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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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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:

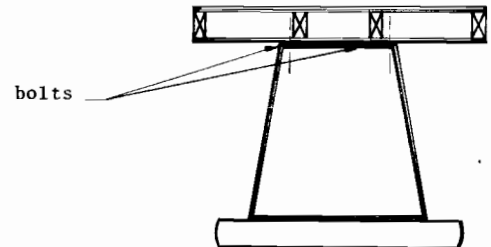
The system reset circuitry described above requires that the coin counter is attached to the system. If there is a coin counter problem and no replacement is available, the game will function properly if a 10K Ohm resistor is connected across the coin counter input pins to the video logic board.

REPACKAGING INSTRUCTIONS

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

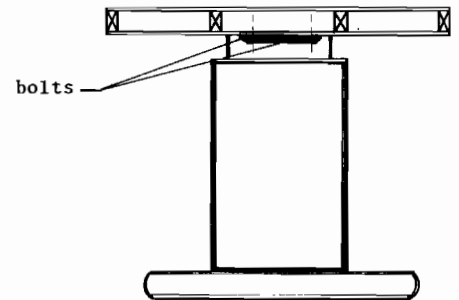
COCKTAIL VERSION:

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.



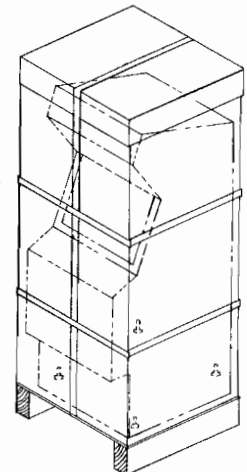
STAND-AROUND VERSION:

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.)

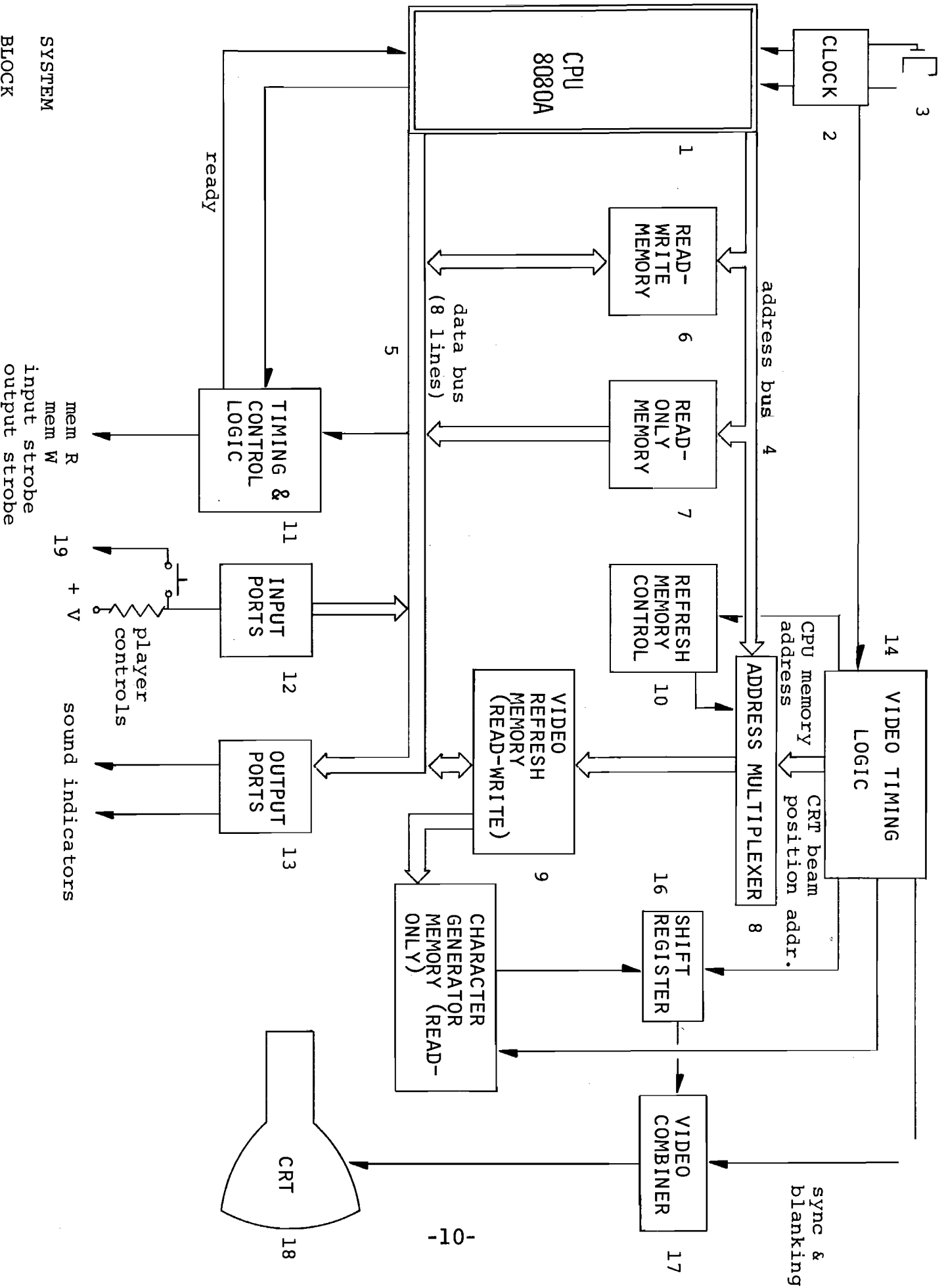
II. MICROPROCESSOR - (Cont'd.)

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.)

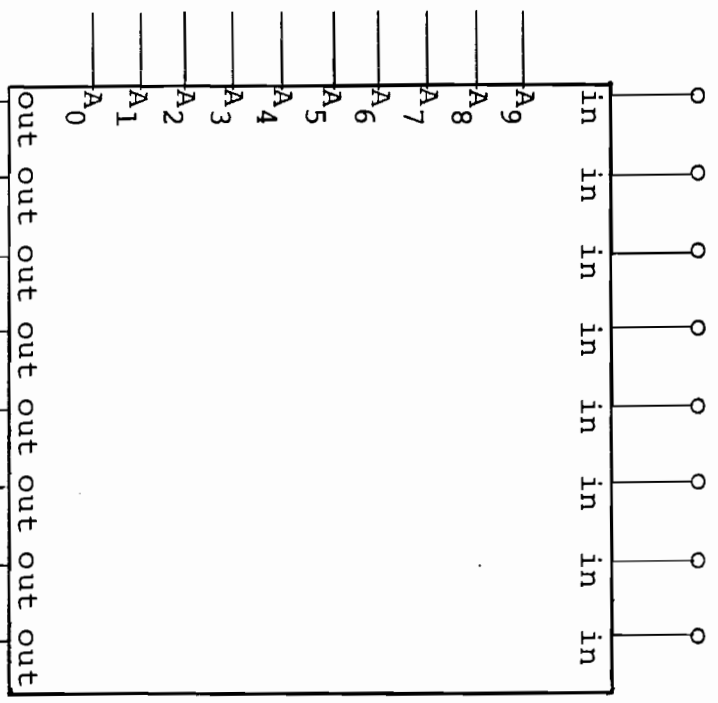


SYSTEM
BLOCK
DIAGRAM

MEMORY INPUT DATA
FROM MICROPROCESSOR

DATA BUS

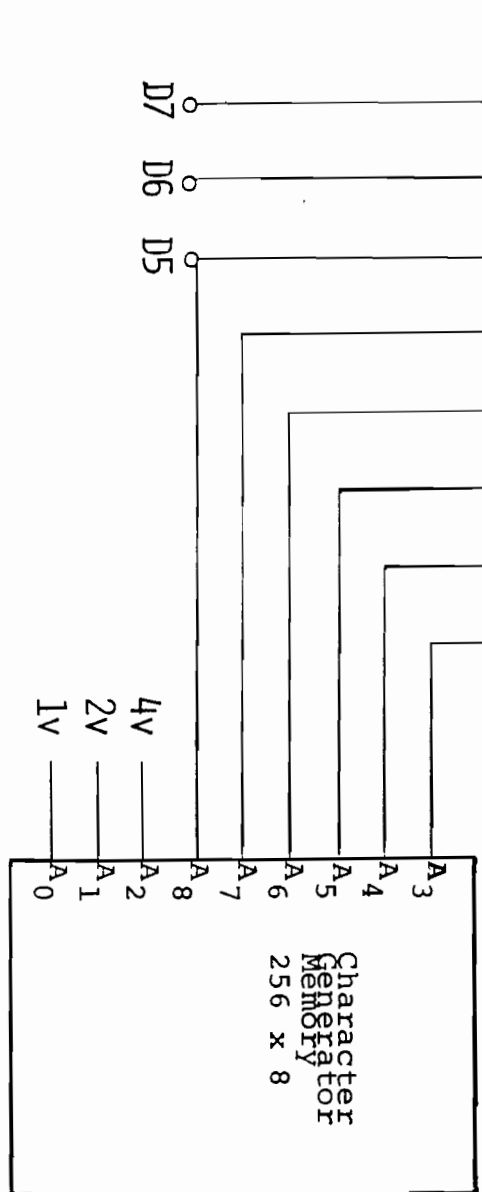
7 6 5 4 3 2 1 0



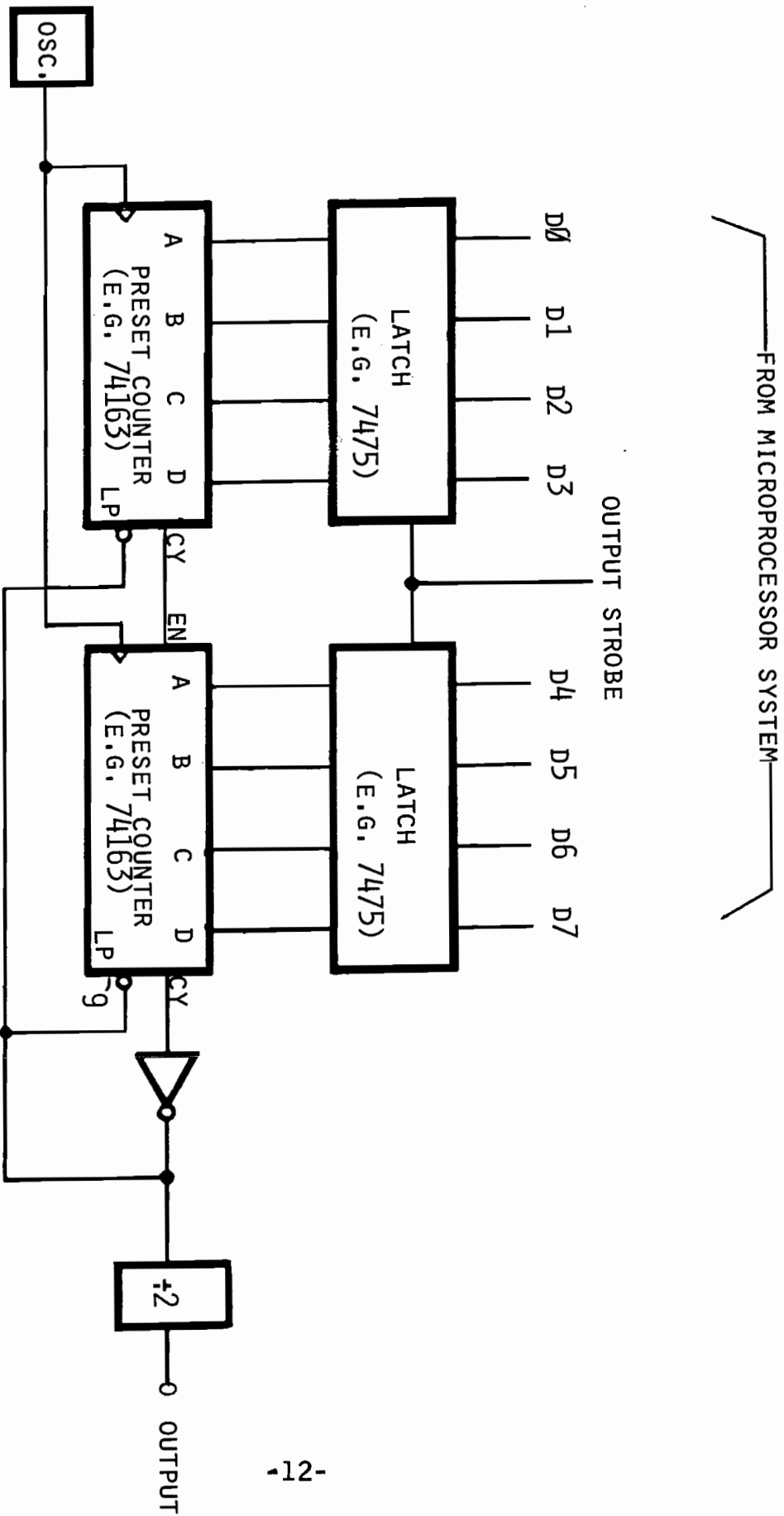
VIDEO
REFRESH
MEMORY
ADDRESS--
FROM
MULTIPLEXOR

VIDEO
REFRESH
MEMORY
1024 x 8

CHARACTER
GENERATION
CIRCUITRY
DIAGRAM



EIGHT
OUTPUTS
TO SHIFT
REGISTER



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.

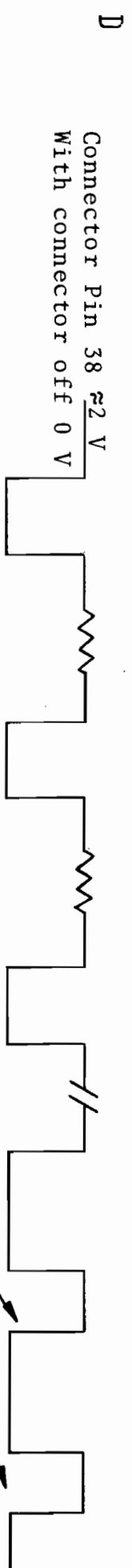
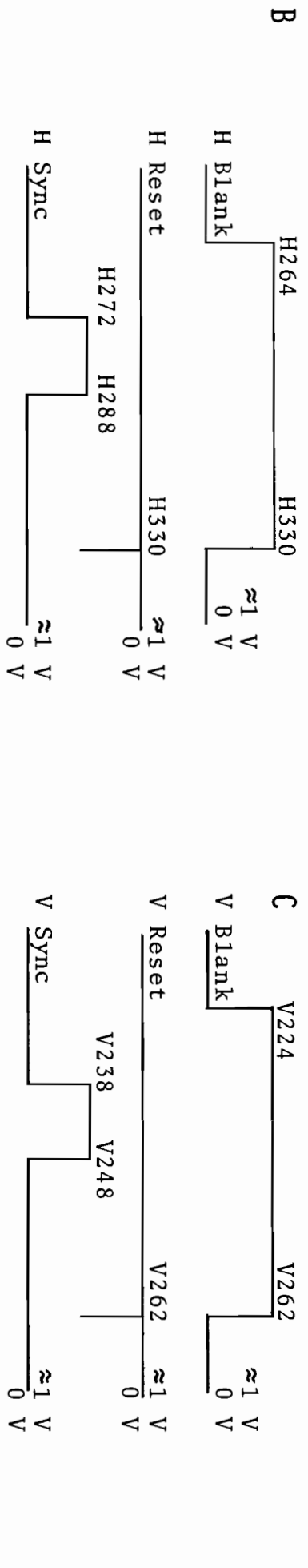
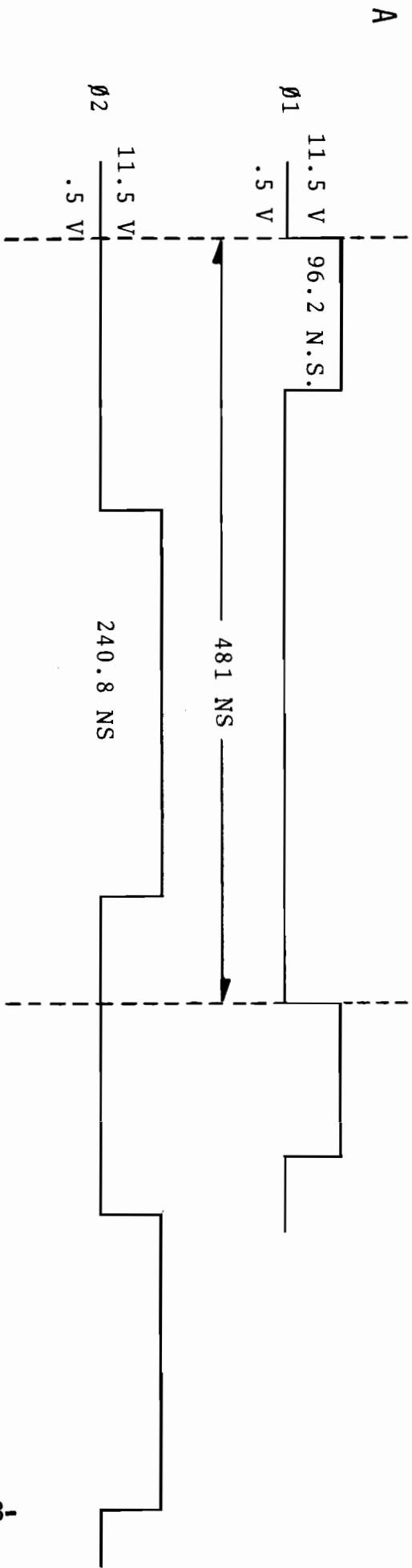
Audio Tones; Sour/None:

(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









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	0
0	0	0	0	0	1	⊥	0	1	0	0	0	1	1
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	T	0	1	0	1	0	1	5
0	0	0	1	1	0	I	0	1	0	1	1	0	6
0	0	0	1	1	1	M	0	1	0	1	1	1	7
0	0	1	0	0	0	E	0	1	1	0	0	0	8
0	0	1	0	0	1	G	0	1	1	0	0	1	9
0	0	1	0	1	0	A	0	1	1	0	1	0	
0	0	1	0	1	1	M	0	1	1	0	1	1	(BLOWUP)
0	0	1	1	0	0	E	0	1	1	1	0	0	(BLOWUP)
0	0	1	1	0	1	O	0	1	1	1	0	1	(BLOWUP)
0	0	1	1	1	0	V	0	1	1	1	1	0	⊥
0	0	1	1	1	1	R	0	1	1	1	1	1	⊥









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	0
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	T	1	1	0	1	0	1	5
1	0	0	1	1	0	I	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
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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

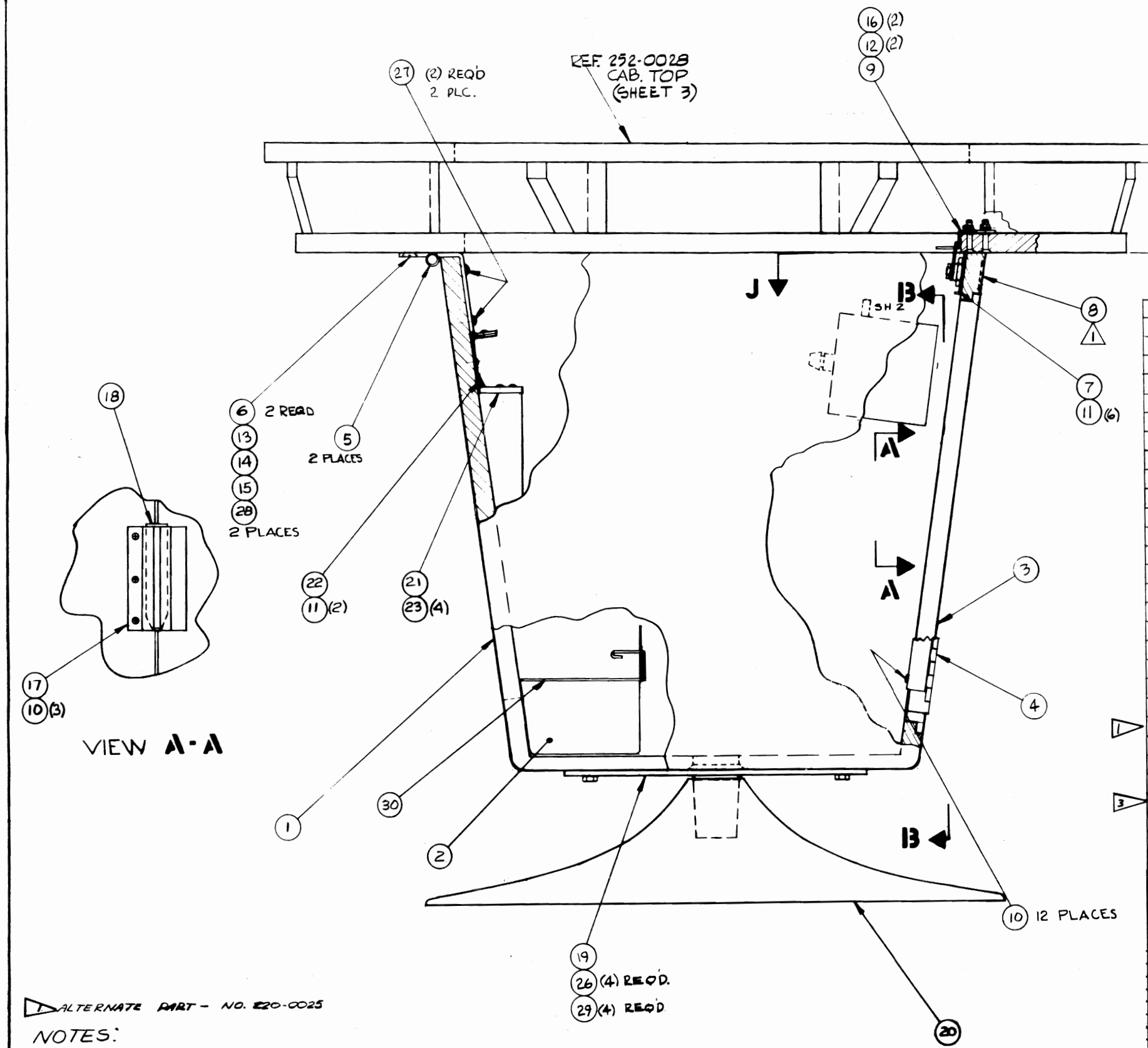
PART NO.	QTY.	DESCRIPTION	ARCADE	COCKTAIL/STANDAROUND
130-9001	1	Speaker, 6x9	X	X
150-9019	2	Cap., 4700MFD, 25 V	X	X
150-9022	1	Cap., 9000MFD, 12 V	X	X
213-9002	2	Socket, 18 pin, dual-in-line	X	X
213-9004	2	Socket, 16 pin, dual-in-line	X	X
220-9008	1	Counter, Digital	X	X
220-9035	1	Lock, Coin Door	X	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	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			5-8-77	Ulsen



(PARTS LIST CONTU ON SH 2)

QTY REQD	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.75LG CAD PLT	27
4			BOLT, HEX 1/4-20 x 1.0 LG CAD PLT	26
				25
				24
4			SCREW, SH MET, CRS RECES RD HD #8x.75LG 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		250-0090	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, #10x1.19LG 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	RIENFORCING PLATE	7
4			SCREW, SH. MET, FLT HD CR. REC, #10x.75, CAR PLT.	6
2		250-0033	HINGE	5
1		250-0034	HINGE ASSY.	4
1		252-0037	ACCESS DOOR ASSY.	3
1		220-0013	CASH BOX	2
1		252-0021-1	BASE ASSY.	1

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:		CONTRACT NO.		Greslin Industries, Inc.	
FRACTIONS	DECIMALS	APPROVALS	DATE	San Diego, California 92108	
±	±	J. W. BELL	5/2/76	TOP ASSY.	
MATERIAL	CONTR	Ulsen	5-8-77	BLASTO	
FINISH				SIZE	CODE IDENT NO. DRAWING NO.
DO NOT SCALE DRAWING				D	719-0001
				SCALE 1/2	SHEET 1 OF 7

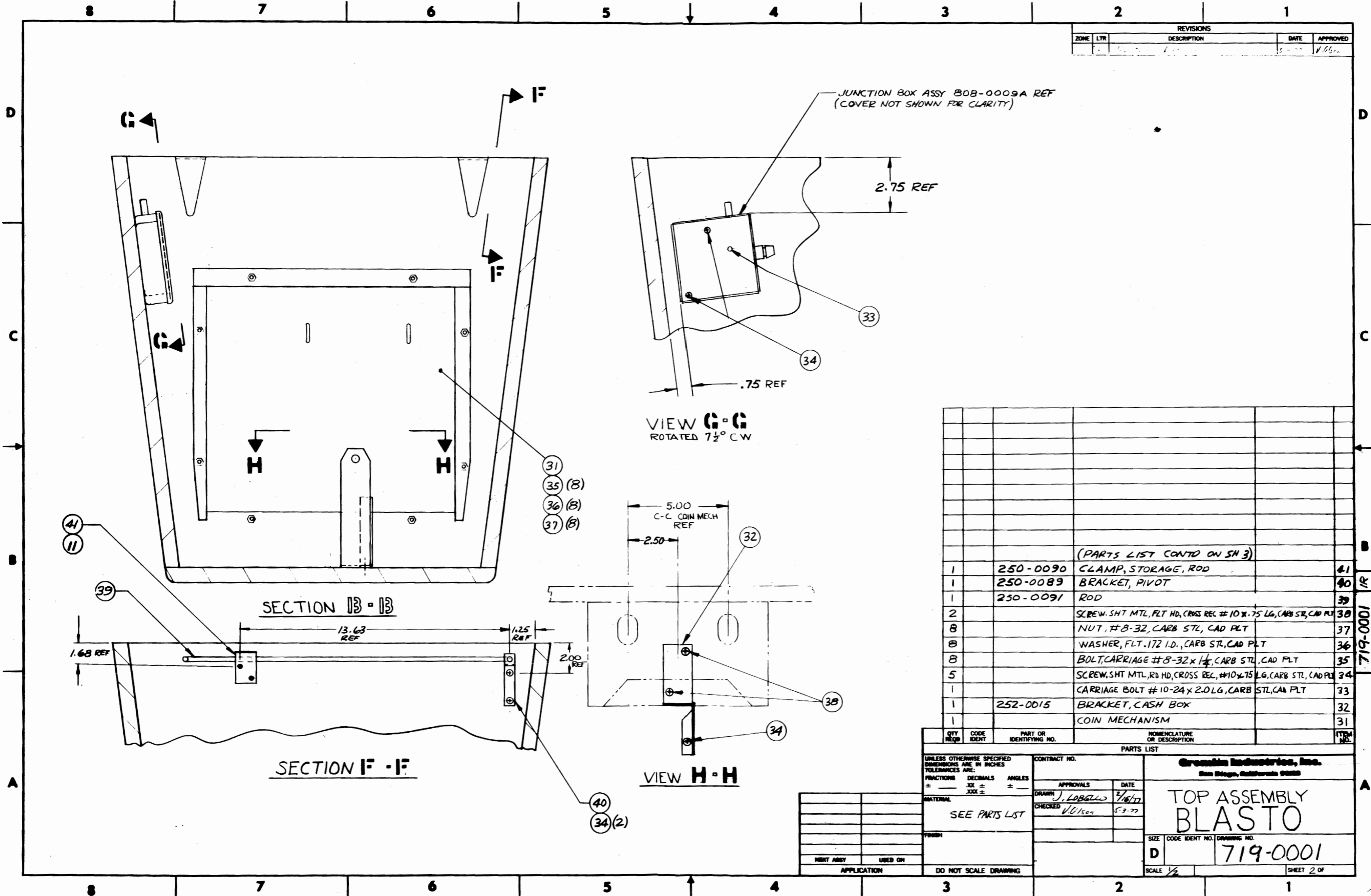
ALTERNATE PART - NO. 220-0025
 NOTES:

3 2 1

3 2 1

D
C
B
A
719-0001 IR

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED



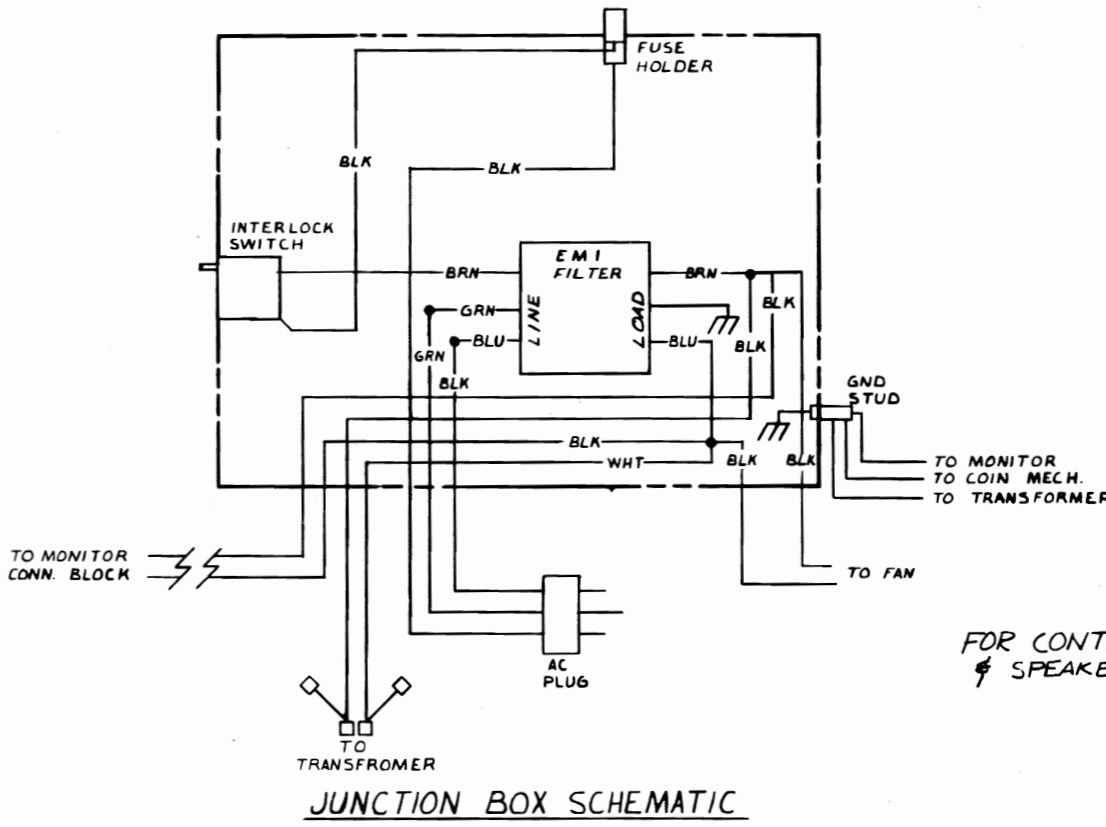
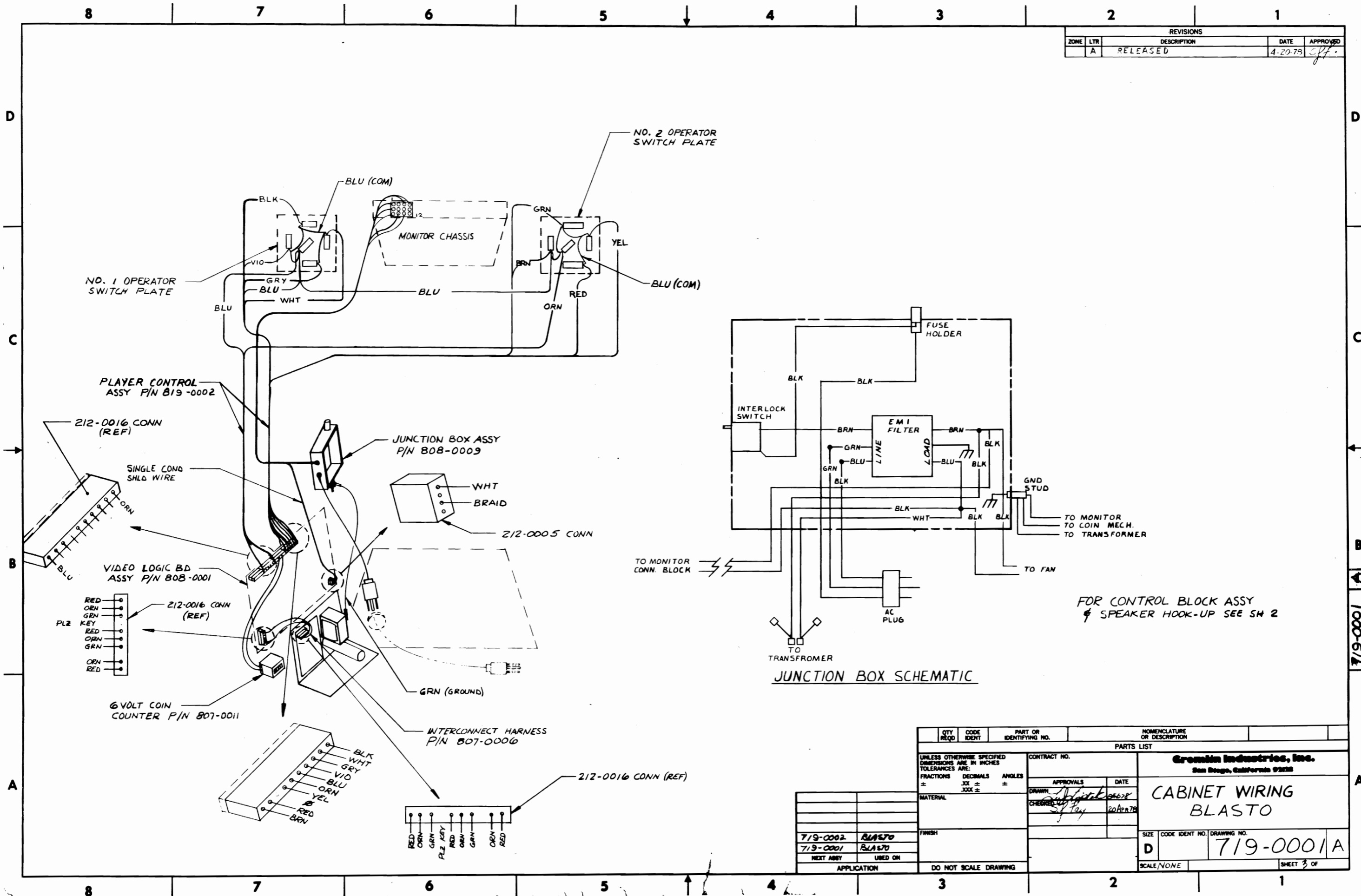
(PARTS LIST CONTD ON SH 3)

QTY	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	ITEM NO.
1	250-0090	CLAMP, STORAGE, ROD		41
1	250-0089	BRACKET, PIVOT		40
1	250-0091	ROD		39
2		SCREW, SHT MTL, FLT HD, CROSS REC # 10 X .75 LG, CARB STL, CAD FLT		38
8		NUT, # 8-32, CARB STL, CAD FLT		37
8		WASHER, FLT. 172 I.D., CARB STL, CAD FLT		36
8		BOLT, CARRIAGE # 8-32 X 1/4, CARB STL, CAD FLT		35
5		SCREW, SHT MTL, RD HD, CROSS REC, # 10 X .75 LG, CARB STL, CAD FLT		34
1		CARRIAGE BOLT # 10-24 X 2.0 LG, CARB STL, CAD FLT		33
1	252-0015	BRACKET, CASH BOX		32
1		COIN MECHANISM		31

PARTS LIST		CONTRACT NO.		Grosnick Industries, Inc.	
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:		APPROVALS		DATE	
FRACTIONS	DECIMALS	DRAWN J. LOBALO		2/16/77	
± .0005	.001 ±	CHECKED W. Wilson		5-3-77	
MATERIAL SEE PARTS LIST		FINISH		SIZE CODE IDENT NO. DRAWING NO.	
NEXT ASSY USED ON APPLICATION		DO NOT SCALE DRAWING		D 719-0001	
				SCALE 1/2 SHEET 2 OF	

719-0001

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
A		RELEASED	4-20-78	<i>[Signature]</i>

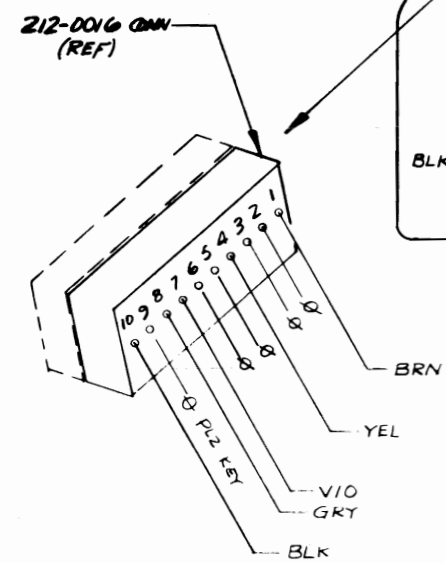
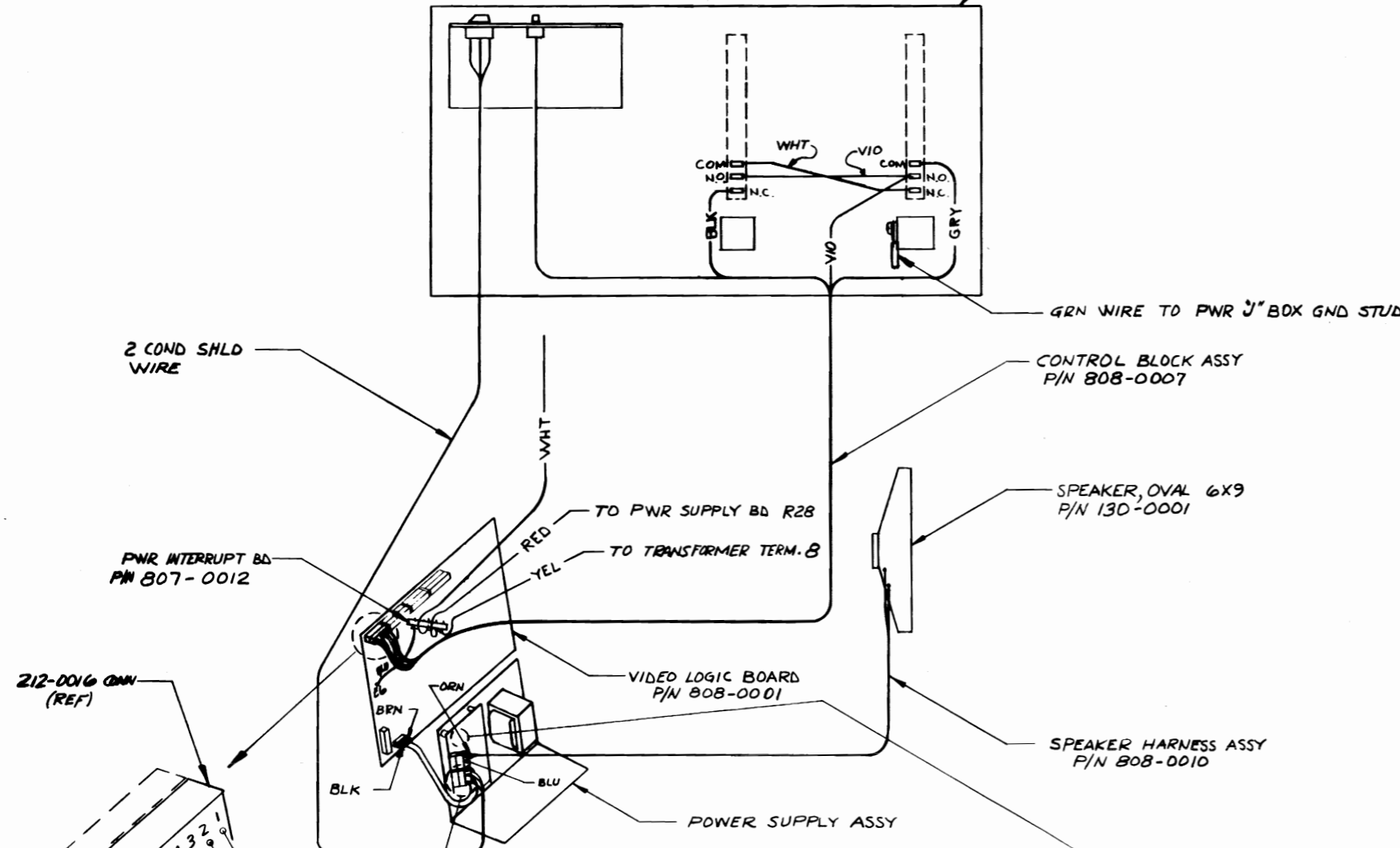


QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
PARTS LIST			
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:		CONTRACT NO.	
FRACTIONS	DECIMALS	ANGLES	Gremm Industries, Inc. San Diego, California 92128
±	±	±	
MATERIAL		APPROVALS	DATE
FINISH		<i>[Signature]</i> 4/20/78 <i>[Signature]</i> 4/20/78	
APPLICATION		CABINET WIRING BLASTO	
DO NOT SCALE DRAWING		SIZE	CODE IDENT NO. DRAWING NO.
		D	719-0001A
		SCALE/NONE	SHEET 3 OF

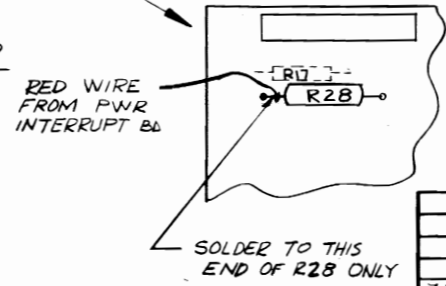
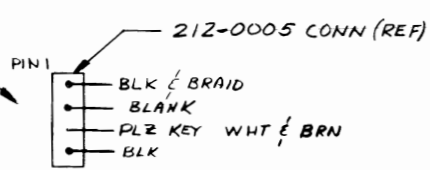
719-0001A

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
A		RELEASED	4-20-78	SJH

COIN MECH. WIRING TYP FOR FOLLOWING PARTS
 P/N 220-0010 (COIN MECH)
 220-0066 (SINGLE U.S. BILLARS)
 220-0067 (DOOR CASH)



CONTROL BLOCK ASSY & SPEAKER HOOK-UP



719-0002	BLASTO
719-0001	BLASTO
NEXT ASSY	USED ON
APPLICATION	DO NOT SCALE DRAWING

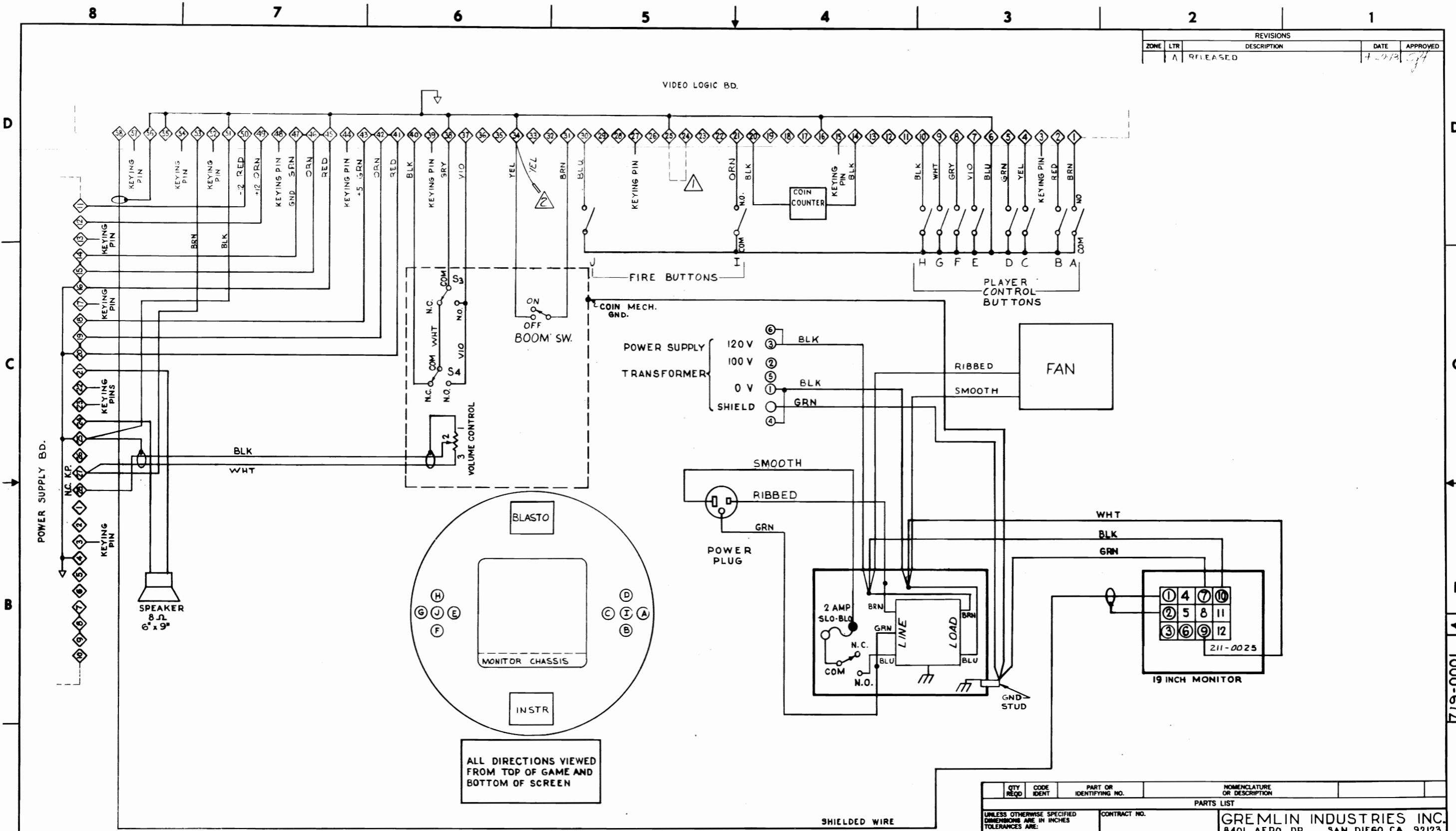
QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
PARTS LIST			
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:		CONTRACT NO.	
FRACTIONS	DECIMALS	ANGLES	APPROVALS
±	.XX ±	±	DATE
±	.XXX ±		
MATERIAL		DRAWN	
		CHECKED	
FINISH		DATE	
SIZE		CODE IDENT NO.	
D		DRAWING NO.	
		719-0001 1	
SCALE NONE		SHEET 4 OF	

Gromin Industries, Inc.
 San Diego, California 92123

CABINET WIRING
 BLASTO

719-0001

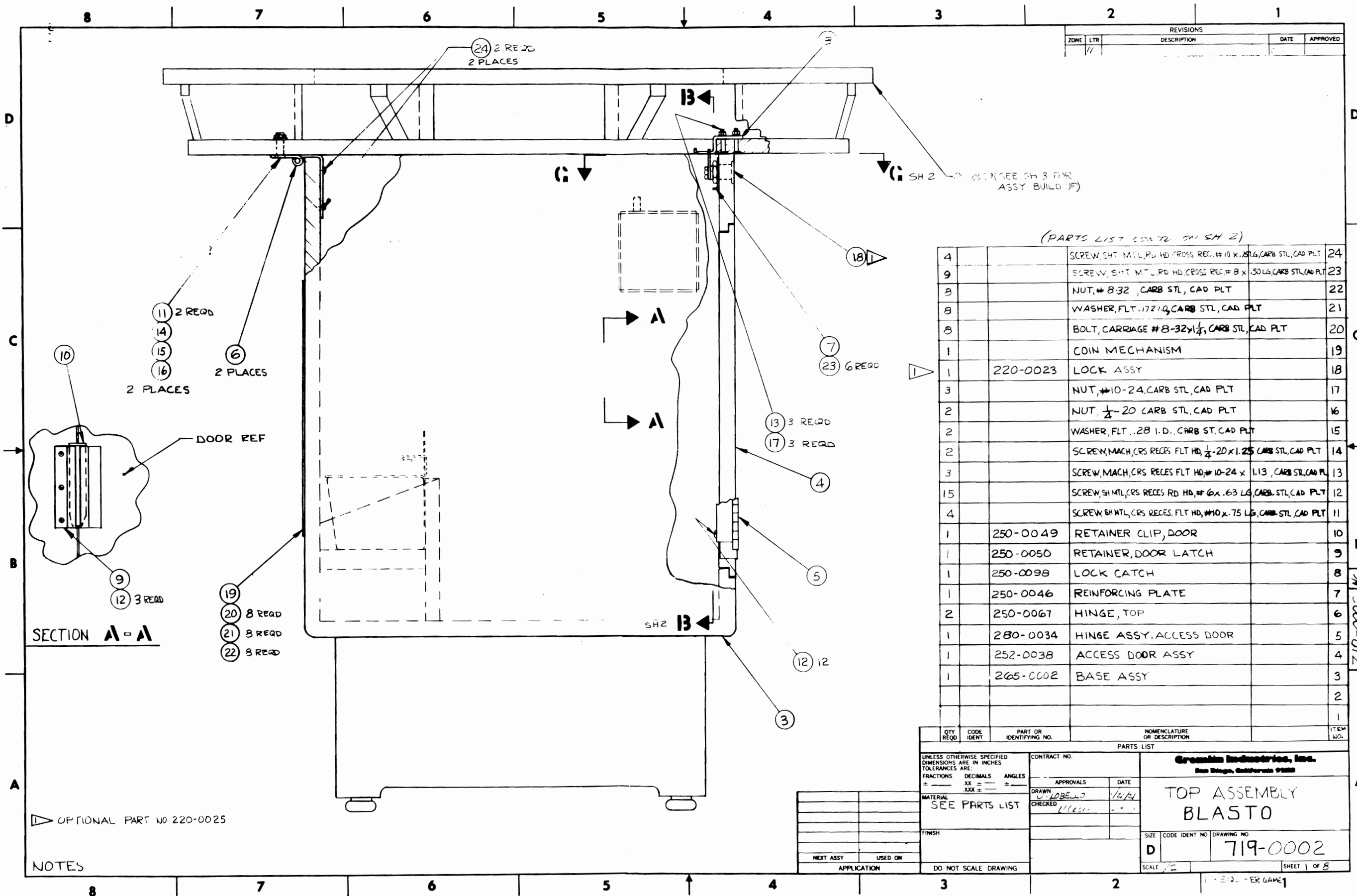
REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
A	RELEASED		7-2-78	[Signature]



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

QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
			UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ± .XX ± .XXX ±
			CONTRACT NO. GREMLIN INDUSTRIES INC. 8401 AERO DR. SAN DIEGO, CA. 92123
			APPROVALS DATE 8 FEB 78
			CHECKED DATE 20 MAR 78
			SIZE CODE IDENT NO. DRAWING NO. D 719-0001A
			SCALE NONE SHEET 5 OF

719-0001A



REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
1/7				

(PARTS LIST CONT. ON SH 2)

QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	ITEM NO.
4			SCREW, SHT MTL, RD HD, CRSS REC, #10 x .25 LG, CARB STL, CAD PLT	24
9			SCREW, SHT MTL, RD HD, CRSS REC, #8 x .50 LG, CARB STL, CAD PLT	23
8			NUT, #8-32, CARB STL, CAD PLT	22
8			WASHER, FLT. 17210, CARB STL, CAD PLT	21
8			BOLT, CARRIAGE #8-32 x 1/4, CARB STL, CAD PLT	20
1			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 STL, 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

SECTION A-A

OPTIONAL PART NO 220-0025

NOTES

PARTS LIST		CONTRACT NO.		Graham Industries, Inc.	
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:		APPROVALS		San Diego, California 92108	
FRACTIONS	DECIMALS	DATE		TOP ASSEMBLY BLASTO	
±	XX ±	1/2/74			
±	XXX ±			DRAWING NO. 719-0002	
MATERIAL SEE PARTS LIST		CHECKED		SIZE CODE IDENT NO. DRAWING NO.	
FINISH				D	
NEXT ASSY USED ON				SCALE 1/2"	
APPLICATION		DO NOT SCALE DRAWING		SHEET 1 OF 8	

719-0002

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

Gremlin Industries, Inc.
San Diego, California 92123

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

CHECK *For in the Shop*

APPR *Ken D. [Signature]*

REVISION DESCRIPTION

DRAFT

CHECK

APPR

LTR DATE

RELEASED

REVISION DESCRIPTION

DRAFT

CHECK

APPR

A 3/14/78

RELEASED

REVISION DESCRIPTION

DRAFT

K.D.

K.D.

B 4/12/78

SM'S ADD 16 1/2 DIM FOR LOCATING JUNCT. BOX

REVISION DESCRIPTION

4/8/78

K.D.

K.D.

Gremelin Industries, Inc.
San Diego, California 92123

PARTS LIST

TITLE

BLASTO - ASSY

719-0003

DWG NO

SH 3 OF

REV B

ITEM NO	PART NO	QTY PER ASSY			DESCRIPTION	REF DES
26	420-0041	1			DECAL; 5/16 SMALL	
27	420-0060	1			DECAL; TRPN TELL	
28	420-0071	1			INST; UN GRATING	
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 92173

PARTS LIST

TITLE
BLASTO - ASSY

719-0003
DWG NO

SH 4
OF

B
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; #8 SPLIT LOCK	
60		8			WASHER; #10 SPLIT LOCK	
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 BLACK 1/2" X .015	
67		1			DECAL WARNING TIP N TELL	PART OF 420-0060
68						
69						
70						
71						
72						
73						
74						
75						

Greenlin Industries, Inc.
San Diego, California 92123

PARTS LIST

TITLE
BLASTO - ASSY

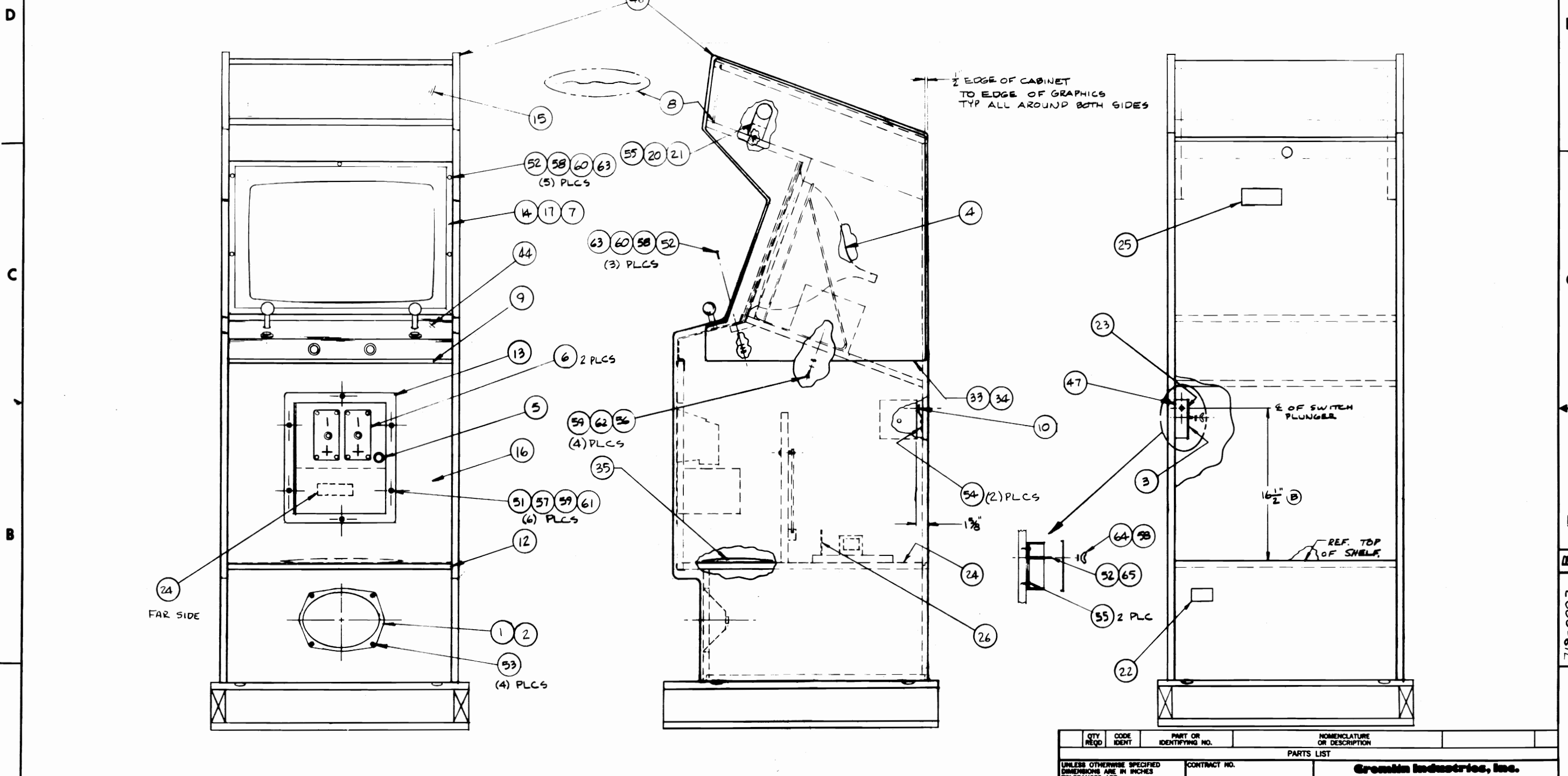
719-0003
DWG NO

SH 2
OF
REV B

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 FOR LOCK	
6	220-0066	2			MECH. CON SINGLE	
7	250-0032	1			FRAME BEZEL	
8	250-0032	1			SPRING, RETAINER	
9	250-0038	1			MOLDING STRIP	
10	250-0048	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 SCRIN	
18	280-0004	25			CLIP, WIRE HOLDDOWN	
19	280-0010	2			NUT, WIRE	
20	390-0011	1			LAMP, 18" FLOR	
21	390-0012	1			LAMP, FIX FLOR	
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-CYCLE	

8 7 6 5 4 3 2 1

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED

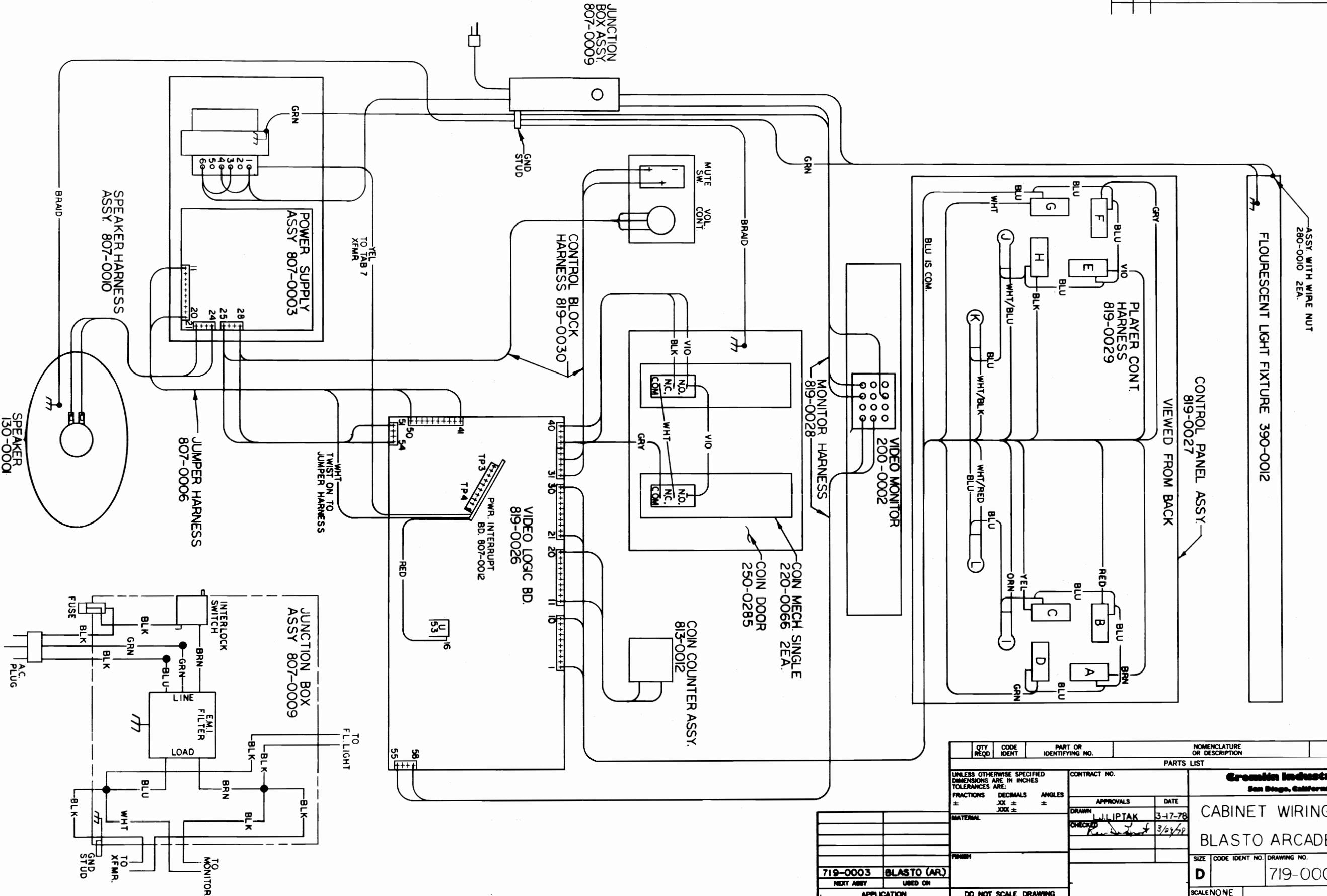


QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
PARTS LIST			
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:		CONTRACT NO.	
FRACTIONS	DECIMALS	ANGLES	Green Industries, Inc. San Diego, California 92108
±	.XX ±	±	
MATERIAL	APPROVALS		DATE
FINISH	DRAWN <i>G. SMITH</i>		<i>11/11/78</i>
NEXT ASSY	CHECKED <i>[Signature]</i>		<i>12/1/78</i>
USED ON	DO NOT SCALE DRAWING		SIZE CODE IDENT NO. DRAWING NO. D 719-0003
APPLICATION	SCALE NONE		SHEET 5 OF B REV

8 7 6 5 4 3 2 1

719-0003 B

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED



QTY REQD		CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
PARTS LIST				
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:				Creslin Industries, Inc. San Diego, California 92128
FRACTIONS	DECIMALS	ANGLES	APPROVALS	
±	JX ±	±	DATE	
MATERIAL				DRAWN: <i>J. LIPTAK</i> 3-17-78 CHECKED: <i>Randy</i> 3/23/78
FINISH				SIZE: D CODE IDENT NO.: 719-0003 DRAWING NO.: 719-0003 REV.: B
APPLICATION				SCALE: NONE SHEET 7 OF 8

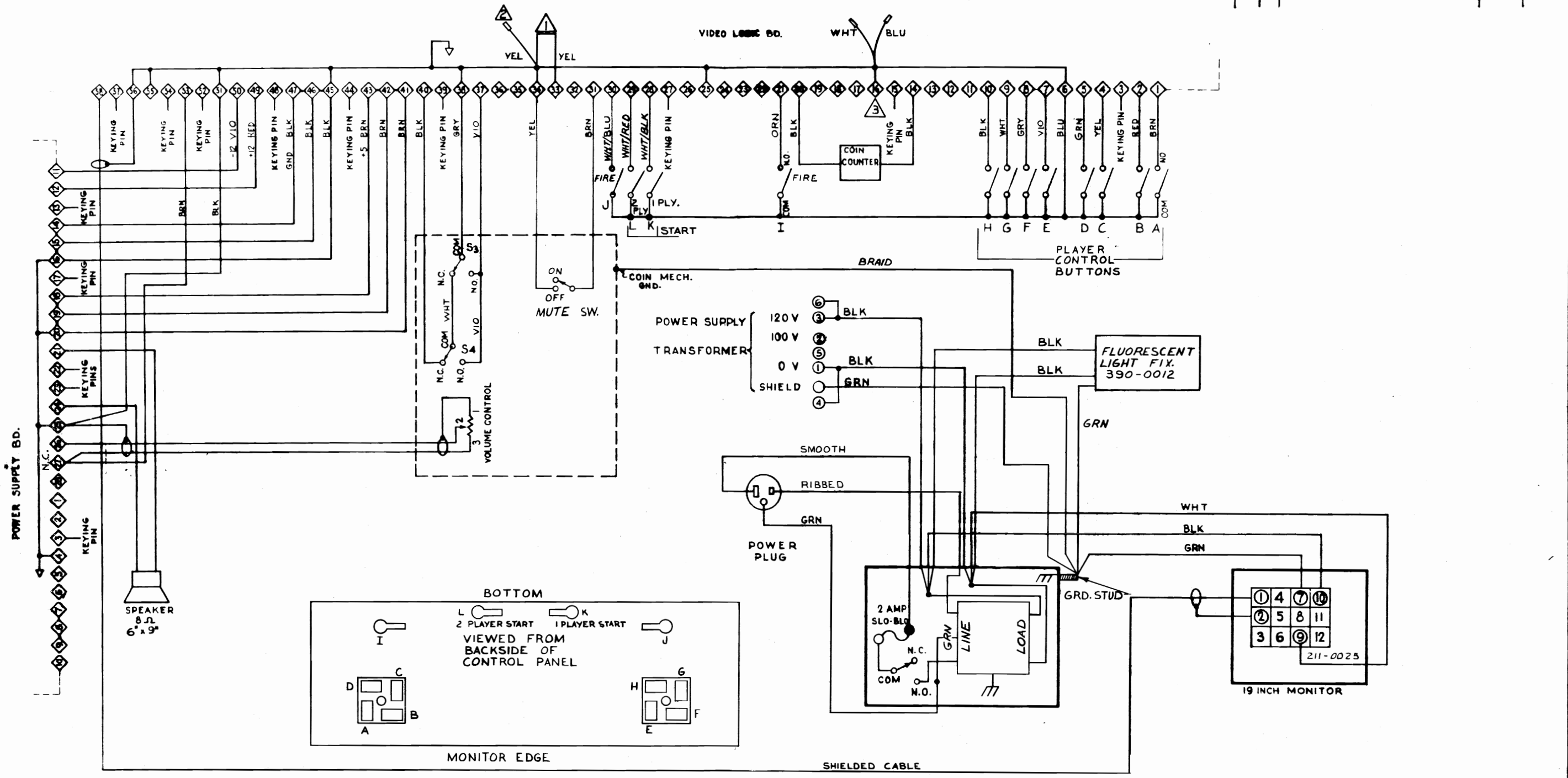
719-0003	BLASTO (AR)
NEXT ASSY	USED ON
DO NOT SCALE DRAWING	

8 7 6 5 4 3 2 1

D C B A

8000-617

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED



▲ JUMPERS FOR MORE THAN ONE COIN PER PLAY
 COINS PIN 17 PIN 18
 2 GND OPEN
 1 GND GND
 PIN 16 15 GND

▲ JUMPER THIS WIRE TO PIN 32 FOR TO SECOND GAME
 ▲ CUT THIS WIRE TO DISABLE FREE GAMES

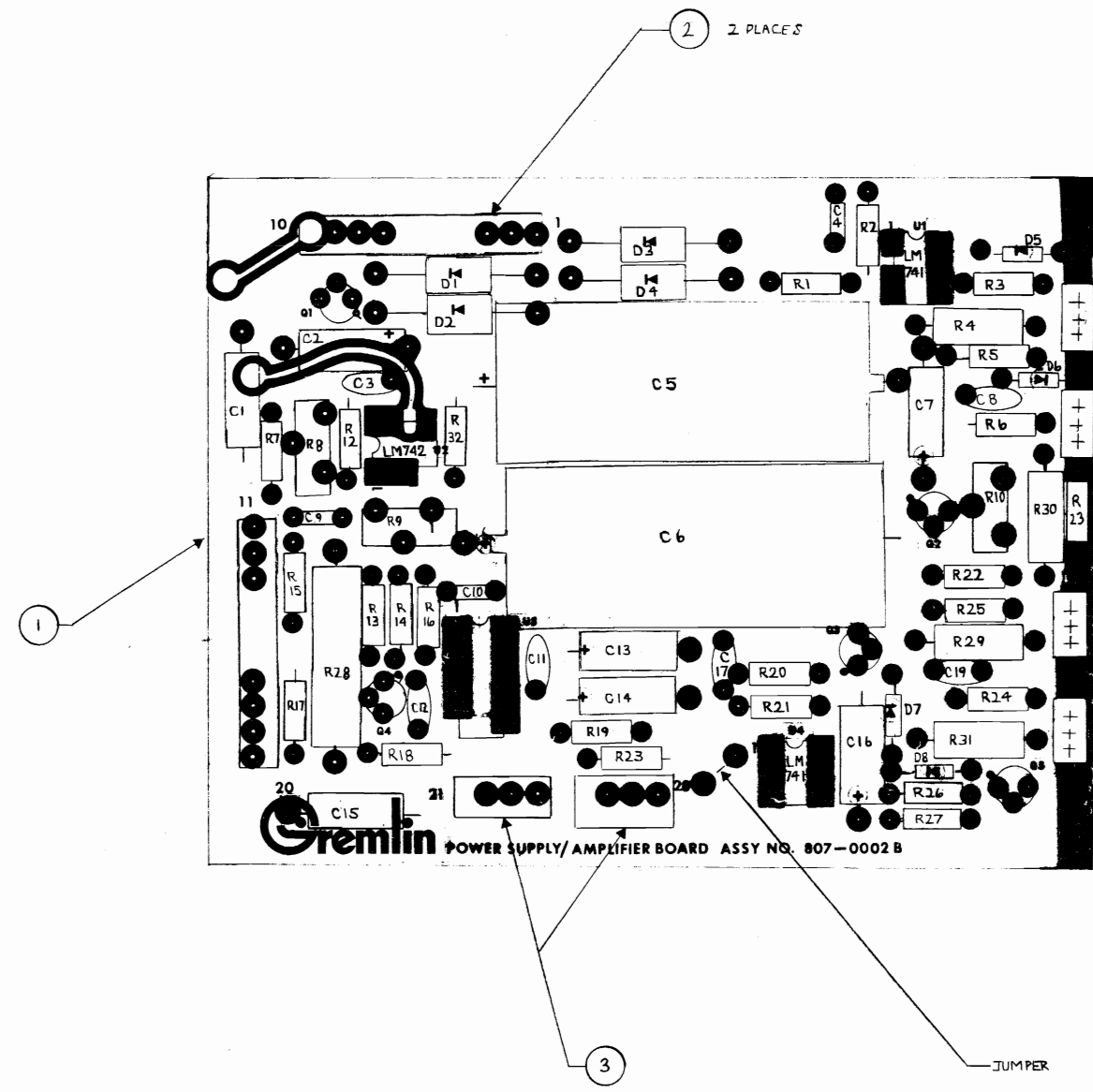
NOTES

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 ± .005 ± .001 ± .001 ±		CONTRACT NO.	
MATERIAL		APPROVALS	DATE
FINISH		CHECKED	DATE
719-0003 BLASTO AR.		GREMLIN INDUSTRIES INC. 8401 AERO DR. SAN DIEGO, CA. 92123	
NEXT ASSY USED ON		SCHEMATIC BLASTO CABINET WIRING	
APPLICATION		SIZE CODE IDENT NO DRAWING NO D 719-0003 A	
DC NOT SCALE DRAWING		SCALE NONE SHEET 2 OF 8	

719-0003 B

8 7 6 5 4 3 2 1

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
B		PER ECN 63	KB 7-6-77	
C		C12 713 15 WAS 25V	2/2 3/21/78	RND



ITEM NO.	QTY	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
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 2N4401
Q1 Q3 Q4	3	482-0006	XISTOR 2N4403
D7 D8	2	481-0006	DIODE IN914 OR IN4148
D5 D6	2	481-0008	DIODE ZENER 1N5231
D1-D4	4	481-0004	DIODE MR 501
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 C9 C12	3	151-0011	CAP. CER. .01M 50V
C3	1	151-0012	CAP. CER. .1M 50V
C14, C16	2	150-0004	CAP. E 10MF 25V
C1, C2, C7, C13, C15	5	150-0023	CAP. E 10MF 15V
R9	1	475-0004	POT. 1K TRIMMER
R8 R10	2	475-0005	POT. 2K TRIMMER
R28	1	475-0001	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%
R32	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%
R5	1	471-0822	RES. 8.2K OHM 1/2W 5%
R2 R6 R11 R12 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. LM 723
U1 U2 U4	3	313-0004	I.C. LM 741 EN

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE FRACTIONS DECIMALS ANGLES
= . = . = .
XXX = .

CONTRACT NO. GREMLIN INDUSTRIES INC.
8401 AERO DR SAN DIEGO, CA. 92123

POWER SUPPLY/AMP. BOARD
BLOCKADE
PARTS OVERLAY

APPROVALS: DRAWN BY K. BREWER 7-6-77, CHECKED BY [Signature] 7-7-77, APPR BY [Signature] 7-7-77, [Signature] 3/29/78

DATE: 7-6-77

SIZE: D CODE/IDENT NO: 807-0002 DRAWING NO: 807-0002 REV: C

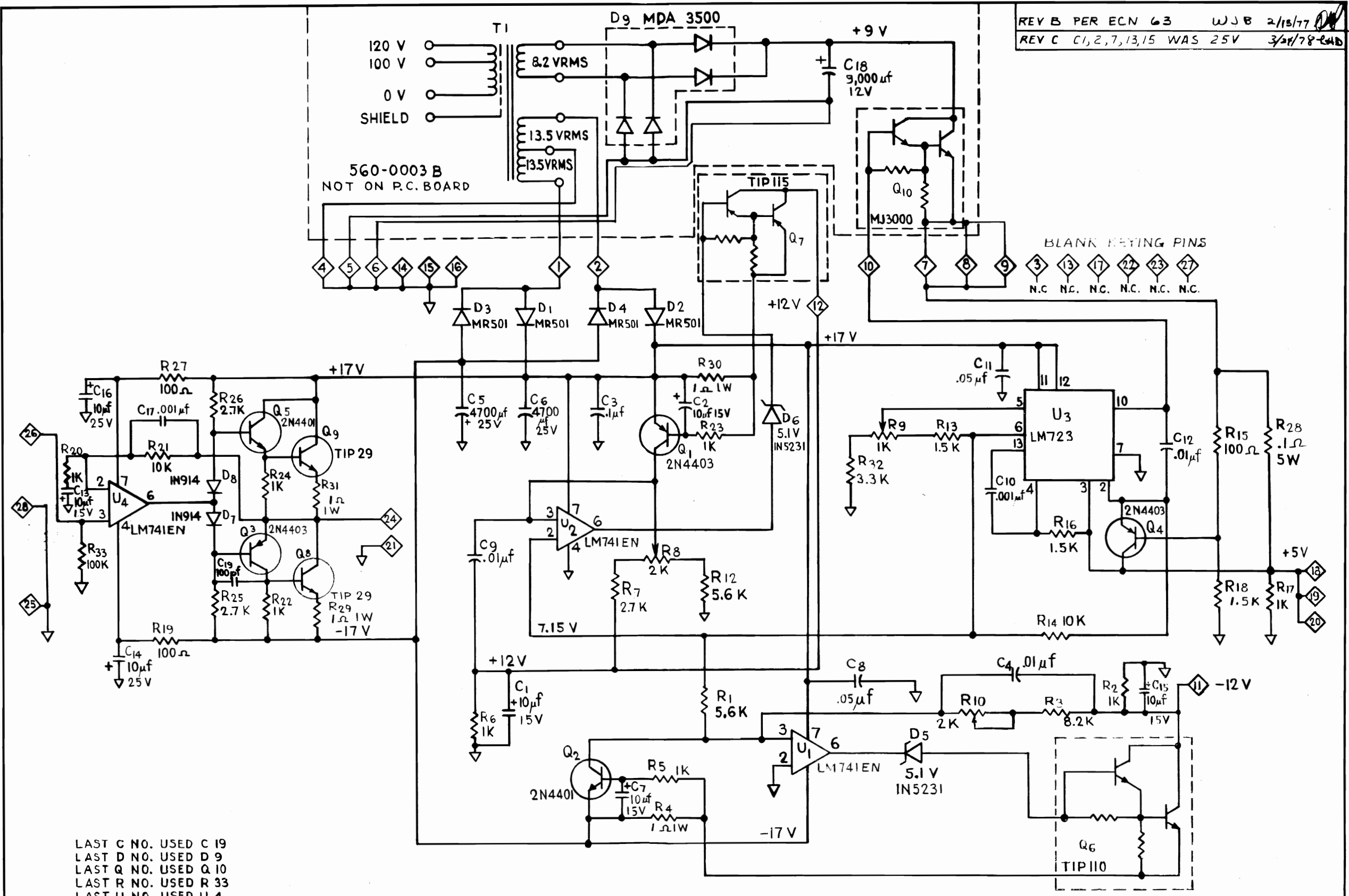
SCALE: 2: X SHEET 1 OF 2

714-0001	HUSTLE
708-0004	COMOTION IIIA
708-0002	COMOTION II
708-0001	COMOTION I
707-0001	BLOCKADE
NEXT ASSY	USED ON
APPLICATION	DO NOT SCALE DRAWING

OMIT R11

8 7 6 5 4 3 2 1

REV B PER ECN 63 WJB 2/15/77
 REV C C1,2,7,13,15 WAS 25V 3/21/78-LMB



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
	SCHMATIC
	BLOCKADE PWR. SUPPLY
DRAWN Jce M.	CHECKED
APPROVED	SCALE
	NONE
	DRAWING NO.
	807-0002

GREMLIN IND. INC.
SAN DIEGO CA 92123

PARTS LIST

TITLE
ASSY PWR SUPPLY

807-0003
DWG NO

SH 1
OF 3
REV B

RELEASED

DRAWN

ENGR

DESIGN

CHECK

APPR

LTR AUTH

REVISION DESCRIPTION

DRAFT

CHECK

APPR

A RELEASED

B 2/24/78 ADDED CAP CLAMP

[Handwritten signature]

RKD

RKD

3-3-78

GREMLIN IND INC
SAN DIEGO CA 92123

PARTS
LIST

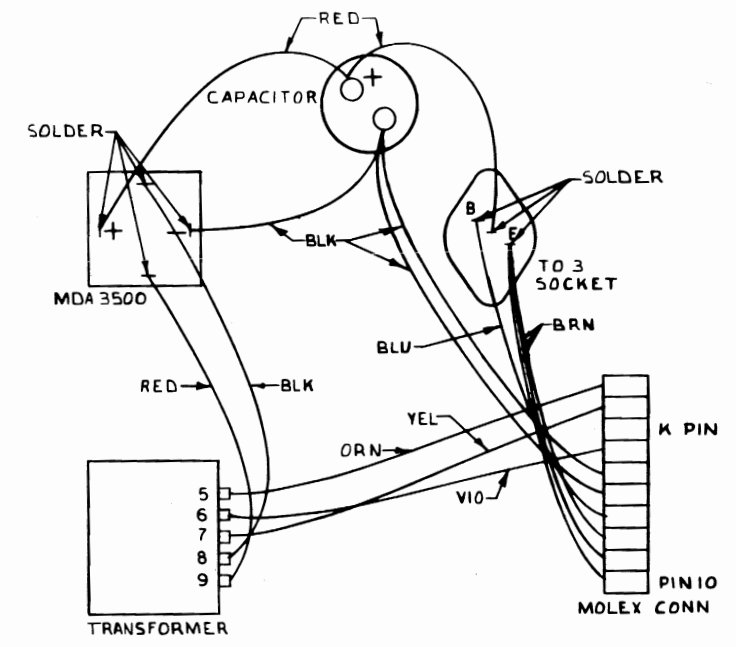
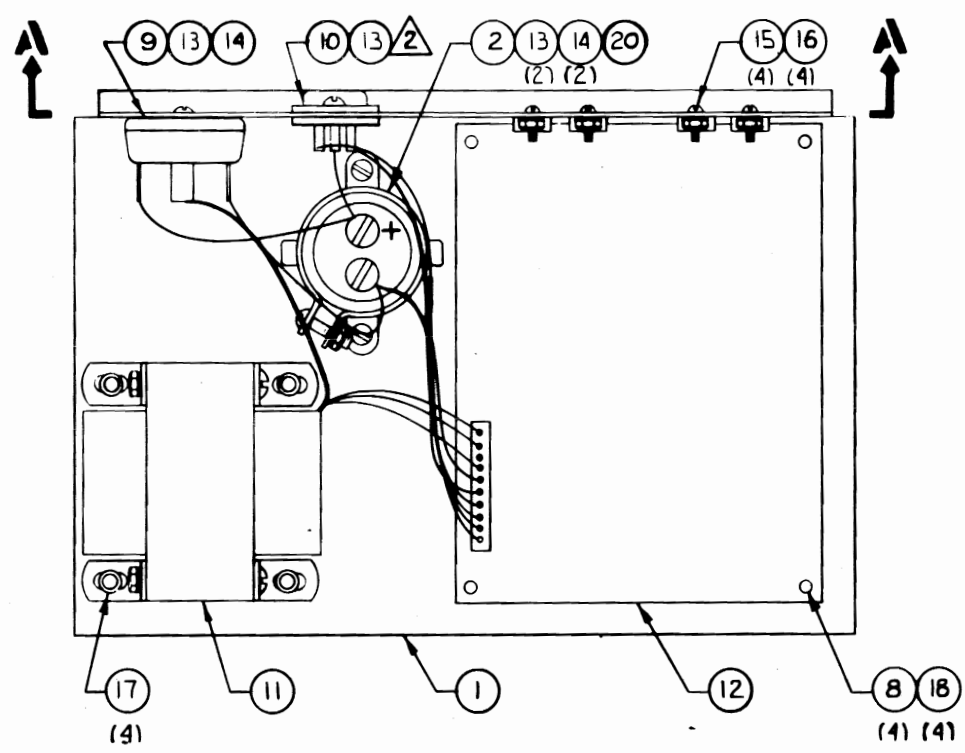
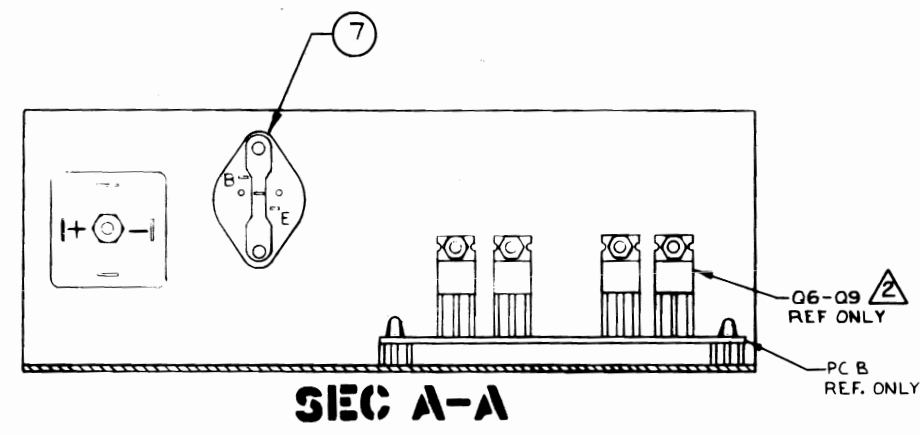
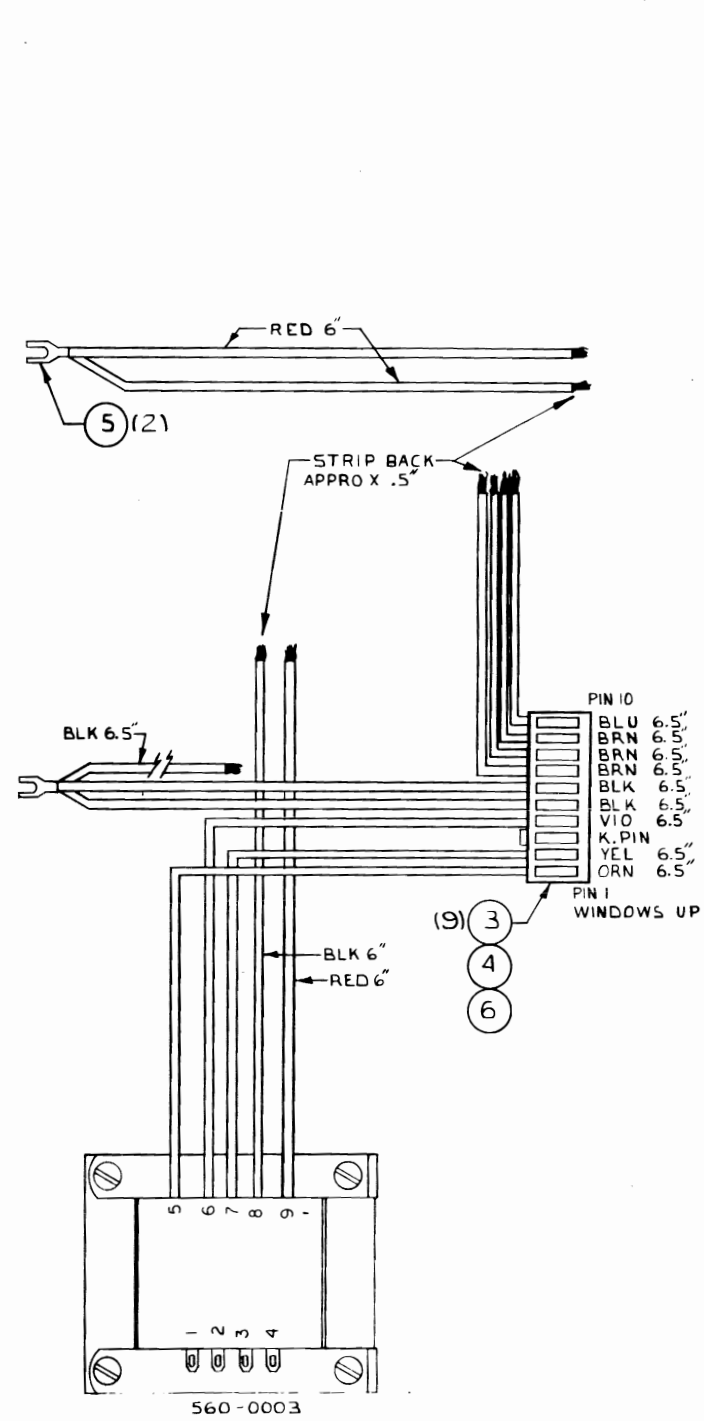
TITLE
ASSY. PWR. SUPPLY

807-0003
DWG NO

SH 2
OF 3
REV B

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, MJ3000	
11	560-0003					1 XFMR MODEL 4-10345B	
12	807-0002					1 ASSY PWR SUPP/AMP B	
	807-0002					SCHEM. ASSY PWR SUPP	(REFERANCE)
13						5 SCR-MACH P.HD. #6-32 X 1/2"	
14						3 NUT HEX. #6-32	
15						4 SCR-MACH. RD. HD. #4-40 X 3/8"	
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							
20						1 CLAMP CAP VR3 1 3/8"	
21							
22							

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



WIRING DIAGRAM

SEE DETACHED PARTS LIST 807-0003

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

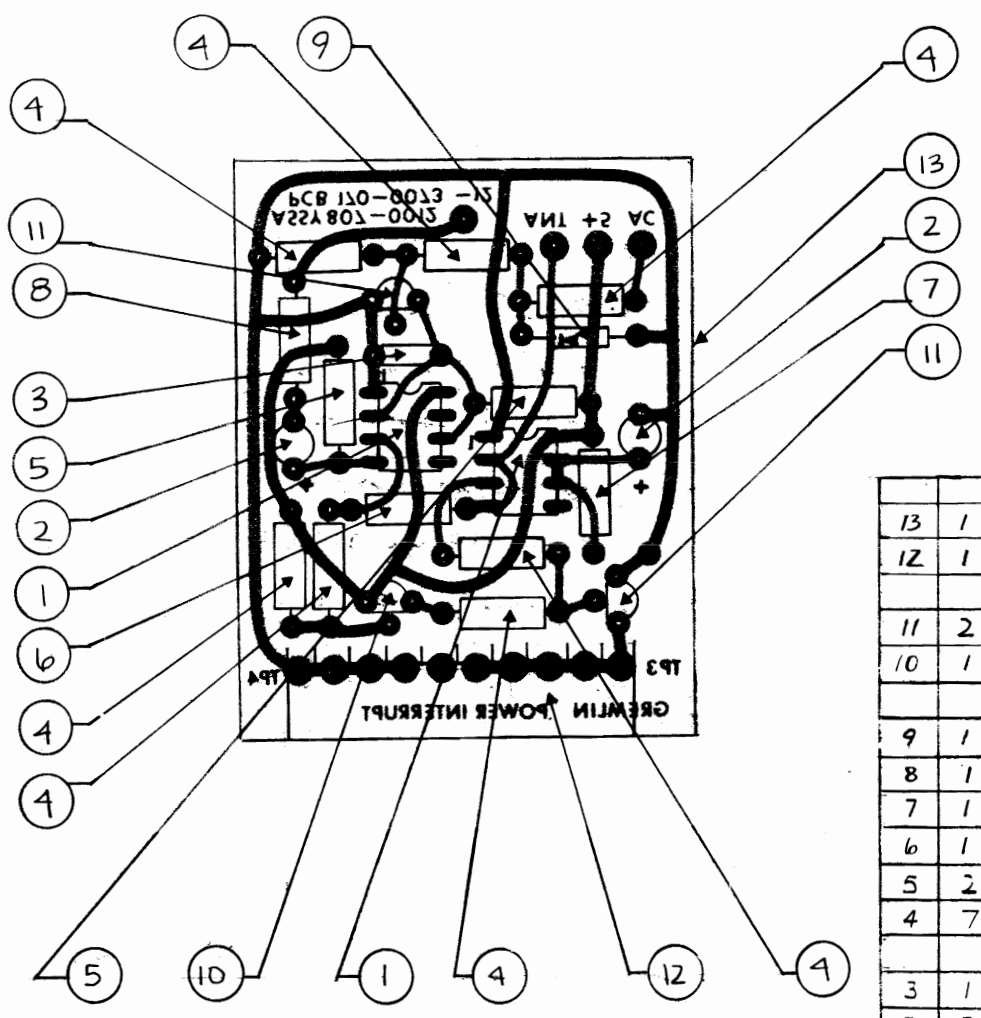
QTY	CODE	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
719-0002		BLASTO	
719-0001		BLASTO	
713-0005		S/D HUSTLE	
713-0002		HUSTLE II	
713-0001		HUSTLE I	
708-0004		COMOTION II	
708-0002		COMOTION II	
708-0001		COMOTION I	
707-0001		BLOCKADE	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:		CONTRACT NO.	
FRACTIONS	DECIMALS	ANGLES	
±	±	±	
MATERIAL		APPROVALS	DATE
FINISH		LEE LIPTAK	3/2/77
NEXT ASSY USED ON		3-3-78	
APPLICATION		DO NOT SCALE DRAWING	

Gremlin Industries, Inc. San Diego, California 92108			
ASSY POWER SUPPLY			
SIZE	CODE IDENT NO.	DRAWING NO.	REV
D		807-0003	B
SCALE FULL			SHEET 3 OF 3

4 3 2 1

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
-	A	REVISED + REDRAWN PER ECN 131 KB	8-5-77	KWB
	B	C2 & 3 WAS "CAP. 1M 75V," ADDED SHE	3/29/78	PLD



QTY	CODE	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	
13	1	170 - 0073	P.C. BOARD	
12	1	212 - 0017	CONN FEMALE 10 PIN RT ANGLE	
11	2	482 - 0014	TRANSISTOR 2N4401	Q1, Q3
10	1	482 - 0006	TRANSISTOR 2N4403	Q2
9	1	481 - 0008	DIODE ZENER 1N5231	D1
8	1	471 - 0103	RES. 10K OHM 1/2 W 5%	R12
7	1	471 - 0474	RES. 470K OHM 1/2 W 5%	R7
6	1	471 - 0333	RES. 33K OHM 1/2 W 5%	R6
5	2	471 - 0104	RES. 100K OHM 1/2 W 5%	R4, R5
4	7	471 - 0102	RES. 1K OHM 1/2 W 5%	R1-R3, R8-R11
3	1	152 - 0002	CAP. F. .22M 100V C1	C1
2	2	150 - 0009	CAP. E. 1M 50V	C2, C3
1	2	314 - 0001	IC TIMER NE555	U1, U2

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

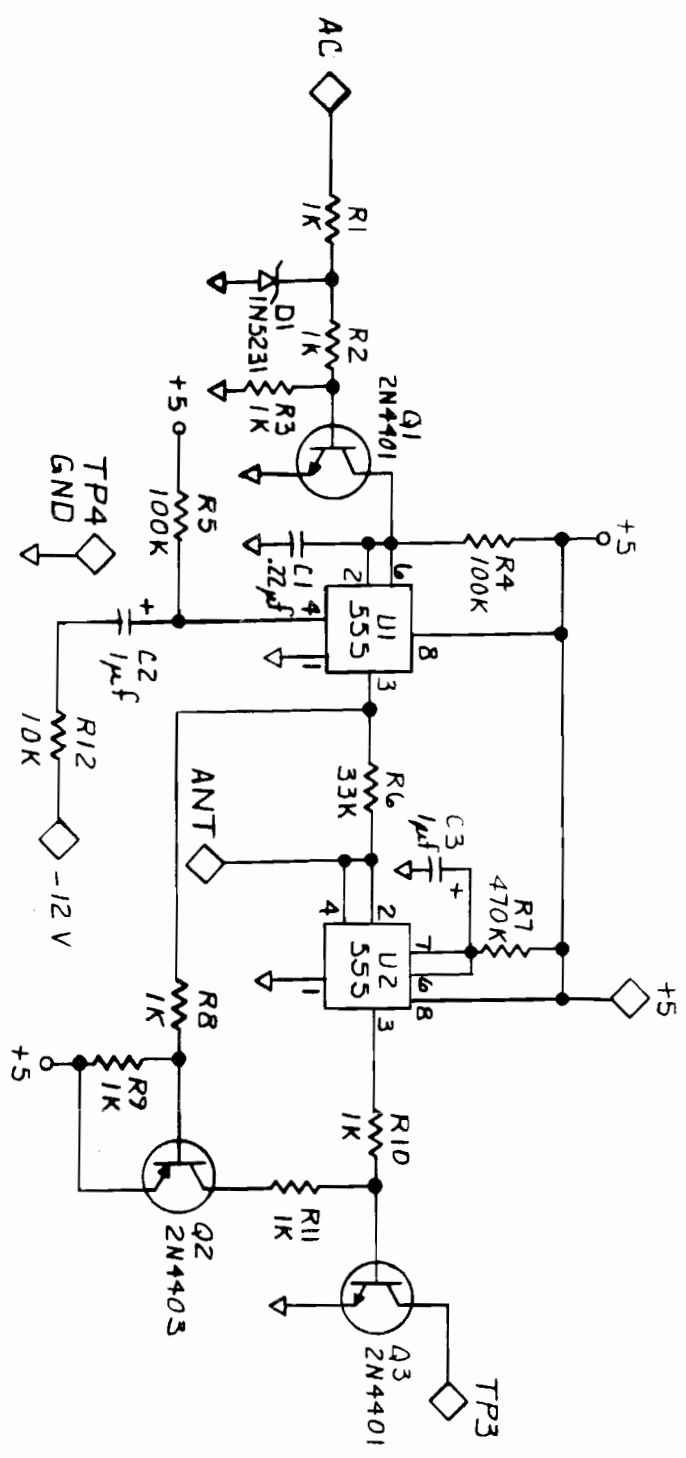
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES XX . . . = XXX - . . . =		CONTRACT NO.		Gremlin Industries, Inc. San Diego, California 92123	
MATERIAL		APPROVALS	DATE		
FINISH		DRAWN K. BREWER	8-5-77	POWER INTERRUPT ASSY PARTS OVERLAY	
NEXT ASSY USED ON		CHECKED [Signature]	3/29/78		
APPLICATION		DO NOT SCALE DRAWING		SIZE C	CODE IDENT NO. 807-0012
				DRAWING NO. 807-0012	REV B
				SCALE NONE SHEET 1 OF 2	

4 3 2 1

D
C
B
A

D
C
B
A

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
A		PER E-D 131	7-21-77	<i>[Signature]</i>



UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES FRACTIONS DECIMALS ANGLES		CONTRACT NO.	
±	±	APPROVALS	DATE
±	±	<i>[Signature]</i>	12/27/76
MATERIAL		DESIGN	DATE
FINISH		<i>[Signature]</i>	3/6/73
NEXT ASSEMBLY APPLICATION		SCALE NONE	
USED ON		DRAWING NO. 807-0012	
DO NOT SCALE DRAWINGS		SHEET 2 OF 2	
GREMLIN INDUSTRIES INC. 8401 AERO DR. SAN DIEGO, CA. 92123		REV B	
SCHEMATIC — POWER INTERRUPT		REV B	

Greenlin Industries, Inc.
San Diego, California 92161

PARTS LIST

TITLE
VIDEO LOGIC BOARD
BLASTO

DWG NO 819-0001

SH 2 OF 8

REV A

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 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	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	30-0006	1				XTAL .9.790 MHZ CIK	Y1

Gremlin Industries, Inc.
San Diego, California 92123

PARTS LIST

TITLE
VIDEO LOGIC BOARD
BLASTO

819-0001
DWG NO

SH 4
OF 8
REV A

ITEM NO	PART NO	QTY PER ASSY				DESCRIPTION	REF DES
42	316-0090	1				I.C. PRDM 1024X4	U3
43	316-0091	1				I.C. PRDM 1024X4	U4
44	316-0092	1				I.C. PRDM 1024X4	U5
45	316-0093	1				I.C. PRDM 512X4	U29
46	316-0094	1				I.C. PRDM 512X4	U43
47	390-0003	1				L.E.D. RED	D7
48	471-0101	1				RES 100 OHMS 1/2W 5%	R53
49	471-0102	42				RES 1K OHMS 1/2W 5%	R1-R27,R37,R39-R41,R44
							R50,R55,R64,R65,R69,
							R76,R79,R80,R83,R85
50	471-0103	2				RES 10K OHMS 1/2W 5%	R58,R67
51	471-0150	1				RES 15 OHMS 1/2W 5%	R49
52	471-0154	1				RES 150K OHMS 1/2W 5%	R72
53	471-0220	2				RES 22 OHMS 1/2W 5%	R43,R45
54	471-0221	5				RES 220 OHMS 1/2W 5%	R28,R42,R54,R84,R86
55	471-0222	1				RES 2.2K OHMS 1/2W 5%	R38
56	471-0223	9				RES 22K OHMS 1/2W 5%	R29-R36,R60
57	471-0224	1				RES 220K OHMS 1/2W 5%	R68
58	471-0272	1				RES 2.7K OHMS 1/2W 5%	R78
59	471-0331	4				RES 330 OHMS 1/2W 5%	R46,R47,R81,R82
60	471-0333	4				RES 33K OHMS 1/2W 5%	R59,R63,R66,R70
61	471-0334	1				RES 330K OHMS 1/2W 5%	R57
62	471-0471	1				RES 470 OHMS 1/2W 5%	R52

Greenlin Industries, Inc.
San Diego, California 92123

PARTS LIST

TITLE
VIDEO LOGIC BOARD
BLASTO

819-0001
DWG NO

SH 5
OF 8

A
REV

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	7		XSTR 2N4401	Q4-Q7 Q9-Q11
76	213-0005	1		SKT 40 PIN DUAL INLV	U19

Gremlin Industries, Inc.
San Diego, California 92123

PARTS LIST

TITLE
VIDEO LOGIC BOARD
BLASTO

819-0001

DWG NO

SH 3
OF 8

REV
A

ITEM NO	PART NO	QTY PER ASSY			DESCRIPTION	REF DES
19	313-0004	1			IC, 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	8			I.C. 7408	U20, U22, U23, U33,
						U45 - U47, U63
26	314-0015	1			I.C. 7404	U34
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	U14 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	314-0046	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 1024 X 4	U2

Gremlin Industries, Inc.
San Diego, California 92123

PARTS LIST

TITLE
VIDEO LOGIC BOARD
BLASTO

819-0001
DWG NO

SH 1
OF 8

A
REV

DRAWN

John De Quack

ENGR

Stewart J. Fay

CHECK

APPR

Stewart J. Fay

REVISION DESCRIPTION

DRAFT

Wynona RMD

APPR

CHECK

Stewart J. Fay

LTR

DATE

REVISION DESCRIPTION

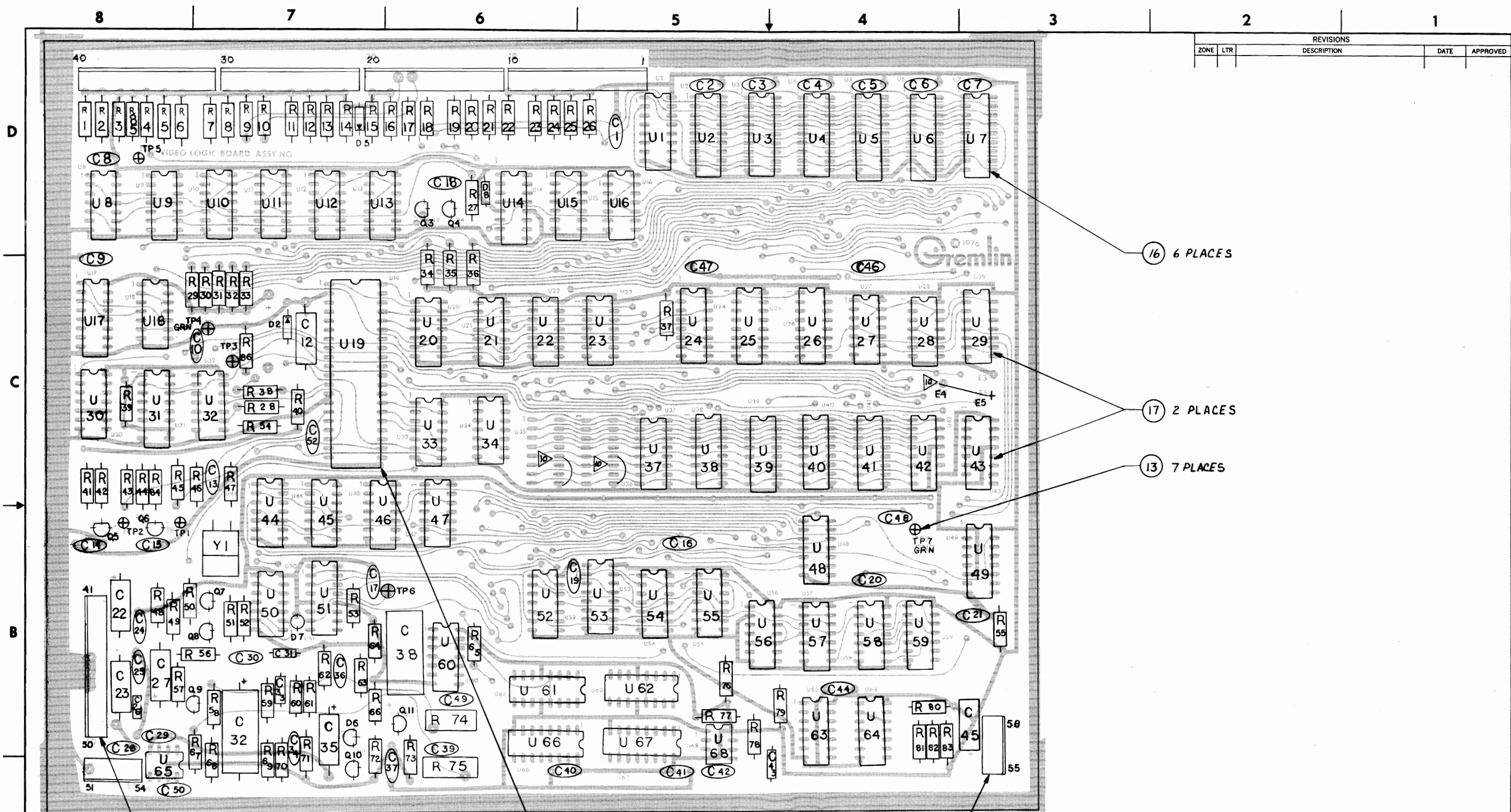
APPR

A

5-5-78

REDRAWN

Stewart J. Fay



ZONE		LTR		REVISIONS	DATE	APPROVED
				DESCRIPTION		

16 6 PLACES

17 2 PLACES

13 7 PLACES

14 5 PLACES

76

12

2 PLACES 15

- 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
- 10 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

QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
PARTS LIST			
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:		CONTRACT NO.	
FRACTIONS	DECIMALS	ANGLES	
±	.XX ±	±	
	.XXX ±		
MATERIAL		APPROVALS DATE	
		DRAWN T. E. JOHNSON 5-16-78	
FINISH		CHECKED	
719-0002 BLASTO			
719-0001 BLASTO			
NEXT ASSY USED ON			
APPLICATION		DO NOT SCALE DRAWING	

Gremlin Industries, Inc.
San Diego, California 92123

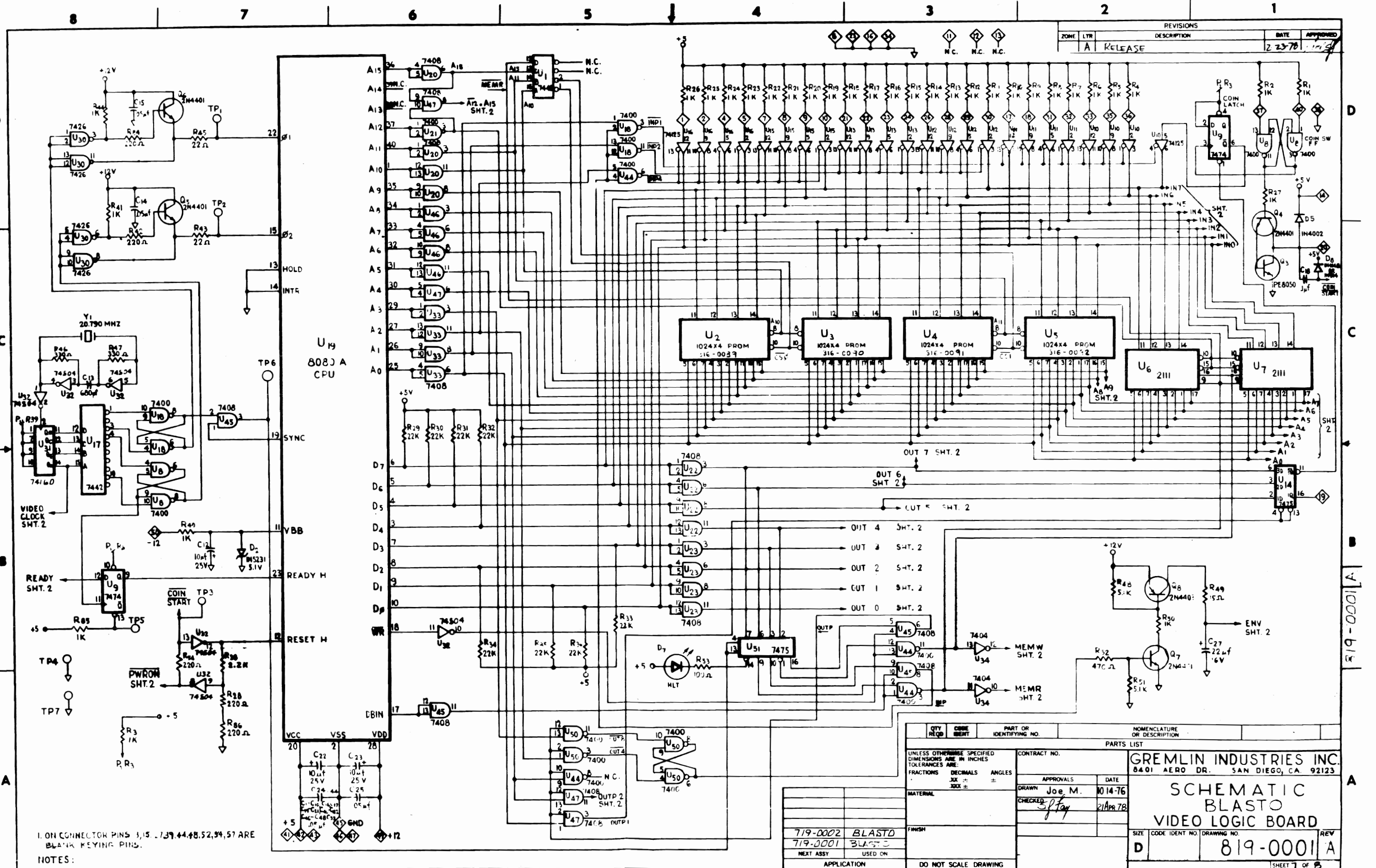
PC ASSEMBLY
VIDEO LOGIC BOARD
BLASTO

SIZE CODE IDENT NO. DRAWING NO. REV
D 819-0001 A

SCALE 2/1 SHEET 6 OF 8

819-0001 A B

REVISIONS		DATE	APPROVED
ZONE	LTR	DESCRIPTION	
A	RELEASE		2-23-78



1. ON CONNECTOR PINS 3, 15, 17, 39, 44, 48, 52, 34, 57 ARE BLANK KEYING PINS.

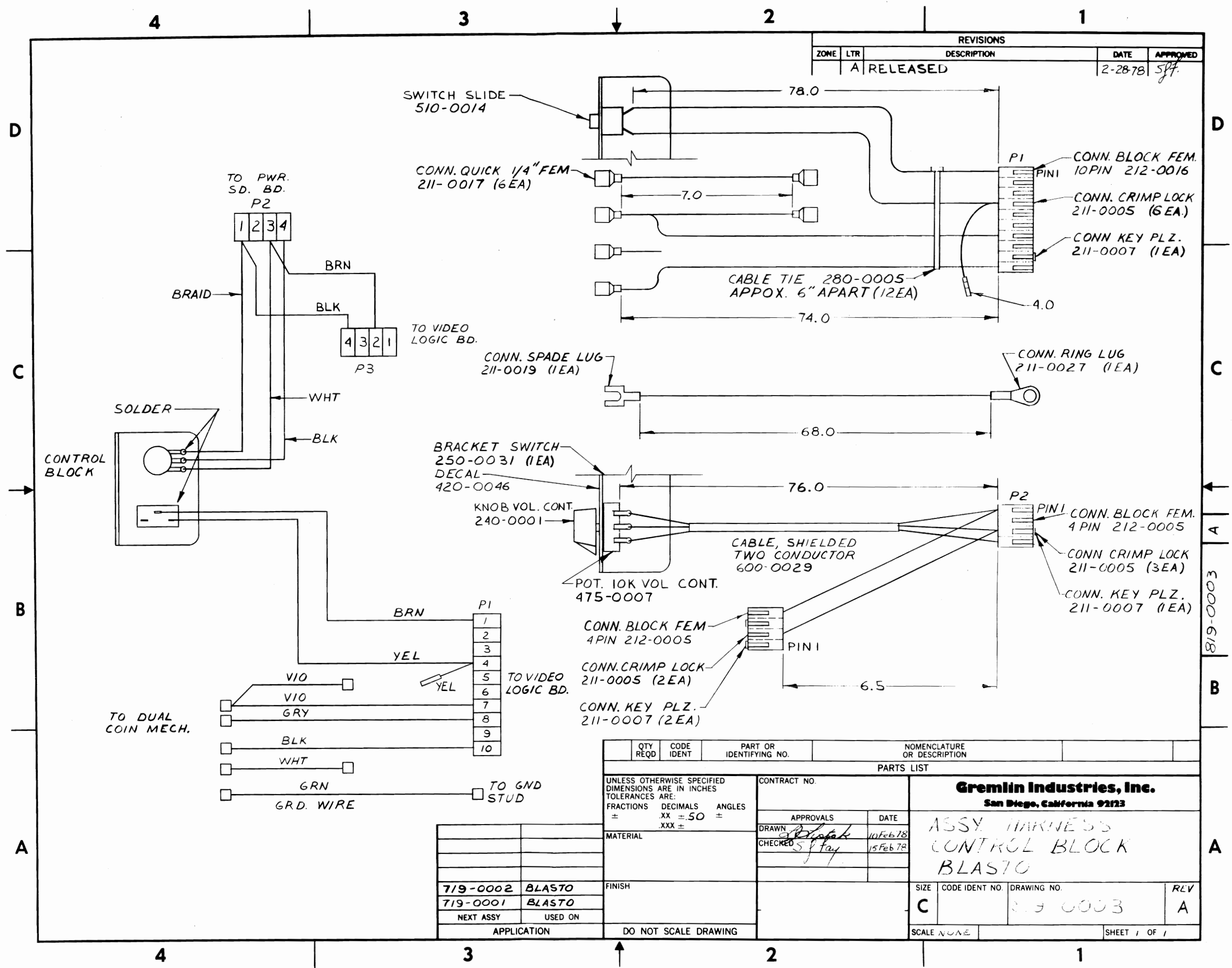
NOTES:

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 ±	±	
CONTRACT NO.			
APPROVALS		DATE	
DRAWN Joe M.		10/14/76	
CHECKED Sffay		21 APR 78	
MATERIAL			
FINISH			
APPLICATION			
DO NOT SCALE DRAWING			

GREMLIN INDUSTRIES INC.	
8401 AERO DR. SAN DIEGO, CA. 92123	
SCHEMATIC	
BLASTO	
VIDEO LOGIC BOARD	
SIZE	CODE IDENT NO. DRAWING NO. REV
D	819-0001 A

819-0001A

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 ±	DATE
	.50 ±		10 Feb 78
	.XXX ±		15 Feb 78
MATERIAL		APPROVALS	
		DRAWN <i>S. J. Fay</i>	
		CHECKED <i>S. J. Fay</i>	
FINISH		DATE	
719-0002 BLASTO			
719-0001 BLASTO			
NEXT ASSY USED ON		SIZE CODE IDENT NO. DRAWING NO. REV	
APPLICATION		C 819-0003 819-0003 A	
DO NOT SCALE DRAWING		SCALE NONE SHEET 1 OF 1	

Gremlin Industries, Inc.
San Diego, California 92123

ASSY. HARNESS
CONTROL BLOCK
BLASTO

Gremlin Industries, Inc.
 San Diego, California 92123

PARTS LIST

TITLE
 VIDEO LOGIC BOARD
 BLASTO

819-0026
 DWG NO

SH 1
 OF 8
 REV A

DRAWN

ENGR

CHECK

APPR

REVISION DESCRIPTION

DRAFT

CHECK

APPR

LTR DATE

RE DRAWN

Wynner

R4D

R4D

5-5-78

Grenlin Industries, Inc.
San Diego, California 92123

PARTS LIST

TITLE
VIDEO LOGIC BOARD

819-0026
DWG NO

SH 3
OF 8
REV A

ITEM NO	PART NO	QTY PER ASSY				DESCRIPTION	REF DES
19	313-0004	1				I.C. LA1741	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, U44, U50
23	314-0010	1				I.C. 7410	U48
24	314-0011	2				I.C. 7442	U1, U17
25	314-0012	8				I.C. 7408	U20, U22, U23, U33, U45 - U47, U63
26	314-0015	1				I.C. 7404	U34
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	U14, 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	314-0046	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	316-0095	1				I.C. 1074X4 PROM	U2

Gremlin Industries, Inc.
San Diego, California 92133

PARTS LIST

TITLE
VIDEO LOGIC BOARD
BLASTO

819-0026
DWG NO

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 1N4002 D5	
70	481-0006	1				DIODE 1N914 OR 1N4148 D8	
71	481-0008	1				DIODE ZENER 1N5231 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 92123

PARTS LIST

TITLE
VIDEO LOGIC BOARD
BLASTO

819-0026
DWG NO

SH 4
OF 8
REV A

ITEM NO	PART NO	QTY PER ASSY			DESCRIPTION	REF DES
42	316-0096	1			I.C. 1024 X4 PROM	U3
43	316-0097	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, R83,R85
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

Gremelin Industries, Inc.
San Diego, California 92123

PARTS LIST

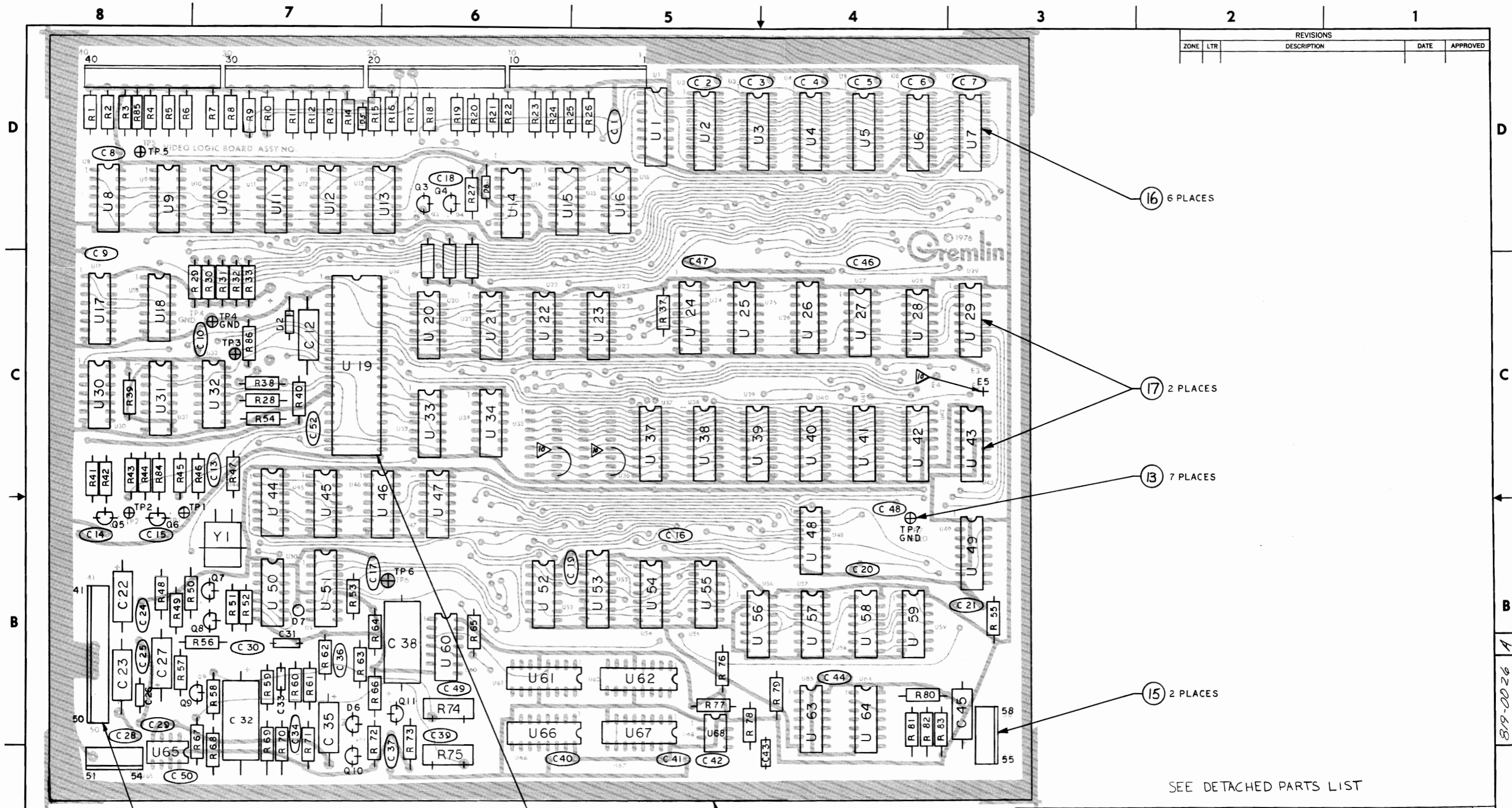
TITLE
VIDEO LOGIC BOARD
BLASTO

819-0026
DWG NO

SH 2
OF 8
REV A

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 pf 50V	C25, C40-C42, C44, C46-C48, C52
6	151-0008	1		CAP CER. .001 μ f 50V	C13
7	151-0011	1		CAP CER. .01 μ f 50V	C50
8	151-0012	8		CAP CER. .1 μ f 50V	C49
9	152-0001	1		CAP F. .1 μ f 100V	C18, C28-C30, C34, C36, C37, C39
10	152-0007	1		CAP F. .001 μ f 250V	C26
11	152-0015	2		CAP F. .033 μ f 250V	C43
12	170-0057	1		PCB VIDEO LOGIC	C31, C33
13	211-0004	7		CONN PIN TEST PT	
14	212-0003	5		CONN MALE 10 PIN	TP1-TP7
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

ZONE		LTR		REVISIONS		DATE	APPROVED
				DESCRIPTION			



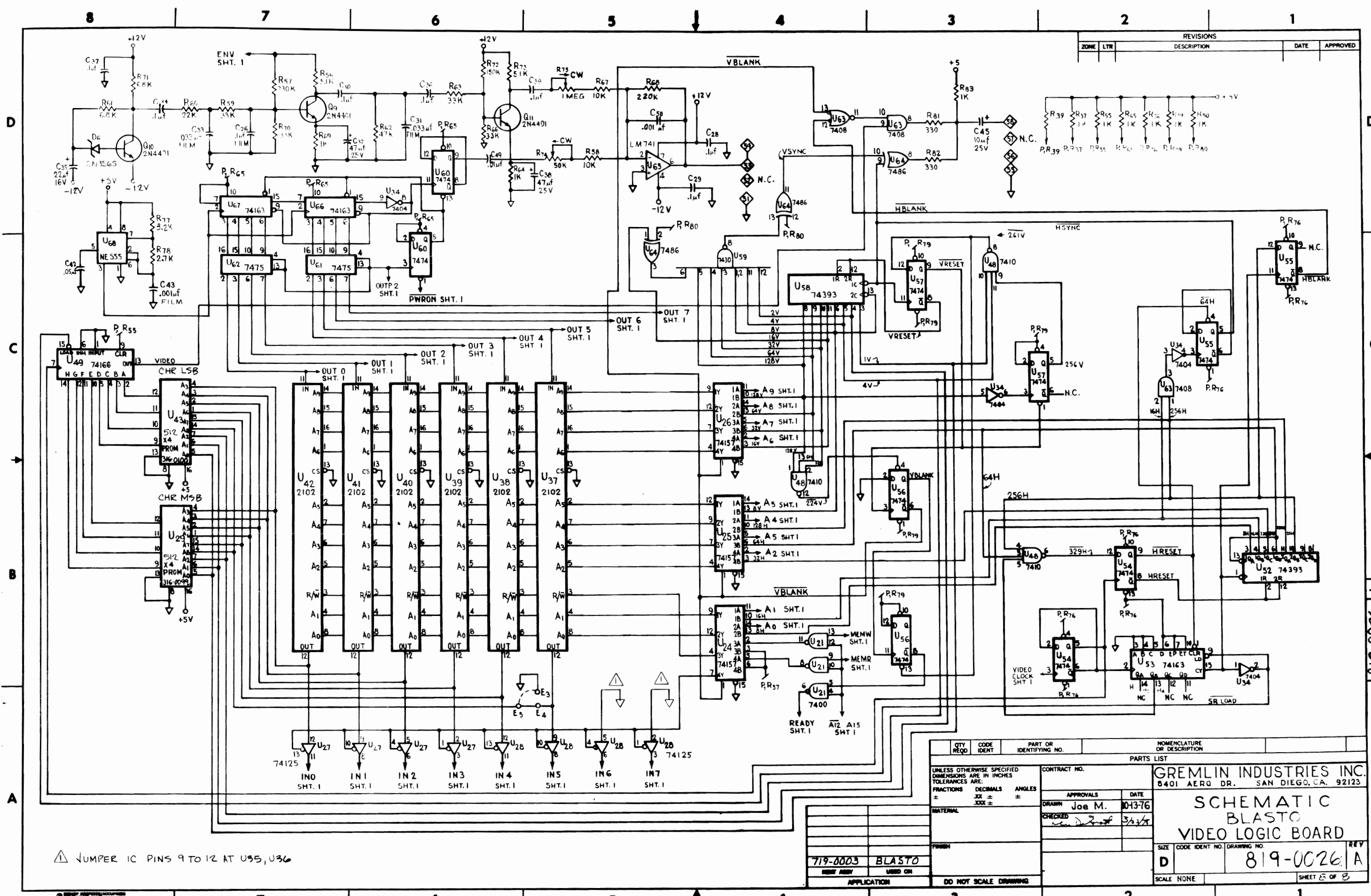
SEE DETACHED PARTS LIST

- 6. OMIT Q1, Q2, D1, D3, D4, U35, U36, C11, C51, E1, E2
 - 5. LAST C No. USED C52
 - 4. LAST D No. USED D8
 - 3. LAST R No. USED R86
 - 2. LAST Q No. USED Q11
 - 1. LAST U No. USED U68
- 10. JUMPER WIRES AS NOTED
 - 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

NOTES: UNLESS OTHERWISE SPECIFIED

QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
PARTS LIST			
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:		CONTRACT NO.	
FRACTIONS	DECIMALS	ANGLES	
±	.XX ±	±	
	.XXX ±		
MATERIAL		APPROVALS	DATE
FINISH		CHECKED	
NEXT ASSY		USED ON	
APPLICATION		DO NOT SCALE DRAWING	
<p style="text-align: center;">Gremlin Industries, Inc. San Diego, California 92123</p>			<p>P.C. ASSEMBLY VIDEO LOGIC BOARD BLASTO</p>
SIZE	CODE IDENT NO.	DRAWING NO.	REV
D		819-0026	A
SCALE 2/1			SHEET 6 OF 8

819-0026



REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED

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		
±	JXX ±	±		
MATERIAL				
FINISH				
719-0003 BLASTO USED ON DO NOT SCALE DRAWING				
CONTRACT NO.		APPROVALS		
GREMLIN INDUSTRIES INC.		DATE		
8401 AERO DR. SAN DIEGO, CA. 92123		DRAWN Joe M. 10-13-76		
SCHEMATIC		CHECKED [Signature] 3/2/78		
BLASTO		VIDEO LOGIC BOARD		
SIZE	CODE IDENT NO.	DRAWING NO.	REV	
D		819-0026	A	
SCALE NONE		SHEET 23 OF 23		

⚠ JUMPER IC PINS 9 TO 12 AT U55, U36

819-0026 A

Gremilin Industries, Inc.
San Diego, California 92123

PARTS LIST

TITLE
CONTROL PANEL ASSY

819 - 0027
DWG NO

SH 1
OF 3

A
REV

SHEET 3 15 D SIZE

DRAWN G. SMITH
CHECK *RWD*

ENGR
APPR

LTR DATE

REVISION DESCRIPTION

DRAFT

CHECK

APPR

1 3/9/78

PROTO

RWD

RWD

A 4/5/78

RELEASE

RWD

RWD

Gremilin Industries, Inc.
San Diego, California 92123

PARTS LIST

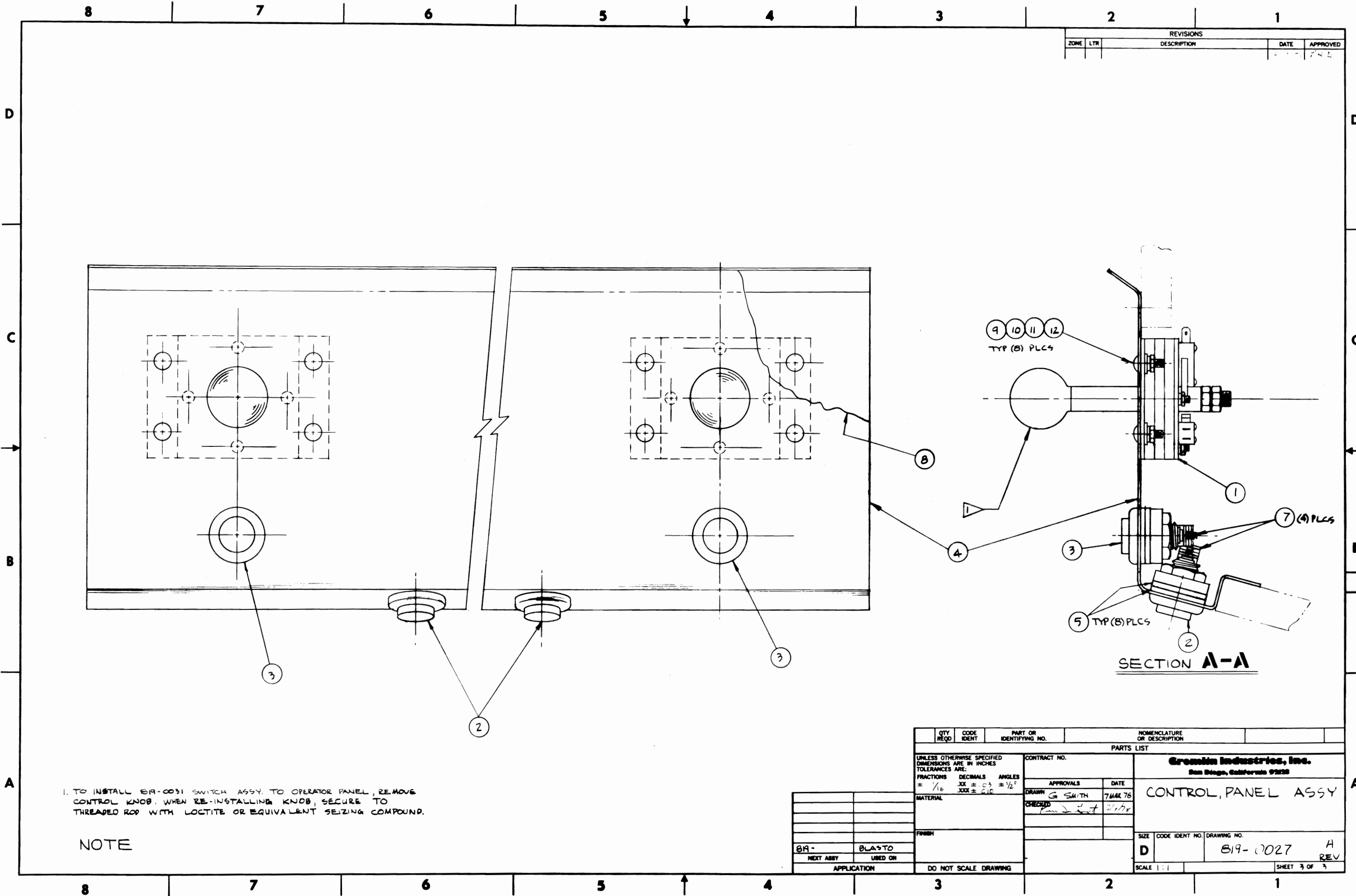
TITLE
CONTROL PNL ASSY

819-0027
DWG NO

SH 2
OF 3

A
REV

ITEM NO	PART NO	QTY PER ASSY			DESCRIPTION	REF DES
1	819-0031	2			SWITCH ASSY, JOY STKC	
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

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

SECTION A-A

QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
PARTS LIST			
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:		CONTRACT NO.	
FRACTIONS	DECIMALS	ANGLES	APPROVALS
± 1/16	XX ± .03	± 1/2°	DATE
	XXX ± .010		
MATERIAL		DRAWN G. SMITH 7 MAR 76	
FINISH		CHECKED [Signature]	
NEXT ASSY		SIZE CODE IDENT NO. DRAWING NO.	
BLASTO		D B19-0027 A	
USED ON		SCALE 1:1 SHEET 3 OF 3	
APPLICATION		DO NOT SCALE DRAWING	

Groddin Industries, Inc.
San Diego, California 92128

CONTROL, PANEL ASSY

Gremilin Industries, Inc.
San Diego, California 92123

PARTS LIST

TITLE
SWITCH ASSY,
JOY STICK

819 - 0031

DWG NO

SH 1
OF 3

A
REV

SHT 3 IS B'S IZC

DRAWN G. SMITH

ENGR

CHECK *Ron De Jesus*

APPR

LTR DATE

REVISION DESCRIPTION

DRAFT

CHECK

APPR

A 4/5/78

RELEASED

FAD

FAD

Gremilin Industries, Inc.
San Diego, California 91133

PARTS LIST

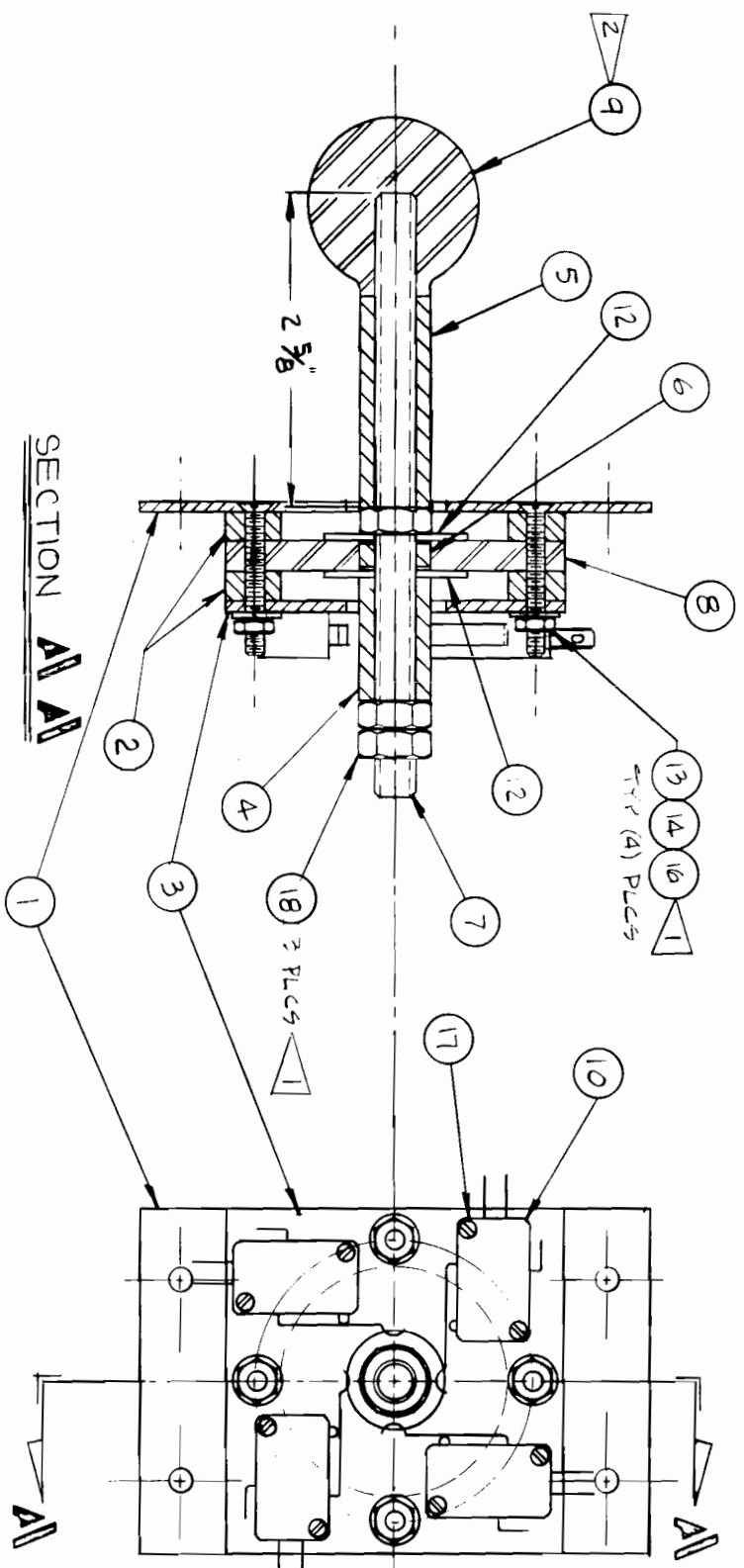
TITLE
SWITCH ASSY,
JOY STICK

819-0031
DWG NO

SH 2
OF 3
REV A

ITEM NO	PART NO	QTY PER ASSY			DESCRIPTION	REF DES
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. 100%K	
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 TAMB	
19						
20						
21						
22						
23						
24						
25						

REVISIONS		DATE	APPROVED
1	RELEASED		



▷ CONTROL KNOB TO BE TEMPORARILY
 INSTALLED THIS ASSY.
 ▷ INSTALL NUTS WITH LOCTITE TM OR
 EQUIVALENT SEIZING COMPOUND

NOTE:

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES FRACTIONS DECIMALS ANGLES		CONTRACT NO.	
MATERIAL		APPROVALS	DATE
FINISH		DRAWN: G. SMITH	DATE: 1/14/78
DO NOT SCALE DRAWING		CHECKED: J. R. A. 3/1/78	
APPLICATION	USED ON	SIZE: B	
NEAT ASSY		CODE IDENT NO.: 819-0031	
		DRAWING NO.: 819-0031	
		SHEET 3 OF 3	

Gromm Industries, Inc.
 San Diego, California 92133

SWITCH ASSY.
 JOY STICK