

comotio



MANUFACTURED BY

Gremlin
Industries, inc.

OWNER'S MANUAL

CoMOTION
OPERATING INSTRUCTIONS
AND
SERVICE MANUAL

GREMLIN INDUSTRIES, INC.
8401 Aero Drive
San Diego, CA. 92123
JUNE 20, 1977

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GENERAL INFORMATION

INTRODUCTION:

CoMOTION 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, 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 V O I D 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 NOTES

An important service note is posted in the CoMOTION 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 CoMOTION has been arranged so that the insertion of a quarter thru 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.

WARRANTY/FACTORY SERVICE INFORMATION

WARRANTY:

CoMOTION is under factory warranty (parts and labor) for the following time periods:

A. All electronic components/connectors for one (1) year except:

1. Transformers - 90 days.
2. Fuses/Lamps - No Warranty
3. Control Push Button Switches - 90 days.

This Warranty covers defects/failures under normal use.

FACTORY SERVICE:

Should an assembly become defective, contact your local distributor. Factory authorization to return the assembly will be issued with transportation charges prepaid. If decided upon by factory representative an advance replacement will be made.

The assembly will be repaired and returned, transportation charges prepaid, if still in Warranty and no advance replacement made.

If the assembly is found to be damaged by misuse, improper attempts at repair or abuse, it will be repaired and returned with transportation and repair charges billed.

Out of Warranty assemblies, if returned to the factory with transportation charges prepaid, will be repaired and returned with transportation and repair charges billed.

In the instance of a defect of an assembly manufactured by other than GREMLIN INDUSTRIES, INC., every effort will be made to assist the customer in obtaining satisfaction from the original manufacturer.

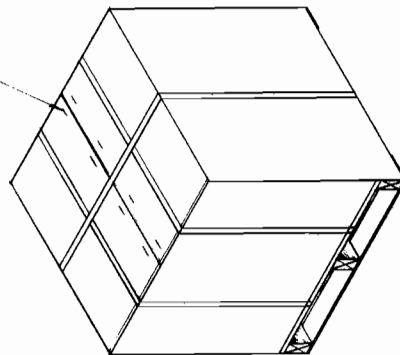
4 3 2 1

REVISIONS			
ZONE	LTR	DESCRIPTION	DATE
		INITIAL RE-ENG	3-11-77
			UCA

D

D

—STAPLES

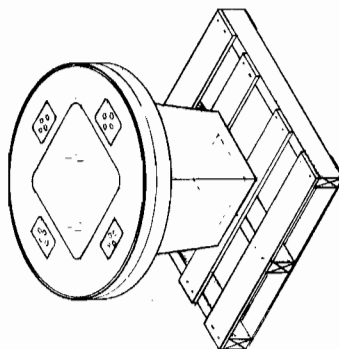


STEP 1

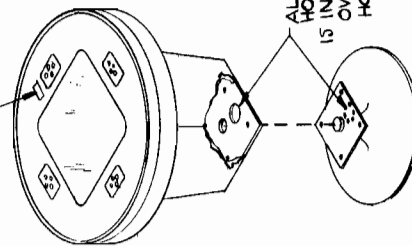
CUT AND REMOVE SHIPPING BANDS. REMOVE ALL STAPLES TO PREVENT DAMAGE TO CABINET. OPEN TOP OF CONTAINER AND REMOVE PACKING AND PEDESTAL. LIFT CONTAINER UP AND OFF GAME.

STEP 2

REMOVE (2) 1/4" SHIPPING BOLTS THAT SECURE GAME TO PALLET. (DISCARD BOLTS). LIFT GAME UP AND REMOVE PEDESTAL ADAPTER.



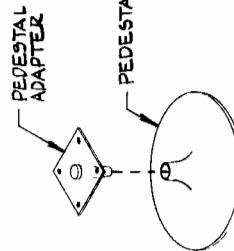
KEYS TO GAME TAPED TO TOP OF CABINET.



ALIGN VENT HOLES (IF FAN HOLES IS INSTALLED PLACE OVER VENT HOLES)

STEP 3

INSTALL PEDESTAL ADAPTER WITH TAPERED COLUMN DOWN INTO PEDESTAL AS SHOWN.



STEP 4

LOWER GAME AND CENTER ON PEDESTAL MAKING SURE VENT HOLES ALIGN WITH HOLES IN PEDESTAL ADAPTER. SECURE WITH (4) 1/4 x 1" BOLTS (PACKED INSIDE CABINET). SET IN DESIRED LOCATION. REFER TO MANUAL FOR FURTHER INSTRUCTION.

420-0061

B

A

QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	PARTS LIST
UNLESS OTHERWISE SPECIFIED TOLERANCES ARE IN INCHES FRACTIONS DECIMALS ANGLES ± .XX ± .XXX ± ° ±				
CONTRACT NO.				
DRAWN G. SMITH DATE 3/10/77				
CHECKED 11/10/507 3/11/77				
APPROVALS				
MATERIAL				
FINISH				
DO NOT SCALE DRAWING				
NEXT ASSY USED ON APPLICATION				
SIZE CODE IDENT NO. DRAWING NO. 420-0061				
SCALE NONE				
SHEET 1 OF 1				

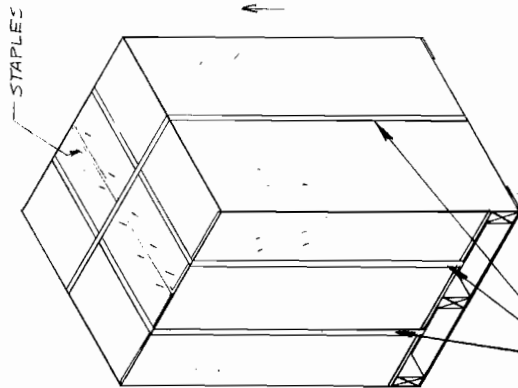
Grosbeak Industries, Inc.
San Diego, California 92108

COMOTION I & IA
UNCRATING INSTRUCTIONS

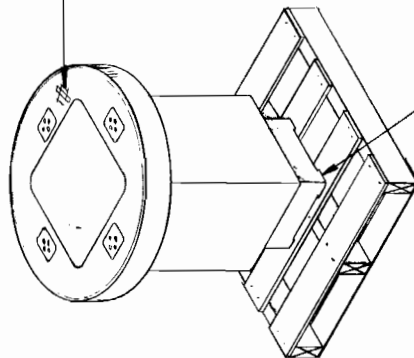
4 3 2 1

4 3 2 1

REVISIONS			
ZONE	LTR	DESCRIPTION	DATE
		INITIAL RELEASE	8-11-77
			V. Ulen



STEP 1
CUT AND REMOVE SHIPPING BANDS.
REMOVE ALL STAPLES TO PREVENT
DAMAGE TO CABINET. OPEN TOP
OF CONTAINER AND REMOVE PACKING.
LIFT CONTAINER UP AND OFF GAME.



KEYS TAPED TO
TOP OF CABINET

STEP 2
REMOVE (2) 5/16" SHIPPING
BOLTS THAT SECURE GAME
TO PALLET. (DISCARD BOLTS).
LIFT GAME OFF PALLET
AND SET IN DESIRED LOCATION.
REFER TO MANUAL FOUND
INSIDE CABINET FOR FURTHER
INSTRUCTIONS

420-0062

B

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 .XX ± DECIMALS .XXX ± ANGLES ±					
MATERIAL		APPROVALS		DATE	
		DRAWN G. SMITH		3/10/77	
		CHECKED V. Ulen		3-10-77	
FINISH		CODE IDENT NO.		DRAWING NO.	
NEXT ASSY		C		420-0062	
APPLICATION		SCALE NONE		SHEET 1 OF 1	
DO NOT SCALE DRAWING		COMOTION II & IIA		UNCRATING INSTRUCTIONS	

OPERATION

I. GAME CONCEPT -

CoMOTION is a two, three or four player game of elimination in which each player controls the direction of a maneuverable arrow on the face of a video screen.

The perimeter of the screen is constructed as a wall with images which resemble bricks.

Each player utilizes his push buttons to maneuver his arrow. As it moves, the arrow leaves behind a "trail" of brick images, which form a continuous wall.

Each time a player crashes, one of his arrow counters is eliminated. When a player has exhausted his supply of arrow counters, he is eliminated from the remaining rounds of the game.

The object of the game is to avoid crashing into any of three possible obstacles. They are:

1. The perimeter walls
2. The brick "trails" left behind by any of the players including your own.
3. Any other player(s) arrow(s) including the "dead" arrows from non-participating player(s).

Each player is allotted a preset number of crashes (three to four). The number of crashes allotted each player is represented by the number of arrow counters appearing opposite his push buttons on the screen. The arrow counters appear in the perimeter walls of the game and are located in front of each player on the screen. Each time a player crashes, one of his arrow counters is eliminated. When a player has exhausted his supply of arrow counters, he is eliminated from the remaining rounds of the game.

II. OPERATION -

CoMOTION is equipped with four sets of player controls. The player controls are four push buttons which correspond to the arrow directions: Up, Right, Down and Left.

The arrows move alternately at a fixed rate, (until there is a crash, at which time game speed is accelerated) approximately once per second.

To change the direction of his arrow, a player momentarily depresses the push button which corresponds to the desired direction. The arrow will move in the new direction until changed again. A player's reaction time is important as turns must be made at precise moments during play.

As the arrows move, a series of tones are generated. Every player direction for each arrow produces a different pitch. There are sixteen different tones in all, four for every player.

As a result, there is an audible change anytime a player makes a turn. After each round, the screen is cleared. The remaining players are positioned at their starting locations on the screen, and the next round begins.

Whenever CoMOTION is not being played, an advertising sequence is initiated. The game plays itself to attract attention. While advertising is in action, the message "INSERT 25¢ FOR 2 PLAYERS, 50¢ FOR FOUR PLAYERS, THEN PRESS START" appears on the screen.

Anytime a player's arrow crashes with any of the obstacles, there is an audible explosion and accompanying flashing image appears on the screen at the point of impact. Whenever there is a crash, the following things happen:

1. One arrow counter of the player who crashes into the obstacle is removed. Anytime two players crash into one another, both players lose one arrow counter.
2. All of the obstacle bricks left behind by the player(s) who crashed are removed from the screen, and play resumes for the remaining players at a higher speed.

III. OPERATION - (Cont'd.)

3. If a brick "trail" is hit, a hole is left in the trail at the position where the player crashed.

The game proceeds for a series of "rounds" in which players eliminate themselves until one (or none) of them is left. The case where no players are left in a "round" occurs when two remaining players crash into each other.

The winner of the game is the player who has at least one arrow counter remaining, while all other players have none. It is possible for the game to end with "No Winner". This occurs when only two players are left in the game, each of which has one arrow counter remaining and they crash into each other.

E-Z AdjustTM Control Panel - CoMOTION has three adjustments, all of which are located on the back of the coin door. These three controls are:

1. VOLUME CONTROL -

Set to desired volume for boom and tones during the game. This also effects advertising boom volume if boom switch is "ON".

2. BOOM SWITCH -

Switch to "ON" position if boom is desired during advertising.

3. GAME END SWITCH -

Switch to desired game ending score. (3-4)

SYSTEM DESCRIPTION:

I. SEE SYSTEM BLOCK DIAGRAM

II. MICROPROCESSOR -

The game microprocessor is a Model 8080A and it functions as the Central Processing Unit (CPU) in the system. The CPU (1) is synchronized by a clock circuit which provides frequencies required by the CPU and the Video Timing Logic (14).

Address Bus (4) selects the memory addresses to be accessed by the CPU. It is routed to three subsystems:

1. Read Write Memory (6): A random Access Memory (Ram) used to form a first in/last out (stack) memory. Used to perform subroutine calls and returns, also used for temporary data storage during program execution.
2. Read Only Memory (Rom) (7): Stores program instructions for the CPU.
3. Address Multiplexer (8): Selects either CPU addresses or addresses from the Video Timing Logic. Used to address the Video Refresh Memory (9).

Data Bus (5) carries data to and from the CPU. It receives data from Read Write Memory, Read Only Memory, Video Refresh Memory and Input Ports (12). The Bus transmits data to Read Write Memory, Output Ports and Video Refresh Memory. The Input Ports accept player control data (19). The Output Port (13) initiates sound control and activates any external logic and indicators needed by the game.

Timing and Control Logic (11) generates synchronizing signals to keep system operation synchronized to the CPU. It controls:

1. Memory Read
2. Memory Write
3. Input Port Read
4. Output Port Write

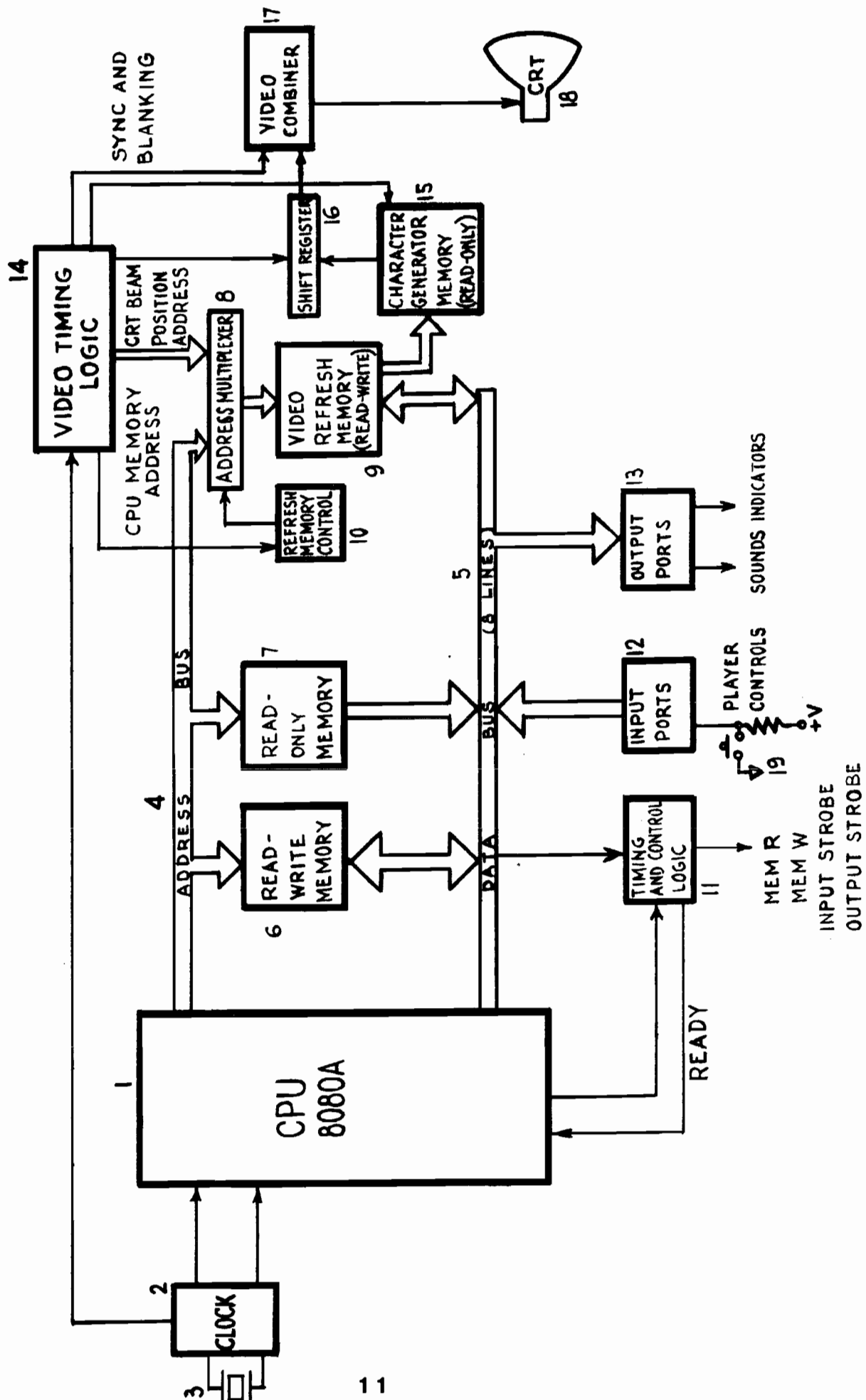
II. MICROPROCESSOR - (Cont'd.)

The remaining elements in the System Block Diagram convert (CPU) system information into a video display format. The T.V. monitor (18) uses a standard 525 scanline system.

Video Refresh Memory (9) stores information from the CPU which is read out as the CRT beam sweeps across the screen. It is addressed from two sources as controlled by Address Multiplexer (8). During vertical sweep retrace of the CRT, the Video Refresh Memory is addressed by the CPU so information can be updated. During scan time, Video Refresh Memory is addressed by Video Timing Logic (14). Refresh Memory Control (10) insures that address demands from Video Timing Logic and the CPU never occur simultaneously.

Character Generator Memory (15) provides a means for Video Refresh Memory to select 64 dots for each 8 word access. Each image, on the display, will have the dimensions of 8 dots high, and 8 dots wide. Shift register (16) develops this into a video signal. (Page 12.)

A tone Generator is driven by Output Ports (13). The CPU controls the frequency of the tone by loading a number (0-255) into the Output Ports (13). A direction change by a player will cause the CPU to load a different number into the Output Port, changing the tone. (Page 13.)

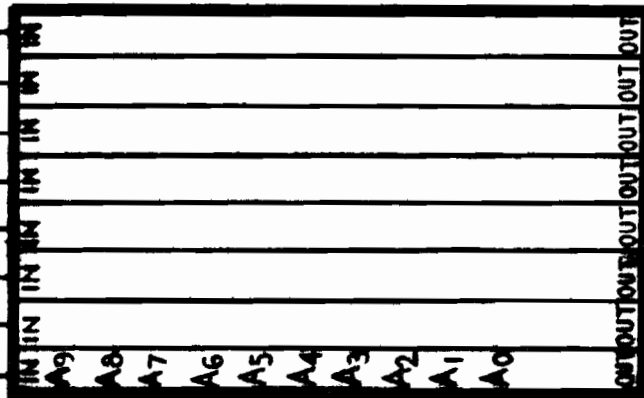


SYSTEM BLOCK DIAGRAM

MEMORY INPUT DATA
FROM MICROPROCESSOR

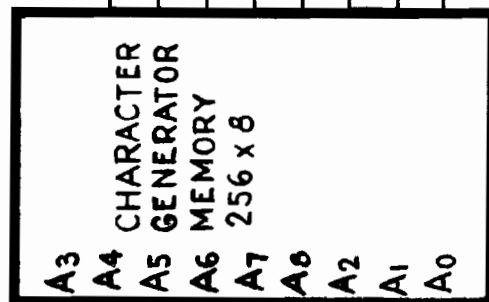
DATA BUS

7 6 5 4 3 2 1 0



VIDEO
REFRESH
MEMORY
ADDRESS -
FROM
ADDRESS
MULTIPLEXOR

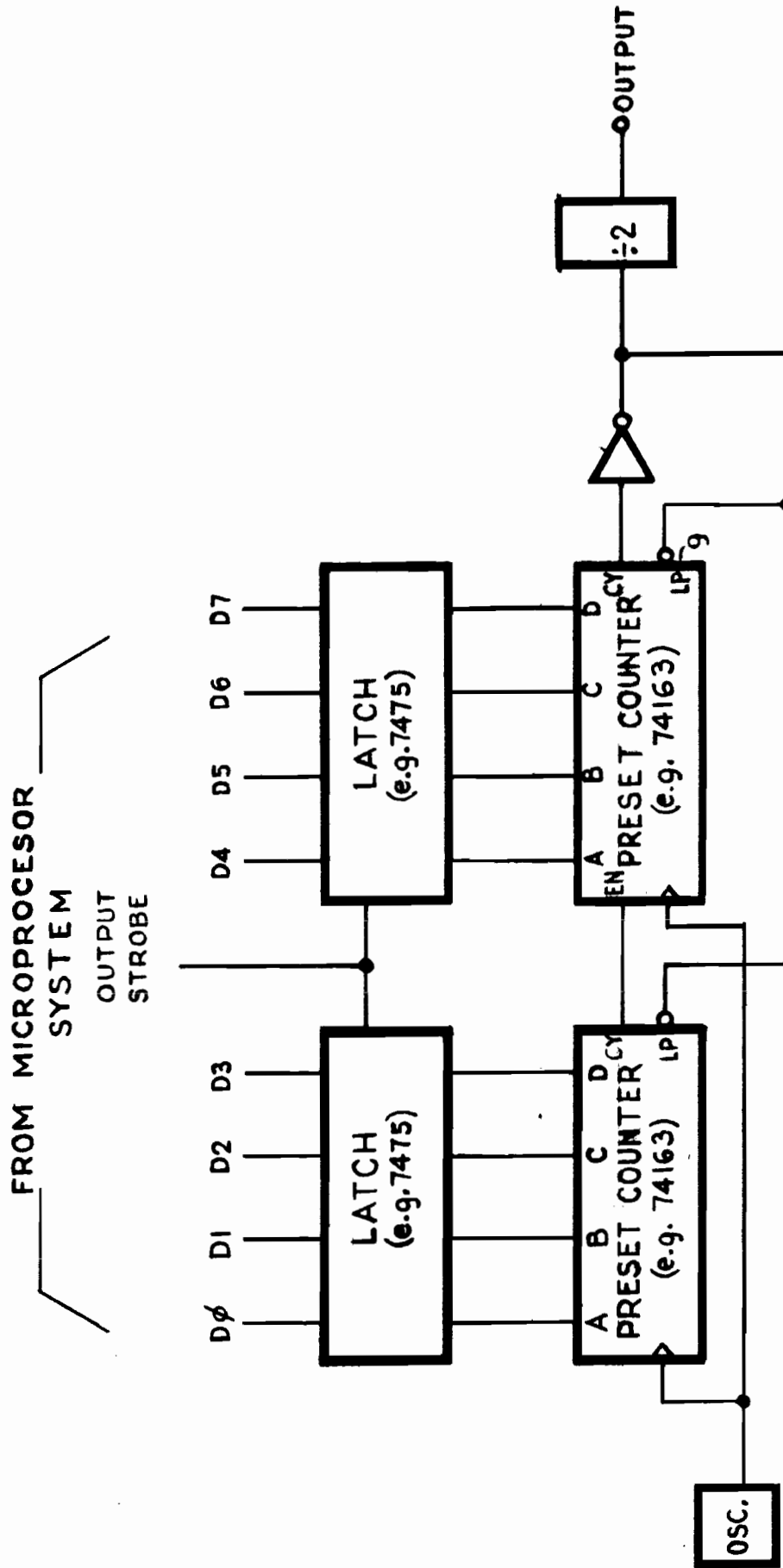
VIDEO
REFRESH
MEMORY
1024 x 8



EIGHT
OUTPUTS
TO SHIFT
REGISTER

4V
2V
1V

D7 D6 D5



TONE GENERATOR

MAINTENANCE

FACTORY ASSISTANCE:

TECHNICAL HELP IS AVAILABLE FROM THE GREMLIN FACTORY. IF A PROBLEM OCCURS WHICH CANNOT BE EASILY RESOLVED BY YOUR DISTRIBUTOR, A PHONE CALL OR LETTER TO THE FACTORY WILL BRING ATTENTION TO YOUR PROBLEM BY A TRAINED REPRESENTATIVE.

NOTE: IF AT ANY TIME THE T.V. SCREEN SHOWS A MEANINGLESS DISPLAY OR THE GAME OTHERWISE MALFUNCTIONS, DROP A COIN IN THE COIN MECHANISM. THIS SHOULD CORRECT THE PROBLEM. IF NOT, THE GAME REQUIRES SERVICE.

EQUIPMENT: THE FOLLOWING IS A RECOMMENDED LIST FOR ANYONE ATTEMPTING TO SERVICE CoMOTION.

1. Oscilloscope - 50 Mhz or wider band width
2. DVM (Digital Volt Meter)
3. OHM Meter
4. Logic Probe
5. Solder Station - in most cases a digital IC can only take about 300* of heat for 10 seconds. (a 75 watt soldering iron is much higher). Recommended wattage should be 40 watts or less.
6. Jumpers
7. Replacement parts including game programs:
1024 x 4 prom 316-0007 and 316-0008, 316-0009,
and 316-0010.

MAINTENANCE PROCEDURES:

CoMOTION POWER SUPPLY MALFUNCTION:

1. Remove Output Connectors
2. Initial Tests: (GND lead to C-18 negative terminal located off board.)
 - a. +9 at "+" of C-18
 - b. +19v at C-6 (4700 mfd)
 - c. -19v at C-5 (4700 mfd)
 - d. -12v at pin 11
 - e. +12v at pin 12
 - f. +5v at pins 18-20
 - g. zero v (GND) at pins 14-16
3. If adjustments are required, attach meter ground to pins 14, 15 or 16 or equivalent local ground and:
 - a. +5v adjust - input lead to pins 18, 19, 20 and adjust R-9 for +5.0 to +5.1 VDC.
 - b. +12v adjust - input lead to pin 12 and adjust R-10 for +11.5 to +12.1 VDC.
 - c. -12v adjust - input lead to pin 11 and adjust R-10 for -11.5 to -12.1 VDC
4. If initial test is good, attach output connectors to Video Logic Board. Repeat Step 2.
 - a. If readings differ from those previously taken, a loading problem exists on the Video Logic Board.

No -12VDC or 5VDC on the Video Logic Board: (Power Supply Normal)

Video Logic Board Schematic (VLBS) (SH. 2). CHECK U-65, C-29 for open/short. CHECK R-40, C-12, D-2 (VLBS) (SH. 1).

CoMOTION POWER SUPPLY MALFUNCTION: (Cont'd.)

No +12VDC at CPU: (Power Supply Normal)

(VLBS) (SH. 2). CHECK U-65, C-28. (VLBS) (SH. 1) CHECK C-23, C-25.

VIDEO LOGIC BOARD MALFUNCTION:

No Ø1, Ø2 CLOCKS: (Ref. Fig. 4A)

(VLBS, (SH. 1). CHECK U-32 pins 1 and 3 for 20.79 MHZ. CHECK U-31 pins 14, 13, 12, and 11 for 150 nsec sinewave. CHECK U-17 pins 1, 3, 4, and 10. CHECK latch network U-18 and U-8. CHECK high voltage outputs of U-30 pins 3 and 6. If not present, remove driver transistor. Should U-30 now show output, replace driver transistor, if still not present replace U-30. U-45 could load down Ø1 clock.

No Coin Start:

(VLBS) (SH. 1) CHECK output U-9 pin 6. If signal not present, lift U-10 pin 5. Should signal return, replace U-10. If still not present, check output of U-8 pin 3. CHECK D-8 pull up diode and C-18. CHECK U-14. U-32 could be shorting signal to Q₃ and Q₄.

Screen Flashes: (Similar to COIN START clear)

Power Interrupt Board bad (Q-3, U-2). Wires on coin box leading to Antenna of power Interrupt are intermittent. Wires on +VAC from power supply open/intermittent. Power Interrupt Board not secure on TP3 and TP4.

No Coin Meter Action:

(VLBS) (SH. 1) Signal from U-8 pin 11 feeds current limiter R-27 to Q₄. Saturated Q₄ turns high current transistor Q₅. If Q₄ or Q₅ faulty, will inhibit meter.

No Player Control:

(VLBS) (SH. 1) Input accepted through U-12 and U-13 via data lines when strobe IND2 signal is generated through U-18 from U-45 and U-51 (status latch). CHECK U-18 pin 11, U-45 pin 8, U-45 pin 11, U-51 pin 10 for strobe pulse.

VIDEO LOGIC BOARD MALFUNCTION: (Cont'd.)

No Game Time Select:

(VLBS) (SH. 1). Input accepted through U-10 and U-11 via data lines when strobe IND1 signal is generated through U-18 from U-45 and U-51. CHECK U-18 pin 3, U-45 pin 8, U-45 pin 11, U-51 pin 10 for strobe pulse.

Meaningless Display on Screen: (Inserting coin does not correct problem)

Possible areas:

1. A program malfunction
 - a. Check ROM sockets, U-2, U-3, U-4 and U-5.
 - b. Power Interrupt Board bad (Q-3, U-2)
 - c. Power Interrupt Board not properly secure on TP3 and TP4.
2. A data transfer malfunction
 - a. Test the CPU Data Bus by ensuring proper voltage levels. Pullup resistors are used to make memory outputs compatible with the 8080A. High State Logic on the Data Bus should be 3.3v minimum. For involved problems in this area contact GREMLIN INDUSTRIES.

Characters on Screen not correct: (Wrong image behaves normally)

(VLBS) (SH. 2). Use character generator code table to isolate possible bad RAM (U-35, U-36, U-37, U-38, U-39, U-40, U-41, or U-42). Also probable are U-22, U-23 (data buffers), U-24, U-25, U-26 (multiplexers), U-29 and U-43 (character Proms) and U-49 (shift register).

No Video: (Ref. Fig. 4B, 4C, 4D)

(VLBS) (SH. 2) CHECK U-54, U-53 circuitry for H reset. U-52 pin 1, clock for horizontal scan. U-55, U-58 provides timing for vertical blanking.

VIDEO LOGIC BOARD MALFUNCTION: (Cont'd.)

Bad Video:

(VLBS) (SH. 2) Bad video could be vertical roll or horizontal sliding. CHECK U-55 pin 12 and U-56 pin 4 of horizontal or vertical generators. CHECK U-63 pins 12 and 13 for vertical and horizontal blanking. U-64 develops sync pulses.

Monitor Malfunction:

Refer to Motorola Service Manual (File VP 12). This manual included with CoMOTION schematics.

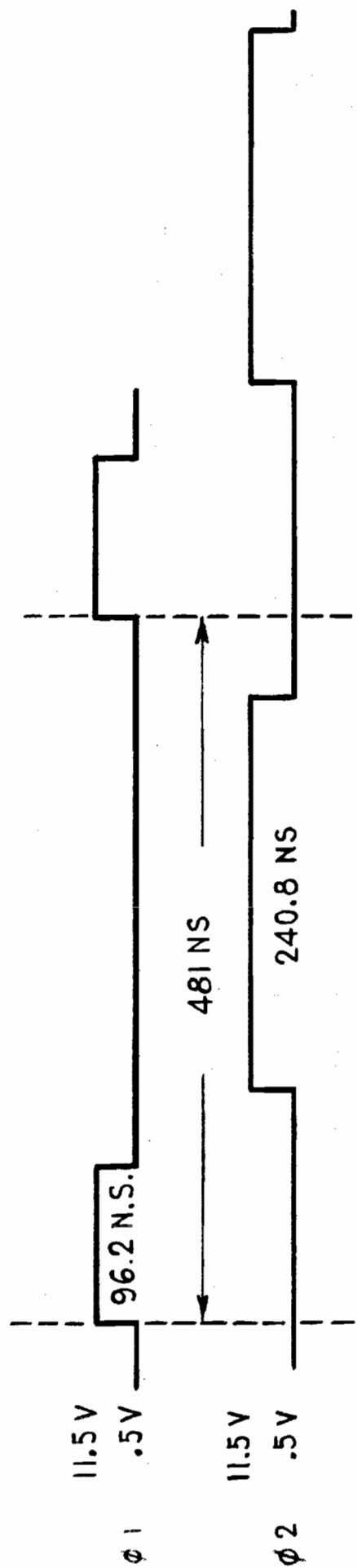
Audio Tones; Sour/None:

(VLBS) (SH. 2). U-68, U-61, U-62, U-66, U-67, U-60 comprise tone generator. Amplifier on Power Supply Board (U-4, Q₅, Q₃, Q₈, Q₉). Could also be problem area.

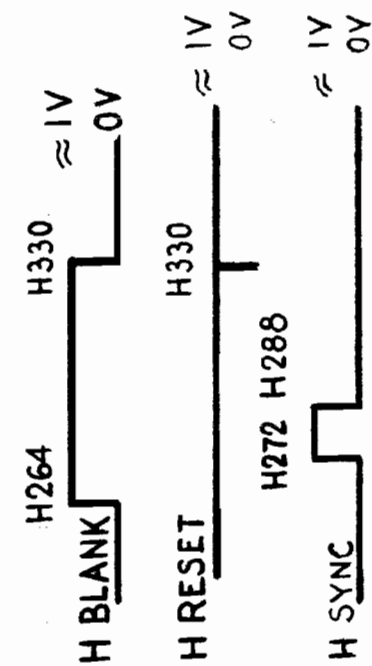
Boom; Sour/None:

(VLBS) (SH. 1, SH. 2). D-6, Q₁₀, Q₉, Q₁₁, U-5, Q₇, Q₈, Generates Boom. Amplifier section on Power Supply Board (U-4, Q₅, Q₃, Q₈, Q₉), also probable.

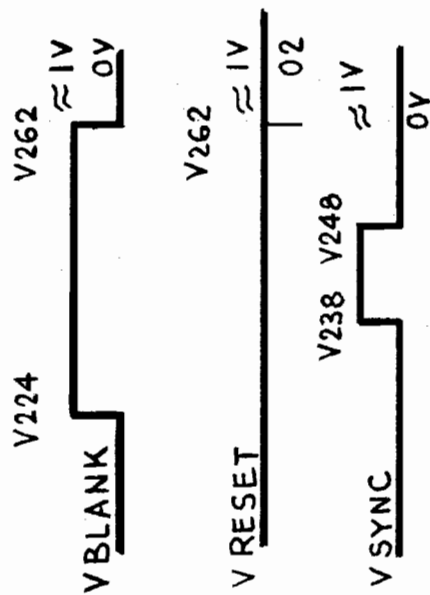
(A)



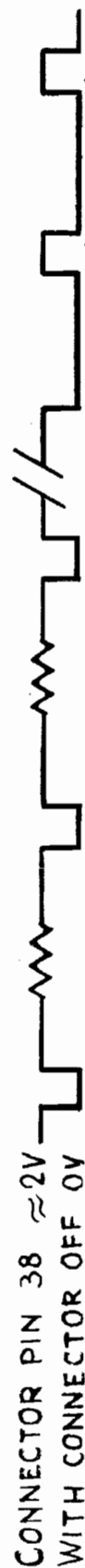
(B)



(C)



(D)



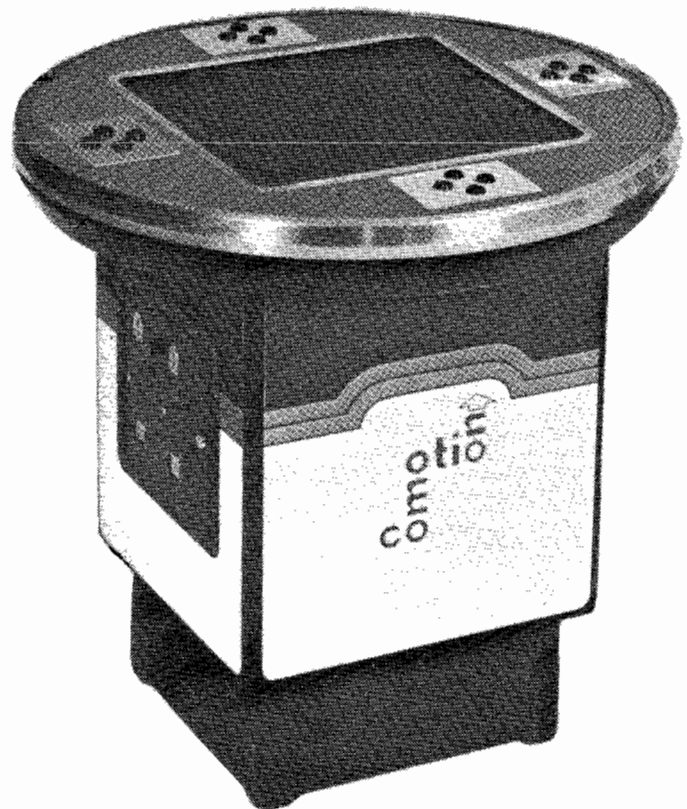
CONNECTOR PIN 38 $\approx 2V$
WITH CONNECTOR OFF 0V
4 INVERTED HORIZ. DURING V BLANK

C H A R A C T E R C O D E T A B L E

I.C. (U#)							I.C. (U#)						
37	38	39	40	41	42		37	38	39	40	41	42	
0	0	0	0	0	0	┌	0	1	0	0	0	0	F
0	0	0	0	0	1	└	0	1	0	0	0	1	H
0	0	0	0	1	0	└	0	1	0	0	1	0	I
0	0	0	0	1	1	└	0	1	0	0	1	1	L
0	0	0	1	0	0	—	0	1	0	1	0	0	N
0	0	0	1	0	1		0	1	0	1	0	1	O
0	0	0	1	1	0	(BLANK)	0	1	0	1	1	0	P
0	0	0	1	1	1	(BLOW UP)	0	1	0	1	1	1	R
0	0	1	0	0	0	↑	0	1	1	0	0	0	S
0	0	1	0	0	1	→	0	1	1	0	0	1	T
0	0	1	0	1	0	↓	0	1	1	0	1	0	W
0	0	1	0	1	1	←	0	1	1	0	1	1	Y
0	0	1	1	0	0	(BLANK)	0	1	1	1	0	0	2
0	0	1	1	0	1	A	0	1	1	1	0	1	4
0	0	1	1	1	0	C	0	1	1	1	1	0	5
0	0	1	1	1	1	E	0	1	1	1	1	1	8



comotion I
2,3,4 PLAYER SITDOWN



comotion II
2,3,4 PLAYER STANDUP

PARTS LIST FOR
CoMOTION I -- (708-000)

<u>DESCRIPTION</u>	<u>QUANTITY USED</u>	<u>PART NUMBER</u>
Access door assembly	1	252-0037
Base assembly	1	265-0001
Bracket, cash box	1	252-0015
Bracket, pivot	1	250-0089
Cabinet top assembly	1	252-0028
Cash box	1	220-0013
Chassis hanger	1	250-0045
Chassis hanger	1	250-0044
Clamp, storage rod	1	250-0090
Coin mechanizm	1	220-0030
Cover, cash box	1	220-0016
Frame, glass	1	280-0029
Glass table top	1	275-0003
Guide pin assembly	1	280-0038
Hinge	2	250-0053
Hinge assembly	1	280-0034
Light bracket	1	250-0063
Light window	1	253-0019
Lock assembly	1	220-0023
Lock catch plate	1	250-0047
Monitor	1	200-0002
Monitor support	1	250-0043
Monitor support	1	250-0042
Monitor support	2	250-0041
Monitor support	2	250-0040
Operator switch assembly	2	808-0004
Operator switch assembly	2	808-0002
Pedestal	1	140-0008
Pedestal adapter	1	250-0039
Reinforcing plate	1	250-0039
Retainer clip	1	250-0049

CoMOTION I PARTS LIST:(Cont'd.)

<u>DESCRIPTION</u>	<u>QUANTITY USED</u>	<u>PART NUMBER</u>
Retainer, door latch	1	250-0050
Retainer, rod	1	250-0088
Rod	1	250-0091
Sealant, foam	1	320-0022
Sealant, foam	4	320-0021
Sealant, foam	3	320-0020
Table shroud	1	253-0017
Trim ring assembly	1	265-0006

PARTS LIST FOR

CoMOTION II and CoMOTION IIA
(708-0002 and 708-0004)

<u>DESCRIPTION</u>	<u>QUANTITY USED</u>	<u>PART NUMBER</u>
Access door assembly	1	252-0038
* Base assembly	1	265-0002
** Base assembly	1	265-0003
Bracket, pivot	1	250-0089
Cabinet tip assembly	1	252-0029
** Cash box	1	220-0039
* Cash box body	1	220-0012
* Cash box cover	1	220-0016
Chassis hanger	1	250-0045
Chassis hanger	1	250-0044
Clamp, storage, rod	1	250-0090
* Coin mechanism	1	220-0030
** Coin mechanism	1	220-0026
Color screen, table	1	253-0018
** Frame, coin mechanism	1	220-0026
Glass table top	1	275-0003
Guide pin assembly	1	280-0038
Hinge, ass'y., access door	1	280-0034
Hinge, top	2	250-0067
Lock ass'y.	1	220-0023
Lock catch	1	250-0098
** Lock, door, mech., coin	1	220-0027
** Mech., coin, dual	1	220-0017
Monitor	1	200-0002
Monitor support	1	250-0043
Monitor support	1	250-0042
Monitor support	2	250-0041
Monitor support	2	250-0040
Operator switch assembly	2	808-0004
Operator switch assembly	2	808-0002
Operator switch plate	4	250-0036
Reinforcing plate	1	250-0046
Retainer, clip door	1	250-0049

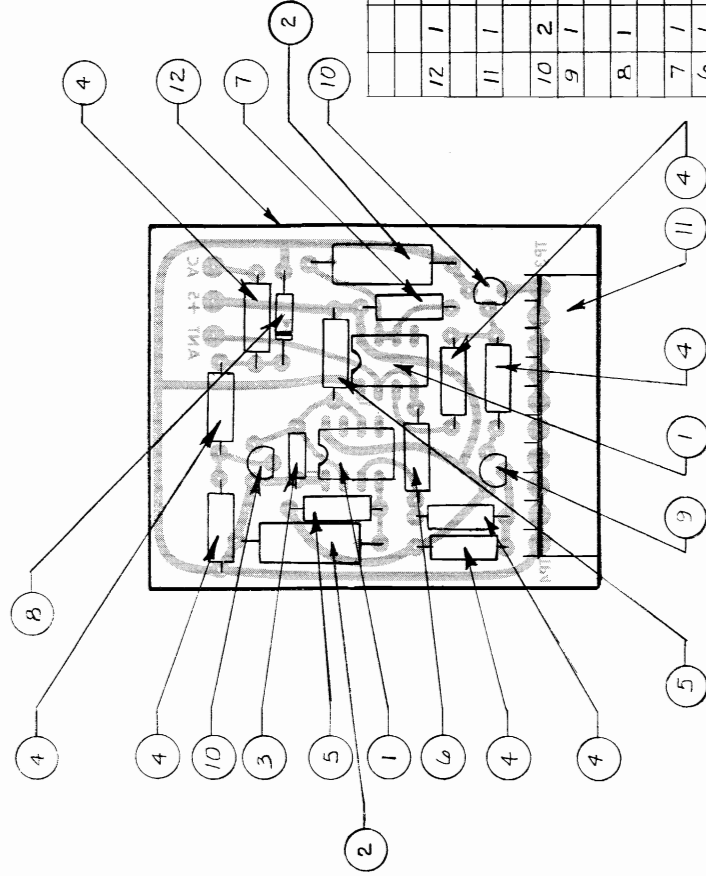
CoMOTION II AND IIA PARTS LIST: (Cont'd.)

<u>DESCRIPTION</u>	<u>QUANTITY USED</u>	<u>PART NUMBER</u>
Retainer, door latch	1	250-0050
Retainer, rod	1	250-0088
Rod	1	250-0091
Sealant, foam	1	320-0022
Sealant, foam	4	320-0021
Sealant foam	3	320-0020
Shadow mask	1	253-0015
Switch actuator	1	250-0064
Table shroud	1	253-0017
Trim ring assembly	1	265-0006

The primary difference between CoMOTION II and CoMOTION IIA is the coin boxes. CoMOTION II uses the COIN MECH coin box and CoMOTION IIA uses the U.S. Billiards coin box.

* USED FOR CoMOTION II ONLY.

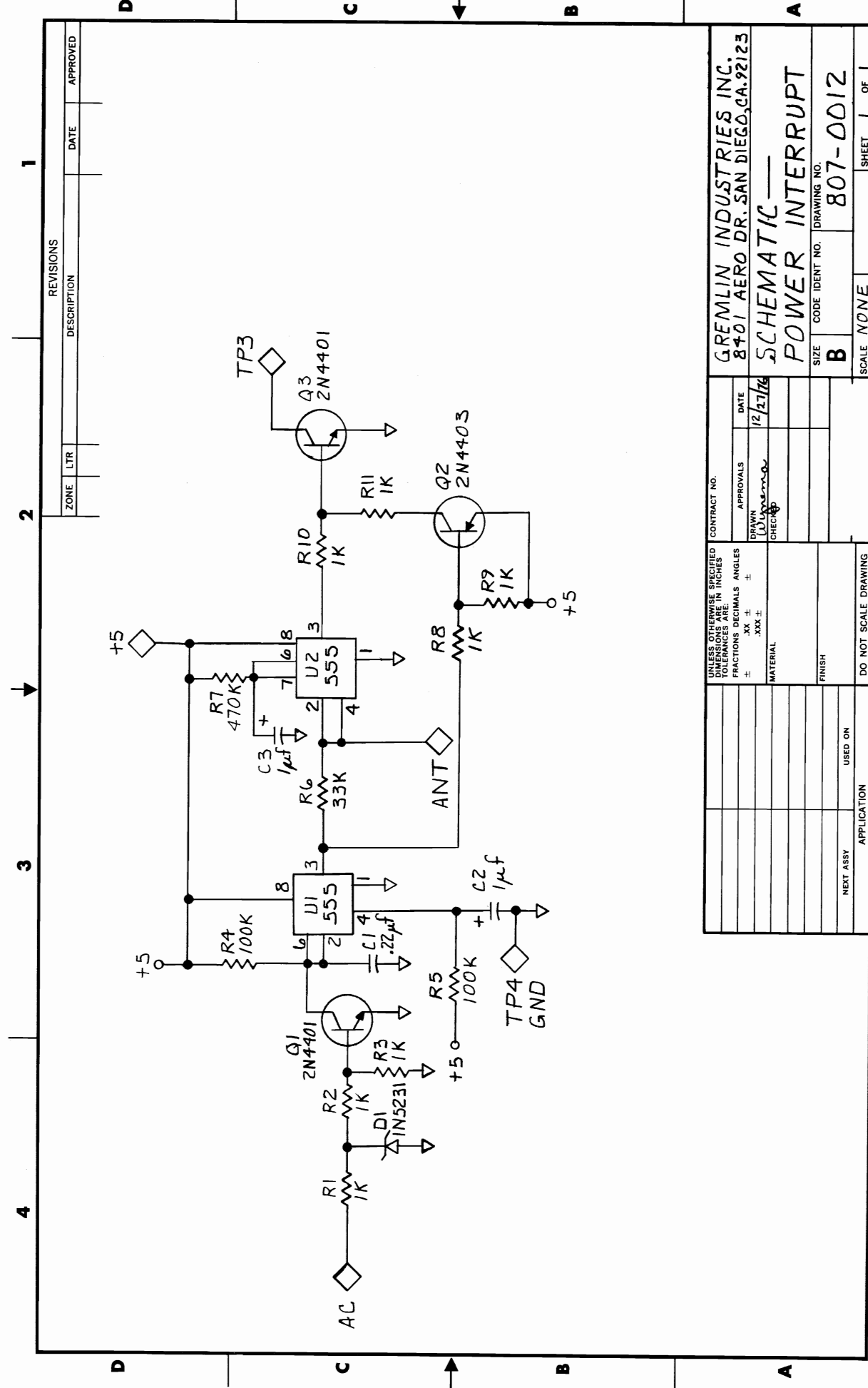
** USED FOR CoMOTION IIA ONLY.



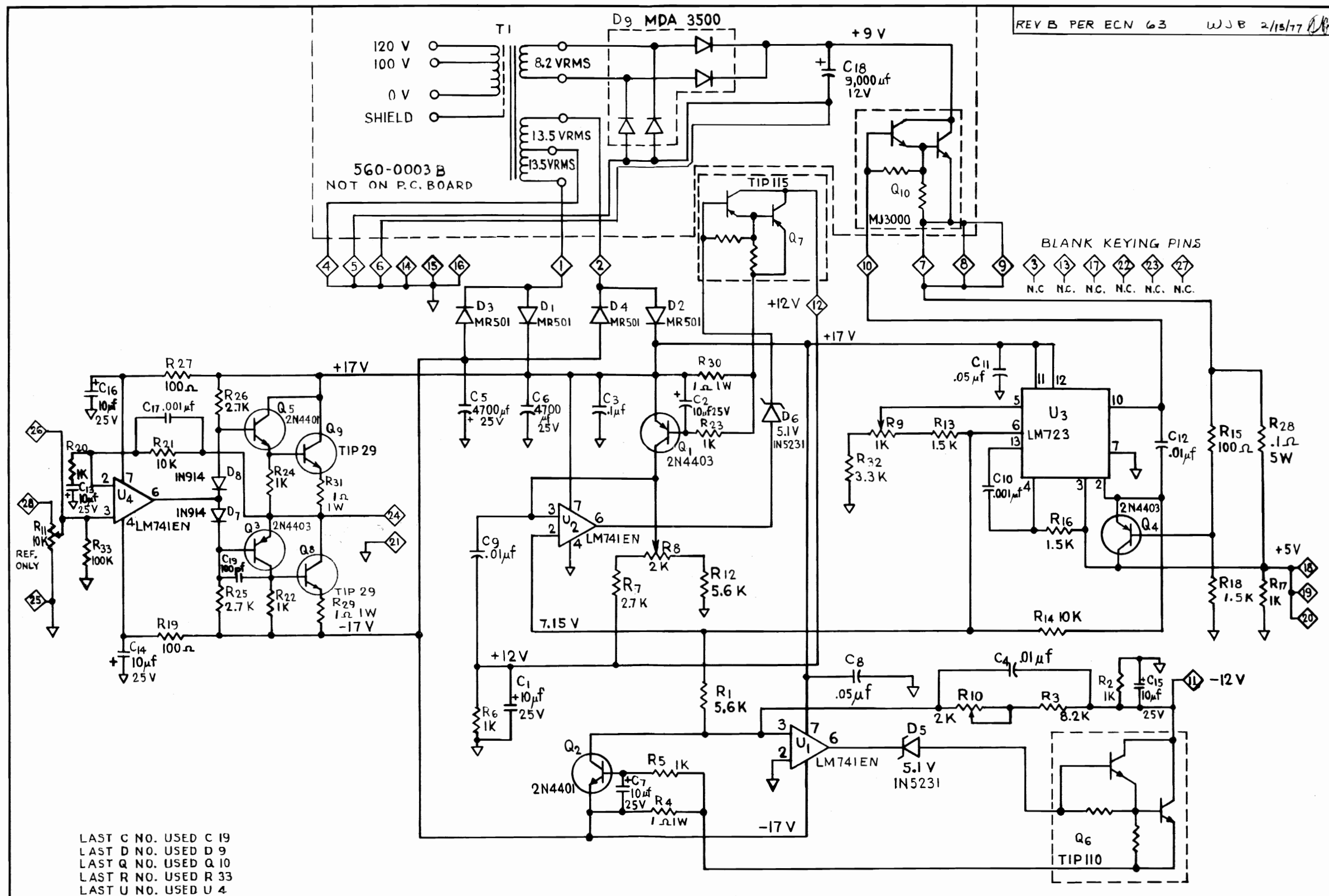
ITEM NO.			
12	1	170-0073	P.C. BOARD
11	1	212-0017	CONN FEMALE 10PIN RT ANGLE
10	2	482-0014	TRANSISTOR 2N4401
9	1	482-0006	TRANSISTOR 2N4403
8	1	481-0008	DIODE ZENER IN5231
7	1	471-0474	RES. 470K OHM 1/2W 5%
6	1	471-0333	RES. 33K OHM 1/2W 5%
5	2	471-0104	RES. 100K OHM 1/2W 5%
4	7	471-0102	RES. 1K OHM 1/2W 5%
3	1	152-0002	CAP. F. .22M 100V C1
2	2	150-0009	CAP. E. 1M 50V
1	2	314-0001	IC TIMER NE555
			UI, U2

GREMLIN INDUSTRIES INC.
8401 AERO DR. SAN DIEGO, CA. 92123
POWER INTERRUPT ASSY
PARTS OVERLAY

807-0012

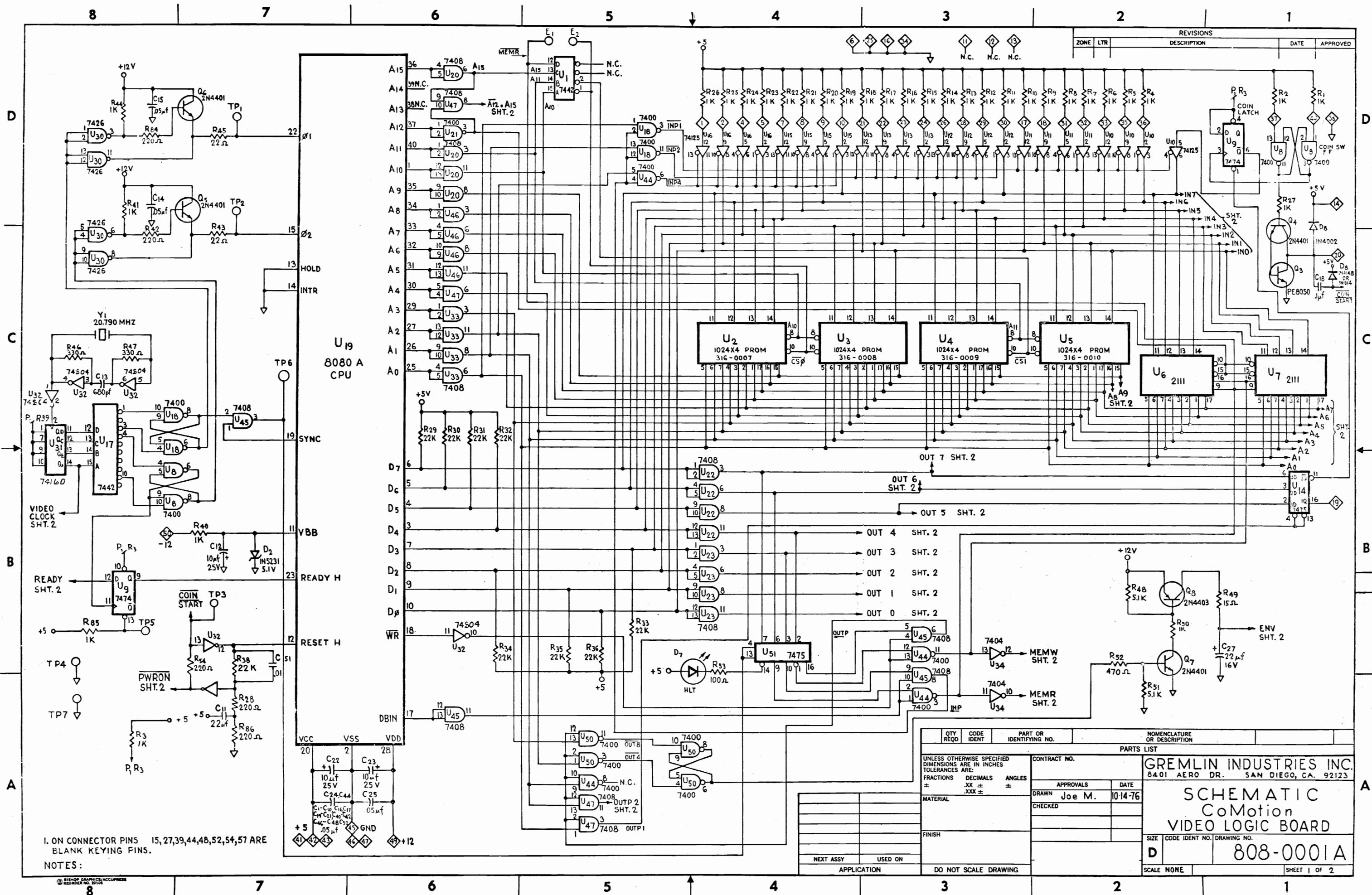


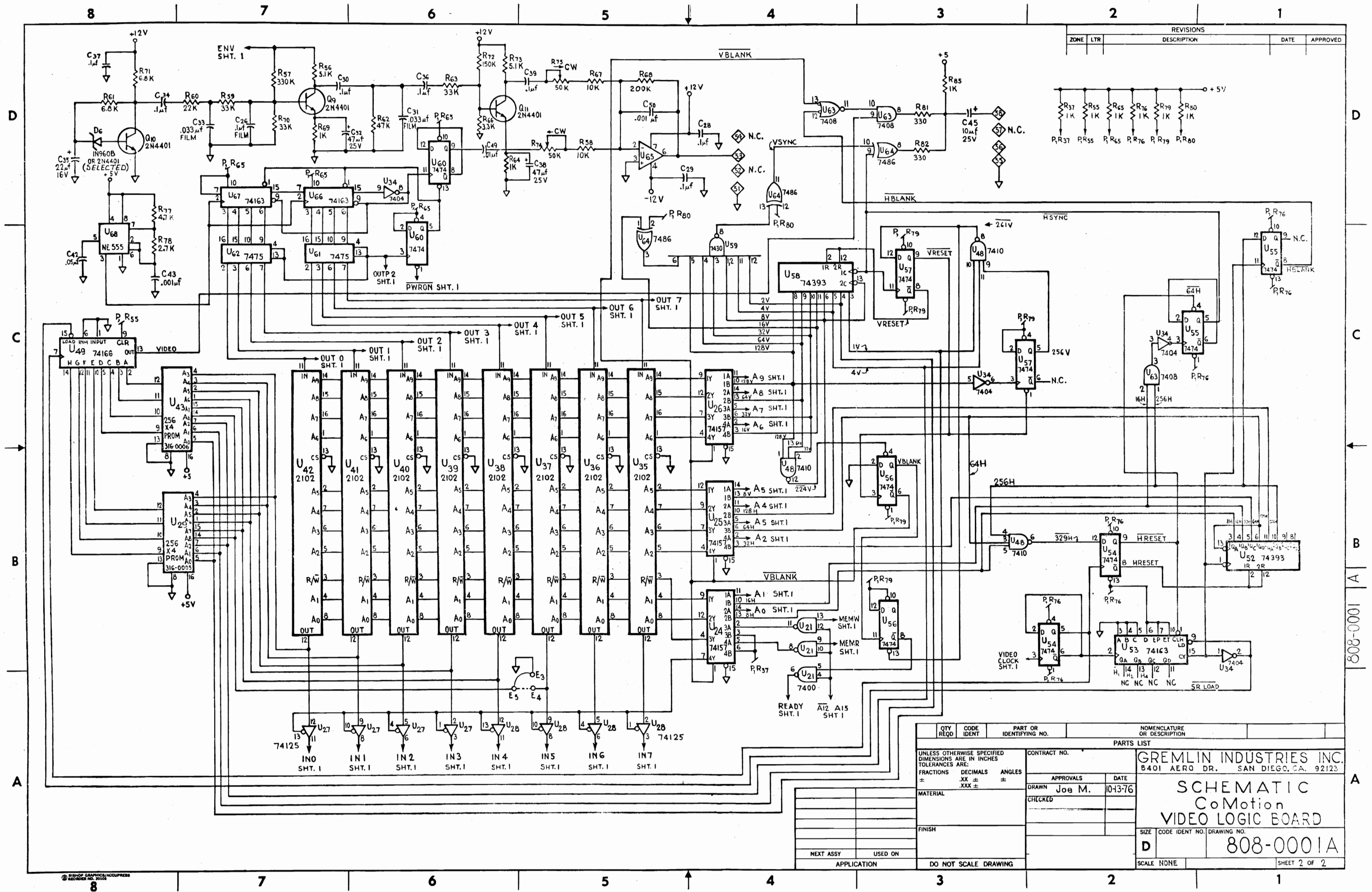
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES FRACTIONS DECIMALS ANGLES		CONTRACT NO.	
±	XX ±	±	±
±	XXX ±	±	±
MATERIAL		FINISH	
NEXT ASSY		USED ON	
APPLICATION		DO NOT SCALE DRAWING	
SCALE NONE		DRAWING NO. 807-0012	
SIZE B		SHEET 1 OF 1	
GREMLIN INDUSTRIES INC. 8401 AERO DR. SAN DIEGO, CA. 92123		SCHEMATIC— POWER INTERRUPT	



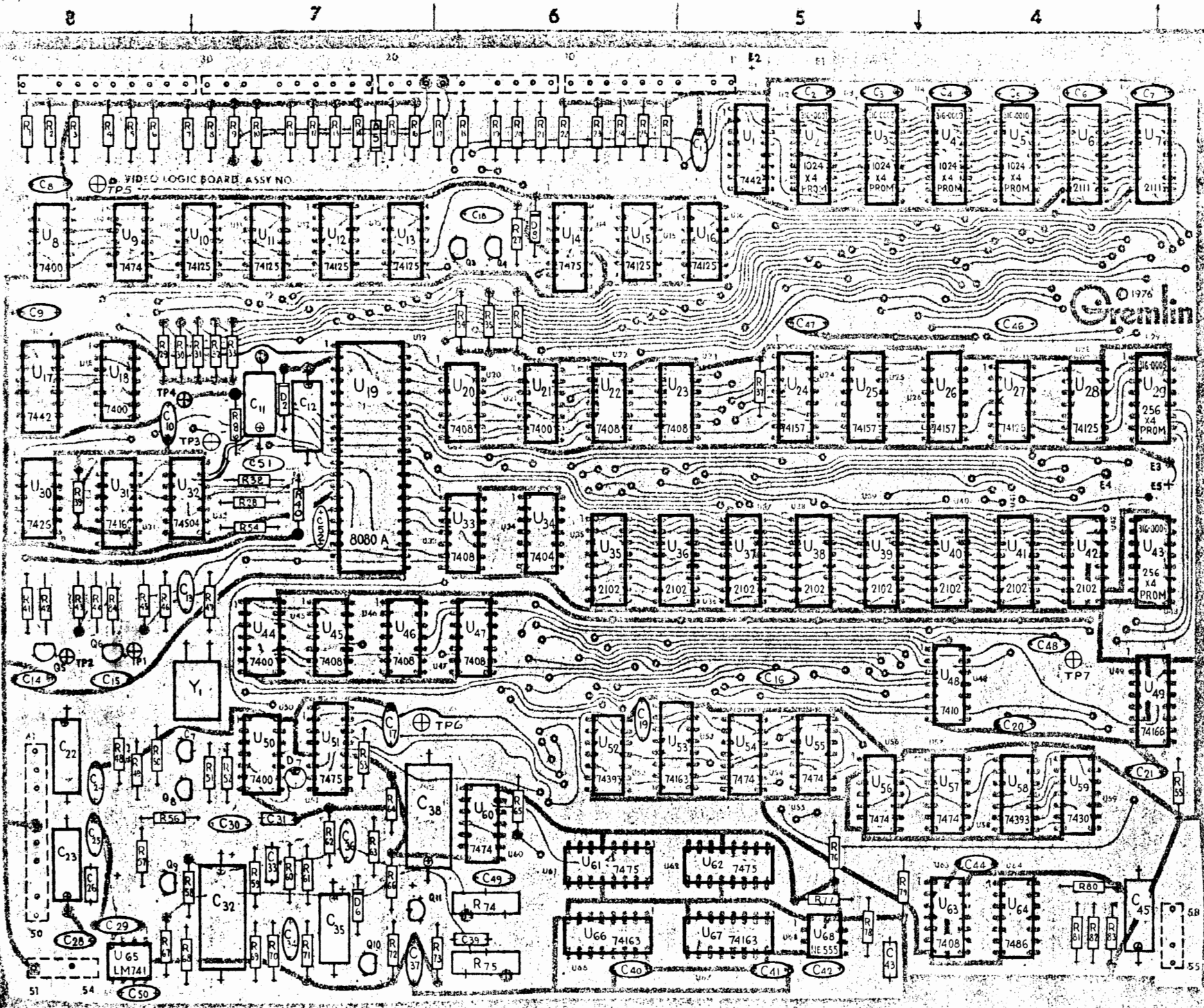
GREMLIN INDUSTRIES INC.
8401 AERO DR. SAN DIEGO, CA. 92123

REVISIONS		TITLE	
		SCHEMATIC	
		BLOCKADE PWR. SUPPLY	
DRAWN Joe M.	CHECKED	SCALE	DRAWING NO.
APPROVED		NONE	807-00026





QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	
PARTS LIST				
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ± .XX ± ± MATERIAL FINISH		CONTRACT NO.	GREMLIN INDUSTRIES INC. 8401 AERO DR. SAN DIEGO, CA. 92123	
		APPROVALS DATE	SCHEMATIC CoMotion VIDEO LOGIC BOARD	
DRAWN Joe M. 10-13-76				
CHECKED				
		SIZE	CODE IDENT NO.	DRAWING NO.
		D		808-0001A
DO NOT SCALE DRAWING		SCALE NONE		SHEET 2 OF 2



			REVISIONS			
			ZONE	LTR	DESCRIPTION	DATE
U43	1	316 - 0006	I.C.		256X4 PROM	
U5	1	316 - 0010	I.C.		1024X4 PROM	
U4	1	316 - 0009	I.C.		1024X4 PROM	
U3	1	314 - 0046	I.C.		74604	
TI-T7	7	211 - 0004	TEST POINT		PINS	
Y1	1	230 - 0006	XTAL		20.790 MHZ CLK	
U2-U5 (REF. ONLY)	4	213 - 0002	SKT.		16 PIN DUAL INLN	
J6-J7	2	212 - 0004	CONN. MALE		4 PIN	
J1-J5	5	212 - 0003	CONN. MALE		10 PIN	
P.C.B. 1	1	170 - 0057A	P.C. BOARD		B/A LOGIC	
Q8	1	482 - 0006	XISTOR		2N 4403	
Q4-Q7-Q9-Q11	7	482 - 0014	XISTOR		2N 4401	
Q3	1	482 - 0010	XISTOR		PE 8050	
D7	1	390 - 0003	L.E.D.		RED	
D6	1	481 - 0003	DIODE		ZENER IN 960B	
D5	1	481 - 0001	DIODE		IN 4002	
D2	1	481 - 0008	DIODE		ZENER IN 5231	
D8	1	481 - 0006	DIODE		IN914 OR IN4148	
C50	1	151 - 0008	CAP. CER.		.001 M 50 V	
C49-C51	2	151 - 0011	CAP. CER.		.01 M 50 V	
C43	1	152 - 0007	CAP. F.		.001 M 250 V	
C32-C38	2	150 - 0012	CAP. E.		.47 M 25 V	
C31-C33	2	152 - 0015	CAP. F.		.033 M 250 V	
C45-C46-C47-C48	8	151 - 0012	CAP. CER.		.1 M 50 V	
C27-C35-C37	3	150 - 0015	CAP. E.		.22 M 16 V	
C26	1	152 - 0001	CAP. F.		.1 M 100 V	
C19	1	151 - 0005	CAP. CER.		680 P 50 V	
C22-C23-C45	4	150 - 0004	CAP. E.		.10 M 25 V	
C25-C40-C42-C44-C46-C48	8	151 - 0001	CAP. CER.		.05 M 50 V	
C1-C10-C11-C13-C14-C15-C16-C17-C18	18	151 - 0001	CAP. CER.		.05 M 50 V	
C52	1	151 - 0001	CAP. CER.		.05 M 50 V	
R74-R75	2	475 - 0008	POT.		50 K OHM CTS	
R39	1	471 - 0222	RES.		22 K OHM 1/2 W 5%	
R78	1	471 - 0272	RES.		27 K OHM 1/2 W 5%	
R62	1	471 - 0473	RES.		47 K OHM 1/2 W 5%	
R72	1	471 - 0154	RES.		150 K OHM 1/2 W 5%	
R77	1	471 - 0472	RES.		47 K OHM 1/2 W 5%	
R69	1	471 - 0224	RES.		220 K OHM 1/2 W 5%	
R61-R71	2	471 - 0682	RES.		6.8 K OHM 1/2 W 5%	
R59-R63-R66-R70	4	471 - 0333	RES.		33 K OHM 1/2 W 5%	
R57	1	471 - 0334	RES.		330 K OHM 1/2 W 5%	
R53	1	471 - 0101	RES.		100 OHM 1/2 W 5%	
R52	1	471 - 0471	RES.		470 OHM 1/2 W 5%	
R49	1	471 - 0150	RES.		15 OHM 1/2 W 5%	
R45-R51-R56-R73	4	471 - 0512	RES.		5.1 K OHM 1/2 W 5%	
R46-R47-R49-R52	4	471 - 0331	RES.		330 OHM 1/2 W 5%	
R43-R45	2	471 - 0220	RES.		22 OHM 1/2 W 5%	
R42-R28-R44-R54-R66	5	471 - 0221	RES.		220 OHM 1/2 W 5%	
R58-R67	2	471 - 0103	RES.		10 K OHM 1/2 W 5%	
R29-R36-R60	9	471 - 0223	RES.		22 K OHM 1/2 W 5%	
R60-R63-R41-R44-R65	5	471 - 0102	RES.		1 K OHM 1/2 W 5%	
R64-R65-R69-R76-R79	5	471 - 0102	RES.		1 K OHM 1/2 W 5%	
R1-R2-R3-R7-R9-R10-R11-R12-R13-R14-R15-R16-R17-R18-R19-R20-R21-R22-R23-R24-R25-R26-R27-R30-R31-R32-R33-R34-R35-R36-R37-R38-R39-R40-R41-R42-R43-R44-R45-R46-R47-R48-R49-R50-R51-R52-R53-R54-R55-R56-R57-R58-R59-R60-R61-R62-R63-R64-R65-R66-R67-R68-R69-R70-R71-R72-R73-R74-R75-R76-R77-R78-R79-R80	32	471 - 0102	RES.		1 K OHM 1/2 W 5%	
U3	1	316 - 0008	I.C.		1024X4 PROM	
U35-U42	8	315 - 0015	I.C.		2102 RAM (500 NS)	
U6-U7	2	315 - 0018	I.C.		2111 RAM (500 NS)	
U28	1	314 - 0001	I.C.		TIMER NE 555	
U65	1	313 - 0004	I.C.		LM 741	
U4	1	314 - 0022	I.C.		7486	
U59	1	314 - 0020	I.C.		7430	
U53-U56-U57	3	314 - 0038	I.C.		74163	
U57-U58	2	314 - 0030	I.C.		74393	
U49	1	314 - 0039	I.C.		74166	
U48	1	314 - 0010	I.C.		7410	
U14-U51-U61-U62	4	314 - 0021	I.C.		7475	
U34	1	314 - 0015	I.C.		7404	
U31	1	314 - 0032	I.C.		74160	
U30	1	314 - 0031	I.C.		7426	
U29	1	316 - 0005	I.C.		256X4 PROM	
U24-U26	3	314 - 0029	I.C.		74157	
U20-U23-U25-U45-U46-U47	8	314 - 0012	I.C.		7408	
U19	1	315 - 0014	I.C.		8080A CPU	
U10-U13-U15-U16-U17-U18	8	314 - 0017	I.C.		74125	
U9-U54-U57-U60	6	314 - 0006	I.C.		7474	
U2-U18-U21-U44-U50	5	314 - 0009	I.C.		7400	
U2	1	316 - 0007	I.C.		1024X4 PROM	
U1-U17	2	314 - 0011	I.C.		7442	
ITEM NO.		QTY	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			
± .XX ± ° ±			DRAWN Joe M. 10-27-76			
MATERIAL			CHECKED			
FINISH			SIZE CODE IDENT NO. DRAWING NO			
DO NOT SCALE DRAWING			D 808-0001A			
			SCALE 2 x SHEET 1 OF 1			

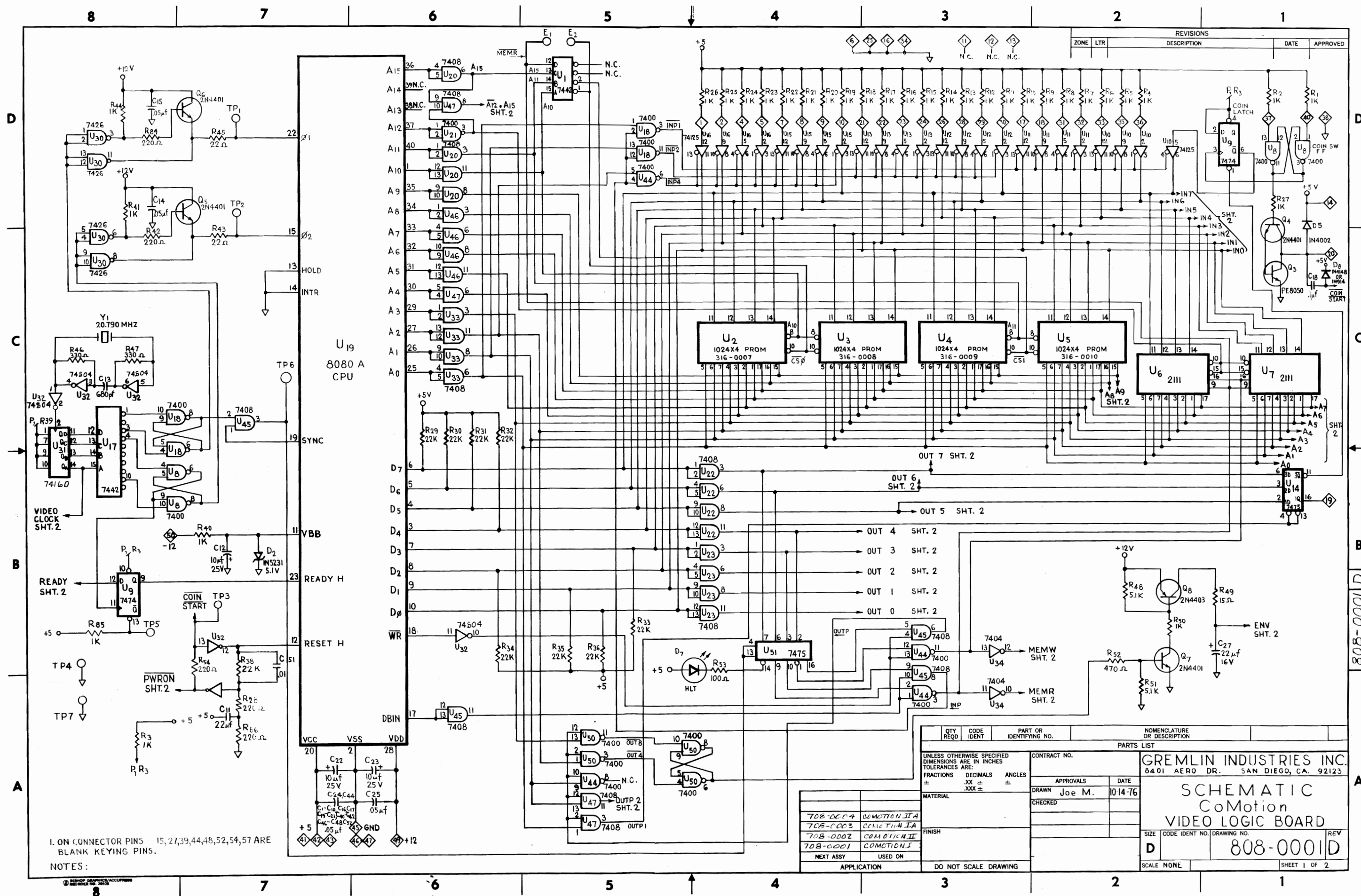
7. ON CONNECTOR PINS 3,15,27,39,44,48,52,54,57 ARE BLANK KEYING PINS
6. OMIT Q₂ D₁ D₃ D₄
5. LAST C NO. USED C 52
4. LAST D NO. USED D 8
3. LAST Q NO. USED Q 11
2. LAST R NO. USED R 86
1. LAST U NO. USED U 68

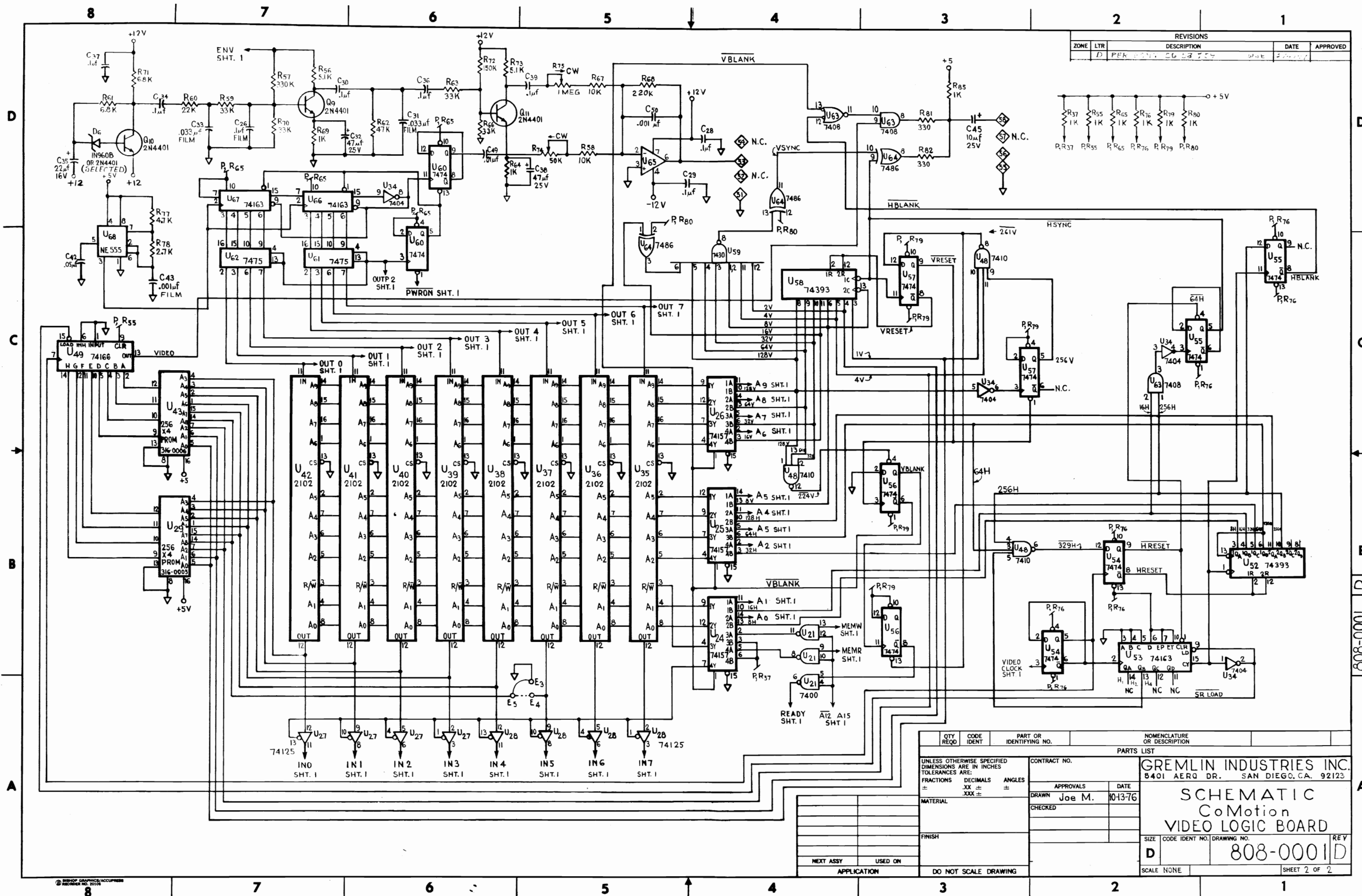
NOTES:

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

VIDEO LOGIC BOARD
CoMotion
PARTS OVERLAY

808-0001A





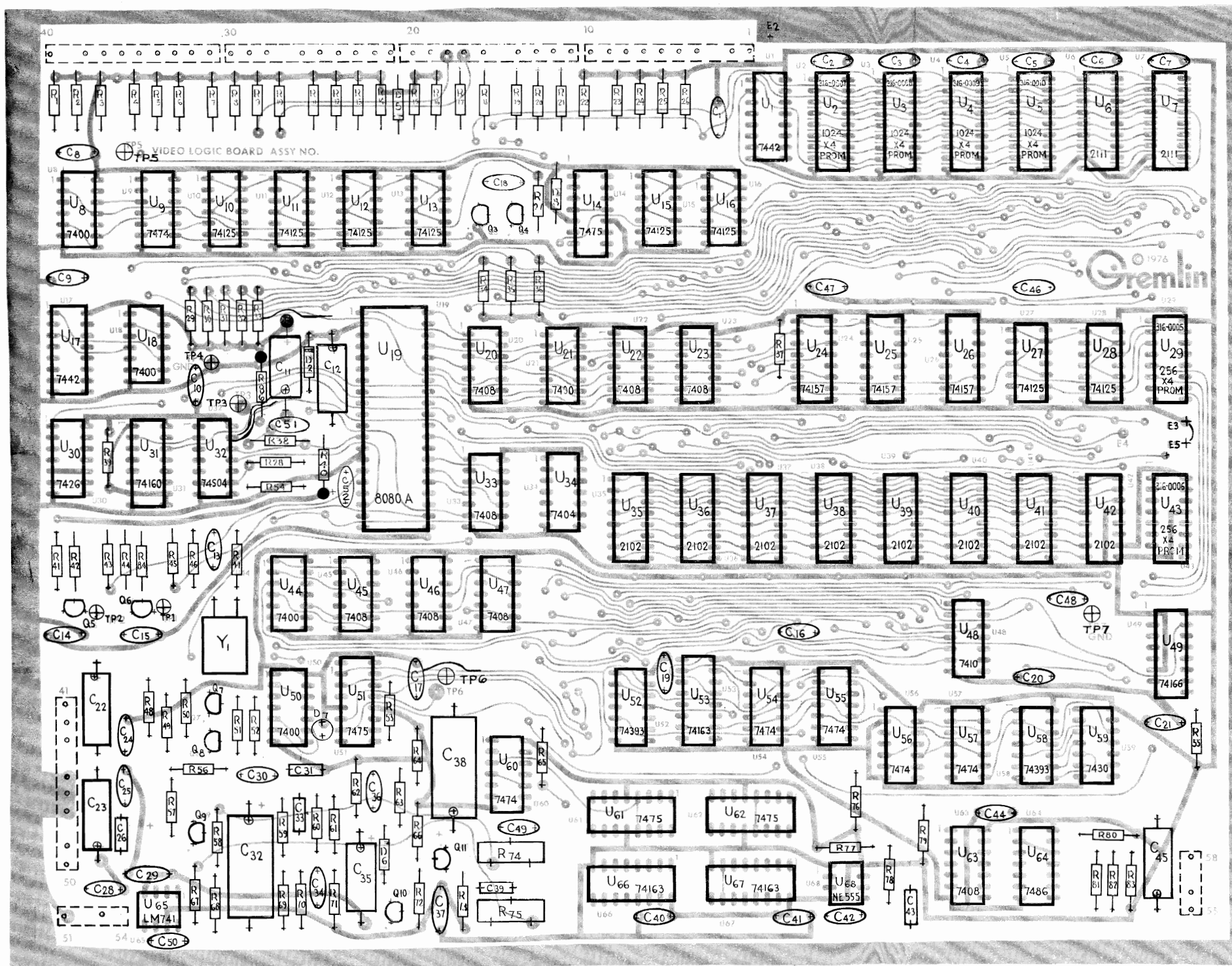
REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
D	PER	808-0001	10/13/76	

QTY REQD		CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
PARTS LIST				
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		CONTRACT NO.		
TOLERANCES ARE:		APPROVALS		
FRACTIONS	DECIMALS	ANGLES	DATE	
±	±	±	10/13/76	
MATERIAL		DRAWN Joe M.		
FINISH		CHECKED		
NEXT ASSY		USED ON		
APPLICATION		DO NOT SCALE DRAWING		
SCALE NONE		SHEET 2 OF 2		

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

SCHEMATIC
CoMotion
VIDEO LOGIC BOARD

808-0001



7. ON CONNECTOR PINS 3,15,27,39,44,48,52,54,57 ARE BLANK KEYING PINS
 6. OMIT Q₁ Q₂ D₁ D₃ D₄
 5. LAST C NO. USED C 52
 4. LAST D NO. USED D 8
 3. LAST Q NO. USED Q 11
 2. LAST R NO. USED R 86
 1. LAST U NO. USED U 68

NOTES:

D PER ECN'S 56 58 E 59 WLB 2/4/77			
U43	1	316 - 0006	I.C. 256X4 PROM
U5	1	316 - 0010	I.C. 1024X4 PROM
U4	1	316 - 0009	I.C. 1024X4 PROM
U32	1	214 - 0046	I.C. 74504
T1-T7	7	211 - 0004	TEST POINT PINS
Y1	1	230 - 0006	XTAL 20.790 MHZ CLK
U2-U5 (REF. ONLY)	4	213 - 0002	SKT. 18 PIN DUAL INLN
J6-J7	2	212 - 0004	CONN. MALE 4 PIN
J1-J5	5	212 - 0003	CONN. MALE 10 PIN
P.C.B. 1	1	170 - 0057B	P.C. BOARD B/A LOGIC
Q8	1	482 - 0006	XISTOR 2N 4403
Q4-Q7-Q9-Q11	7	482 - 0014	XISTOR 2N 4401
Q3	1	482 - 0010	XISTOR PE 8050
D7	1	390 - 0003	L.E.D. RED
D6	1	481 - 0003	DIODE ZENER IN 960 B
D5	1	481 - 0001	DIODE IN 4002
D2	1	481 - 0008	DIODE ZENER IN 5231
D8	1	481 - 0006	DIODE IN914 OR IN 4148
C52	1	151 - 0001	CAP. CER. .05 M 50 V
C50	1	151 - 0008	CAP. CER. .001 M 50 V
C49C51	2	151 - 0011	CAP. CER. .01 M 50 V
C43	1	152 - 0007	CAP. F. .001 M 250 V
C32C38	2	150 - 0012	CAP. E. 47 M 25 V
C31C33	2	152 - 0015	CAP. F. .033 M 250 V
C28-C30C34C36C37C39C48	8	151 - 0012	CAP. CER. .1 M 50 V
C27C35C41	3	150 - 0015	CAP. E. 22 M 16 V
C26	1	152 - 0001	CAP. F. .1 M 100 V
C13	1	151 - 0005	CAP. CER. 680 P 50 V
C12C22C23C45	4	150 - 0004	CAP. E. 10 M 25 V
C25C40-C42C44C46C48	8	151 - 0001	CAP. CER. .05 M 50 V
C1-C10C14-C16C17C21C24	18	151 - 0001	CAP. CER. .05 M 50 V
R75	1	475 - 0002	POT. TIMEG OHM CTS
R74	1	475 - 0008	POT. 50 K OHM CTS
R38	1	471 - 0222	RES. 22 K OHM 1/2 W 5%
R78	1	471 - 0272	RES. 27 K OHM 1/2 W 5%
R62	1	471 - 0473	RES. 47 K OHM 1/2 W 5%
R72	1	471 - 0154	RES. 150 K OHM 1/2 W 5%
R77	1	471 - 0472	RES. 47 K OHM 1/2 W 5%
R68	1	471 - 0224	RES. 220 K OHM 1/2 W 5%
R61R71	2	471 - 0682	RES. 6.8 K OHM 1/2 W 5%
R59R63R66R70	4	471 - 0333	RES. 33 K OHM 1/2 W 5%
R57	1	471 - 0334	RES. 330 K OHM 1/2 W 5%
R53	1	471 - 0101	RES. 100 OHM 1/2 W 5%
R52	1	471 - 0471	RES. 470 OHM 1/2 W 5%
R49	1	471 - 0150	RES. 15 OHM 1/2 W 5%
R48R51R56R73	4	471 - 0512	RES. 51 K OHM 1/2 W 5%
R46R47R81R82	4	471 - 0331	RES. 330 OHM 1/2 W 5%
R43R45	2	471 - 0220	RES. 22 OHM 1/2 W 5%
R42R28R84R84R86	5	471 - 0221	RES. 220 OHM 1/2 W 5%
R58R67	2	471 - 0103	RES. 10 K OHM 1/2 W 5%
R29-R36R60	9	471 - 0223	RES. 22 K OHM 1/2 W 5%
R80R83R41R44R85	5	471 - 0102	RES. 1 K OHM 1/2 W 5%
R64R65R69R76R79	5	471 - 0102	RES. 1 K OHM 1/2 W 5%
R1-R27R37R39R40R50R55	32	471 - 0102	RES. 1 K OHM 1/2 W 5%
U3	1	316 - 0008	I.C. 1024X4 PROM
U35-U42	8	315 - 0015	I.C. 2102 RAM (500 NS)
U6U7	2	315 - 0018	I.C. 2111 RAM (500 NS)
U68	1	314 - 0001	I.C. TIMER NE 555
U65	1	313 - 0004	I.C. LM 741
U64	1	314 - 0022	I.C. 7486
U59	1	314 - 0020	I.C. 7430
U53U66U67	3	314 - 0038	I.C. 74163
U57U58	2	314 - 0030	I.C. 74393
U49	1	314 - 0039	I.C. 74166
U48	1	314 - 0010	I.C. 7410
U14U51U61U62	4	314 - 0021	I.C. 7475
U34	1	314 - 0015	I.C. 7404
U31	1	314 - 0032	I.C. 74160
U30	1	314 - 0031	I.C. 7426
U29	1	316 - 0005	I.C. 256X4 PROM
U24-U26	3	314 - 0029	I.C. 74157
U20U22U23U33U45U47U63	8	314 - 0012	I.C. 7408
U19	1	315 - 0014	I.C. 8080A CPU
U10U13U15U16U27U28	8	314 - 0017	I.C. 74125
U9U54-U57U60	6	314 - 0006	I.C. 7474
U6U16U21U44U50	5	314 - 0009	I.C. 7400
U2	1	316 - 0007	I.C. 1024X4 PROM
U1U17	2	314 - 0011	I.C. 7442
ITEM NO.	QTY		

Joe M.

1027-76

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

VIDEO LOGIC BOARD
 CoMotion
 PARTS OVERLAY

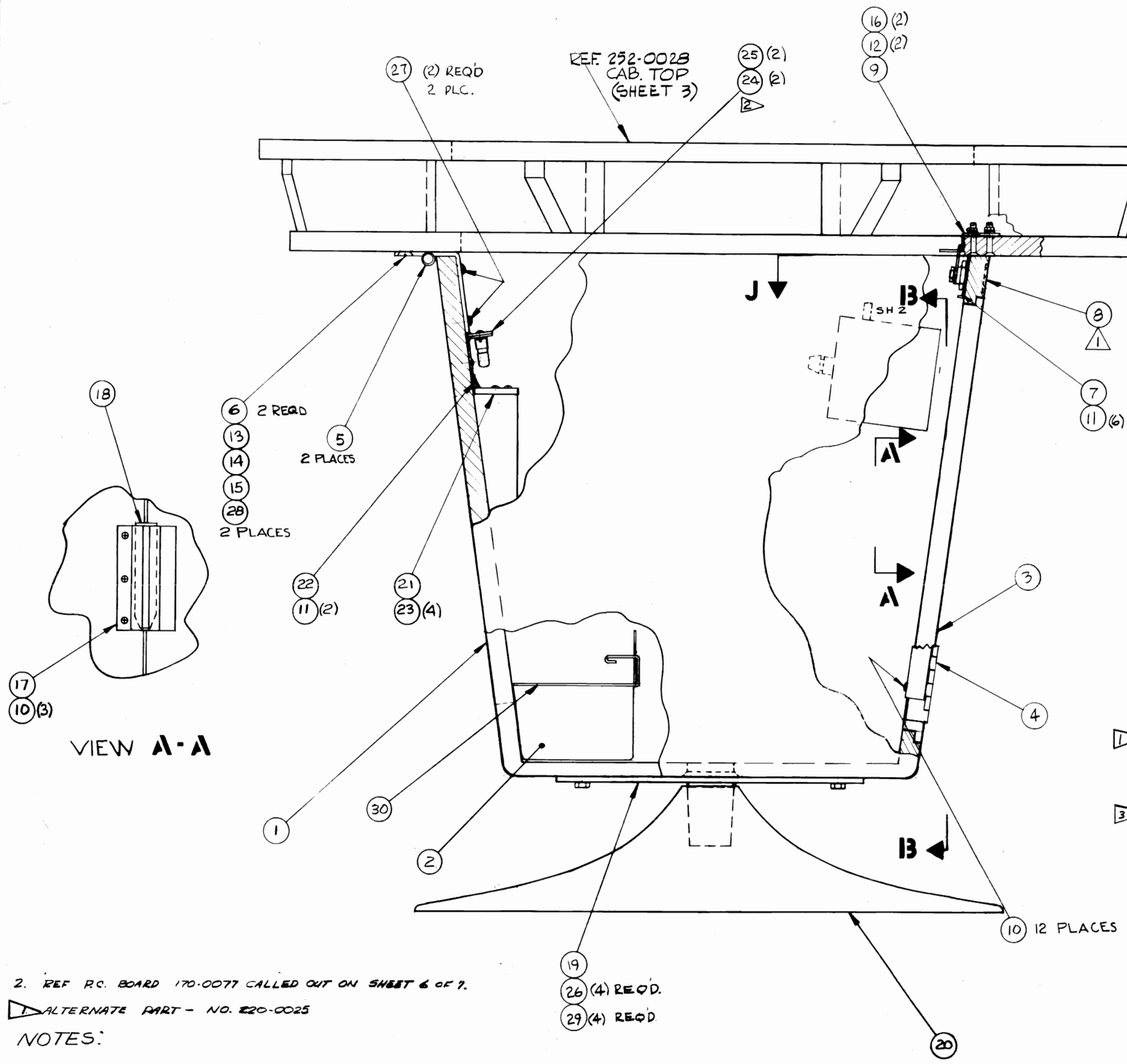
808-0001

REV D

2 x

808-0001 D

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
IR			5-2-77	W. Olson



J SH 4 (PARTS LIST CONT'D ON SH 2)

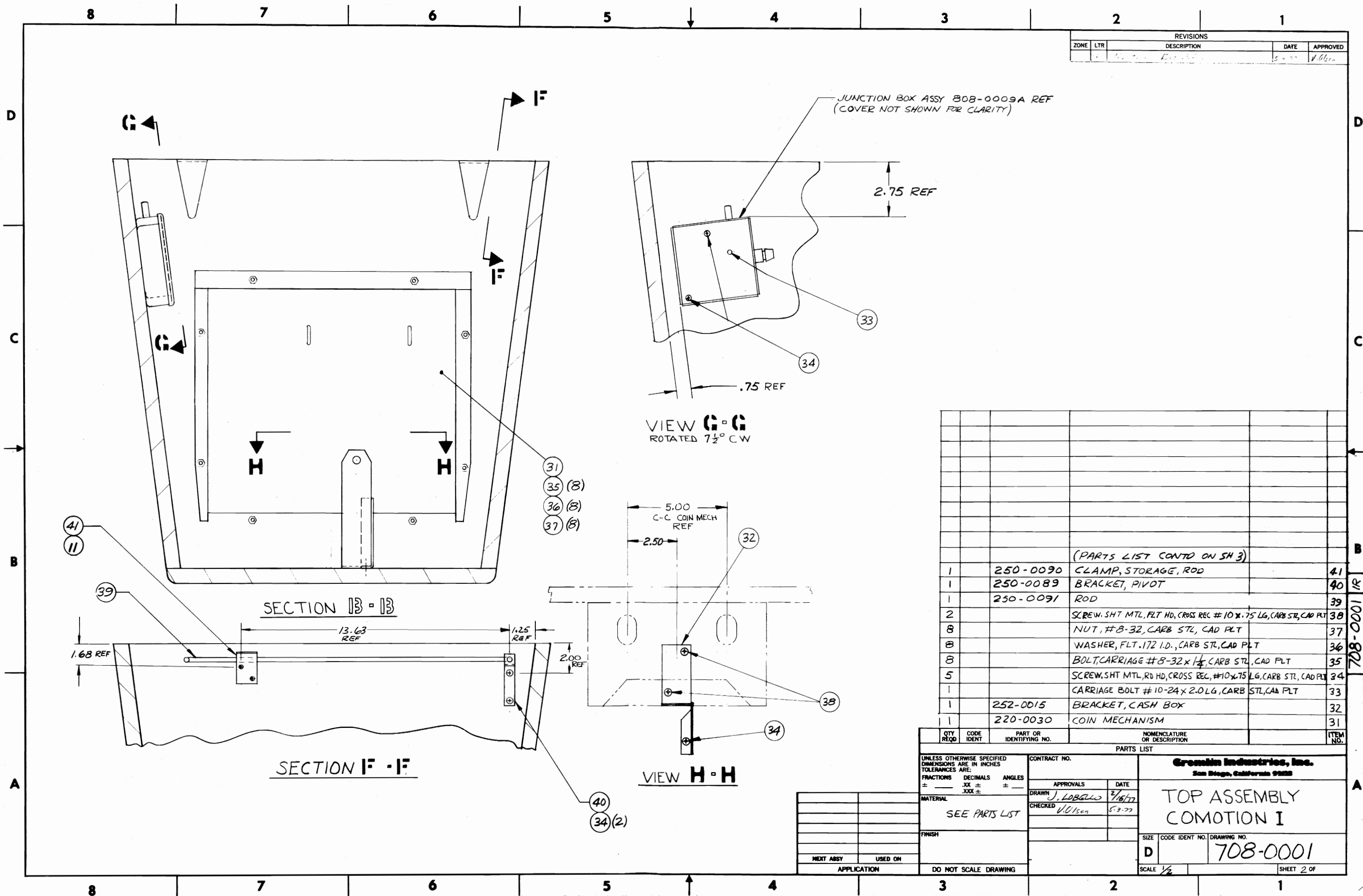
QTY REQ'D	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	
1		220-0016	COVER, CASH BOX	30
4			TEE NUT, 1/4-20	29
2			WASHER, LOCK .28 I.D.	28
4			SCREW, SH MET, CR REC RD HD #10x.75 LG	CAD PLT 27
4			BOLT, HEX 1/4-20 x 1.0 LG	CAD PLT 26
2			NUT, #6-32	25
2			SCREW, MACH, CRS RECES RD HD #6-32x.50 LG	CAD PLAT 24
4			SCREW, SH MET, CRS RECES RD HD #8x.75 LG	CAD PLT 23
1		250-0063	LIGHT BRACKET	22
1		253-0019	LIGHT WINDOW	21
1		140-0008	PEDESTAL	20
1		250-0039	PEDESTAL ADAPTER	19
1		250-0049	RETAINER CLIP	18
1		250-0050	RETAINER, DOOR LATCH	17
2			NUT, 10-24, CAD PLT	16
2			NUT, 1/4-20, CAD PLT	15
2			WASHER, FLT, .28 I.D.	CAD PLT 14
2			SCREW, MACH, FLT HD CR REC 1/4-20x1.25	CAD PLT 13
2			SCREW, MACH FLT HD CR REC, #10x1.13 LG	CAD. PLT. 12
11			SCREW, SH MET, RD HD CR REC, #8x.50 LG	CAD PLT. 11
15			SCREW, SH MET, RD HD CR REC #6x.63 LG	CAD PLT. 10
1		250-0047	LOCK CATCH PLATE	9
1		220-0023	LOCK ASSY.	8
1		250-0046	REINFORCING PLATE	7
4			SCREW, SH MET, FLT HD CR REC, #10x.75, CAD PLT	6
2		250-0033	HINGE	5
1		280-0034	HINGE ASSY.	4
1		252-0037	ACCESS DOOR ASSY.	3
1		220-0013	CASH BOX	2
1		252-0021-1	BASE ASSY.	1

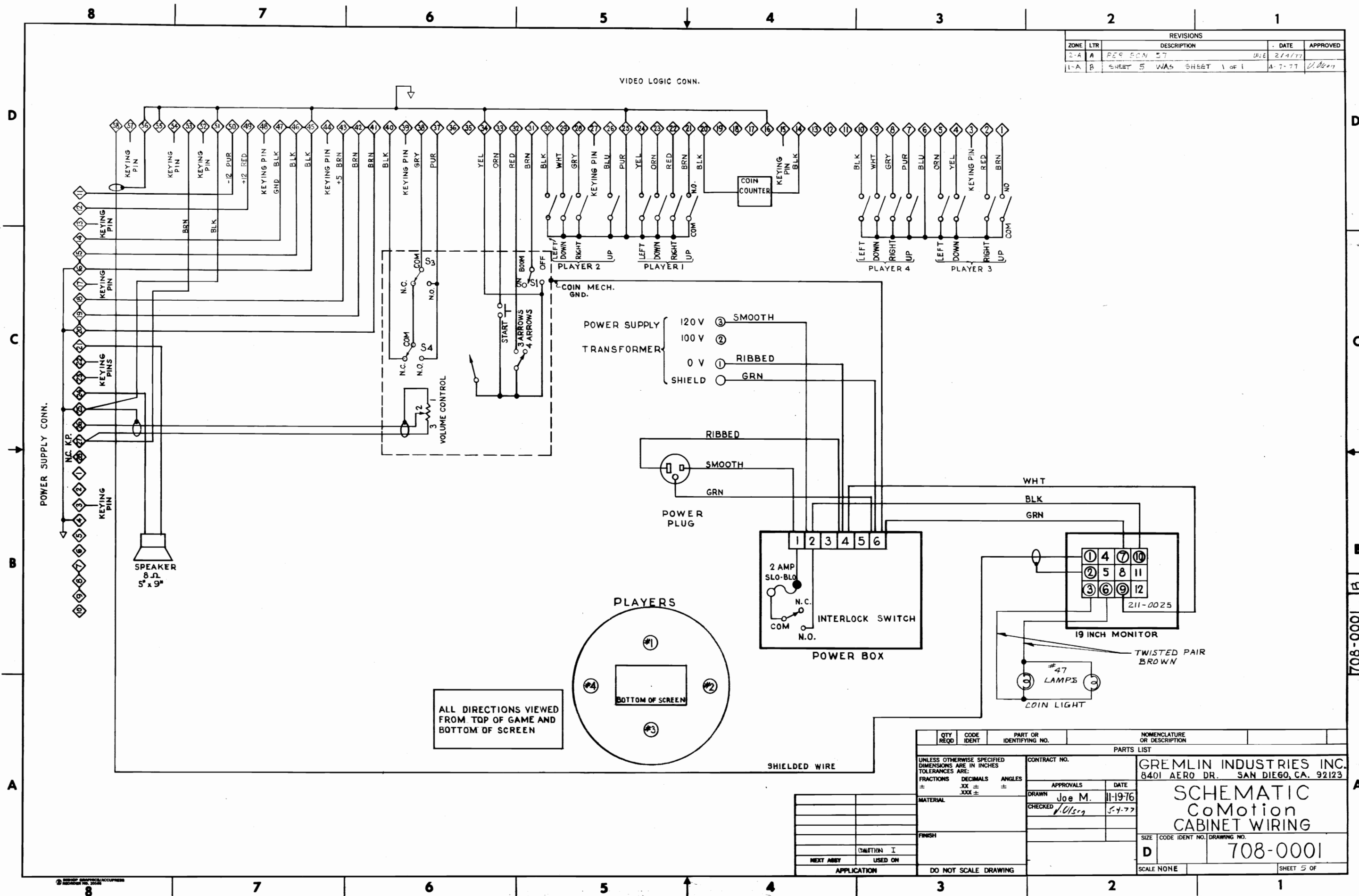
2. REF RC. BOARD 170-0077 CALLED OUT ON SHEET 6 OF 7.

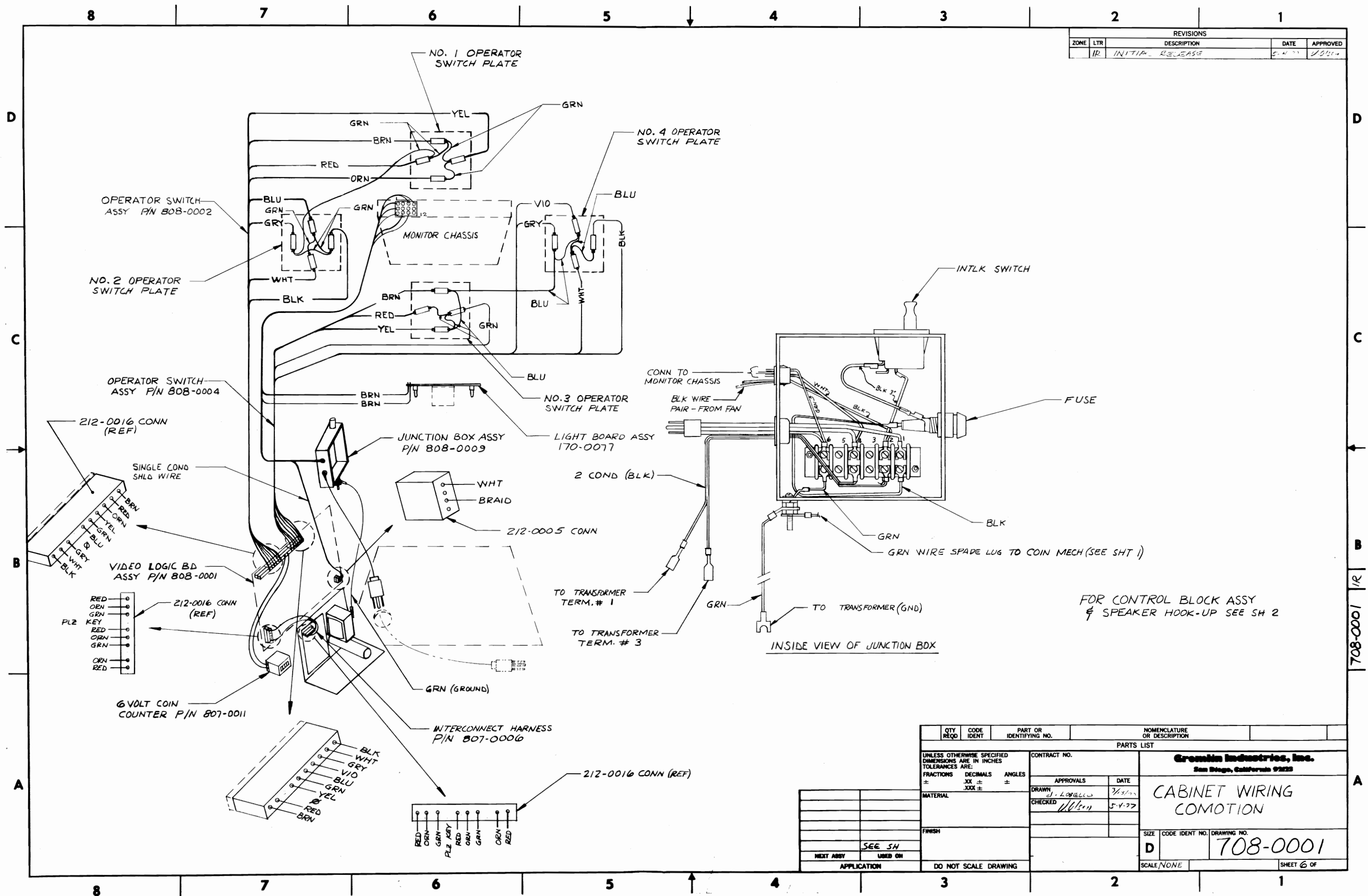
1. ALTERNATE PART - NO. 220-0025

NOTES:

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:		CONTRACT NO.		Gremlin Industries, Inc. San Diego, California 92128	
FRACTIONS	DECIMALS	ANGLES	APPROVALS	DATE	
±	.XX ±	±	DRAWN J. LOBELLO	12/2/76	
	.XXX ±		CHECKED W. Olson	5-3-77	
MATERIAL		FINISH		SIZE CODE IDENT NO. DRAWING NO.	
				D 708-0001	
DO NOT SCALE DRAWING		SCALE 1/2		SHEET 1 OF 7	



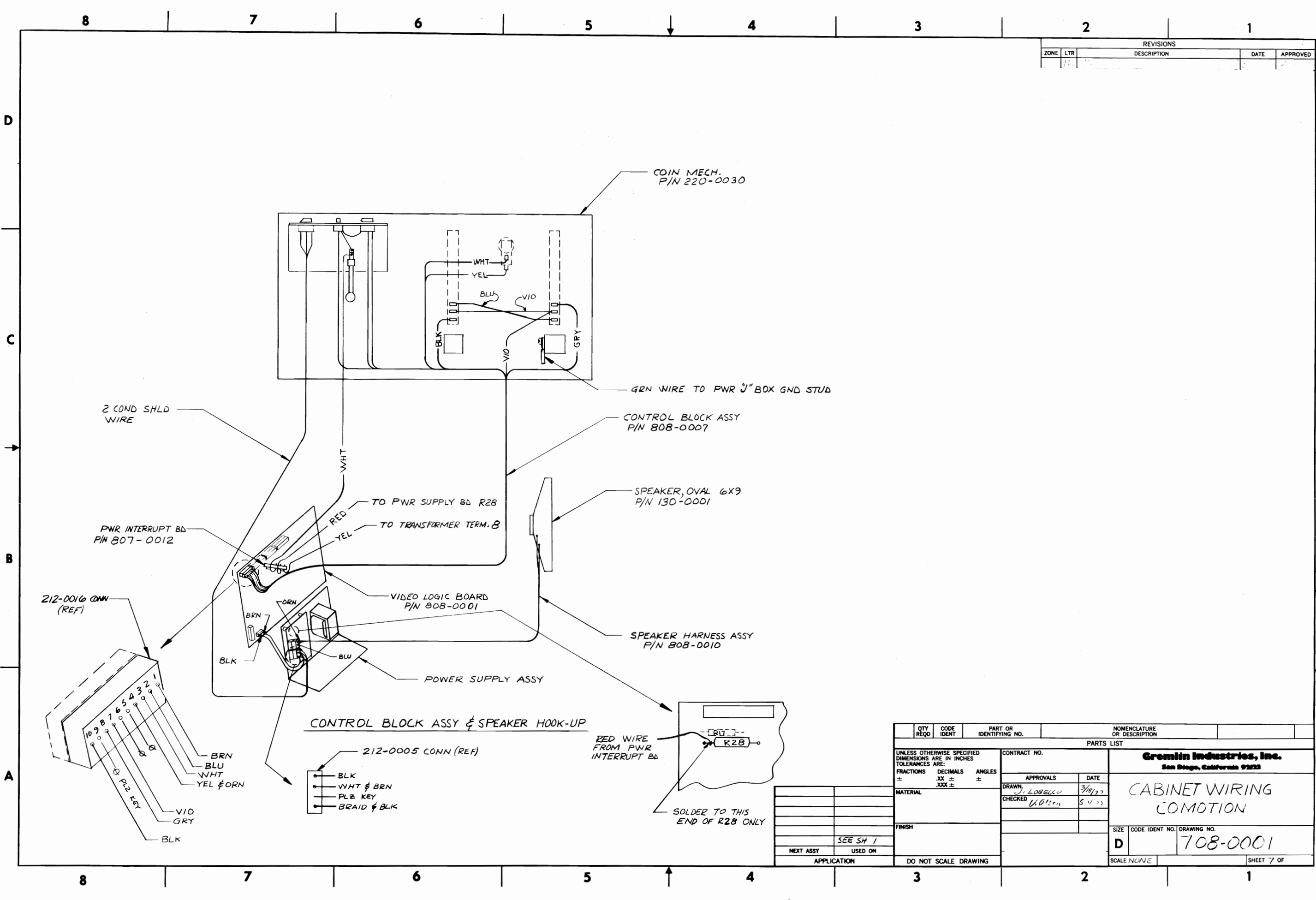




REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
1				

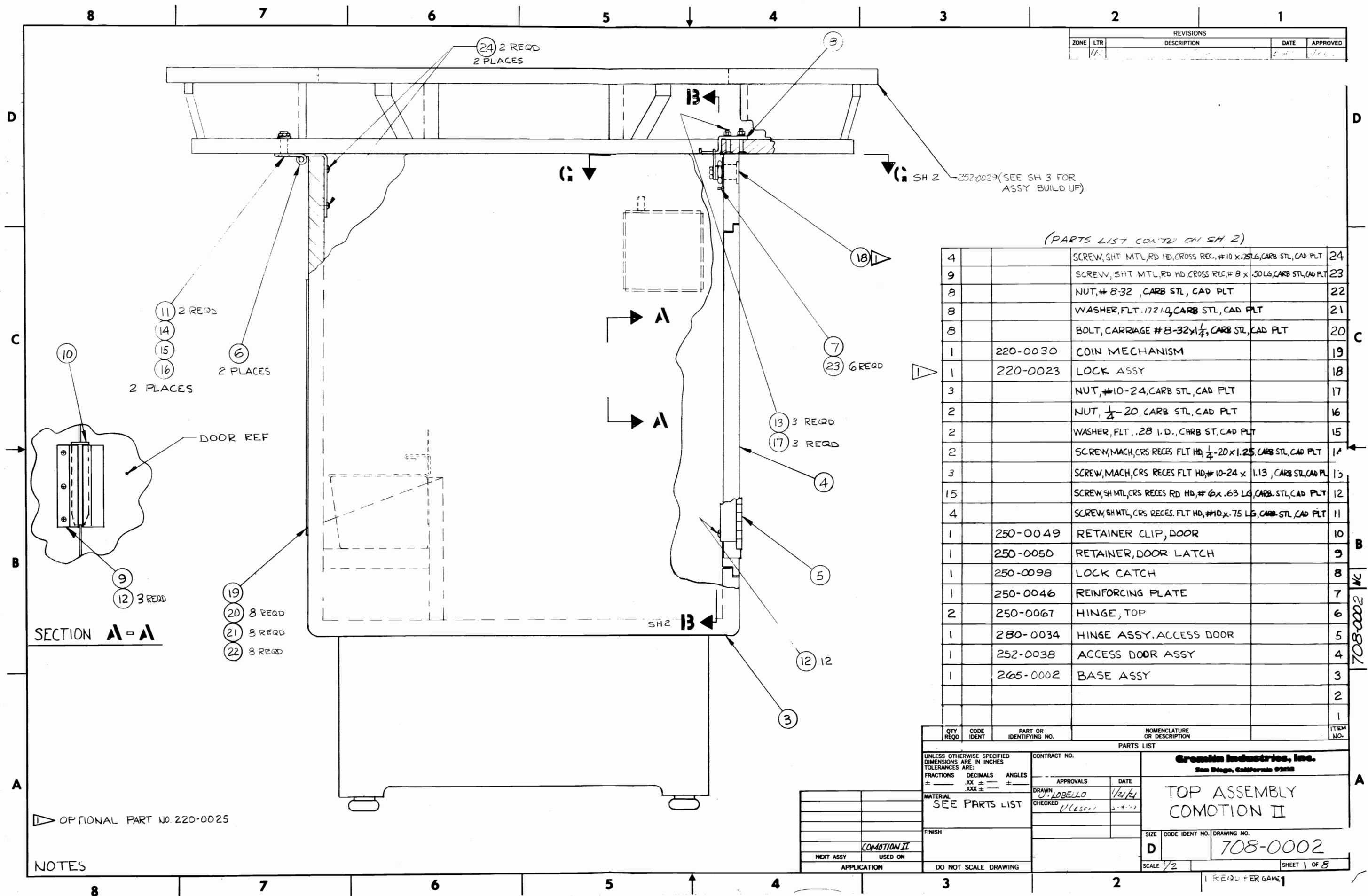
D
C
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D
C
B
A



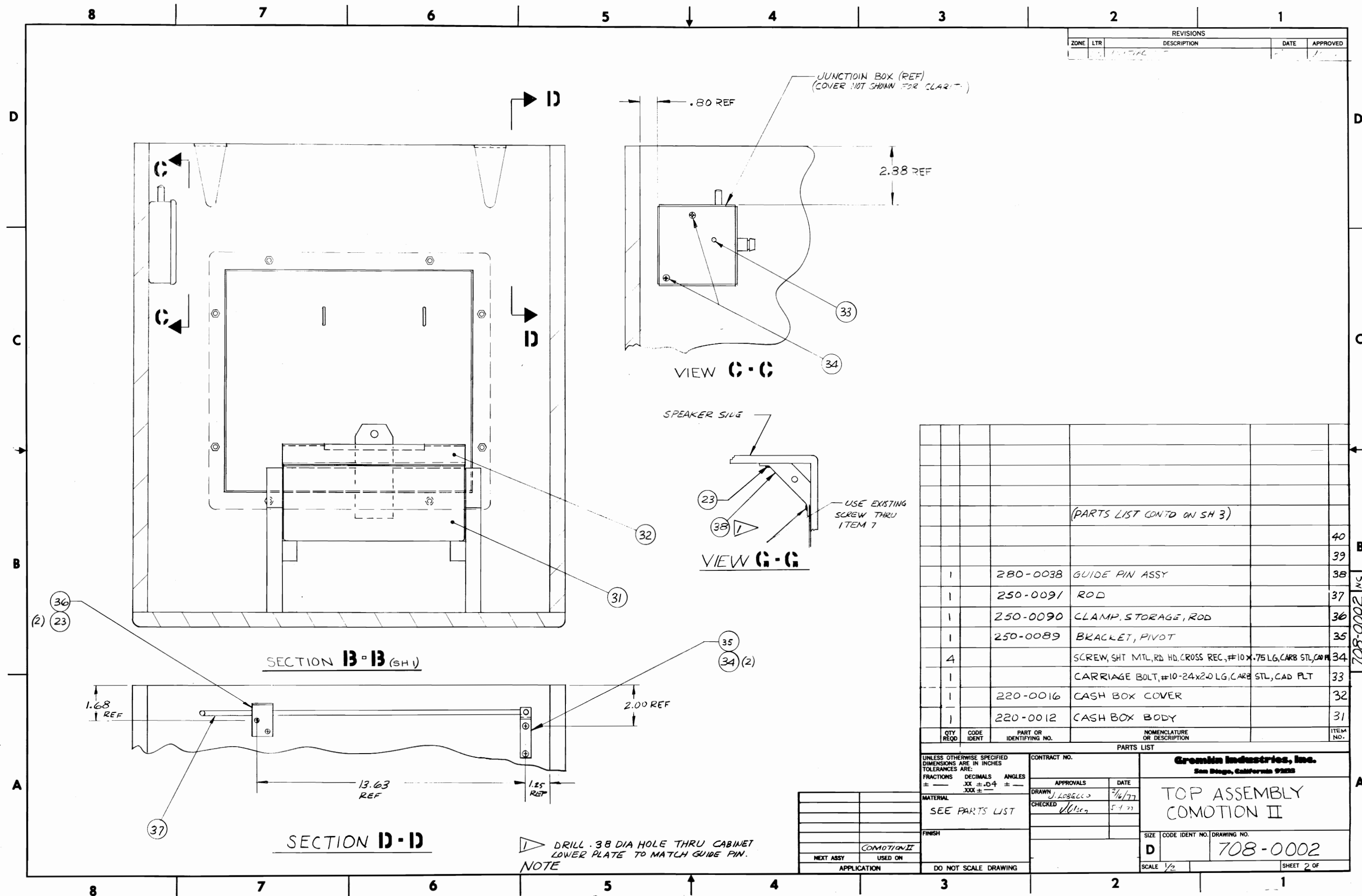
QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
PARTS LIST			
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:		CONTRACT NO.	
FRACTIONS ±	DECIMALS .XX ±	ANGLES ±	
MATERIAL		APPROVALS	DATE
FINISH		DRAWN J. LOBELLO	3/18/77
NEXT ASSY		CHECKED V. LOBELLO	5/4/77
APPLICATION		Gremlin Industries, Inc. San Diego, California 92123	
DO NOT SCALE DRAWING		CABINET WIRING COMOTION	
		SIZE D	CODE IDENT NO. 708-0001
		DRAWING NO. 708-0001	
		SCALE NONE	
		SHEET 7 OF	

708-0001 1/R



4			SCREW, SHT MTL, RD HD, CROSS REC, #10 x .25 LG, CARB STL, CAD PLT	24
9			SCREW, SHT MTL, RD HD, CROSS REC, #8 x .50 LG, CARB STL, CAD PLT	23
8			NUT, #8-32, CARB STL, CAD PLT	22
8			WASHER, FLT. .172 LG, CARB STL, CAD PLT	21
8			BOLT, CARRIAGE #8-32 x 1 1/4, CARB STL, CAD PLT	20
1	220-0030		COIN MECHANISM	19
1	220-0023		LOCK ASSY	18
3			NUT, #10-24, CARB STL, CAD PLT	17
2			NUT, 1/4-20, CARB STL, CAD PLT	16
2			WASHER, FLT. .28 I.D., CARB ST, CAD PLT	15
2			SCREW, MACH, CRS RECES FLT HD, 1/4-20 x 1.25, CARB STL, CAD PLT	14
3			SCREW, MACH, CRS RECES FLT HD, #10-24 x 1.13, CARB STL, CAD PLT	13
15			SCREW, SH MTL, CRS RECES RD HD, #6 x .63 LG, CARB STL, CAD PLT	12
4			SCREW, SH MTL, CRS RECES. FLT HD, #10 x .75 LG, CARB STL, CAD PLT	11
1	250-0049		RETAINER CLIP, DOOR	10
1	250-0050		RETAINER, DOOR LATCH	9
1	250-0098		LOCK CATCH	8
1	250-0046		REINFORCING PLATE	7
2	250-0067		HINGE, TOP	6
1	280-0034		HINGE ASSY, ACCESS DOOR	5
1	252-0038		ACCESS DOOR ASSY	4
1	265-0002		BASE ASSY	3
				2
				1
QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	ITEM NO

QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION		ITEM NO.
PARTS LIST					
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:			Gremkin Industries, Inc. San Diego, California 92123		
FRACTIONS DECIMALS ANGLES			TOP ASSEMBLY COMOTION II		
± .XX ± ±					
.XXX ± ±					
MATERIAL					
SEE PARTS LIST					
FINISH			SIZE CODE IDENT NO. DRAWING NO. D 708-0002		
DO NOT SCALE DRAWING			SCALE 1/2 SHEET 1 of 8		

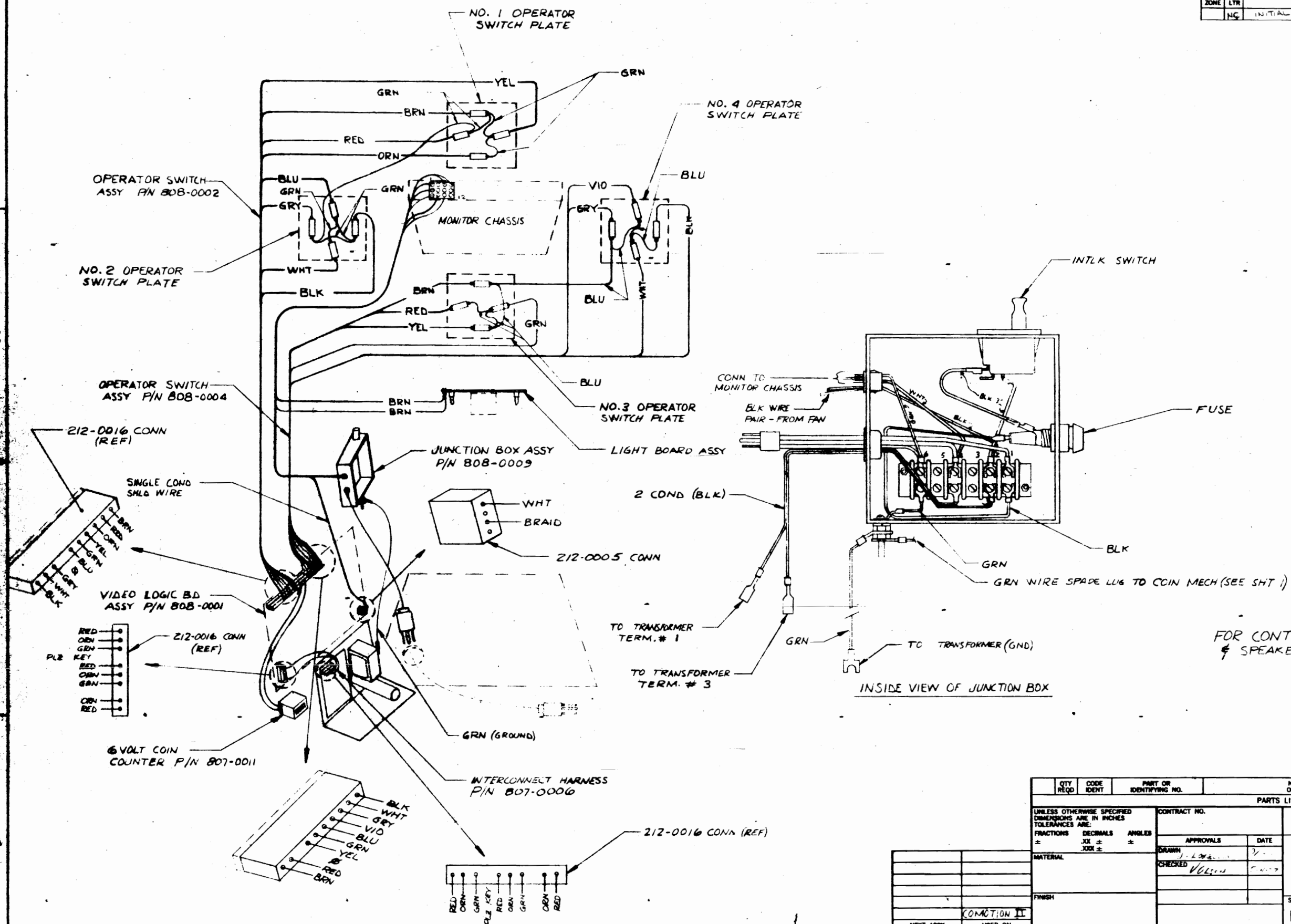


REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
NG		INITIAL RELEASE	4-7-77	JJ GLENN

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Received by _____
Date 4/8/77



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	
±	±	±	
±	±	±	
MATERIAL		APPROVALS	
FINISH		DATE	
NEXT ASSY		CHECKED	
APPLICATION		DO NOT SCALE DRAWING	
USED ON		SCALE/NONE	
		SHEET 6 OF	

Gremm Industries, Inc.
San Diego, California 92108

CABINET WIRING CONNECTION II

SIZE: D CODE IDENT NO. 708-0002

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	NC	INITIAL RELEASE	4-7-77	W. J. S. 7

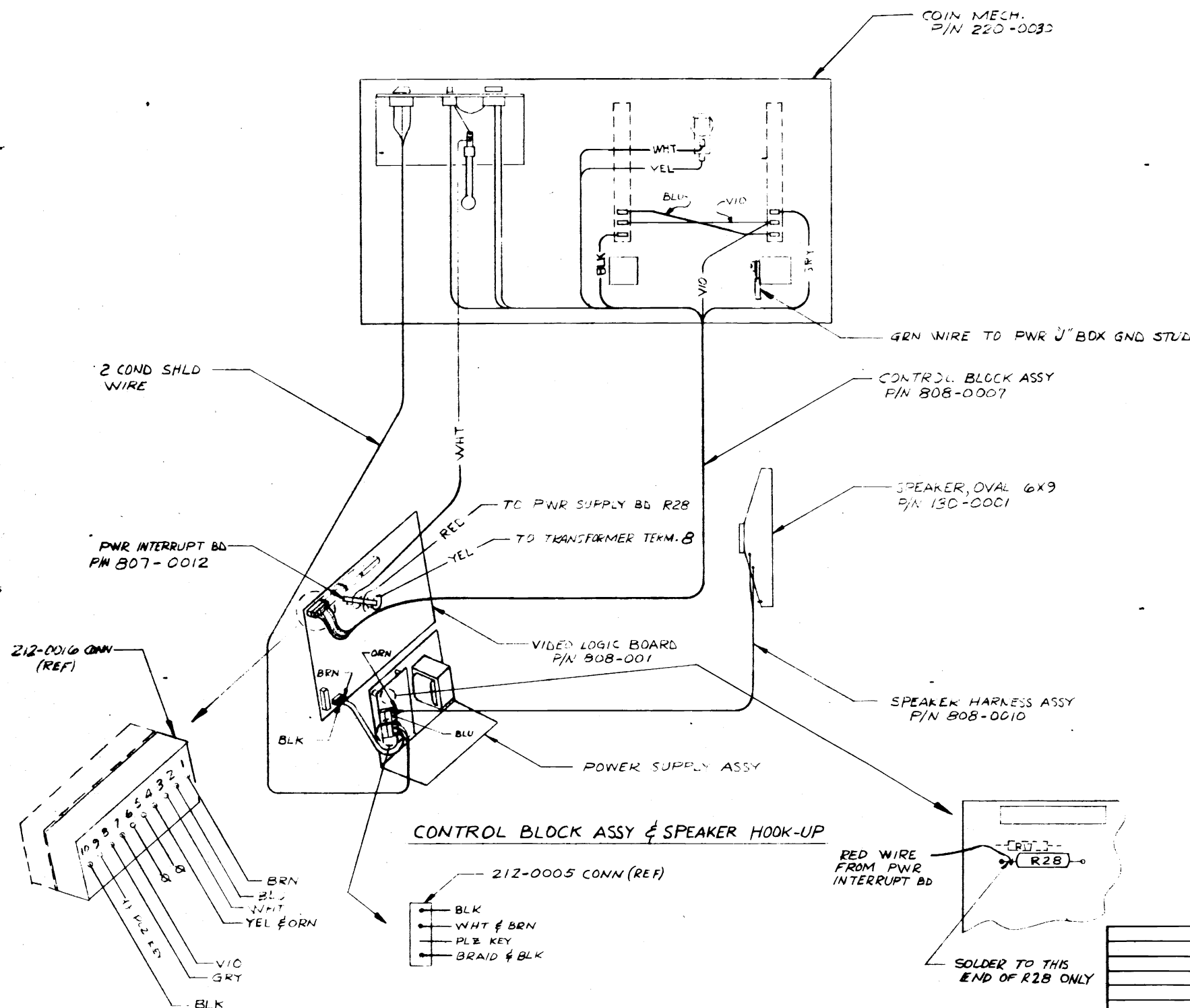
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Date 4/2/77



QTY REQD		CODE IDENT		PART OR IDENTIFYING NO.		NOMENCLATURE OR DESCRIPTION			
						PARTS LIST			
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ± .XX ± ± .XXX ±				CONTRACT NO.		Gramin Industries, Inc. San Diego, California 92123			
MATERIAL				APPROVALS		DATE		CABINET WIRING COMOTION II	
				DRAWN		5-4-77			
CHECKED		5-4-77							
FINISH						SIZE		CODE IDENT NO.	
DO NOT SCALE DRAWING						D		DRAWING NO.	
								708-0002	
				SCALE				SHEET 7 OF	

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
NO	INITIAL	RELEASE	4-7-77	VOLCAN

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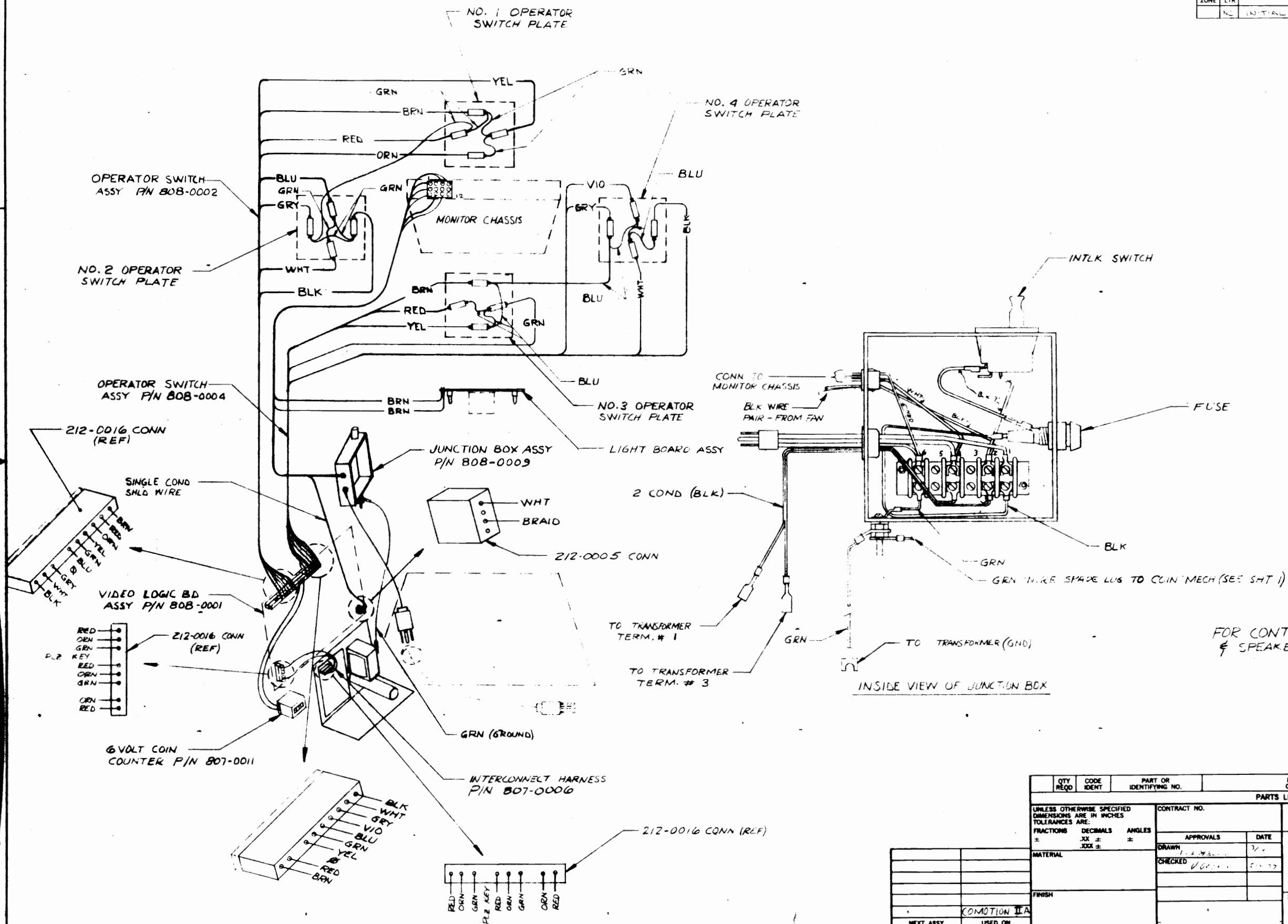
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Date: 4/7/77

D

C



FOR CONTROL BLOCK ASSY
& SPEAKER HOOK-UP SEE SH 2

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	
± .001 ± .001 ± .001				DRAWN DATE	
MATERIAL				CHECKED DATE	
FINISH					
NEXT ASSY USED ON				SIZE CODE IDENT NO. DRAWING NO.	
APPLICATION				D 708-0004	
DO NOT SCALE DRAWING				SCALE NONE SHEET 6 OF 6	

8

7

6

5

4

3

2

1

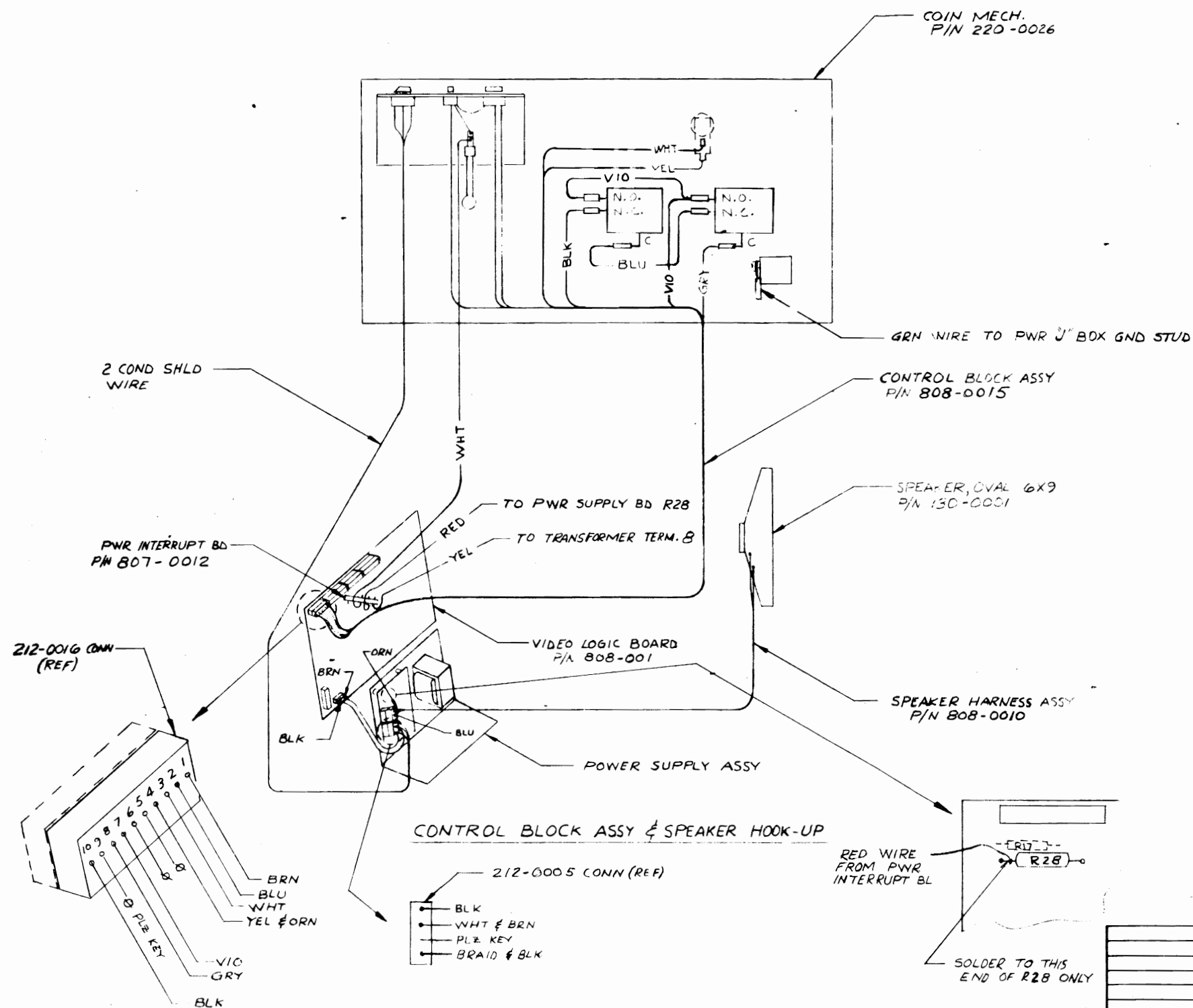
REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	NC	INITIAL RELEASE	4-7-77	JOSEY

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Received by _____

Date: 4-7-77



QTY REQD		CODE IDENT		PART OR IDENTIFYING NO.		NOMENCLATURE OR DESCRIPTION		
PARTS LIST								
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ± .XX ± ± MATERIAL FINISH			CONTRACT NO.		Gremlin Industries, Inc. San Diego, California 92123 CABINET WIRING COMOTION II A			
			APPROVALS		DATE			
			DRAWN <i>W. J. ...</i>		<i>4/4/77</i>			
			CHECKED <i>W. J. ...</i>		<i>4/4/77</i>			