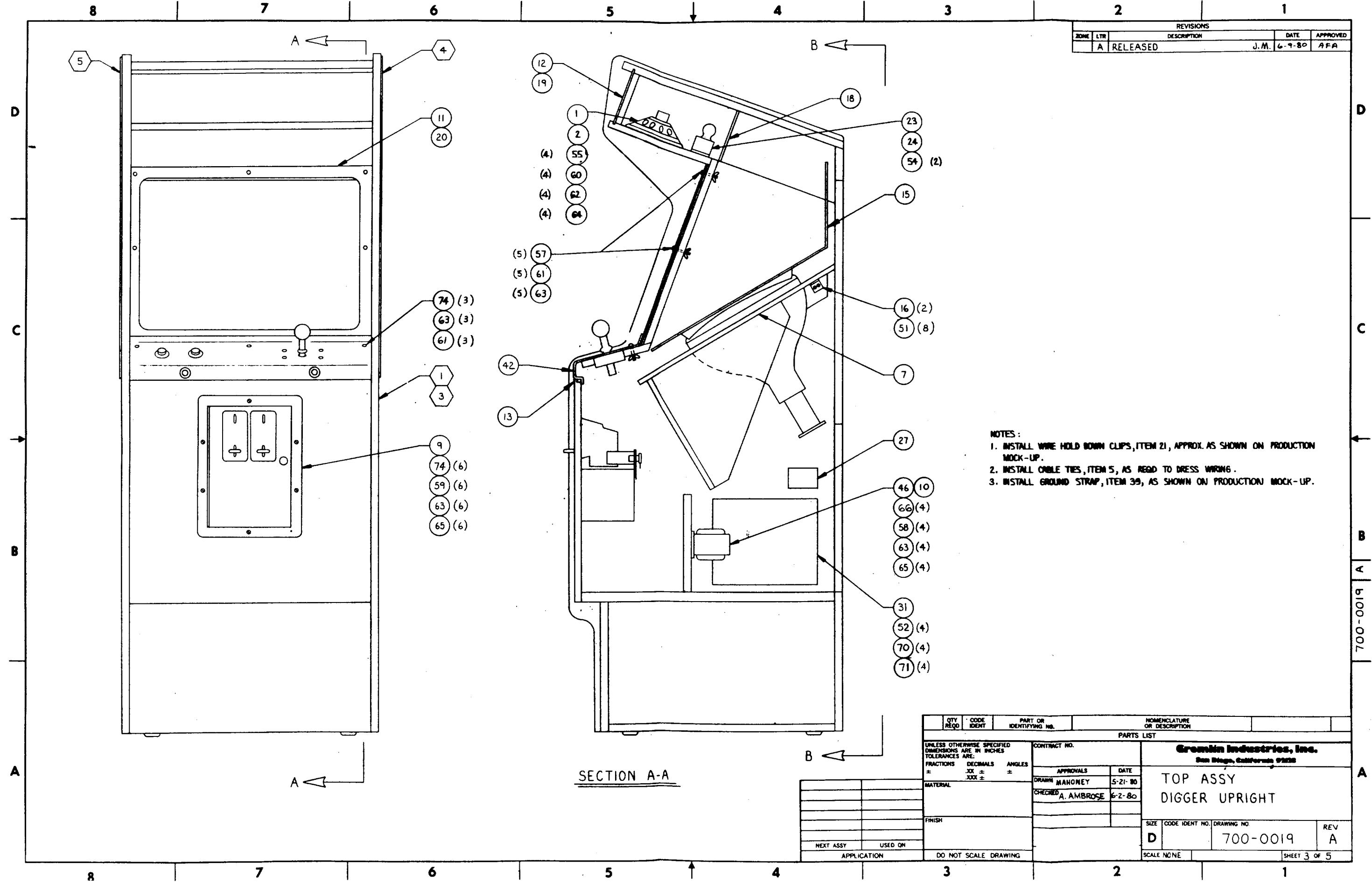
VIEW B-B
(REAR PANEL AND DOOR REMOVED)

VIEW B-B

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	Gremlin Industries, Inc. San Diego, California 92122
±	.XX ±	±	
MATERIAL	FINISH	APPROVALS	DATE
		DRAWN MAHONEY	5-21-80
		CHECKED A. AMBROSE	6-2-80
NEXT ASSY	USED ON	SIZE	CODE IDENT NO. DRAWING NO.
APPLICATION	DO NOT SCALE DRAWING	D	700-0019
		SCALE NONE	REV A
			SHEET 4 OF 5

700-0019

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
A	RELEASED		J.M. 6-9-80	AFA



- NOTES:
1. INSTALL WIRE HOLD DOWN CLIPS, ITEM 21, APPROX. AS SHOWN ON PRODUCTION MOCK-UP.
 2. INSTALL CABLE TIES, ITEM 5, AS REQD TO DRESS WIRING.
 3. INSTALL GROUND STRAP, ITEM 39, AS SHOWN ON PRODUCTION MOCK-UP.

SECTION A-A

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 .XX ±	ANGLES ±	
MATERIAL		APPROVALS	DATE
FINISH		DRAWN MAHONEY	5-21-80
NEXT ASSY USED ON		CHECKED A. AMBROSE	6-2-80
APPLICATION		Gremkin Industries, Inc. San Diego, California 92128	
		TOP ASSY DIGGER UPRIGHT	
SIZE	CODE IDENT NO.	DRAWING NO.	REV
D		700-0019	A
SCALE NONE		SHEET 3 OF 5	

700-0019 A