

DEPTHCHARGE

The word "DEPTHCHARGE" is written in a large, bold, outlined font. The letters are slightly irregular and have a hand-drawn feel. A horizontal line with a wavy, water-like pattern runs through the middle of the letters. To the right of the word, there is a stylized illustration of a globe with a bomb or explosive device attached to its right side, with jagged lines radiating from the bomb, suggesting an explosion or impact.

MANUFACTURED BY

Gremlin
Industries, inc.

OWNER'S MANUAL

DEPTHCHARGE
OPERATING INSTRUCTIONS
AND
SERVICE MANUAL

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

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INTRODUCTION

DEPTHCHARGE 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 the DEPTHCHARGE 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 DEPTHCHARGE 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.

WARRANTY/FACTORY SERVICE INFORMATION

WARRANTY

All Gremlin products are warranted against defective materials and workmanship. This warranty applies for 90 (ninety) days from the date of delivery. This warranty covers defects/failure for all electronic components and connectors (except fuses and lamps, which have no warranty) under normal use. No other warranty is expressed or implied. Permission must be obtained from factory for warranty repair returns. No liability will be accepted if returned without such permission.

FACTORY SERVICE

Should an assembly become defective, contact your local distributor. Factory authorization to return the assembly will be issued with transportation charges prepaid. If decided upon by factory representative, an advance replacement will be made. No merchandise may be returned to the factory without prior authorization.

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

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

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

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

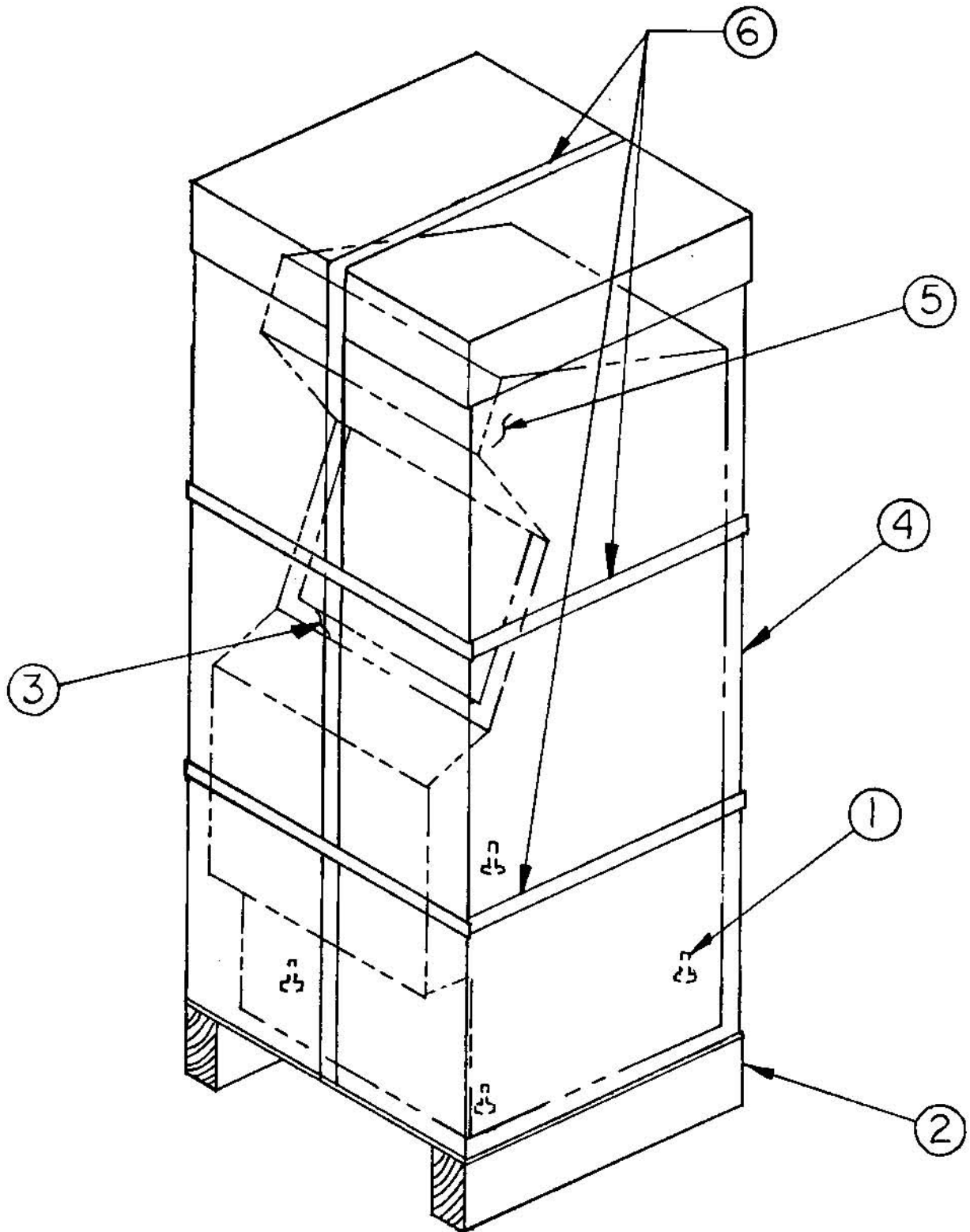
REPACKAGING INSTRUCTIONS

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

- A) If the original shipping bolts (Ref. 1) have been discarded, obtain four 5/16"-18" x 1-3/4" hex head bolts with 5/16" flat washer. Lay game on its side and attach skid (Ref. 2).
- B) Place game upright. Tape game keys to upper flange of operator's panel (Ref. 3). Crate the game using appropriate shock-absorbent packing material (Ref. 4). Include padding on all four corners of the game (Ref. 5).
- C) After crating is completed, secure package with strapping (Ref. 6).

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 accomplished; include the full serial number of the game.

REPACKAGING INSTRUCTIONS



DEPTHCHARGE GAME CONCEPT

DEPTHCHARGE is a video game of skill and strategy in which the player attempts to hit as many submarines as possible using depth charges launched from a maneuverable surface ship. Game time runs 90 count.

PLAYFIELD:

At the top of the screen is a ship which can be moved left or right using two player control buttons. Two additional control buttons launch depth charges from either the right or left side of the ship. The ship movement is necessary both offensively to aim depth charges, and defensively to dodge mines which are released by the submarines and float to the surface. The words TIME and SCORE are displayed in the upper left and upper right of the screen, respectively.

As the game progresses, as many as four submarines appear at different depths, and move at different speeds across the screen. Each submarine has a number on its side, which indicates the point value for sinking that sub.

DEPTH CHARGES:

The player has six (6) depth charges at his disposal. At the top center of the screen, the number of depth charges in his arsenal is displayed. Every time a depth charge is launched, one of the depth charge counters disappears, and every time a depth charge explodes, one depth charge counter reappears. The depth charge counters thus give a clear indication of how many are available for firing at any time during the game.

MINES:

As the submarines move across the screen, they randomly release mines which float slowly to the surface and explode. If one of these mines hits the player's ship, a stiff penalty is imposed (See SCORING). The mine explosion is accompanied by a realistic explosion and "spray" sound.

GRAVEYARD:

Every time a submarine (or the ship) is sunk, a miniature image of it appears at the bottom of the screen. Every hit adds another submarine to the graveyard, so a player can gauge his proficiency with a quick glance at the graveyard. The graveyard images are also used for end-of-game bonus scoring.

DEPTHCHARGE GAME CONCEPT (Cont'd.):

SUBMARINES:

Submarines run automatically, and appear at random depths and speeds. There are never more than four subs on the screen at one time. The deep submarines carry higher scores than shallow ones, since they are more difficult to hit. The mines which the subs release are also automatic and random.

SCORING:

Hitting a submarine scores the value shown on the sub. Anytime the player's ship is sunk by a mine, the player's score is cut in half. At the end of the game, a 30 point bonus is awarded for every submarine in the graveyard.

HIGH SCORE:

Current high score is displayed at the lower center of the screen during the advertising sequence. It updates with each new higher score. High score can be reset to zero by unplugging the game from line voltage and plugging it back in.

TIME:

DEPTHCHARGE is set to run for approximately two minutes. This has been found to be an optimum time, and is not adjustable.

OVERTIME:

If a player manages to score 500 or more points in a game, he is awarded extended time. Extended time runs 45 counts.

END-OF-GAME:

Whenever DEPTHCHARGE is not being played, an "advertisement" sequence is initiated. The game plays itself to attract attention. To avoid patron confusion, the words "Game Over" appear while the advertising game is being played, and during a thirty (30) second delay thereafter. Following the delay, the advertising sequence repeats.

DEPTHCHARGE GAME CONCEPT (Cont'd.):

E-Z Adjust TM control Panel - DEPTHCHARGE has only one adjustment and it is located behind the coin door.

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

MAINTENANCE

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.

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.

EQUIPMENT:

1. Oscilloscope - 50 mhz or wider band width
2. DVM (Digital Volt Meter)
3. OHM Meter
4. Logic Probe
5. Solder Station - 75 Watt or less
6. Jumpers

The above list is recommended for anyone attempting to service DEPTHCHARGE.

OPERATIONAL WAVE FORMS

The following set of scope photographs are intended to aid in the troubleshooting of a malfunctioning Video Logic Board. Although the photos were taken with a four channel scope, the system can be just as easily checked out with a single or dual-channel scope. The important thing to look for is the existence of the signals shown.

SIGNALS 1-15:

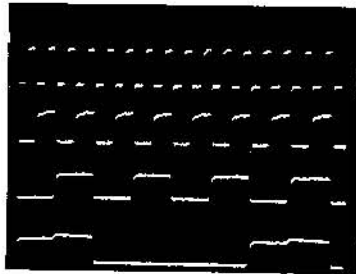
Signals 1-15 show the signals developed by the Video Logic board's master signal sequencer. These signals form the basic timing for the entire board, and therefore, should be checked first. All photos use 5 volt per centimeter vertical sensitivity, and a time base of 200 nanoseconds per division horizontal.

The important thing to check with these photos is the relative shapes of the signals. Don't be concerned with the actual pulse widths and frequencies. If any of the signals are missing (always high or low) check the input side of the 74S175 latch which corresponds to the defective output. If a signal is seen here (don't worry if it is loaded with noise spikes, the 74S175 is there to remove them), the 74S175 should be suspected. Keep in mind that it could also be a line which the 74S175 is driving which is pulling high or low. The best way to check this is to use an exacto knife to cut the trace leaving the proper 74S175 output pin, and again check the 74S175 output. (CAUTION: BEFORE ATTEMPTING ANY REPAIRS REFER TO PAGE 3. FOR WARRANTY CONDITIONS.)

If it is now correct, the problem is on the "downstream" side of the 74S175. DON'T FORGET TO RE-JUMPER THE CONNECTION YOU CUT. If the input side of the 74S175 is also "dead", suspect the PROM (U27 or U28), whichever is applicable.

OPERATIONAL WAVE FORMS (Cont'd.):

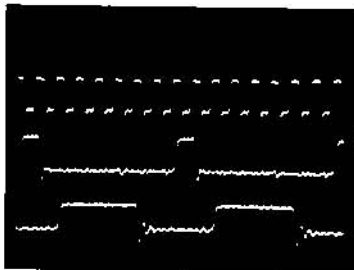
SIGNALS 1-15:



1. (U14-15)
2. (U14-10)
3. M1 (U14-2)
4. M2 (U14-7)



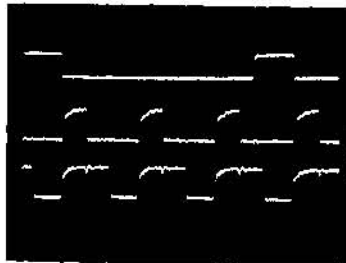
5. (U13-15) SRCK (Shift Register Clock)
6. (U13-2) SRLD (Shift Register Load)
7. M4 (U13-13)



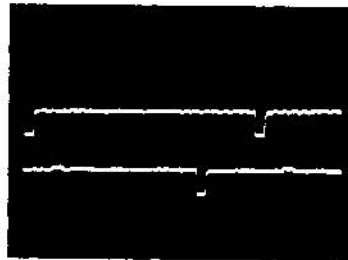
8. (U11-14) Pin 9
9. (U12-15) Processor-Clock Phase 1
10. (U12-10) Processor-Clock Phase 2

OPERATIONAL WAVE FORMS (Cont'd.):

SIGNALS 1-15 (Cont'd.):



- 11. S1 (U11-17)
- 12. $\overline{\text{RAS}}$ (U29-12)
- 13. $\overline{\text{CAS}}$ (U11-2)

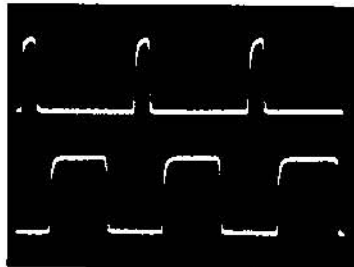


- 14. $\overline{\text{RWT}}$ (U11-10)
- 15. $\overline{\text{MSB}}$ (U12-7)

OPERATIONAL WAVE FORMS (Cont'd.):

SIGNALS 16 AND 17:

Signals 16 and 17 are the 8080 clocks. Vertical sensitivities are 5 volts per centimeter; horizontal is 200 ns/cm. Make sure that these signals pull up to at least 10.5 volts (they normally drive to 12 volts).



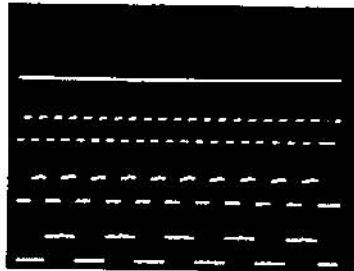
16. 12 Volt
Phase 1 Clock
(TP 1)

17. 12 Volt
Phase 2 Clock
(TP 2)

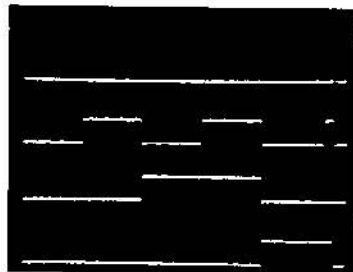
OPERATIONAL WAVE FORMS (Cont'd.):

SIGNALS 18 THROUGH 28:

Signals 18 through 28 show signals from the horizontal timing chain for the CRT timing. The three photos show the top signal as HORIZONTAL RESET, which is a good triggering signal for viewing the other waveforms. The time between horizontal reset pulses should be about 63 microseconds.



- 18. Horizontal Reset (U46-2,12)
- 19. 8H (U46-3)
- 20. 16H (U46-4)
- 21. 32H (U46-5)



- 22. Horizontal Reset (U46-2,12)
- 23. 64H (U46-6)
- 24. 128H (U46-11)
- 25. 256H (U46-10)

OPERATIONAL WAVE FORMS (Cont'd.):

SIGNALS 18 THROUGH 28 (Cont'd.):

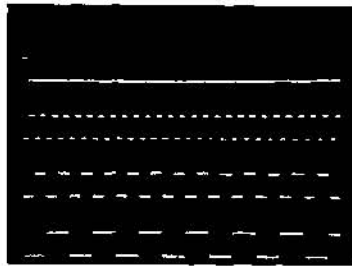


- 26. Horizontal Reset (U46-2,12)
- 27. HSYNC (U36-8)
- 28. HBLANK (U47-1)

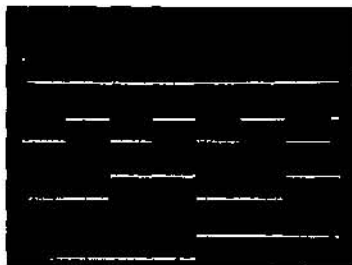
OPERATIONAL WAVE FORMS (Cont'd.):

SIGNALS 29 THROUGH 43:

Signals 29 through 43 show the vertical timing chain waveforms. In these four photos, the top trace is VERTICAL RESET. Note that the horizontal time base for signals 29 through 36 is different than for 37 through 43. The time between vertical reset pulses should be about 16 milliseconds (last two photos).



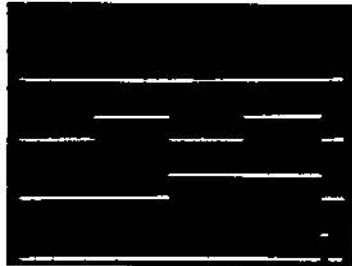
- 29. Vertical Reset (U49-2)
- 30. 1V (U49-3)
- 31. 2V (U49-4)
- 32. 4V (49-5)



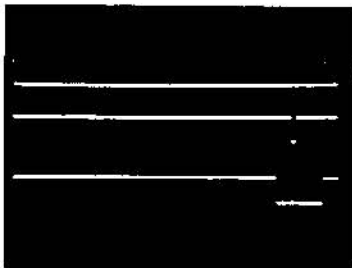
- 33. Vertical Reset (U49-2)
- 34. 8V (U49-6)
- 35. 16V (U49-11)
- 36. 32V (U49-10)

OPERATIONAL WAVE FORMS (Cont'd.):

SIGNALS 29 THROUGH 43 (Cont'd.):



- 37. Vertical Reset (U49-2)
- 38. 64V (U49-9)
- 39. 128V (U49-8)
- 40. 256V (U60-5)



- 41. Vertical Reset (U49-2)
- 42. VSYNC (U47-12)
- 43. VBLANK (U48-5)

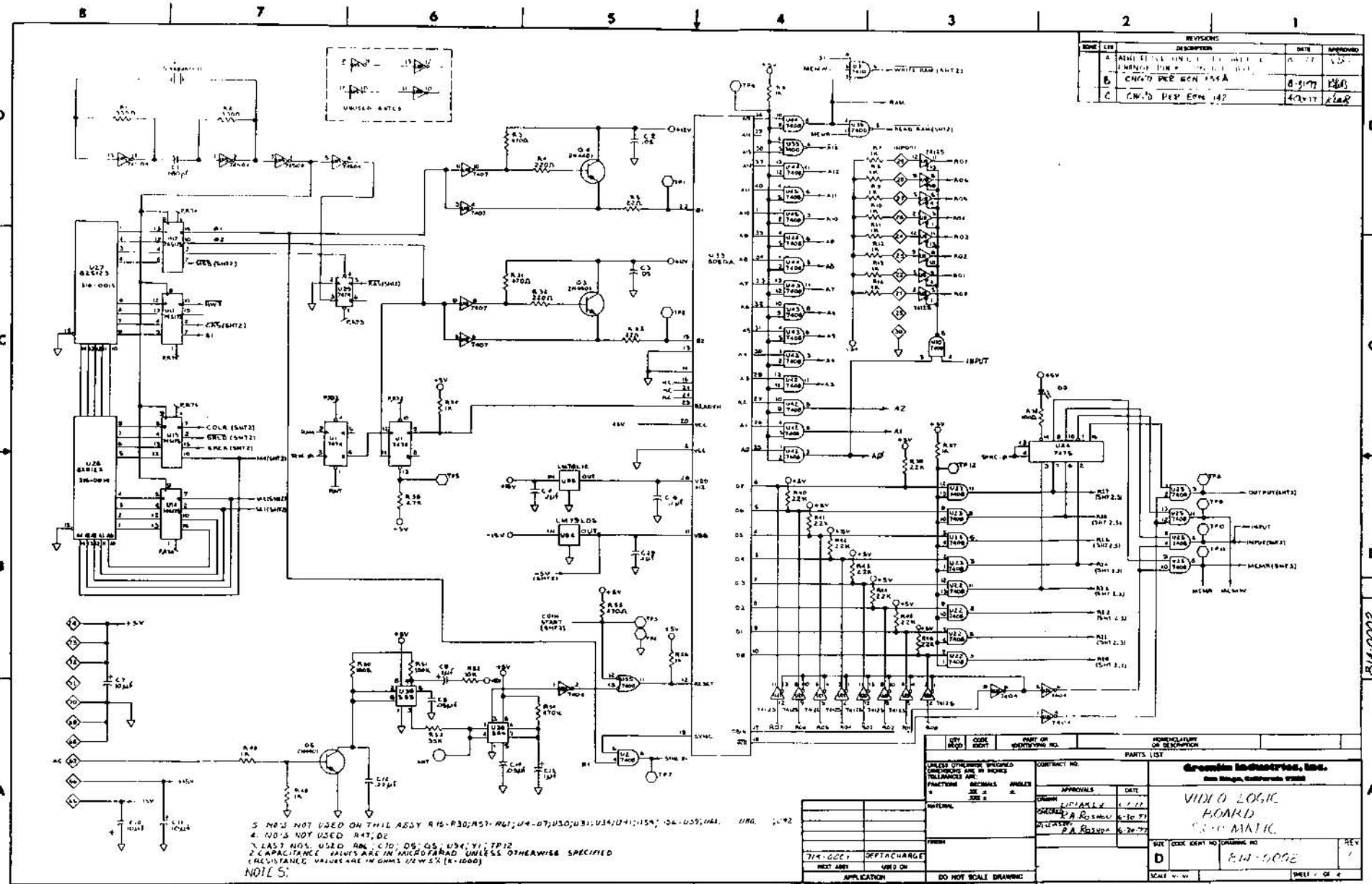
DEPTHCHARGE REPLACEABLE PARTS LIST

<u>DESCRIPTION</u>	<u>PART NUMBER</u>	<u>QTY USED.</u>
BUSHING S/REL. 3/8"	280-0001	1
BUTTON, PLUNGER RED	240-0006	4
CABINET VIDEO	140-0022	1
CABINET TIE	280-0005	10
CASH BOX, TABLE	220-0013	1
CLIP, SWITCH	250-0048	1
CLIP, WIRE HOLDDOWN	280-0004	35
COIN MECHANISM, DUAL	220-0010	1
CONTROL PANEL	280-0039	1
COVER, SPEAKER 6x9	130-0002	1
DECAL, CAUTION 115V	420-0030	1
DECAL, DEPTHCHARGE	420-0064	1
DECAL, IMPORTANT NOTE	420-0038	2
FEET, CABINET	280-0030	4
FIXT, LAMP FLOUR 18"	390-0012	1
FRAME, BEZEL	250-0032	1
GRAPHIC, FRONT	253-0056	1
GRAPHIC, SIDE LEFT D/C	253-0042	1
GRAPHIC, SIDE RT. D/C	253-0041	1
JUNCTION BOX COVER M	140-0021	1
LAMP, FLUORESCENT 18"	390-0011	1
LID ASSY, COIN BOX	220-0016	1
MANUAL, DEPTHCHARGE	420-0077	1
MASK, SHADOW CABINET	253-0014	1
MONITOR SCREEN	253-0028	1

DEPTHCHARGE REPLACEABLE PARTS LIST (Cont'd.):

<u>DESCRIPTION</u>	<u>PART NUMBER</u>	<u>QTY USED.</u>
MONITOR, VIDEO 19"	200-0002	1
NUT, WIRE	280-0010	2
PANEL, DISPLAY UPPER	253-0029	1
PANEL, FRONT SWITCH	250-0103	1
PLATE, COIN RETENSION	250-0062	2
SPEAKER, GAME 6x9	130-0001	1
SPEAKER, COVER 6x9	130-0002	1
SPRING RETAINER	250-0034	1
VOULME CONTROL BRACKET	250-0031	1
VOLUME CONTROL KNOB	240-0001	1
ASSY, COIN COUNTER	814-0011	1
ASSY, JUNCTION BOX	808-0009	1
ASSY, MONITOR HARN.	814-0010	1
ASSY, POWER SUPPLY	814-0005	1
ASSY, SPEAKER CABLE	807-0010	1
DEPTHCHARGE SOUND BOARD	814-0001	1
HARN. COIN MECH. ASSY.	814-0008	1
HARN. JUMPER ASSY.	814-0007	1
POWER SUPPLY ASSY.	814-0003	1
VIDEO LOGIC ASSY.	814-0002	1
HARN. VOL. CONTROL BLK.	814-0009	1
OPERATOR SWITCH ASSY.	814-0006	1

REVISIONS				
REV	DATE	DESCRIPTION	APPROVED	BY
A	8-27-77	INITIAL DESIGN		
B	8-29-77	CHANGE PER GEN 156A		WAB
C	8-29-77	CHANGE PER GEN 147		WAB



5. NO'S NOT USED ON THIS ASY: R15-R30; R57-R61; U4-U7; U10; U13; U14; U16; U18; U19; U20; U21; U22; U23; U24; U25; U26; U27; U28; U29; U30; U31; U32; U33; U34; U35; U36; U37; U38; U39; U40; U41; U42; U43; U44; U45; U46; U47; U48; U49; U50; U51; U52; U53; U54; U55; U56; U57; U58; U59; U60; U61; U62; U63; U64; U65; U66; U67; U68; U69; U70; U71; U72; U73; U74; U75; U76; U77; U78; U79; U80; U81; U82; U83; U84; U85; U86; U87; U88; U89; U90; U91; U92; U93; U94; U95; U96; U97; U98; U99; U100.

6. LAST NOS. USED: R47, D2.

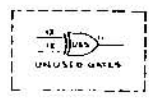
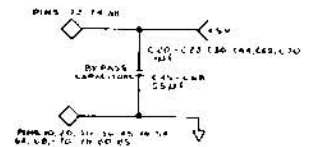
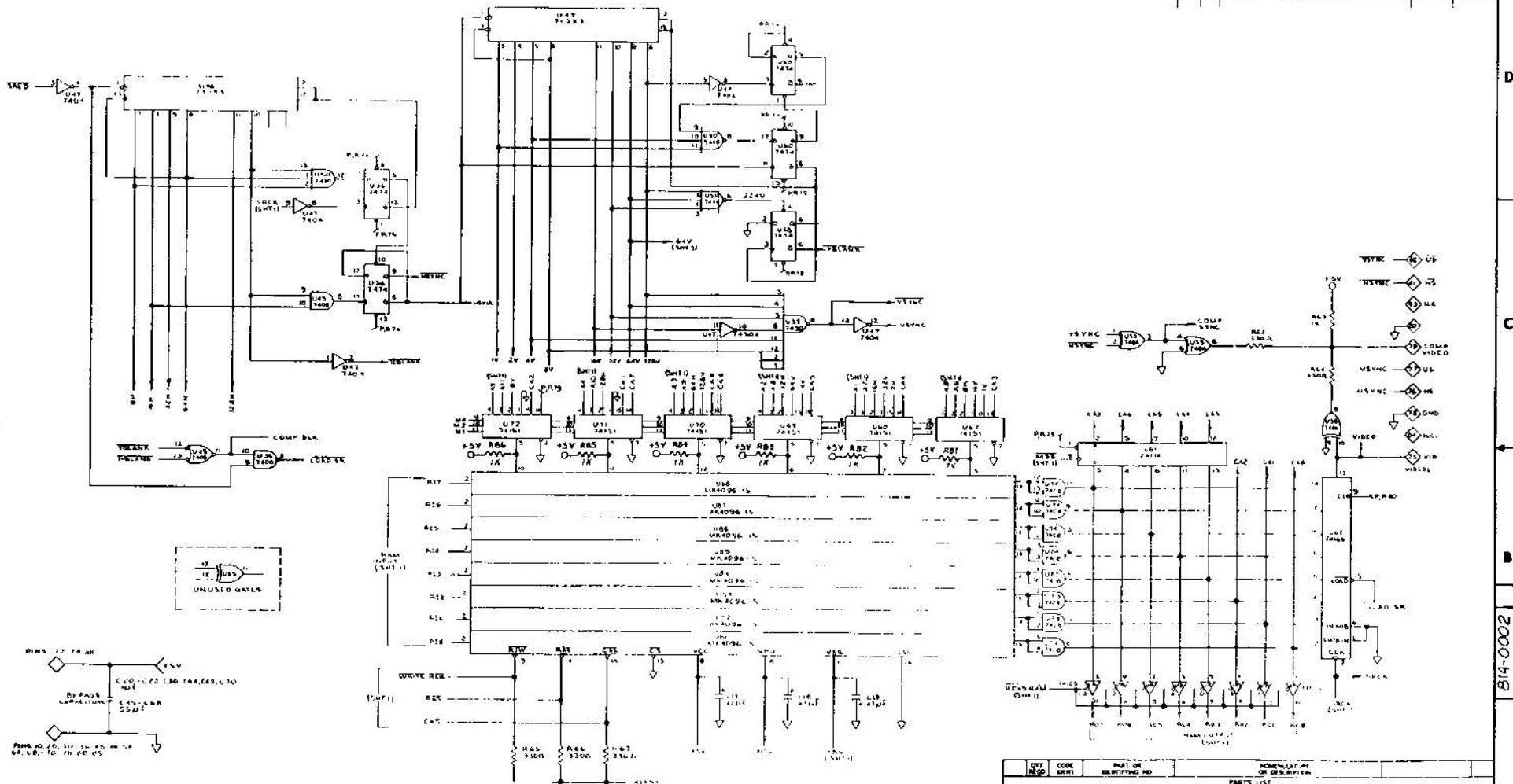
7. CAPACITANCE VALUES ARE IN MICROFARAD UNLESS OTHERWISE SPECIFIED (RESISTANCE VALUES ARE IN OHMS UNLESS OTHERWISE SPECIFIED).

NOTES:

REV. NO.	CODE	PART OR IDENTIFYING NO.	QUANTITY
PARTS LIST			
UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES. TOLERANCES ARE: FRACTIONS DECIMALS ANGLES		CONTRACT NO.	
DRAWN BY: L. J. BAKER		DATE: 6-1-77	
CHECKED BY: P. A. BISHOP		DATE: 6-20-77	
APPROVED BY: P. A. BISHOP		DATE: 6-29-77	
MATERIAL		FINISH	
714-0001 DEPT. CHARGE		USED ON	
NEXT ASSY		DO NOT SCALE DRAWING	
APPLICATION		SCALE: 1" = 1"	
DATE: 8-29-77		SHEET: 1 OF 4	

514-0002

REV	DATE	APPROVED



11	U10	74104	1K
12	U11	74104	1K
13	U12	74104	1K
14	U13	74104	1K
15	U14	74104	1K
16	U15	74104	1K
17	U16	74104	1K
18	U17	74104	1K
19	U18	74104	1K
20	U19	74104	1K
21	U20	74104	1K
22	U21	74104	1K
23	U22	74104	1K
24	U23	74104	1K

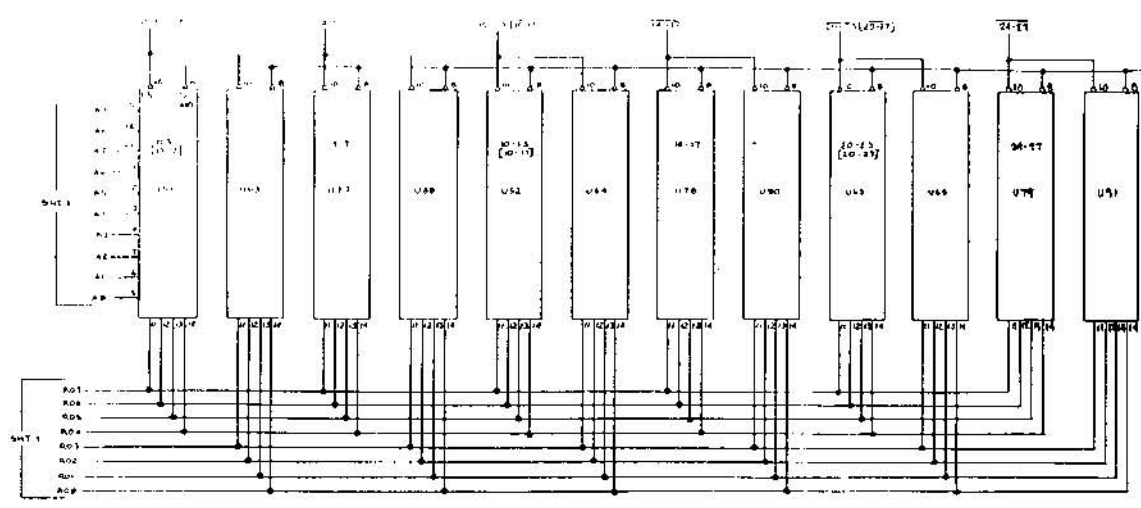
QTY	CODE	PART OR IDENTIFYING NO.	ASSEMBLY OR DESCRIPTION
PARTS LIST			
UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES. TOLERANCES ARE FRACTIONS DECIMALS ANGLES		CONTACT NO.	
DIMENSIONS		APPROVALS	
DRAWN		DATE	
CHECKED		BY	
REWORKED		BY	
<p style="text-align: center;">Growth Industries, Inc. New Haven, Connecticut 06510</p> <h2 style="text-align: center;">VIDEO LOGIC BOARD</h2> <h3 style="text-align: center;">SCHEMATIC</h3>			
REV		DRAWING NO.	
D		8-3 0002	
SCALE 1:1		SHEET 1 OF 4	

SEE NOTES 1001 101

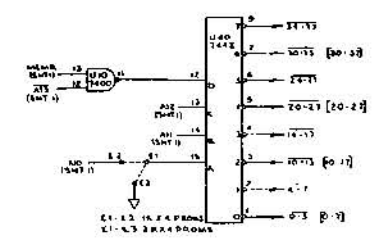
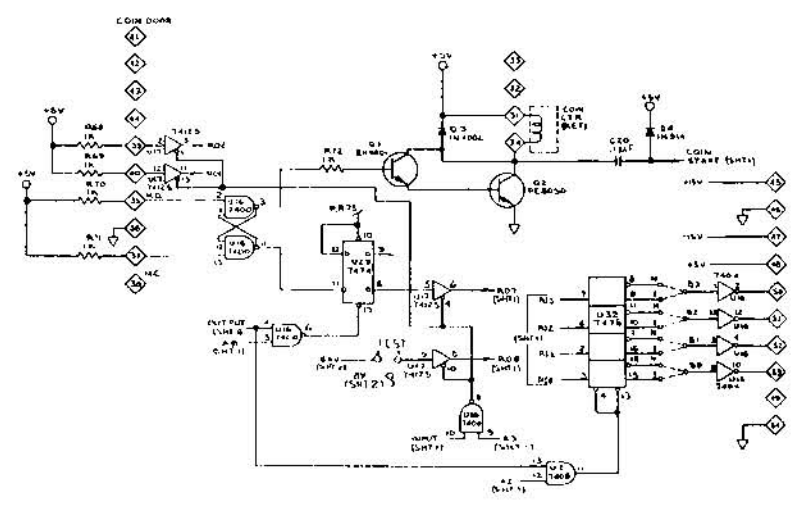
NOTES

814-0002

REV		REVISIONS	DATE	APPROVED
		DESCRIPTION		



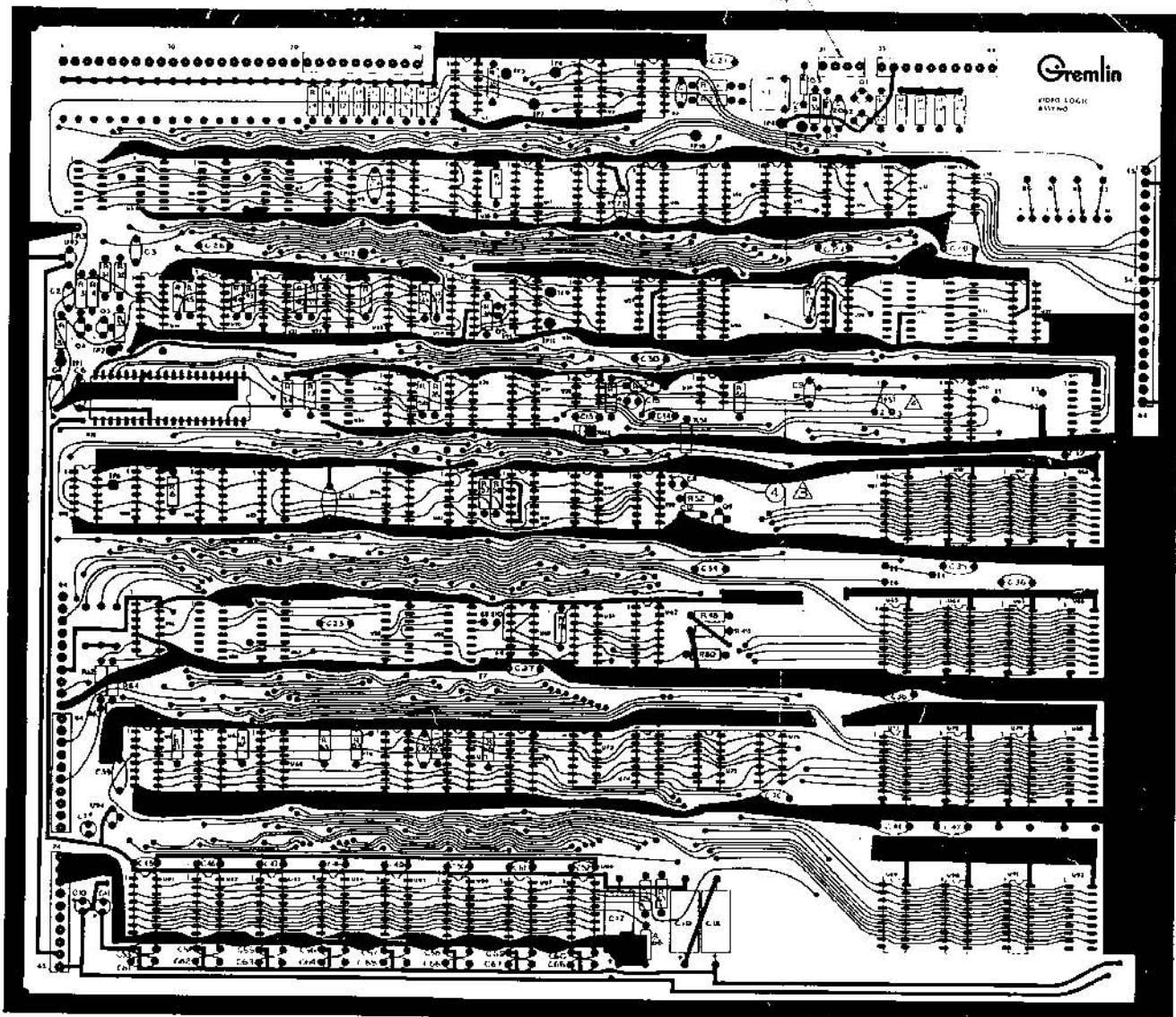
A10 (SHT)
 0 E6
 0 E4
 0 E5
 E4-E5 1K x 4 PROMS
 E4-E6 2K x 4 PROMS



QTY	CODE	PART OR	NOMENCLATURE												
REQD	IDENT	IDENTIFYING NO.	OR DESCRIPTION												
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:															
FRACTIONS		DECIMALS	ANGLES												
± .010		± .005	± .005												
<table border="1"> <tr> <td>DATE</td> <td>APPROVALS</td> <td>DATE</td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table>				DATE	APPROVALS	DATE									
DATE	APPROVALS	DATE													
714-0001 DEPTHERARGE		CONTRACT NO.													
NEXT ASBY USED ON		Microelectronics, Inc. 10000 S.W. 20th Ave. VIDEO LOGIC BOARD SCH: MAIL													
APPLICATION		SIZE: 1/2" x 1/2" x 1/2" (DRAWING NO) D EM-0002 L													
DO NOT SCALE DRAWING		SCALE: 1" = 1" SHEET 1 OF 4													

NOTES:

EM-0002



Gremlin
VIDEO LOGIC BOARD

24 PAGES

QTY	PART NUMBER	DESCRIPTION	ITEM NUMBER
1	201-0001	SOCKET	TO 47, 47B
1	201-0002	CONTACT	40M W/2.5M 4.5M 1.7M 1.1M
1	201-0004	15KΩ 1/4W 5%	15KΩ 1/4W 5%
1	201-0005	4.7KΩ 1/4W 5%	4.7KΩ 1/4W 5%
1	201-0006	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0007	10KΩ 1/4W 5%	10KΩ 1/4W 5%
1	201-0008	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0009	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0010	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0011	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0012	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0013	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0014	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0015	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0016	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0017	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0018	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0019	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0020	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0021	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0022	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0023	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0024	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0025	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0026	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0027	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0028	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0029	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0030	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0031	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0032	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0033	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0034	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0035	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0036	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0037	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0038	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0039	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0040	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0041	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0042	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0043	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0044	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0045	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0046	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0047	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0048	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0049	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0050	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0051	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0052	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0053	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0054	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0055	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0056	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0057	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0058	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0059	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0060	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0061	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0062	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0063	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0064	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0065	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0066	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0067	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0068	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0069	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0070	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0071	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0072	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0073	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0074	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0075	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0076	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0077	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0078	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0079	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0080	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0081	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0082	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0083	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0084	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0085	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0086	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0087	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0088	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0089	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0090	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0091	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0092	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0093	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0094	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0095	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0096	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0097	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0098	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0099	100Ω 1/4W 5%	100Ω 1/4W 5%
1	201-0100	100Ω 1/4W 5%	100Ω 1/4W 5%

NOTES:
 1. JUMPER TO BE ADDED AFTER FINAL TEST
 2. ALL WIRE IS WIRE # 22 GA. (CONNECTED TO PIN # 2-001)
 3. ALL CAPACITANCE VALUES ARE IN MICROFARADS
 4. ALL RESISTANCE VALUES ARE IN OHMS UNLESS OTHERWISE SPECIFIED

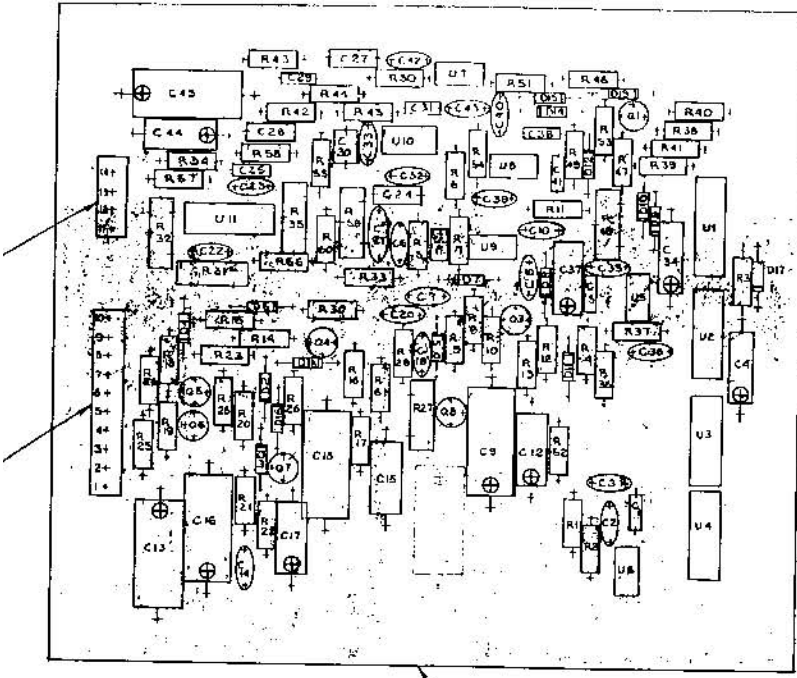
GREMLIN INC. DVC
 SAN DIEGO, CALIFORNIA 92108

PARTS OVERLAY
 VIDEO LOGIC BOARD

REVISED: 11/70
 DESIGNED BY: [Name]
 CHECKED BY: [Name]
 APPROVED BY: [Name]

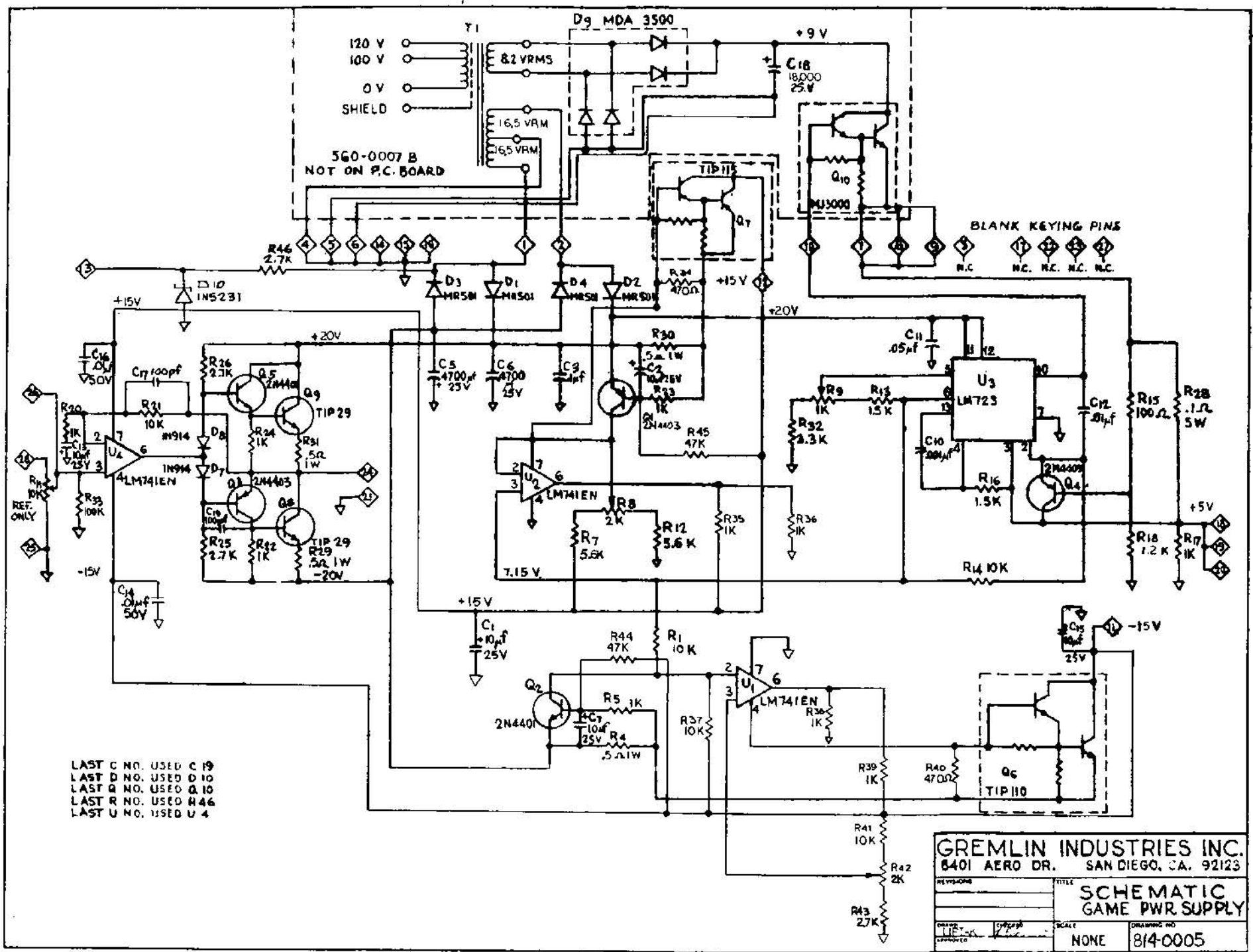
REV: E
 PART NUMBER: 201-0002
 DATE: 11/70

REVISED		DATE	APPROVED
ITEM	REF	DESCRIPTION	



7	152-0000	CAP. F. 47M 100V	C 30
6	157-000A	CAP. CER. 0.005M	C6, C25
5	217-0004	CONN. MALE 4PIN	3
4	217-0003	CONN. MALE 10 PIN	2
3	315-0028	IC. 4006	U4
2	315-0027	IC. 4030	U3
1	315-0006	IC. 4017	U1
1	315-0005	IC. 4013	U2
2	315-0004	IC. LM 741	U8, U7, U10
1	313-0008	IC. LM 324	U11
3	34-0001	IC. NE 555	U5, U6, U9
6	482-0014	RES TOR 2M401	Q7, Q3, Q7
1	482-0006	RES TOR 2M403	Q8
1	481-0008	DIODES 1N39A	D1-D17
1	413-0008	POT 50K TRIMMER	R27
2	415-0006	POT 100K TRIMMER	R35, R48
1	415-0001	POT 10K TRIMMER	R59
2	415-0002	POT 1MΩ TRIMMER	R37, R32
1	411-0393	RES. 39K 1/2W 5%	A2
2	411-0101	RES. 100Ω 1/2W 5%	R53, R55
2	411-0222	RES. 2.2K 1/2W 5%	R02, R56
1	411-0824	RES. 220K 1/2W 5%	R49
1	411-0124	RES. 120K 1/2W 5%	R41
1	411-0483	RES. 48K 1/2W 5%	R40
2	411-0153	RES. 15K 1/2W 5%	R38, R39
1	411-0411	RES. 470Ω 1/2W 5%	R24, R12, R18
1	411-0563	RES. 56K 1/2W 5%	R22
1	411-0482	RES. 48K 1/2W 5%	R77
3	411-0120	RES. 120Ω 1/2W 5%	R16, R10, R28
4	411-0562	RES. 56K 1/2W 5%	R15, R19, R25, R24
1	411-0105	RES. 1MΩ 1/2W 5%	R31
1	411-0681	RES. 680Ω 1/2W 5%	R13
3	411-0472	RES. 47K 1/2W 5%	R12, R50, R41
2	411-0154	RES. 150K 1/2W 5%	R11, R47
4	411-0223	RES. 22K 1/2W 5%	R10, R13, R29, R42, R44, R45
6	411-0103	RES. 10K 1/2W 5%	R9, R21, R30, R33, R34, R46, R47, R60
2	411-0104	RES. 100K 1/2W 5%	R7, R8
1	411-0224	RES. 220K 1/2W 5%	R5
6	411-0473	RES. 47K 1/2W 5%	R3, R4, R6, R17, R39, R43
3	411-0102	RES. 1K 1/2W 5%	R1, R26, R50
1	153-0004	CAP. TANT. 4.7M 25V	C37
1	153-0002	CAP. TANT. 1M 25V	C9
9	151-0011	CAP. CER. 0.01M 50V	C10, C22, C23, C31, C33, C38, C40, C44, C45
3	152-0017	CAP. F. 33M 100V	C24, C27, C28
2	152-0007	CAP. F. 0.01M 250V	C1
2	152-0006	CAP. F. 0.22M 100V	C38, C41
2	152-0005	CAP. F. 0.001M 50V	C4, C31
1	152-0005	CAP. F. 2.2M 100V	C8
1	152-0007	CAP. F. 1M 100V	C21, C29
9	151-0001	CAP. CER. 0.05M 50V	C2, C3, C7, C10, C16, C18, C19, C35, C36
1	153-0003	CAP. TANT. 2.2M 25V	C34
4	150-0013	CAP. E. 100M 25V	C13, C45, C18
2	150-0012	CAP. E. 47M 25V	C9, C16
4	153-0007	CAP. TANT. 10M 25V	C12, C15, C17, C44
1	110-0081	PCB	1

QTY	CODE	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	ITEM NUMBER
PARTS LIST				
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:		CONTRACT NO.		
FRACTIONS	DECIMALS	ANGLES	Gremlin Industries, Inc.	
±	±	±	2800 Orange, California 92723	
MATERIAL		APPROVALS	DATE	PARTS OVERLAY DEPTH CHARGE SOUND BOARD
FINISH		CHECKED	DATE	
NEXT ASSY USE ON		DATE	DATE	
APPLICATION		DO NOT SCALE DRAWING		SCALE: NONE
714-CR111		DENY CHARGE		REV
844-0001		844-0001		B



LAST C NO. USED C 19
 LAST D NO. USED D 10
 LAST Q NO. USED Q 10
 LAST R NO. USED R 46
 LAST U NO. USED U 4

GREMLIN INDUSTRIES INC.
 6401 AERO DR. SAN DIEGO, CA. 92123

REVISIONS	TITLE
	SCHEMATIC
	GAME PWR SUPPLY
DATE	SCALE
APPROVED	NONE
	DRAWING NO. 814-0005