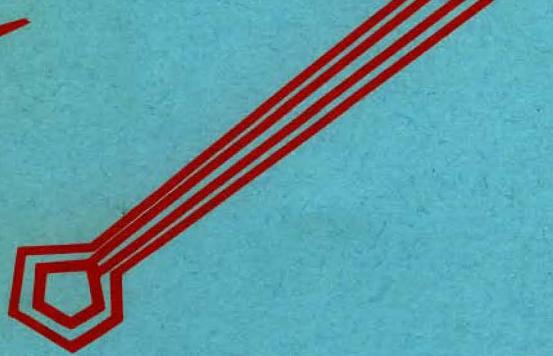
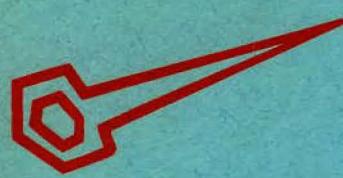


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MANUFACTURED BY

Gremlin®
Industries, Inc.



OWNER'S MANUAL

**BLASTO
OPERATING INSTRUCTIONS
AND
SERVICE MANUAL**

**GREMLIN INDUSTRIES, INC.
8401 Aero Drive
San Diego, CA. 92123**

BLASTO

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SCHEMATICS

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:

- | | |
|----------------|--|
| NEVER | replace any components with anything other than exact replacement parts. (See Parts List located on Service Schematics.) |
| NEVER | remove circuit boards/connections while power is on. |
| DO NOT | replace the fuse with anything other than the proper value. A blown fuse indicates an overload condition within the game. Replacing the fuse with a higher value can cause severe damage to internal components if an overload occurs. |
| ALWAYS | consult the manual before attempting repairs. |
| CORRESPONDENCE | regarding this game should be addressed to: |

GREMLIN INDUSTRIES, INC.
8401 Aero Drive
San Diego, California 92123
(714) 277-8700

IMPORTANT NOTE

An important service note is posted in this game and is repeated here for emphasis:

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

The circuitry in this game has been arranged so that the insertion of a quarter through the coin mechanism will reset the restart in the system. This clears up temporary problems caused by power line disturbances, static, etc.

SERVICE TECHNICIAN NOTE:

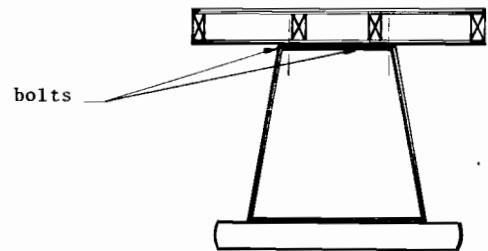
The system reset circuitry described above requires that the coin counter is attached to the system. If there is a coin counter problem and no replacement is available, the game will function properly if a 10K Ohm resistor is connected across the coin counter input pins to the video logic board.

REPACKAGING INSTRUCTIONS

Should it be necessary to ship this game, the following instructions are provided for game crating:

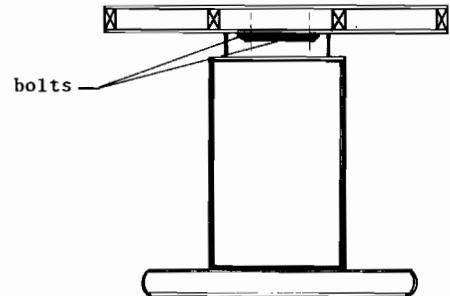
COCKTAIL VERSION:

1. Turn game upside down, taking care to protect the game top and player keys.
2. Attach pallet to game bottom with two 1/4"-20 x 1-3/4" bolts, as shown:
3. See Final Recrating Instructions, below.



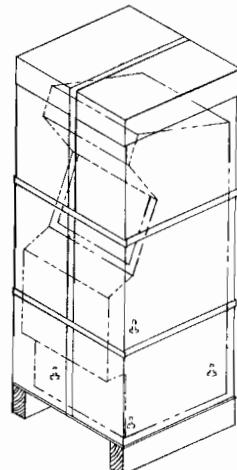
STAND-AROUND VERSION:

1. Turn game upside down.
2. Attach pallet with two 5/16"-18 x 3" bolts, as shown:
3. See Final Recrating Instructions, below.



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 Recrating Instructions, below.



FINAL RECRATING INSTRUCTIONS:

Place game upright. Tape down game keys. Then, crate the game using appropriate shock-absorbent packing material. Include padding 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.

GAME CONCEPT & OPERATION

BLASTO is a two player video game in which opponents compete for high score. The game is available in two versions--a sitdown or standaround table version, and an arcade upright style version. Electronically, the two versions are nearly identical. This manual is intended to describe both versions.

Each player is provided with a set of controls to maneuver a spaceship, and launch a Gremmaray from the spaceship. In the sitdown version, these controls are four direction buttons, and a center mounted FIRE button. In the upright version, a four-position joystick assembly and fire button are used for each player.

The spaceships are highly mobile. The response to the motion controls has been carefully "tuned" for maximum response to the player's actions. Tapping a direction control moves the ship instantly in that direction. Holding a direction control down produces a quick "single step" motion, automatically followed by rapid continuous motion across the screen. This gives the players good control of the spaceships.

The playfield is arranged as a maze of small squares, with patterns of mines randomly interspersed. The mine pattern is different for every game played (the general maze pattern is always the same). Each player has a SCORE indication.

SCORING:

There are three ways to score. Hitting any of the squares which form the maze scores one point (sitdown version) or ten points (upright). Hitting a mine scores five points (sitdown) or fifty points (upright). Hitting the opponent scores 100 points (sitdown) or 1000 points (upright).

MINES:

(NOTE: Numbers in () are values for the upright version.) Whenever a mine is hit, the player who hit it scores as the mine explodes (accompanied by a loud boom sound). Additionally, the exploding mine explodes everything adjacent to the mine. This includes squares, additional mines, or one of the spaceships if it has the misfortune of being next to an exploding mine. This makes several very interesting shots possible. Two examples: A player who runs up next to a mine and explodes it scores 5 (50) for the mine, but then blows up his spaceship (from the mine explosion) which scores 100 (1000) for the opponent. Also, if a long chain reaction of mines is touched off by hitting one of a series of adjacent mines, and a player's ship is next to any of the mines as they go off, he is blown up and the other player scores 100 (1000) points.

The score values are arranged so that players can enjoy the game at many levels. Beginners

GAME CONCEPT & OPERATION: (Cont'd.)

MINES: (Cont'd.)

will usually play to hit the most mines, and ignore the 100 (1000) point "kill shot". As it is discovered that it is much more profitable to hit the opponent, the game takes on a renewed frenzy. Anytime a player is hit, he must hit the opponent to get back into the game. This type of balance at all skill levels insures a long playing history for BLASTO.

Whenever a player's spaceship is hit, it rapidly spins around (accompanied by a humorous spinning sound), and then explodes, awarding the opponent 100 (1000) points. Whenever this happens, both players are reset to their starting positions.

GAME TIME:

When a coin is accepted, the game timer is set to 90 seconds, and ticks down to zero for the end of the game. An internal jumper is provided to make the beginning time 60 seconds (see cable harness drawing).

ADVERTISING:

When the game is not in play, an advertising sequence continuously plays. The words "GAME OVER" appear in the screen center, and the two spaceships randomly move and fire. The scores from the previous game are retained during advertising. A switch inside the coin door allows the spaceship "spinning" sound, which occurs anytime a spaceship is hit, to be switched on or off during advertising.

GAME ADJUSTMENTS:

The E-Z Adjust TM control panel, mounted on the rear of the cash box, provides two adjustments:

1. Volume control. Set to desired sound during game play. This game is a sonic spectacular, so set this as loud as you can stand; the sounds alone will really attract players.
2. Advertising sound. Switches the spaceship "spinning" sound on or off during advertising. When the game starts, all sounds are automatically switched on.

FREE GAMES:

The upright version of BLASTO allows free games. As shipped from the factory, the free game feature is connected. YOU MUST DISCONNECT THE FREE GAME FEATURE IF

GAME CONCEPT & OPERATION: (Cont'd.)

FREE GAMES: (Cont'd.)

IT IS ILLEGAL IN YOUR AREA. To do this, simply remove the back from the game, and cut the wire loop at the rear of the video logic board (between pins 33 and 34). After you have done this, the game starts as follows:

When a credit is accepted, the screen clears, and the message PRESS START appears on the screen. If the SINGLE PLAYER START button is pressed, the message "HIT ALL MINES FOR FREE GAME" appears for about five seconds; then the screen clears, the playfield sets up, and the game starts. It is not possible to win two free games in a row (no free games on a free game). When a free game is won, either a single player or two player game may be played.

Free games are awarded only for single player games.

STARTING THE GAME: (Sitdown version only.)

Inserting a coin starts the game. The playfield from the advertising sequence is cleared from the screen, a new playfield is built, and the player spaceships are placed at their starting positions. The spaceships alternately flash (accompanied by a random beeping sound) to indicate that the game is ready to play. As soon as any of the player buttons is pushed, the game starts.

STARTING THE GAME: (Upright version only.)

If the multiple coin option is implemented, inserting the first coin clears the screen. The game then waits for the proper number of coins to be inserted. For the single coin game (standard version), inserting a coin clears the playfield and displays the message "PRESS START". The player now has the option of playing a single player or two player game. Note that the single player high score is always displayed at the bottom of the screen. This provides a powerful incentive to the single player.

Pressing SINGLE PLAYER START begins the game. With free games enabled, the game starts after briefly displaying the message "HIT ALL MINES FOR FREE GAME".

OPTIONS:

Both versions allow the game time to be shortened to 60 seconds. In addition, the following options apply to the upright (arcade) version only:

1. The number of coins for a game credit may be changed from one to two, three to four. Refer to the proper harness drawing at the rear of this manual.
2. The wire loop at the rear of the logic board (between pins 33 and 34) should be

GAME CONCEPT & OPERATION: (Cont'd.)

OPTIONS: (Cont'd.)

left intact to enable free games. **FREE GAMES ARE HIGHLY RECOMMENDED.** Our earning reports show that this will significantly improve and prolong the earnings for the game.

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

SYSTEM DESCRIPTION: (Cont'd.)

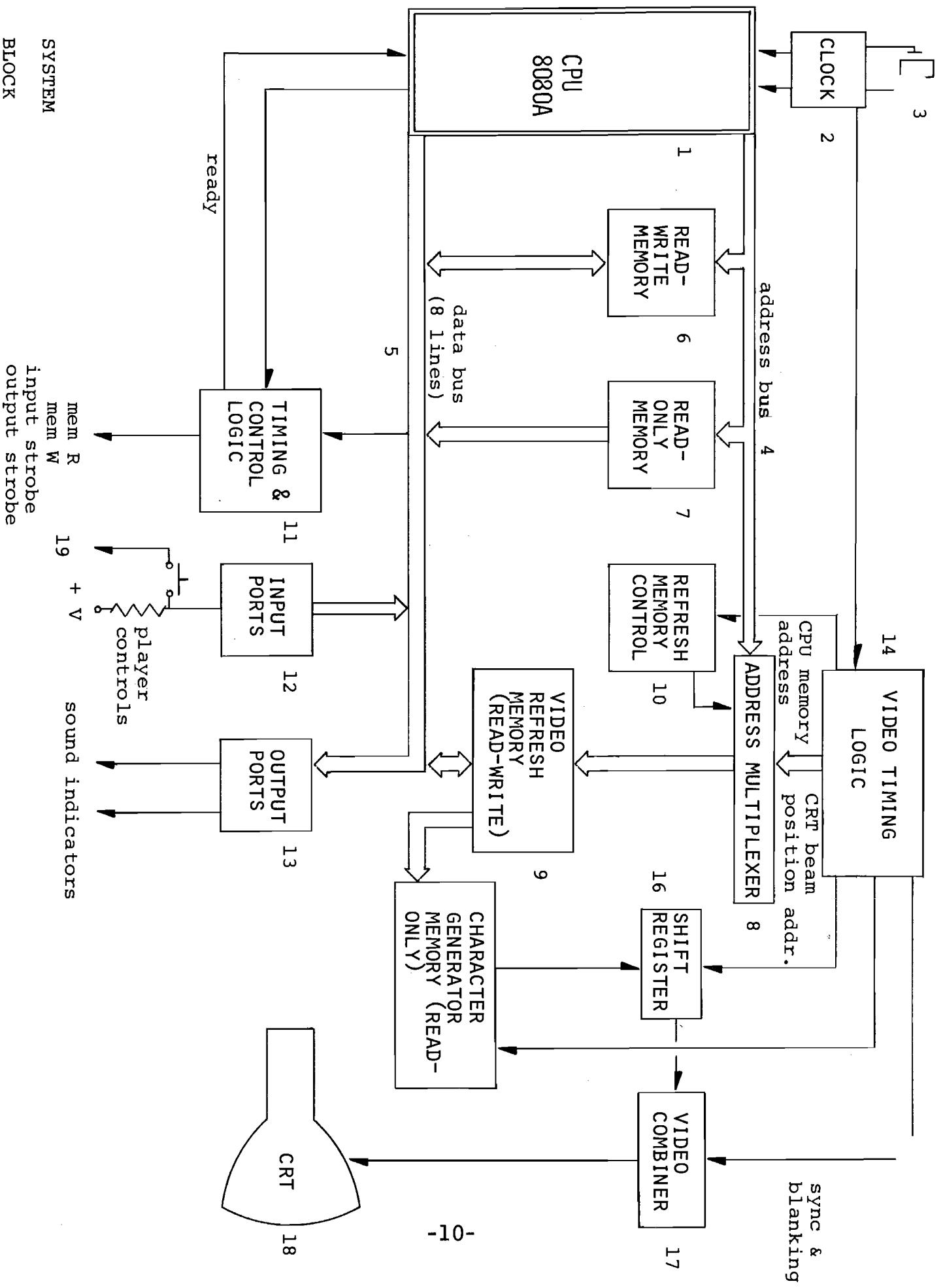
II. MICROPROCESSOR - (Cont'd.)

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.)



MEMORY INPUT DATA
FROM MICROPROCESSOR

DATA BUS

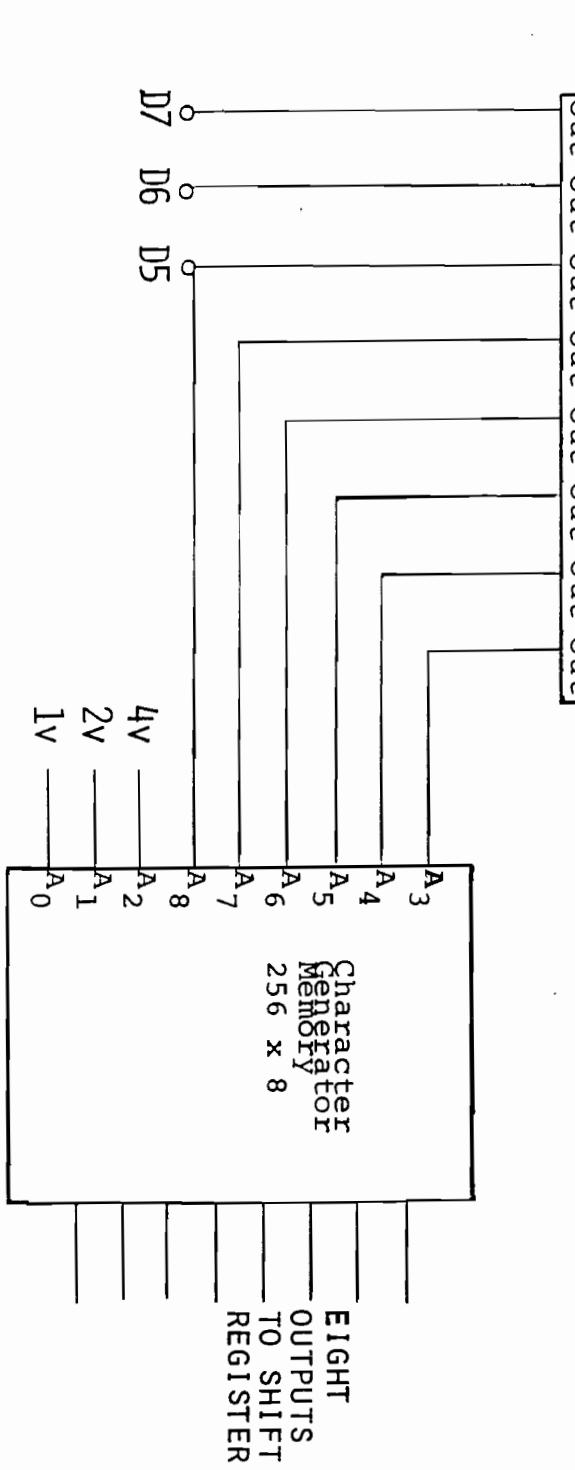
7 6 5 4 3 2 1 0

in in in in in in in in

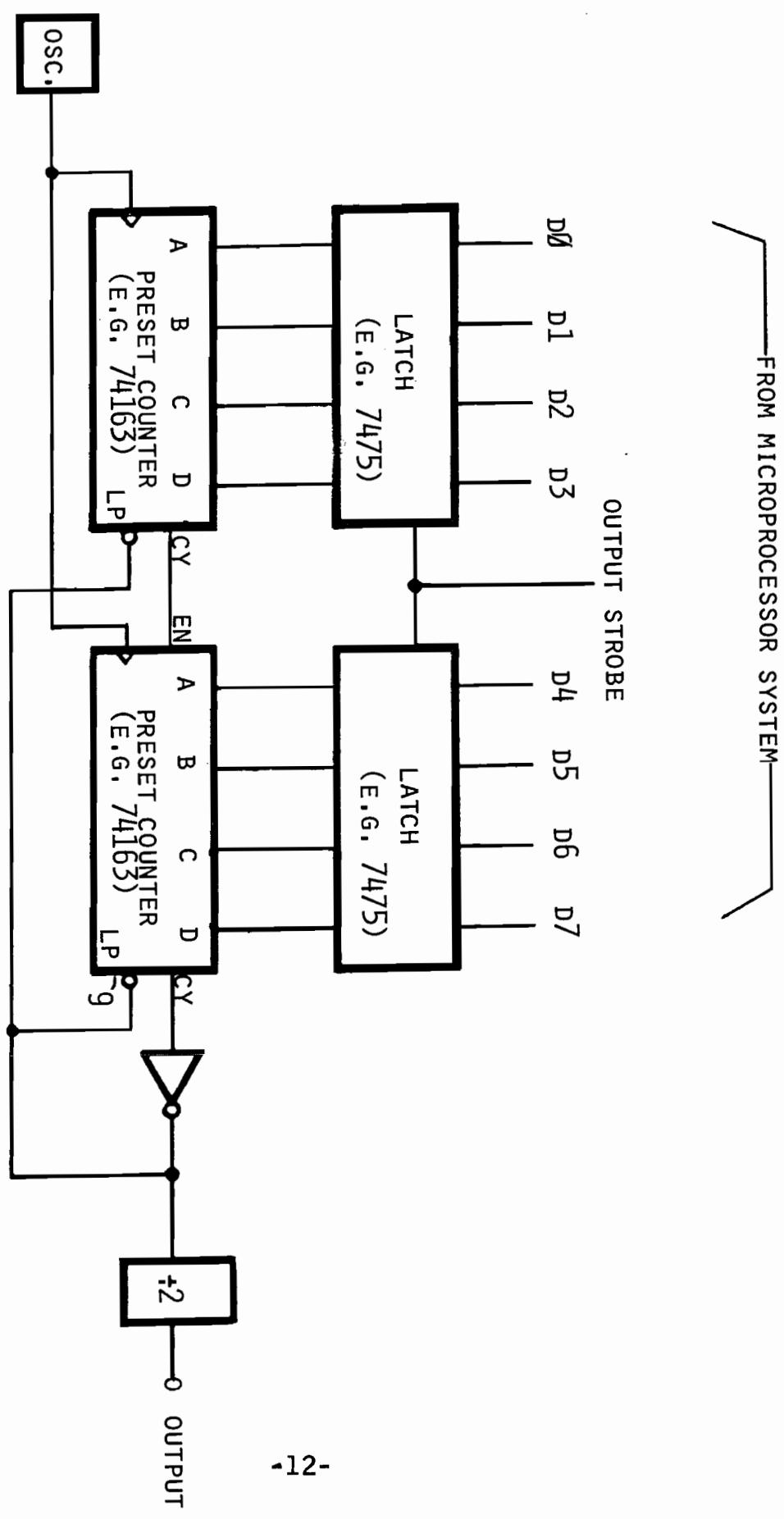
VIDEO
REFRESH
MEMORY
ADDRESS-
FROM
ADDRESS
MULTIPLEXOR

VIDEO
REFRESH
MEMORY
1024 x 8

-11-



TONE GENERATOR DIAGRAM



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 THIS GAME

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, see Recommended Spare Parts List, page 23.

MAINTENANCE PROCEDURES: (Cont'd.)

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).

MAINTENANCE PROCEDURES: (Cont'd.)

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. Eight 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.

MAINTENANCE PROCEDURES: (Cont'd.)

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.

MAINTENANCE PROCEDURES: (Cont'd.)

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 Monitor Service Manual. This manual is included with the game's
schematics.

Audio Tones; Sour/None:

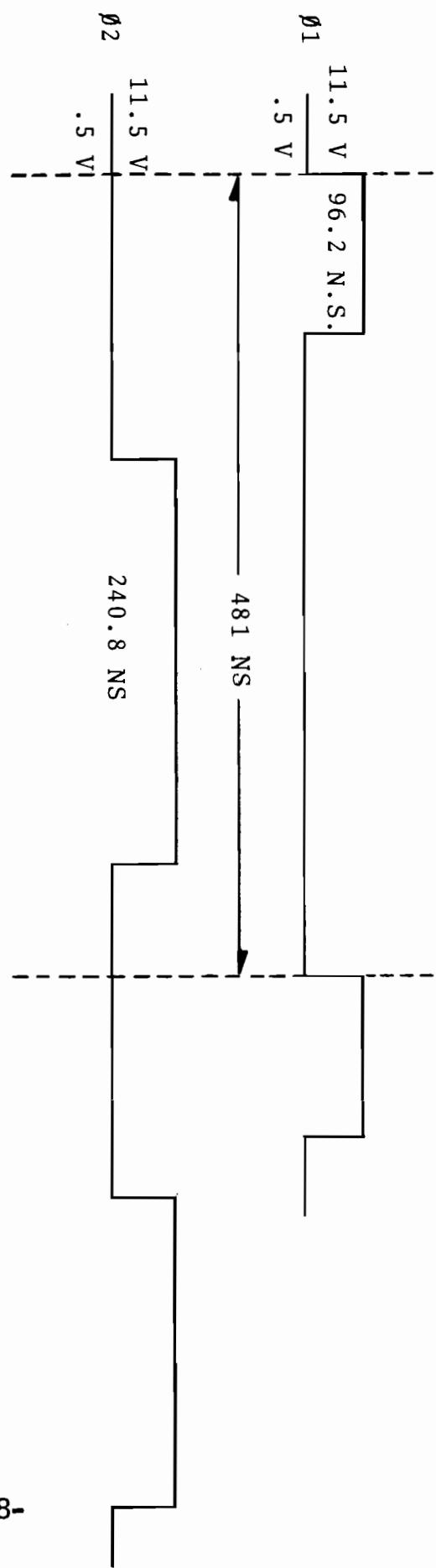
(VLBS) (SH. 2). U-68, U-61, U-62, U-66, U-67, U-60 comprise
tone generator. Amplifier on Power Supply Board (U-4, Q₅,
Q₃, Q₈, Q₉). Could also be problem area.

Boom; Sour/None:

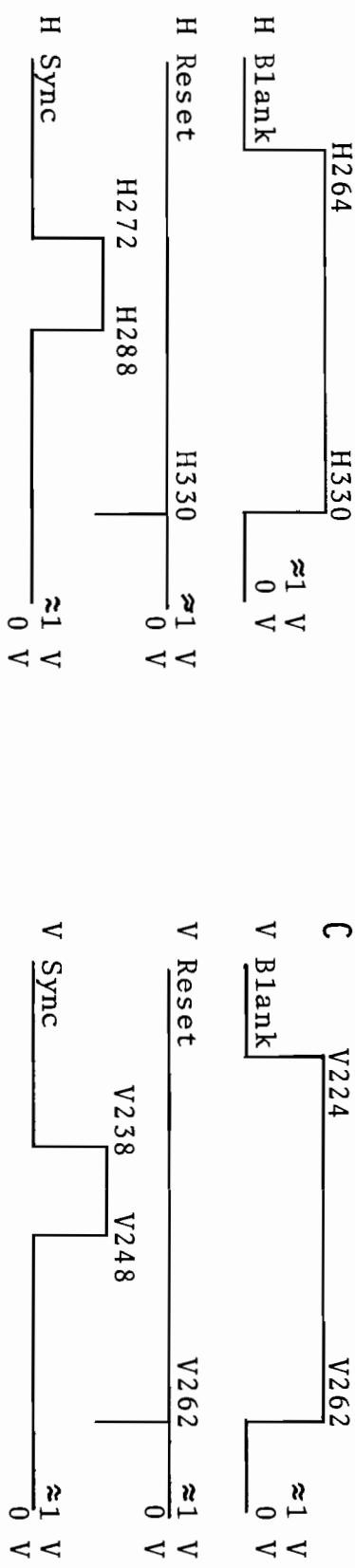
(VLBS) (SH. 1, SH. 2). D-6, Q₁₀, Q₉, Q₁₁, U-5, Q₇, Q₈, Generates
Boom. Amplifier section on Power Supply Board (U-4, Q₅, Q₃, Q₈, Q₉),
also probable.

KEY WAVEFORMS DIAGRAM

A



B

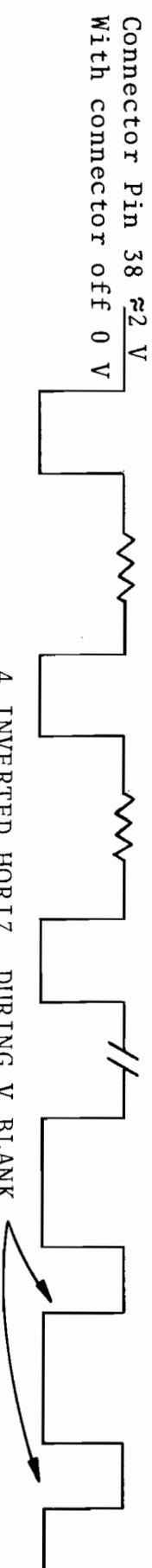


-18-

C



D



CHARACTER CODE TABLE

(Sit-Down & Stand-Around Versions)

IC (U#)						Image	IC (U#)						Image
37	38	39	40	41	42		37	38	39	40	41	42	
0	0	0	0	0	0		0	1	0	0	0	0	O
0	0	0	0	0	1		0	1	0	0	0	1	T
0	0	0	0	1	0		0	1	0	0	1	0	2
0	0	0	0	1	1		0	1	0	0	1	1	3
0	0	0	1	0	0		0	1	0	1	0	0	4
0	0	0	1	0	1		0	1	0	1	0	1	5
0	0	0	1	1	0		0	1	0	1	1	0	6
0	0	0	1	1	1		0	1	0	1	1	1	7
0	0	1	0	0	0		0	1	1	0	0	0	8
0	0	1	0	0	1		0	1	1	0	0	1	9
0	0	1	0	1	0		0	1	1	0	1	0	
0	0	1	0	1	1		0	1	1	0	1	1	(BLOWUP)
0	0	1	1	0	0		0	1	1	1	0	0	(BLOW UP)
0	0	1	1	0	1		0	1	1	1	0	1	(BLOWUP)
0	0	1	1	1	0		0	1	1	1	1	0	
0	0	1	1	1	1		0	1	1	1	1	1	R

CHARACTER CODE TABLE

(Sit-Down & Stand-Around Versions)

IC (U#)						Image	IC (U#)						Image
37	38	39	40	41	42		37	38	39	40	41	42	
1	0	0	0	0	0	(BLANK)	1	1	0	0	0	0	O
1	0	0	0	0	1	↖	1	1	0	0	0	1	1
1	0	0	0	1	0	↗	1	1	0	0	1	0	2
1	0	0	0	1	1	↔	1	1	0	0	1	1	3
1	0	0	1	0	0	↑	1	1	0	1	0	0	4
1	0	0	1	0	1	↓	1	1	0	1	0	1	5
1	0	0	1	1	0	↔	1	1	0	1	1	0	6
1	0	0	1	1	1	M	1	1	0	1	1	1	7
1	0	1	0	0	0	E	1	1	1	0	0	0	8
1	0	1	0	0	1	□	1	1	1	0	0	1	9
1	0	1	0	1	0	○	1	1	1	0	1	0	(BLOWUP)
1	0	1	0	1	1	○	1	1	1	0	1	1	(BLOWUP)
1	0	1	1	0	0	○	1	1	1	1	0	0	(BLOWUP)
1	0	1	1	0	1	■	1	1	1	1	0	1	(BLOWUP)
1	0	1	1	1	0	↗	1	1	1	1	1	0	(BLOWUP)
1	0	1	1	1	1	↖	1	1	1	1	1	1	(BLOWUP)

CHARACTER CODE TABLE

(Arcade Version)

IC (U#)						Image	IC (U#)						Image
37	38	39	40	41	42		37	38	39	40	41	42	
0	0	0	0	0	0		0	1	0	0	0	0	L
0	0	0	0	0	1	(BLANK)	0	1	0	0	0	1	M
0	0	0	0	1	0	(BLANK)	0	1	0	0	1	0	N
0	0	0	0	1	1	(BLANK)	0	1	0	0	1	1	O
0	0	0	1	0	0	(BLANK)	0	1	0	1	0	0	P
0	0	0	1	0	1		0	1	0	1	0	1	R
0	0	0	1	1	0		0	1	0	1	1	0	S
0	0	0	1	1	1		0	1	0	1	1	1	T
0	0	1	0	0	0		0	1	1	0	0	0	V
0	0	1	0	0	1	A	0	1	1	0	0	1	Y
0	0	1	0	1	0	C	0	1	1	0	1	0	
0	0	1	0	1	1	E	0	1	1	0	1	1	(BLOWUP)
0	0	1	1	0	0	F	0	1	1	1	0	0	(BLOWUP)
0	0	1	1	0	1	G	0	1	1	1	0	1	(BLOWUP)
0	0	1	1	1	0	H	0	1	1	1	1	0	
0	0	1	1	1	1	I	0	1	1	1	1	1	

CHARACTER CODE TABLE

(Arcade Version)

IC (U#)						Image	IC (U#)						Image
37	38	39	40	41	42		37	38	39	40	41	42	
1	0	0	0	0	0	(BLANK)	1	1	0	0	0	0	0
1	0	0	0	0	1	(BLANK)	1	1	0	0	0	1	1
1	0	0	0	1	0	(BLANK)	1	1	0	0	1	0	2
1	0	0	0	1	1	(BLANK)	1	1	0	0	1	1	3
1	0	0	1	0	0	(BLANK)	1	1	0	1	0	0	4
1	0	0	1	0	1		1	1	0	1	0	1	5
1	0	0	1	1	0		1	1	0	1	1	0	6
1	0	0	1	1	1		1	1	0	1	1	1	7
1	0	1	0	0	0		1	1	1	0	0	0	8
1	0	1	0	0	1		1	1	1	0	0	1	9
1	0	1	0	1	0		1	1	1	0	1	0	(BLOWUP)
1	0	1	0	1	1		1	1	1	0	1	1	(BLOWUP)
1	0	1	1	0	0		1	1	1	1	0	0	(BLOWUP)
1	0	1	1	0	1		1	1	1	1	0	1	(BLOWUP)
1	0	1	1	1	0		1	1	1	1	1	0	(BLOWUP)
1	0	1	1	1	1		1	1	1	1	1	1	(BLOWUP)

RECOMMENDED SPARE PARTS LIST

Per Ten Units

PART NO.	QTY.	DESCRIPTION	ARCADE	COCKTAIL/STANDAROUND
130-9001	1	Speaker, 6x9	X	X
150-9019	2	Cap., 4700MFD, 25 V	X	X
150-9022	1	Cap., 9000MFD, 12 V	X	X
213-9002	2	Socket, 18 pin, dual-in-line	X	X
213-9004	2	Socket, 16 pin, dual-in-line	X	X
220-9008	1	Counter, Digital	X	X
220-9035	1	Lock, Coin Door	X	X
220-9066	2	Coin Mech., single	X	***
240-9006	2	Button, red	X	
240-9007	25	Button, black		X
240-9009	2	Button, yellow	X	
240-9090	5	Button, red fire		X
313-9001	2	IC LM 723	X	X
313-9004	2	IC LM 741 EN DIP	X	X
314-9001	2	IC NE555 DIP	X	X
314-9006	2	IC 7474	X	X
314-9009	2	IC 7400	X	X
314-9012	2	IC 7408	X	X
314-9017	2	IC 74125	X	X
314-9046	1	IC 74S04	X	X
315-9014	1	IC 8080A, CPU	X	X
315-9015	2	IC 2102 RAM	X	X
315-9018	1	IC 2111 RAM	X	X
316-9089	1	PROM, U2		X
316-9090	1	PROM, U3		X
316-9091	1	PROM, U4		X
316-9092	1	PROM, U5		X
316-9093	1	PROM, U29		X
316-9094	1	PROM, U43		X
316-9095	1	PROM, U2	X	
316-9096	1	PROM, U3	X	
316-9097	1	PROM, U4	X	
316-9098	1	PROM, U5	-23-	X

SPARE PARTS LIST, CONT'D

PART NO.	QTY.	DESCRIPTION	ARCADE	COCKTAIL/STANDARD
316-9099	1	PROM, U29	X	
316-9100	1	PROM, U43	X	
390-9009	2	Lamp, #47		X
482-9006	2	Transistor, 2N4403	X	X
482-9010	2	Transistor, PE 8050	X	X
482-9011	1	Transistor, MJ 3000	X	X
482-9013	2	Transistor, TIP 110	X	X
482-9014	2	Transistor, 2N4401	X	X
482-9015	2	Transistor, TIP 115	X	X
482-9016	2	Transistor, TIP 29	X	X
510-9023	5	Switch Assy., WICO	X	X
510-9041	4	Snap acting switch	X	
560-9003	1	Transformer #4-10345B	X	X
807-9003	1	Power Supply Assy.	X	X
807-9012	1	Power Interrupt Assy.	X	X
819-9001	1	Video Logic Board		X
819-9026	1	Video Logic Board	X	

*** Used in some table models.

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	IR	INITIAL DRAWING	5-7-77	D.CTS-1

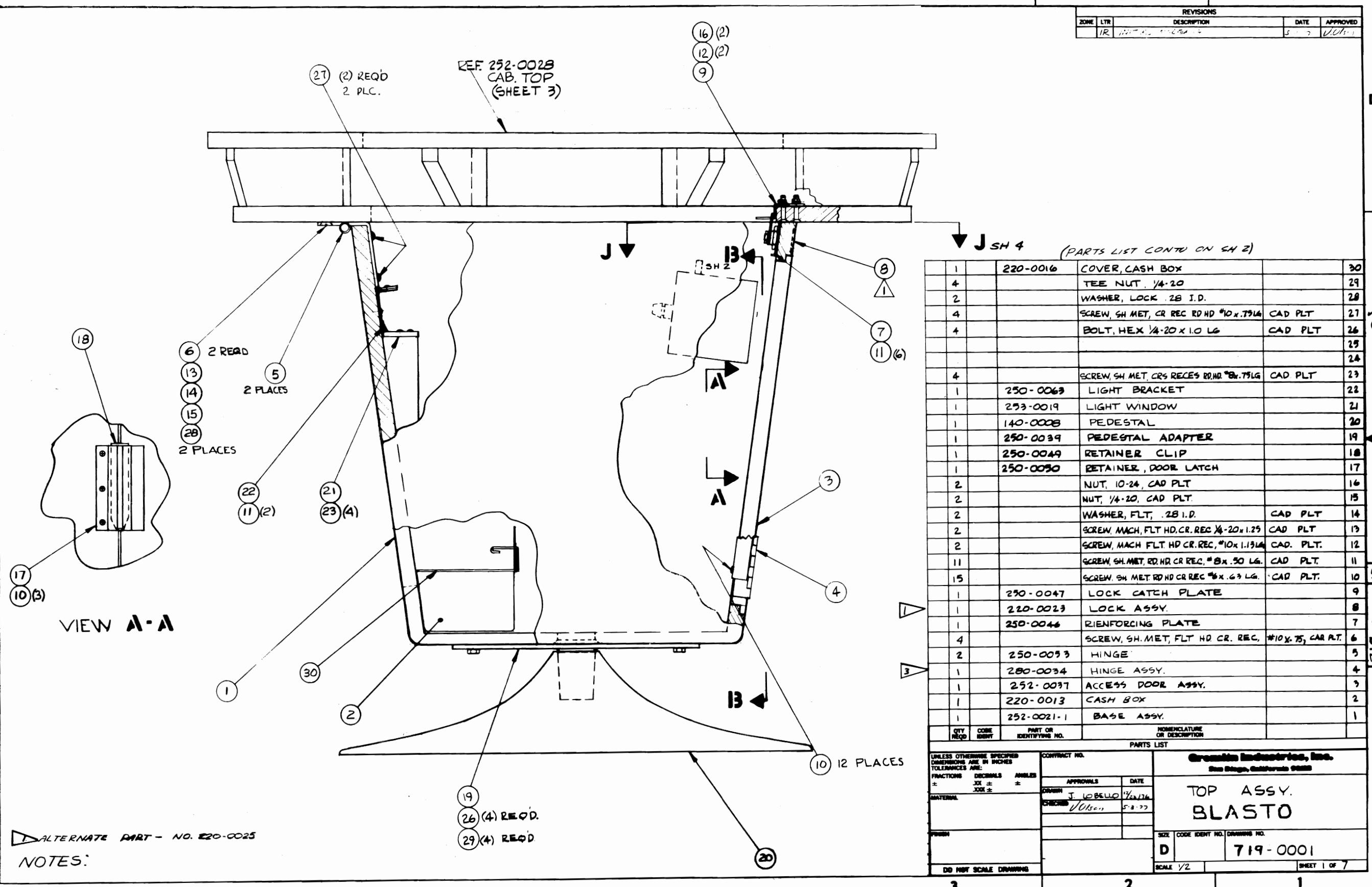
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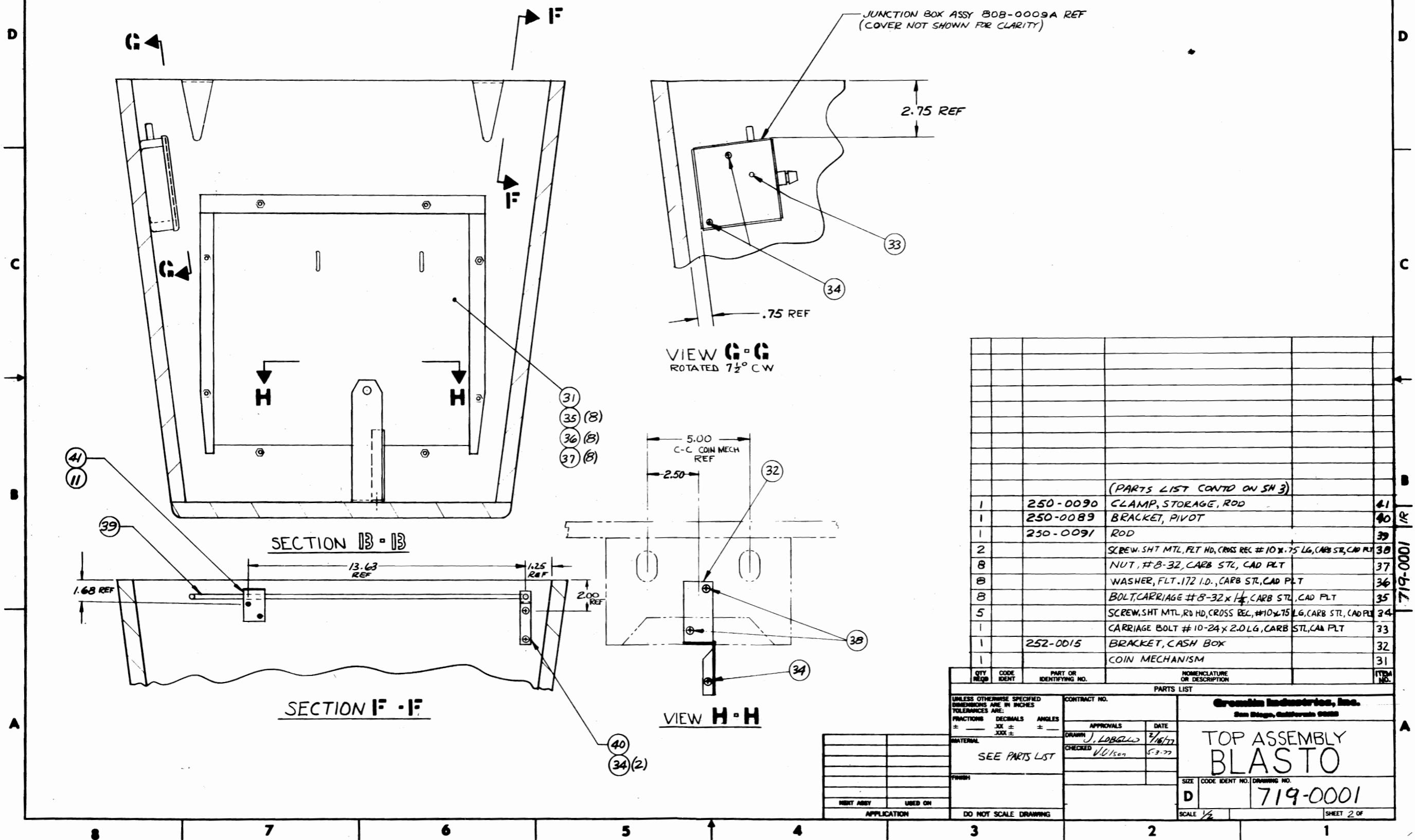
A

719-0001



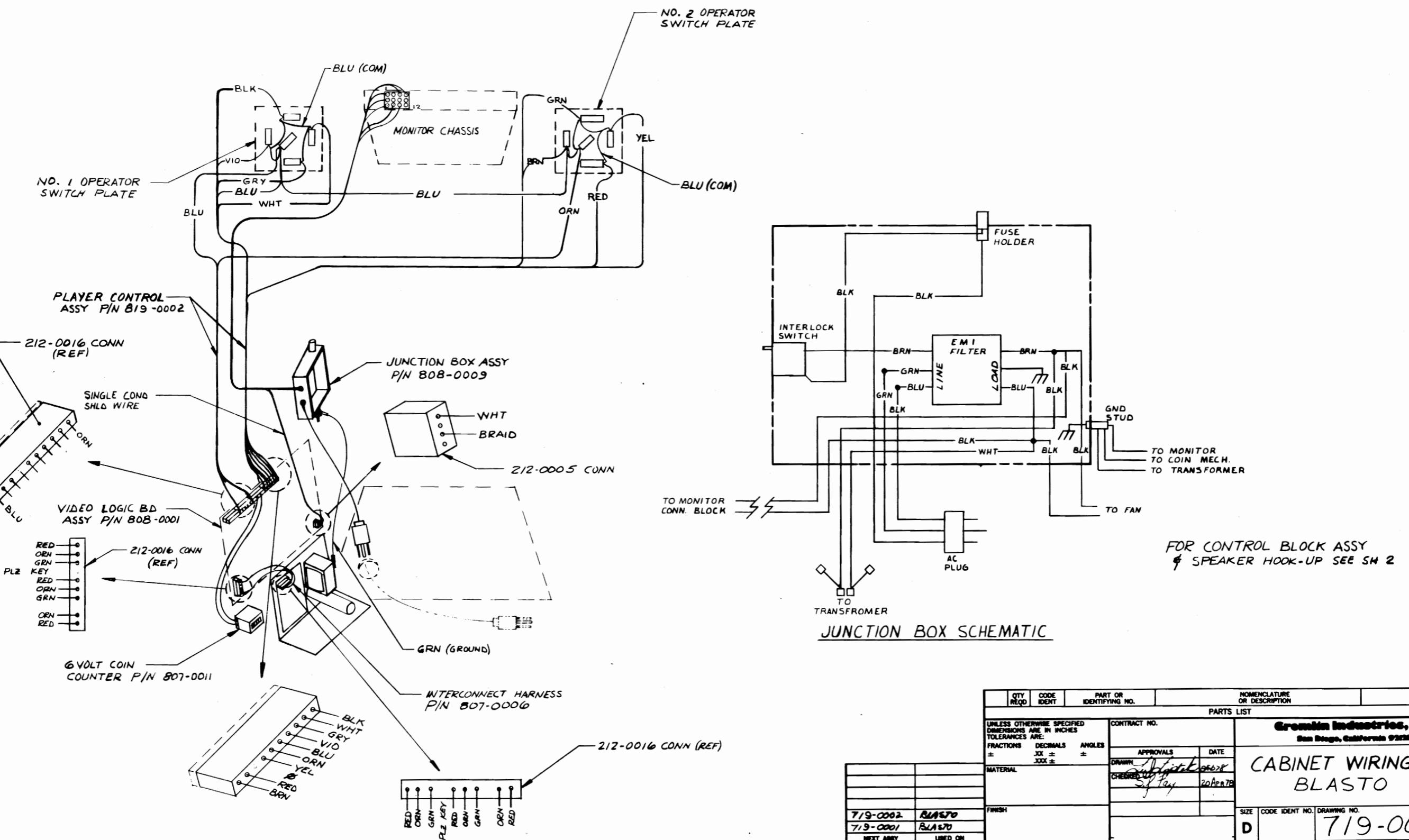
8 | 7 | 6 | 5 | 4 | 3 | 2 | 1

REVISED		DESCRIPTION		DATE	APPROVED
ZONE	ltr			5-22	K. Ober



8 7 6 5 4 3 2 1

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
A		RELEASED	4-20-73	Jff.



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REVISED		DESCRIPTION	DATE	APPROVED
ZONE	LTR	A RELEASED	4-20-78	SFH

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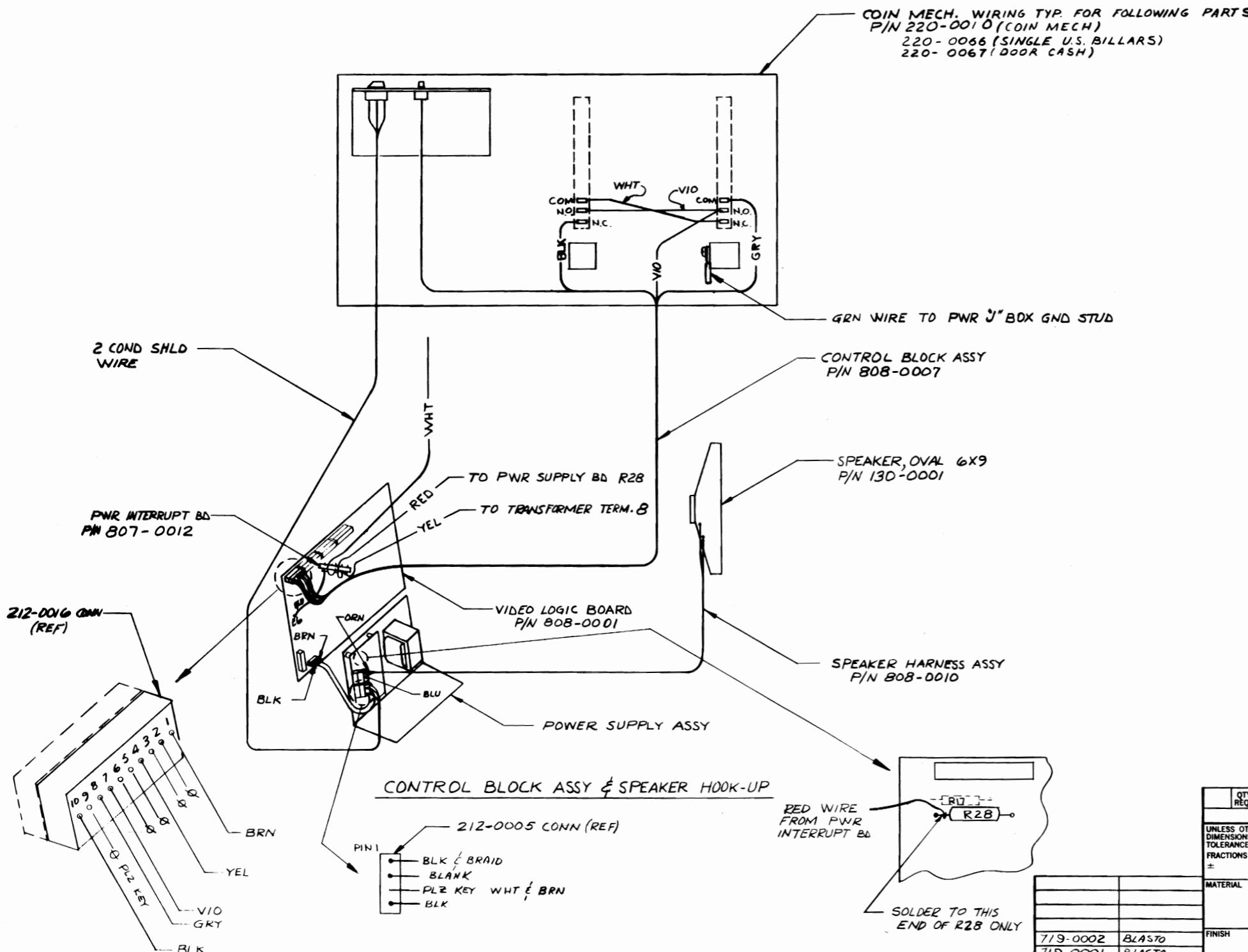
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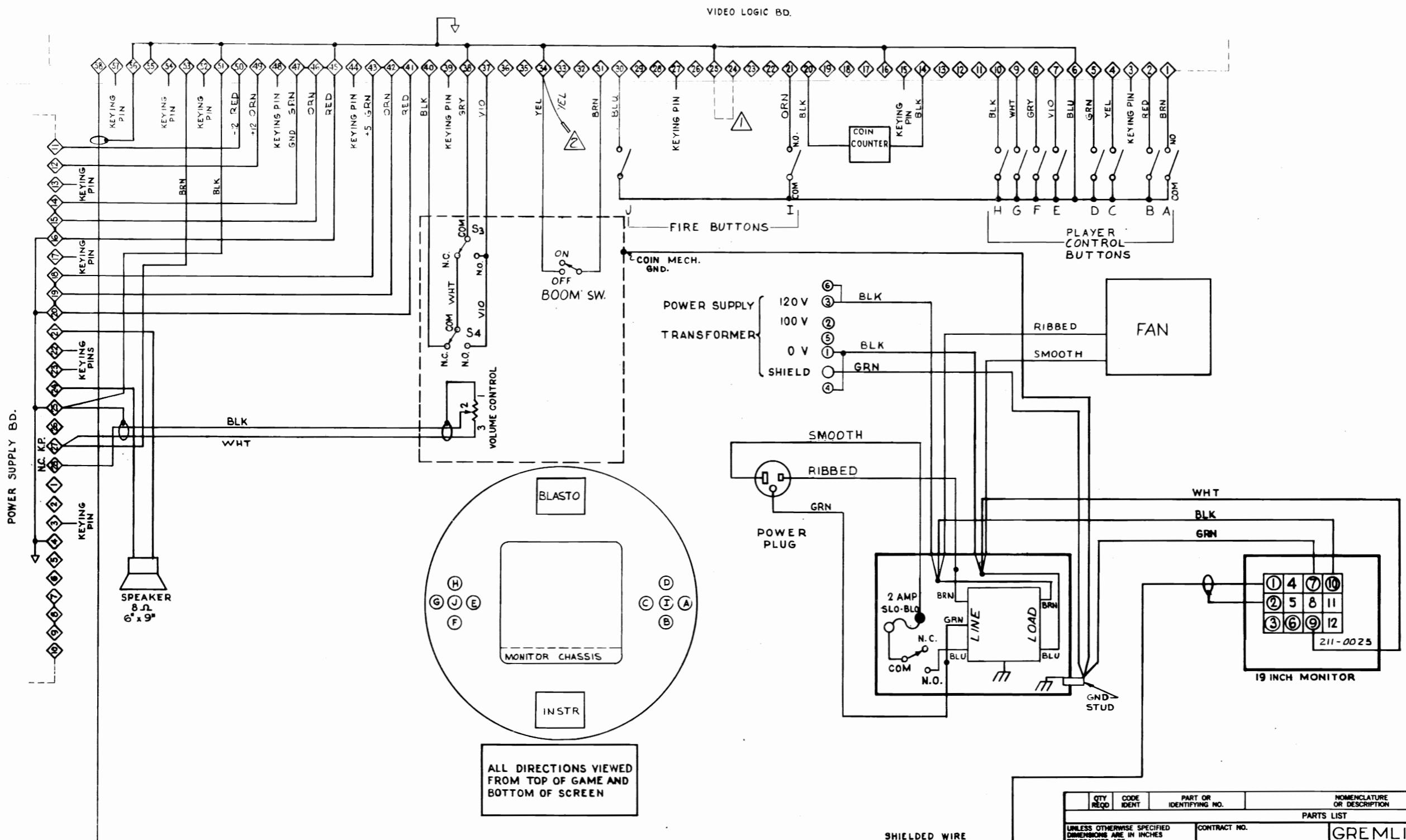
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8 7 6 5 4 3 2 1

REVISIONS	
ZONE	LTR
A	RELEASED

4-27-78



CONNECT TO PIN 32 FOR 60 SECOND GAME
JUMPER 24-25 FOR COIN MECH MECHANISM
NO JUMPER FOR U.S. BILLIARDS MECH.

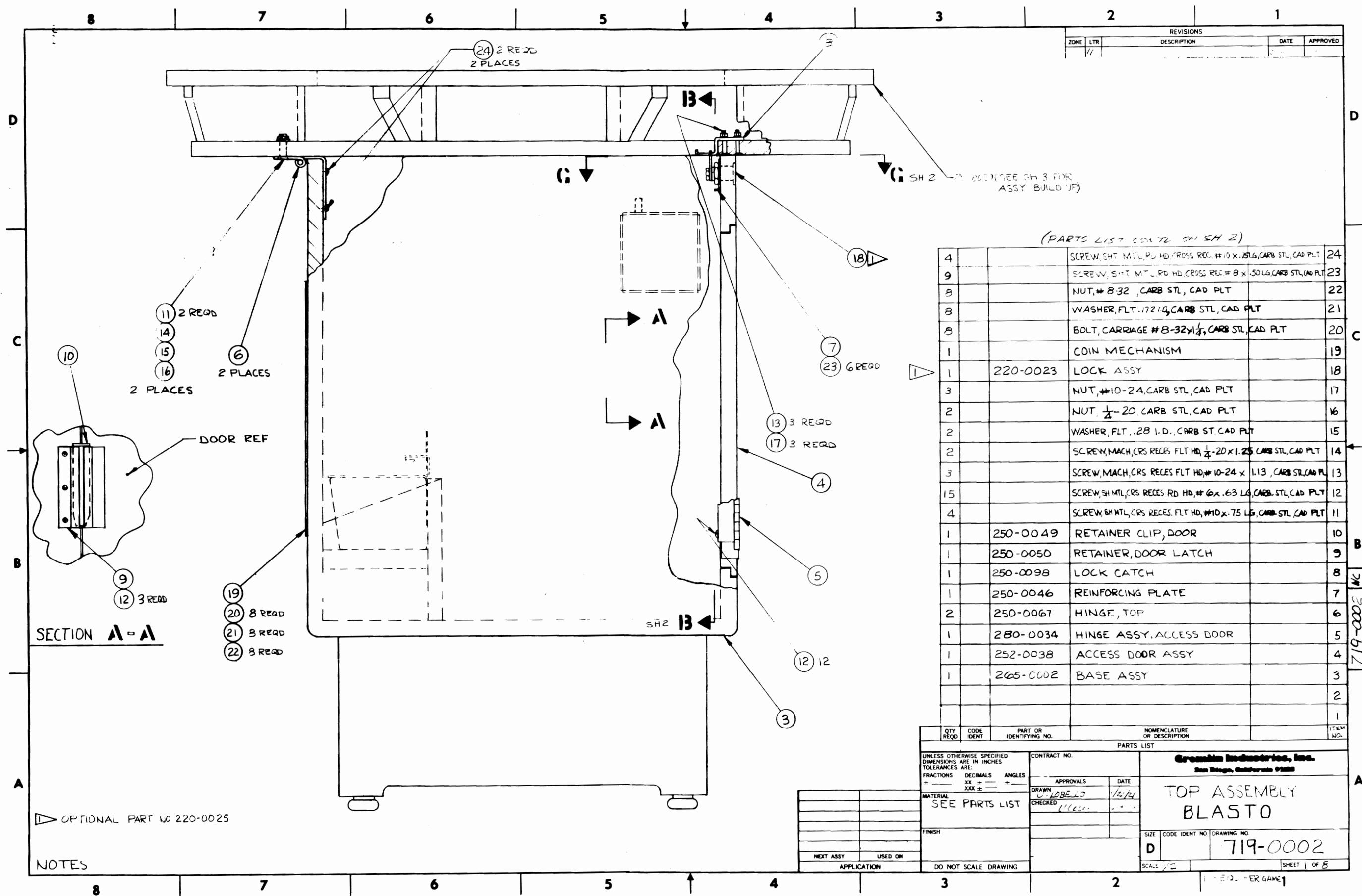
NOTES:

QTY REQ'D	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 ±			
MATERIAL	CONTRACT NO.	GREMLIN INDUSTRIES INC. 8401 AERO DR. SAN DIEGO, CA. 92123	
719-0002 BLASTO	APPROVALS	DATE	
719-0001 BLASTO	DRAWN	01FEB78	
NEXT ASSY USED ON	CHECKED	20APR78	
APPLICATION	FINISH		
DO NOT SCALE DRAWING			
SCALE NONE			

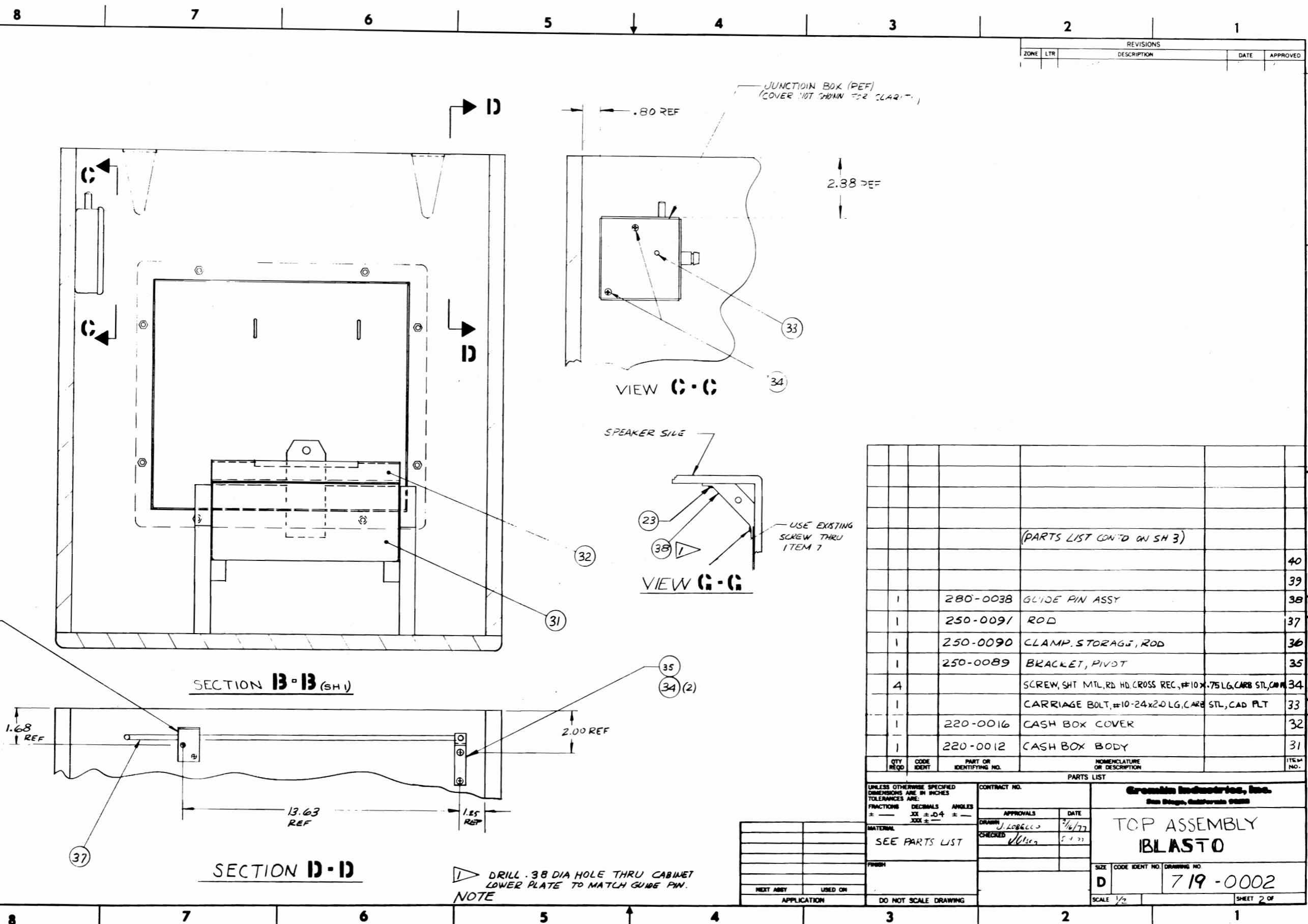
SCHEMATIC BLASTO CABINET WIRING

719-0001 A

Sheet 5 of



REVISIONS			
ZONE	LTR	DESCRIPTION	DATE APPROVED



FOR 719-0002 CABINET
WIRING DIAGRAMS, SEE
719-0001 SHEETS 3, 4
& 5.

Gremilin Industries, Inc. San Diego, California 92121		PARTS LIST	TITLE BLASTO - ASSY	719-0003 DWG NO	SH 1 OF 8	B. REV
SHEETS 5 THRU 8 ARE 'D' SIZE		DRAWN G. SMITH	ENGR			
LTR	DATE	REVISION DESCRIPTION	DRAFT	CHECK	APPR	
A	3/14/78	RELEASED		KHD.	KHD.	
B	4/12/78	SANS ADD 16 1/2 DIM FOR LOCATING JUNKT. BOX	KHD.	KHD.	KHD.	

Gremlin Industries, Inc.
San Diego, California 92123

PARTS
LIST

TITLE

719-0003

DWG NO

SH 3 B
OF REV

ITEM NO	PART NO	QTY PER ASSY	DESCRIPTION	REF DES
26	420-0041	1	DECAL; SYN SMALL	
27	420-0060	1	DECAL; TRN TELL	
28	420-0071	1	INST; UNCOATING	
29	420-0116	1	WRAP AROUND SIDE	
30	420-0117	1	TOP COVER	
31	420-0124	4	CORNER STRIP	
32	420-0139	1	BLASTO; CARTON DECAL	
33	420-0140	1	BLASTO; LT SIDE GRAPHIC	
34	420-0141	1	BLASTO; RT SIDE GRAPHIC	
35	420-0129	1	MANUAL BLASTO	
36				
37	280-0005	5	CABLE TIE	
38	807-0003	1	ASSY; POWER SUPPLY	
39	807-0006	1	JUMPER HARNESS ASSY.	
40	807-0010	1	SPEAKER HARNESS ASSY.	
41	807-0012	1	ASSY PWR. INTERRUPT	
42	819-0029	1	ASSY HARN OPER. CONT	
43	819-0030	1	ASSY HARN CONTROL BLK	
44	819-0027	1	ASSY CONTROL PANEL	
45	819-0026	1	ASSY VIDEO LOGIC	
46	800-0018	1	ASSY CAB VID DRT	
47	807-0009	1	ASSY JUNCT. BOX	
48	819-0028	1	ASSY MONITOR HARN.	
49	813-0012	1	COIN COUNTER ASSY.	
50				

Gremlin Industries, Inc.
San Diego, California 92113

PARTS
LIST

TITLE
BLASTO - ASSY

719-0003
DWG NO

SH 4
OF
REV

ITEM NO	PART NO	QTY PER ASSY	DESCRIPTION	REF DES
51	6		BOLT; 8-32 CARRIAGE 1 1/4" LG	
52	9		BOLT; 10-32 CARRIAGE 1 3/4" LG	
53	4		MACH SCR; 8-32 SLOT OVAL HD	1 1/2" LG
54	2		SCR; #6 SHT.MTL. RD.HD.CRS.REC.	1/2" LG
55	4		SCR; #8 SHT.MTL. RD.HD.CRS.REC.	1/2" LG
56	4		SCR; #8 SHT.MTL. HEX.HD. 1 1/4" LG	
57	6		WASHER; #8 FLAT	
58	9		WASHER; #10 FLAT	
59	10		WASHER; #10 SPLIT LOCK	
60	8		WASHER; #8 CLIP	
61	6		NUT; 8-32 HEX	
62	4		NUT; #8 CLIP	
63	8		NUT; 10-32 HEX	
64	1		NUT; 10-32 WING	
65	1		SPACER; 3/16 I.D. X 1 1/4" LG.	
66	31'		POLY BANDING BLOCK 1/2" X .015	
67	1		DECAL WARNING TIP N TELL	PART OF 420-0060
68				
69				
70				
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75				

Gremlin Industries, Inc. San Diego, California 92113		PARTS LIST	TITLE BLASTO - ASSY.	719-00003 DWG NO	SH 2 OF	B REV
ITEM NO	PART NO	QTY PER ASSY	DESCRIPTION		REF DES	
1	130-0001	1	SPEAKER, GAME 6x9			
2	130-0002	1	SPEAKER, COVER 6x9			
3	140-0021	1	COVER JUNCTION BOX M			
4	200-0002	1	MONITOR, VIDEO 19 IN			
5	220-0035	1	LOCK FORT LOCK			
6	220-0066	2	MECH. COM SINGLE			
7	250-0032	1	FRAME BEZEL			
8	250-0032	1	SPRING, RETAINER			
9	250-0038	1	MOLDING STRIP			
10	250-0049	1	CLIP; SWITCH			
11						
12	250-0109	1	MOLDING; TRIM LWR.			
13	250-0285	1	FRAME; CASH DOOR MOD.			
14	253-0014	1	MASK; SHADOW CAB.			
15	253-0080	1	PANEL; GRAPHIC LOGO			
16	253-0081	1	PANEL; GRAPHIC FRONT			
17	253-0082	1	PANEL; MONITOR SCR			
18	280-0004	25	CLIP; WIRE HOLDDOWN			
19	280-0010	2	NUT; WIRE			
20	390-0011	1	LAMP; 18" FLR			
21	390-0012	1	LAMP; FIX FLR			
22	420-0028	1	DECAL; S/N			
23	420-0030	1	DECAL; CAUTION 115V			
24	420-0038	2	DECAL; IMPORTANT NOTE			
25	420-0040	1	DECAL; RE-CIRCLE			

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REVISIONS		DESCRIPTION		DATE	APPROVED
ZONE	LTR				

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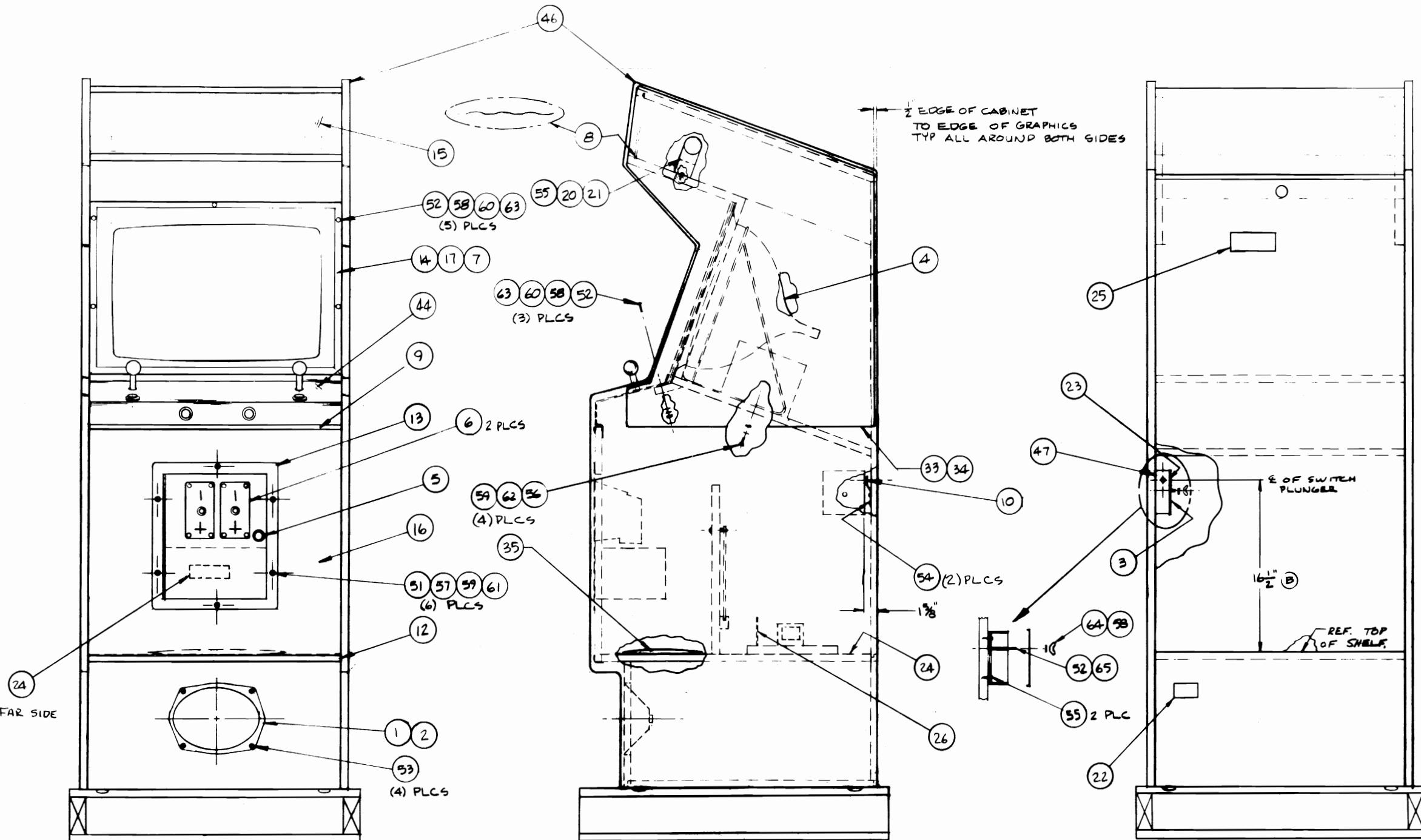
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QTY REQ'D	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION			
PARTS LIST						
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES \pm \pm \pm $JXX \pm$ $JXX \pm$ $JXX \pm$	CONTRACT NO.	Gromlin Industries, Inc. San Diego, California 92108				
MATERIAL	APPROVALS	DATE				
	DRWNR: G. SMITH	14-MAR-78				
	CHG'D: 1. X-1	3/21/78				
FINISH						
NEXT ASSY	USED ON					
APPLICATION	DO NOT SCALE DRAWING					
SHEET NO. 1	SIZE CODE IDENT NO.	DRAWING NO.	719-0003	B REV		

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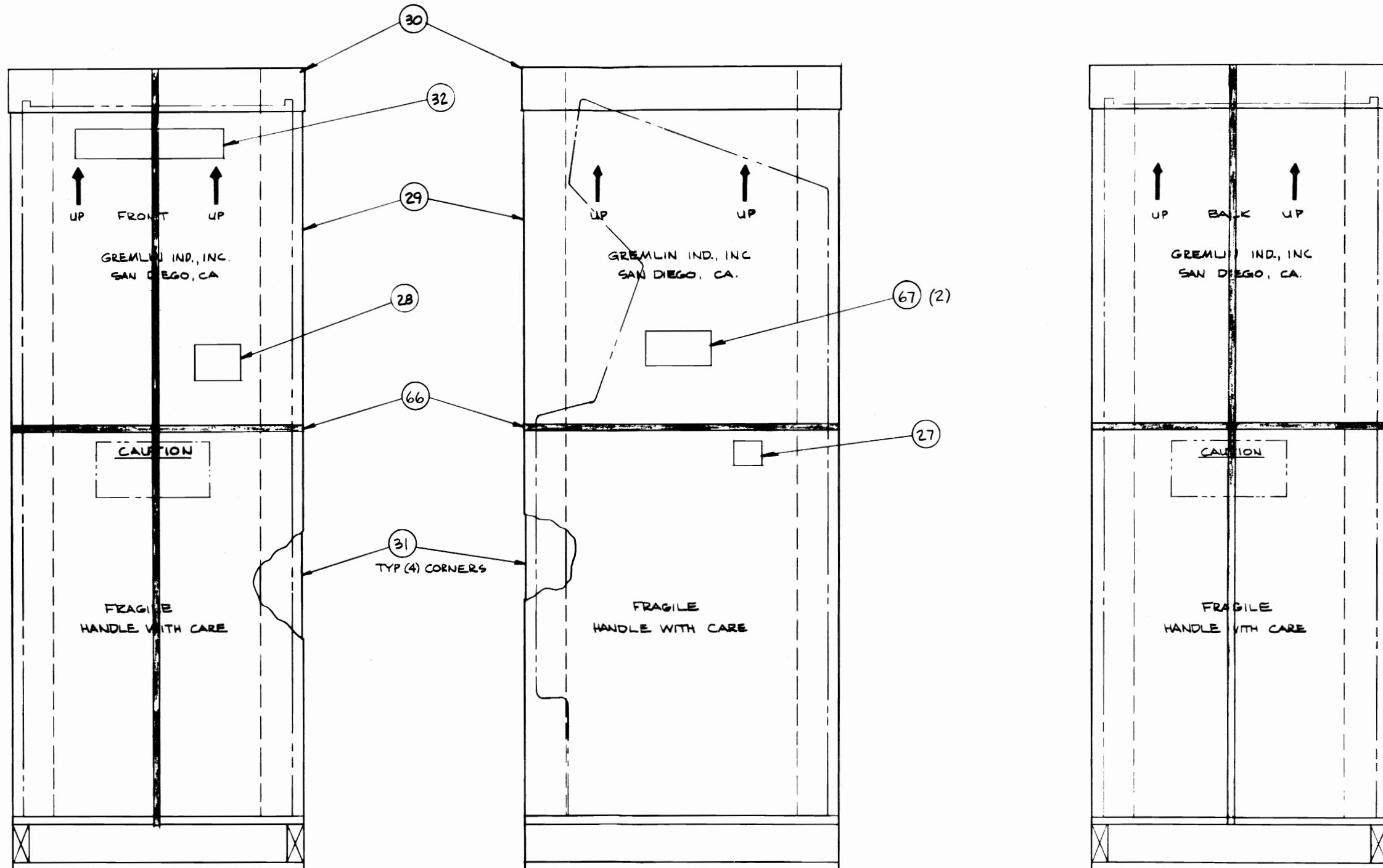
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REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED

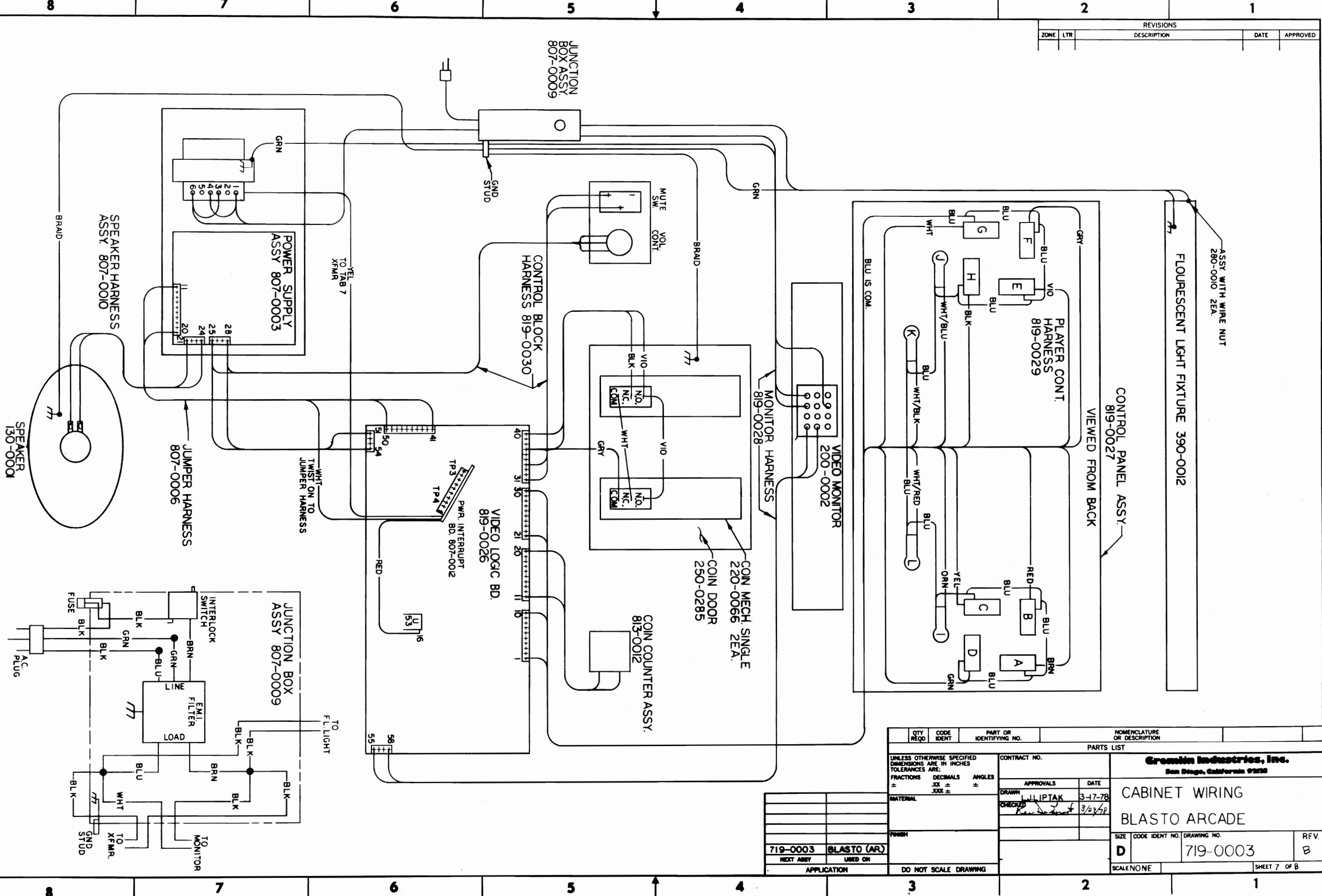
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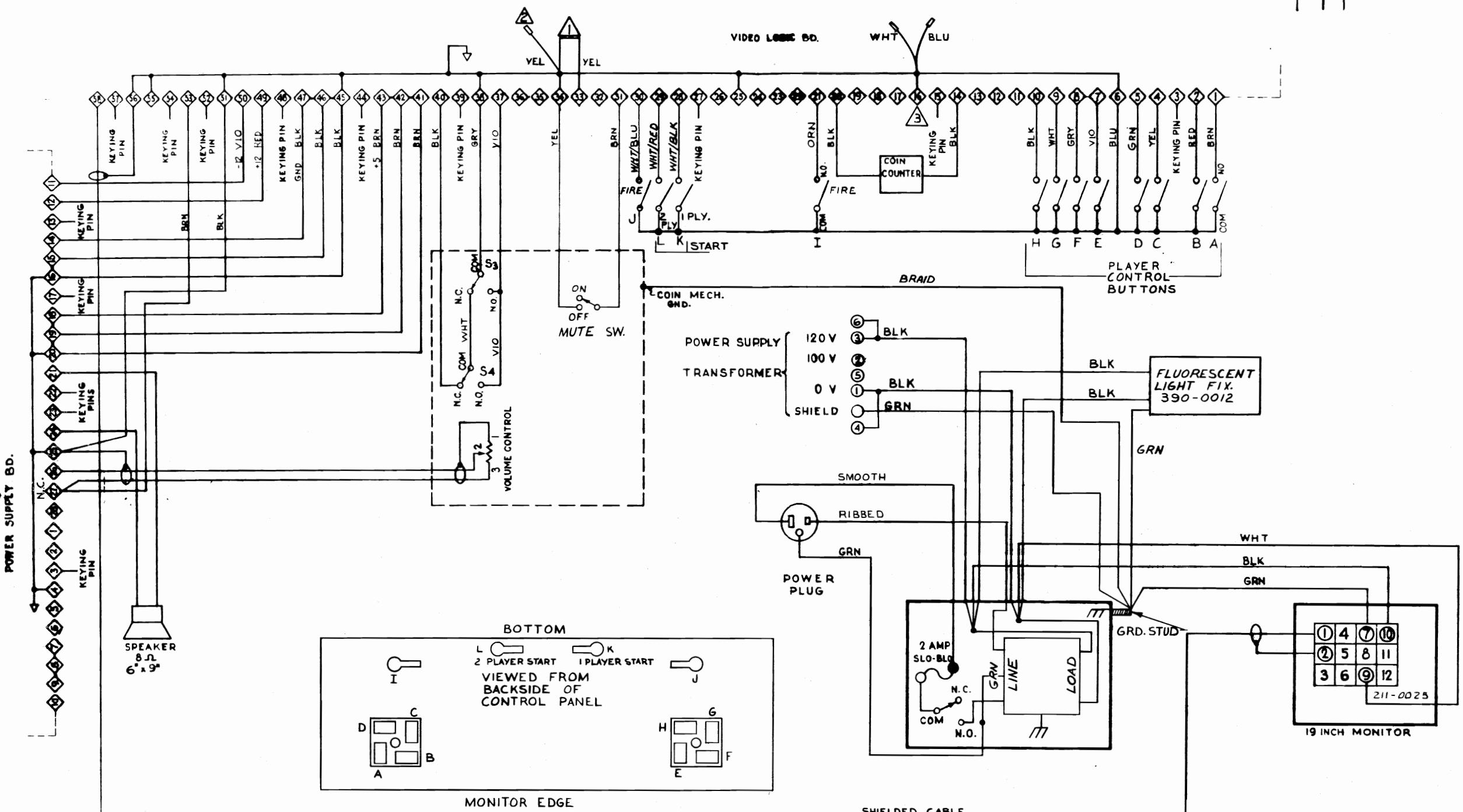
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REVISIONS		DESCRIPTION		DATE	APPROVED
ZONE	LTR				



QTY REQ'D	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
JX ± XXX ±			DRAWN 1/27/75
MATERIAL			CHECKED 5/1/75
FINISH			APPLIED 5/1/75
719-0003 BLASTO AR. NEXT ASY USED ON			APPLICATION
DC NOT SCALE DRAWING			SCALE NONE
SIZE CODE IDENT NO. DRAWING NO.			719-0003 A
SCALE NONE			Sheet 8 of 8

SCHEMATIC
BLASTO
CABINET WIRING

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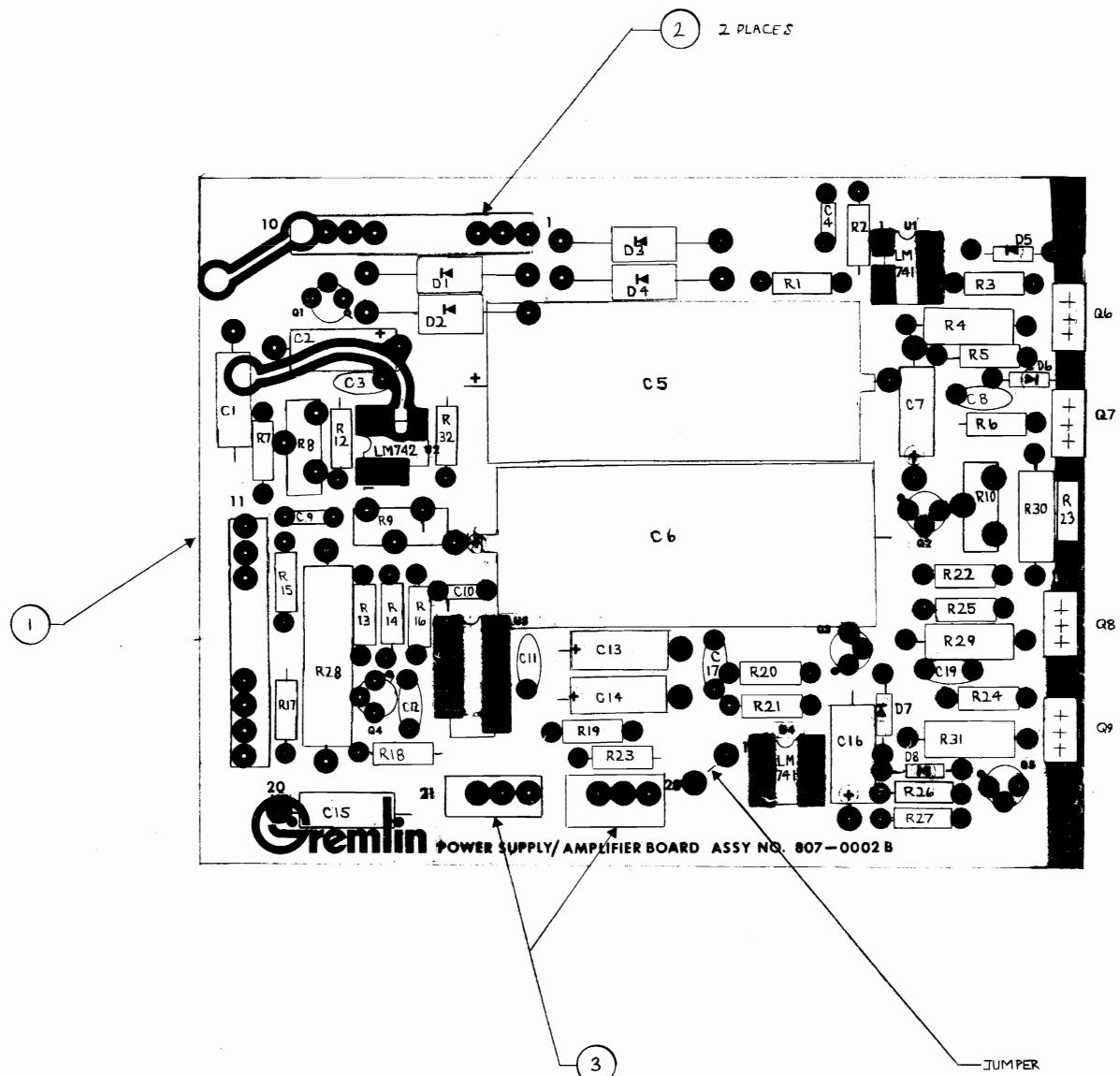
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REVISIONS			
ZONE	LTR	DESCRIPTION	DATE APPROVED
B	P	PER ECN 63	KB 7-6-7
C	C	C1271315 WAS 25V	ZD 3/21/78 R&D

PARTS LIST			
3	2	212-0004	CONN. MALE 4 PIN
2	2	212-0003	CONN. MALE 10 PIN
1	1	170-0058A	P.C. BOARD
Q8 Q9	2	482-0016	XISTOR TIP 29
Q7	1	482-0015	XISTOR TIP 115
Q6	1	482-0013	XISTOR TIP 110
Q2 Q8	2	482-0014	XISTOR ZN4401
Q1 Q3 Q4	3	482-0006	XISTOR ZN4403
D7 D8	2	481-0006	DIODE IN914 OR IN4148
D9 D10	2	481-0008	DIODE ZENER IN5231
D1-D4	4	481-0004	DIODE MR501
C19	1	151-0002	CAP. CER. 100P 50V
C10 C17	2	151-0008	CAP. CER. .001M 50V
C8 C11	2	151-0001	CAP. CER. .05M 50V
C5 C6	2	150-0019	CAP. E. 4700M 25V
C4 C7 C12	3	151-0011	CAP. CER. .01M 50V
C3	1	151-0012	CAP. CER. .1M 50V
C14, C16	2	150-0004	CAP. E 10M 25V
C1, C2, C7, C13, C15	5	150-0023	CAP. E 10MF 15V
R7	1	475-0004	POT. 1K TRIMMER
R8 R10	2	475-0005	POT. 2K TRIMMER
R28	1	473-0001	RES. .1 OHM 5W 3%
R15 R19 R27	3	471-0101	RES. 100 OHM 1/2W 5%
R4 R29-R31	4	472-0010	RES. 1 OHM 1/2W 5%
R33	1	471-0104	RES. 100K OHM 1/2W 5%
R22	1	471-0332	RES. 3.3K OHM 1/2W 5%
R14 R21	2	471-0103	RES. 10K OHM 1/2W 5%
R13 R16 R18	3	471-0152	RES. 1.5K OHM 1/2W 5%
R7 R25 R26	3	471-0272	RES. 2.7K OHM 1/2W 5%
R3	1	471-0822	RES. 8.2K OHM 1/2W 5%
R2 R5 R6 R7 R10 R22-R24	8	471-0102	RES. 1K OHM 1/2W 5%
R1 R12	2	471-0562	RES. 5.6K OHM 1/2W 5%
U3	1	313-0001	I.C. LM723
U1, U2, U4	3	313-0004	I.C. LM741 EN
ITEM NO.	QTY	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ARE
FRACTIONS DECIMALS ANGLES

CONTRACT NO.

APPROVALS DATE

DRAWN K. BREWER 7-6-77

CHECKED 2/10/77

APPR. W. WILSON 7-7-77

K. BREWER 3/24/78

GREMLIN INDUSTRIES INC.

8401 AERO DR SAN DIEGO, CA. 92123

POWER SUPPLY/AMP. BOARD
BLOCKADE
PARTS OVERLAY

SIZE	CODE IDENT NO.	DRAWING NO.	REV
D		807-0002	C
SCALE 2 X			
SHEET 1 OF 2			

COMIT RII

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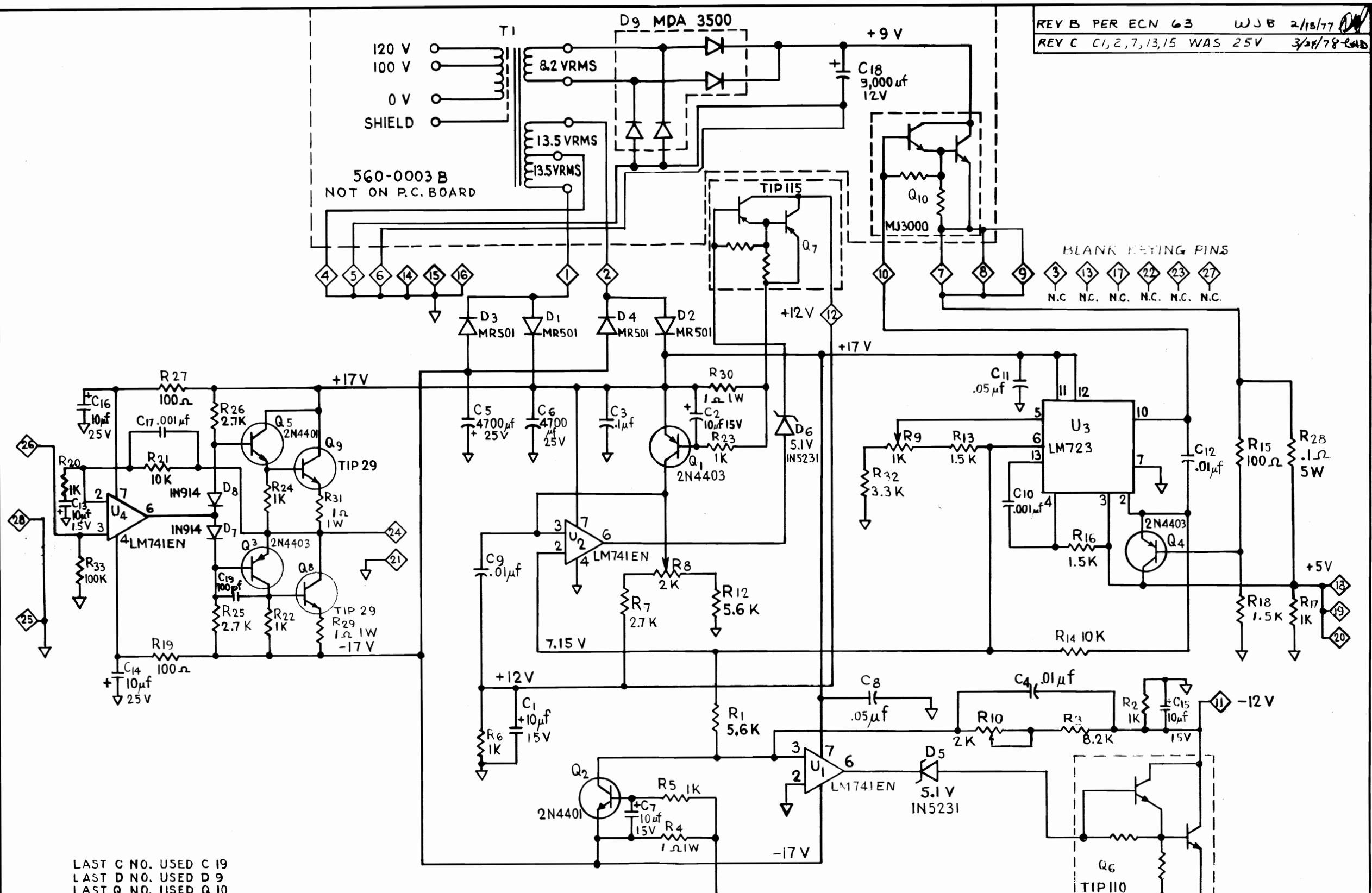
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LAST C NO. USED C 19
LAST D NO. USED D 9
LAST Q NO. USED Q 10
LAST R NO. USED R 33
LAST U NO. USED U 4

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

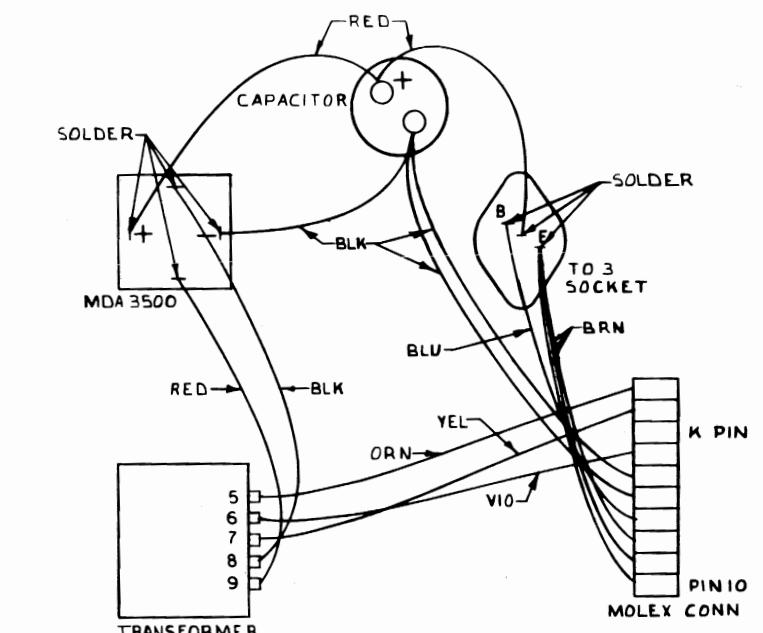
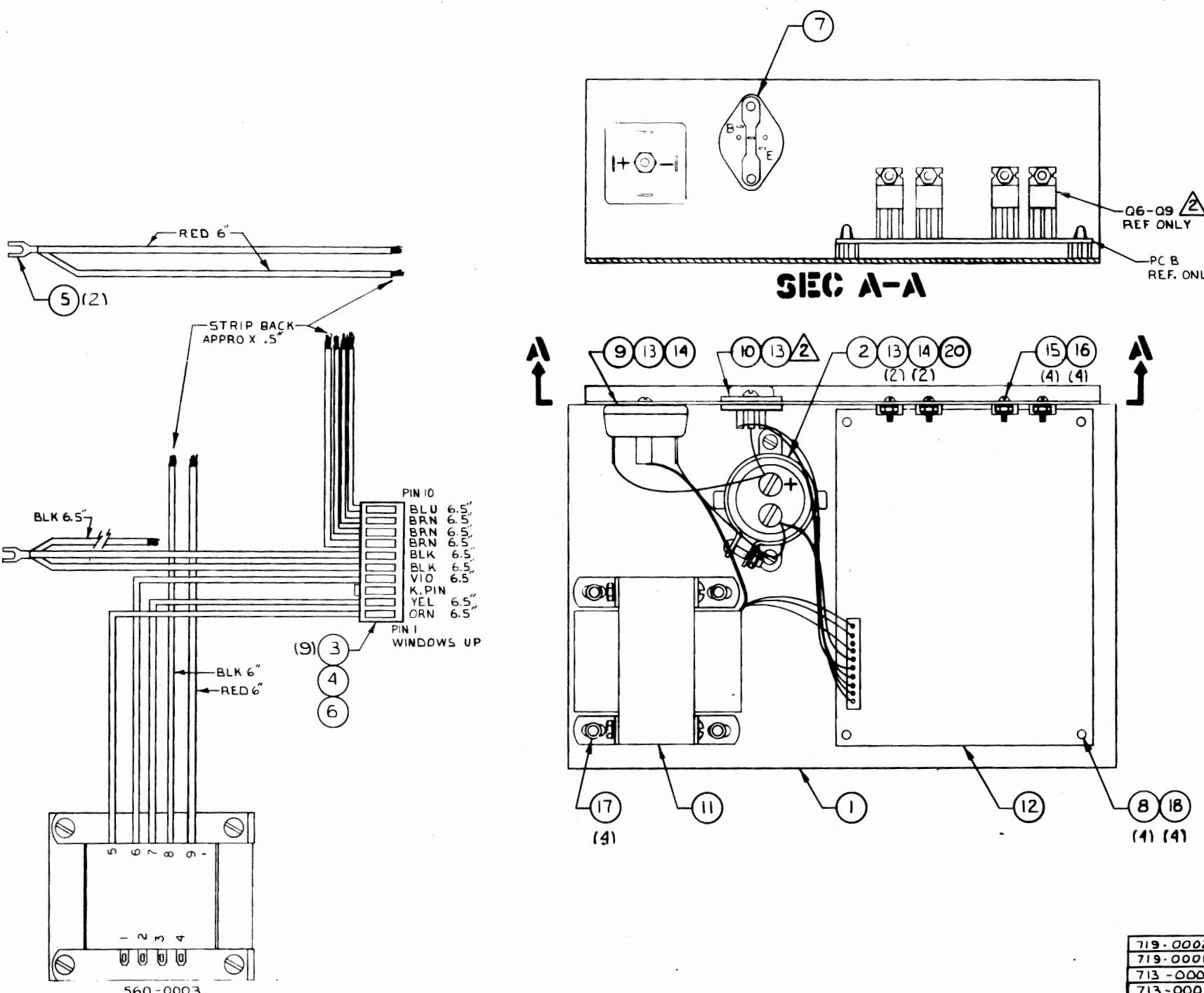
REVISIONS		TITLE	
		SCHEMATIC	
		BLOCKADE PWR. SUPPLY	
DRAWN	Joe M.	CHECKED	SCALE
			NONE
APPROVED		DRAWING NO.	
		807-0002	

GREMLIN IND. INC. SAN DIEGO CA 92123		PARTS LIST	TITLE ASSY PWR SUPPLY		807-00003	DWG NO	SH I OF 3	B REV
RELEASED	DESIGN		DRAWN	CHECK	ENGR	APPR		
LTR	AUTH	REVISION DESCRIPTION	DRAFT	CHECK	APPR			
A		RELEASED						
B	3/24/78	ADDED CAP. CLAMP						

GREMLIN IND INC SAN DIEGO CA 92123		PARTS LIST	TITLE ASSY. PWR.SUPPLY	807-0003 DWG NO	SH 2 OF 3	B REV
ITEM NO	PART NO	QTY PER ASSY	DESCRIPTION		REF DES	
1	140-0015		1 CHASSIS POWER SUPPLY			
2	150-0022		1 CAP.E.9000M 12V			
3	211-0005		9 CONN,CRIMP LOCK			
4	211-0007		1 CONN,KEY,POLARIZING			
5	211-0019		2 CONN SPADE LUG 1/4"			
6	212-0016		1 CONN. FEM 10 PIN			
7	213-0006		1 SOCKET, TO-3			
8	280-0014		4 STAND-OFFS, CLIPS			
9	481-0009		1 DIODE, MDA 3500			
10	482-0011		1 XISTOR, MJ 3000			
11	560-0003		1 XFMR MODEL 4-10345B			
12	807-0002		1 ASSY PWR SUPP/AMP B			
			SCHEM. ASSY PWR SUPP (REFERANCE)			
13		5	SCR-MACH P.HD. # 6-32 X 1 1/2"			
14		3	NUT HEX. # 6-32			
15		4	SCR-MACH.RD:HD.# 4-40X3X8"			
16		4	NUT HEX. # 4-40			
17		4	RIVET, POP 3/16"			
18		4	SCR-MACH. HEX. WAS.HD. 1/4-20 X 5/8"			
19		1	CLAMP CAP VR3 1 3/8"			
20						
21						
22						

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REVISIONS		DESCRIPTION		DATE	APPROVED
ZONE	LTR				
A	RELEASED			3-3-78	SPT
		SEE P/L FOR FURTHER REVISIONS			



WIRING DIAGRAM

SEE DETACHED PARTS LIST 807-0003

QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	
			PARTS LIST	
719-0002	BLASTO	CONTRACT NO.	Gromin Industries, Inc. San Diego, California 92126	
719-0001	BLASTO	APPROVALS	LEF LIPTAK 3-3-78	
713-0005	S/D HUSTLE	DATE	CHECKED 3-3-78	
713-0002	HUSTLE II		P.M.D. 3-3-78	
713-0001	HUSTLE I			
708-0004	COMOTION II A			
708-0002	COMOTION II			
708-0001	COMOTION I			
707-0001	BLOCKADE			
NEXT ASSY USED ON				
APPLICATION		DO NOT SCALE DRAWINGS		
SCALE FULL			REV B	
SIZE D		DRAWING NO 807-0003	SHEET 3 OF 3	

ASSY
POWER SUPPLY

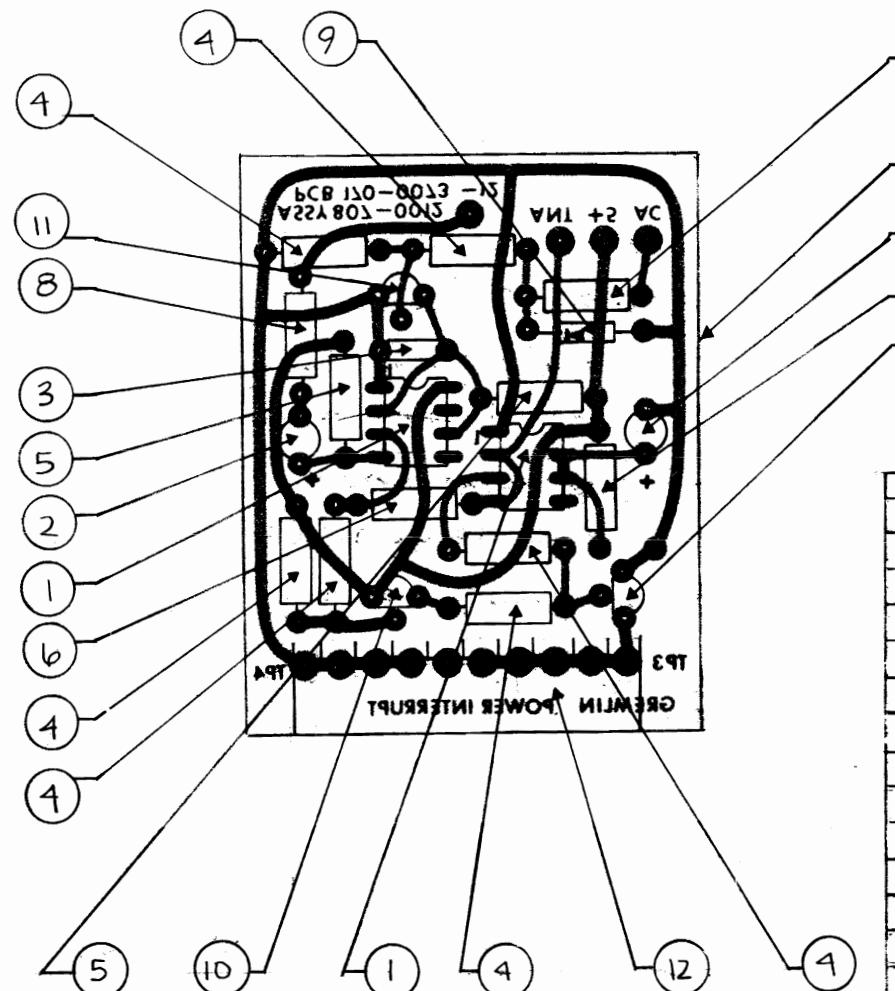
NOTES:
UNLESS OTHERWISE SPECIFIED
② ALL POWER TRANSISTORS TO BE MOUNTED WITH
HEAT SINKING PASTE & INSULATING HARDWARE

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REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
-	A	REVISED + REDRAWN PER ECRN 131 KB	8-5-77	RAB
	B	C2 & 3 WAS "CAPE. 1M 75V," ADDED SH2	3/29/78	FND

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.
		MATERIAL	APPROVALS DATE DRAWN K. BREWER 8-5-77 CHECKED <i>Randall Root</i> 3/29/78
		FINISH	
			SIZE CODE IDENT NO. DRAWING NO. C 807-001Z REV B
			SCALE NONE SHEET 1 OF 2

GromMin Industries, Inc.
San Diego, California 92123

**POWER INTERRUPT ASSY
PARTS OVERLAY**

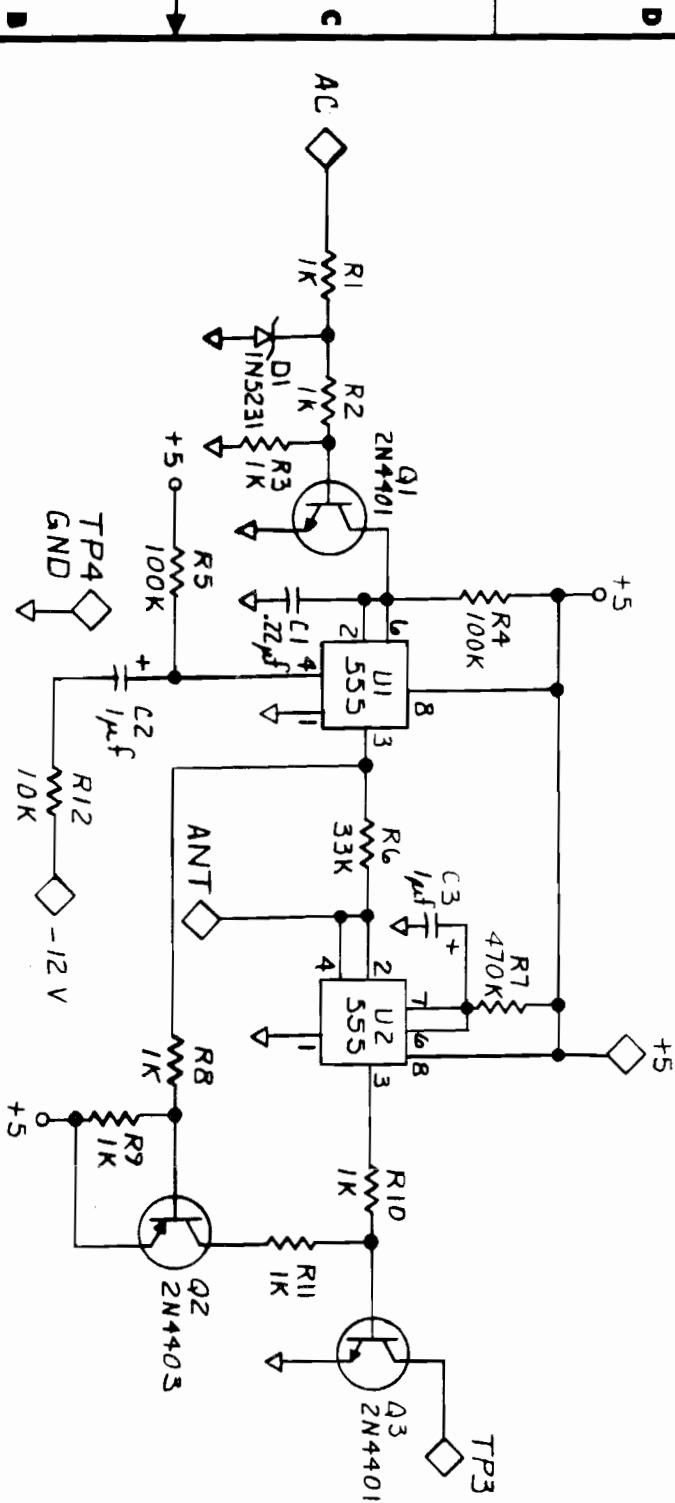
NEXT ASSY	USED ON
APPLICATION	DO NOT SCALE DRAWING

4

3

2

1



UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		CONTRACT NO.		GREMLIN INDUSTRIES INC. 8401 AERO DR. SAN DIEGO, CA 92123	
TOLERANCES: ANGLES		APPROVALS		DATE	
FRACTIONS DECIMALS	±	DESIGN	12/27/68		
XX ±	XX ±	MANUFACTURE	12/27/68		
MATERIAL		SCHEMATIC — 12/27/68 POWER INTERRUPT			
PRINTED	APPLIED ON	SIZE	CODE IDENT NO.	DRAWING NO.	REV
DO NOT SCALE DRAWING		B		807-0012	B
PRINT AREA	APPLICATION	SCALE	NOTE	SHEET	OF
				2	2

Gremm Industries, Inc.
San Diego, California 92108

PARTS LIST TITLE
VIDEO LOGIC BOARD 819-0001
DWG NO

SH 2
OF 8
REV

ITEM NO	PART NO	QTY PER ASSY	DESCRIPTION	REF DES
1	150-0004	4	CAP E. 10 μ f 25V	C12,C22,C23,C45
2	150-0012	2	CAP E. 47 μ f 25V	C32,C38
3	150-0015	2	CAP E. 22 μ f 16V	E27,C35
4	151-0001	27	CAP CER. .05 50V	C1-C10,C14-C17,C19-C21,C24-C25,C40-C42,C44,C46,C48,C52
5	151-0005	1	CAP CER. 680 pf 50V	C13
6	151-0008	1	CAP CER. .001 μ f 50V	C50
7	151-0011	1	CAP CER. .01 μ f 50V	C49
8	151-0012	8	CAP CER. .1 μ f 50V	C18,C28-C30,C34,C36,C37,C39
9	152-0001	1	CAP F. .1 μ f 100V	C26
10	152-0007	1	CAP F. .001 μ f 250V	C43
11	152-0015	2	CAP F. .033 μ f 250V	C31,C33
12	170-0057	1	PCB VIDEO LOGIC	
13	211-0004	7	CONN PIN TEST PT	TPI-TPT
14	212-0003	5	CONN MALE 10 PIN	
15	212-0004	2	CONN MALE 4 PIN	
16	213-0002	6	SKT 18 PIN DUAL INL	XU2-XU7
17	213-0004	2	SKT 16 PIN DUAL INL	XU29,XU43
18	"30-00061"		XTAL 2.720 MHz CLK	Y1

Gremlin Industries, Inc.
San Diego, California 92113

ITEM NO	PART NO	QTY PER ASSY	DESCRIPTION	TITLE		DWG NO	SH 4 OF 8	A REV
				VIDEO	LOGIC BOARD BLASTO			
42	3/16 - 0090	1	I.C. PROM 1024 X 4			U3		
43	3/16 - 0091	1	I.C. PROM 1024 X 4			U4		
44	3/16 - 0092	1	I.C. PROM 1024 X 4			U5		
45	3/16 - 0093	1	I.C. PROM 512 X 4			U29		
46	3/16 - 0094	1	I.C. PROM 512 X 4			U43		
47	390 - 0003	1	L.E.D. RED			D7		
48	471 - 0101	1	RES 100 OHMS 1/2 W 5%			R53		
49	471 - 0102	42	RES 1K OHMS 1/2 W 5%			R1-R27,R37,R39-R41,R44		
50	471 - 0103	2	RES 10K OHMS 1/2 W 5%			R58,R67		
51	471 - 0150	1	RES 15 OHMS 1/2 W 5%			R49		
52	471 - 0154	1	RES 150K OHMS 1/2 W 5%			R72		
53	471 - 0220	2	RES 22 OHMS 1/2 W 5%			R43,R45		
54	471 - 0221	5	RES 220 OHMS 1/2 W 5%			R28,R42,R54,R84,R86		
55	471 - 0222	1	RES 2.2K OHMS 1/2 W 5%			R38		
56	471 - 0223	9	RES 22K OHMS 1/2 W 5%			R29-R36,R60		
57	471 - 0224	1	RES 220K OHMS 1/2 W 5%			R68		
58	471 - 0272	1	RES 2.7K OHMS 1/2 W 5%			R78		
59	471 - 0331	4	RES 330 OHMS 1/2 W 5%			R46,R47,R81,R82		
60	471 - 0333	4	RES 33K OHMS 1/2 W 5%			R59,R63,R66,R70		
61	471 - 0334	1	RES 330K OHMS 1/2 W 5%			R57		
62	471 - 0471	1	RES 470 OHMS 1/2 W 5%			R52		

Gremlin Industries, Inc.
San Diego, California 92113

San Diego, California 92123

ITEM NO		PARTS LIST	TITLE VIDEO LOGIC BOARD BLASTO	819-00001 DWG NO	SH 5 OF 8 REV A
ITEM NO	PART NO	QTY PER ASSY	DESCRIPTION	REF DES	
63	471-0473	1	RES 47K OHMS 1/2W 5%	R62	
64	471-0512	4	RES 5.1K OHMS 1/2W 5%	R48, R51, R56, R73	
65	471-0682	2	RES 6.8K OHMS 1/2W 5%	R61, R71	
66	471-0822	1	RES 8.2K OHMS 1/2W 5%	R77	
67	475-0002	1	POT 1 MEG OHMS CTS	R75	
68	475-0008	1	POT 50K OHMS CTS	R74	
69	481-0001	1	DIODE IN4002	D5	
70	481-0006	1	DIODE IN914 OR IN4148	D8	
71	481-0008	1	DIODE ZENER IN5231	D2	
72	482-0002	1	XSTR 2N3565	D6	
73	482-0006	1	XSTR 2N4403	Q8	
74	482-0010	1	XSTR PE8050	Q3	
75	482-0014	1	XSTR 2N4401	Q4-Q7 Q9-Q11	
76	213-0005	1	SKT 40 PIN DUAL INLN	U19	

Gremlin Industries, Inc.
San Diego, California 92123

ITEM NO	PART NO	QTY PER ASSY	DESCRIPTION	TITLE		SH 3 OF 8	A REV
				V	VIDEO LOGIC BOARD		
19	313-0004	1	I.C. LM741	U65			
20	314-0001	1	I.C. NE555 DIP	U68			
21	314-0006	6	I.C. 7474	U9, U54-U57, U60			
22	314-0009	5	I.C. 7400	U8, U18, U21, C44, U50			
23	314-0010	1	I.C. 7410	U48			
24	314-0011	2	I.C. 7442	U1, U17			
25	314-0012	3	I.C. 7408	U20, U22, U23, U33,			
26	314-0015	1	I.C. 7404	U45-U47, U63			
27	314-0017	8	I.C. 74125	U10-U13, U15, U16, U27, U28			
28	314-0020	1	I.C. 7430	U59			
29	314-0021	4	I.C. 7475	U19 U51 U61 U62			
30	314-0022	1	I.C. 7486	U64			
31	314-0029	3	I.C. 74157	U24-U26			
32	314-0030	2	I.C. 74393	U52, U58			
33	314-0031	1	I.C. 7426	U30			
34	314-0032	1	I.C. 74160	U31			
35	314-0038	3	I.C. 74163	U53, U66, U67			
36	314-0039	1	I.C. 74166	U49			
37	314-0040	1	I.C. 74504	U32			
38	315-0014	1	I.C. 8080A CPU	U19			
39	315-0015	6	I.C. 2102 RAM (500NS)	U37-U42			
40	315-0018	2	I.C. 2111 RAM (500NS)	U6, U7			
41	316-0089	1	I.C. PROM 1024X4	U2			

Gremlin Industries, Inc.
2200 Shadeland, Indianapolis, Indiana 46226

PARTS
LIST

TITLE
VIDEO LOGIC BOARD

819-0001

SH /
A
REV

DRAWN

ENGR

CHECK

APPR

CHECK *John DeLancey*

APPR *Steve J. Fay*

CHECK

APPR

LTR

DRAFT

CHECK

APPR

DATE

Wynema

F&D

J.H.

PARTS

Wynema

F&D

J.H.

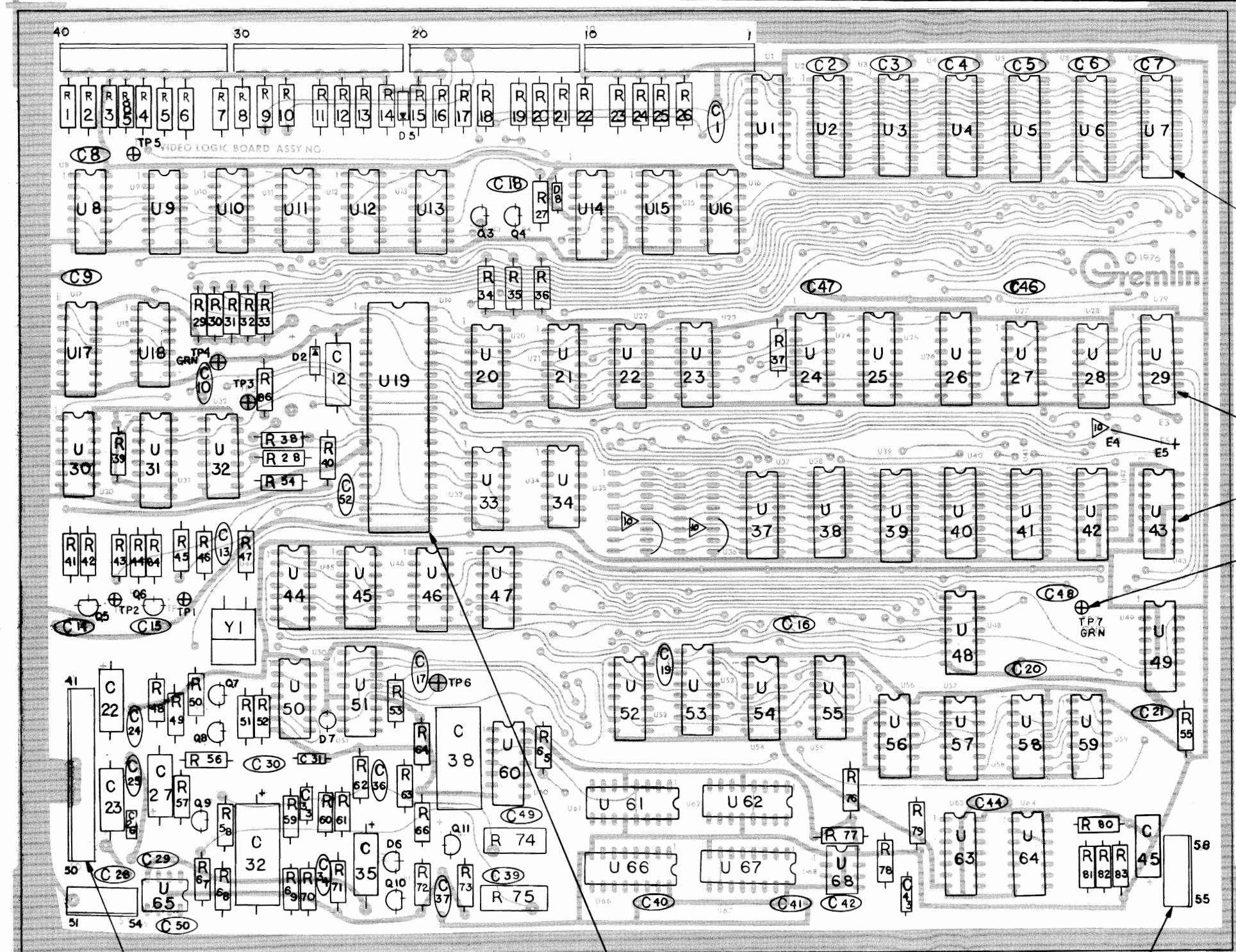
LIST

Wynema

F&D

J.H.

8 7 6 5 4 3 2 1



6. OMIT Q1,Q2,D1,D3,D4,U35,U36,C11,C51,E1,E2

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: UNLESS OTHERWISE SPECIFIED

▷ JUMPER WIRES AT NOTES

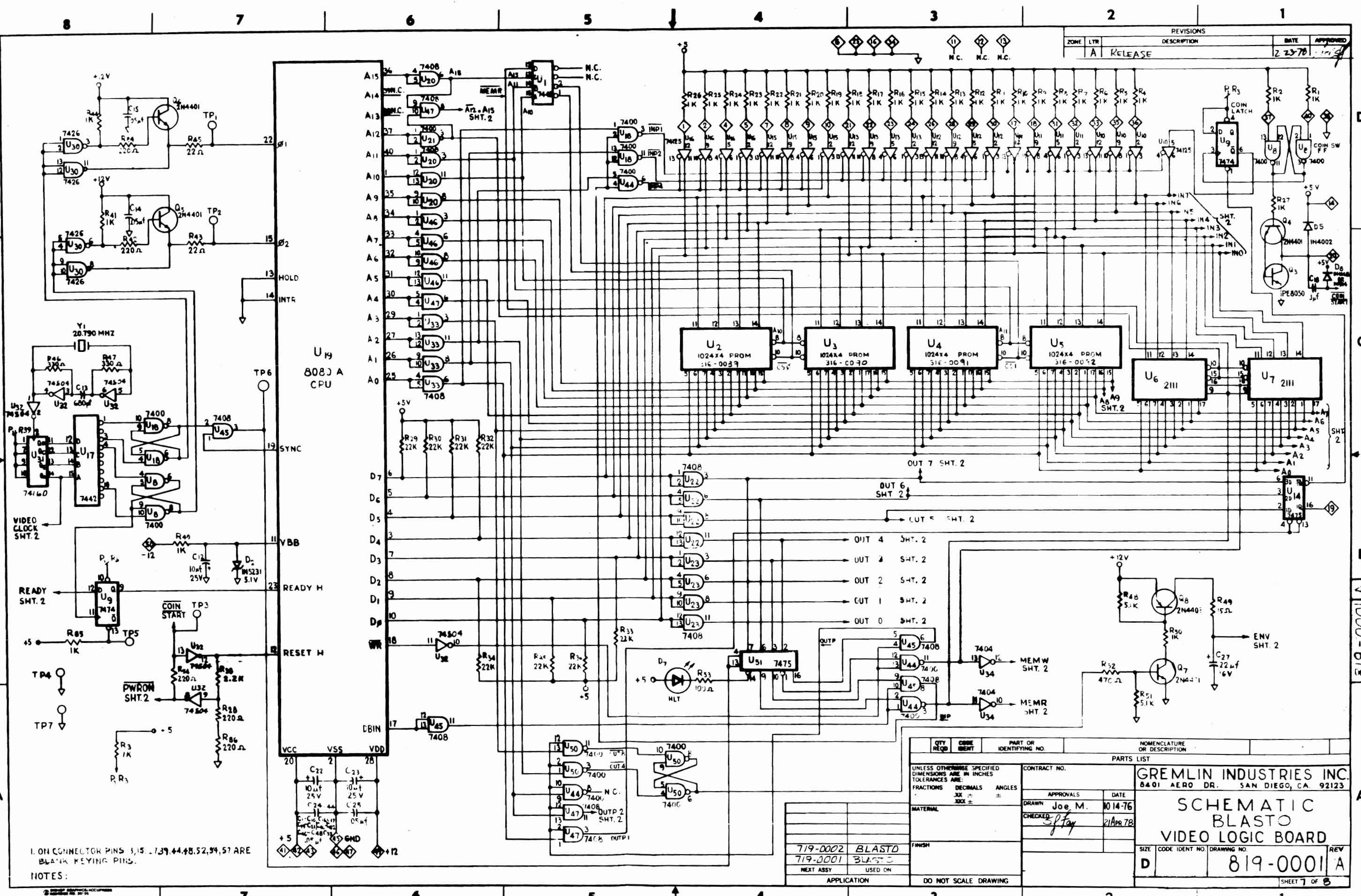
9. CAPACITANCE VALUES ARE IN MICROFARADS

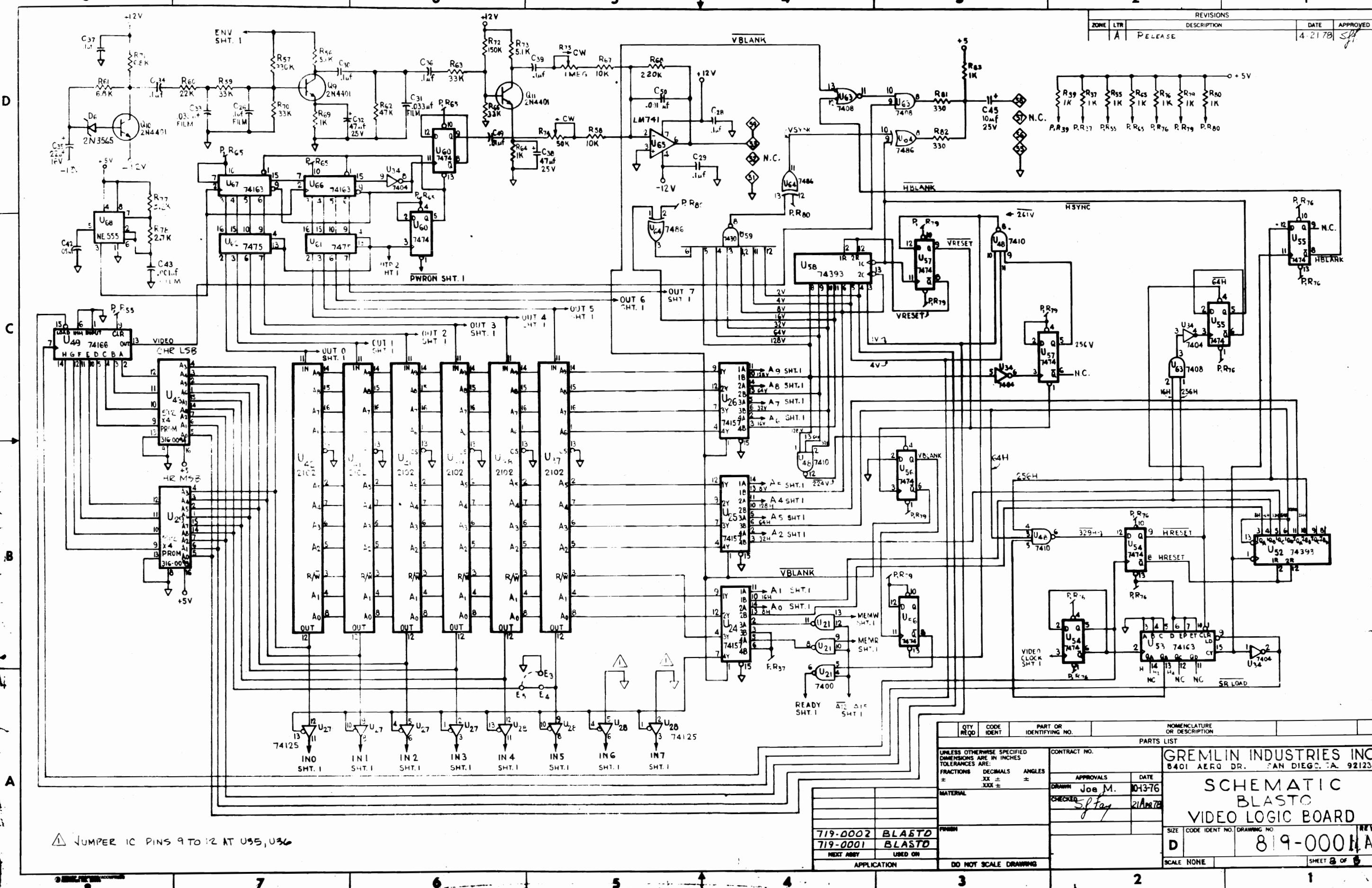
8. RESISTANCE VALUES ARE IN OHMS

7. ON CONNECTOR PINS 3,15,27,39,44,48,52,54,57, ARE BLANK KEYING PINS

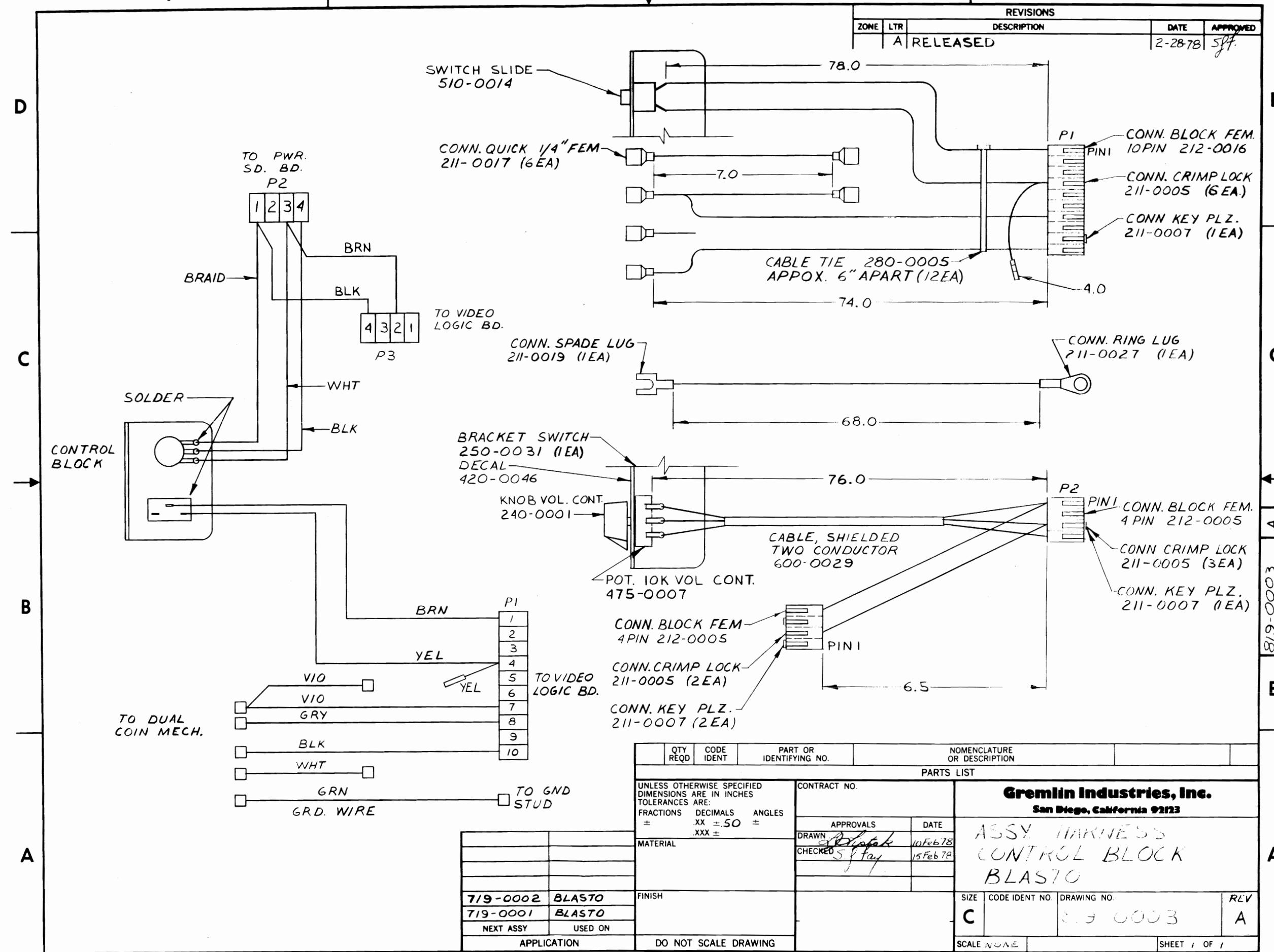
REVISIONS		DESCRIPTION	DATE	APPROVED
ZONE	LTR			

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 $\pm .XX$ $\pm .XXX$ \pm		CONTRACT NO.	Gremlin Industries, Inc. San Diego, California 92123	
MATERIAL		APPROVALS	DATE	
719-0002 BLASTO		DRAWN T.E.JOHNSON	5-16-78	
719 0001 BLASTO		CHECKED		
NEXT ASSY USED ON		FINISH		
APPLICATION		DO NOT SCALE DRAWING		
SCALE 2/1		SHEET 6 OF 8		





△ JUMPER IC PINS 9 TO 12 AT U35, U36



4

3

2

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GREMLIN INDUSTRIES, INC. SAN BRUNO, CALIFORNIA 94066		PARTS LIST	TITLE VIDEO LOGIC BOARD BLASTO		819-0026	SH 1	A	REV
LTR	DATE	REVISION DESCRIPTION	DRAFT	CHECK	APPR	OF 8		
A	5-5-78	REDRAWN	WYRMAN	RHD	RHD			

GREMLIN INDUSTRIES, INC. SAN DIEGO, CALIFORNIA 92113		PARTS LIST	TITLE VIDEO LOGIC BOARD	819-0026	SH 3 OF 3	A REV
ITEM NO	PART NO	QTY PER ASSY	DESCRIPTION		REF DES	
19	313-0004	1	1.C. LM1741		U65	
20	314-0001	1	1.C. NE555 DIP		U68	
21	314-0006	6	1.C. 7474		U9, U54-U57, U60	
22	314-0009	5	1.C. 7400		U8, U18, U21, U44, U50	
23	314-0010	1	1.C. 7410		U48	
24	314-0011	2	1.C. 7442		U11, U17	
25	314-0012	3	1.C. 7408		U20, U22, U23, U33,	
26	314-0015	1	1.C. 7404		U45-U47, U63	
27	314-0017	8	1.C. 74125		U34	
28	314-0020	1	1.C. 7430		U28	
29	314-0021	4	1.C. 7475		U14, U51, U61, U62	
30	314-0022	1	1.C. 7486		U59	
31	314-0029	3	1.C. 74157		U24-U26	
32	314-0030	2	1.C. 74393		U64	
33	314-0031	1	1.C. 74160		U52, U58	
34	314-0032	1	1.C. 7426		U30	
35	314-0038	3	1.C. 74163		U31	
36	314-0039	1	1.C. 74166		U53, U66, U67	
37	314-0046	1	1.C. 74504		U49	
38	315-0014	1	1.C. 8080A CPU		U32	
39	315-0015	6	1.C. 2102 RAM (500NS)		U19	
40	315-0018	2	1.C. 2111 RAM (500NS)		U37-U42	
41	316-0095	1	1.C. 1074X4 PROM		U6, U7	

Gremlin Industries, Inc.
San Diego, California 92113

TITLE
VIDEO LOGIC BOARD
BLASTO

PARTS
LIST

DWG NO
819-0026

SH 5
OF 8
REV A

ITEM NO	PART NO	QTY PER ASSY	DESCRIPTION	REF DES
63	471-0473	1	RES 47K OHM 1/2W 5%	R62
64	471-0512	4	RES 5.1K OHM 1/2W 5%	R48,R51,R56,R73
65	471-0682	2	RES 6.8K OHM 1/2W 5%	R61,R71
66	471-0822	1	RES 8.2K OHM 1/2W 5%	R77
67	475-0002	1	POT 1MEG OHM CTS	R75
68	475-0008	1	POT 50K OHM CTS	R74
69	481-0001	1	DIODE IN4002	D5
70	481-0006	1	DIODE IN914 OR IN4148	D8
71	481-0008	1	DIODE ZENER IN5231	D2
72	482-0002	1	XSTR 2N3565	D6
73	482-0006	1	XSTR 2N4403	Q8
74	482-0010	1	XSTR PE8050	Q3
75	482-0014	7	XSTR 2N4401	Q4-Q7 Q9-Q11
76	213-0005	1	SKT 40 PIN DUAL INLN	XU19

Gremlin Industries, Inc.
San Diego, California 92113

ITEM NO	PART NO	QTY PER ASSY	TITLE VIDEO LOGIC BOARD	B19-0026		SH 4 OF 8	A REV
				V1	DWG NO		
42	316-0096	1		I.C. 1024 X4 PROM	U3		
43	316-0191	1		I.C. 1024 X4 PROM	U4		
44	316-0098	1		I.C. 1024 X4 PROM	U5		
45	316-0099	1		I.C. 512 X 4 PROM	U29		
46	316-0100	1		I.C. 512 X 4 PROM	U43		
47	390-0003	1	L.E.D. RED		D7		
48	471-0101	1	RES 100 OHM 1/2W 5%		R53		
49	471-0102	42	RES 1K OHM 1/2W 5%		R1-R27,R37,R39-R41,R44,R50, R55,R64,R65,R69,R76,R79,R80		
50	471-0103	2	RES 10K OHM 1/2W 5%		R58,R67		
51	471-0150	1	RES 15 OHM 1/2W 5%		R49		
52	471-0154	1	RES 150K OHM 1/2W 5%		R72		
53	471-0220	2	RES 22 OHM 1/2W 5%		R43,R45		
54	471-0221	5	RES 220 OHM 1/2W 5%		R28,R42,R54,R84,R86		
55	471-0222	1	RES 2.2K OHM 1/2W 5%		R38		
56	471-0223	9	RES 22K OHM 1/2W 5%		R29-R36,R60		
57	471-0224	1	RES 220K OHM 1/2W 5%		R68		
58	471-0272	1	RES 2.7K OHM 1/2W 5%		R78		
59	471-0331	4	RES 330 OHM 1/2W 5%		R46,R47,R81,R82		
60	471-0333	4	RES 33K OHM 1/2W 5%		R59,R63,R66,R70		
61	471-0334	1	RES 330K OHM 1/2W 5%		R57		
62	471-0471	1	RES 470 OHM 1/2W 5%		R52		

Gremlin Industries, Inc.
San Diego, California 92113

PARTS
LIST

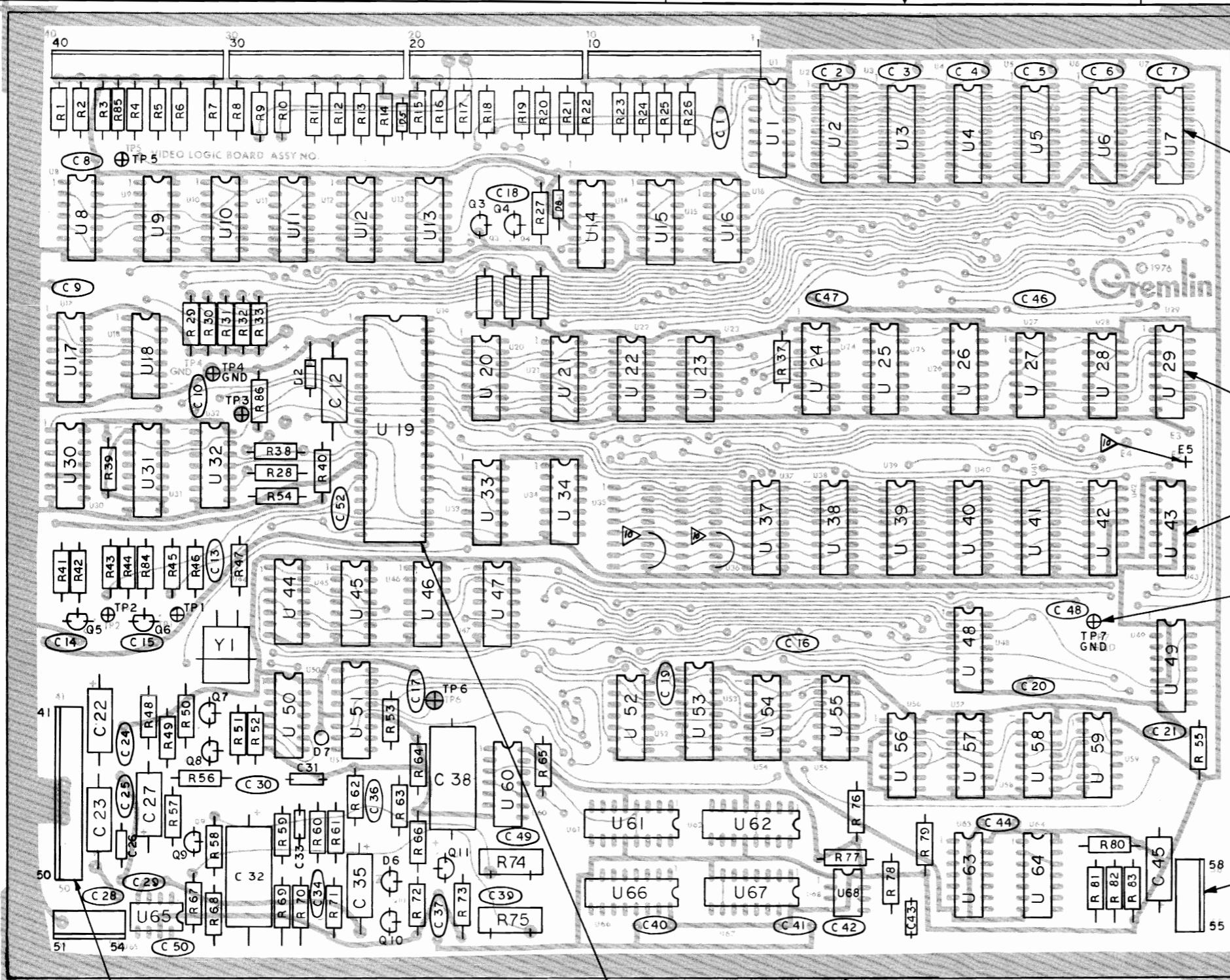
TITLE
VIDEO LOGIC BOARD

819-0026

DWG NO

A
REV

ITEM NO	PART NO	QTY PER ASSY	DESCRIPTION	REF DES
1	150-0004	4	CAP E. 10 μ f 25V	C12,C22,C23,C45
2	150-0012	2	CAP E. 47 μ f 25V	C32,C38
3	150-0015	2	CAP E. 22 μ f 16V	C27,C35
4	151-0001	27	CAP CER. .05 μ f 50V	C1-C10,C14-C17,C19-C21,C24
5	151-0005	1	CAP CER. 680 μ f 50V	C25,C40-C42,C44,C46-C48,C52
6	151-0008	1	CAP CER. .001 μ f 50V	C50
7	151-0011	1	CAP CER. .01 μ f 50V	C49
8	151-0012	8	CAP CER. .1 μ f 50V	C18,C28,C30,C34,C36,C37,C39
9	152-0001	1	CAP F. .1 μ f 100V	C26
10	152-0007	1	CAP F. .001 μ f 250V	C43
11	152-0015	2	CAP F. .033 μ f 250V	C31,C33
12	170-0057	1	PCB VIDEO LOGIC	
13	211-0004	7	CONN PIN TEST PT	TP1-TP7
14	212-0003	5	CONN MALE 10 PIN	
15	212-0004	2	CONN MALE 4 PIN	
16	213-0002	6	SKT 18 PIN DUAL INL	XU2-XU7
17	213-0004	2	SKT 16 PIN DUAL INL	XU29,XU43
18	230-0006	1	XTAL 20.790 MHZ CLK	Y1



SEE DETACHED PARTS LIST

6. OMIT Q1, Q2, D1, D3, D4, U3S, U3G, C11, C51, E1, E2
 5. LAST C No. USED C52
 4. LAST D No. USED DB
 3. LAST R No. USED RB6
 2. LAST Q No. USED Q11
 1. LAST U No. USED UGB
 NOTES: UNLESS OTHERWISE SPECIFIED

10. JUMPER WIRES AS NOTE

9. CAPACITANCE VALUES ARE IN MICROFARADS

5. RESISTANCE VALUES ARE IN OHMS

7. ON CONNECTOR PINS 8,15,27,39,44,48,52,54,57 ARE BLANK KEYING PIN

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.		Gremlin Industries, Inc. San Diego, California 92123
± .XX ± .XXX ±		APPROVALS	DATE	P.C. ASSEMBLY _____ VIDEO LOGIC BOARD BLASTO
MATERIAL		DRAWN <i>Steve M.</i>	5/16/78	
		CHECKED		
FINISH				SIZE CODE IDENT NO. DRAWING NO. D 819-0026
DO NOT SCALE DRAWING				REV A SCALE 2/1 SHEET 6 OF 8

8

7

6

5

4

3

2

1

REVISIONS

ZONE	LTR	DESCRIPTION	DATE	APPROVED
A	RELEASE		13-23-78	RHD

D

D

C

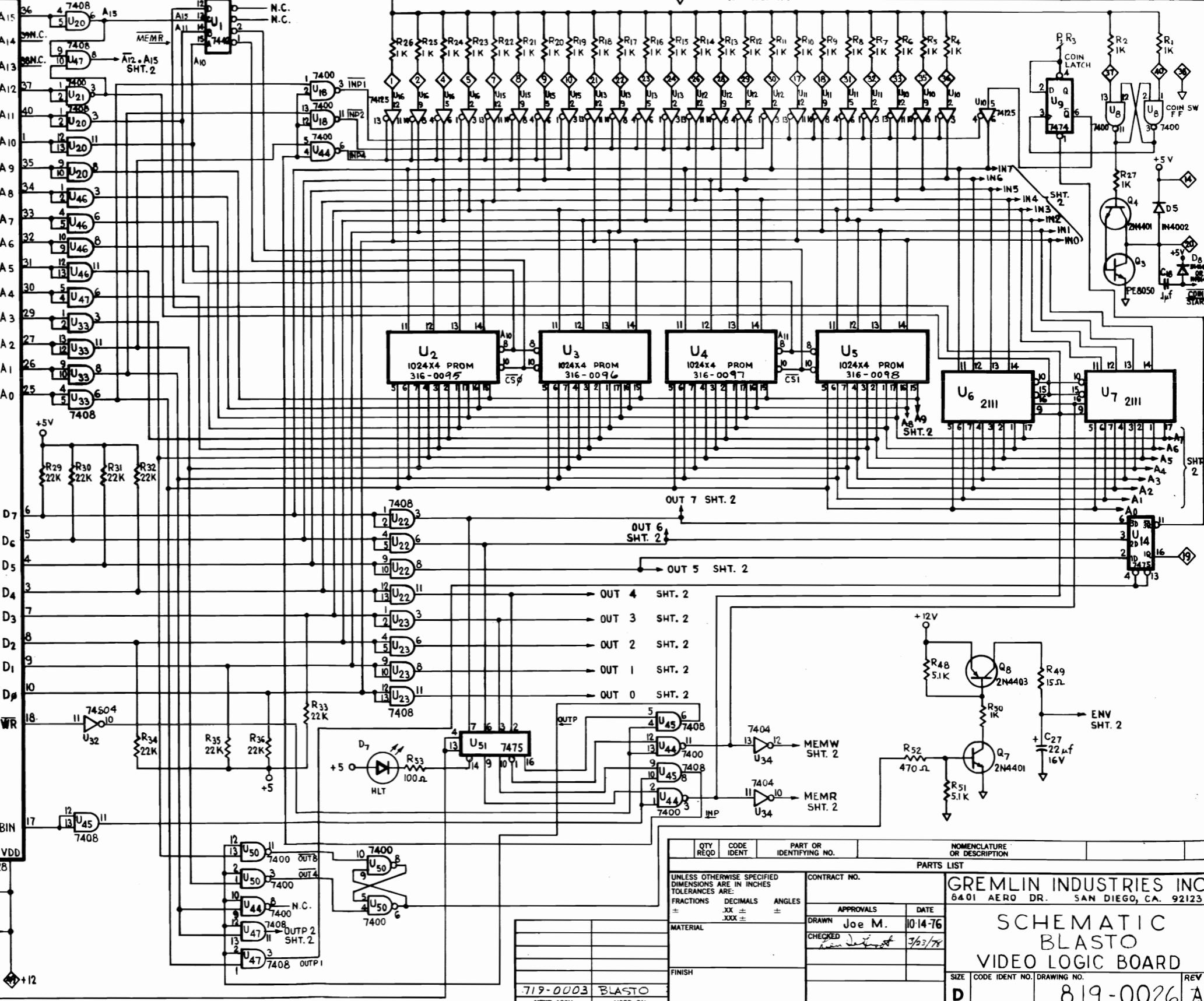
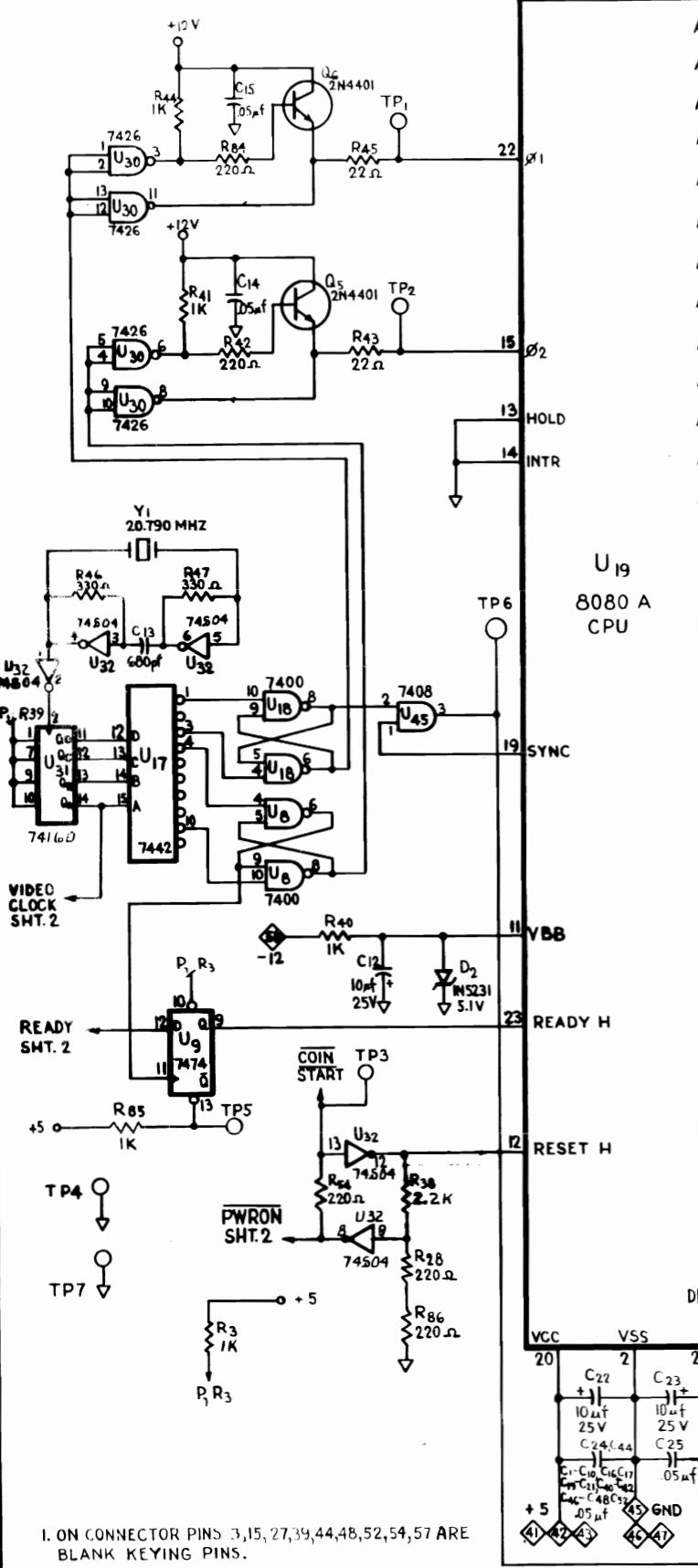
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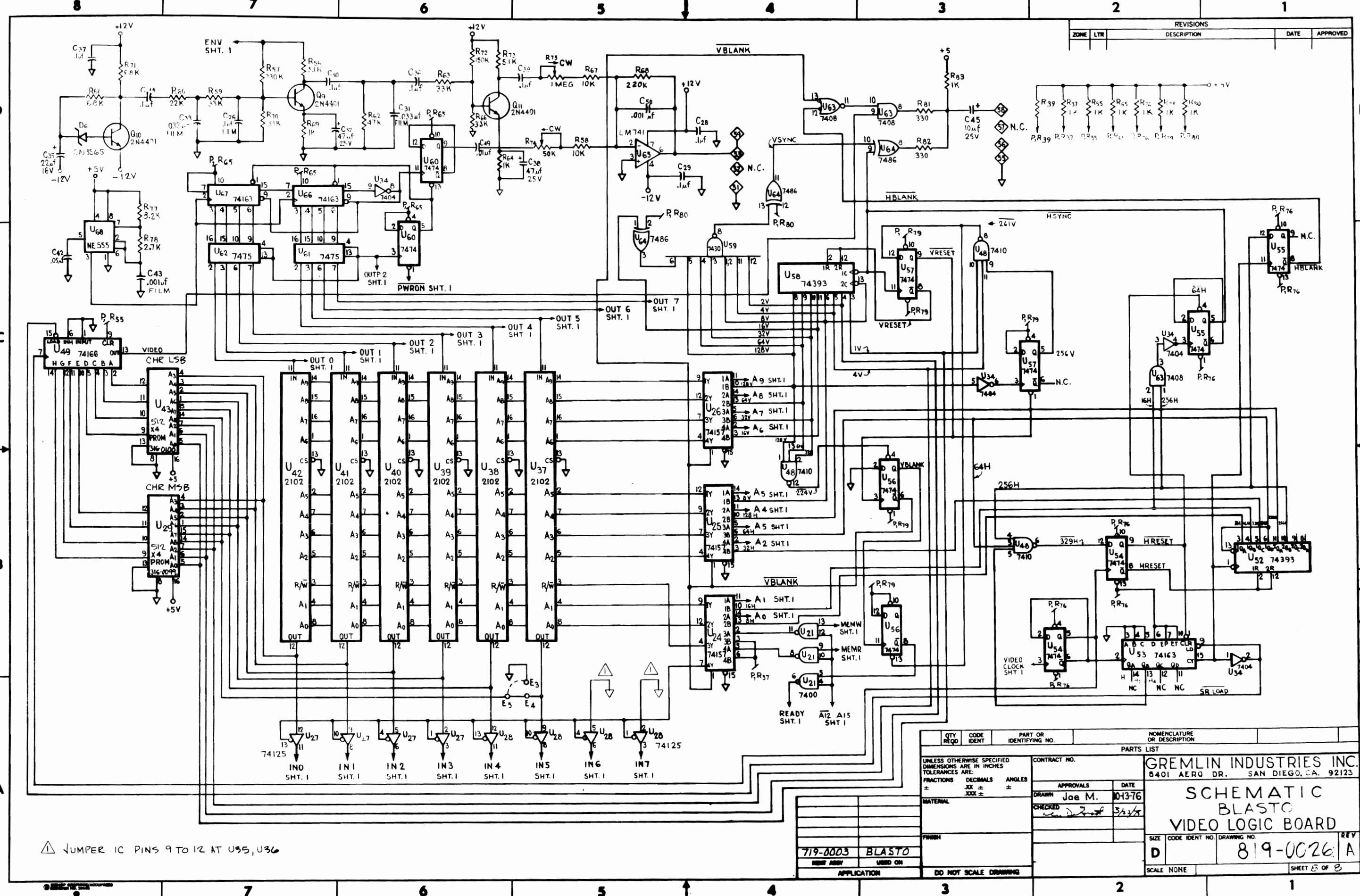
B

B

A

A





Gremlin Industries, Inc.
San Diego, California 92113

PARTS
LIST

TITLE
CONTROL PANEL ASSY

819 - 0027
DWG NO

SH 1
OF 3
A
REV

SHEET 3 IS D SIZE

DRAWN G. SMITH
CHECK *Ron D. Knott*

ENGR
APPR

LTR DATE REVISION DESCRIPTION

DRAFT CHECK APPR

1 3/9/78 PROTO

K4D K4D

A 4/15/78 RELEASE

Gremlin Industries, Inc.
San Diego, California 92113

ITEM NO	PART NO	QTY PER ASSY LIST	TITLE	DWG NO	SH 2 OF 3	A REV
			CONTROL PNL ASSY			
1	819 - 0031	2	SWITCH ASSY JOY STICK			
2	240 - 0009	2	BUTTON PLUNGER YELLOW			
3	240 - 0006	2	BUTTON PLUNGER REC -			
4	250 - 0299	1	PANEL CONTROL UPRIGHT			
5	253 - 0031	8	SPACER, WICO SWITCH			
6						
7	510 - 0023	4	SWITCH, ASSY WICO			
8	253 - 0083	1	GRAPHIC CONTROL PNL.			
9		8	BOLT; 10-24 RD. HD SQ NECK 1/2" LG.			
10		8	NUT; 10-32 HEX.			
11		8	WASHER; #10 FLAT			
12		8	WASHER; #10 SPLIT LOCK			
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED

D

D

C

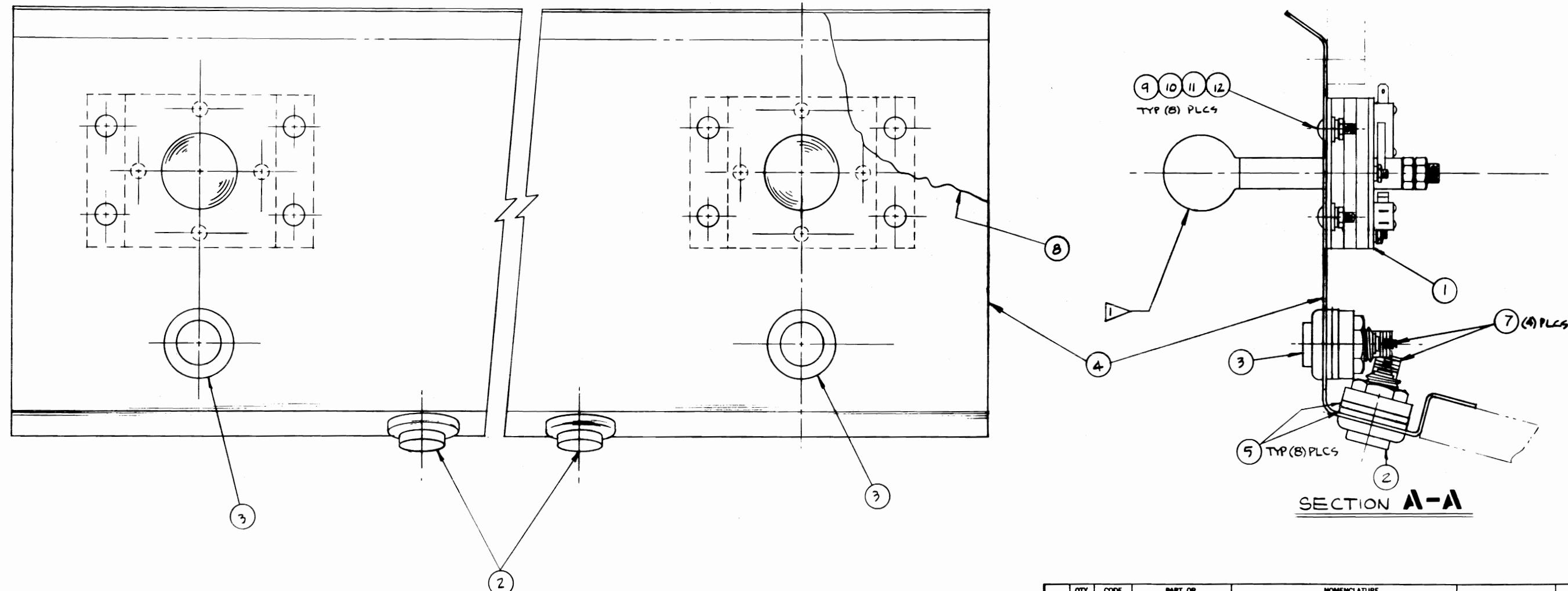
C

B

B

A

A



1. TO INSTALL B19-0031 SWITCH ASSY. TO OPERATOR PANEL, REMOVE CONTROL KNOB. WHEN RE-INSTALLING KNOB, SECURE TO THREADED ROD WITH LOCTITE OR EQUIVALENT SEIZING COMPOUND.

NOTE

QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	
PARTS LIST				
			CONTRACT NO.	Groenin Industries, Inc. San Diego, California 92126
			APPROVALS	DATE
			DRAWN G SMITH	7/14/76
			CHEESED	7/14/76
			MATERIAL	
			FINISH	
			SIZE	CODE IDENT NO. DRAWING NO.
			D	B19-0027 H REV
			SCALE	1:1
			SHEET	3 OF 3

Gremlin Industries, Inc. San Diego, California 92113		PARTS LIST	TITLE SWITCH ASSY, JOYSTICK SHT 3 IS 'B' SIZE	819-0031	SH 1 OF 3	A REV
		DRAWN G. SMITH	CHECK R. D. WOOD	ENGRAVED	APPR	
LTR	DATE	REVISION DESCRIPTION	DRAFT	CHECK	APPR	
A	4/5/78	RELEASED	F&D	RWD		

Gremlin Industries, Inc.
San Diego, California 92123

ITEM NO	PART NO	QTY PER ASSY	DESCRIPTION	REF DES		
				TITLE	PARTS LIST	TITLE
1	250-0293	1	ADAPTER, SWITCH MOUNTING			
2	253-0079	2	SPACER, SWITCH			
3	250-0294	1	PLATE, SWITCH			
4	250-0290	1	SPACER, TUBULAR 1"			
5	250-0291	1	SPACER, TUBULAR 2"			
6	250-0292	1	SPACER, TUBULAR (.275)			
7	250-0289	1	ROD, THREADED 3/8-24			
8	280-0106	1	ELASTOMER, LEVER RETURN			
9	240-0091	1	KNOB, CONTROL LEVER			
10	510-0041	4	SWITCH, SNAP ACTING			
11						
12		2	WASHER; A.S.TYP B PLAIN WASHER .406 I.D. 1.25 O.D.100T			
13		4	MACH. SCR; 8-32 SLT 100°FLT HD 1 3/8"-LG			
14		4	WASHER; #8 PLAIN TYP A			
15						
16		4	NUT; 8-32 UNC			
17		8	SCREW; 4-40 UNC CRS REC PAN HD 1/2" LG			
18		3	NUT, 3/8-24 UNF HEX JAMB			
19						
20						
21						
22						
23						
24						
25						

ZONE	LTR.	DESCRIPTION	DATE	APPROVED
A	RELEASED			

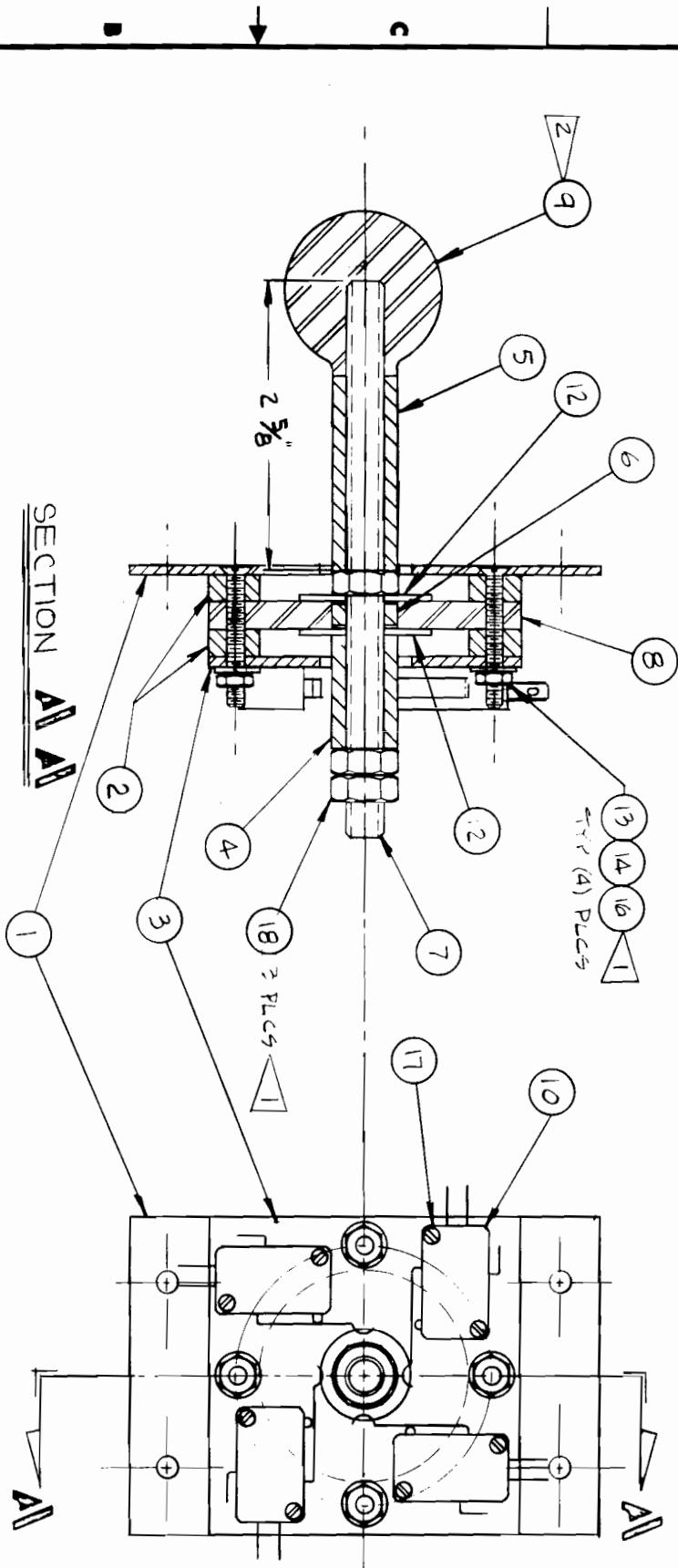
REVISIONS

1

2

3

4



► CONTROL KNOB TO BE TEMPORARILY
INSTALLED THIS ASSY.

► INSTALL NUTS WITH LOCTITE OR
EQUIVALENT SEIZING COMPOUND

NOTE:

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE DECIMALS		CONTRACT NO.		
FRACTIONS XX ± .03 ± 1/ 1/16		APPROVALS		
MATERIAL XXX ± .03 ± 1/ 1/16		DRAWN BY	MANUFACTURED BY	DATE
		J. M. WATTE	J. M. WATTE	
		CHEKED J. M. WATTE	J. M. WATTE	
		3/17/81		
FINISH		SIZE	CODE IDENT NO.	DRAWING NO.
		B		819-0031 A
APPLICATION		SCALE 1 : 1	SHEET 2 OF 3	REV.
NEXT ASSY	USED ON	DO NOT SCALE DRAWING		