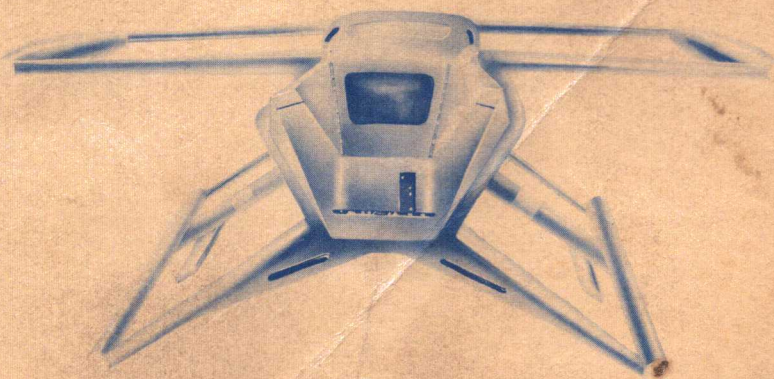


MOON CRESTA[®]

Owner's Manual



Manual Part No.
420-0518

MANUFACTURED BY
Gremlin/SEGA
TLX 910-335-1621

MOON CRESTA[®]

Operating Instructions and Service 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 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 board 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/SEGA
8401 Aero Drive
San Diego, California 92123
(714) 277-8700

game concept

Gremlin/Sega "MOON CRESTA" is a one or two player game in which players may compete for highest score against the game computer. Each time a player is hit by an alien, the game switches to his opponent's sequence.

The object is to destroy as many of the descending aliens as possible. To accomplish this, the player is given a three stage multi-fire Warship. He begins with the first stage, firing a single laser at the enemy. If he is successful in eliminating the first four sets of aliens, he is given an opportunity to dock his first stage onto the second within a specific time limit (the sooner he unites the stages, the higher is his awarded score).

Once docked, the stages combine their firing power, so the first (one laser) adds to the second (two lasers) giving the player a total of three usable lasers as the game continues.

The player then must face two more sets of aliens and a shower of meteors, after which he has a chance to dock again, this time uniting with the third stage for a combined fire power of five lasers. If he is able to defeat the last two sets of aliens intact, the entire sequence begins again. The game continues with increasing difficulty until the entire warship is destroyed. When the warship is hit the layer continues with whatever stages remain. If his score reaches 30,000 he is awarded a free game and his score continues to accumulate.

options selection

Your **Moon Cresta** game is equipped with a set of switches that allows you to determine the charge per play. The switches are located in the upper left corner of the logic board.

Coinage	Switch Position					
	1	2	3	4	5	6
1 coin/1 play			off	off		
2 coin/1 play			on	off		
3 coin/1 play			off	on		
4 coin/1 play			on	on		

Switch adjustments **must** be done with the power off. Switches are set at 1 coin/1 play when machine is shipped.

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.

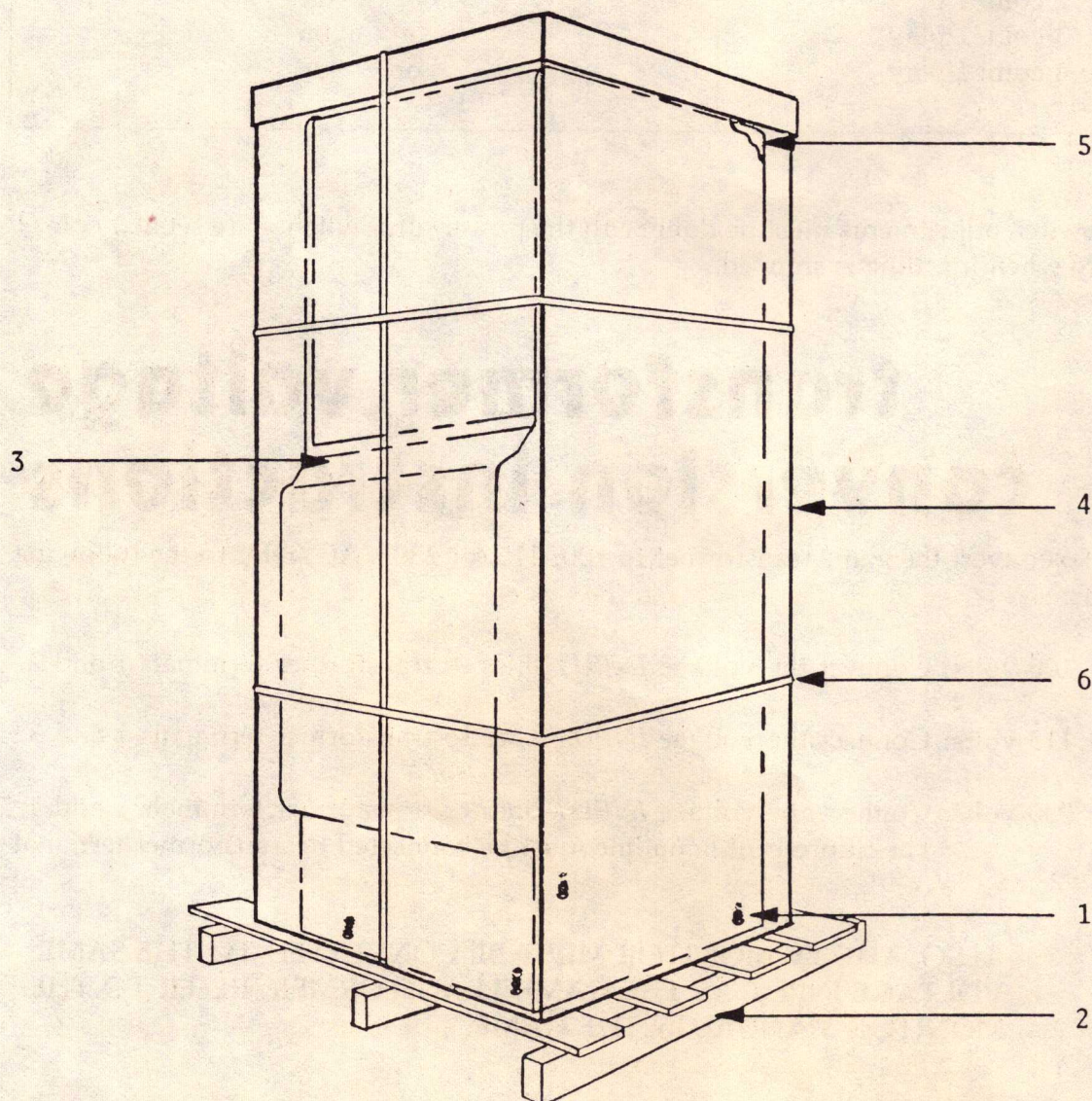
ALSO, THE TV MONITOR MUST BE CONVERTED TO THE SAME VOLTAGE INPUT AS THE GAME TRANSFORMER. REFER TO THE MONITOR MANUAL IN THE GAME.

repackaging instructions

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

- A) If the original shipping bolts have been discarded (Ref. 1), obtain four 5/16-18 x 1 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.**

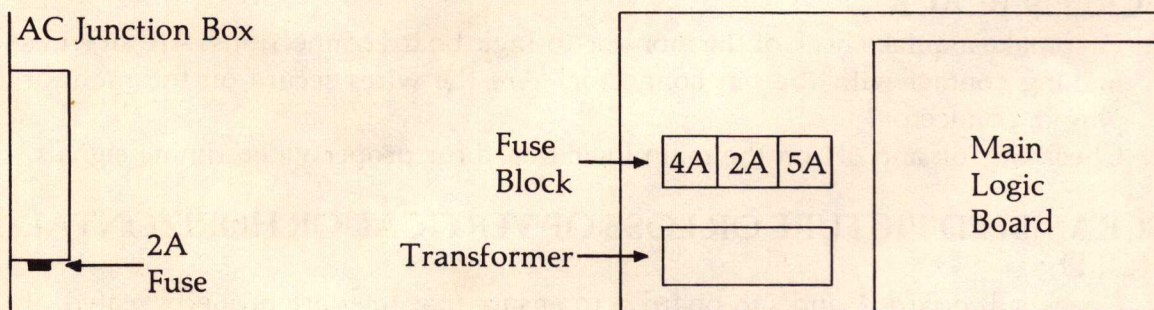


maintenance and troubleshooting procedures

Always check and confirm the following items when it is believed that a problem has developed. These items are relatively simple but commonly overlooked.

1. Is the power switch on?
2. Are all fuses intact?

One fuse is located directly on the bottom of the AC junction box and three others are located in a fuse block directly behind the transformer and to the left of the logic board when looking in from the rear. If a fuse blows out after being replaced, it indicates trouble in another component. **Always** replace with the prescribed capacity fuse, as normal equipment may be damaged if larger fuses are used as a substitute.



3. Are the connectors firmly inserted?
Poor connector connections must be considered for any indication of trouble. Check all related connectors for poor contact. Although disconnected connectors are easily spotted, poor contacts are difficult to locate. The connectors should therefore be pushed in firmly and then loosened to spot poor connections. When testing the PC board connectors, **always** turn off the power.
4. Turn power supply off and on again.
As the unit may return to normal if the control circuit is reset when the game seems abnormal, turn the power off and on to see if the trouble will clear up.
5. Are there any metallic objects on the PC board?
Ensure that there are no metallic objects on the PC board, as this will cause shorts in the system. Also refrain from putting other objects inside the cabinet.
6. Ensure that all eproms are firmly seated in the logic board.

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

NO PICTURE—TV TUBE AND FLUORESCENT LAMP ARE OFF.

1. 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, proceed to next step.
2. Check fuse located on the bottom of the AC junction box. If it is good, proceed to next step.
3. Remove the cover of the junction box. Measure 115 VAC on the output of the EMI filter. If it is not present, the EMI 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.
4. If the fluorescent lamp still does not operate, turn the game off and then turn it 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.

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

1. 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?
2. Check 5C, 6F and 6H on the main logic board for proper video timing signals.

SCRAMBLED PICTURE OR LOSS OF VERTICAL OR HORIZONTAL HOLD.

1. Check sub board A and sub board B to ensure that they are properly seated. If they are loose or ajar, it will cause a scrambled picture.
2. Check the wires on the 6H modification to ensure they are not broken. Bottom wire controls vertical synchronization and top wire controls horizontal synchronization. Refer to drawing 800-3110.

SOUND PROBLEM OR NO SOUND.

1. Check wires running from VR to edge connector to ensure they are intact.
2. If they are not broken then check 11A.

INCORRECT POWER SUPPLY

1. Check D4, D5, IRI and IRIL. Replace if necessary. All voltage is at +5V except 10L and 11A which uses 7V DC.

GAME DOES NOT COIN UP.

1. 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.
2. 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.
3. Check main logic board—resistor packs 1 or 2 may be bad and need to be replaced. Also Check 9E.

PLAYER CONTROLS NOT WORKING.

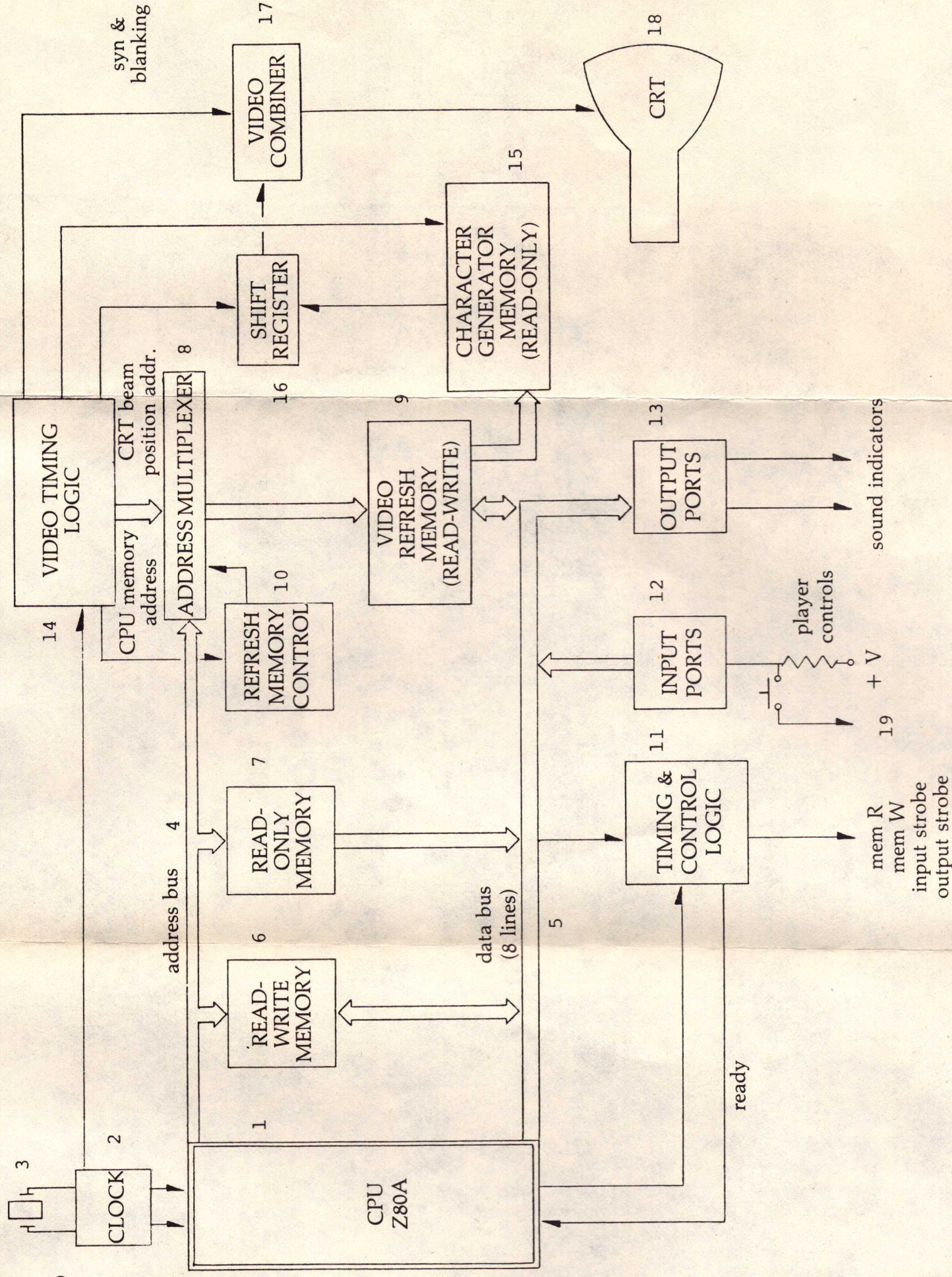
1. Check first to be sure all control switch connections are secure. This includes checking the black ground wire leads.
2. If these connections are good, make sure the control panel leads are intact inside the connector to the logic board.
3. Check the main logic board—the 3 jumpers illustrated in detail B of drawing 800-3110 may have broken loose. Also check 9E.

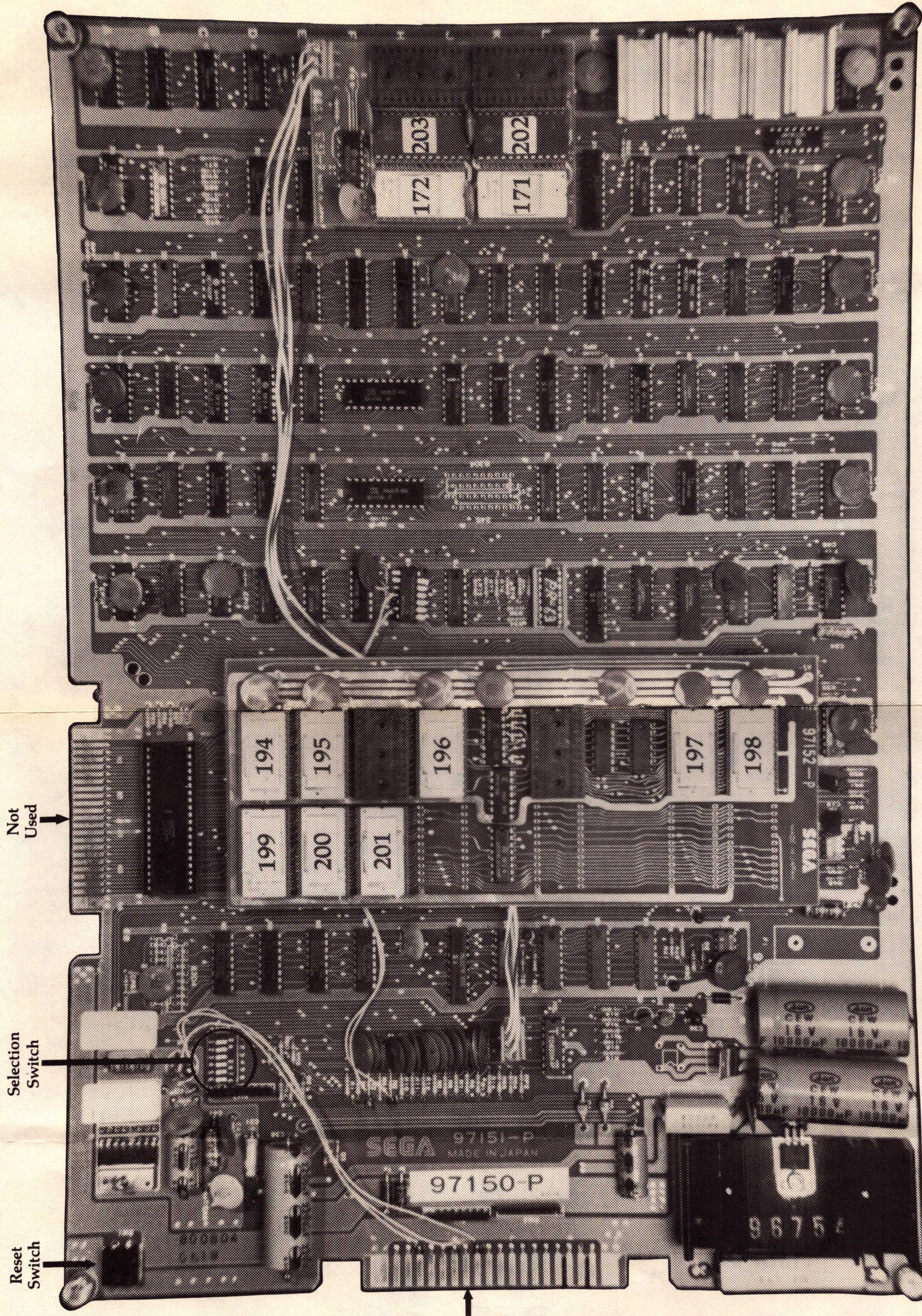
recommended spare parts single games

Gremlin Part #	Description	Quantities Per 10 Games
130-0001	speaker	1
130-0002	speaker cover	2
200-0019/21/22	color monitor	1
220-0035	lock (coin door)	2
220-0066	coin mechanism	2
240-0007	black button	5
240-0009	yellow button	5
250-0034	spring retainer	5
250-0285	front cash door	1
253-0104	panel monitor	1
253-0192	panel logo M/C	2
253-0193	control panel graphics	1
390-0011	fluorescent lamp	1
420-0515	interior graphics	1
420-0518	manual M/C	2
510-0016	slam switch	1
510-0023	WICO switch assembly	5
514-0025	2A fuse	5
514-0053	5A fuse	5
514-0054	4A fuse	5
560-0054	game transformer	1
230-0023	18.432 MHZ crystal	3
482-0101	2SD553 transistor	3
482-0102	1SA1015Y	2
481-0073	diode 3BZ61	3
313-0035	UA 78MGUIC IC	3
316-0751	eprom 171	1
316-0752	eprom 172	1
316-0753	eprom 194	1
316-0754	eprom 195	1
316-0755	eprom 196	1
316-0756	eprom 197	1
316-0757	eprom 198	1
316-0758	eprom 199	1
316-0759	eprom 200	1
316-0760	eprom 201	1
316-0761	eprom 202	1
316-0762	eprom 203	1
314-0118	74LS 366	2
315-0046	2114 RAM	5
314-0092	8216	5
312-0013	2101 RAM	5
314-0119	74LS 377	2
315-0041	Z80A	1
315-0045	4066 IC	3
313-0033	MB3713	3
313-0032	TD62064 P	3
313-0034	LM324	3
315-0066	93425	4
314-0099	74LS 245	2
514-0001	2A fuse (AC junction box)	5

BLOCK DIAGRAM: Refer to schematic for parts that make up this diagram.

1. 7B
2. 1E, 1D, 3C
3. Crystal, 18.432 MHZ
4. A0 through A15 on Z80 CPU; buffered by 7D, 7E, 8D
5. D0 through D7 on Z80 CPU; buffered by 8H, 8F
6. 2114: 3H, 3F, 7N, 7P
2101: 4F, 5F
7. All Eeprom
93425: 1N, 1P, 1R, 1S, 1T
8. 6H, 6J, 4E, 5E, 2E, 3E, 2F
9. 8D
10. 8P
11. 8N, 8M, 9N, 5R, 4R, 5S, 4S, 5P
12. 9D, 9E, 9F, 9C
13. 9R, 8R, 8S, 8T, 9J, 9M, 6T, 7T, 7S, 9L
14. 1A, 1B, 2A, 2B, 2D, 6N, 6H, 6B, 6F, 3S, 3R, 5B
15. All Eeprom
16. 2H, 2J, 2K, 2L, 1U, 3L
17. 6M, 6L
18. CRT (monitor)
19. Control Panel





Reset
Switch

Selection
Switch

Not
Used

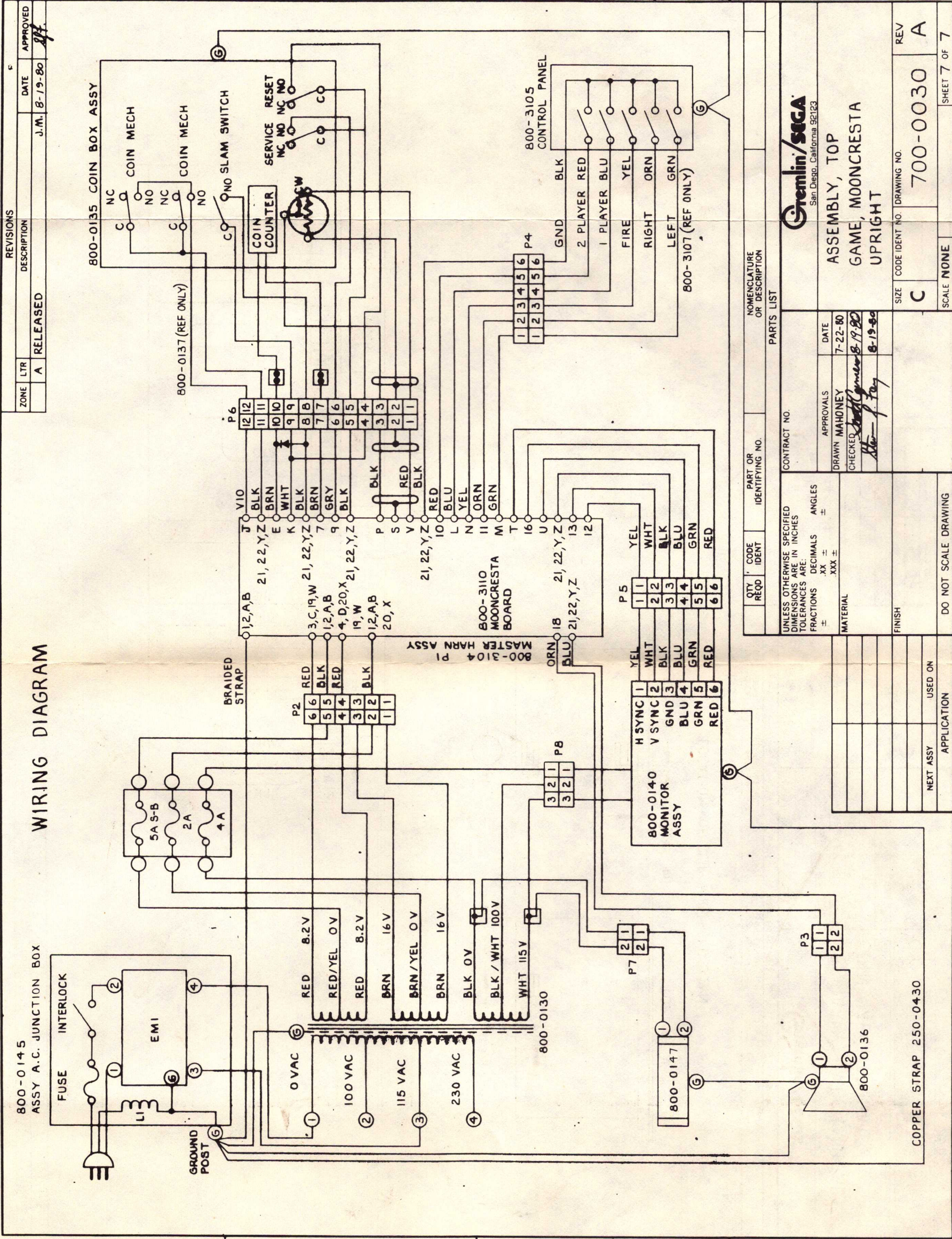
Attach edge
connector here.
Lettered row of
edge connector
faces up.

Top of Board View

Gremlin Industries, Inc. San Diego, California 92123			PARTS LIST	TITLE ASSY TOP GAME, MOON CRESTA UPRIGHT	700-0030 DWG NO	SH 3 OF 7	A REV
ITEM NO	PART NO	QTY PER ASSY			DESCRIPTION	REF DES	
26	420-0519	1			COVER, FUSE BLOCK		
27	514-0025	1			FUSE 2 A SLOW BLO		
28	514-0052	1			FUSE BLOCK		
29	514-0053	1			FUSE 5A SLOW BLO		
30	514-0054	1			FUSE 4A FAST BLO		
31	800-0136	1			ASSY, HARN SPEAKER, UPRIGHT		
32	800-0130	1			ASSY POWER XFMR		
33	800-0147	1			ASSY, FLORESCENT LAMP 2		
34	800-0135	1			ASSY, MECHANICAL COIN MECH		
35	800-0140	1			ASSY, MONITOR CLR 19" VERT		
36	800-3104	1			ASSY HARN MASTER M/C		
37	800-3105	1			ASSY CONTROL PANEL M/C		
38	800-3110	1			ASSY GAME ELECTRONICS M/C		
39	800-0145	1			ASSY A.C. JUNCTION BOX		
40	420-0526	1			MANUAL ELECTROHOME MONITOR (VERTICAL MOUNT)		
41	420-0132	1			LBL PRICE 25¢		
42	800-0142	1			ASSY, GROUND STRAP 12"		
43	320-0020	1			SEALANT, FOAM		
44	280-0324	6			CABLE CLAMP, NYLON		
45		6			SCR. PHL. RD. HD. #6 x 1/2" SHT. MTL.		
46		16			SCR. PHL. RD. HD. #8 x 1/2" SHT. MTL.		
47		4			SCR. MACH. SLOT HD. 8-32 x 1 1/2"		
48		6			BOLT, CARRIAGE 10-24 x 1 1/4"		
49		4			NUT, HEX 8-32		
50		4			NUT, WING 10-24		

Gremlin Industries, Inc. San Diego, California 92123				PARTS LIST		TITLE ASSY, TOP GAME, MOON CRESTA UPRIGHT		700-0030 DWG NO		SH 2 OF 7		A REV	
ITEM NO	PART NO	QTY PER ASSY				DESCRIPTION	REF DES						
1	130-0002	1				SPEAKER COVER							
2	140-0021	1				COVER J BOX							
3	140-0049	1				CABINET DIRECT WOODGRAIN							
4	250-0032	1				FRAME BEZEL							
5	250-0034	1				SPRING RETAINER							
6	250-0038	1				MOULDING STRIP							
7	250-0048	1				CLIP SWITCH							
8	250-0356	2				BRKT COLOR MONITOR							
9	250-0430	1				GROUND STRAP UPRIGHT							
10	253-0104	1				WINDOW GLASS							
11	253-0192	1				PANEL LOGO M/C							
12	280-0004	18				CLIP WIRE, HOLD-DOWN							
13	130-0001	1				SPEAKER, GAME 6x9							
14	280-0064	2				SPCR 3/8" LNG PVC							
15	390-0019	1				LAMP, FLOR 18 INCH							
16	420-0028	1				DECAL S/N							
17	420-0030	2				DECAL CAUTION 115V							
18													
19	420-0040	1				DECAL, RECYCLE							
20	420-0041	1				DECAL, S/N SMALL							
21	420-0507	1				LIGHT BAFFLE UPRIGHT 6M							
22	420-0515	1				GRAPHIC INT. CENTER M/C							
23	420-0516	1				GRAPHIC INT. LEFT M/C							
24	420-0517	1				GRAPHIC INT. RIGHT M/C							
25	420-0518	1				MANUAL M/C							

WIRING DIAGRAM



Gremilin/SEGA
San Diego, California 92123

ASSEMBLY, TOP
GAME, MOONCRESTA
UPRIGHT

APPROVALS
DRAWN MAHONEY
CHECKED *[Signature]*
DATE 7-22-80
8-19-80

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

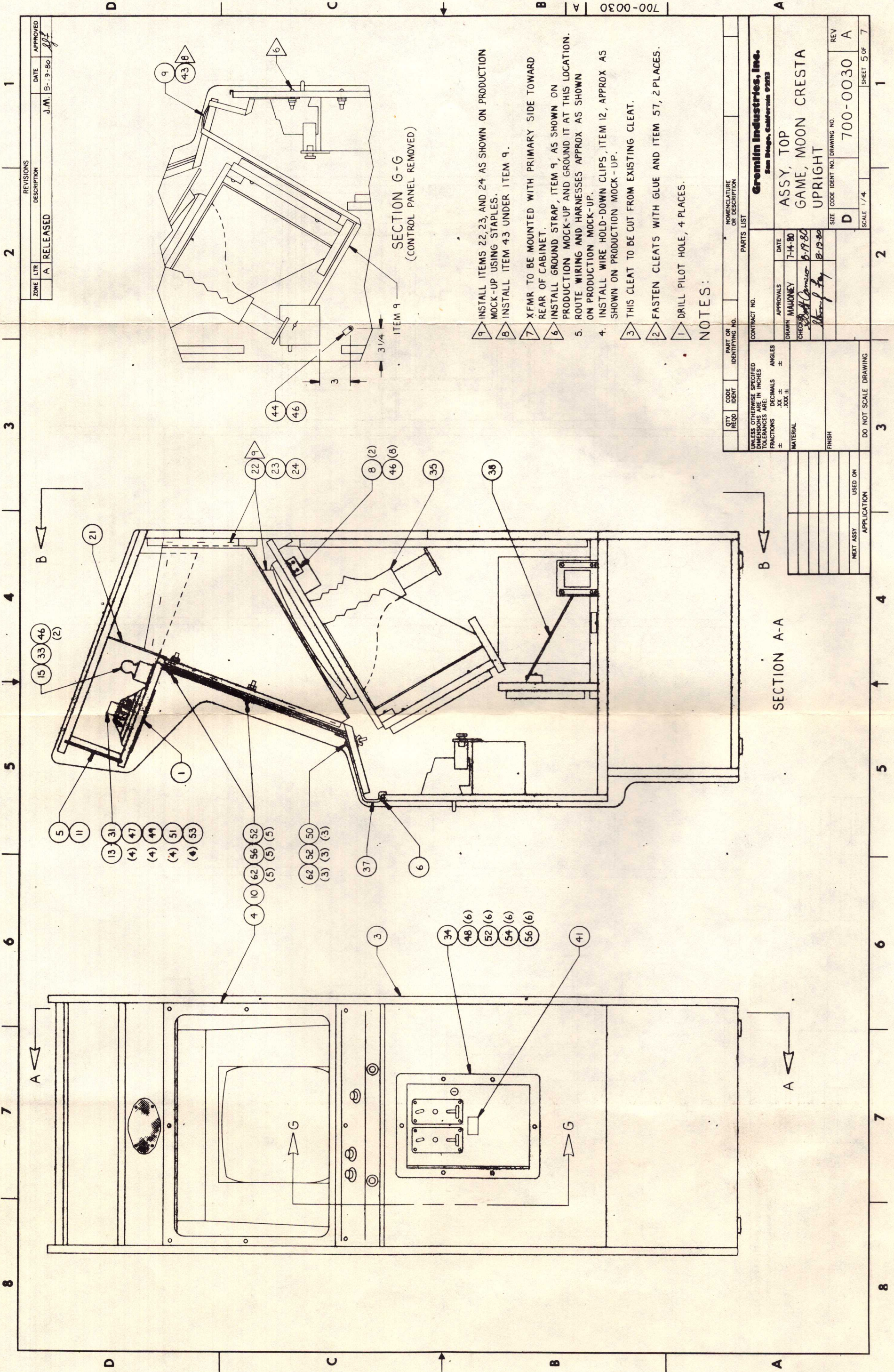
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APPLICATION
NEXT ASSY USED ON

SCALE NONE

SIZE CODE IDENT NO. DRAWING NO. 700-0030

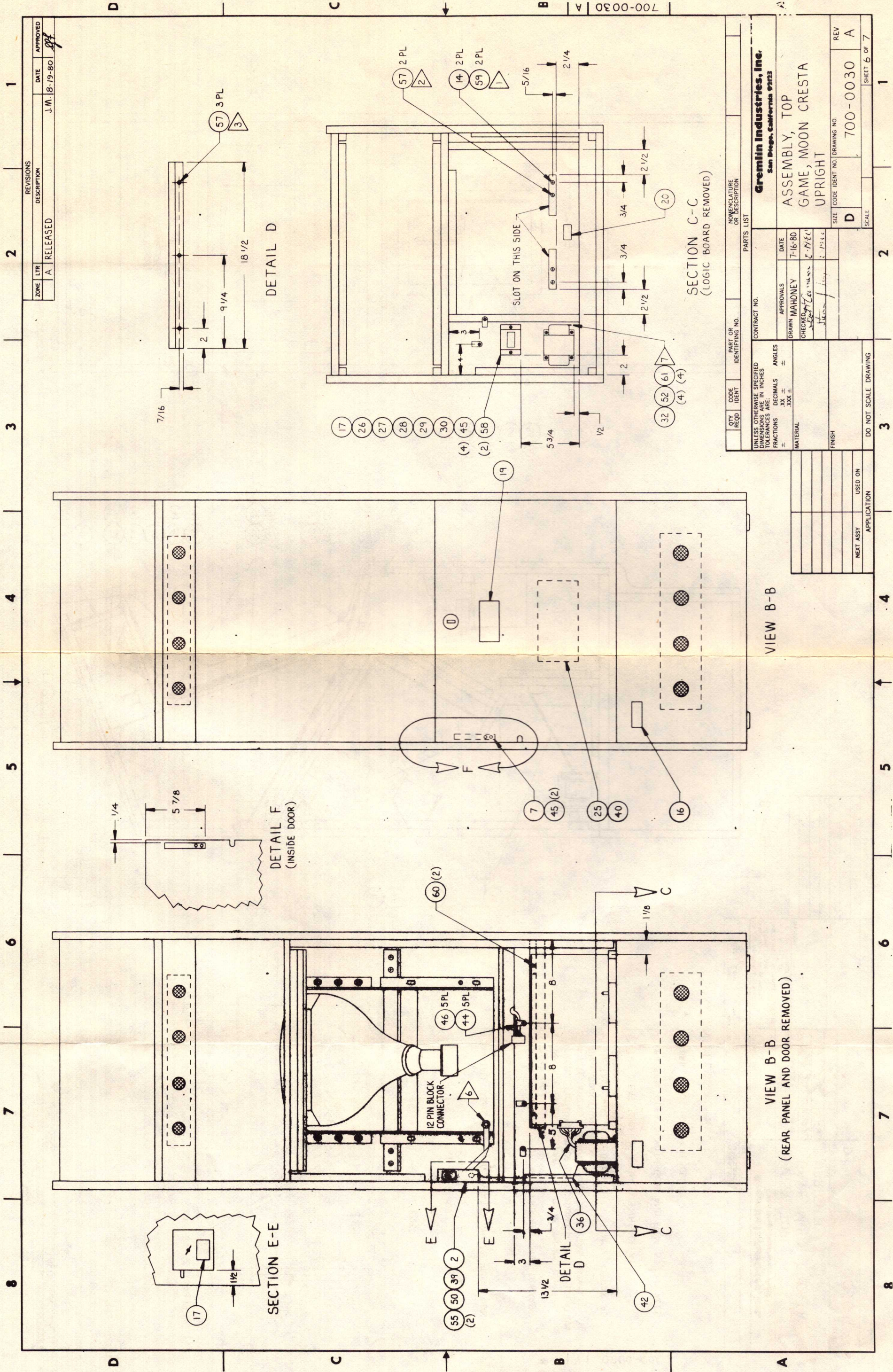
REV A
SHEET 7 OF 7



- NOTES:
- 1. INSTALL ITEMS 22, 23, AND 24 AS SHOWN ON PRODUCTION MOCK-UP USING STAPLES.
 - 2. INSTALL ITEM 43 UNDER ITEM 9.
 - 3. XFMR TO BE MOUNTED WITH PRIMARY SIDE TOWARD REAR OF CABINET.
 - 4. INSTALL GROUND STRAP, ITEM 9, AS SHOWN ON PRODUCTION MOCK-UP AND GROUND IT AT THIS LOCATION.
 - 5. ROUTE WIRING AND HARNESSES APPROX AS SHOWN ON PRODUCTION MOCK-UP.
 - 6. INSTALL WIRE HOLD-DOWN CLIPS, ITEM 12, APPROX AS SHOWN ON PRODUCTION MOCK-UP.
 - 7. THIS CLEAT TO BE CUT FROM EXISTING CLEAT.
 - 8. FASTEN CLEATS WITH GLUE AND ITEM 57, 2 PLACES.
 - 9. DRILL PILOT HOLE, 4 PLACES.

NOTES:

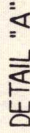
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PARTS LIST			
CONTRACT NO.			
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES			
FRACTIONS	DECIMALS	ANGLES	
±	±	±	
MATERIAL			
FINISH			
DO NOT SCALE DRAWING			
NEXT ASSY USED ON APPLICATION			
ASSY, TOP			
GAME, MOON CRESTA			
UPRIGHT			
Gremlin Industries, Inc. San Diego, California 92123			
DATE 7-14-80			
DRAWN MALONEY			
CHECKED J. J. J. 6-19-80			
APPROVED 8-13-80			
SIZE CODE IDENT NO. DRAWING NO. 700-0030			
REV A			
SCALE 1/4" = 1"			
SHEET 5 OF 7			



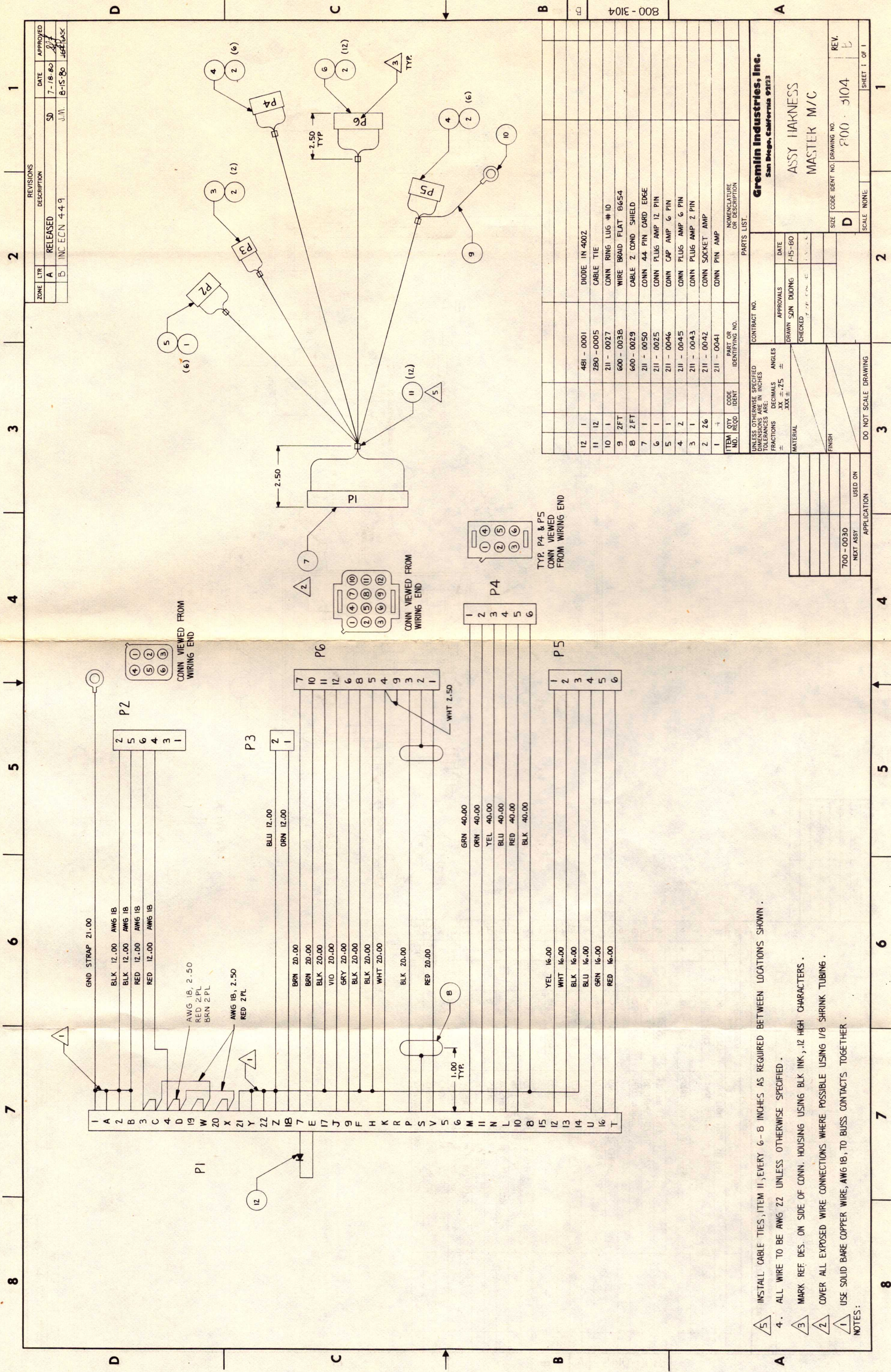
REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	RELEASED	J.M. 8-19-80	<i>[Signature]</i>

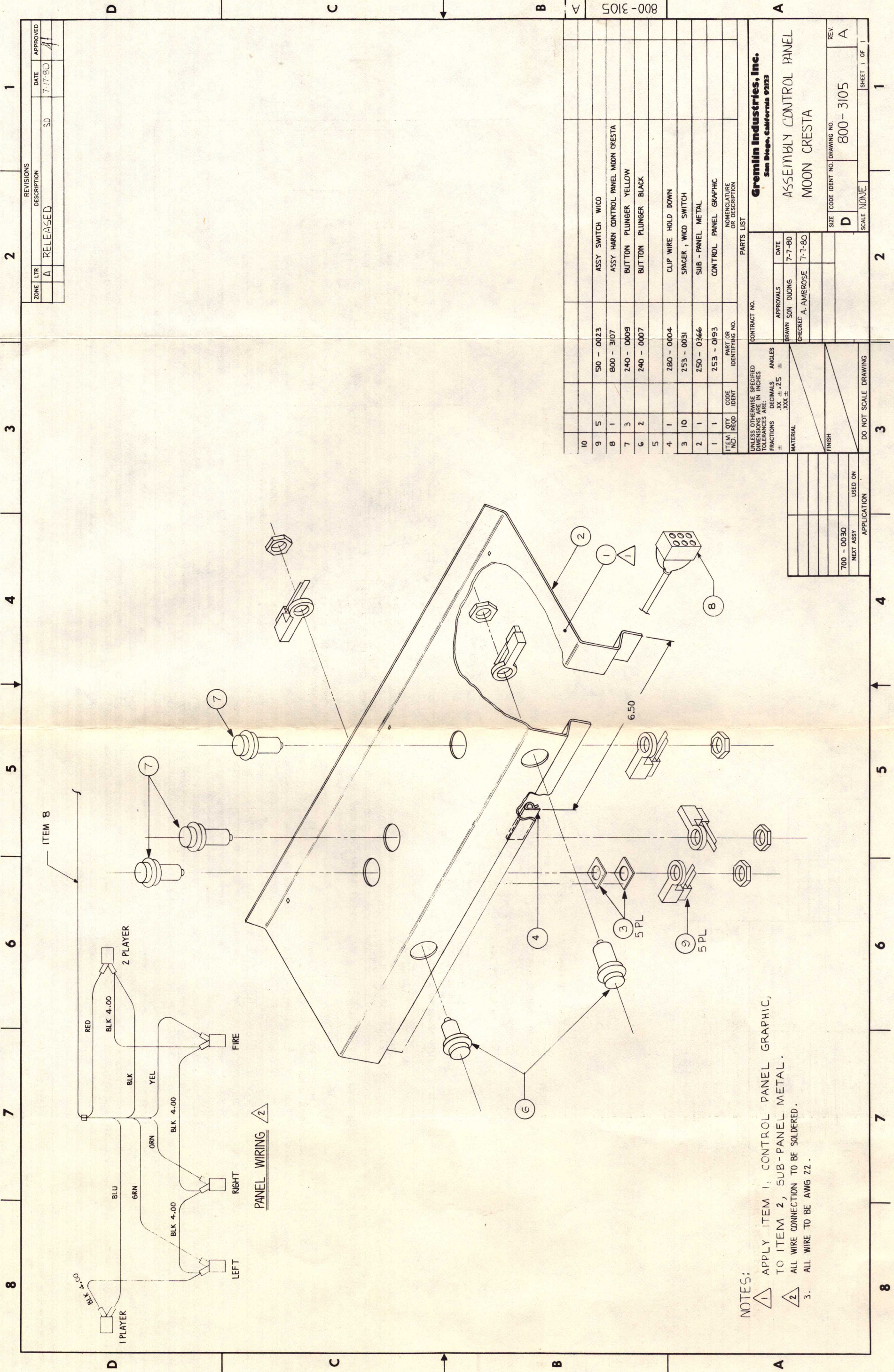
PARTS LIST		CONTRACT NO.		DATE		APPROVALS	
UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES. TOLERANCES ARE:		DRAWN MAHONEY		7-16-80		CHECKED	
FRACTIONS .XX ± .XXX ±		MATERIAL		FINISH		DO NOT SCALE DRAWING	
QTY REQD		CODE IDENT		PART OR IDENTIFYING NO.		NOMENCLATURE OR DESCRIPTION	
17		26		27		28	
29		30		32		36	
42		45		46		49	
50		51		52		53	
54		55		56		57	
58		59		60		61	
62		63		64		65	
66		67		68		69	
70		71		72		73	
74		75		76		77	
78		79		80		81	
82		83		84		85	
86		87		88		89	
90		91		92		93	
94		95		96		97	
98		99		100			

Gremlin Industries, Inc. San Diego, California 92123	
ASSEMBLY, TOP GAME, MOON CRESTA UPRIGHT	
SIZE	CODE IDENT NO. DRAWING NO.
D	700-0030
REV	A
SHEET 6 OF 7	



UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:		CONTRACT NO.		Gremlin Industries, Inc. San Diego, California 92123			
FRACTIONS	DECIMALS	APPROVALS	DATE	ASSEMBLY A.C. JUNCTION BOX			
±	±						
MATERIAL		DRAWN	8-8-80	SIZE	CODE	IDENT NO.	REV
		CHECKED		D		800 - 0145	A
		<i>AMERKOE</i>					
FINISH				SCALE NONE			
DO NOT SCALE		DRAWING		SHEET 1 OF 1			





NOTES:
1. APPLY ITEM 1, CONTROL PANEL GRAPHIC, TO ITEM 2, SUB-PANEL METAL.
2. ALL WIRE CONNECTION TO BE SOLDERED.
3. ALL WIRE TO BE AWG 22.

REVISIONS			
ZONE	LTR	DESCRIPTION	DATE
	A	RELEASED	7-17-80

ITEM NO.	QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
10				
9	5		510 - 0023	ASSY SWITCH WICO
8	1		800 - 3107	ASSY HARN CONTROL PANEL MOON CRESTA
7	3		240 - 0009	BUTTON PLUNGER YELLOW
6	2		240 - 0007	BUTTON PLUNGER BLACK
5				
4	1		280 - 0004	CLIP WIRE HOLD DOWN
3	10		253 - 0031	SPACER, WICO SWITCH
2	1		250 - 0366	SUB - PANEL METAL
1	1		253 - 0193	CONTROL PANEL GRAPHIC

CONTRACT NO.		PARTS LIST	
UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		DATE	
FRACTIONS .XX ± .25 ±	DECIMALS .XXX ±	DRAWN SON DUONG	7-7-80
ANGLES ±		CHECKED A. AMBROSE	7-7-80
MATERIAL		FINISH	
700 - 0030		USED ON	
NEXT ASSY		APPLICATION	
DO NOT SCALE DRAWING			
Gremlin Industries, Inc. San Diego, California 92123		ASSEMBLY CONTROL PANEL MOON CRESTA	
SIZE	CODE IDENT NO.	DRAWING NO.	REV.
D		800 - 3105	A
SCALE		SHEET 1 OF 1	

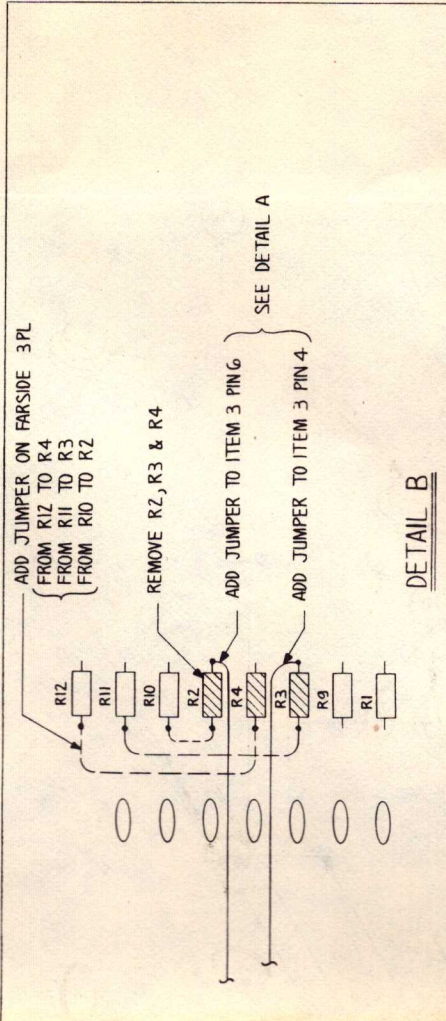
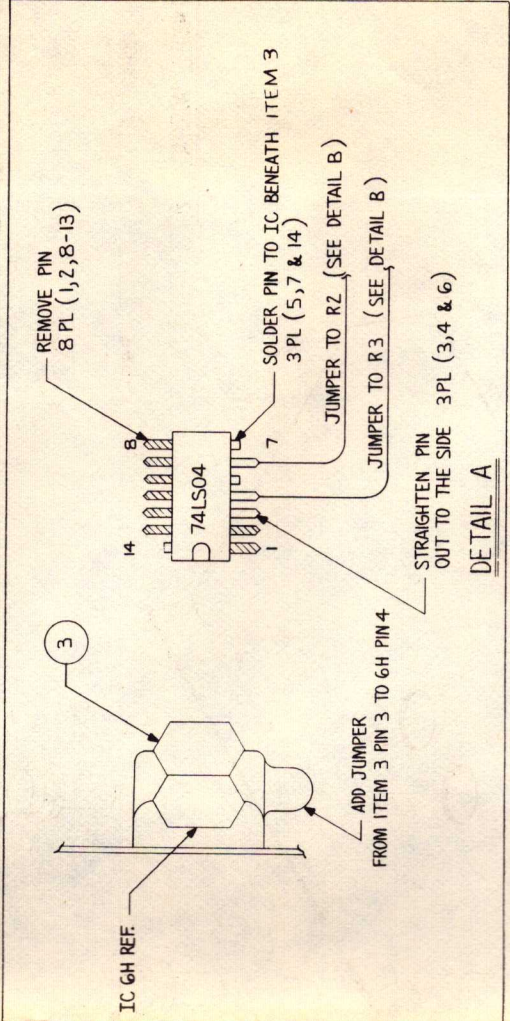
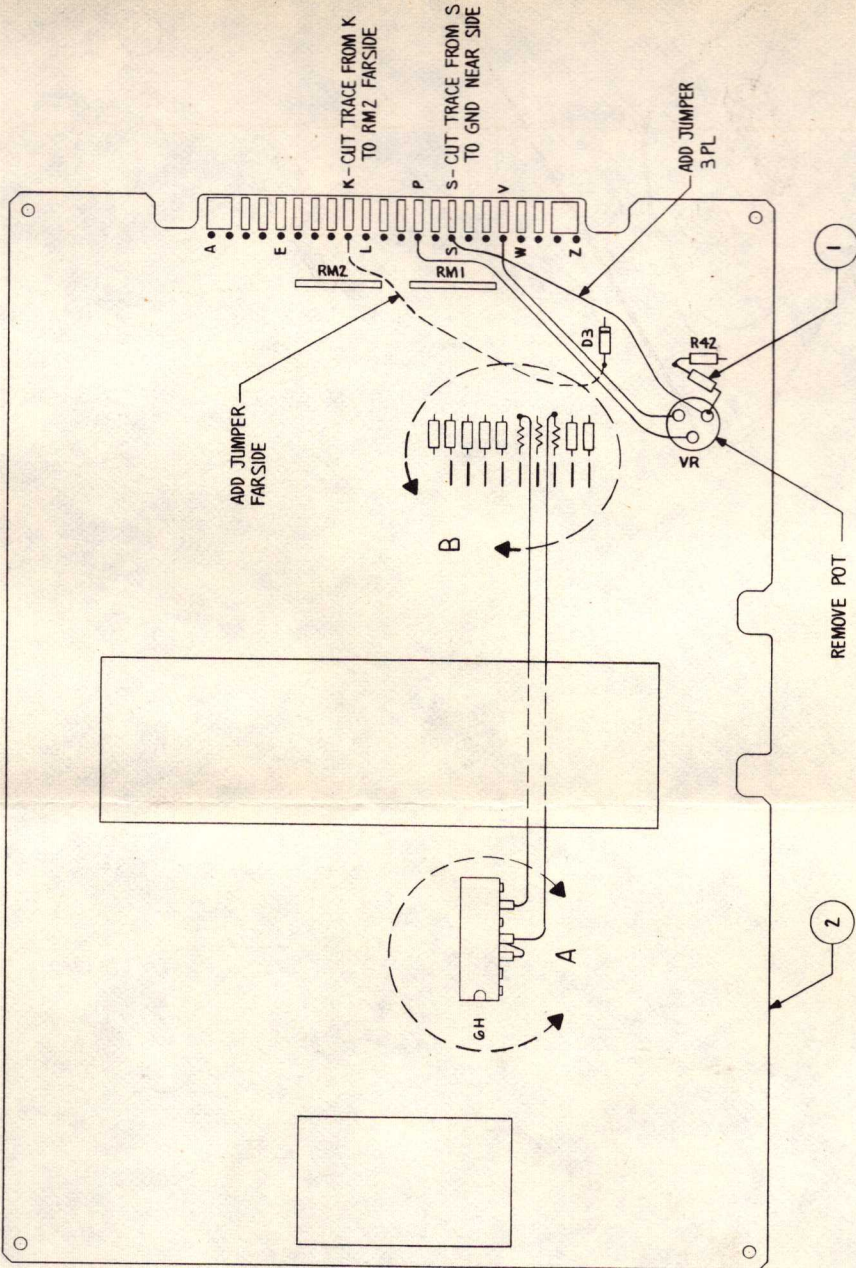
8 7 6 5 4 3 2 1

D

C

B

A



DETAIL B

D

C

B

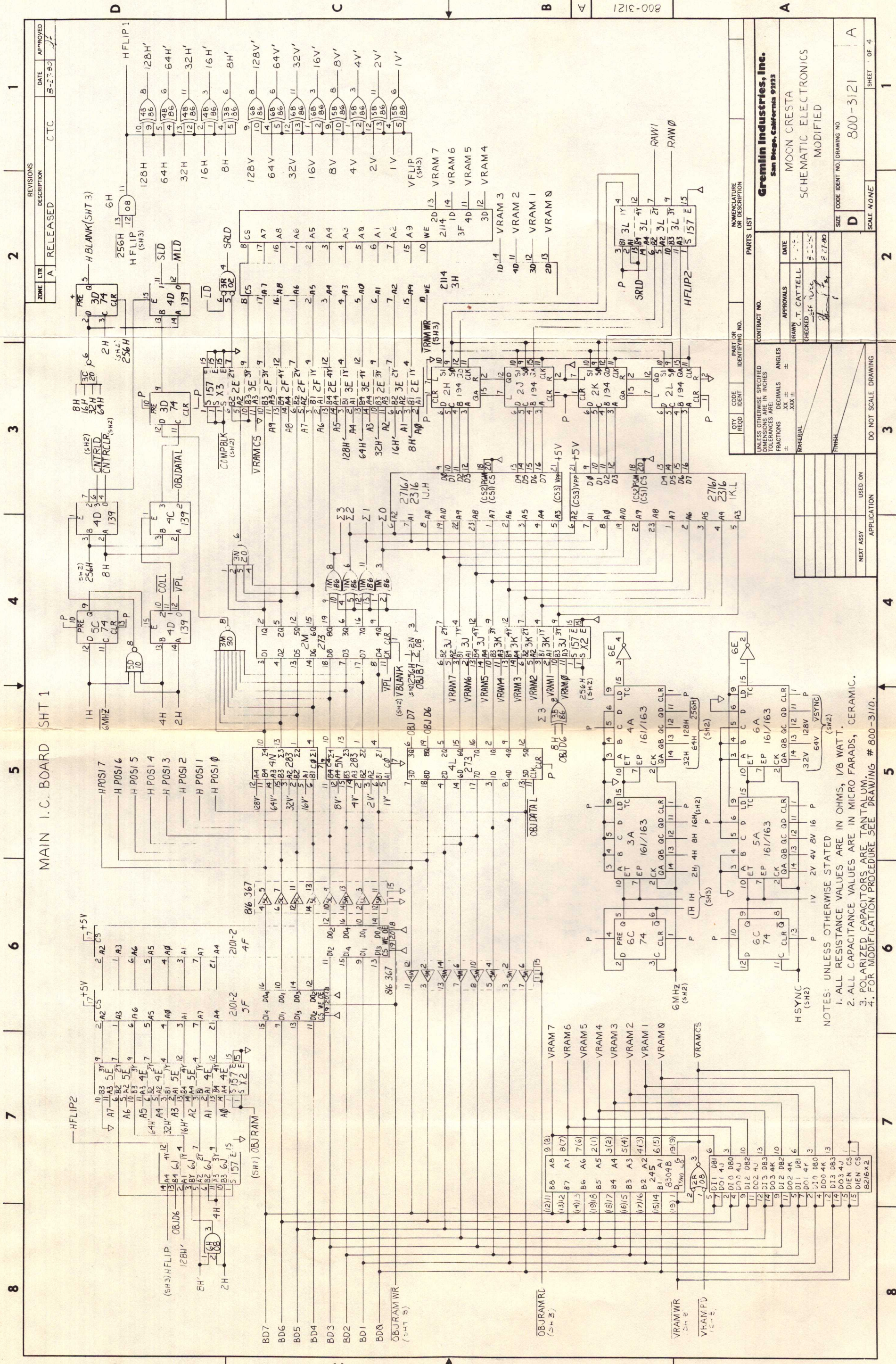
A

800-3110

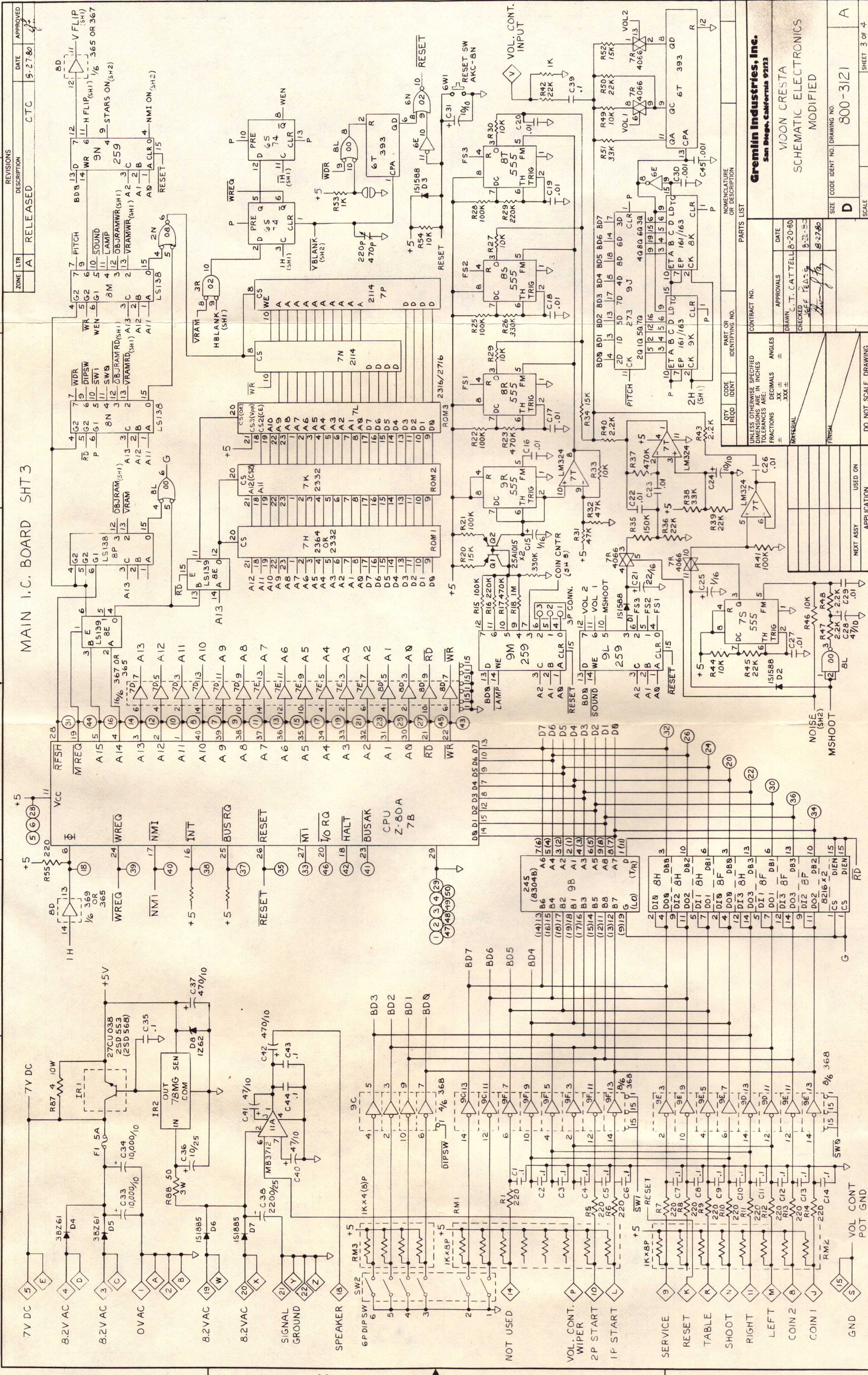
REVISIONS			DATE	APPROVED
ZONE	LTR	DESCRIPTION		
A	1	RELEASED	7-17-80	SD

3	1	314 - 0019	IC 74LS04		
2	1	834 - 0026	ASSY GAME ELEC. M/C		
1	1	470 - 0102	RESISTOR 1K, 1/4 W, 5%		
ITEM NO.	QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	
PARTS LIST					
CONTRACT NO.					
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ± .XX ± .XXX ± °					
MATERIAL					
FINISH					
TOO - 0030					
NEXT ASSY					
USED ON					
APPLICATION					
DO NOT SCALE DRAWING					
APPROVALS					
DRAWN SON DUONG					
CHECKED A. AMBROSE					
DATE 7-17-80					
7-17-80					
Gremlin Industries, Inc. San Diego, California 92123					
ASSY GAME ELECTRONICS M/C MODIFIED					
SIZE CODE IDENT NO. DRAWING NO. 800 - 3110					
REV. A					
SCALE NONE					
SHEET 1 OF 1					

1. ALL JUMPER WIRE TO BE AWG 26 .
NOTES:



MAIN I.C. BOARD SHT 3



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