

Gottlieb®

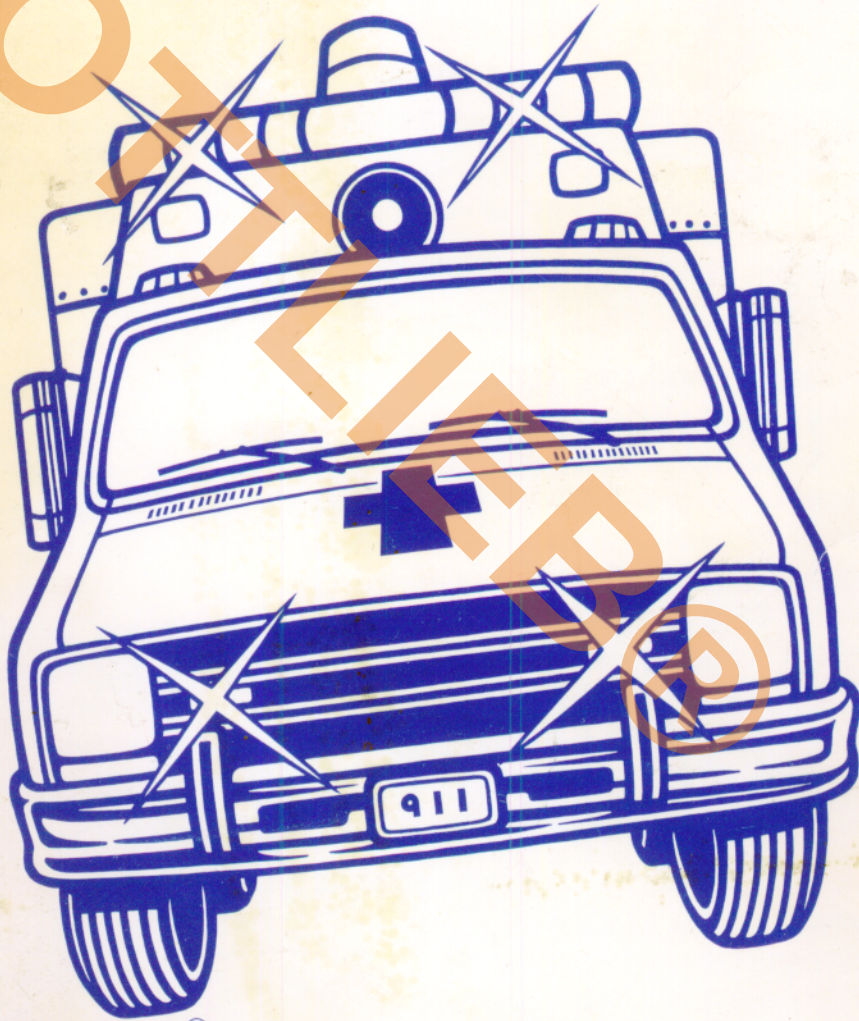
THE PREMIER NAME IN PINBALL

RESCUE 911



©1994 CBS Inc. All Rights Reserved.
Premier Technology is an authorized user.

TM



Premier®
Technology

INSTRUCTION MANUAL

RESCUE 911™

GAME #740

(INSTALL 4 BALLS IN OUTHOLE)

INSTRUCTION MANUAL

TABLE OF CONTENTS

SECTION	PAGE(S)
I. INSTALLATION.....	ii-1
II. GAME PLAY AND SCORING.....	2-4
III. TEST MODE	
I. SELF-TEST.....	6-7
II. BOOKKEEPING.....	7
III. GAME ADJUSTMENTS.....	7-15
IV. UTILITIES.....	16
V. TOURNAMENT MODE.....	16-17
IV. THEORY OF OPERATION.....	17-22
V. GENERAL INFORMATION.....	24-26
VI. WIRING AND SCHEMATIC DIAGRAMS.....	27-62
VII. PARTS INFORMATION.....	63-76
TROUBLESHOOTING GUIDE.....	INSIDE BACK COVER

GAME PROM:	DISPLAY PROM:	SOUND PROM:	
(TYPE 26C512)	(TYPE 27C040-25)	(TYPE 27C256)	(TYPE 27C040-25)
740/GPROM	740/DSPROM	740/DROM1	740/AROM 1
		740/YROM1	(TYPE 27C020-25)
			740/AROM 2

NOTE: ANY PROM CHANGES DURING PRODUCTION WILL BE INDICATED BY A REVISION NUMBER FOLLOWING THE GAME NUMBER. CONSULT YOUR DISTRIBUTOR FOR ANY PROM CHANGE UPDATE.

Premier®
Technology

759 INDUSTRIAL DRIVE
BENSENVILLE, IL 60106
1-708-350-0400
FAX: 1-708-350-1097

SYSTEM 3 OVERVIEW

System 3 contains many new features which improve game play and reliability. Some of these features are as follows:

- 1) New lithium battery provides data retention for a minimum of 5 years under normal operation and virtually eliminates battery leakage. Also a low battery warning is given in the displays when the voltage drops to the critical level.
- 2) New interlocking connector system for improved reliability.
- 3) Use of High Speed CMOS technology for low power consumption and cooler operation.
- 4) Improved solenoid driver reliability due to simplified circuitry and the use of Rugged Power MOSFETS.
- 5) Lamp short protection.
- 6) Switch matrix input protection.
- 7) Easy line voltage adjustment on location.
- 8) Improved bookkeeping functions.
- 9) New 128 x 32 Dot Matrix Display.
- 10) Capability for operators to enter their own messages in the attract mode.
- 11) Use of new SMART SWITCH tm technology which eliminates the use of contact points on switches. Therefore the need for cleaning dirty switches is eliminated.
- 12) Addition of a Tournament Mode switch which allows quick and easy way to replace current adjustment settings with special settings. This switch also provides an easy way to set the game for free play.

This equipment has been found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

WARNING

DO NOT TRANSPORT GAME WITH LIGHTBOX IN THE UPRIGHT (PLAYING) POSITION.
USE LATCH ONLY TO TEMPORARILY HOLD LIGHTBOX UPRIGHT WHILE ATTACHING THE LIGHTBOX TO THE CABINET.
SECURE THE LIGHTBOX TO THE CABINET WITH THE TWO BOLTS AND LOCKWASHERS PROVIDED.

I. INSTALLATION

A. SET-UP

1. Bolt the legs to the cabinet.
2. Lift lightbox into an upright position. Be sure none of the cables are crimped in between the lightbox and cabinet.
3. Engage the snap in the rear of the lightbox to the cabinet.
4. To remove the lightbox backglass and gain servicing access to the electronics panel and the insert lamp assembly, proceed as follows:

UNLOCK THE LIGHTBOX BY TURNING THE KEY A QUARTER TURN CLOCKWISE.

LIFT UP THE BACKGLASS RETAINING BOTTOM TRIM ABOUT 3/4" TO CLEAR THE "H" RETAINING CHANNEL ON THE TOP EDGE OF THE DISPLAY/SPEAKER PANEL, PIVOT OUT TOWARDS YOU AND SLIDE THE BACKGLASS DOWN AND OUT, CAREFULLY SET ASIDE.

REMOVE THE "H" RETAINING CHANNEL, SLIDE THE PLEXIGLASS INSERT UP AND OUT, SLIDE UP AND REMOVE THE DISPLAY/SPEAKER PANEL AND LAY FACE DOWN ON THE CABINET.

UNLOOSEN THE TWO WING NUTS ON THE LEFT SIDE AND PUSH THE LOCK SLIDE UPWARDS, THIS ALLOWS THE LIGHTBOX LAMP INSERT TO SWING OUT AND FOR GAINING ACCESS TO THE ELECTRONICS PANEL.

5. Secure the lightbox to the cabinet with the bolts and washers provided.

TO REPLACE THE BACKGLASS, INSERT THE DISPLAY/SPEAKER PANEL, ENSURE THAT THE METAL TABS ON THE PANEL MATE INTO THE WOOD RETAINERS, SLIDE IN THE PLEXIGLASS PANEL AND INSERT THE "H" RETAINING CHANNEL.

SLIDE THE BACKGLASS UP INTO THE LIGHTBOX, PIVOT INWARDS AND SLIDE DOWN INTO THE "H" CHANNEL, TURN THE KEY A QUARTER TURN COUNTER-CLOCKWISE TO LOCK THE LIGHTBOX.

6. Open the cabinet door and loosen the front moulding locking arm.
7. Remove the front moulding from the cabinet.
8. Slide the playfield glass toward you and remove it, carefully set aside.
9. Slide the playfield toward you, pivot upwards and back towards the lightbox,

hold in place and insert the prop stick into the countersunk hole on the underside of the playfield.

CAUTION!

Use prop stick when servicing under the playfield.

10. Unravel and straighten out the power line cord located at the rear of the cabinet.
11. Proceed to "B. CHECK-OUT".

B. CHECK-OUT

1. Check that all cables are clear of moving parts.
2. Check for any loose wires.
3. Check switches for loose solder or other foreign matter.
4. Be certain all fuses are firmly seated.
5. Check transformer for any foreign matter across terminals.
6. Be sure that the Transformer Panel power input connector A12J5, corresponds to the supply voltage.
7. Check the setting of the normally open tilt switch on the underside of the playfield. One blade should be free-floating with a weight on the end.
8. The plumb-bob tilt can be adjusted by loosening the clip and raising the plumb-bob to increase its sensitivity, or lowering it to decrease its sensitivity.
9. Lower the playfield into the cabinet. Using the leg adjusters, level the playfield. At this point, the pitch of the playfield should be approximately 6 degrees.
10. Plug the line-cord into a properly grounded 3-wire receptacle ONLY!
11. Refer to Section III to make all necessary game adjustments.
12. Re-install the playfield glass, front moulding and lock the cabinet door.
13. CAUTION! If this game has been subjected to extreme cold, allow to warm up to room temperature.

I. INSTALLATION

C. COIN METER (OPTIONAL)

A +12vdc mechanical coin meter may be installed by the operator to count total coins accepted by the machine. The coin meter leads should be soldered to the lugs on the terminal strip mounted inside the front door on the right side (see Figure 1). If the coin meter is polarized, the positive lead (red) should be attached to the lug that has the cathode (banded) side of the diode attached to it otherwise the leads may be attached in any order. The COIN METER adjustment must be set to on and the following four adjustments should be set to the number of pulses (counts) required for each coin denomination used.

NOTE: Make sure that the GAME MODE adjustment is not set to either REPLAY + TICKETS or TICKETS ONLY (see Game Adjustments section).

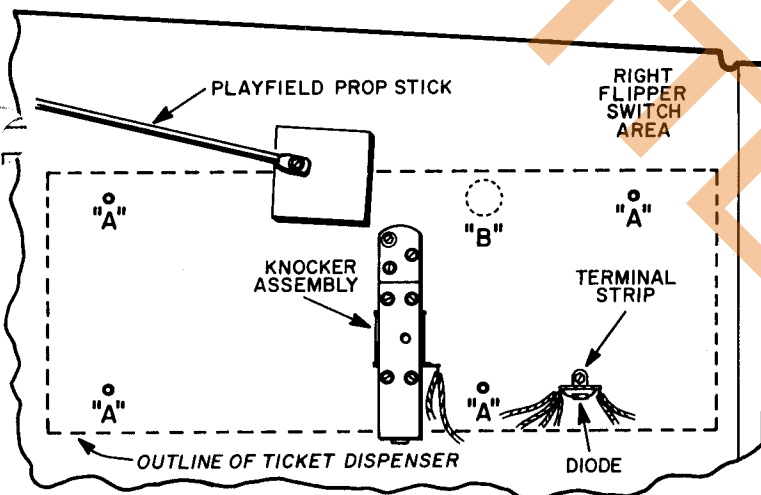


FIGURE 1.

D. TICKET DISPENSER (OPTIONAL)

This machine is equipped to easily interface to the Deltronic Labs TDOM-10-S-S ticket dispenser. To install the dispenser, first locate the five partially drilled holes on the inside of the cabinet on the right side (see Figure 1). The four "A" holes are for mounting the cabinet with #10 X 1-3/4" carriage bolts. The "B" hole is for cable access to the unit. Drill the "A" holes out from the inside of the cabinet using a 13/64"

drill bit. Drill the "B" hole out from the inside of the cabinet using a 1" drill bit. In the game envelope you will find template #30213 for a 1/2" plywood spacer to be used between the outside of the game cabinet and the dispenser cabinet so that the dispenser will clear the leg on the game when opened for loading tickets.

The GAME MODE adjustment is used to set whether to dispense a number of tickets along with each replay awarded (REPLAY + TICKETS) or to dispense a number of tickets in place of each replay awarded (TICKETS ONLY). The TICKETS TO AWARD adjustment is used to set the number of tickets to dispense for each replay awarded (see Game Adjustments section).

NOTE: Make sure that the COIN METER adjustment is set to off when using a ticket dispenser.

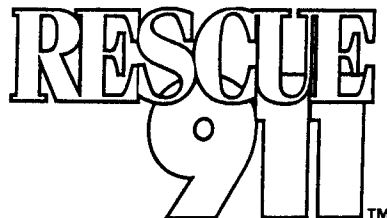
E. BILL ACCEPTOR (OPTIONAL)

A bill acceptor can be easily interfaced electrically to this machine. The two unused 522 (green-red-red) and 622 (blue-red-red) center chute switch wires should be attached to the switch output of the bill acceptor (see Cabinet/Front Door Schematic Diagram). The line voltage validator outlet located inside the cabinet on the right side can be used for supplying power to the unit. The CHUTE 3 UNITS adjustment can then be used to set the value of the bill being used. The bill acceptor models known to fit the door mechanically are Mars model VFM2 and Tekbilt model NV110. The Tekbilt model also requires an adapter plate.

F. COMMUNICATIONS ADAPTER (OPTIONAL)

A kit (MA-1940) may be purchased through your distributor which will allow the system to output Bookkeeping data to a serial printer.

II. GAME PLAY AND SCORING



*** GENERAL GAME FEATURES ***

GAME THEME:

- * THE PLAYER IS A MEMBER OF A RESCUE TEAM WHO TRIES TO SAVE AS MANY LIVES AS HE CAN DURING 6 VARIOUS EMERGENCY SITUATION TIMED ROUNDS. ROUNDS CAN BE ENTERED BY SHOOTING EITHER OF THE "CALL 911" LAMPS WHEN FLASHING. IF A ROUND BEGINS AT THE BALL LIFTER WITH "ACTIVATE HELICOPTER" LIT, THE HELICOPTER WILL FLY THE BALL TO THE TOP OF THE GAME OR UNTIL THE PLAYER PRESSES A FLIPPER TO RELEASE THE BALL.

STORK EXTRA BALL ROUND:

- * ROUND BEGINS BY STROBING THE LAMPS FOR THE TOP LEFT SHOT AND FLASHING THE TOP UPKICKER LAMPS. MAKING EITHER ONE OF THOSE SHOTS TRANSFERS THE STROBING TO THE CAPTIVE SPOT TARGET. MAKING THAT SHOT AWARDS AN EXTRA BALL.

WILD FIRES ROUND:

- * THIS ROUND STARTS WITH SEVERAL TARGETS STROBING OR FLASHING. EACH SUCCESSFUL SHOT SCORES THE CURRENT POP BUMPER BONUS TIMES MULTIPLIER AND SAVES 3 LIVES. COMPLETING ALL SHOTS AWARDS A BONUS OF 5 LIVES (10 LIVES IF ALL ROUNDS PLAYED ONCE ALREADY).

FLASH FLOOD ROUND:

- * EACH HIT ON A STROBING TARGET SCORES 1,000,000 AND SAVES PROGRESSIVELY MORE LIVES. FIRST HIT SAVES 2 LIVES, SECOND 4 LIVES, ETC. COMPLETING ALL SHOTS SCORES 50,000,000.

CAVE-IN ROUND:

- * EACH HIT ON THE TOP RIGHT SPOT TARGET BEHIND THE DROP TARGETS SCORES 5,000,000 AND SAVES 5 LIVES (10,000,000 AND 10 LIVES IF ALL ROUNDS PLAYED ALREADY). THIS ROUND IS PLAYED IN MULTIBALL THE FIRST TIME. EACH DROP TARGET SAVES 2 LIVES.

JAWS OF LIFE ROUND:

- * THIS ROUND BEGINS WITH 1 STROBING TARGET. A HIT SCORES 10,000,000, SAVES 2 LIVES, AND MOVES THE STROBING TO ANOTHER TARGET. A HIT ON THE NEW TARGET SCORES 20,000,000, SAVES 4 LIVES, AND MOVES THE STROBING. THE NEXT HIT SCORES 30,000,000, SAVES 6 LIVES, AND MOVES THE STROBING. THE FINAL HIT SCORES 100,000,000, SAVES 20 LIVES, AND ENDS THE ROUND. EACH HIT ALSO PUTS TIME BACK ON THE CLOCK IF TIME IS RUNNING LOW. THIS ROUND IS PLAYED IN MULTIBALL THE FIRST TIME.

HOSTAGE RESCUE ROUND:

- * THE OBJECTIVE IS TO SAVE LIVES BY MAKING AS MANY HITS AS POSSIBLE ON THE POP BUMPER, POP BUMPER RUBBER, LEFT KICKING TARGET, AND TOP LEFT SPOT TARGET. MAKING THE DISPLAYED NUMBER OF HITS (ADJUSTABLE) SAVES 2 LIVES AND SCORES 3,000,000. EACH LIFE SAVED IS PLACED IN ESCROW AND THEN COLLECTED WHEN THE ROUND ENDS.

LIFEFORCE & SUPER LIFEFORCE:

- * THESE ARE TIMED FEATURES THAT ARE QUALIFIED BY SAVING THE NEEDED AMOUNT OF LIVES (ADJUSTABLE). WHEN QUALIFIED, "LIFEFORCE" FLASHES AND THE RIGHT RAMP STROBES. SHOOTING THE RIGHT RAMP BEGINS FLASHING OF THE SHOTS NEEDED TO COMPLETE BEFORE TIME EXPIRES. SUCCESSFUL COMPLETION SCORES 300,000,000 IN "LIFEFORCE" AND 1 BILLION IN "SUPER LIFEFORCE" (REDUCED SCORING - 100,000,000 AND 300,000,000 RESPECTIVELY).

MULTIBALL:

- * CAN BE PLAYED WITH 2 OR 3 BALLS. MULTIBALL CAN BE ENTERED BY LOCKING 2 BALLS IN THE WIRE RAMP OR BY PLAYING "CAVE-IN" OR "JAWS OF LIFE" FOR THE FIRST TIME. THE OBJECTIVE IS TO MAKE THE SHOTS WHERE "COLLECT JACKPOT" AND "ADVANCE JACKPOT" ARE FLASHING.

II. GAME PLAY AND SCORING

HOOK & LADDER FEATURE:

- * A CARRYOVER FEATURE IN WHICH LETTERS ARE ADDED TO THE WORDS "HOOK & LADDER" BY SHOOTING THE RIGHT RAMP WHEN FLASHING. COMPLETION AWARDS A 2 OR 3 BALL MULTIBALL IN WHICH EVERY SWITCH ADDS POINTS (ADJUSTABLE) TO THE "HOOK & LADDER" BONUS. THIS BONUS IS COLLECTED AT END OF BALL.

EMERGENCY ROOM FEATURE:

- * AWARDED FROM SHOOTING THE TOP LEFT HOLE WHEN "EMERGENCY ROOM" LIT. THE AWARD SEQUENCE IS 2 MILLION, 5 MILLION, HURRY-UP EXTRA BALL, 10 MILLION, 20 MILLION.

PLAYER'S CHOICE:

- * SHOOTING THE RIGHT RAMP WHEN FLASHING AWARDS "PLAYER'S CHOICE". THE PLAYER USES THE FLIPPERS TO CHOOSE EITHER AN AWARD OF 5 LIVES SAVED OR BEGIN THE DROP TARGET "SUPER COUNTDOWN". "PLAYER'S CHOICE" IS QUALIFIED BY SHOOTING THE LIT RIGHT KICKING TARGET UNTIL ALL LETTERS OF "RESCUE" ARE COMPLETE.

POP LEVEL FEATURE:

- * EACH POP BUMPER HIT ADDS THE LIT VALUE TO THE "POP BUMPER BONUS". THE LIT VALUE CAN BE INCREASED FOR A TIME BY COMPLETING THE 3 LEFT SPOT TARGETS. THE "POP BUMPER BONUS" IS COLLECTED AT END OF BALL.

*** PLAYFIELD FEATURES ***

LOWER TRACK OPTO:

- * COLLECT & DOUBLE JACKPOT IF FLASHING.
- * SCORE 3,000,000 & SAVE 1 LIFE IF 67 LAMP FLASHING.
- * SCORE 30,000 IF NO OTHER AWARD GIVEN.
- * COLLECT EMERGENCY ROOM FEATURE IF LIT.
- * LOCK BALL IF FLASHING.

TOP UPKICKER:

- * SCORE 50,000.
- * BEGIN A RESCUE ROUND IF "CALL 911" FLASHING.
- * LOCK BALL IF FLASHING.

DROP TARGETS:

- * SCORE 50,000.
- * IF COUNTDOWN BONUS ACTIVE, FREEZE & COLLECT BONUS WHEN BOTH TARGETS DOWN.
- * BOTH TARGETS HIT ON THE SAME SHOT SCORES 10,000,000.
- * IN NORMAL PLAY, BOTH TARGETS DOWN STARTS FLASHING OUT THE TOP RIGHT SPOT TARGET.

TOP RIGHT SPOT TARGET:

- * SCORE 300,000.

- * COLLECT COUNTDOWN BONUS IF ACTIVE.
- * IF FLASHING OUT IN NORMAL PLAY, ADVANCE THE POP BUMPER "ADD BONUS" LAMPS. SHOULD "ADD BONUS" ALREADY BE AT 3 MILLION, THEN ADD 10,000,000 TO THE POP BUMPER BONUS.

TOP RIGHT ROLLOVER:

- * SCORE 100,000.
- * IF "LIFEFORCE" FLASHING, BEGIN LIFEFORCE.
- * ADVANCE A LETTER IN "HOOK & LADDER" IF FLASHING.
- * AWARD "PLAYER'S CHOICE" IF FLASHING.
- * AWARD "MED-ALERT" IF LIT.

POP BUMPERS:

- * SCORE 90.
- * IF STROBING FOR FLIPPER SKILL SHOT, SCORE 20,000,000.
- * ADD LIT OR FLASHING VALUE TO POP BUMPER BONUS.

TOP LEFT SPOT TARGET:

POP BUMPER RUBBER:

LEFT KICKING TARGET:

- * SCORE 180.
- * ADD TWICE THE LIT OR FLASHING VALUE TO THE POP BUMPER BONUS.

II. GAME PLAY AND SCORING

TOP CENTER SPOT TARGET:

- * SCORE 1,000,000.

- * SAVE 2 LIVES IF DISPATCH FLASHING.

CENTER ISLAND RUBBER:

- * SCORE 30.

RIGHT SPOT TARGETS 1-4:

- * SCORE 3,000.

CENTER SPOT TARGET:

- * SCORE 50,000.

- * IF STROBING FROM FLIPPER SKILL SHOT, SCORE 20,000,000.

- * SCORE 30,000,000 IF HURRY-UP FLASHING OUT.

- * ADVANCE RED VALUE IF LIT.

- * ADVANCE BLUE VALUE IF LIT.

CAPTIVE SPOT TARGET:

- * SCORE 300,000.

- * IF STROBING FROM FLIPPER SKILL SHOT, SCORE 20,000,000.

- * AWARD AN EXTRA BALL IF HURRY-UP FLASHING OUT.

- * SCORE 10,000,000 & SAVE 1 LIFE IF FLASHING.

- * ADJUSTS THE FLASHING ROUND DURING NORMAL PLAY.

- * COLLECT RED VALUE IF LIT.

- * COLLECT BLUE VALUE IF LIT.

BALL LIFT OPTO:

- * SCORE 300.

- * COLLECT JACKPOT IF FLASHING.

- * ADVANCE JACKPOT IF FLASHING.

- * BEGIN RESCUE ROUND IF "CALL 911" FLASHING.

- * ACTIVATE HELICOPTER MECHANISM TO LIFT BALL IF LIT.

LEFT SPOT TARGETS 1-3: :

- * SCORE 30,000.

- * IF FLASHING AND "ACTIVATE HELICOPTER" LIT, ADVANCE ADD POP BONUS LAMP AND RESTART SEQUENCE.

- * IF FLASHING AND "ACTIVATE HELICOPTER" UNLIT, LIGHT "ACTIVATE HELICOPTER".

RIGHT KICKING TARGET:

- * ADD A LETTER TO "RESCUE" IF LIT.

- * UNLIT, SCORE 30,000.

BOTTOM LEFT SPOT TARGET:

- * ADVANCE MULTIPLIER WHEN LIT.

- * UNLIT, SCORE 3,000.

SHOOTER RAMP (PLUNGER SKILL SHOT):

- * ADVANCE MULTIPLIER IF LIT.

- * SCORE 10,000,000 IF LIT.

- * IF FLIPPER SHOT LIT, BEGIN STROBING THE CAPTIVE TARGET, POP BUMPERS, OR CENTER TARGET FOR A ONE TRY SKILL SHOT.

KICKING RUBBERS:

- * SCORE 30.

LEFT RETURN ROLLOVER:

- * SCORE 30,000.

- * IF "LIGHT HOOK & LADDER" LIT, START "HOOK & LADDER" FLASHING FOR 1 SHOT.

RIGHT RETURN ROLLOVER:

- * SCORE 30,000.

- * IF "LIGHT SPELL RESCUE" LIT, THEN LIGHT "SPELL RESCUE".

LEFT & RIGHT OUTLANES:

- * AWARD SPECIAL IF LIT OR FLASHING OUT.

- * UNLIT, SCORE 3,000,000.

OUTHOLE:

- * AT END OF BALL, SCORE ANY ACCUMULATED POP BUMPER BONUS TIMES MULTIPLIER & ANY "HOOK & LADDER" BONUS IF A "HOOK & LADDER" MULTIBALL WAS PLAYED.

- * AT END OF GAME, SCORE 100,000 TIMES MULTIPLIER FOR EACH LIFE SAVED UNLESS REDUCED SCORING ADJUSTED.

FLIPPERS:

- * ADJUST THE FLASHING ROUND WHILE THE BALL IS SITTING AT THE BALL SHOOTER.

NOTES

GOITLBER®

III. TEST MODE

There are several functions accessible to the operator while in the test mode. These functions are Self-Test, Bookkeeping, Game Adjustments, and Utilities. Each of these functions will be explained in detail later in this section. To enter the test mode, the game must be in the attract mode (game over). Then depress the Test button located just inside the front door of the game. The operator will then be given a choice as to which function he wants to access. Use the left flipper button to choose (highlight) the function desired and then either the Test button or the right flipper button to enter the chosen function.

NOTE: The Test button may be held in to fast forward through the steps of a particular function.

To exit the test mode or change functions the Slam switch (front door) must be activated or the power must be turned off.

I. SELF-TEST

This function will allow the operator to test all the hardware related devices in the game. Each test is described below.

A. MEMORY TEST

This function tests all memory devices on the Control Board (A1). If all the devices pass the test an "OK" will be displayed. If a failure occurs, a description of the faulty component will be displayed. Then after a short period of time the Game Prom check sum will be displayed. The Credit button can be used to restart this test.

B. LAMP CHECK

This function will flash all the controlled lamps and flasher lamps continuously. This will allow the operator to easily check for and replace any burned out light bulbs.

C. LAMP MATRIX TEST

This test will allow the operator to single step through and check the operation of each lamp in the game. The left flipper button will

decrement the active lamp number by one while the right flipper button will increment the active lamp number by one. The strobe number and the return number are combined to form the lamp number (strobe,return) which is shown in the display along with a description of the lamp. The Credit button can be used to restart this test. Only one lamp at a time should flash during this test.

D. RELAY AND SOLENOID TEST

This test will allow the operator to single step through and check the operation of each relay and solenoid driver in the game. The left and right flipper buttons are used to change the active driver number. The selected driver description and number will appear in the display. The Credit button is then used to activate the driver for a short time period. Solenoid #31 ("Q" relay) is always on during this test so as to provide power to devices such as the pop bumpers and kicking rubbers (see Playboard Schematic Diagram).

E. SWITCH MATRIX TEST

The first part of this test will report any inactive switches. If a switch has not been actuated in the course of the last 15 games the switch name and number will be displayed.

The second part of the test will allow the operator to test the operation of all the switches used in the game. If no switches are closed when this test is started, the message "ALL SWITCHES OPEN" will be displayed. If any switches are closed either before or after this test is started, the closed switch(s) name and number will be displayed. The strobe number and the return number are combined to form the switch number (strobe,return). The Credit button can be used to restart this test.

F. DISPLAY TEST

This test allows the operator to check the operation of the 128 x 32 dot matrix display. The right flipper button is used to advance this test. The first two steps check the different levels of display intensity.

III. TEST MODE

Each block that appears on the display should be of lesser intensity than the one to the left of it. During the next four steps a diagonal pattern is stepped from left to right in the display. While in this part of the test every fourth pixel only in each row of dots should be lit. During the next eight steps another diagonal pattern is stepped from left to right in the display. While in this part of the test every eighth pixel only in each row of dots should be lit. The Credit button can be used to restart this test.

G. SOUND TEST

This test allows the operator to test the interface lines from the Control Board (A1) to the Sound Board (A6). Every time the right flipper button is pressed, a different tone should be heard from the Sound Board. During each tone, the sound line connection which is being tested will be shown in the display. After the tone stops the sound line which is being tested will still be kept at a low level (<.8v) until the right flipper button is pressed again or the Credit button is used to restart the test.

H. FRONT DOOR TEST

This test allows the operator to check the operation of the coin chutes used in the game. Utilizing this function will not affect any bookkeeping values. Each coin chute closure is categorized and shown in the display. The Credit button can be used to restart this test.

I. AUXILIARY DRIVER TEST

This test will allow the operator to single step through and check the operation of each driver transistor on the Auxiliary Driver Board (A11). The left and right flipper buttons are used to change the active driver number. The selected driver description and number will appear in the lower display. The Credit button is then used to activate the driver for a short time period.

II. BOOKKEEPING

The Test button is used to step through bookkeeping. The display will contain a description of each step,

the step number, and two different bookkeeping values. The value in the leftmost column represents long term bookkeeping. The value in the rightmost column (in brackets) represents short term bookkeeping. These two values are provided so that the operator may compare recent performance with long term performance and then make any necessary game adjustments.

NOTE: The left column of steps 1 (earnings) and 17-20 (coin chute counts) will not be displayed unless the credit button is pressed during that active step number.

The left flipper button will allow the operator to reset all of the left (long term) and right (short term) bookkeeping values. The right flipper button will allow the operator to reset all of the right (short term) bookkeeping values only. If the R.BOOK AUTO-RESET adjustment is on, the right (short term) bookkeeping will automatically be reset after every 2000 plays (see Game Adjustments). Therefore, the operator does not need to reset the short term bookkeeping himself unless he prefers to follow his own procedure. Also, this feature will aid in adjusting the game payout percentage to the caliber of players in different locations. If there happens to be a major error in a long term bookkeeping value the word ERROR will appear to the right of that bookkeeping value. To correct this error the long term bookkeeping must be reset. A description of each bookkeeping step is given in the test mode flowchart.

III. GAME ADJUSTMENTS

This function allows the operator to make any adjustments to his game as necessary.

A. FACTORY SETTINGS

Upon entering the game adjustment section of bookkeeping, the operator is given a choice to load all factory settings or to single step through the game adjustments and adjust each section individually. If he chooses

III. TEST MODE

to enter the factory settings by depressing the Credit button, he will also be given a choice of what language to load. By using the right flipper button he may choose the appropriate language and then depress the Credit button again to enter the settings. After the settings are loaded the display should show the message "FACTORY SETTINGS LOADED" for a short time and then proceed to game adjustment step 1. At any time during the previous steps the operator may either exit the test mode or depress the Test button to proceed immediately to game adjustment step 1.

WARNING

Loading the factory settings will affect all previous game adjustment settings. Therefore be careful when selecting this feature.

B. GAME ADJUSTMENT STEPS

Each time the Test button is pressed a description of the next step appears in the display along with the step number and the current status of that step. Unless otherwise specified, the left and right flipper buttons are used to change the possible selections in each step.

- 1) SCORE REPLAY LEVEL 1
- 2) SCORE REPLAY LEVEL 2
- 3) SCORE REPLAY LEVEL 3

Each Score Replay Level may be set by using the left flipper button to decrement the score and the right flipper button to increment the score. The Credit button can be used to load the factory setting for each individual level if desired. If the Auto-Percentaging adjustment is on, Replay Levels 2 & 3 can only be set to on or off. If Replay Level 2 is on, the score level will be set to two times Replay Level 1. If Replay Level 3 is on, the score level will be set to three times Replay Level 1. This allows the operator several combinations of levels in the Auto-Percentaging mode (i.e. 1, 1 & 2, 1 & 3, or 1 & 2 & 3).

- 4) HIGH GAME TO DATE 1
- 5) HIGH GAME TO DATE 2
- 6) HIGH GAME TO DATE 3

- 7) HIGH GAME TO DATE 4

- 8) HIGH GAME TO DATE 5

Each High Game To Date may be set by using the left flipper button to decrement the score and the right flipper button to increment the score. The Credit button can be used to load the factory setting for the displayed level and all those below it.

- 9) GAME PRICING

This step provides a choice of loading a standard setting for a particular country or a custom setting. When a standard setting is selected, the following steps (10-17) are skipped.

- 10) CHUTE 1 UNITS (L)

- 11) CHUTE 2 UNITS (R)

- 12) CHUTE 3 UNITS (C)

- 13) CHUTE 4 UNITS

- 14) UNITS REQUIRED FOR CREDIT

- 15) UNITS REQUIRED FOR BONUS

- 16) BONUS CREDITS

- 17) MINIMUM UNITS REQUIRED FOR CREDIT

Steps 10-17 are used if a custom setting is selected in step 9 (GAME PRICING). Steps 10-13 select the number of units that each chute is worth when a coin is dropped into that particular chute. The value entered for step 14 determines how many units must be accumulated for a credit to be issued on the game. Steps 15 and 16 determine how many units must be accumulated for any bonus credits to be issued. A value of zero entered for step 15 will disable the bonus feature. Step 17 indicates the number of units required before any credits are issued (see Coin Chute Setting Table for examples).

- 18) COIN METER

If set to ON, the pulses to be given for each of the four coin chutes can be defined so that the number of pulses for a given chute are in relation to the currency denomination. If set to OFF, steps 19-22 will be skipped.

- 19) CHUTE 1 PULSES

- 20) CHUTE 2 PULSES

- 21) CHUTE 3 PULSES

- 22) CHUTE 4 PULSES

The four steps above are used to set

III. TEST MODE

COIN CHUTE SETTING TABLE

COIN CHUTE SETTING TABLE														
Country		Coin Chutes				Plays/Coin(s)	Chute Adjustment Steps							
		Left 1	Right 2	Center 3	4		10	11	12	13	14	15	16	17
USA		.25	.25	\$1		1/.50, 2/\$1	01	01	04	00	02	00	00	00
USA (Custom)						1/.50, 5/\$2	01	01	04	00	02	08	01	00
						1/.50, 2/.75, 3/\$1	03	03	12	00	04	00	00	00
						1/.50, 3/\$1	01	01	04	00	02	04	01	00
						1/.25, 4/\$1	01	01	04	00	01	00	00	00
Australia	1	.20	\$1	\$2	-	1/3x.20, 2/\$1, 5/\$2	02	10	20	00	05	20	01	00
	2	.20	\$1	\$2	-	1/5x.20, 1/\$1, 3/\$2	01	05	10	00	05	10	01	00
	3	.20	\$1	\$2	-	1/5x.20, 1/\$1, 2/\$2	01	05	10	00	05	00	00	00
Belgium		5Fr	20Fr	50Fr	-	1/20Fr, 2/40Fr, 3/50Fr	01	04	10	00	04	10	01	00
Canada		.25	\$1	-	-	1/.50, 2/\$1	01	04	00	00	02	00	00	00
Denmark		1Kr	10Kr	-	-	1/3x1Kr, 4/10 Kroner	01	10	00	00	03	10	01	00
Finland		5Mka	1Mka	-	-	1/3x1 Markka, 2/5 Markkaa	10	02	00	00	05	00	00	00
France	1	1Fr	5Fr	10Fr	20Fr	1/3x1Fr, 2/5Fr, 5/10Fr	02	10	20	40	05	20	01	00
	2	1Fr	5Fr	10Fr	20Fr	2/5Fr, 4/10Fr, 9/20Fr	02	10	20	40	05	40	01	10
	3	1Fr	5Fr	10Fr	20Fr	1/5Fr, 3/10Fr, 7/20Fr	03	15	30	60	10	60	01	15
Germany	1	5DM	2DM	1DM	-	1/1DM, 2/2DM, 6/5 D-Mark	05	02	01	00	01	05	01	00
	2	5DM	2DM	1DM	-	1/2DM, 2/3DM, 3/4DM, 5/5DM	20	08	04	00	05	20	01	00
	3	5DM	2DM	1DM	-	1/2DM, 3/5DM	05	02	01	00	02	05	01	00
Hungary		20F	20F	-	-	1/20 Forint	01	01	00	00	01	00	00	00
Italy		500L	500L	-	-	1/2x500L, 2/3x500L, 3/4x500L	03	03	00	00	04	00	00	00
Japan		100Y	100Y	-	-	1/100 Yen, 3/2x100 Yen	01	01	00	00	01	02	01	00
New Zealand		\$1	\$2	-	-	1/\$1, 3/\$2	01	02	00	00	01	02	01	00
Norway		5Kr	10Kr	-	-	1/5Kr, 2/10 Kroner	01	02	00	00	01	00	00	00
Singapore	1	-	.50	Token	-	1/.50 or 1/Token	00	01	01	00	01	00	00	00
	2	.20	-	-	-	1/2x.20	01	00	00	00	02	00	00	00
Spain		500P	100P	-	-	1/100P, 6/500 Pesetas	05	01	00	00	01	05	01	00
Sweden		10Kr	5Kr	-	1Kr	1/5x1Kr, 1/5Kr, 2/10Kr	10	05	00	01	05	00	00	00
Switzerland		1Fr	5Fr	2Fr	-	1/1Fr, 3/2Fr, 7/5 Francs	01	07	03	00	01	00	00	00
United Kingdom	1	1£	50P	20P	10P	1/3x10P, 2/50P, 4/1 Pound								
	2	1£	50P	20P	10P	1/50P, 3/1 Pound								
Universal		-	-	-	-	1/1 Coin	01	01	00	00	01	00	00	00

III. TEST MODE

the number of pulses to be issued for each of the four coin chutes.

23) COIN DOOR TYPE

This step provides a choice of loading a standard setting for a particular country or a custom setting. When a standard setting is selected, the following steps (24-28) are skipped.

24) COLLECTION TEXT

25) CHUTE 1 VALUE

26) CHUTE 2 VALUE

27) CHUTE 3 VALUE

28) CHUTE 4 VALUE

Step 24 is used to enter the name of the currency in use. The remaining four steps are used to set the monetary value of each coin chute.

29) GAME BUY-IN BONUS

At the end of a game, if enabled, a 10-second timer is initialized allowing each player that participated in the previous game a chance to purchase 1 credit for either 1 or 2 coins.

30) EXTENDED PLAY

At the end of a player's last ball in play, if enabled, a 10-second timer is initialized allowing the player to continue playing his current game by inserting either 1 or 2 coins for one extra ball.

31) EXTENDED PLAY MAXIMUM

This step sets the maximum number of extra balls a player may purchase in any one game when the EXTENDED PLAY feature is enabled. In a multiple player game, each player can only purchase one ball so this step will have no effect.

32) EXTENDED PLAY CHUTE(S)

This step sets which coin chute(s) will be enabled toward purchasing a game if step 29 is enabled and/or an extra ball if step 30 is enabled. A coin dropped in any other chute will be used toward purchasing a new game.

33) GAME PERCENT PAYOUT

This step is used to set the game payout percentage used when the Auto-Percentaging adjustment is on. The value entered for this step is compared to the value calculated by

dividing total replays by total plays (see Bookkeeping section). Total replays include all replays won from beating the score replay level, achieving a new high game to date, winning a playfield special, and all match replays.

When the GAME MODE adjustment is set to Add a Ball this setting refers to extra ball percentage rather than replay percentage. The value entered in this case will be compared to the value calculated by dividing total extra balls won by total plays (see Bookkeeping section).

34) MATCH PERCENT PAYOUT

This step is used to set the match payout percentage. If this step is set to zero, the match will be disabled.

NOTE: The MATCH PERCENT PAYOUT value is included in the value entered for GAME PERCENT PAYOUT (step #30). Therefore in order to retain the same payout percentage for the other payout features in the game such as score level replays, the GAME PERCENT PAYOUT will be automatically adjusted by the same amount as this step when changed.

35) HIGH GAME REPLAYS

This step is used to set the number of replays to award when the highest game to date has been beaten.

36) MAXIMUM CREDITS

This step sets the maximum number of credits allowed on the game.

37) TILT WARNINGS

This step sets the number of tilts allowed before the current player's ball in play is terminated.

38) BALLS PER GAME

This step sets the game to 3-ball play or 5-ball play.

39) GAME MODE

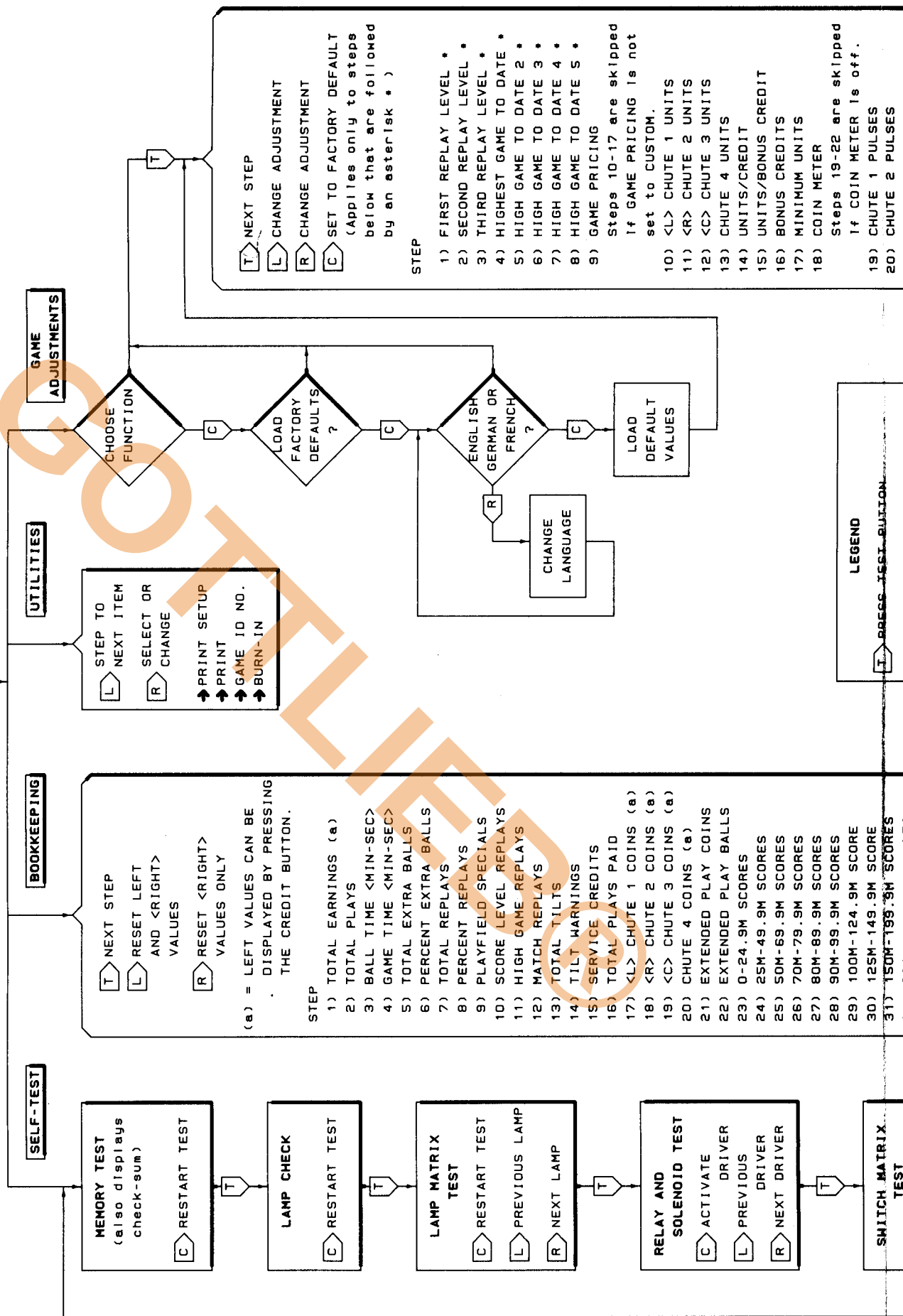
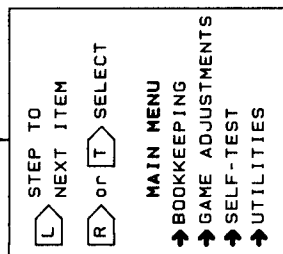
This step allows the game to be played in Replay, Replay + Tickets, Tickets Only, Add a Ball, or Novelty mode. In Replay mode all Specials and replays are allowed. Replay + Tickets mode is the same as Replay mode with the addition of one or more tickets to be issued (TICKETS TO AWARD) along

NOTE:

THE TEST MODE CAN ONLY BE-ACCESSED DURING THE ATTRACT MODE (GAME OVER).

THE TEST MODE MAY BE EXITED BY EITHER ACTUATING THE SLAM SWITCH ON THE FRONT DOOR OR TURNING THE POWER OFF.

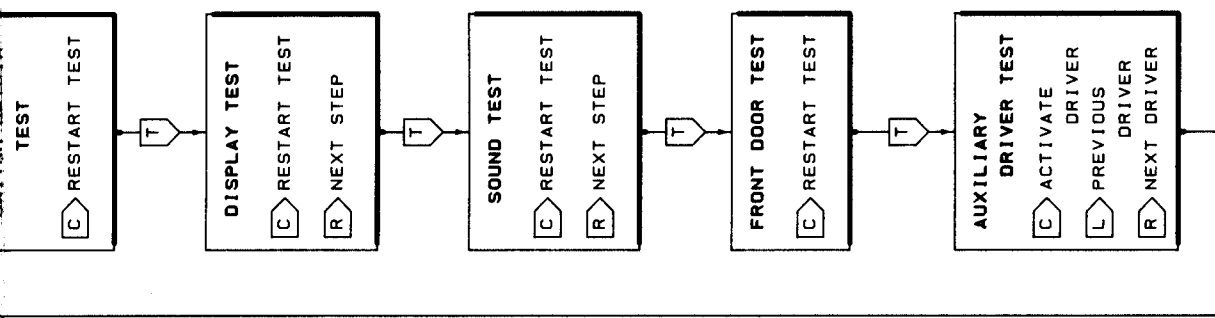
TEST MODE



- 20) CHUTE 2 PULSES
- 21) CHUTE 3 PULSES
- 22) CHUTE 4 PULSES
- 23) COIN DOOR TYPE
- Steps 24-28 are skipped if COIN DOOR TYPE is not set to CUSTOM.
- 24) COLLECTION TEXT
- 25) CHUTE 1 VALUE
- 26) CHUTE 2 VALUE
- 27) CHUTE 3 VALUE
- 28) CHUTE 4 VALUE
- 29) GAME BUY-IN BONUS
- 30) EXTENDED PLAY
- 31) EXTENDED PLAY MAXIMUM
- 32) EXTENDED PLAY CHUTE(S)
- 33) GAME PERCENT PAYOUT
- 34) MATCH PERCENT PAYOUT
- 35) HIGH GAME REPLAYS
- 36) MAXIMUM CREDITS
- 37) TILT WARNINGS
- 38) BALLS PER GAME
- 39) GAME MODE
- 40) TICKETS TO AWARD
- 41) LANGUAGE
- 42) AUTO PERCENTAGING
- 43) REPLAY LIMIT
- 44) HIGH GAMES 2-5
- 45) ATTRACT SOUND
- 46) ATTRACT MESSAGE 1
- Use the credit button to enter a message.
- 47) ATTRACT MESSAGE 2
- 48) RIGHT BOOK AUTO-RESET
- 49) PLAYFIELD SPECIAL
- 50) REPLAY LEVEL BOOST
- 51) GAME RESTART
- 52) GAME INACTIVITY TIMER
- 53) GAME DIFFICULTY
- 54) ROUND TIMING
- 55) LIFEFORCE TIMING
- 56) MED-ALERT EXTRA BALL %
- 57) HURRY-UP EXTRA BALL
- 58) ADVANCE MULTIPLIER
- 59) HELICOPTER ACTIVATION
- 60) HOSTAGE RESCUE AWARD
- 61) HOOK & LADDER BONUS
- 62) LAST BALL SPECIAL
- 63) HIGH LIVES SPECIAL
- 64) LIFEFORCE
- 65) SUPER LIFEFORCE
- 66) HOOK & LADDER ADVANCE
- 67) BALL TIME SAFETY
- 68) REDUCED SCORING
- 69) HELICOPTER LIFT
- 70) HELICOPTER MESSAGE
- 71) HIGH LIVES SAVED

- 31) 150M-199.9M SCORES
- 32) 200M-299.9M SCORES
- 33) 300M-399.9M SCORES
- 34) 400M+ SCORES
- 35) FIRST REPLAY LEVEL
- 36) HIGHEST GAME TO DATE
- 37) 1-15 SEC. BALL TIME
- 38) 16-30 SEC. BALL TIME
- 39) 31-45 SEC. BALL TIME
- 40) 46-60 SEC. BALL TIME
- 41) 61 SEC.+ BALL TIME
- 42) % L OUTLANE DRAINS
- 43) % R OUTLANE DRAINS
- 44) STORK EB RESCUE
- 45) ACTIVATE EB SHOT
- 46) STORK EB COLLECT
- 47) WILDFIRE RESCUE
- 48) 1 SHOT COMPLETED
- 49) 2 SHOTS COMPLETED
- 50) FLASH FLOOD RESCUE
- 51) 1-3 SHOTS COMPLETED
- 52) 4 SHOTS COMPLETED
- 53) CAVE-IN RESCUE
- 54) CAVE-IN COLLECTS
- 55) JAWS OF LIFE RESCUE
- 56) 1-3 SHOTS COMPLETED
- 57) HOSTAGE RESCUE
- 58) HOSTAGE POP HITS
- 59) LIFEFORCE
- 60) 1-3 SHOTS COMPLETED
- 61) 4-6 SHOTS COMPLETED
- 62) 7-8 SHOTS COMPLETED
- 63) LIFEFORCE COMPLETED
- 64) LIVES SAVED MED-ALERT
- 65) LIVES SAVED (RESCUES)
- 66) MULTIBALL
- 67) JACKPOT ADVANCES
- 68) JACKPOTS COLLECTED
- 69) JACKPOT POINTS (M)
- 70) SUPER LIFEFORCE
- 71) SUPER LIFEFORCE WON
- 72) HOOK & LADDER MODE
- 73) HOOKALADDER BONUS ADV
- 74) RESCUE PLAYERS CHOICE
- 75) SELECT (5 LIVES)
- 76) SCORE COUNTDOWN <25M
- 77) SCORE COUNTDOWN >25M
- 78) MED-ALERT EXTRA BALLS
- 79) HURRY-UP EXTRA BALLS
- 80) LIVES SAVED SPECIALS
- 81) OUTLANE SPECIALS
- 82) LOW GAME SPECIALS
- 83) MULTIPLIER ADVANCES
- 84) TOTAL LIVES SAVED
- 85) TOTAL MED-ALERTS

- 20) CHUTE 2 PULSES
- 21) CHUTE 3 PULSES
- 22) CHUTE 4 PULSES
- 23) COIN DOOR TYPE
- Steps 24-28 are skipped if COIN DOOR TYPE is not set to CUSTOM.
- 24) COLLECTION TEXT
- 25) CHUTE 1 VALUE
- 26) CHUTE 2 VALUE
- 27) CHUTE 3 VALUE
- 28) CHUTE 4 VALUE
- 29) GAME BUY-IN BONUS
- 30) EXTENDED PLAY
- 31) EXTENDED PLAY MAXIMUM
- 32) EXTENDED PLAY CHUTE(S)
- 33) GAME PERCENT PAYOUT
- 34) MATCH PERCENT PAYOUT
- 35) HIGH GAME REPLAYS
- 36) MAXIMUM CREDITS
- 37) TILT WARNINGS
- 38) BALLS PER GAME
- 39) GAME MODE
- 40) TICKETS TO AWARD
- 41) LANGUAGE
- 42) AUTO PERCENTAGING
- 43) REPLAY LIMIT
- 44) HIGH GAMES 2-5
- 45) ATTRACT SOUND
- 46) ATTRACT MESSAGE 1
- Use the credit button to enter a message.
- 47) ATTRACT MESSAGE 2
- 48) RIGHT BOOK AUTO-RESET
- 49) PLAYFIELD SPECIAL
- 50) REPLAY LEVEL BOOST
- 51) GAME RESTART
- 52) GAME INACTIVITY TIMER
- 53) GAME DIFFICULTY
- 54) ROUND TIMING
- 55) LIFEFORCE TIMING
- 56) MED-ALERT EXTRA BALL %
- 57) HURRY-UP EXTRA BALL
- 58) ADVANCE MULTIPLIER
- 59) HELICOPTER ACTIVATION
- 60) HOSTAGE RESCUE AWARD
- 61) HOOK & LADDER BONUS
- 62) LAST BALL SPECIAL
- 63) HIGH LIVES SPECIAL
- 64) LIFEFORCE
- 65) SUPER LIFEFORCE
- 66) HOOK & LADDER ADVANCE
- 67) BALL TIME SAFETY
- 68) REDUCED SCORING
- 69) HELICOPTER LIFT
- 70) HELICOPTER MESSAGE
- 71) HIGH LIVES SAVED



IV. THEORY OF OPERATION

A. CONTROL BOARD (A1)

The Control Board is supplied with 5vdc (A1P1) from the Power Supply (A2P2). The data contained in ram (U3) is kept valid when power is turned off by the lithium battery (BAT1) and controller (U6).

NOTE: When replacing either the battery, ram, or the controller there may be a message that appears in the display on power up the first time that indicates a low battery condition. If this occurs, turn the power off and back on again. The board should power up normally this time. If not, there is another problem on the board.

The Control Board can accommodate either a 27512 or a 27256 Eprom. JP1 must be installed for a 27512 or JP2 for a 27256 Game Prom. A 4 Mhz oscillator is configured using U17, R1, R2, C22, C23, and XTAL1. The oscillator output is then divided by 2 to a 2Mhz clock by U18 which is used as the input clock to the 65C02 (U1) microprocessor. The clock output of U1 (pin 39) is used as a sync signal for reading from or writing to the peripheral devices.

Two versatile interface adapters (U4, U5) are used to develop the necessary control signals for the system. The display connector (A1P3) is comprised of several signals. U4-15 and U4-17 are used as inputs to receive data from the Display Controller Board. Data is output to the Display Controller Board by U7 (BD0-BD7) and then latched by pulsing the DS0 line at U9-4. The output at DS1 (U9-5) is used to reset the Display Controller Board if it does not respond to data output by the Control Board.

The Driver Board connector (A1P2) contains all the signals necessary to operate the lamp and switch matrix strobes, the lamp matrix returns, and the solenoids. The lamp clear (LCLR), lamp strobe (LSTB), and lamp strobe data (LDATA) are generated by U4-12, U4-11, and U4-10 respectively. The appropriate lamp return data

during each active lamp strobe is output by U7 and latched into U5 on the Driver Board by the lamp return data strobe (LDS). The solenoid data is output by U7 (BD0-BD7) and latched into the appropriate Driver Board device (U1-U4) by the solenoid strobes (SS0-SS3).

The switch matrix returns are input at A1P5, buffered by U19 and U20 and then input to U4. Discrete inputs are provided at A1P5 for the slam, tilt, and test switches.

The connection to the Sound Board (A1P4) is made up of eight sound data lines (SD0-SD7), a return line (SRET), and a reset line (MR).

A reset circuit is configured using U13, U14, R3, and C24. When power is applied to the system, the microprocessor reset pin (U1-40) is held low for approximately 10 milliseconds. The system can also be reset by pressing the switch (SW1) on the board. Whenever a reset occurs the master reset signal (MR) (U18-9) is held low until the display strobe (DSTB) becomes active. At this point the master reset goes high which enables the peripheral IC's on the Display Board and Driver Board to accept data.

A watchdog circuit is employed to monitor both the display digit strobe and the lamp strobe. This circuit is made up of U11, U12, U13, U16, R5, R6, R29, R32, R33, C20, C21, C28, and C29. If either the display strobe (DSTB) or the lamp strobe (LSTB) is missing for 330 milliseconds the system will be reset. The system will also be reset if the supply voltage drops below 4vdc. This voltage monitor is configured using U21, VR1, D1, D2, R34, and R35.

B. POWER SUPPLY (A2)

The transformer panel delivers 12vdc to the input of the power supply. The regulated output voltage should be set to 5vdc by using potentiometer R3. This voltage is then supplied to the Control Board (A1), Driver Board (A3), Display Board (A4), Sound Board

IV. THEORY OF OPERATION

(A6), Display Controller Board (A8), and any other auxillary board which may require it.

C. DRIVER BOARD (A3)

Two voltages are supplied to this board at A3P1. The 5vdc is supplied from the Power Supply (A2) and the 20vdc is supplied from the transformer panel. The 20vdc is used to source the controlled lamps and the switch matrix. The Driver Board receives its data at A3P2 from the Control Board (A1P2). Solenoid data is latched into U1-U4. Lamp return data is latched into U5. Lamp and switch strobe data is shifted through U6 and U7. The comparators (U10,U11) are used to protect the MOSFETS (Q33-Q49). If a sensed input voltage exceeds the reference voltage (Vref), the corresponding MOSFET is turned off immediately following the lamp clear pulse (LCLR) supplied by U12 thus limiting the duty cycle. If the master reset signal (MR) is held low all lamps and solenoids will be disabled.

D. DISPLAY CONTROLLER (A8)

This board is comprised of the power supply section and the digital section. The power supply is used to generate the necessary voltages that are required to power the Display Board. All voltages are input at A8P1 and then output to the Display Board at A8P2.

The digital section controls the information which appears in the display and also the refresh of the display information. The clock circuit runs at 3.579 MHz and is divided by two through U5 and then fed to the microprocessor (U1-37) as the master clock. The LED on the board will flash if the microprocessor (U1) is running properly. A controller chip (U2) is used to refresh the Display Board independent from the code which is being executed by the microprocessor (U1). U1 uses the data bus during the phase 2 portion of the clock while U2 uses it during the phase 1 portion. The address lines from both U1 and U2 are multiplexed through U9-U11 to determine which device has control of

the ram (U4). The necessary data is then output to the Display Board at A8P4. Data is both transmitted and received from the Control Board at A8P3. If the Control Board cannot successfully communicate with the Display Controller Board it will attempt to reset the Controller Board by sending a negative going signal on A8P3-14 (DS1).

E. DISPLAY BOARD (A4)

The Display Board consists of a 128 column X 32 row gas plasma display. The drive electronics located on the backside of the board convert low voltage serial data in to high voltage parallel data out for driving the display. The column drivers contain output latches so that column data for the following row can be entered while the present row is being displayed. All voltages required by the display are input at A4P1. All control signals needed to multiplex the display are input at A4P2. The Display Controller Board sends 128 bits of serial column data on the SDATA line for every row of display information. The data is shifted through the driver IC's by the dot clock signal (DCLK). The column data for a particular row is then latched by the column latch (CLATCH) signal. The row clock (RCLK) signal is used to clock the row driver data (RDATA) through the row driver IC. There is only one active row at a time. Between rows the display enable (DE) signal is used to prevent the display from flickering.

F. SOUND BOARD (A6)

The Sound Board consists of two 6502 microprocessor systems, a dual DAC, an input port to receive commands from the system Control Board, and a low level audio output at A6P2-9 which is sent to the summing amplifier located on the Auxiliary Sound Board (A20) for amplification.

The Sound Board requires three supply voltages +5vdc, +12vdc, and -12vdc. In addition, a power-up reset signal is required from the Control Board. If a manual reset is desired, pressing SW2 will reset both processors.

IV. THEORY OF OPERATION

A 4MHz oscillator is configured with R11, R12, C14, C15, C22, XTAL1, and T1. This clock is then divided down by S1 into either a 2MHz or 1MHz clock signal for the processors N1 and T3. A 250 KHz clock signal from S1-11 is used by the programmable timer section consisting of N5, H5, T5, and K5.

Eight lines from the Control Board are input at A6P1 on the Sound Board and sent to the two input code latches A3 and B2. When any of these inputs goes low (except for A6P1-9 when JP7 is not installed) A2-8 goes high which causes the input code data to be latched into A3 and B2. Also at the same time the flip-flops contained in A4 are clocked which cause the IRQ input of each microprocessor to go low. The outputs of A4 will remain in the low state until each flip-flop is cleared by a signal from its associated microprocessor after each IRQ is processed.

The Sound Board is designed to accomodate different types of Eproms. Jumpers JP1, JP2, JP3, and JP4 should be set to their proper positions based on the density of the Eproms being used.

G. AUXILIARY SOUND BOARD (A20)

The Auxiliary Sound Board contains a sound generator YM2151 (U9) and a sound/speech generator MSM6295 (U1). Both of these IC's operate under the control of the T3 microprocessor on the master Sound Board (A6). The sound generator YM2151 responds to its commands by sending serial data to the YM3014 DAC (U10). The DAC then converts this data into an analog signal which is filtered through a series of op-amps and then sent to the main summing amplifier (U11).

A 74HCT74 IC (U6) is used to divide the 4 MHz clock signal present at A20P4-9 into both a 1 MHz and 2 MHz signal which is selectable via JP3 (2 MHz) or JP4 (1 MHz). This signal is then used as the master clock for the speech generator (U1). When the speech generator (U1) receives a command, it then retrieves its data from the Eproms (U4, U5). The analog output at pin 36 (DAO) is then sent

through an active filter network and then to the main summing amplifier (U11).

The output of the main summing amplifier (U11-7) is input to a voltage controlled amplifier (VCA) (U13). The volume is controlled by a potentiometer located just inside the front door of the game. The potentiometer acts as a resistor divider which supplies a 0 to 5 volt signal to the VCA at U13-2. The output of the VCA is then sent to Auxiliary Power Supply (A5) for amplification.

H. SENSOR BOARD (A15)

This board is used to detect if any flipper is energized and then inputs the data to the Control Board to be processed. This board therefore eliminates the need for a second switch to be used on the flipper assembly itself. U1 is an optocoupler device which converts the input signal from the flipper circuit when energized to a signal which can be recognized by the Control Board as a valid switch closure.

I. OPTICAL INTERFACE (A25)

The optical interface assembly generates and receives the infrared light pulses needed to optically detect the ball breaking an infrared light beam. It also provides a visual indication that the interface assembly is functioning properly.

This method of detection transmits infrared light pulses from an opto LED to an opto phototransistor receiver. The LED light pulses are generated from a switch strobe that is buffered and current amplified by two sections of the LM339 voltage comparator (output pins 1 & 2) and transistor Q2.

When no ball is present, the light pulses reach the opto receiver which passes the pulses 180 degrees out of phase with the switch strobe on to two additional sections of the comparator (pins 9 & 10). Because the strobe pulses and receive pulses are out of phase, they cancel at resistors R1 & R3 and keep comparator

IV. THEORY OF OPERATION

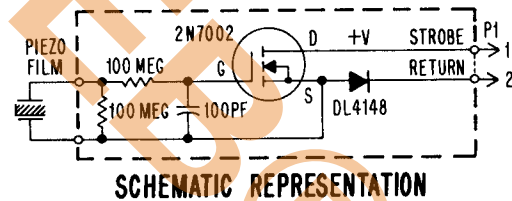
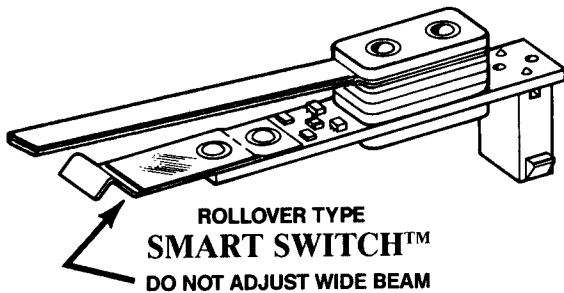
output pin 13 high therefore preventing Q1 from passing strobes on to the switch return line.

As a ball passes between the opto transmitter and receiver, the light beam is broken. Now, with no out of phase pulses coming from the receiver, the strobe appears at comparator inputs 9 & 10. Comparator output pin 13 begins pulsing low and passes the strobes through Q1 to the return line to signal a closed switch. Also positive strobe pulses at output pin 14 of the comparator turn Q3 on and light LED D2. D2 lit indicates a broken light beam and a closed optical switch.

J. SMART SWITCH™ (Piezo Film Sensor)

These devices take the place of the the normal contact point type switches used for sensing the ball on various different devices in the game. These devices should not require any adjustment. DO NOT ATTEMPT TO ADJUST THE WIDE CANTILEVER BEAM used in a switch assembly. This could cause permanent damage to the device. The lifetime of these switches has been determined to be over 10 million

cycles. The main advantage of these switches is the fact that they cannot be contaminated by such elements as moisture, dust, or smoke. Each switch assembly consists of a wide cantilever beam which has a piezo film sensor element laminated to its surface. When this beam is deflected, it induces a strain on the laminated piezo film sensor element. As the beam is returning to its rest position it generates an output voltage which triggers the on board circuit. This circuit then generates a momentary output which resembles that of contact points being closed. The switch design used in rollover and spot target applications generates an output signal as the beam which contains the piezo film returns to its rest position after it is actuated. The switch design used for pop bumpers generates an output signal as the beam is deflected in order to provide an immediate response by the pop bumper solenoid. This immediate response type of switch can be distinguished from the other because either the film itself or the printed circuit board will be colored blue. BE CAREFUL not to interchange these two different types of switches.



NOTES

GOTTFRID[®]

V. GENERAL INFORMATION

A. PRINTED CIRCUIT BOARDS ARE DESIGNATED AS FOLLOWS:

A1 - Control Board
A2 - Power Supply
A3 - Driver Board
A4 - Dot Matrix Display
A5 - Auxiliary Power Supply
A6 - Sound Board
A8 - Display Controller
A11 - Auxiliary Driver Board
A13 - Resistor Board
A15 - Sensor Board
A16 - Filter Board
A17 - Diode Board
A20 - Auxiliary Sound Board
A22 - LED Board
A25 - Optical Interface Board
A26 - Game Controls Board
A27 - Communications Adapter (Optional)
A28 - Interface Board (Miscellaneous)

Printed circuit board connectors will be labeled AX-JX. For example, A3-J4 is the connector J4 to the driver board (A3).

B. WIRE COLORS ARE SHOWN AS NUMBERS:

0 Black
1 Brown
2 Red
3 Orange
4 Yellow
5 Green
6 Blue
7 Violet
8 Gray
9 White

For example, 688 is a BLUE-GRAY-GRAY striped wire.

C. FUSE AND COIL INFORMATION

TRANSFORMER PANEL

F1	Line Input.....	110V AC.....	8 Amp	SLO-BLO
		220V AC.....	4 Amp	SLO-BLO
F2	Primary Power.....	110V AC.....	5 Amp	SLO-BLO
		220V AC.....	2-1/2 Amp	SLO-BLO
F3	Display.....		3/8 Amp	SLO-BLO
F4	Display.....		3/8 Amp	SLO-BLO
F5	Power Supply.....		2-1/2 Amp	SLO-BLO
F6	Controlled Lamps and Switches.....		10 Amp	SLO-BLO
F7	Solenoids.....		8 Amp	SLO-BLO
F8	Lightbox Illumination.....		15 Amp	
F9	Playfield Illumination.....		10 Amp	
F10	Auxiliary Power Supply.....		3 Amp	SLO-BLO
F11	Auxiliary Power Supply.....		3 Amp	SLO-BLO

NOTE:

FUSE DESIGNATIONS F12 THRU F14 NOT USED.

V. GENERAL INFORMATION

PLAYBOARD FUSES, COILS/COLORS/SLEEVES

FUSE	RATING	PART NO.	USAGE	COIL/COLOR	SLEEVE
F15	1-1/2 AMP SLO-BLO	EL-24	LEFT POP BUMPER (Q1)	16570 (GREEN)	5064
F16	1-1/2 AMP SLO-BLO	EL-24	RIGHT POP BUMPER (Q2)	16570 (GREEN)	5064
F17	1-1/2 AMP SLO-BLO	EL-24	TOP POP BUMPER (Q3)	16570 (GREEN)	5064
F18	1-1/2 AMP SLO-BLO	EL-24	LEFT KICKING RUBBER (Q4)	5195 (WHITE)	5064
F19	1-1/2 AMP SLO-BLO	EL-24	RIGHT KICKING RUBBER (Q5)	5195 (WHITE)	5064
F20	1-1/2 AMP SLO-BLO	EL-24	LEFT KICKING TARGET (Q6)	5195 (WHITE)	5064
F21	1-1/2 AMP SLO-BLO	EL-24	RIGHT KICKING TARGET (Q7)	5195 (WHITE)	5064
F22	2-1/2 AMP SLO-BLO	EL-21	BOTTOM LEFT FLIPPER	25959 (RED)	5065
F23	2-1/2 AMP SLO-BLO	EL-21	BOTTOM RIGHT FLIPPER	25959 (RED)	5065
F24	1-1/2 AMP SLO-BLO	EL-24	TOP RIGHT FLIPPER	28740 (TAN)	5065
F25	1/2 AMP SLO-BLO	EL-20	BALL RELEASE (Q28)	26451 (YELLOW)	5065
			OUTHOLE (Q29)	26451 (YELLOW)	5065
F26	1/2 AMP SLO-BLO	EL-20	ELECTROMAGNET (Q13)	30297 (BLUE)	30370
F27	1/2 AMP SLO-BLO	EL-20	TOP RIGHT PLUNGER GATE (Q12)	26451 (YELLOW)	5064
F28	1/2 AMP SLO-BLO	EL-20	RAMP PLUNGER GATE (Q11)	26451 (YELLOW)	5064
F29	1/2 AMP SLO-BLO	EL-20	2 POSITION BANK RESET (Q8)	26450 (PINK)	25605
F30	1-1/2 AMP SLO-BLO	EL-24	TOP UPKICKER (Q10)	16570 (GREEN)	5064
			BALL LIFT SHOOTER (Q9)	16570 (GREEN)	5064

V. GENERAL INFORMATION

D. COIL CHART

SOLENOID COILS					
PART NUMBER	WHERE USED	RESISTANCE (OHMS)	NUMBER OF TURNS	WIRE GAUGE	WRAPPER COLOR
A-19300	GENERAL PURPOSE	7.8	1075	#25	ORANGE
A-5195	GENERAL PURPOSE	12.3	1305	#26	WHITE
A-16570	GENERAL PURPOSE	15.5	1450	#27	GREEN
A-17876	GENERAL PURPOSE	24	1750	#28	TAN
A-26450	GENERAL PURPOSE	42	2400	#29	PINK
A-26451	GENERAL PURPOSE	65.8	3000	#30	YELLOW
A-30297	GENERAL PURPOSE	66.5	2750	#30	BLUE
A-26926	3-BANK RESET	32.8	2650	#27	BLUE
A-29876	FLIPPER (NEW UNIT)	2.36/202	560/3325	#23/#33	ORANGE
A-25959	FLIPPER (NEW UNIT)	3.85/202	720/3325	#24/#33	RED
A-26646	FLIPPER (NEW UNIT)	4.57/201	725/3470	#25/#33	BLUE
A-28740	FLIPPER (NEW UNIT)	6.02/207	790/3600	#26/#33	TAN
A-27642	FLIPPER (NEW UNIT)	9.1/203	950/3700	#27/#33	YELLOW
A-27643	FLIPPER (OLD UNIT)	11.4/202	960/3670	#28/#33	GREEN
A-30468	FLIPPER (OLD UNIT)	11.59/269	960/4700	#28/#33	WHITE
A-27926	GENERAL PURPOSE	64.7	3475	#29	BLUE
RELAY COILS					
PART NUMBER	WHERE USED	RESISTANCE (OHMS)	NUMBER OF TURNS	WIRE GAUGE	WRAPPER COLOR
A-26452	DROP TAR. TRIP	137	2450	#35	PINK
A-16890	GENERAL PURPOSE	231	4000	#35	ORANGE

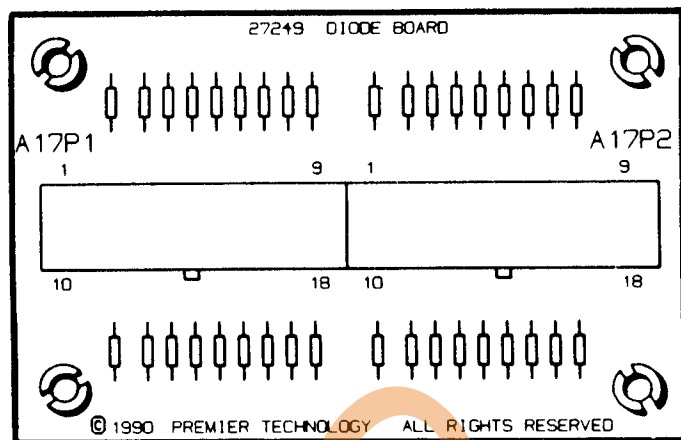
VI. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS

TABLE OF CONTENTS

	PAGE(S)
DIODE BOARD (A17)	
COMPONENT LOCATION AND PARTS LIST.....	28
FILTER BOARD (A16)	
COMPONENT LOCATION.....	28
GAME CONTROLS BOARD (A26)	
COMPONENT LOCATION AND PARTS LIST.....	28
RESISTOR BOARD (A13)	
COMPONENT LOCATION AND PARTS LIST.....	28
AUXILIARY DRIVER BOARD (A11)	
SCHEMATIC DIAGRAM.....	29
COMPONENT LOCATION AND PARTS LIST.....	29A
SENSOR BOARD (A15)	
COMPONENT LOCATION AND PARTS LIST.....	30
SCHEMATIC DIAGRAM.....	30
CONTROL BOARD (A1)	
COMPONENT LOCATION AND PARTS LIST.....	30A
SCHEMATIC DIAGRAM.....	31-33
DRIVER BOARD (A3)	
SCHEMATIC DIAGRAM.....	34-36
COMPONENT LOCATION AND PARTS LIST.....	37
OPTO TRANSMITTER, OPTO RECIEVER	
QUAD OPTICAL INTERFACE BOARD (A25)	
COMPONENT LOCATION AND PARTS LIST.....	38, 39
AUXILIARY POWER SUPPLY (A5)	
COMPONENT LOCATION AND PARTS LIST.....	40
SCHEMATIC DIAGRAM.....	40
AUXILIARY SOUND BOARD (A20)	
COMPONENT LOCATION AND PARTS LIST.....	41
SCHEMATIC DIAGRAM.....	41, 42
SOUND BOARD (A6)	
COMPONENT LOCATION AND PARTS LIST.....	43
SCHEMATIC DIAGRAM.....	44, 45
DISPLAY CONTROLLER (A8)	
SCHEMATIC DIAGRAM.....	46-48
COMPONENT LOCATION AND PARTS LIST.....	49
DOT MATRIX DISPLAY (A4)	
FRONT VIEW, WIRING DIAGRAM.....	49
SWITCH MATRIX	
SCHEMATIC DIAGRAM.....	50, 51
POWER SUPPLY (A2)	
COMPONENT LOCATION AND PARTS LIST.....	52
SCHEMATIC DIAGRAM.....	52
LAMP MATRIX	
SCHEMATIC DIAGRAM.....	53, 54
PLAYBOARD	
SCHEMATIC DIAGRAM.....	55, 56
MOTOR BOARD, (HELICOPTER ROTOR)	
COMPONENT LOCATION AND PARTS LIST.....	56
BALL LIFT, MOTOR INTERFACE BOARD	
SCHEMATIC DIAGRAM.....	56
COMPONENT LOCATION AND PARTS LIST.....	56
TRANFORMER PANEL	
SCHEMATIC DIAGRAM.....	57, 58
LIGHTBOX/PLAYBOARD	
SCHEMATIC DIAGRAM.....	59, 60
CABINET/FRONT DOOR	
SCHEMATIC DIAGRAM.....	61, 62
ELECTRONIC FRONT DOOR	
SCHEMATIC DIAGRAM.....	62

VI. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS

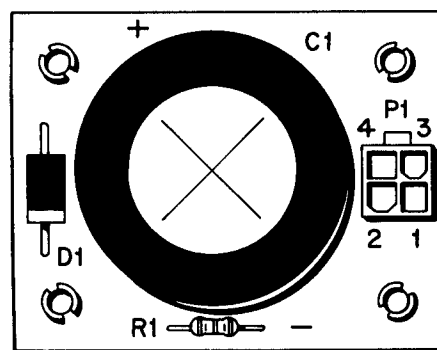
DIODE BOARD (A17) COMPONENT LOCATION



DIODE BOARD (A17) PARTS LIST

REFERENCE	DESCRIPTION	PART NUMBER
1A17	Diode Matrix Assembly	MA-1448
D1-D32	Diode, 1N4148	XO-261
P1, P2	Header, 18 Position	XO-916
R1-R4	Resistor, 220 OHM, 5%, 1/4W	XO-21
	Circuit Board Support (4)	23984

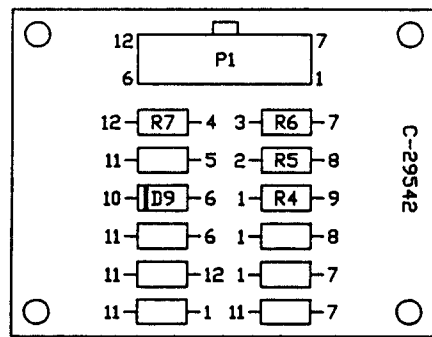
FILTER BOARD (A16) COMPONENT LOCATION



FILTER BOARD (A16) PARTS LIST

REFERENCE	DESCRIPTION	PART NUMBER
	FILTER BOARD ASSEMBLY	MA-1745
C1	CAPACITOR, 2200UF, 100V	XO-923
D1	DIODE, 1N5401	XO-263
R1	RESISTOR, 24K OHM, 5%, 1/4W	XO-10
P1	HEADER, 4 POSITION	XO-909
	CIRCUIT BOARD SUPPORT (4)	23984

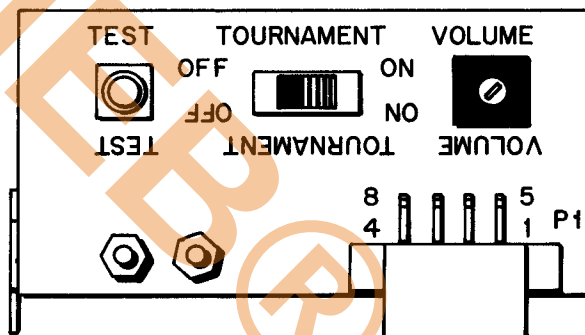
RESISTOR BOARD (A13) COMPONENT LOCATION



RESISTOR BOARD (A13) PARTS LIST

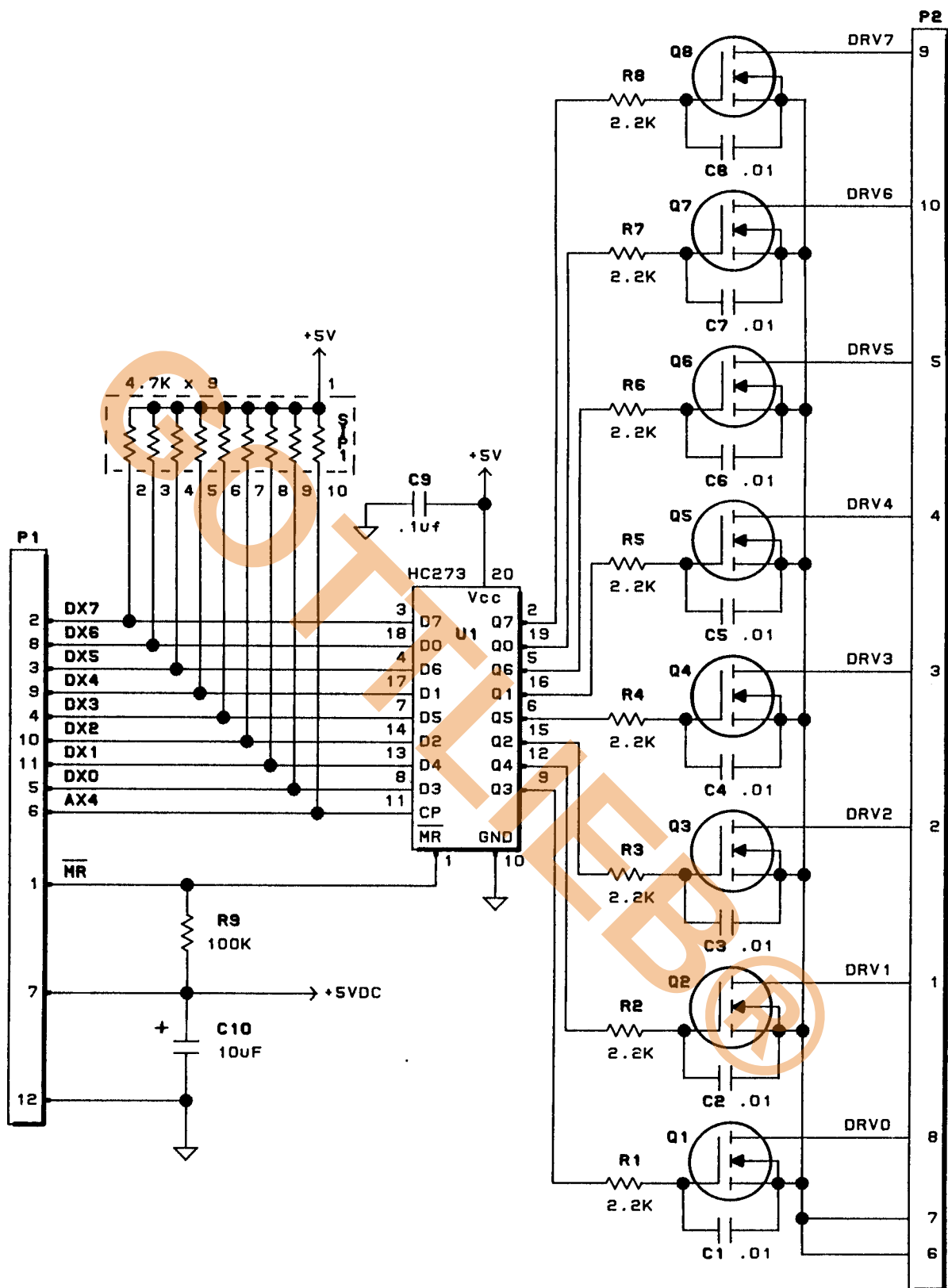
REFERENCE	DESCRIPTION	PART NUMBER
	RESISTOR BOARD (A13)	29643
D9	DIODE, 1N4004	XO-254
R4-R7	RESISTOR, 220 OHM, 5%, 1/4W	XO-21
P1	HEADER, 12 POSITION	XO-913
	SPACER, (4)	23984

GAME CONTROLS BOARD (A26) COMPONENT LOCATION



GAME CONTROLS BOARD (A26) PARTS LIST

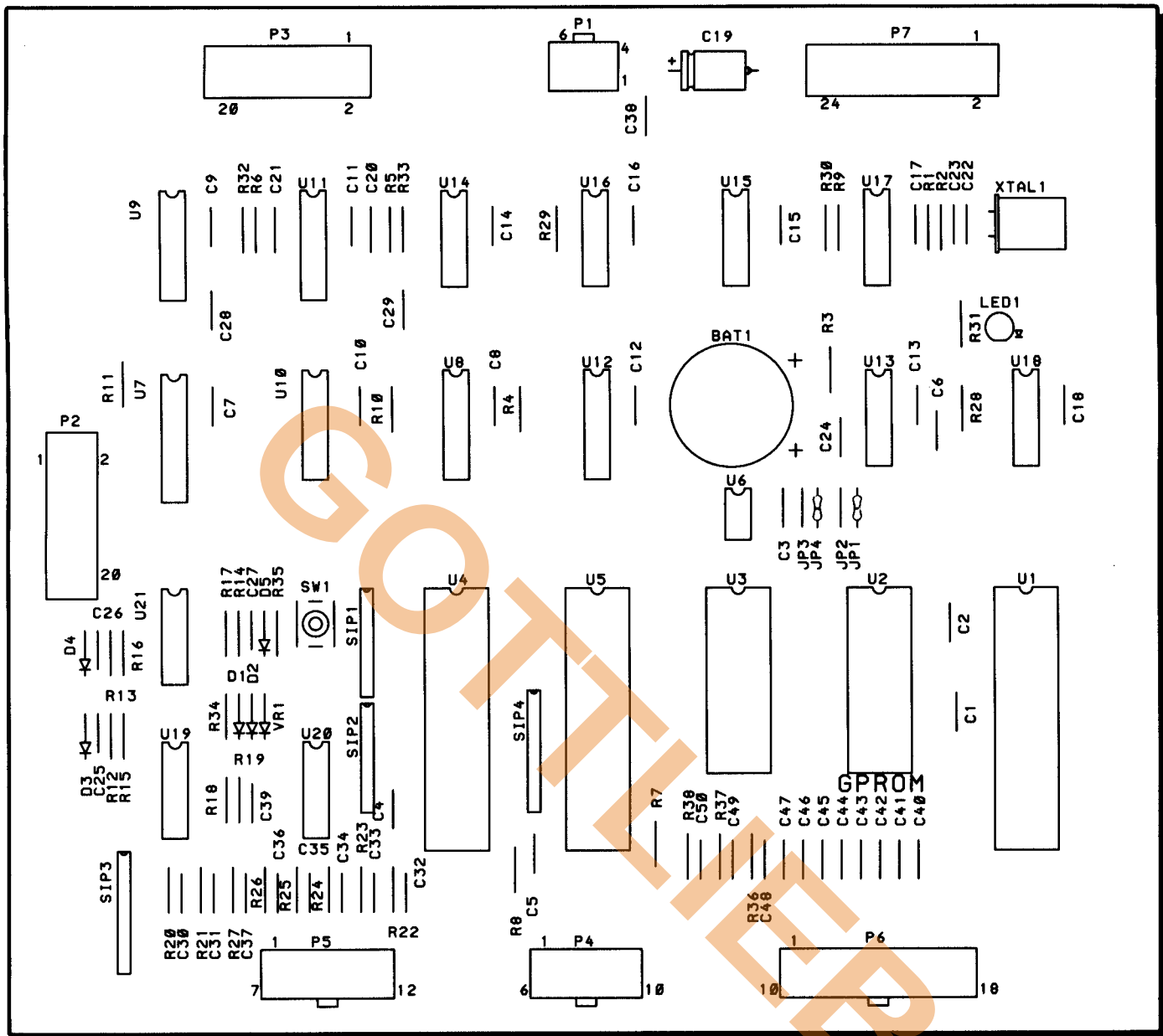
DESCRIPTION	PART NUMBER
Game Controls Board (A26)	MA-1851
Potentiometer, 10K OHM, 20%, 15W	XO-1194
Pushbutton Switch	XO-897
Slide Switch	XO-1193
Header, 8 Position	XO-920
Mounting Bracket	28619
Key Cap, Yellow	XO-1198



Premier Technology			
TITLE			
AUXILIARY DRIVER BOARD (A11)			
SCHEMATIC DIAGRAM			
DRAWN	APPROVED	DATE	
J.B.	RHM	12-2-91	MA-1722

VI. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS

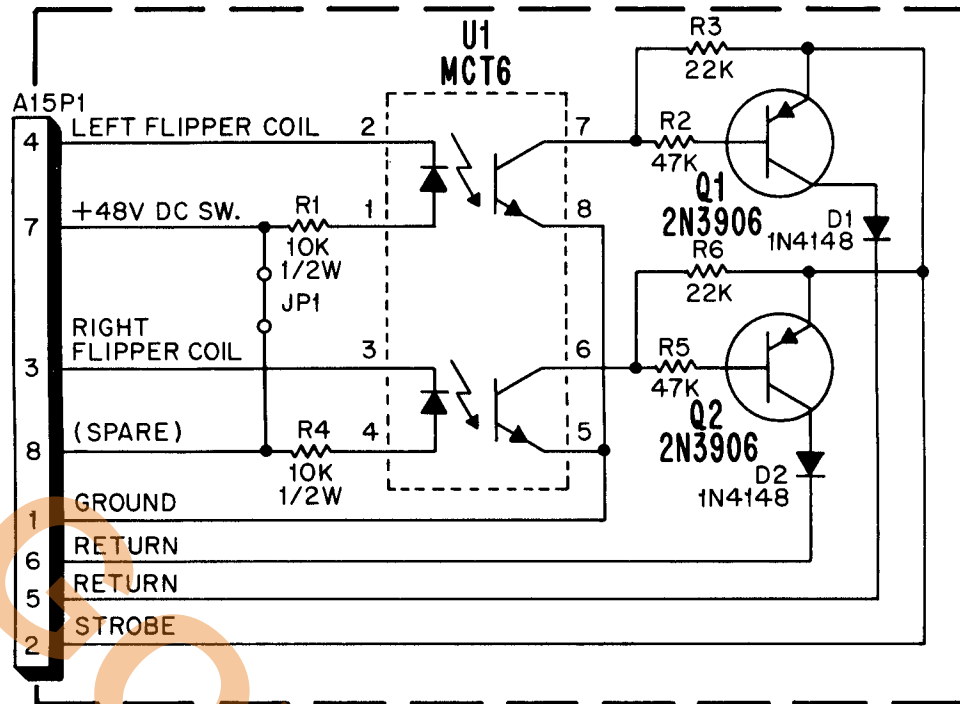
CONTROL BOARD (A1) COMPONENT LOCATION



CONTROL BOARD (A1) PARTS LIST

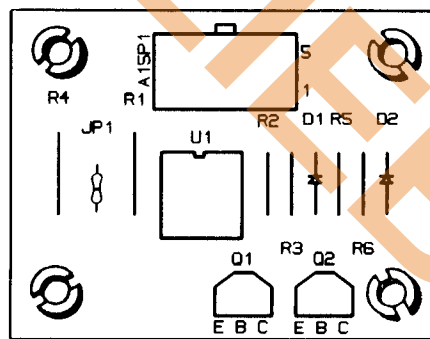
REFERENCE	DESCRIPTION	PART NUMBER	REFERENCE	DESCRIPTION	PART NUMBER
BAT 1	Control Board Assembly (A1)	MA-1934	SIP3,SIP4	Resistor Pack, 4.7K OHM X 8	X0-161
C3, C7-C18,	Lithium Battery, LM2430, 3V	X0-925	SW1	Switch, N.O.	X0-897
C30-C50	Capacitor, .01UF, +80% -20%, 50V	X0-229	U1	IC, 65C02P2, CPU, 2MHZ	X0-927
C1,C2,C4	Capacitor, 0.1UF, +80% -20%, 50V	X0-230	U3	IC, 6264LP, 8K X 8, Static Ram	X0-781
C5,C25,C27	Capacitor, 33PF, 10%, 50V	X0-896	U4,U5	IC,6522AP, Versatile Interface Adaptor (VIA)	X0-929
C6,C22,C23	Capacitor, 100UF, +80% -20%, 10V	X0-211	U6	IC, DS1210, Non-Volatile Controller	X0-930
C19	Capacitor, 1UF, 20%, 50V	X0-746	U7	IC, 74HCT373, Octal Latch	X0-931
C20,C21	Capacitor, .022UF, 10%, 50V	X0-873	U8	IC, 74HCT138, Decoder	X0-932
C24	Capacitor, 1000PF, 10%, 100V	X0-296	U9,U10	IC, 74HCT139, Dual Decoder	X0-933
C28,C29	Diode, 1N4148	X0-261	U11	IC, 74HC123, Dual Multivibrator	X0-934
D1-D5	LED, MV5752 (Red)	X0-270	U12	IC, 74HC161, Binary Counter	X0-935
LED 1	Resistor, 22 MEGOHM, 5%, 1/4W	X0-74	U13	IC, 74HC14, Schmitt Hex Inverters	X0-936
R1	Resistor, 10K OHM, 5%, 1/4W	X0-18	U14	IC, 74HC11, Triple "And" Gates	X0-937
R2,R10,R11	Resistor, 560K OHM, 5%, 1/4W	X0-169	U15,U16	IC, 74HC00, Quad "Nand" Gates	X0-782
R18,R28,R30	Resistor, 330K OHM, 5%, 1/4W	X0-47	U17	IC, 74HC04, Hex Inverters	X0-888
R3	Resistor, 3K OHM, 5%, 1/4W	X0-23	U18	IC, 74HC74, Dual "D" Flip-Flop	X0-939
R5,R6	Resistor, 2.2K OHM, 5%, 1/4W	X0-27	U19,U20,U21	IC, LM339, Quad Comparators	X0-583
R4,R7-R9	Resistor, 3.3K OHM, 5%, 1/4W	X0-38	VR1	Zener Diode, 1N5225B, 3V, 5%	X0-269
R12-R14	Resistor, 4.7K OHM, 5%, 1/4W	X0-7	XTAL1	Crystal, 4MHZ	X0-366
R15-R17	Resistor, 330 OHM, 5%, 1/4W	X0-34	A1P1	Header, 6 Position	X0-910
R19-R27,	Resistor, 100K OHM, 5%, 1/4W	X0-45	A1P2,A1P3	Header, 20 Position (Ribbon)	X0-940
R36-R38	Resistor, 1K OHM, 5%, 1/4W	X0-5	A1P4	Header, 10 Position	X0-912
R31	Resistor, 100 OHM, 5%, 1/4W	X0-28	A1P5	Header, 12 Position	X0-913
R32-R33	Resistor Pack, 10K OHM X 7, 5%, 1/4W	X0-926	A1P6	Header, 18 Position	X0-916
R34			A1P7	Header, 24 Position	X0-1201
R35				Jumper, Resistor, 0 OHM (2)	X0-469
SIP1,SIP2				Socket, 28 Pin Dip	X0-536

VI. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS



Premier Technology			
TITLE			
SENSOR BOARD (A15)			
SCHEMATIC DIAGRAM			
DRAWN J.P.S.	APPROVED RHM	DATE 10-12-89	E-27041

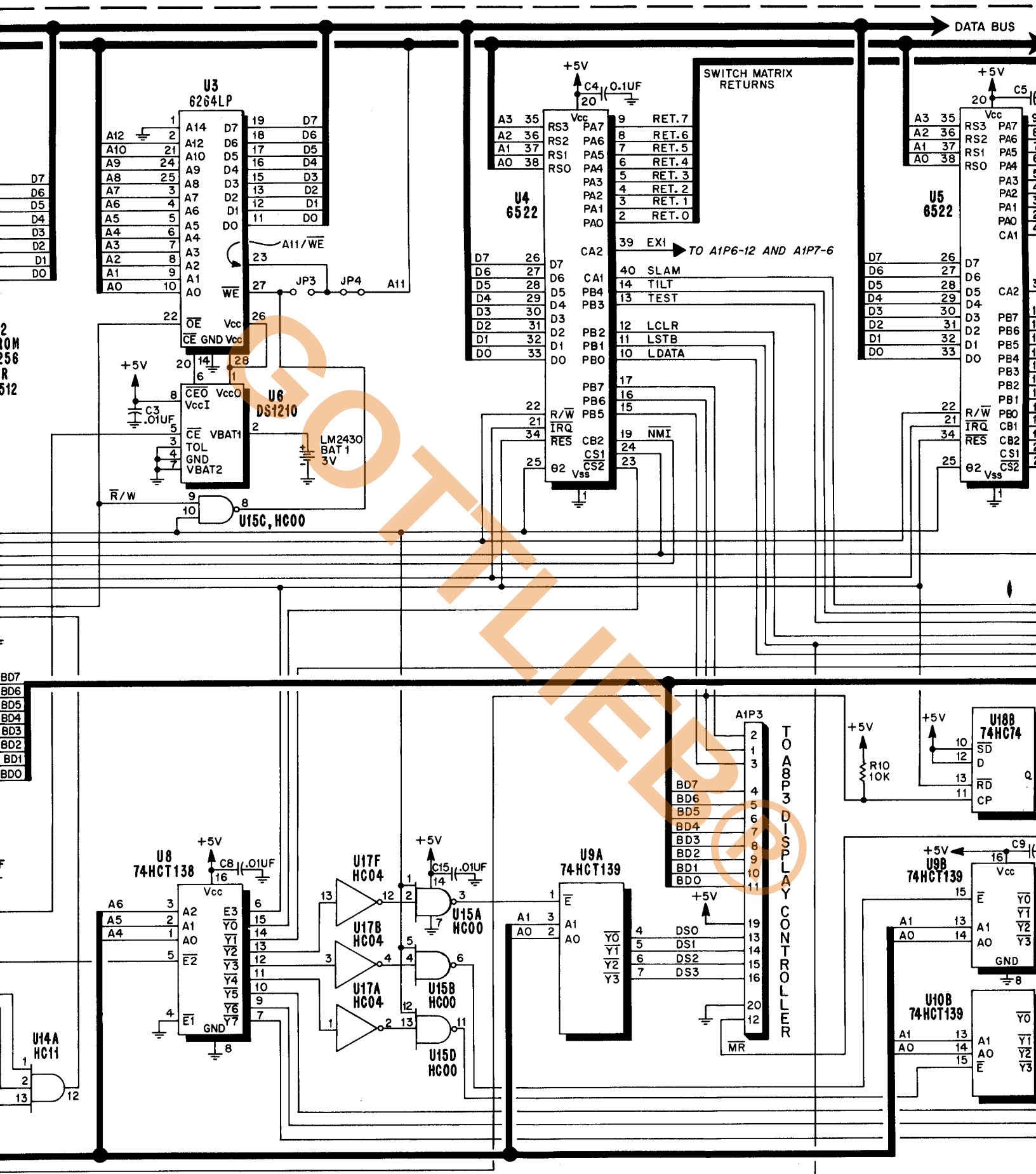
SENSOR BOARD (A15) COMPONENT LOCATION

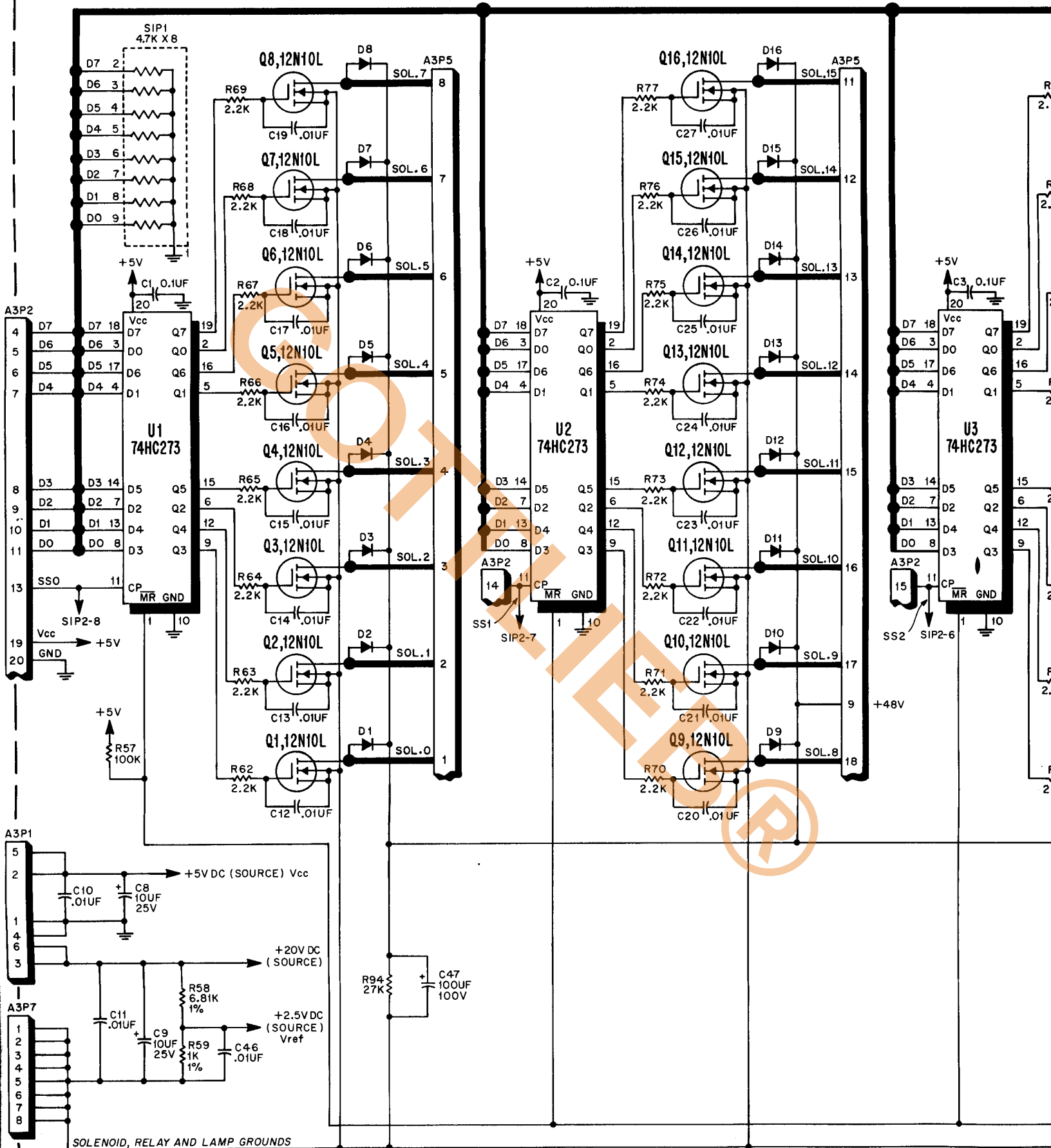


SENSOR BOARD (A15) PARTS LIST

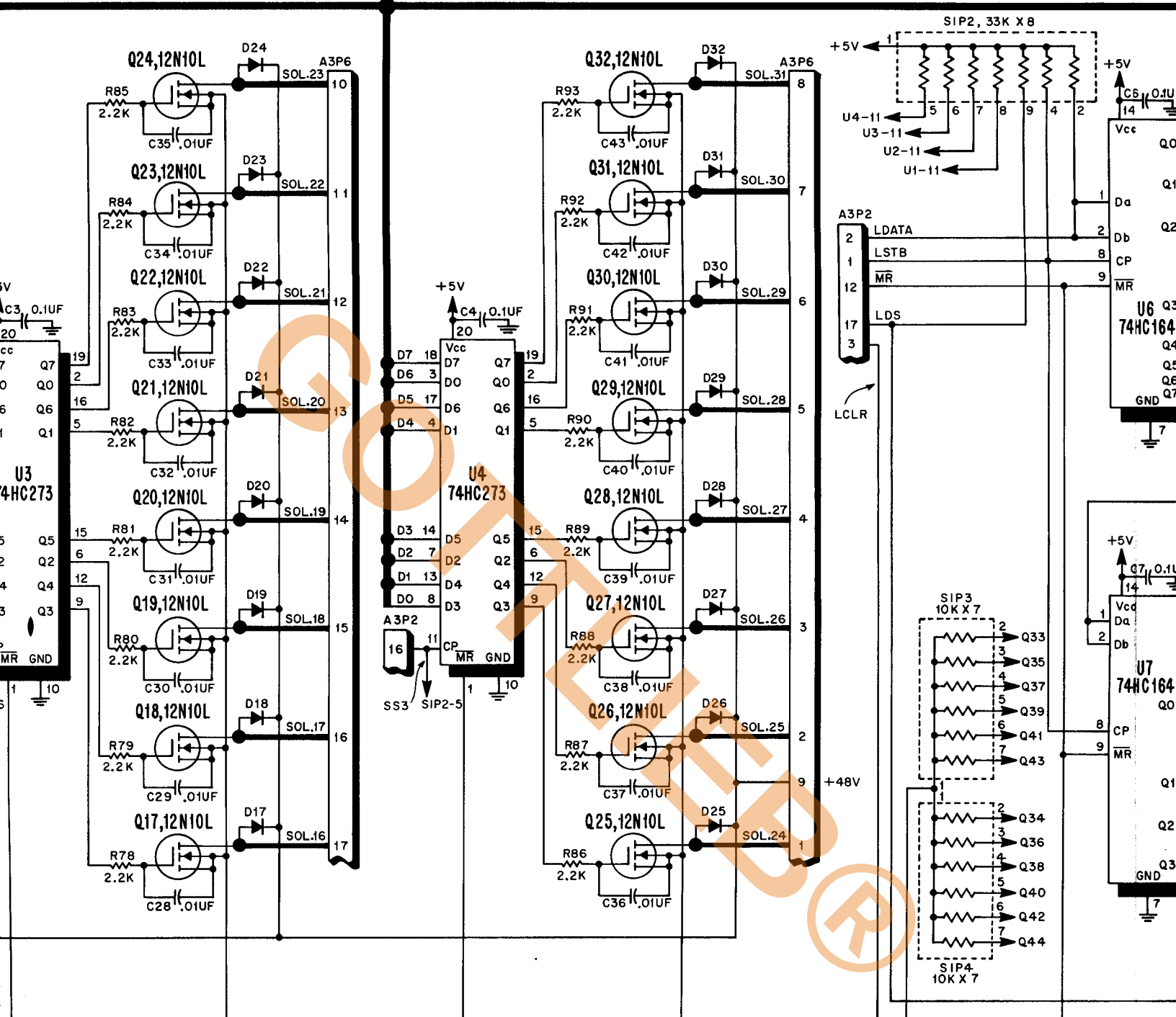
REFERENCE	DESCRIPTION	PART NUMBER
	Sensor Board Assembly (A15)	MA-1334
D1,D2	Diode, 1N4148	XO-261
JP1	Jumper, Resistor, 0 OHM	XO-469
Q1,Q2	Transistor, 2N3906 (PNP)	XO-588
R1,R4	Resistor, 10K Ohm, 5%, 1/2W	XO-62
R2,R5	Resistor, 47K Ohm, 5%, 1/4W	XO-30
R3,R6	Resistor, 22K Ohm, 5%, 1/4W	XO-42
U1	IC, Optocoupler, MCT6	XO-1000
A15P1	Header, 8 Position	XO-911
	Spacer (4)	23984

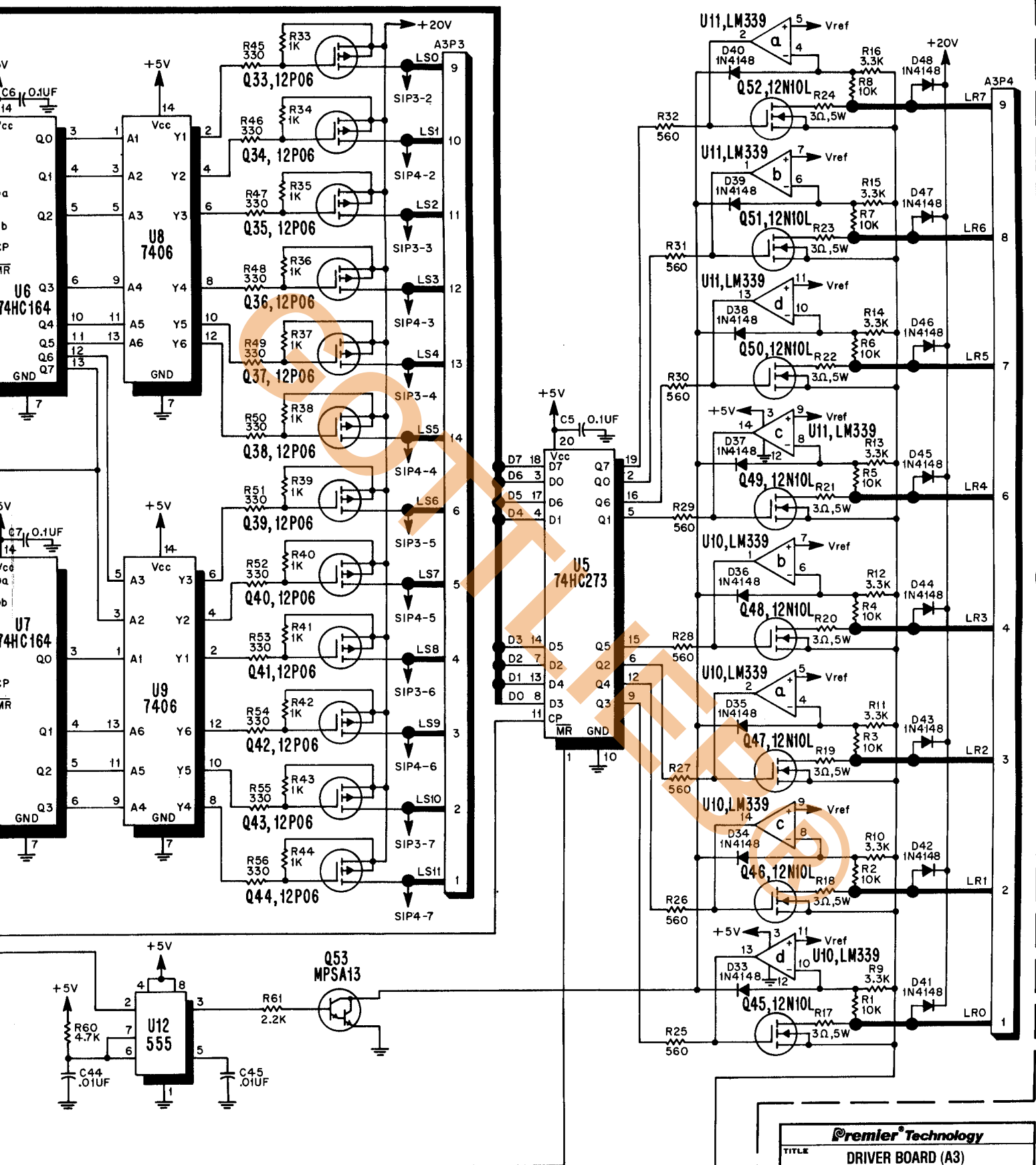
VI. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS





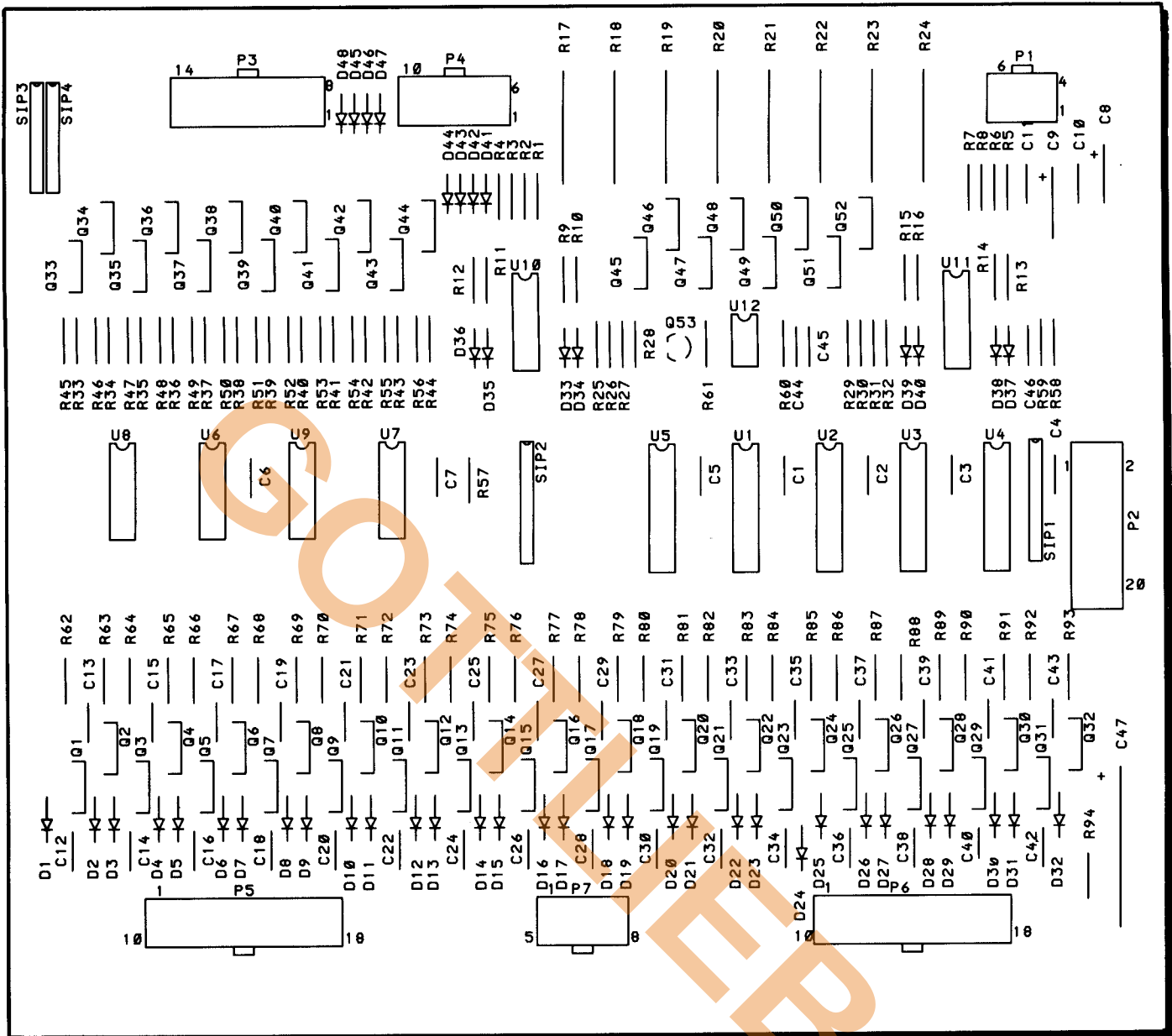
VI. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS





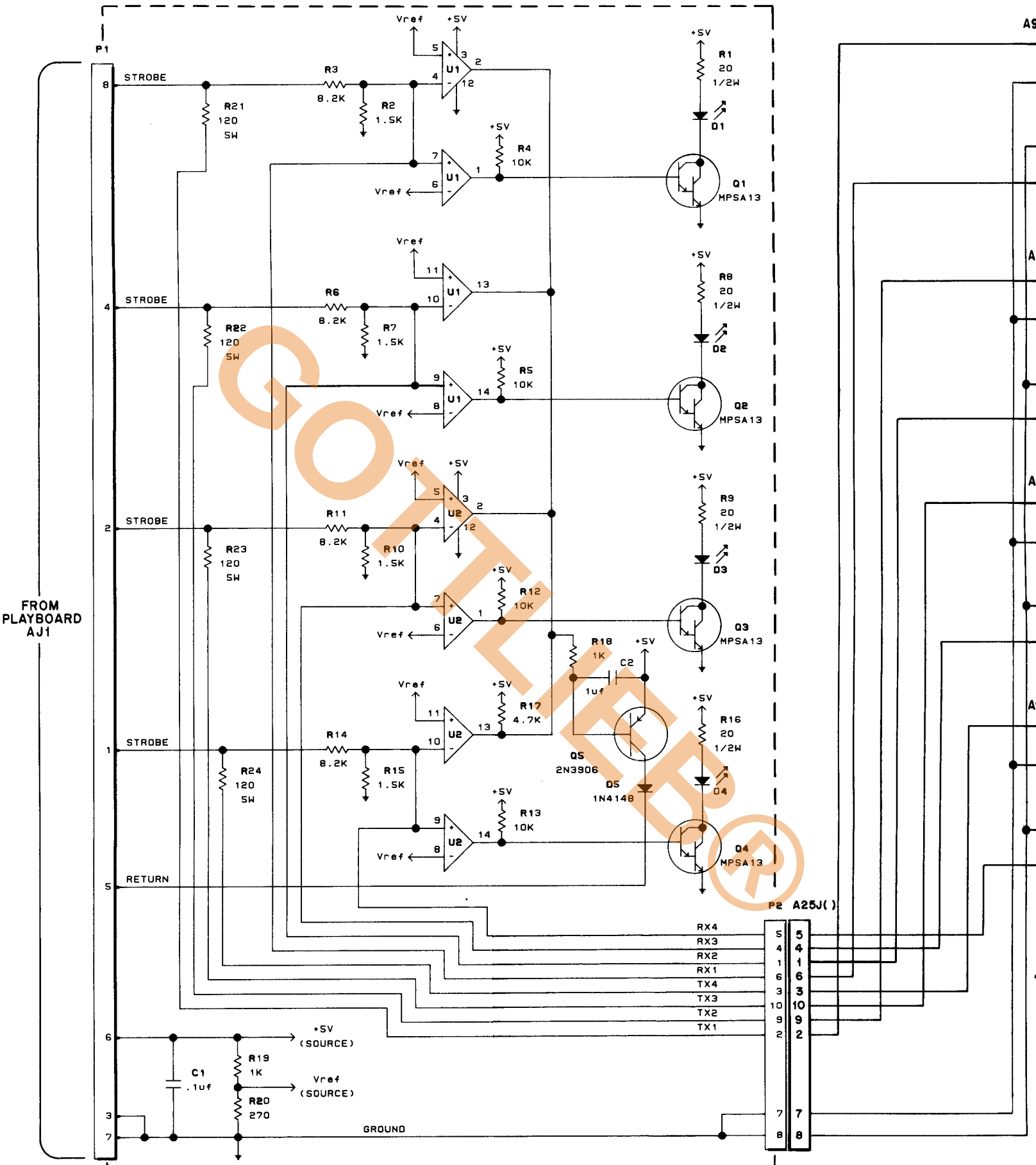
Premier Technology			
TITLE			
DRIVER BOARD (A3)			
SCHEMATIC DIAGRAM			
DRAWN	APR. RHM	APPROVED	DATE
			10-12-89
E-27034			

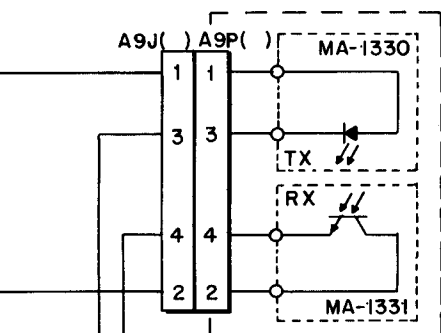
DRIVER BOARD (A3) COMPONENT LOCATION



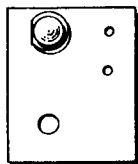
DRIVER BOARD (A3) PARTS LIST

REFERENCE	DESCRIPTION	PART NUMBER	REFERENCE	DESCRIPTION	PART NUMBER
	Driver Board Assembly (A3)	MA-1358	R58	Resistor, 6.81K Ohm, 1%, 1/4W	XO-943
C1-C7	Capacitor, 0.1 UF, +80% -20%, 50V	XO-230	R59	Resistor, 1K Ohm, 1%, 1/4W	XO-944
C8	Capacitor, 10UF, 20%, 25V	XO-127	R60	Resistor, 4.7K Ohm, 5%, 1/4W	XO-7
C9	Capacitor, 10UF, +80% -20%, 25V	XO-225	R61-R93	Resistor, 2.2K Ohm, 5%, 1/4W	XO-27
C10,C11	Capacitor, .01UF, +80% -20%, 50V	XO-229	R94	Resistor, 27K Ohm, 5%, 1/4W	XO-11
C45,C46			SIP1	Resistor Pack, 4.7K Ohm X 8.5%, 1/4W	XO-161
C12-C44	Capacitor, .01UF, 10%, 50V	XO-696	SIP2	Resistor Pack, 33K Ohm X 8.5%, 1/4W	XO-945
C47	Capacitor, 100UF, 20%, 100V	XO-958	SIP3	Resistor Pack, 10K Ohm X 7.5%, 1/4W	XO-926
D33-D48	Diode, 1N4148	XO-261	SIP4		
Q1-Q32,	Transistor, RFP12N10L, OR IRL530,	XO-947	U1-U5	IC, Octal "D" Flip-Flops, 74HC273	XO-949
Q45-Q52,Q54	N-Channel MOSFET		U6-U7	IC, Shift Register, 74HC164	XO-950
Q33-Q44	Transistor, RFP12P06, IRL531 OR MT2955 P-Channel MOSFET	XO-948	U8-U9	IC, Buffer, 7406	XO-85
Q53	Transistor, MPSA13, Darlington	XO-304	U10-U11	IC, Quad Comparator, LM339	XO-583
R1-R8	Resistor, 10K Ohm, 5%, 1/4W	XO-18	U12	IC, Timer, NE555	XO-631
R9-R16	Resistor, 3.3K Ohm, 5%, 1/4W	XO-38	A3P1	Header, 6 Position	XO-910
R17-R24	Resistor, 3 Ohm, 5%, 5W	XO-942	A3P2	Header, 20 Position (Ribbon)	XO-940
R25-R32	Resistor, 560 Ohm, 5%, 1/4W	XO-36	A3P3	Header, 14 Position	XO-914
R33-R44	Resistor, 1K Ohm, 5%, 1/4W	XO-5	A3P4	Header, 10 Position	XO-912
R45-R56	Resistor, 330 Ohm, 5%, 1/4W	XO-34	A3P5	Header, 18 Position	XO-916
R57	Resistor, 100K Ohm, 5%, 1/4W	XO-45	A3P6		
			A3P7	Header, 8 Position	XO-911





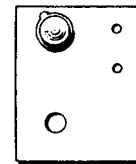
OPTO LED TRANSMITTER BOARD COMPONENT LOCATION



OPTO LED TRANSMITTER BOARD PARTS LIST

REFERENCE	DESCRIPTION	PART NUMBER
TX	Opto LED Transmitter Assembly	MA-1330
	Plastic Transmitter LED	XO-994

OPTO PHOTOTRANSISTOR RECEIVER BOARD COMPONENT LOCATION



OPTO PHOTOTRANSISTOR RECEIVER BOARD PARTS LIST

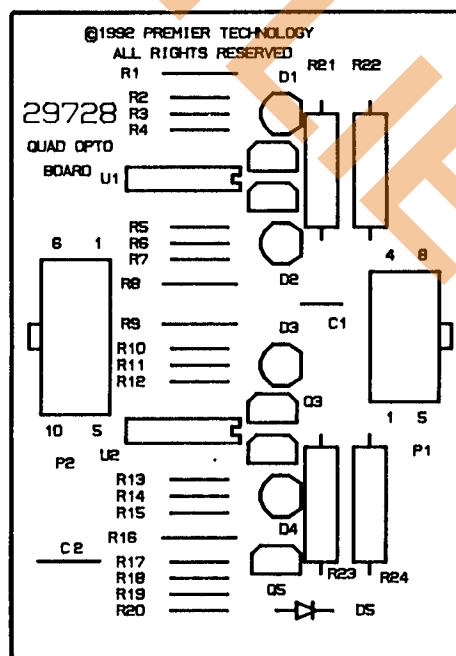
REFERENCE	DESCRIPTION	PART NUMBER
	Opto Phototransistor Receiver Assembly	MA-1331
RX	Plastic Phototransistor	XO-993

BRACKET AND OPTIC BOARD ASSEMBLIES REFERENCE

ASSEMBLY	CONNECTOR NO.	BRACKET NO.	LOCATION
30551	1A25J1-8	30470	BALL LIFT
30487	1A25J1-4	30486	HELI LOWER STOP
30487	1A25J1-2	30486	HELI UPPER STOP
30435	1A25J1-1,5	30460	LOWER TRACK
30479	2A25J1-8	30478	LOWER HELI DROP
30465	2A25J1-4	30461	TOP UPKICKER
30590	2A25J1-2	30589	RIGHT RAMP
30346	2A25J1-1,5	29662	SHOOTER RAMP

NOTE: BRACKET AND OPTIC BOARD ASSEMBLY
DOES NOT INCLUDE WIRING HARNESS.

QUAD OPTICAL INTERFACE BOARD COMPONENT LOCATION

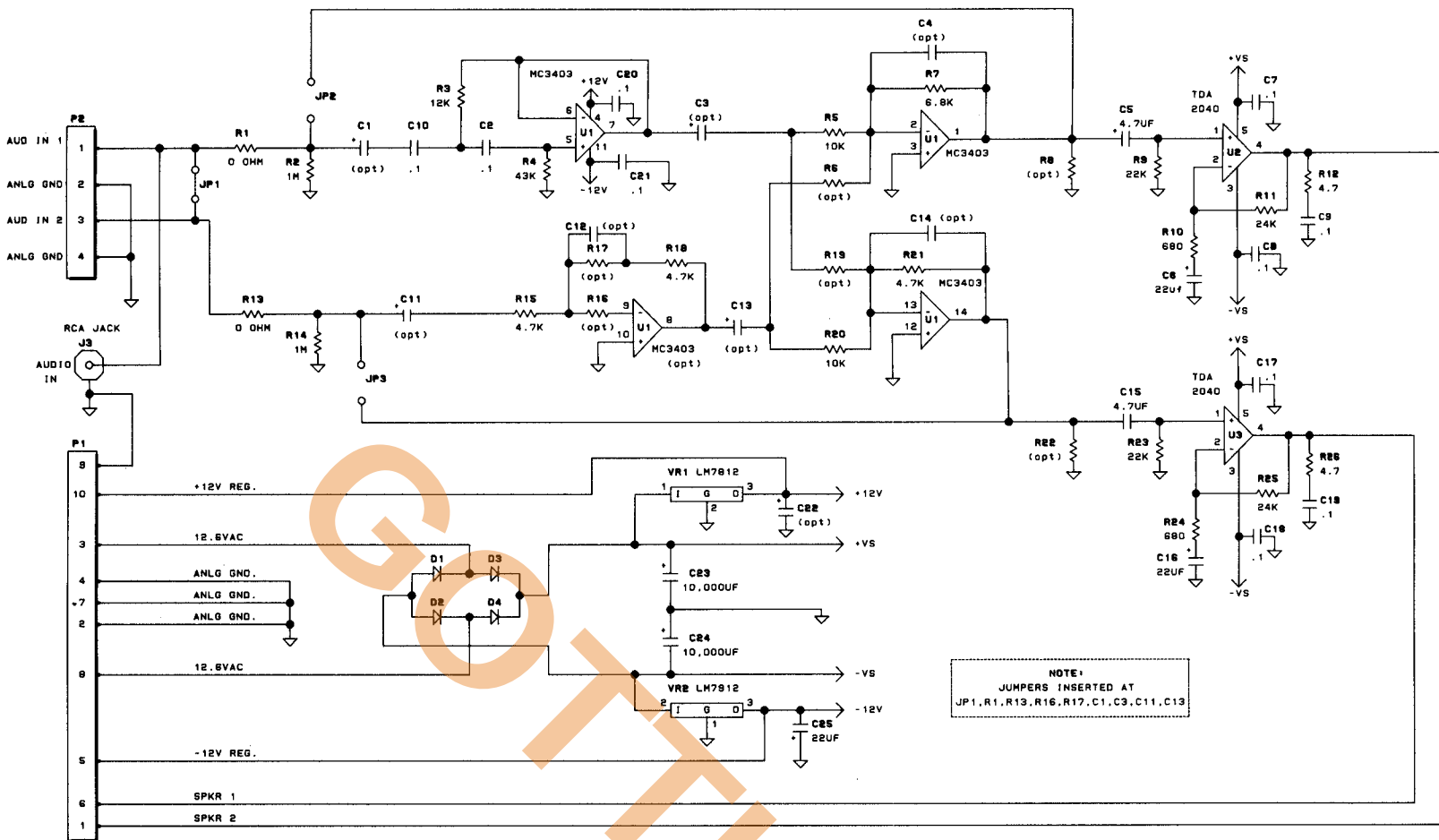


QUAD OPTICAL INTERFACE BOARD PARTS LIST

REFERENCE	DESCRIPTION	PART NUMBER
	QUAD OPTICAL INTERFACE BOARD (A25)	MA-1925
C1	CAPACITOR, 0.1UF, +80%-20%, 50V	XO-230
C2	CAPACITOR, 1UF, NON-POLAR, 50V	XO-746
D1-D4	DIODE, MV5752 (LED,RED)	XO-270
Q1-Q4	TRANSISTOR, NPN, MPS-A13	XO-304
Q5	TRANSISTOR, PNP, 2N3906	XO-588
R1,R8,R9,R16	RESISTOR, 20 OHM, 5%, 1/2W	XO-65
R2,R7,R10,R15	RESISTOR, 1.5K OHM, 5%, 1/4W	XO-20
R3,R6,R11,R14	RESISTOR, 8.2K OHM, 5%, 1/4W	XO-589
R4,R5,R12,R13	RESISTOR, 10K OHM, 5%, 1/4W	XO-18
R17	RESISTOR, 4.7K OHM, 5%, 1/4W	XO-7
R18,R19	RESISTOR, 1K OHM, 5%, 1/4W	XO-5
R20	RESISTOR, 270 OHM, 5%, 1/4W	XO-68
R21,R24	RESISTOR, 120 OHM, 10%, 5W	XO-1042
U1,U2	IC, QUAD COMPARATOR, LM339	XO-583
P1	HEADER, 8 POSITION	XO-911
P2	HEADER, 10 POSITION	XO-912
	SUPPORT, SRS-8-6N, (4)	23984

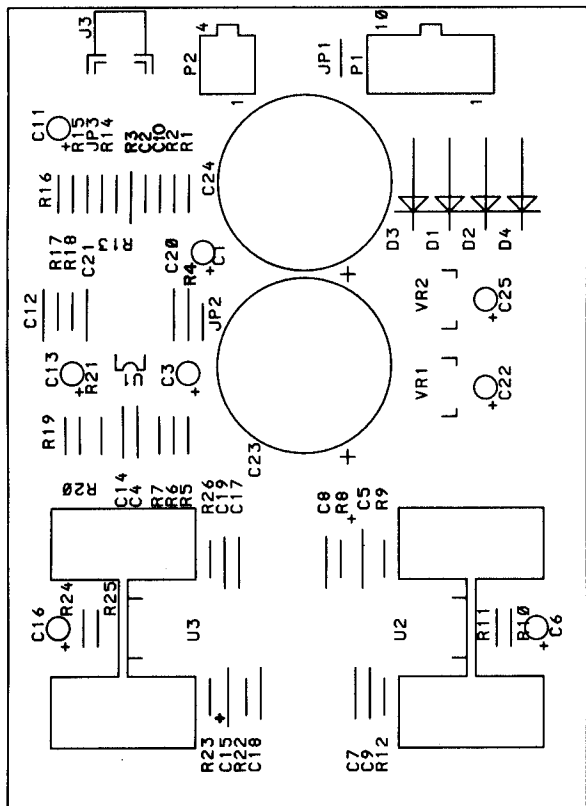
**OPTO LED
TRANSMITTER BOARD
(TX)
SCHEMATIC DIAGRAM
AND
OPTO
PHOTOTRANSISTOR
RECEIVER BOARD
(RX)
SCHEMATIC DIAGRAM**

VI. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS



NOTE:
JUMPERS INSERTED AT
JP1, R1, R13, R16, R17, C1, C3, C11, C13

AUXILIARY POWER SUPPLY (A5) COMPONENT LOCATION

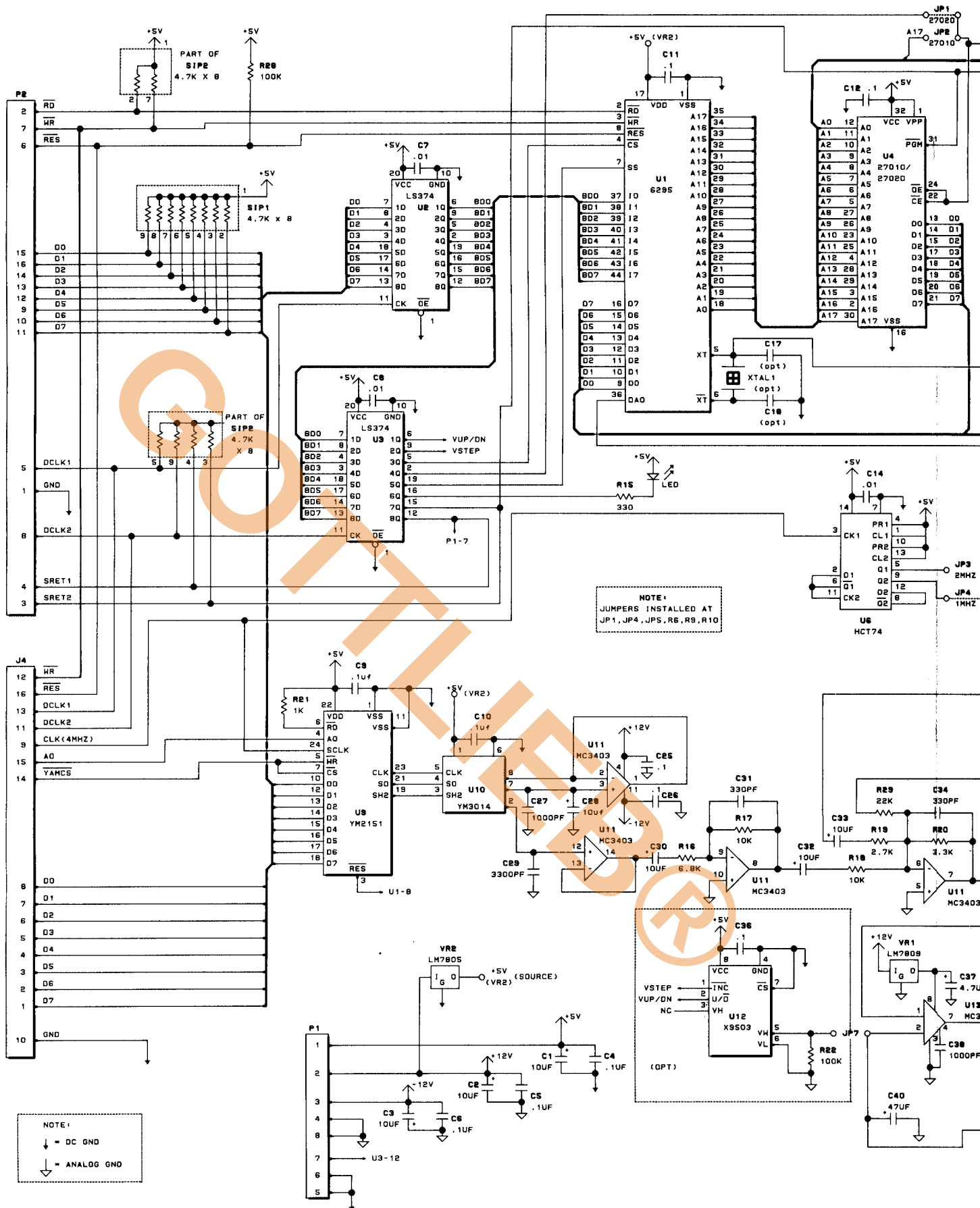


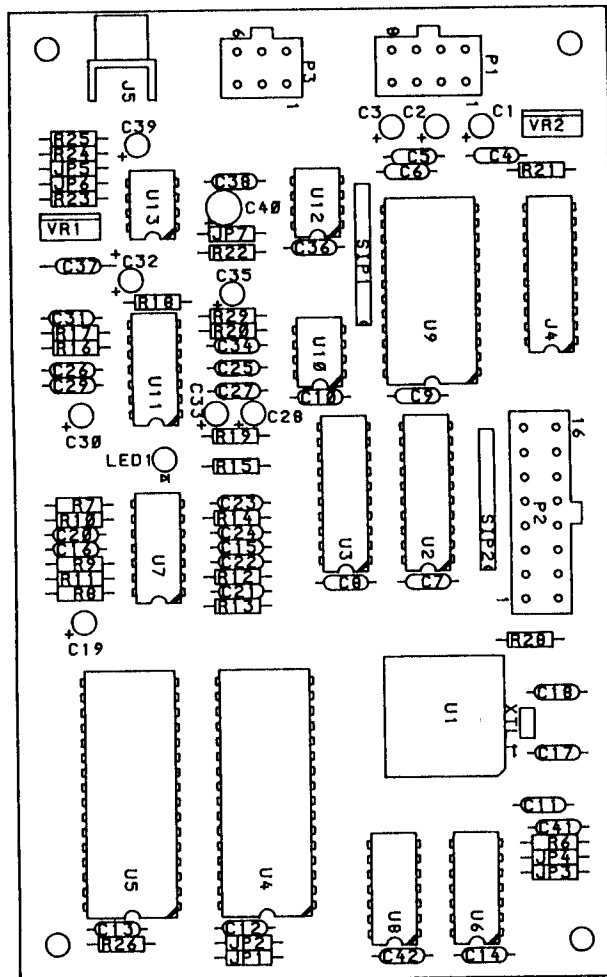
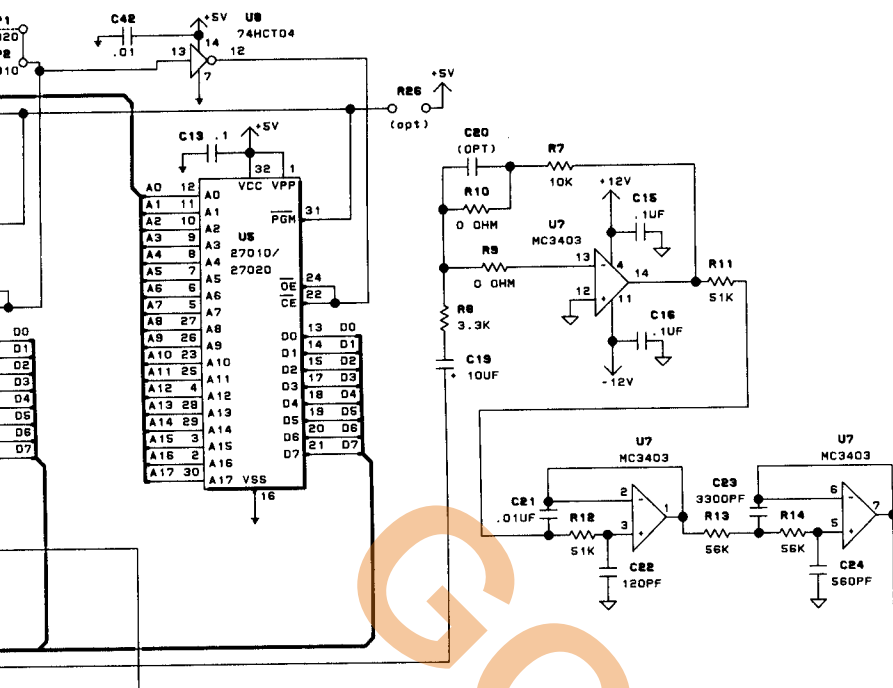
Premier Technology			
TITLE AUXILIARY POWER SUPPLY (A5) SCHEMATIC DIAGRAM			
DRAWN J.B.	APPROVED RHM	DATE 4-8-92	MA-1772

AUXILIARY POWER SUPPLY (A5) PARTS LIST

REFERENCE	DESCRIPTION	PART NUMBER
A5	AUXILIARY POWER SUPPLY	MA-1772
C1, C3, C11, C13	CAPACITOR, 4.7UF, 10%, 10V	XO-469A
C2, C10	CAPACITOR, 0.1UF, 10%, 100V	XO-784
C5, C15	CAPACITOR, 4.7UF, 10%, 10V	XO-226
C6, C16, C25	CAPACITOR, 22UF, +80%-20%, 16V	XO-293
C7, C8, C9, C17, C18, C19, C20, C21	CAPACITOR, 0.1UF, +80%-20%, 50V	XO-230
C23, C24	CAPACITOR, 10,000UF, +80%-20%, 25V	XO-830
D1-D4	DIODE, 1N5401	XO-263
R1, R13, JP1, R16, R17	RESISTOR, 0 OHM, JUMPER	XO-469
R2, R14	RESISTOR, 1 MEGOHM, 5%, 1/4W	XO-604
R3	RESISTOR, 12K OHM, 5%, 1/4W	XO-9
R4	RESISTOR, 43K OHM, 5%, 1/4W	XO-15
R5, R20	RESISTOR, 10K OHM, 5%, 1/4W	XO-18
R7	RESISTOR, 6.8K OHM, 5%, 1/4W	XO-8
R8	RESISTOR, 2.2K OHM, 5%, 1/4W	XO-27
R9, R23	RESISTOR, 22K OHM, 5%, 1/4W	XO-42
R10, R24	RESISTOR, 680 OHM, 5%, 1/4W	XO-139
R11, R25	RESISTOR, 24K OHM, 5%, 1/4W	XO-10
R12, R26	RESISTOR, 4.7 OHM, 5%, 1/4W	XO-800
R15, R18, R21	RESISTOR, 4.7K OHM, 5%, 1/4W	XO-7
U1	IC, QUAD AMP, MC3403P	XO-953
U2, U3	IC, AUDIO AMPLIFIER, TDA2040	XO-1038
VR1	REGULATOR, +12V, LM7812CT	XO-1039
VR2	REGULATOR, -12V, LM7912CT	XO-130
J3	CONNECTOR, RCA	XO-1035
P1	HEADER, 10 POSITION	XO-912
	HEAT SINK	XO-1040

VI. WIRING AND SCHEMATIC DI

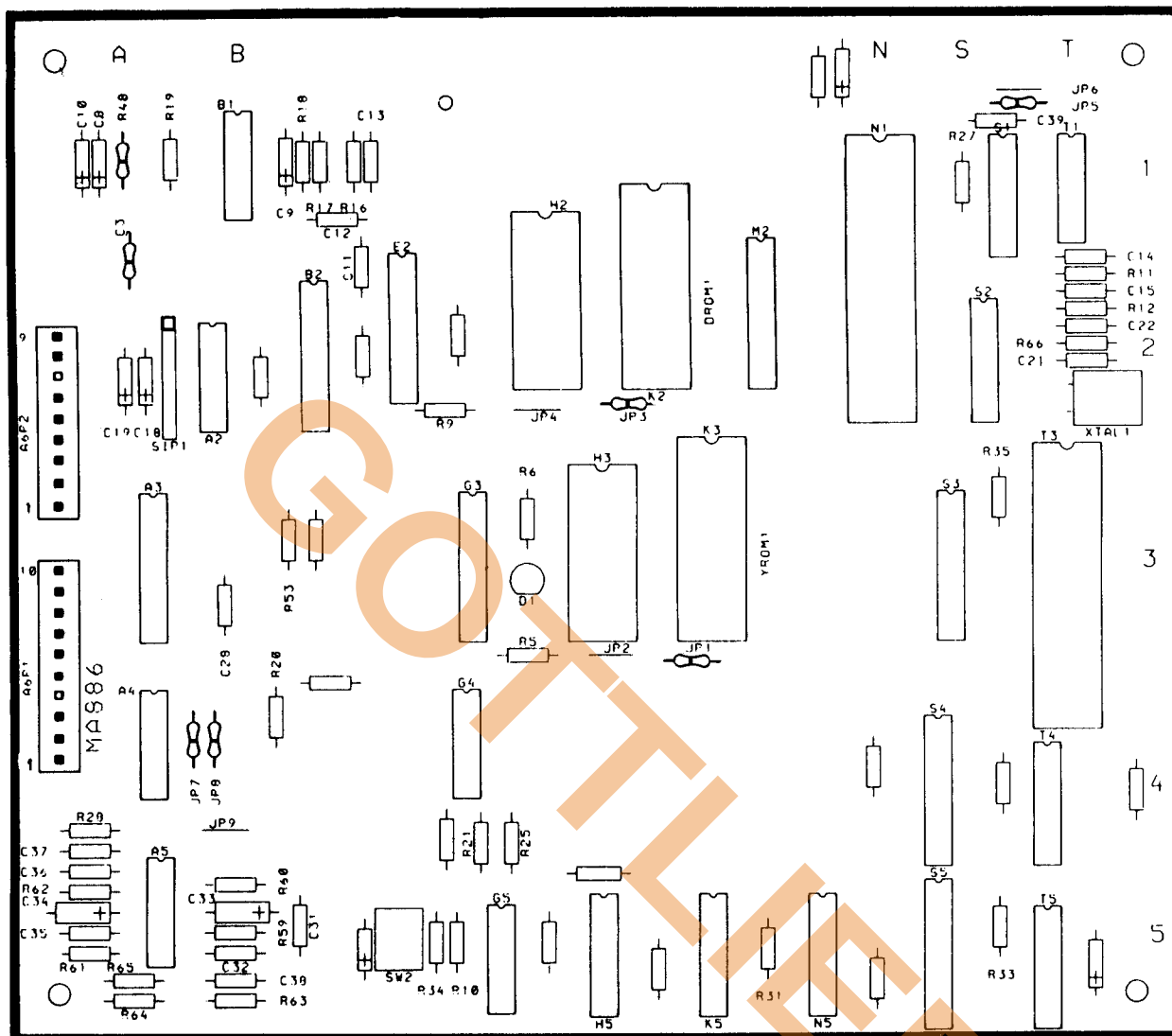




AUXILIARY SOUND BOARD (A20) PARTS LIST

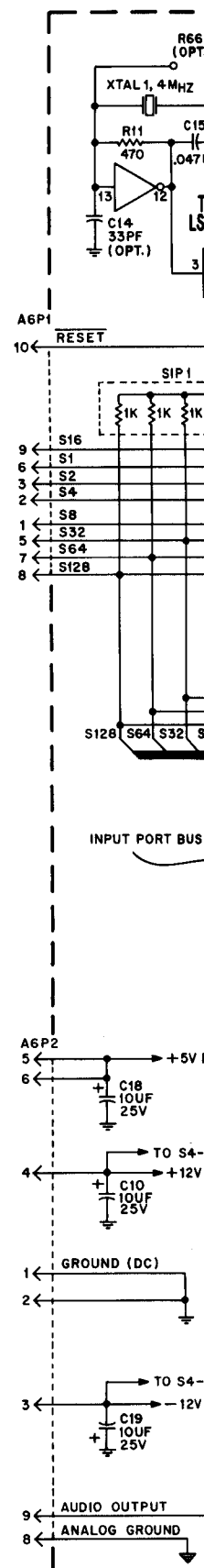
REFERENCE	DESCRIPTION	PART NUMBER
A20	AUXILIARY SOUND BOARD	MA-1770
C1, C2, C3, C19, C28, C30, C32, C33, C35, C39	CAPACITOR, 10UF, +80%-20%, 16V	XO-1030
C4-C6, C9-C13, C15, C16, C25, C26, C36	CAPACITOR, 0.1UF, +80%-20%, 50V	XO-230
C7, C8, C14, C42	CAPACITOR, .01UF, +80%-20%, 50V	XO-229
C21	CAPACITOR, .01UF, 10%, 50V	XO-696
C22	CAPACITOR, 120PF, 10%, 50V	XO-1032
C23, C29	CAPACITOR, 3300PF, 10%, 100V	XO-600
C24	CAPACITOR, 560PF, 10%, 50V	XO-681
C31, C34	CAPACITOR, 330PF, 10%, 50V	XO-1033
C17	CAPACITOR, 4.7UF, 10%, 10V	XO-226
C18	CAPACITOR, 1000PF, 10%, 100V	XO-296
C40	CAPACITOR, 47UF, 10V	XO-227
LED	DIODE, MV5752, RED	XO-270
R7, R17, R18	RESISTOR, 10K OHM, 5%, 1/4W	XO-18
R8, R20	RESISTOR, 3.3K OHM, 5%, 1/4W	XO-38
R6, R9, R10, JP1, JP4, JP5	RESISTOR, 0 OHM, JUMPER	XO-469
R11, R12	RESISTOR, 51K OHM, 5%, 1/4W	XO-44
R13, R14	RESISTOR, 56K OHM, 5%, 1/4W	XO-771
R15	RESISTOR, 330 OHM, 5%, 1/4W	XO-34
R16	RESISTOR, 6.8K OHM, 5%, 1/4W	XO-8
R19	RESISTOR, 2.7K OHM, 5%, 1/4W	XO-6
R21, R25	RESISTOR, 1K OHM, 5%, 1/4W	XO-5
R23	RESISTOR, 1MEG OHM, 5%, 1/4W	XO-604
R28	RESISTOR, 100K OHM, 5%, 1/4W	XO-45
R29	RESISTOR, 22K OHM, 5%, 1/4W	XO-42
U1	IC, MSM6295, SPEECH CHIP	*XO-1023
U2, U3	IC, 74LS374, OCTAL "D" FLIP-FLOP	XO-96
U4, U5	IC, 27C010 (SPECIFIED PER GAME)	
U6	IC, 74HCT74, "D" FLIP-FLOP	XO-889
U7, U11	IC, MC3403P, QUAD AMP	XO-953
U8	IC, 74HCT04, HEX INVERTER	XO-1026
U9	IC, YM2151, SOUND CHIP	XO-882
U10	IC, YM3014, SERIAL DAC	XO-883
U13	IC, MC3340P, VCA, AMPLIFIER	XO-1028
J4	SOCKET, 20 PIN	XO-491
J5	JACK, RCA	XO-1035
P1	HEADER, 8 POSITION	XO-911
P3	HEADER, 6 POSITION	XO-910
U4, U5	SOCKET, 32 PIN	XO-1036
U9	SOCKET, 24 PIN	XO-529
VR1	PCB ASSEMBLY, P/O *XO-1023	27922
VR2	IC, LM7809CT, REGULATOR	XO-1037
	IC, 5V REGULATOR	XO-663

SOUND BOARD (A6) COMPONENT LOCATION

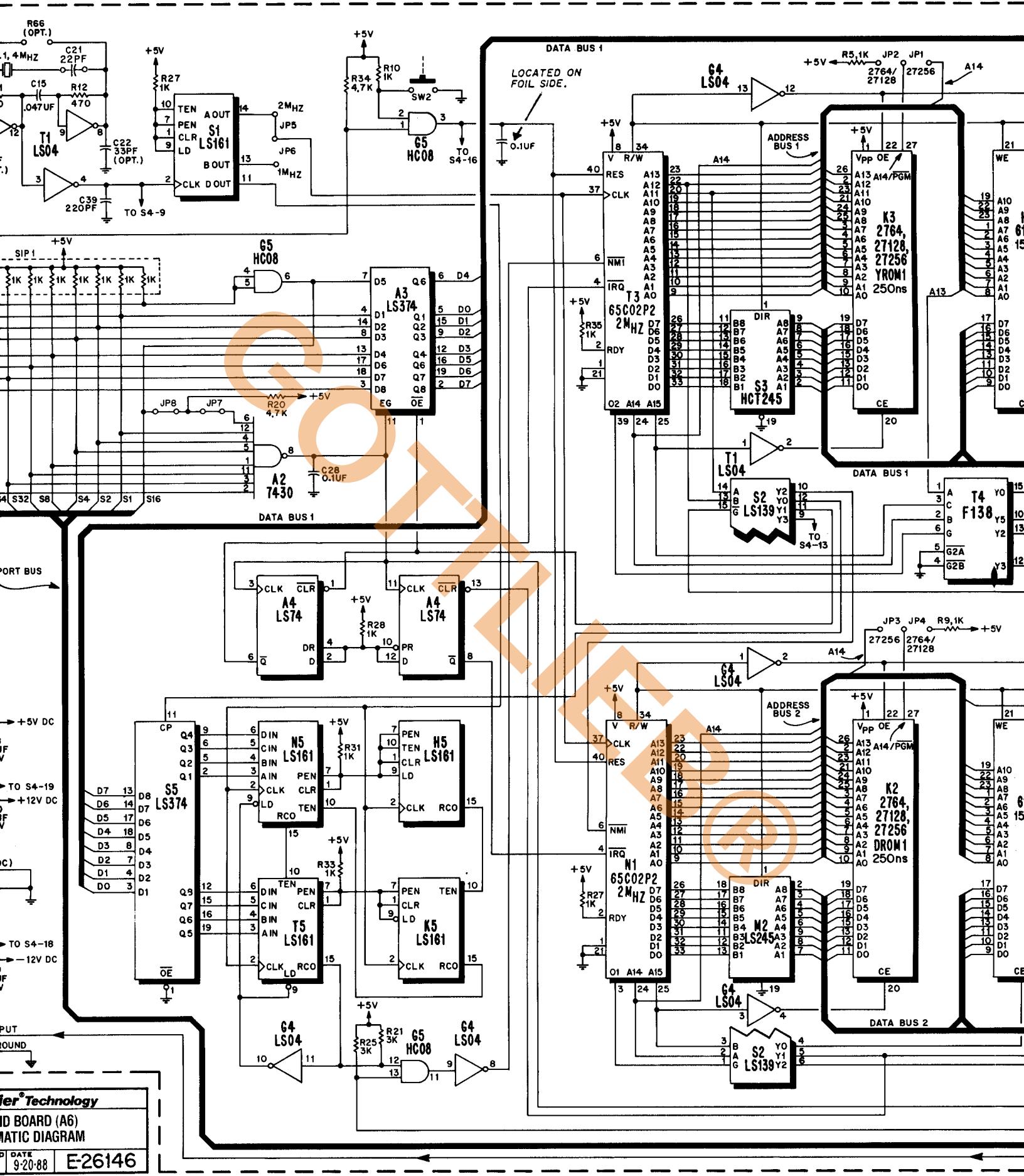


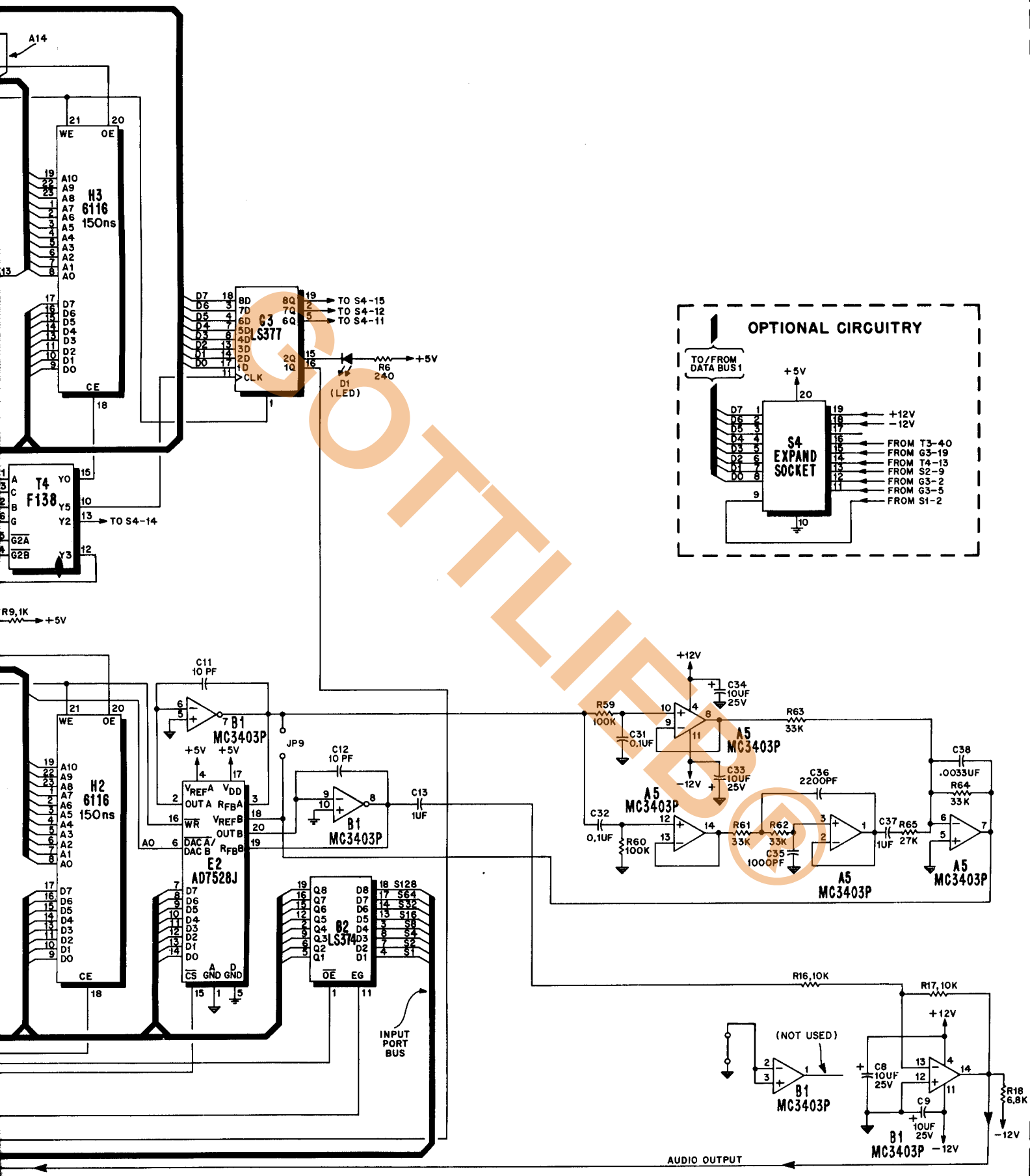
SOUND BOARD (A6) PARTS LIST

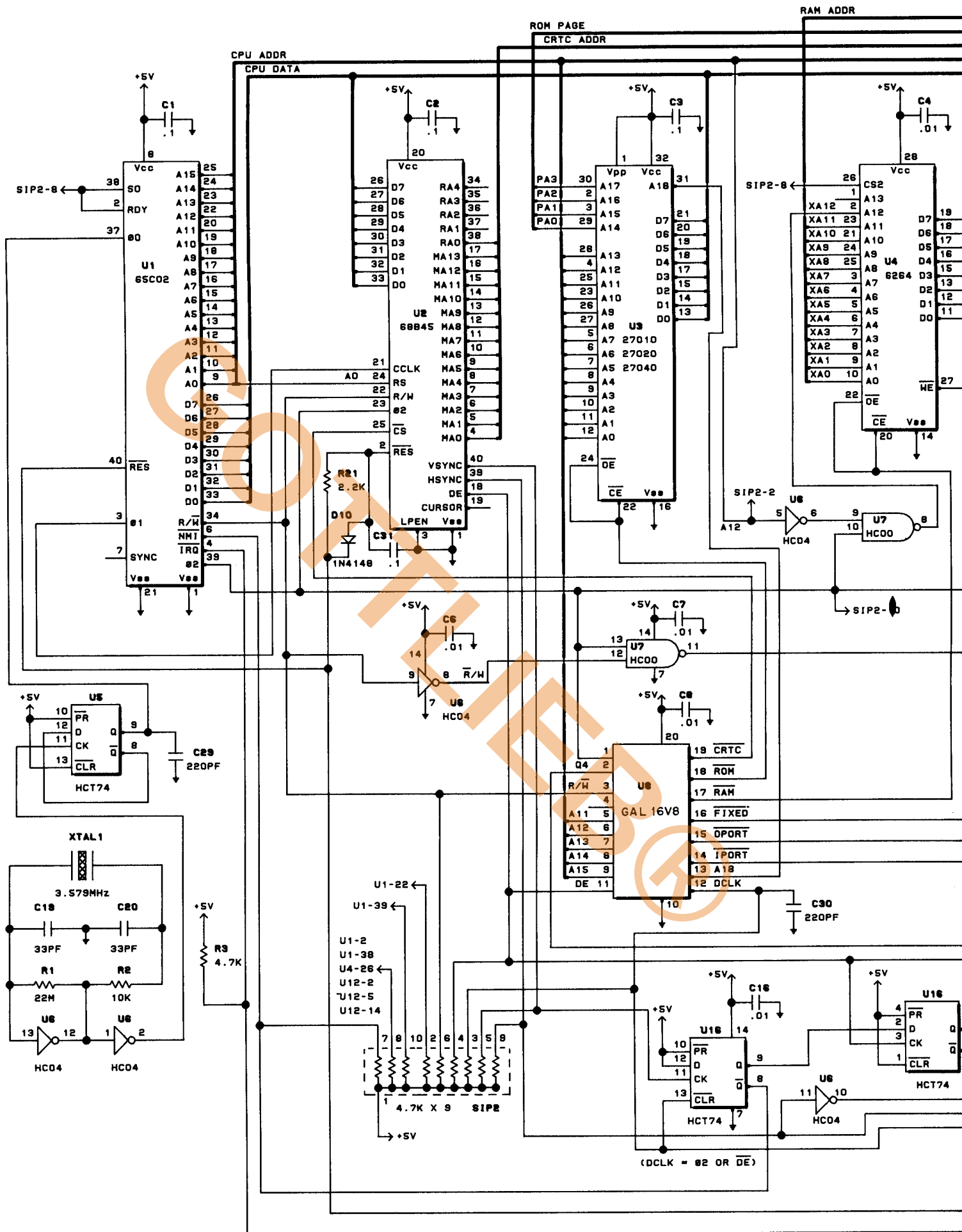
REFERENCE	DESCRIPTION	PART NUMBER	REFERENCE	DESCRIPTION	PART NUMBER
	Sound Board Assembly (1A6)	MA-1629	R20,R34	Resistor, 4.7K Ohm, 5%, 1/4W	XO-7
C13,C37	Capacitor, 1UF, 20%, 50V (Non-polar)	XO-746	R61-R64	Resistor, 33K Ohm, 5%, 1/4W	XO-43
C8,C9,C10,	Capacitor, 10UF, 20%, 25V (Tantalum)	XO-127	R59,R60	Resistor, 100K Ohm, 5%, 1/4W	XO-45
C18,C19,			R65	Resistor, 27K Ohm, 5%, 1/4W	XO-11
C33,C34			A2	IC, 7430, 8 Input NAND Gate	XO-643
AND THREE			A3,B2,S5	IC, 74LS374, Octal "D" Flip Flop	XO-96
UNMARKED			A4	IC, 74LS74, Dual "D" Flip Flop	XO-434
CAPACITORS			A5, B1	IC, MC3403P, Quad Op-Amp	XO-953
C11,C12	Capacitor, 10PF, +80%-20%, 50V	XO-635	E2	IC, AD75283, Multiplier DAC	XO-647
C14,C22	Capacitor, 33PF, 10%, 100V	XO-896	G3	IC, 74LS377, Octal "D" Flip Flop	XO-97
C15	Capacitor, .047UF, 20%, 50V	XO-638	G4,T1	IC, 74LS04, Hex Inverter	XO-418
C21	Capacitor, 22PF, 10%, 50V	XO-633	G5	IC, 74HC08, Quad 2 Input "AND" Gate	XO-872
C28 AND	Capacitor, 0.1UF, +80%-20%, 50V	XO-230	H2,H3	IC, 6116LP-15, 2K X 8 RAM	XO-928
FIFTEEN			H5,K5,N5	IC, 74LS161, Synchronous Presettable	XO-440
UNMARKED			S1,T5	Binary Counter	
CAPACITORS			K2,K3	IC, Specified Per Game	
C31,C32	Capacitor, 0.1UF, 10%, 100V	XO-784	M2	IC, 74LS245, Octal Bus Transceiver	XO-79
C35	Capacitor, 1000PF, 10%, 100V	XO-296	N1,T3	IC, 65C02P2 or 6502A, CPU	XO-893
C36	Capacitor, 2200PF, 10%, 100V	XO-289	S2	IC, 74LS139, Dual 1 of 4 Decoder	XO-419
C38	Capacitor, .0033UF, 10%, 100V	XO-600	S3	IC, 74HCT245, Octal Bus Transceiver	XO-891
C39	Capacitor, 220PF, 10%, 100V	XO-694	T4	IC, 74P138, 1 of 8 Decoder	XO-1041
D1	Diode, MV5752, (LED, Red)	XO-270	SIP 1	Resistor Pack 1K Ohm X 8	XO-493
R5,R9,R10,	Resistor, 1K Ohm, 5%, 1/4W	XO-5	SW2	Switch, Pushbutton	XO-897
R27,R28,R31,			XTAL 1	Crystal, 4 MHZ	XO-366
R33,R35			A6P1,A6P2	Connector (2)	XO-879
R6	Resistor, 240 Ohm, 5%, 1/4W	XO-173			
R11,R12	Resistor, 470 Ohm, 5%, 1/4W	XO-35		28 Pin Dip Socket (2)	XO-536
R21, R25	Resistor, 3K Ohm, 5%, 1/4W	XO-23		Jumper, Resistor, 0 OHM (7)	XO-469
R16,R17	Resistor, 10K Ohm, 5%, 1/4W	XO-18		20 Pin Dip Socket	XO-491
R18	Resistor, 6.8K Ohm, 5%, 1/4W	XO-8			



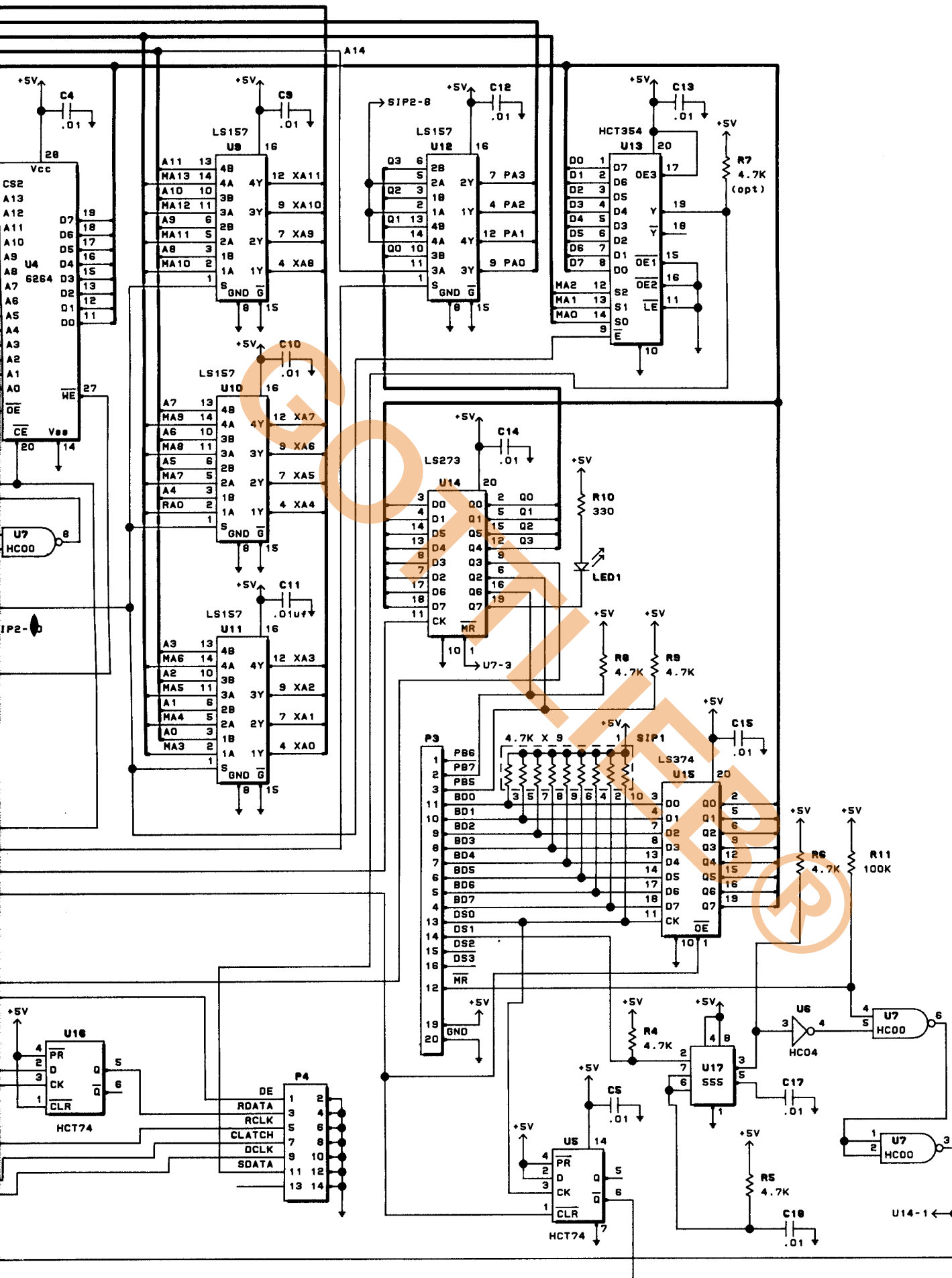
VI. WIRING AND SCHEMATIC

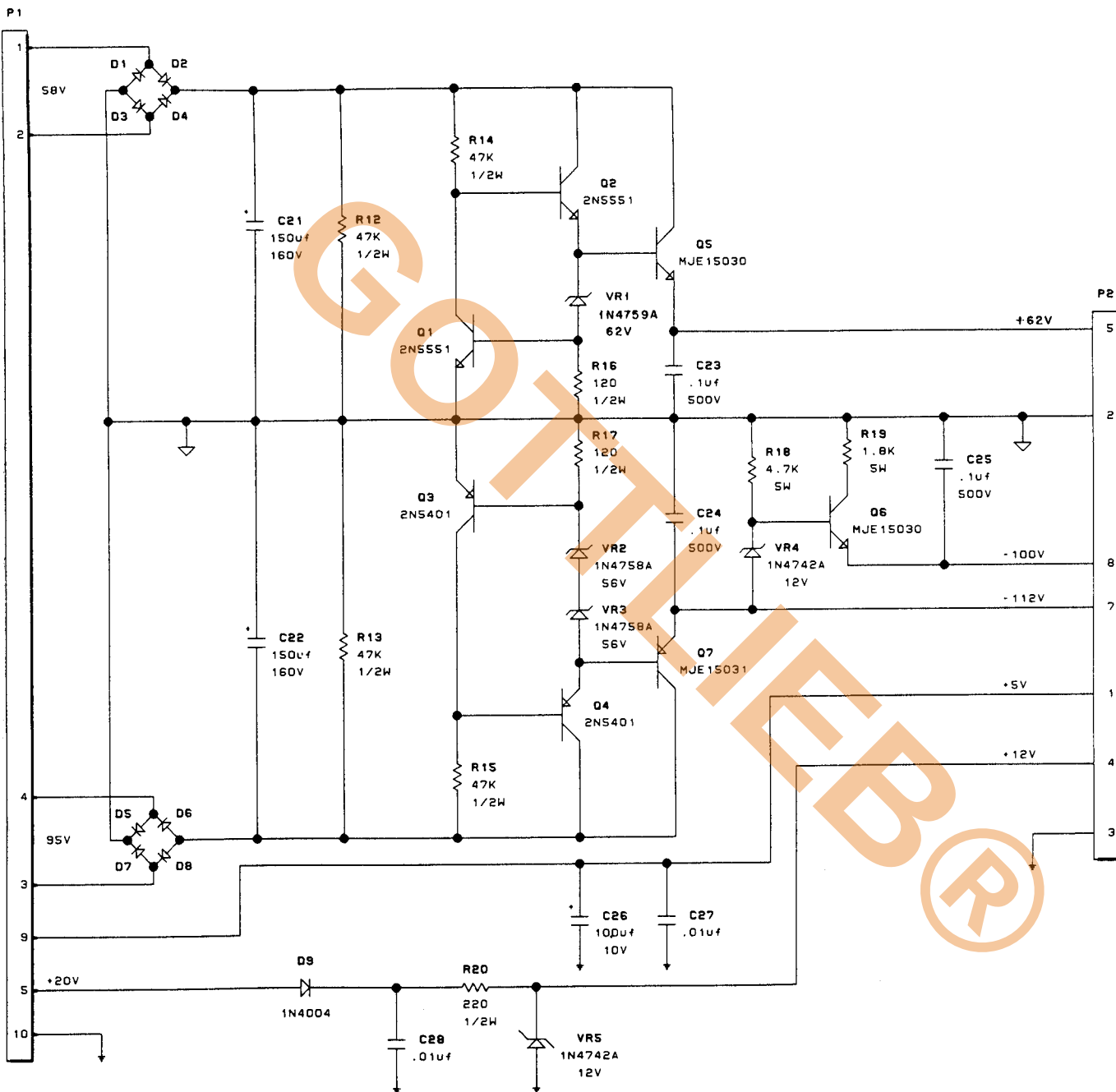






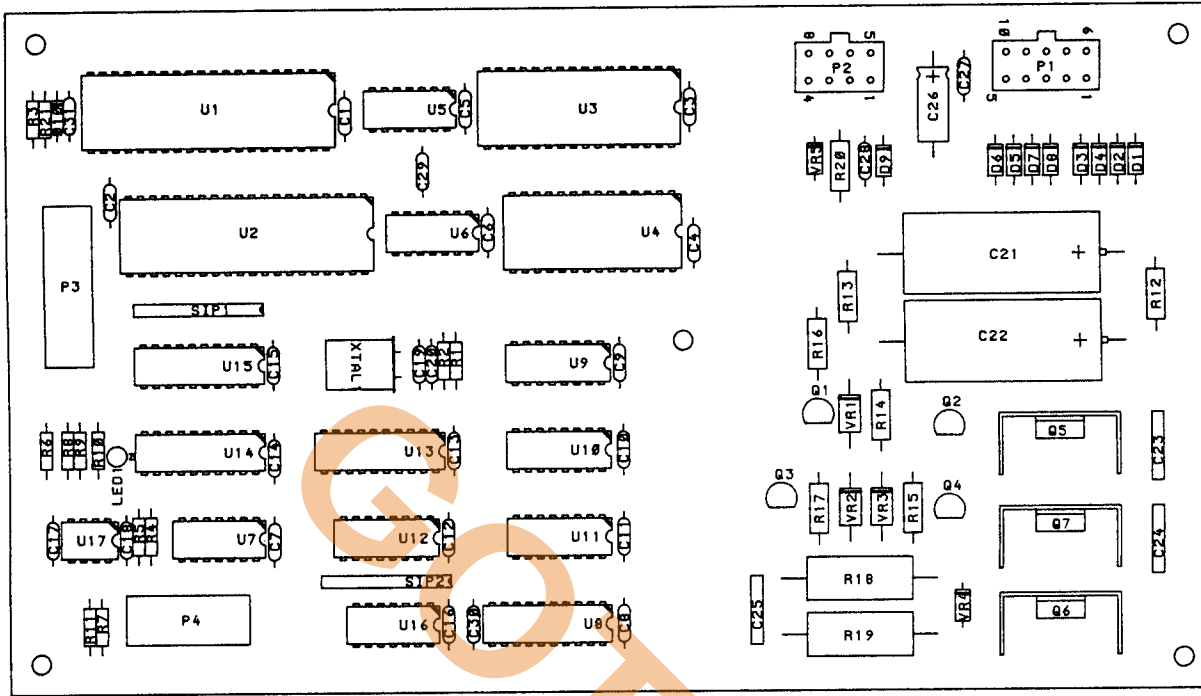
VI. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS





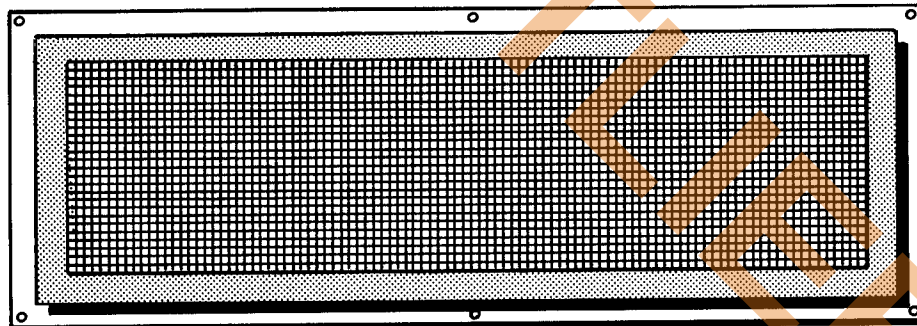
Premier Technology			
TITLE			
DISPLAY CONTROLLER (A8)			
SCHEMATIC DIAGRAM			
DRAWN	APPROVED	DATE	
C.B.	RHM	4-8-92	MA-1739

DISPLAY CONTROLLER (A8) COMPONENT LOCATION

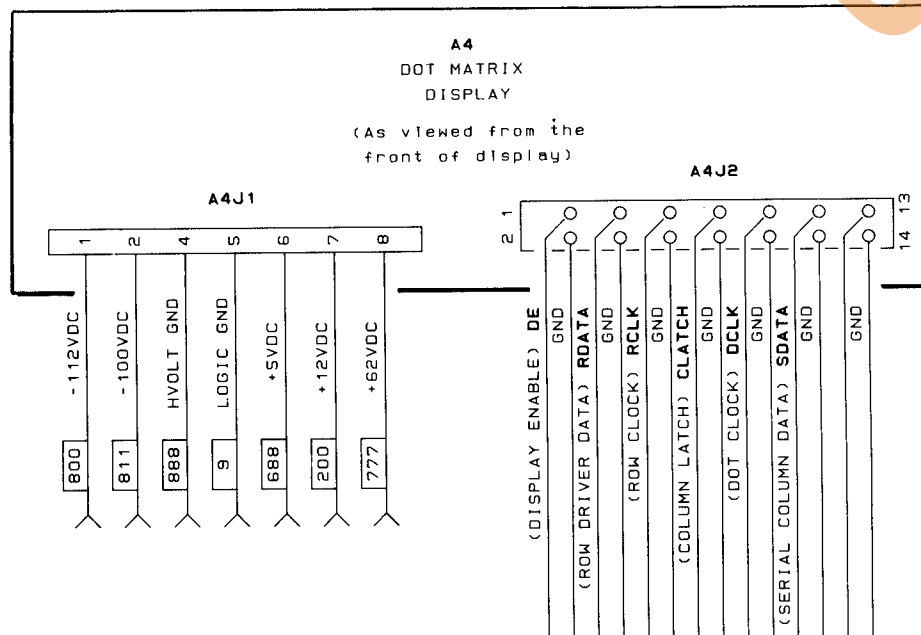


REFERENCE	DESCRIPTION
A8	DISPLAY CONTR
C1-C3	CAPACITOR, 0.0
C4-C18	CAPACITOR, .0
C27, C28	
C19, C20	CAPACITOR, 33
C21, C22	CAPACITOR, 15
C23, C25	CAPACITOR, 0.0
C26	CAPACITOR, 10
C29, C30	CAPACITOR, 22
C31	CAPACITOR, 0.0
D1-D9	DIODE, 1N4004
D10	DIODE, 1N4148
LED 1	DIODE, LED, R
Q1, Q2	TRANSISTOR, N
Q3, Q4	TRANSISTOR, P
Q5, Q6	TRANSISTOR, N
Q7	TRANSISTOR, P
R1	RESISTOR, 22
R2	RESISTOR, 10K
R3-R6,	RESISTOR, 4.7
R8, R9	
R10	RESISTOR, 33K
R11	RESISTOR, 10K
R12-R15	RESISTOR, 47K
R16-R17	RESISTOR, 12K
R18	RESISTOR, 4.7
R19	RESISTOR, 1.8
R20	RESISTOR, 22K
R21	RESISTOR, 2.2
SIP1, SIP2	RESISTOR PACK
U1	IC, 65C02P2,
U2	IC, 68B45, C
U4	IC, 6264LP, 1
U5, U16	IC, 74HCT74,
U6	IC, 74HC04,
U7	IC, 74HC00,
U8	IC, GAL16V8-2
U9-U12	IC, 74LS157,
U13	IC, 74HCT354,
U14	IC, 74LS273,
U15	IC, 74LS374,
U17	IC, NE555, T
VR1	DIODE, ZENER
VR2, VR3	DIODE, ZENER
VR4, VR5	DIODE, ZENER
XTAL1	CRYSTAL, 3.5
P1	HEADER, 10 P
P2	HEADER, 8 P
P3	HEADER, 20 P
P4	HEADER, 14 P
	HEATSINK, 60
	SOCKET, 32 P
	SOCKET, 20 P

DOT MATRIX DISPLAY (A4)



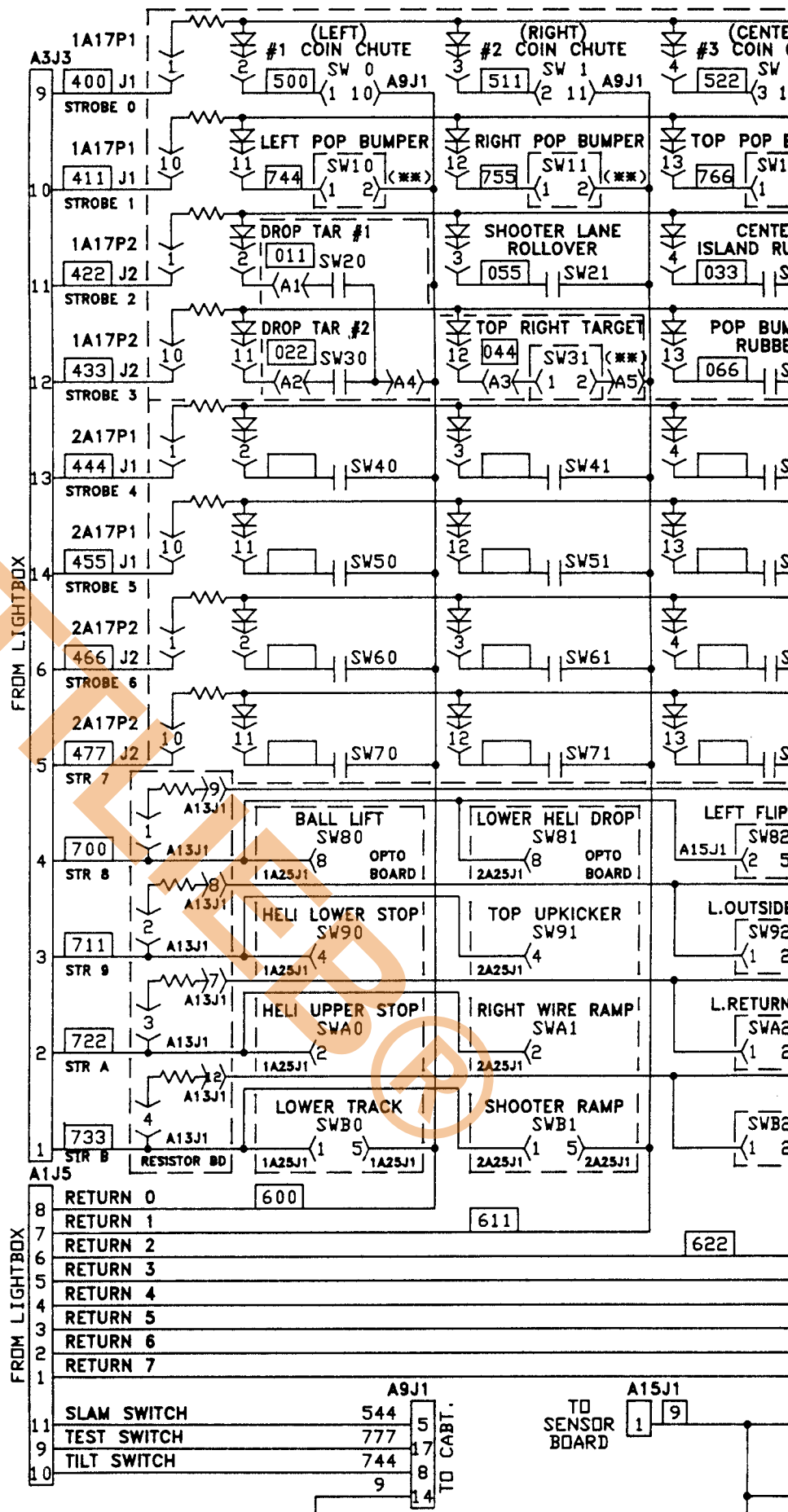
DESCRIPTION	PART NUMBER
DOT MATRIX DISPLAY	29151



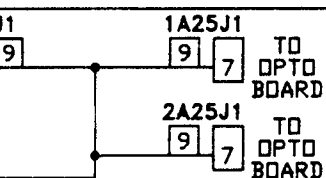
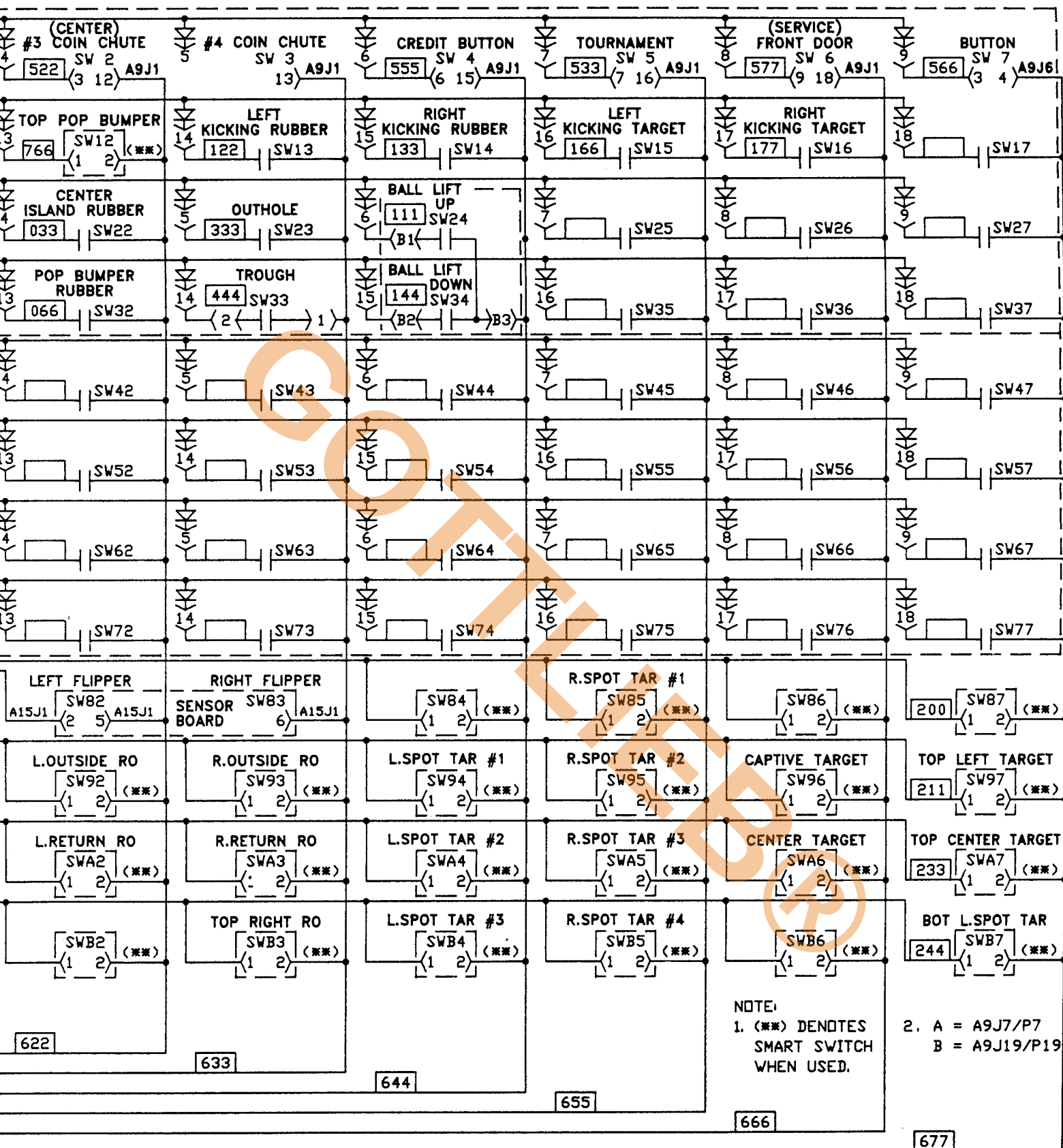
DISPLAY CONTROLLER (A8)

PARTS LIST

DESCRIPTION	PART NUMBER
DISPLAY CONTROLLER	MA-1739
RESISTOR, 0.1UF, +80%-20%	XO-230
RESISTOR, .01UF, +80%-20%	XO-229
RESISTOR, 33PF, 10%, 100V	XO-896
RESISTOR, 150UF, 160V	XO-1133
RESISTOR, 0.1UF, 500V	XO-886
RESISTOR, 100UF, 10V	XO-211
RESISTOR, 220PF, 10%, 100V	XO-694
RESISTOR, 0.1UF, 100V	XO-784
DIODE, 1N4004	XO-254
DIODE, 1N4148	XO-261
LED, RED, MV5752	XO-270
TRANSISTOR, NPN, 2N5551	XO-1141
TRANSISTOR, PNP, 2N5401	XO-1142
TRANSISTOR, NPN, MJE15030	XO-1143
TRANSISTOR, PNP, MJE15031	XO-1144
POTENTIOMETER, 22 MEGOHM, 5%, 1/4W	XO-74
POTENTIOMETER, 10K OHM, 5%, 1/4W	XO-18
POTENTIOMETER, 4.7K OHM, 5%, 1/4W	XO-7
POTENTIOMETER, 330 OHM, 5%, 1/4W	XO-34
POTENTIOMETER, 100K OHM, 5%, 1/4W	XO-45
POTENTIOMETER, 47K OHM, 5%, 1/4W	XO-1135
POTENTIOMETER, 120 OHM, 5%, 1/4W	XO-1136
POTENTIOMETER, 4.7K OHM, 5%, 5W	XO-1137
POTENTIOMETER, 1.8K OHM, 5%, 1/4W	XO-1138
POTENTIOMETER, 220 OHM, 5%, 1/4W	XO-185
POTENTIOMETER, 2.2K OHM, 5%, 1/4W	XO-27
POTENTIOMETER PACK, 4.7 OHM	XO-906
555C02P2, CPU, 2MHZ	XO-927
88B45, CONTROLLER	XO-1139
264LP, RAM STAT 8K X 8	XO-781
4HCT74, DUAL "D" FLIP-FLOP	XO-889
4HC04, INVERTER	XO-888
4HC00, QUAD "NAND" GATES	XO-782
74ALS16V8-25L	U8-G
74ALS157, QUAD 1 OF 2 MULTIPLEXER	XO-390
74HCT354, 1 OF 8 MULTIPLEXER	XO-1140
74ALS273, OCTAL DATA LATCH	XO-94
74ALS374, OCTAL "D" FLIP-FLOP	XO-96
NE555, TIMER	XO-631
DIODE, ZENER, 1N4759A, 62V, 5%	XO-267
DIODE, ZENER, 1N4758A, 56V, 5%	XO-1164
DIODE, ZENER, 1N4742A, 12V, 5%	XO-257
CAPACITOR, 3.579MHZ	XO-1166
POTENTIOMETER, 10 POSITION	XO-912
POTENTIOMETER, 8 POSITION	XO-911
POTENTIOMETER, 20 POSITION, RIBBON	XO-940
POTENTIOMETER, 14 POSITION, RIBBON	XO-1134
RELAY, 6038	XO-472
RELAY, 32 PIN	XO-1036
RELAY, 20 PIN	XO-491



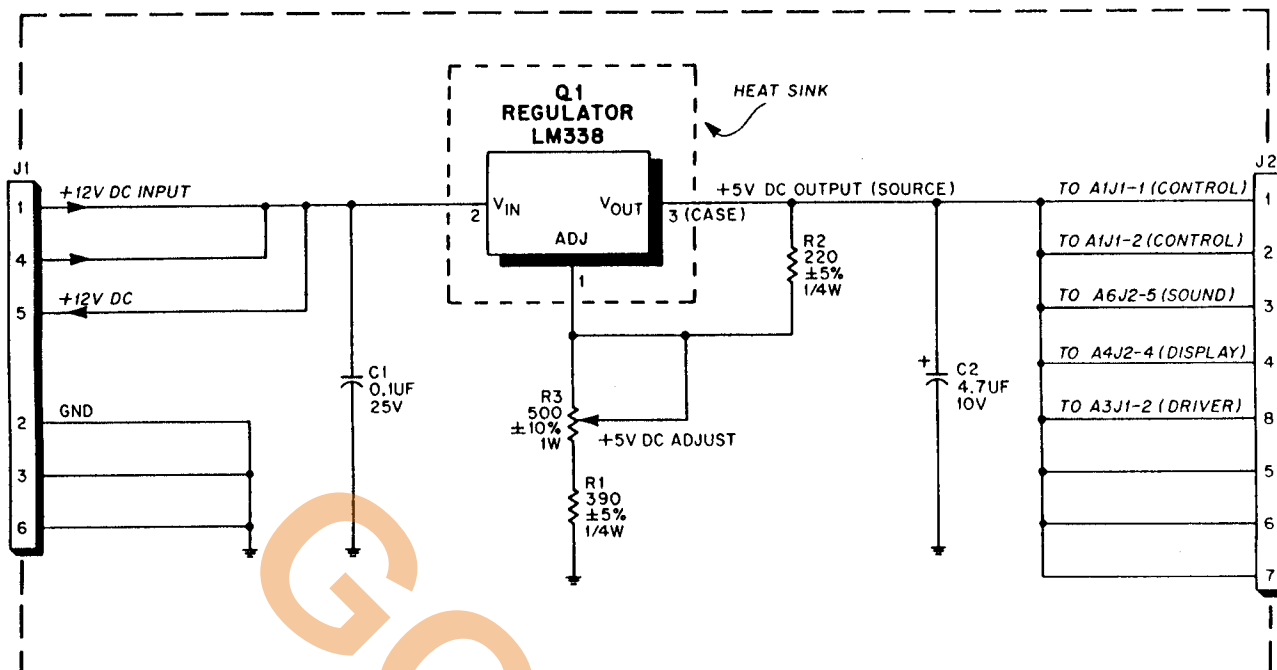
ING AND SCHEMATIC DIAGRAMS, PARTS LISTS



COLOR CODE			
0	BLACK	5	GREEN
1	BROWN	6	BLUE
2	RED	7	VIOLET
3	ORANGE	8	GRAY
4	YELLOW	9	WHITE

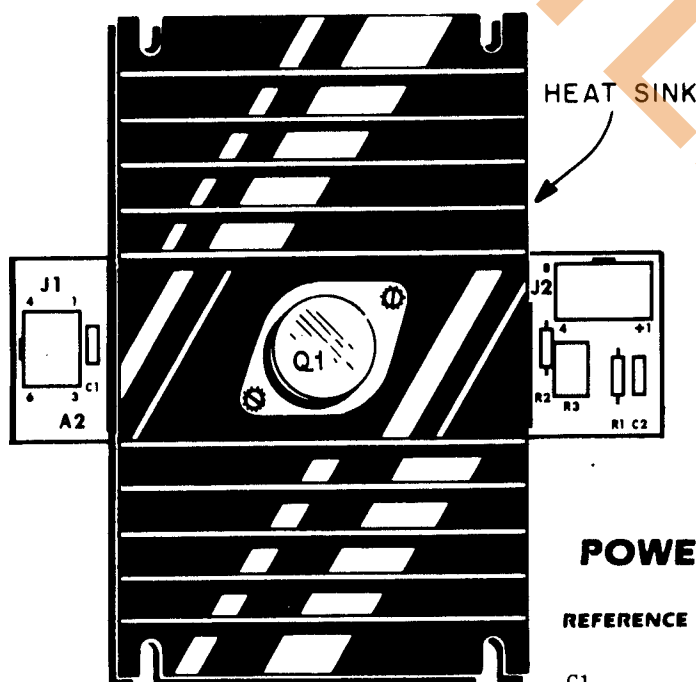
Premier Technology			
TITLE		SWITCH MATRIX	
		SCHEMATIC DIAGRAM	
USED ON	DRAWN	DATE	30568
#740	RLM	02-15-94	

VI. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS



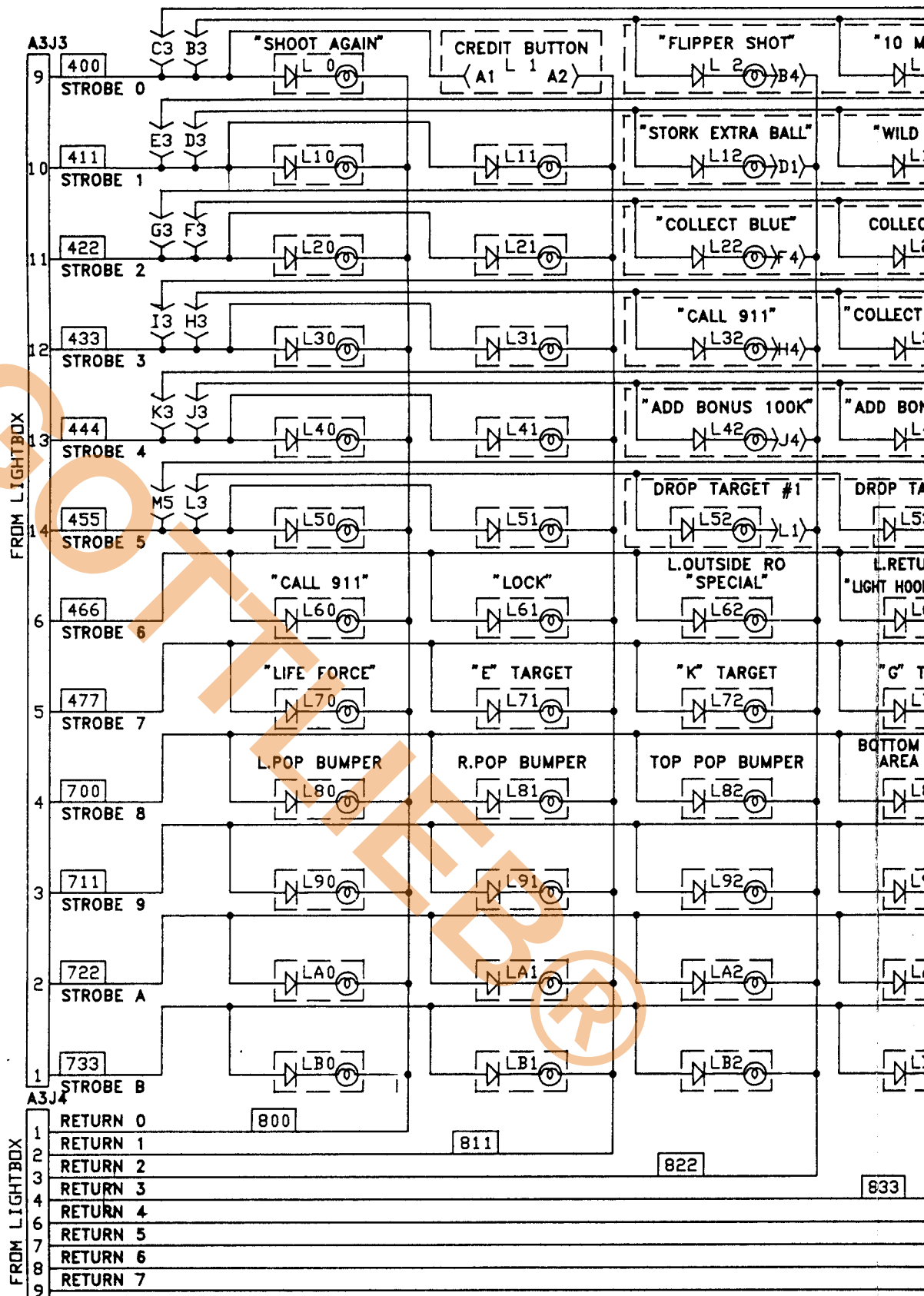
Premier Technology			
TITLE			
POWER SUPPLY (A2)			
SCHEMATIC DIAGRAM			
DRAWN	APPROVED	DATE	E-24441
PRD	RHM	12 FEB 85	

POWER SUPPLY (A2) COMPONENT LOCATION



POWER SUPPLY (A2) PARTS LIST

REFERENCE	DESCRIPTION	PART NUMBER
	Power Supply (A2)	MA-1359
C1	Capacitor, 0.1uF, +80% -20%, 50V	XO-230
C2	Capacitor, 4.7uF, 10% 10V	XO-226
J1	Header, 6 Position	XO-910
J2	Header, 8 Position	XO-911
Q1	Regulator, LM338, (5 Amp)	XO-839
R1	Resistor, 390 Ohm, 5%, 1/4W	XO-845
R2	Resistor, 220 Ohm, 5%, 1/4W	XO-21
R3	Resistor, (Pot) 500 Ohm, 10%, 1W	XO-112
	Heat Sink	XO-534
	Insulator (Regulator)	XO-522
	Insulator (Regulator)	XO-523



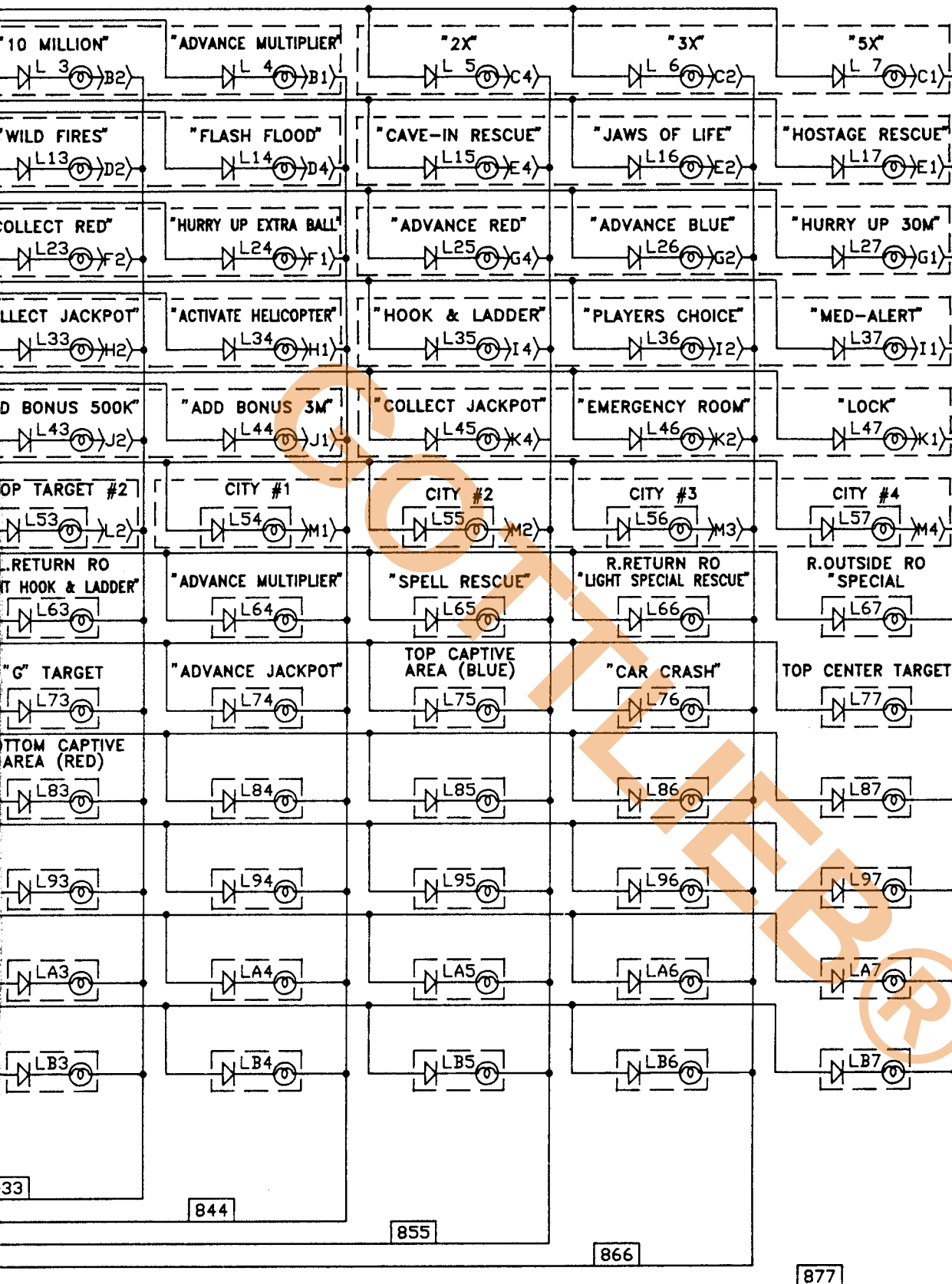
NOTE: 1. ALL LAMP
DIODES ARE
TYPE 1N4004.

2. ALL LAMPS
ARE TYPE #44.

2. A = A9J6
L = A9J9/P9
M = A9J10/P10

3. B = 1
C = 2
D = 3
E = 4
F = 5

DIAGRAMS, PARTS LISTS

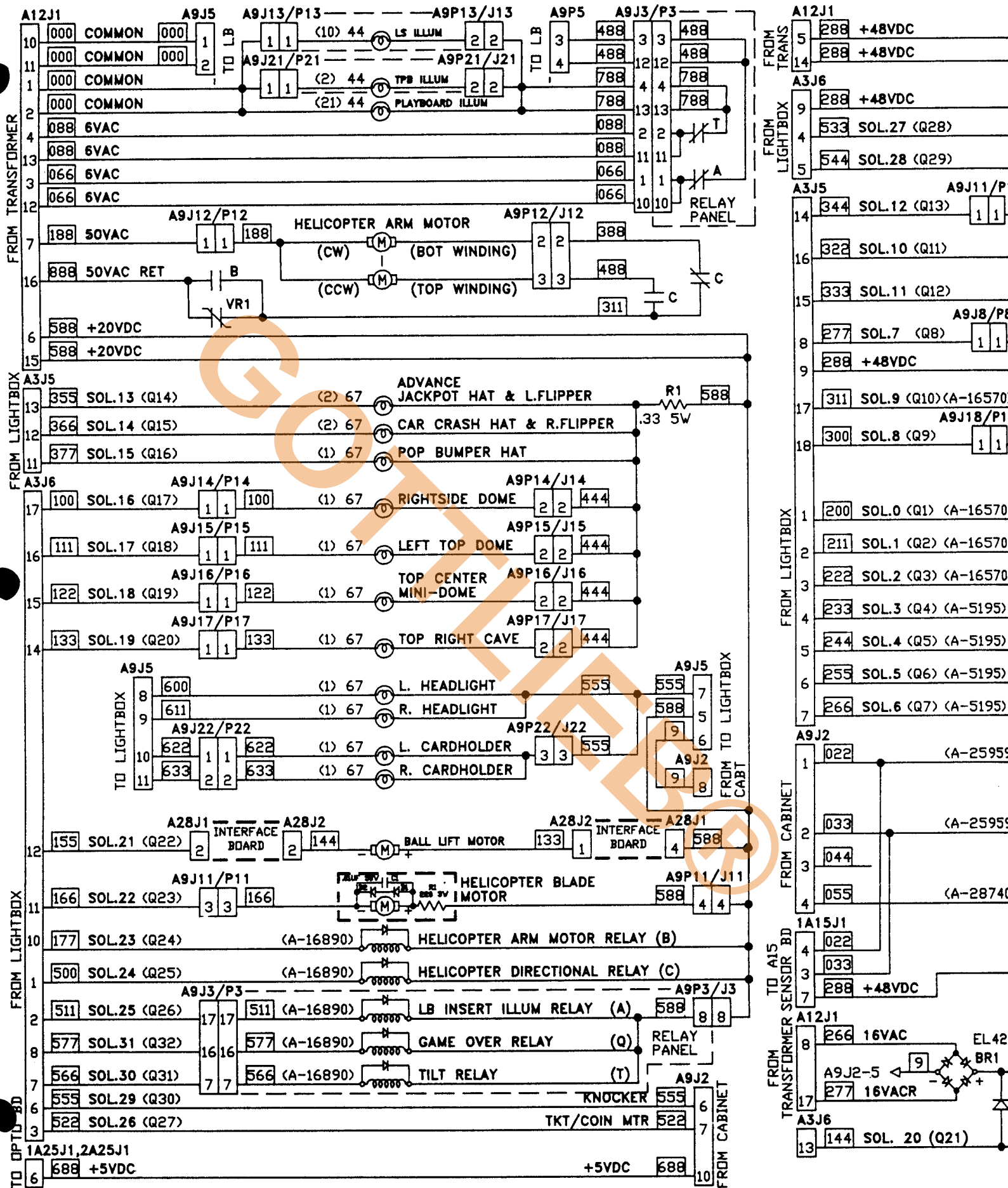


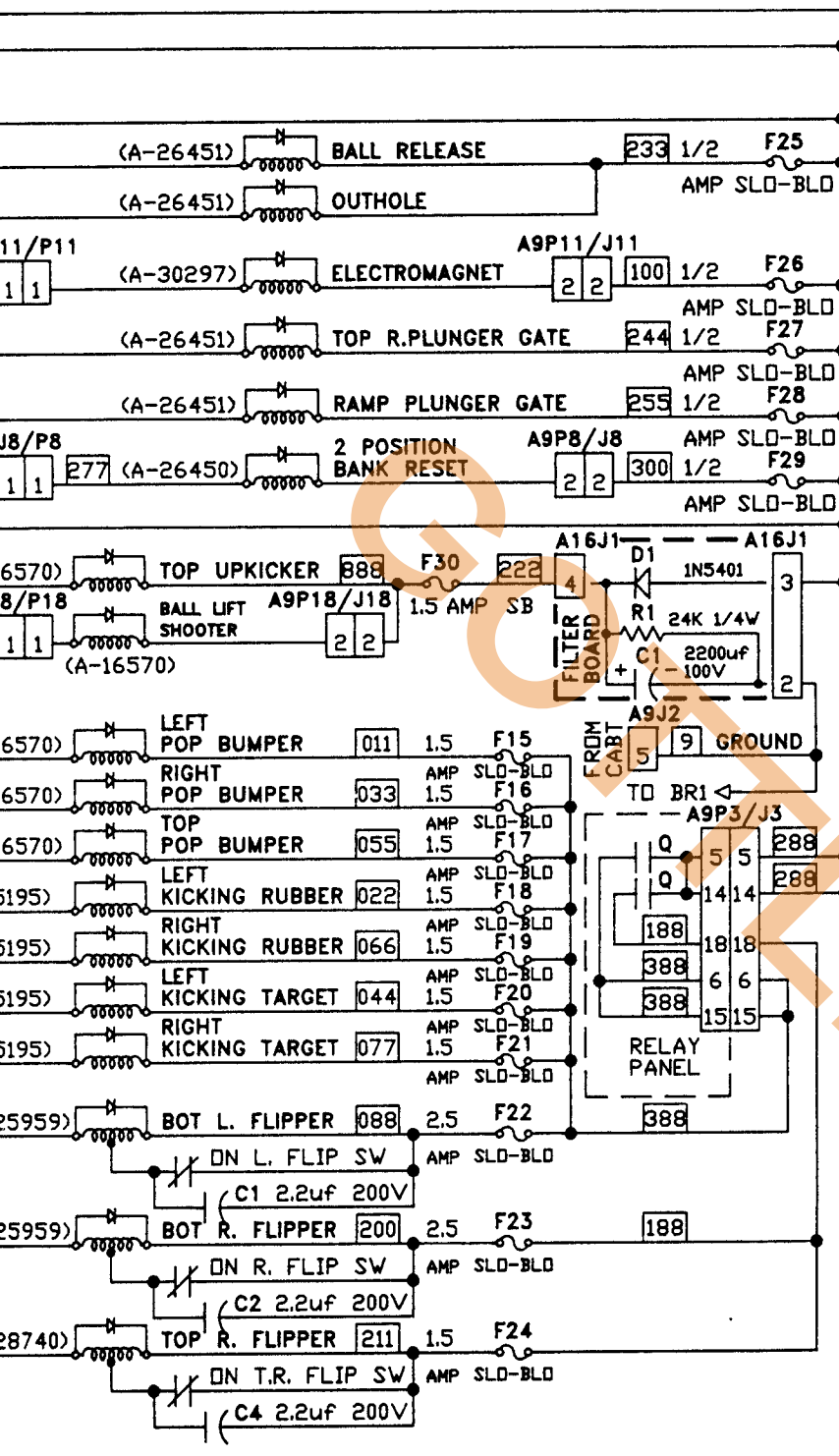
B = 1A22J1
 C = 2A22J1
 D = 3A22J1
 E = 4A22J1
 F = 5A22J1
 G = 6A22J1
 H = 7A22J1
 I = 8A22J1
 J = 9A22J1
 K = 10A22J1

COLOR CODE			
0	BLACK	5	GREEN
1	BROWN	6	BLUE
2	RED	7	VIOLET
3	ORANGE	8	GRAY
4	YELLOW	9	WHITE

Premier Technology			
TITLE LAMP MATRIX SCHEMATIC DIAGRAM			
USED ON #740	DRAWN RLM	DATE 02-15-94	30569

VI. WIRING AND SCHEMATIC





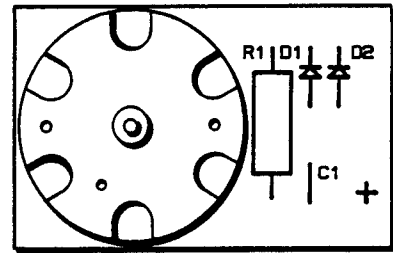
NOTE:

1. ALL DIODES ARE TYPE 1N4004

COLOR CODE			
0	BLACK	5	GREEN
1	BROWN	6	BLUE
2	RED	7	VIOLET
3	ORANGE	8	GRAY
4	YELLOW	9	WHITE

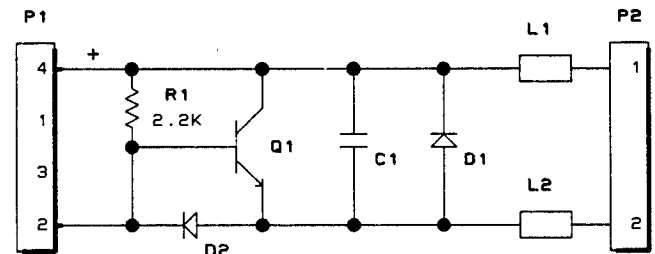
Premier Technology			
TITLE PLAYBOARD SCHEMATIC DIAGRAM			
USED ON #740	DRAWN RLM	DATE 02-15-94	30570

MOTOR BOARD, (HELICOPTER ROTOR) COMPONENT LOCATIONS



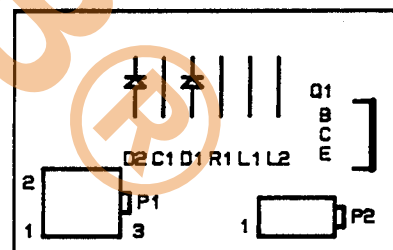
MOTOR BOARD, (HELICOPTER ROTOR) PARTS LIST

REFERENCE	DESCRIPTION	PART NUMBER
C1	MOTOR BOARD, (HELICOPTER ROTOR)	MA-2025
D1, D2	CAPACITOR, .01UF, 50V	XO-229
R1	DIODE, 1N4004	XO-254
	MOTOR, 1.5V DC, 600 RPM	30483
	RESISTOR, 220 OHM, 5%, 3W	XO-1226



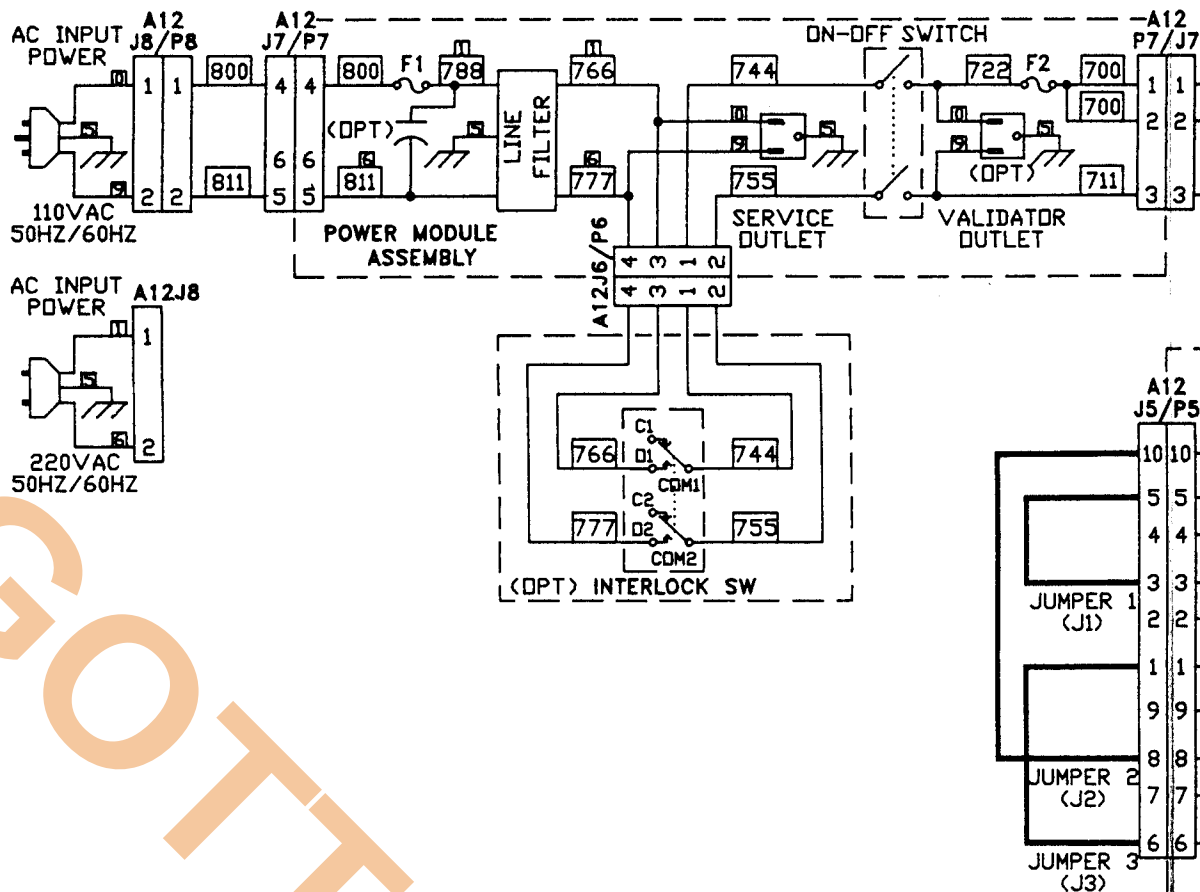
Premier Technology			
TITLE BALL LIFT, MOTOR INTERFACE BOARD (A28) SCHEMATIC DIAGRAM			
DRAWN J.B.	APPROVED J.B.	DATE JAN.9'94	MA-2026

BALL LIFT, MOTOR INTERFACE BOARD (A28) COMPONENT LOCATION



BALL LIFT, MOTOR INTERFACE BOARD (A28) PARTS LIST

REFERENCE	DESCRIPTION	PART NUMBER
C1	BALL LIFT, MOTOR INTERFACE BOARD	MA-2026
D1, D2	CAPACITOR, .01UF, 50V	XO-229
L1, L2	DIODE, 1N4004	XO-254
P1	FERRITE BEAD	XO-338
P2	HEADER, 4 POSITION	XO-909
Q1	HEADER, 2 POSITION	XO-908
R1	TRANSISTOR, NPN, TIP120	XO-1084
	RESISTOR, 2.2K OHM, 5%, 1/4W	XO-27
	SPACER, (3)	23984



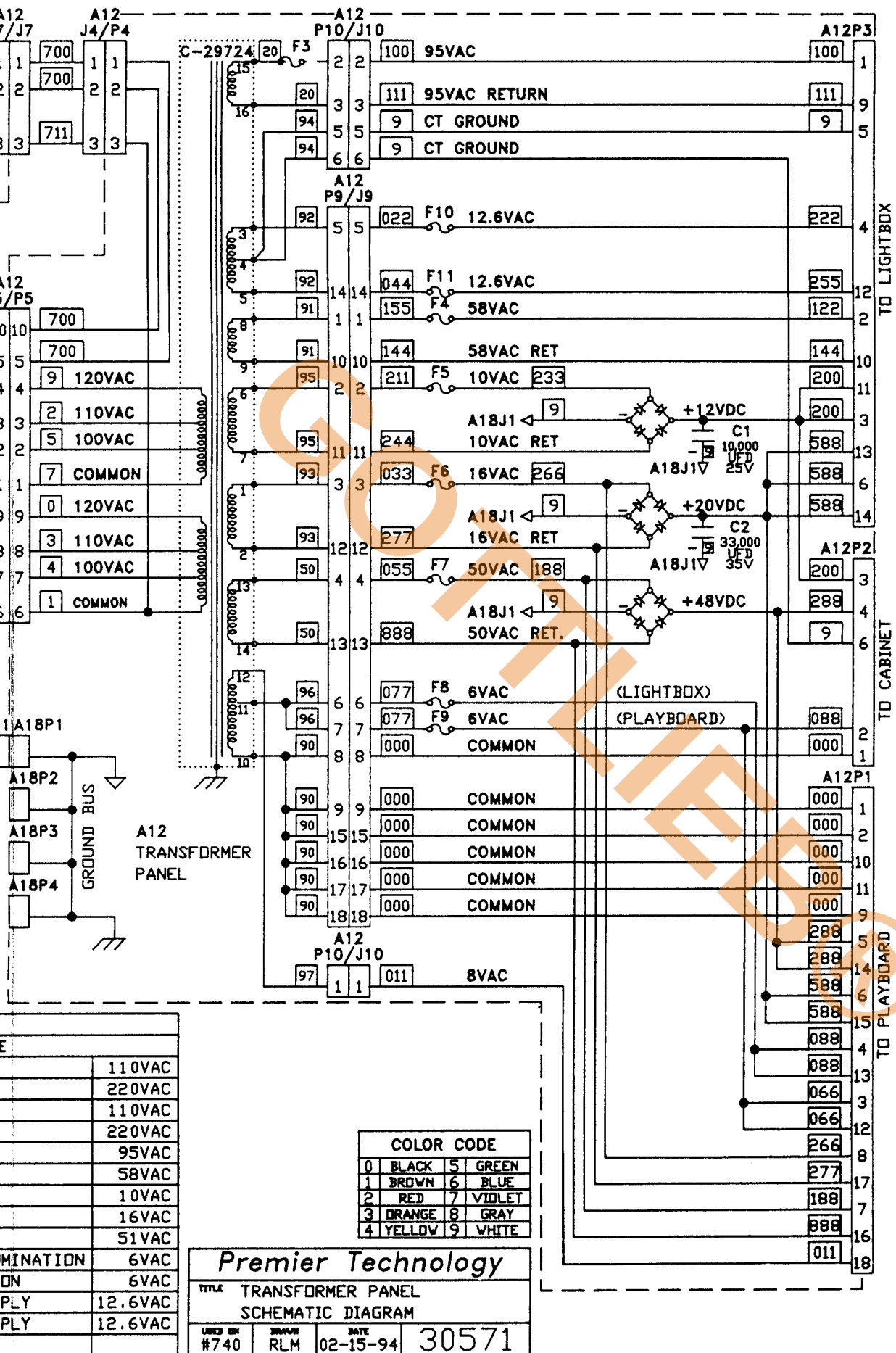
NOTES:

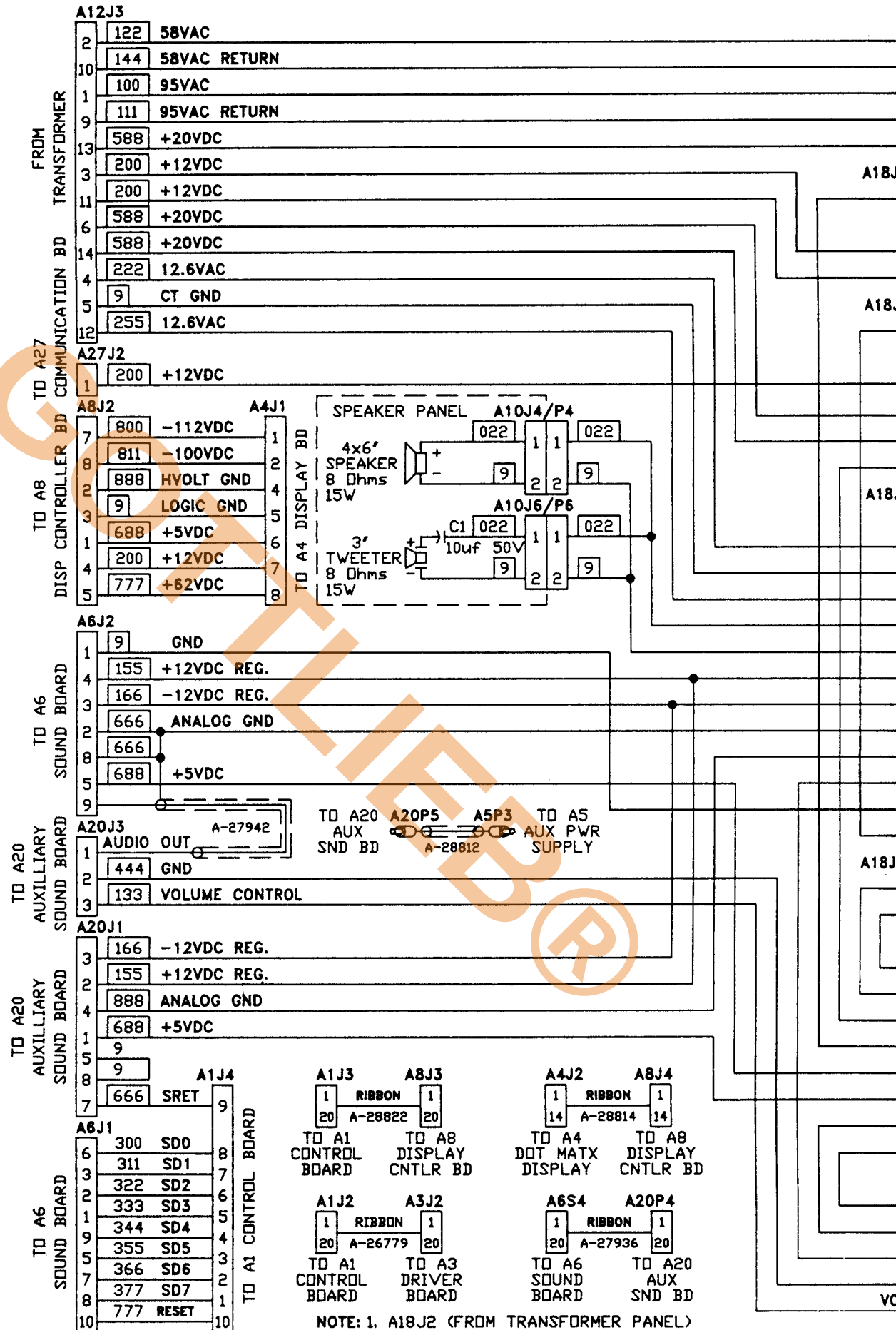
1. XXX INDICATES WIRE COLOR.
2. A12J5 SHOWN IN 110VAC OPERATION.
3. CIRCUIT GROUND EARTH GROUND

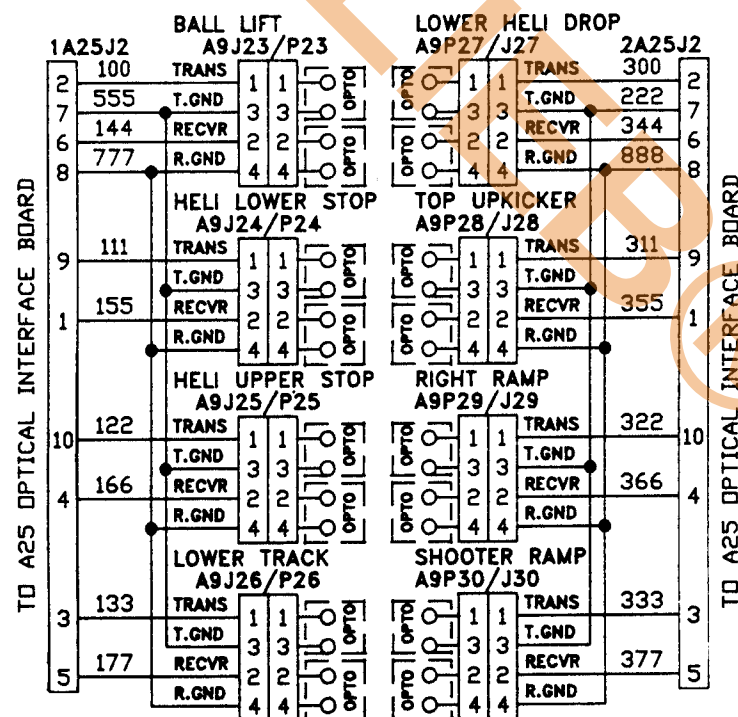
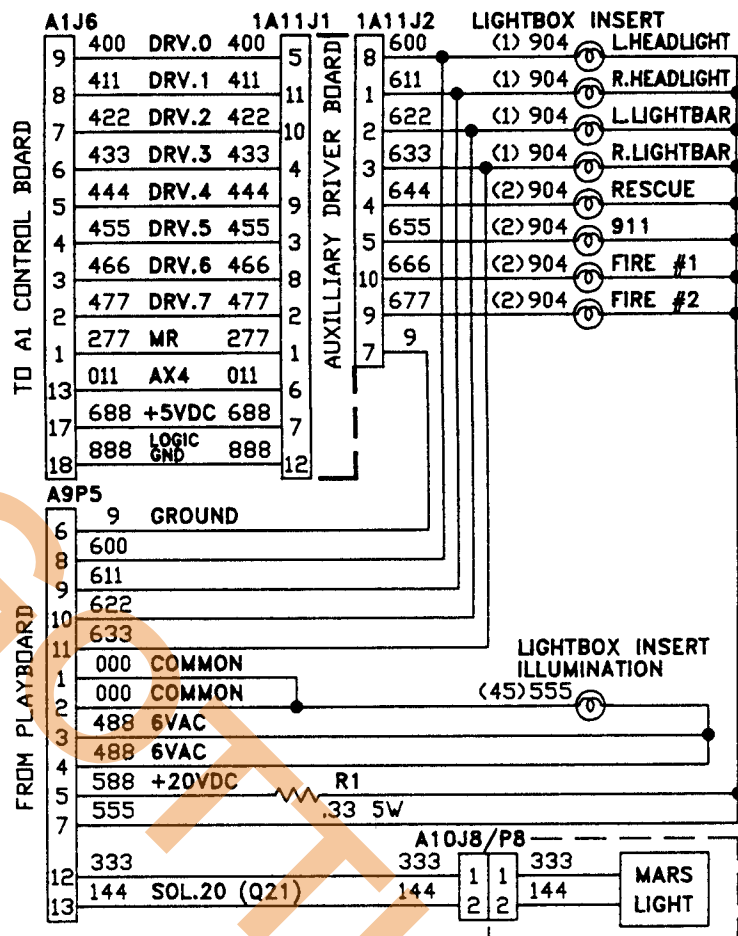
A12J5 WIRING VIEW PIN NUMBERS									
10	9	8	7	6					
5	4	3	2	1					
100VAC INPUT JUMPERS					200VAC INPUT JUMPERS				
J2	9	8	J2	J3	J2	9	8	J2	J3
J1	4	3	J1	J3	J1	4	3	J1	J3
110VAC INPUT JUMPERS					220VAC INPUT JUMPERS				
J2	9	J2	7	J3	J2	9	J2	7	J3
J1	4	J1	2	J3	J1	4	J1	2	J3
120VAC INPUT JUMPERS					240VAC INPUT JUMPERS				
J2	J2	8	7	J3	J2	J2	8	7	J3
J1	J1	3	2	J3	J1	J1	3	2	J3

FUSE DESIGNATIONS TABLE			
FUSE	RATING	PART NO.	USAGE
F1	8.0A SLD-BLD	EL26	LINE INPUT
	4.0A SLD-BLD	EL33	LINE INPUT
F2	5.0A SLD-BLD	EL 8	PRIMARY POWER
	2.5A SLD-BLD	EL21	PRIMARY POWER
F3	3/8A SLD-BLD	EL31	DISPLAY
F4	3/8A SLD-BLD	EL31	DISPLAY
F5	2.5A SLD-BLD	EL21	POWER SUPPLY
F6	10A SLD-BLD	EL36	CONTROLLED LAMPS
F7	8A SLD-BLD	EL26	SOLENOIDS
F8	15A	EL25	LIGHTBOX INSERT ILLUMIN
F9	10A	EL23	PLAYBOARD ILLUMINATION
F10	3.0A SLD-BLD	EL 9	AUXILLIARY POWER SUPPLY
F11	3.0A SLD-BLD	EL 9	AUXILLIARY POWER SUPPLY
F12			

WIRING DIAGRAMS, PARTS LISTS



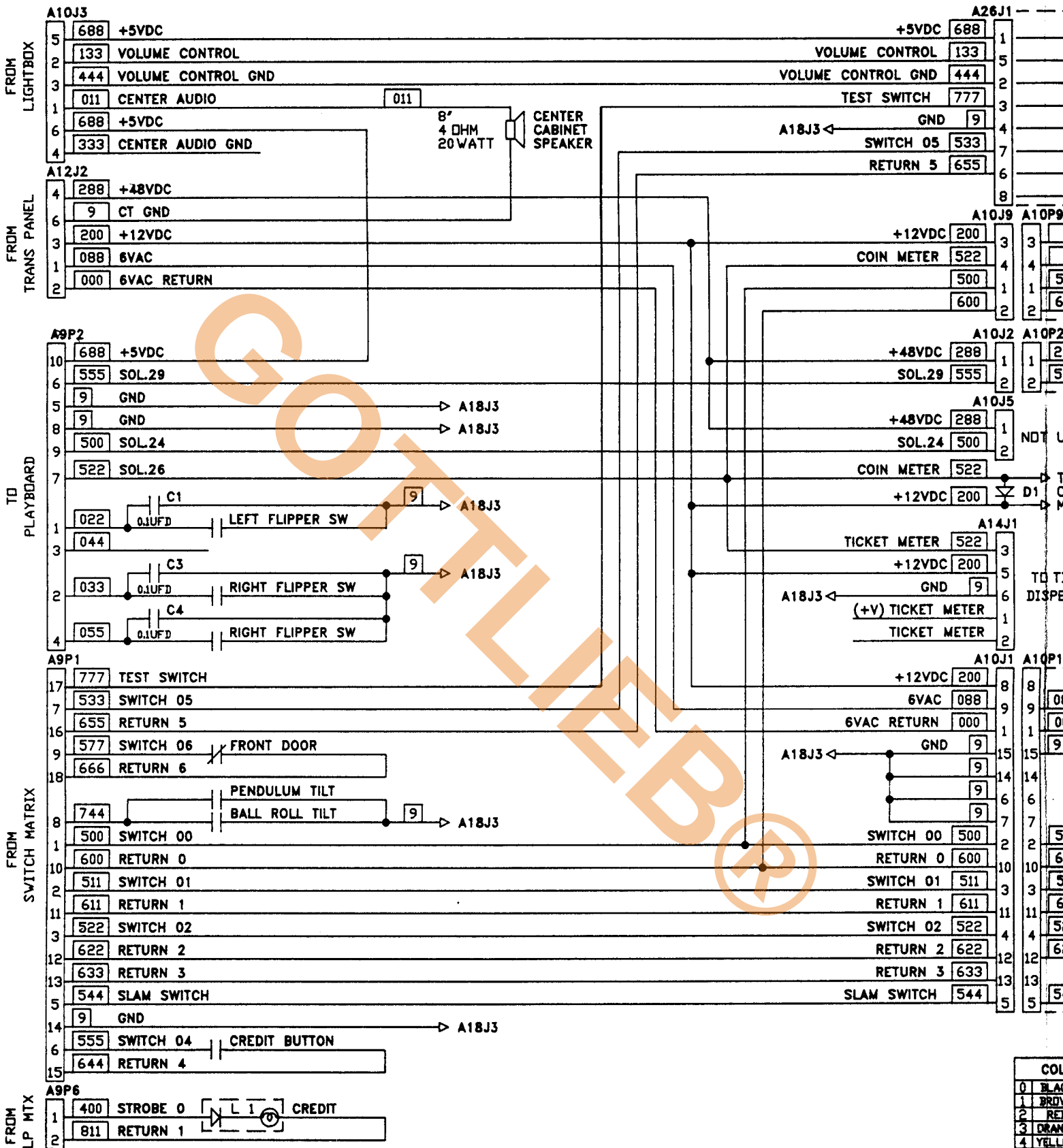




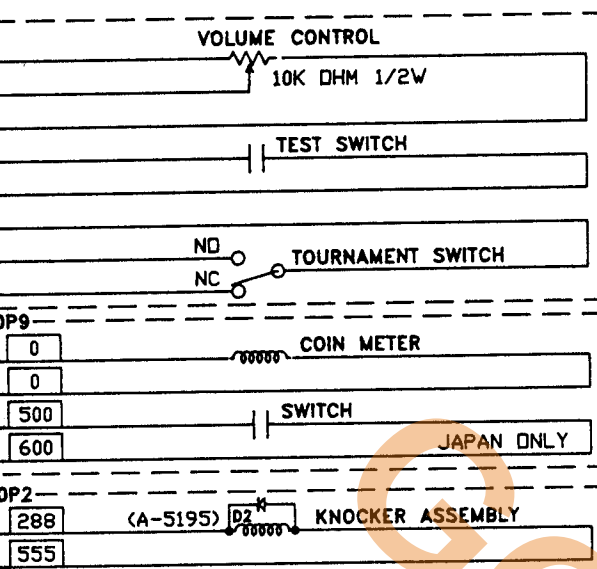
COLOR CODE			
0	BLACK	5	GREEN
1	BROWN	6	BLUE
2	RED	7	VIOLET
3	ORANGE	8	GRAY
4	YELLOW	9	WHITE

Premier Technology			
TITLE LIGHTBOX/PLAYBOARD SCHEMATIC DIAGRAM			
USED ON #740	DRAWN RLM	DATE 02-15-94	30573

VI. WIRING AND SCHEMATIC



C DIAGRAMS, PARTS LISTS



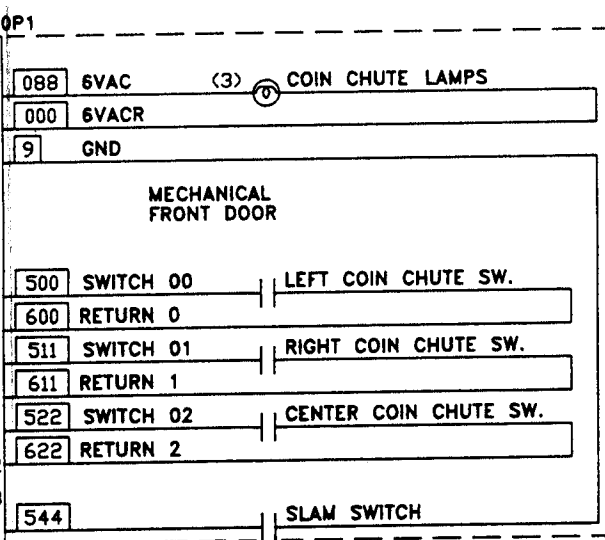
USED

TO
COIN
METER

T
OR
↓
TICKET
SPENSER

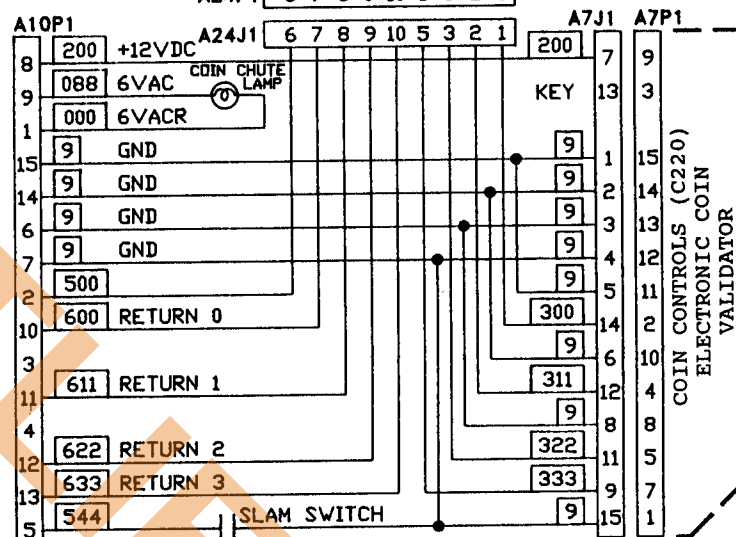
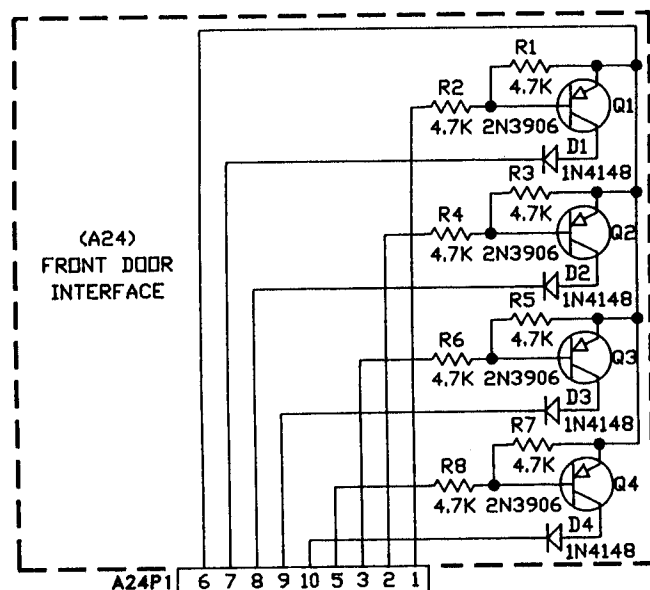
NOTE:

- NOTE:
1. AMOUNT OF PARTS VARIES PER GAME.
 2. ALL DIODES ARE TYPE IN4004.
 3. A18J3 (FROM TRANSFORMER PANEL).



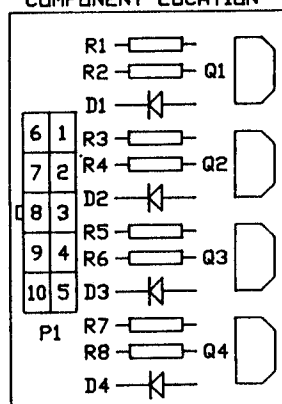
COLOR CODE		
BLACK	5	GREEN
BROWN	6	BLUE
RED	7	VIOLET
ORANGE	8	GRAY
YELLOW	9	WHITE

Premier Technology			
TITLE CABINET/FRONT DOOR SCHEMATIC DIAGRAM			
USED ON #740	DRAWN BY RLM	DATE 02-15-94	30572



TO CABINET

(A24)
DR INTERFACE
NT LOCATION



(A24)
FRONT DOOR INTERFACE
PARTS LIST

REFERENCE DESCRIPTION

REFERENCE DESIGNATOR	DESCRIPTION	QTY
	FRONT DOOR INTERFACE ASSEMBLY	MA1645
D1-D4	DIODE, 1N4148	X0-261
Q1-Q4	TRANSISTOR, PNP, 2N3906	X0-588
R1-R8	RESISTOR, 4.7K OHM, 1/4W, 5%	X0-7
A24P1	HEADER, 10 POSITION	X0-912
	SPACER (4)	23984

COLOR CODE			
0	BLACK	5	GREEN
1	BROWN	6	BLUE
2	RED	7	VIOLET
3	ORANGE	8	GRAY
4	YELLOW	9	WHITE

Premier Technology			
TITLE		SCHEMATIC DIAGRAM	
		ELECTRONIC FRONT DOOR-4 OUTPUT	
USED ON	DRAWN RLM	DATE 09-20-91	28541

VII. PARTS INFORMATION

TABLE OF CONTENTS

	PAGE
CABINET PARTS.....	64
PLAYBOARD PARTS (SWITCHES).....	65
PLAYBOARD PARTS (LAMPS).....	66
PLAYBOARD PARTS (RUBBER RINGS AND MISCELLANEOUS PARTS)....	67
FLIPPER PARTS EXPLODED VIEW.....	68
POP BUMPER PARTS EXPLODED VIEW.....	69
KICKING TARGET ASSEMBLY EXPLODED VIEW.....	70
DROP TARGET PARTS EXPLODED VIEW.....	71
BALL STOP ASSEMBLY EXPLODED VIEW.....	72
BALL STOP ASSEMBLY EXPLODED VIEW.....	73
LIGHTBOX INSERT LAMP IDENTIFICATION.....	74
LIFT AND PIVOT ARM ASSEMBLY VIEW.....	75
UNIQUE PARTS.....	76

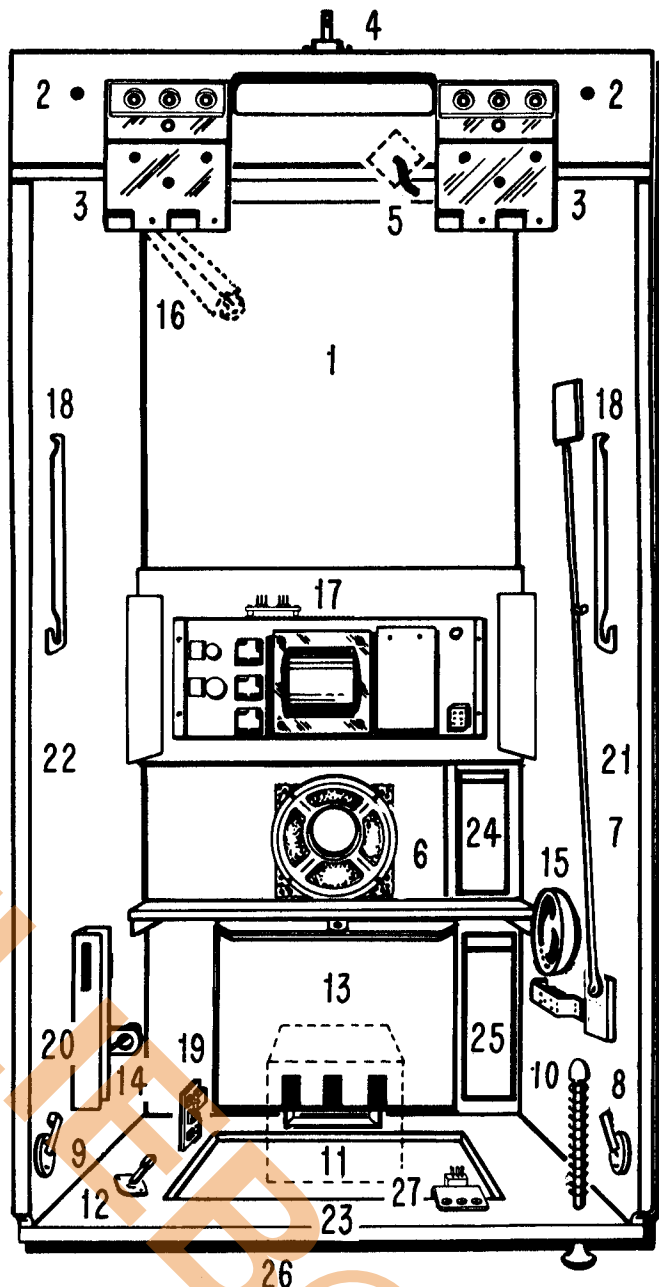
VII. PARTS INFORMATION

CABINET PARTS

ITEM DESCRIPTION

PART NO.

1	Cabinet	30520-740
2	Lightbox Mounting Thumb Screw (2) (Not Shown for Reference Only, Part of Lightbox Assembly)	FA-162
3	Butt Hinge (2) (Attached to Lightbox)	26449
4	"U" Bolt (P/O Lightbox) Latch Assembly (P/O Cabinet)	24659 21969
5	Line Cord (Domestic) Line Cord Cover Plate	23365 23364
6	Speaker, 4 Ohm, 8" Speaker Grille	28934 28935
7	Prop Stick, Playfield	23940
8	Right Flipper Switch Assembly (Switch with Bracket) (Switch Only)	28693 28668
9	Left Flipper Switch Assembly (Switch with Bracket) (Switch Only)	28691 28690
10	Ball Shooter Assembly	26314C
11	Front Door Assembly (Universal) Cable Assembly Slam Switch (N/O) 6V DC Lamp, Wedge Base Lampholder	29106 MA-1938 26130 FD-2 FD-24
12	Replay Switch Assembly	18092
13	Cashbox Cover	28032 *SEE NOTE
14	Plumb Bob Tilt Switch Assembly Strike Plate Carbon, Tilt Bob Rod, Tilt Bracket Clip	358 MH-30 357 22043 14653
15	Knocker Assembly	MA-12
5"	Bell Assembly (When Used)	27591
16	Cabinet Leg (4) Leg Bolt (8) 1-1/2" Leg Adjuster (4) 3/8"-16, Jam Nut (8)	3768 3775 30121 FA-665
17	Transformer Panel Assembly Bridge Rectifier (3) Capacitor, (10,000UF), 25V Capacitor, (33,000UF), 35V Fuse Holder and Cap Fuse Block (8 Pole) F3, 3/8 Amp, SLO-BLO F4, 3/8 Amp, SLO-BLO F5, 2.5 Amp, SLO-BLO F6, 10 Amp, SLO-BLO F7, 8 Amp, SLO-BLO F8, 15 Amp F9, 10 Amp F10, 3 Amp, SLO-BLO F11, 3 Amp, SLO-BLO Transformer	MA-2016 EL-42 XO-830 XO-957 EL-78 EL-10 EL-31 EL-31 EL-21 EL-36 EL-26 EL-25 EL-23 EL-9 EL-9 29724
18	Cabinet Pivot Bracket (Left) Cabinet Pivot Bracket (Right)	25658 25657
19	Game Controls Board (A26)	MA-1851
20	Ball Roll Tilt Housing and Switching Assembly Switch	24394 24393 28700
21	Right Moulding (Not Shown)	28701
22	Left Moulding (Not Shown)	16951
23	Front Moulding (Not Shown)	MA-1872
24	Relay Strip Assembly "Q" Relay "T" Relay "A" Relay	MA-1172 MA-25 MA-1021
25	Power Module Assembly (110V AC) Double Throw Switch Fuse Holder And Cap (2) Line Filter Power Module Assembly (FRANCE) Power Module Assembly (GERMANY) Power Module Assembly (JAPAN) Power Module Assembly (220V AC) F1, 8 Amp SLO-BLO, 110V AC 4 Amp SLO-BLO, 220V AC F2, 5 Amp SLO-BLO, 110V AC 2.5 Amp SLO-BLO, 220V AC	MA-1928 23799 EL-78 EL-50 30255A 30255B 30255C 30255D EL-26 EL-33 EL-8 EL-21



ITEM DESCRIPTION

PART NO.

26	Lock Bar (Not Shown)	29759
	Lock Bracket (Not Shown)	29760
	Lock Bar Bracket (Not Shown)	29761
27	Interlock Switch Support Bracket	29451
	Interlock Switch	29305

*NOTE:
COVER USED WITH ELECTRONIC DOOR
OR 3 CHUTE DOOR, PART NO. 28062

COVER USED WITH 2 CHUTE DOOR WITH
\$1.00 ACCEPTOR SLOT, PART NO. 30002

VII. PARTS INFORMATION

PLAYBOARD SWITCH ASSIGNMENTS

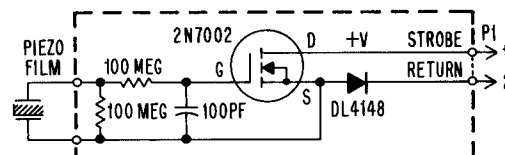
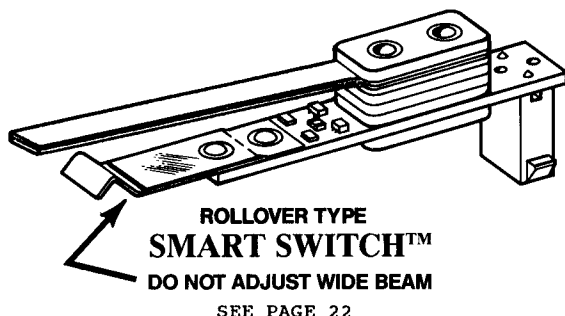
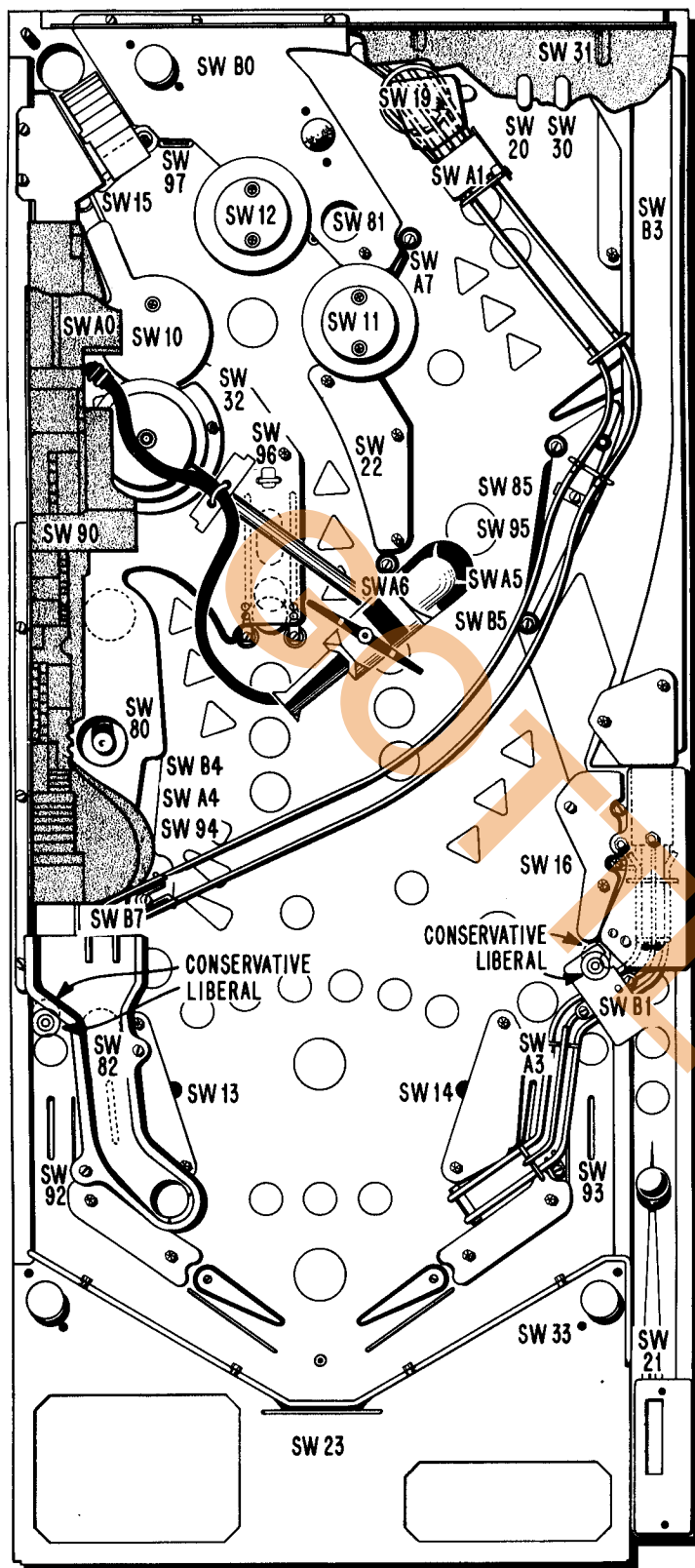
SWITCH MATRIX NUMBER

SWITCH ASSIGNMENT

PART NO.

SW 0	LEFT COIL CHUTE (#1)	P/O FRONT DOOR
SW 1	RIGHT COIL CHUTE (#2)	P/O FRONT DOOR
SW 2	CENTER COIN CHUTE (#3)	P/O FRONT DOOR
SW 3	COIL CHUTE (#4)	P/O ELECTRONIC DOOR
SW 4	START (CREDIT) BUTTON	18092
SW 5	TOURNAMENT	XO-1193
SW 6	FRONT DOOR (SERVICE)	29305
SW 7	(NOT USED)	
*SW 10	LEFT POP BUMPER	29819
*SW 11	RIGHT POP BUMPER	29819
*SW 12	TOP POP BUMPER	29818
SW 13	LEFT KICKING RUBBER (2)	27702
SW 14	RIGHT KICKING RUBBER (2)	27702
SW 15	LEFT KICKING TARGET	28511
SW 16	RIGHT KICKING TARGET	28511
SW 17	(NOT USED)	
SW 20	DROP TARGET #1	25897
SW 21	SHOOTER LANE ROLLOVER	25824
SW 22	CENTER ISLAND RUBBER	22227
SW 23	OUTHOLE	26927
SW 24	BALL LIFT (UP)	30609
SW 25	(NOT USED)	
THRU		
SW 27	(NOT USED)	
SW 30	DROP TARGET #2	25896
*SW 31	TOP RIGHT TARGET (YEL)	30273T
SW 32	POP BUMPER RUBBER	22227
SW 33	TROUGH	29346
SW 34	BALL LIFT (DOWN)	30610
SW 35	(NOT USED)	
THRU		
SW 77		
SW 80	BALL LIFT (OPTICAL INTERFACE, 1A25)	P/O MA-1925
SW 81	LOWER HELI DROP (OPTICAL INTERFACE, 2A25)	P/O MA-1925
SW 82	LEFT FLIPPER (SENSOR BOARD, A15)	P/O MA-1334
SW 83	RIGHT FLIPPER (SENSOR BOARD, A15)	P/O MA-1334
SW 84	(NOT USED)	
*SW 85	RIGHT SPOT TARGET #1 (WHT)	29099Z
SW 86	(NOT USED)	
SW 87	(NOT USED)	
SW 90	HELI LOWER STOP (OPTICAL INTERFACE, 1A25)	P/O MA-1925
SW 91	TOP UPKICKER (OPTICAL INTERFACE, 2A25)	P/O MA-1925
*SW 92	LEFT OUTSIDE ROLLOVER	28625
*SW 93	RIGHT OUTSIDE ROLLOVER	28625
*SW 94	LEFT SPOT TARGET #1 (ORN)	30635V
*SW 95	RIGHT SPOT TARGET #2 (WHT)	29099Z
*SW 96	CAPTIVE TARGET (WHT)	29430Z
*SW 97	TOP LEFT TARGET (WHT)	29099Z
SW A0	HELI UPPER STOP (OPTICAL INTERFACE, 1A25)	P/O MA-1925
SW A1	RIGHT WIRE RAMP (OPTICAL INTERFACE, 2A25)	P/O MA-1925
*SW A2	LEFT RETURN ROLLOVER	28625
*SW A3	RIGHT RETURN ROLLOVER	28625
*SW A4	LEFT SPOT TARGET #2 (ORN)	30636V
*SW A5	RIGHT SPOT TARGET #3 (WHT)	29099Z
*SW A6	CENTER TARGET (WHT)	29104Z
*SW A7	TOP CENTER TARGET (WHT)	29764Z
SW B0	LOWER TRACK (OPTICAL INTERFACE, 1A25)	P/O MA-1925
SW B1	SHOOTER RAMP (OPTICAL INTERFACE, 2A25)	P/O MA-1925
SW B2	(NOT USED)	
*SW B3	TOP RIGHT ROLLOVER	28625
*SW B4	LEFT SPOT TARGET #3 (ORN)	30635V
*SW B5	RIGHT SPOT TARGET #4 (WHT)	29099Z
SW B6	(NOT USED)	
SW B7	BOTTOM LEFT SPOT TARGET (WHT)	29099Z

* SMART SWITCH™



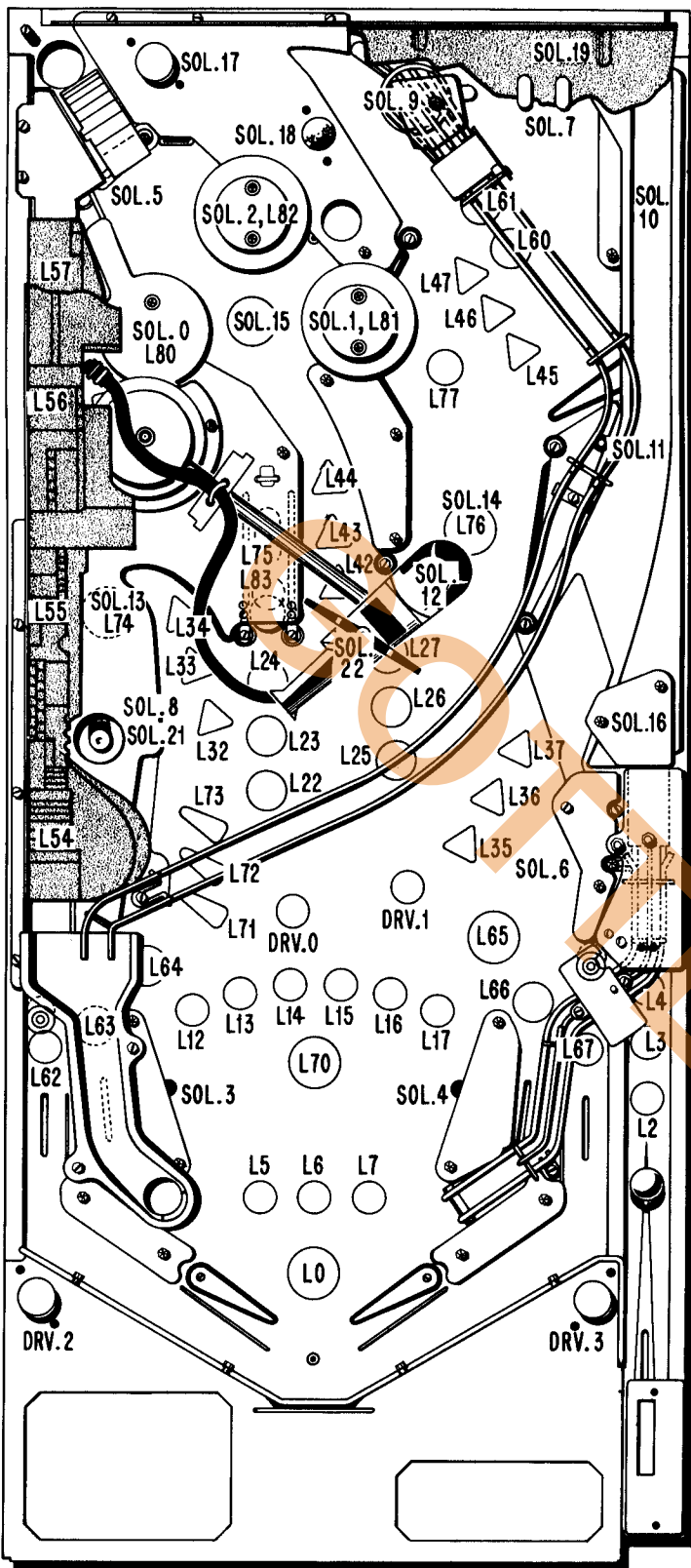
SCHEMATIC REPRESENTATION

VII. PARTS INFORMATION

PLAYBOARD LAMP ASSIGNMENTS

LAMP NUMBER LAMP ASSIGNMENT

L0	"SHOOT AGAIN"
L1	Credit Button
L2	"FLIPPER SHOT"
L3	"10 MILLION"
L4	"ADVANCE MULTIPLIER"
L5	"2X"
L6	"3X"
L7	"5X"
L10	(Not Used)
L11	(Not Used)
L12	"STORK EXTRA BALL"
L13	"WILD FIRES"
L14	"FLASH FLOOD"
L15	"CAVE-IN RESCUE"
L16	"JAWS OF LIFE"
L17	"HOSTAGE RESCUE"
L20	(Not Used)
L21	(Not Used)
L22	"COLLECT BLUE"
L23	"COLLECT RED"
L24	"HURRY UP EXTRA BALL"
L25	"ADVANCE RED"
L26	"ADVANCE BLUE"
L27	"HURRY UP 30M"
L30	(Not Used)
L31	(Not Used)
L32	"CALL 911"
L33	"COLLECT JACKPOT"
L34	"ACTIVATE HELICOPTER"
L35	"HOOK & LADDER"
L36	"PLAYERS CHOICE"
L37	"MED-ALERT"
L40	(Not Used)
L41	(Not Used)
L42	"ADD BONUS 100K"
L43	"ADD BONUS 500K"
L44	"ADD BONUS 3M"
L45	"COLLECT JACKPOT"
L46	"EMERGENCY ROOM"
L47	"LOCK"
L50	(Not Used)
L51	(Not Used)
L52	Drop Target #1
L53	Drop Target #2
L54	City #1
L55	City #2
L56	City #3
L57	City #4
L60	"CALL 911"
L61	"LOCK"
L62	Left Outside Rollover, "SPECIAL"
L63	Left Return Rollover, "LIGHT HOOK & LADDER"
L64	"ADVANCE MULTIPLIER"
L65	"SPELL RESCUE"
L66	Right Return Rollover, "LIGHT SPELL RESCUE"
L67	Right Outside Rollover, "SPECIAL"
L70	"LIFE FORCE"
L71	"E" Target
L72	"K" Target
L73	"G" Target
L74	"ADVANCE JACKPOT"
L75	Top Captive Area (Blue)
L76	"CAR CRASH"
L77	Top Center Target
L80	Left Pop Bumper
L81	Right Pop Bumper
L82	Top Pop Bumper
L83	Bottom Captive Area (Red)
L84	
Thru	(Not Used)
LB7	



SOLENOID, DRIVER FUNCTIONS/LOCATIONS

SOL. 0	LEFT POP BUMPER	SOL. 20	MARS LIGHT
SOL. 1	RIGHT POP BUMPER	SOL. 21	BALL LIFT MOTOR
SOL. 2	TOP POP BUMPER	SOL. 22	HELICOPTER BLADE MOTOR
SOL. 3	LEFT KICKING RUBBER	SOL. 23	HELICOPTER ARM MOTOR RELAY (A)
SOL. 4	RIGHT KICKING RUBBER	SOL. 24	HELICOPTER DIRECTIONAL RELAY (C)
SOL. 5	LEFT KICKING TARGET	SOL. 25	LIGHTBOX ILLUM. RELAY (A)
SOL. 6	RIGHT KICKING TARGET	SOL. 26	TICKET/COIN METER ENABLE
SOL. 7	2 POSITION BANK RESET	SOL. 27	BALL RELEASE
SOL. 8	BALL LIFT SHOOTER	SOL. 28	OUTHOLE
SOL. 9	TOP UPKICKER	SOL. 29	KNOCKER
SOL. 10	TOP RIGHT PLUNGER GATE	SOL. 30	TILT RELAY (T)
SOL. 11	RAMP PLUNGER GATE	SOL. 31	GAME OVER RELAY (Q)
SOL. 12	ELECTROMAGNET	*DRV. 0	LEFT HEADLIGHT, #904; #67
SOL. 13	ADVANCE JACKPOT HAT AND L.FLIPPER	*DRV. 1	RIGHT HEADLIGHT, #904; #67
SOL. 14	CAR CRASH HAT AND R.FLIPPER	*DRV. 2	LEFT LIGHTBAR, #904; #67
SOL. 15	POP BUMPER HAT	*DRV. 3	RIGHT LIGHTBAR, #904; #67
SOL. 16	RIGHT SIDE DOME	*DRV. 4	RESCUE, #904 (2)
SOL. 17	LEFT TOP DOME	*DRV. 5	911, #904 (2)
SOL. 18	TOP CENTER MINI-DOME	*DRV. 6	FIRE #1, #904 (2)
SOL. 19	TOP RIGHT CAVE	*DRV. 7	FIRE #2, #904 (2)

LAMP SOCKETS WITH DIODE BOARD

TYPE	PART NO.
1-1/8" BRACKET	26621
1/2" BRACKET	26622
LAYDOWN	26623

NOTE:
*LAMPS MOUNTED ON LIGHTBOX INSERT,
SEE PAGE 74 FOR LOCATION.

VII. PARTS INFORMATION

PLAYBOARD PARTS INFORMATION

PARTS LIST

ITEM	DESCRIPTION	PART NO.
1	PLASTIC DOME, 1-1/4" DIAM. RED, (2)	25147U
2	PLASTIC SHIELD SET	30596
3	PLASTIC DOME, 1" DIAM. RED	26293U
4	VACUUM FORM CAVE	30490
5	BULB SHIELD, YELLOW (2)	24875T
6	TARGET BANK ASSEMBLY, 2 POSITION (SEE EXPLODED VIEW ILLUSTRATION)	MA-2029
6A	DROP TARGET DECAL (2)	30618
7	DROP TARGET ARM, NYLON, WHITE (2)	11905Z
8	BALL SNUBBER	30629
9	UPKICKER AND OPTO ASSEMBLY	30465
10	WIREFORM RAMP	30459
11	BALL DEFLECTOR	30562
12	BALL SNUBBER (2)	29763
13	OPTO SWITCH COVER	30588
14	OPTO SWITCH AND BRACKET ASSEMBLY	30590
15	VACUUM FORM RAMP ASSEMBLY	30493
16	RAMP FLAP	30474
17	BALL DEFLECTOR	30492
18	DECAL	30619
19	FLIPPER ASSEMBLY (SEE EXPLODED VIEW ILLUSTRATION)	MA-1791C
	FLIPPER COIL	28740
	FLIPPER SWITCH	26438
20	OPTO SWITCH ASSEMBLY	30479
21	TROUGH AND LAMPS ASSEMBLY	30593
22	BALL DROP PLATE	30606
23	KICKING TARGET ASSEMBLY (2) (SEE EXPLODED VIEW ILLUSTRATION)	MA-1485
24	KICKING TARGET DECAL (2)	30617
25	MOLDED CITYSCAPE	30480
26	POP BUMPER BRACKET AND COIL ASSEMBLY (3) (SEE EXPLODED VIEW ILLUSTRATION)	MA-1375
27	POP BUMPER COIL AND DIODE (3)	16570
28	POP BUMPER BODY, WHITE (3)	26860Z
29	OPTO SWITCH AND BRACKET (2)	30487
*30	HELICOPTER ROTOR	30632
*31	HELICOPTER VACUUM FORM	30595
*32	TURNTABLE AND MOTOR ASSEMBLY	30631
*33	PIVOT ARM ASSEMBLY	30638
*34	MOTOR MOUNTING BRACKET	30317
*35	MOTOR, 50V AC (BI-DIRECTIONAL)	30484
*36	LIFT MECHANISM ASSEMBLY	30633
*37	BALL LIFT SHAFT AND CUP ASSEMBLY	30611
*38	GUIDE BRACKET	30556
*39	OPTO SWITCH ASSEMBLY	30551
*40	BALL KICKER ASSEMBLY (SEE PICTORIAL ILLUSTRATION)	30627
41	ACRYLIC BALL, 1" DIAMETER	30482
42	BALL SCOOP ASSEMBLY	30231
43	OPTO SWITCH ASSEMBLY	30346
44	WIREFORM RAMP	30458
45	BALL STOP ASSEMBLY (SEE EXPLODED VIEW ILLUSTRATION)	30201
46	BALL STOP ASSEMBLY (SEE EXPLODED VIEW ILLUSTRATION)	30477
47	VACUUM FORM RAMP ASSEMBLY	30592
48	URETHANE BUMPER	29974
49	BALL SNUBBER (2)	13798
50	STEEL BALL, 1-1/16" DIAMETER	21864
51	PLASTIC DOME, 1-1/4" DIAM., BLUE	25147W
52	PLASTIC DOME, 1-1/4" DIAM., AMBER	25147N
53	BULB SHIELD, RED (2)	24875U
54	BULB SHIELD, BLUE	24875W
55	KICKER ASSEMBLY	MA-1373
56	FLIPPER ASSEMBLY (SEE EXPLODED VIEW ILLUSTRATION)	MA-1790
	FLIPPER COIL	25959
	FLIPPER SWITCH	26439
58	FLIPPER ASSEMBLY (SEE EXPLODED VIEW ILLUSTRATION)	MA-1791
	FLIPPER COIL	25959
	FLIPPER SWITCH	26438
59	MYLAR OVERLAY	30591
60	CARDHOLDER ASSEMBLY	30481
61	POLYURETHANE BUMPER (2)	28680

RUBBER RINGS

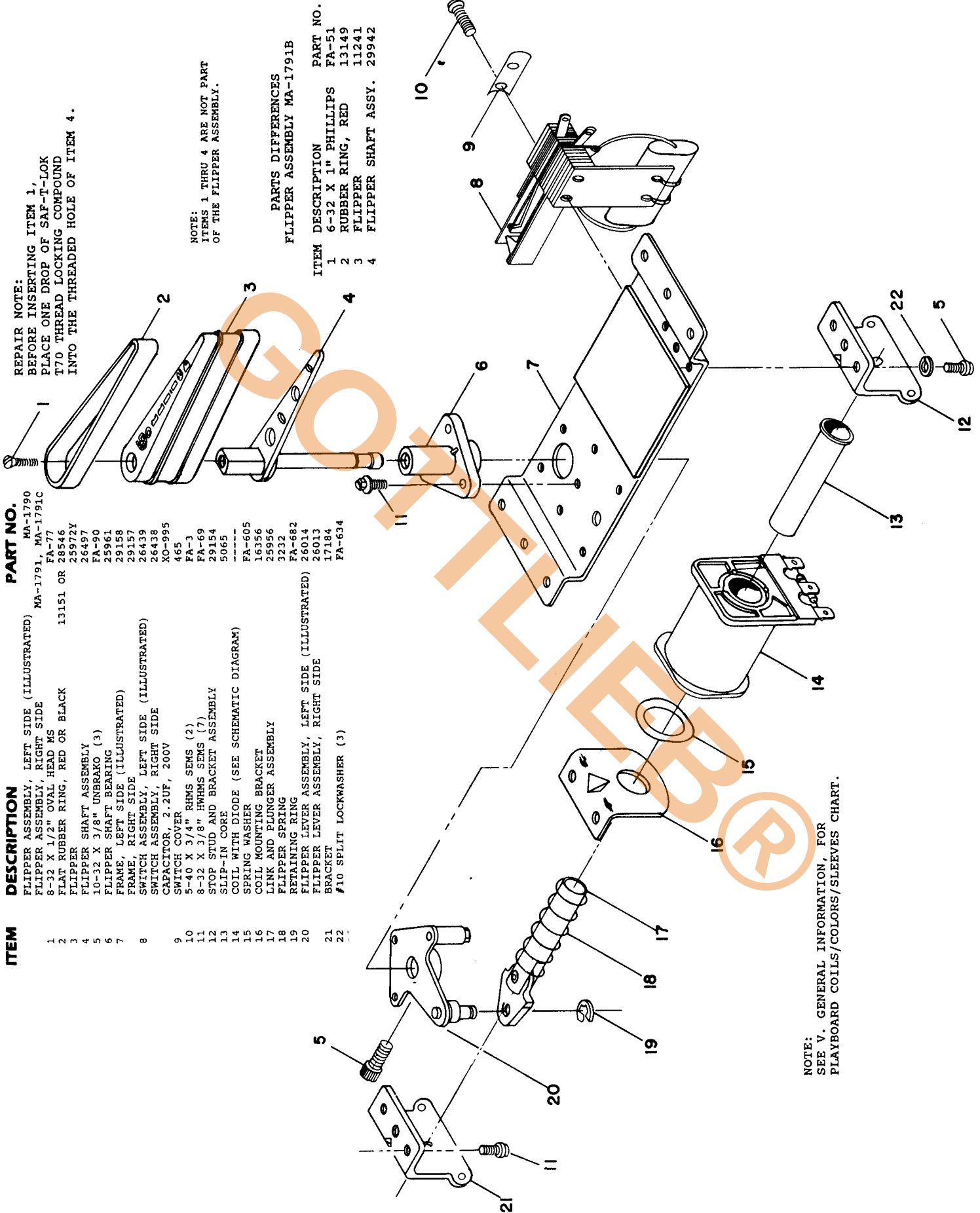
ITEM	DESCRIPTION	PART NO.
A	1-1/2"	10220
B	2"	10221
C	2-1/2" (4)	10222
D	1" (2)	10219
E	5/16" (7)	10217
F	MINI-POST, SMALL (2)	14793
G	MINI-POST, LARGE (4)	15705
H	BUMPER, TAPERED (BLK) (15)	3003Y
J	FLIPPER, BLACK (3)	28546
K	SIAMESE	17493

MISCELLANEOUS PARTS

DESCRIPTION	PART NO.
MINI-POST SCREW	14792
SIAMESE POST	17492
PLASTIC POST, 1" (RED)	11561U
PLASTIC POST, 1-3/16", (RED)	11562U
HAIRPIN CLIP	6947
RUBBER GROMMET	5240
POST FASTENING SCREW	8857

VII. PARTS INFORMATION

FLIPPER PARTS



REPAIR NOTE:
BEFORE INSERTING ITEM 1,
PLACE ONE DROP OF SAF-T-LOK
T70 THREAD LOCKING COMPOUND
INTO THE THREADED HOLE OF ITEM 4.

NOTE:
ITEMS 1 THRU 4 ARE NOT PART
OF THE FLIPPER ASSEMBLY.

PARTS DIFFERENCES
FLIPPER ASSEMBLY MA-1791B

ITEM	DESCRIPTION	PART NO.
1	6-32 X 1" PHILLIPS	FA-51
2	RUBBER RING, RED	13149
3	FLIPPER	11241
4	FLIPPER SHAFT ASSY.	29942

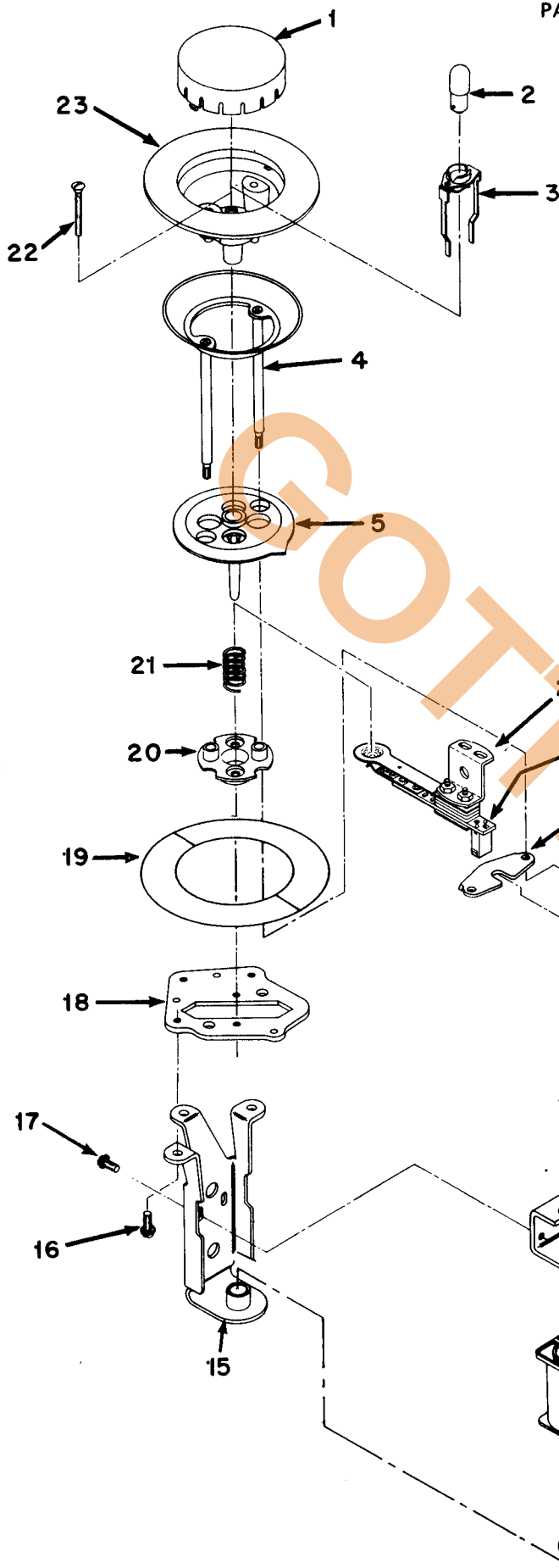
ITEM	DESCRIPTION	PART NO.
1	FLIPPER ASSEMBLY, LEFT SIDE (ILLUSTRATED)	MA-1790
2	FLIPPER ASSEMBLY, RIGHT SIDE	MA-1791, MA-1791C
3	8-32 X 1/2" OVAL HEAD MS	FA-77
4	FLIPPER SHAFT ASSSEMBLY	13151 OR 28546
5	10-32 X 3/8" UNBRAKO (3)	25972Y
6	FLIPPER SHAFT BEARING	26497
7	FRAME, LEFT SIDE (ILLUSTRATED)	FA-90
8	FRAME, RIGHT SIDE	25961
9	SWITCH ASSEMBLY, LEFT SIDE (ILLUSTRATED)	29158
10	SWITCH ASSEMBLY, RIGHT SIDE	29157
11	CAPACITOR, 2.2UF, 200V	26439
12	SWITCH COVER	26438
13	5-40 X 3/4" RHMS SEMS (2)	XO-995
14	8-32 X 3/8" HWMS SEMS (7)	465
15	STOP STUD AND BRACKET ASSEMBLY	FA-3
16	SLIP-IN CORE	FA-69
17	COIL WITH DIODE (SEE SCHEMATIC DIAGRAM)	29154
18	SPRING WASHER	5065
19	COIL MOUNTING BRACKET	FA-605
20	LINK AND PLUNGER ASSEMBLY	16356
21	FLIPPER SPRING	25956
22	RETAINING RING	3232
	FLIPPER LEVER ASSEMBLY, LEFT SIDE (ILLUSTRATED)	FA-682
	FLIPPER LEVER ASSEMBLY, RIGHT SIDE	26014
	BRACKET	26013
	#10 SPLIT LOCKWASHER (3)	17184
		FA-634

NOTE:
SEE V. GENERAL INFORMATION, FOR
PLAYBOARD COILS/SLEEVES CHART.

VII. PARTS INFORMATION

POP BUMPER PARTS

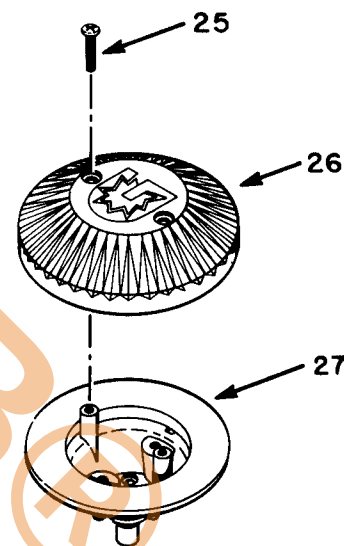
PAT. NO. 213,981



ITEM	DESCRIPTION	PART NO.
1	Pop Bumper Assembly	Specify Game
2	Pop Bumper Cap (Specify Color)	10434
3	Lamp, #555	LA-2
4	Socket	30433
5	Tie Rods and Ring	16634
6	Pop Bumper Skirt (Specify Color)	10433
7	Switch Assembly	Specify Game
8	Slotted Yoke	12149
9	Plunger	2663
10	Insulating Yoke	2662
11	Elastic Stop Nut, 6-32	FA-660
12	Kicker Return Spring	21643
13	Stop Bracket	8571
14	Coil	Specify Game
15	Coil Sleeve	5064
16	Coil Mounting Bracket and Stop	17906
17	8-32 x 1/4 HHMS SEMS	FA-64
18	6-32 x 1/4 HHMS SEMS	FA-53
19	Pop Bumper Pad	16632
20	Pop Bumper Trim Platter	25732
21	Pop Bumper Base	10432
22	Pop Bumper Spring	10430
23	6-32 x 1-1/8 Oval HMS	FA-43
24	Pop Bumper Body (Specify Color)	10435
25	Bracket and Switch Assembly	29819 (ILLUSTRATED)
26		29818 (OPPOSITE BRACKET)
27	4-40 x 1/2 Pan Head Phillips	FA-108
	Pop Bumper Cap, Clear, (Specify Color)	26635
	Pop Bumper Body (Specify Color)	26860

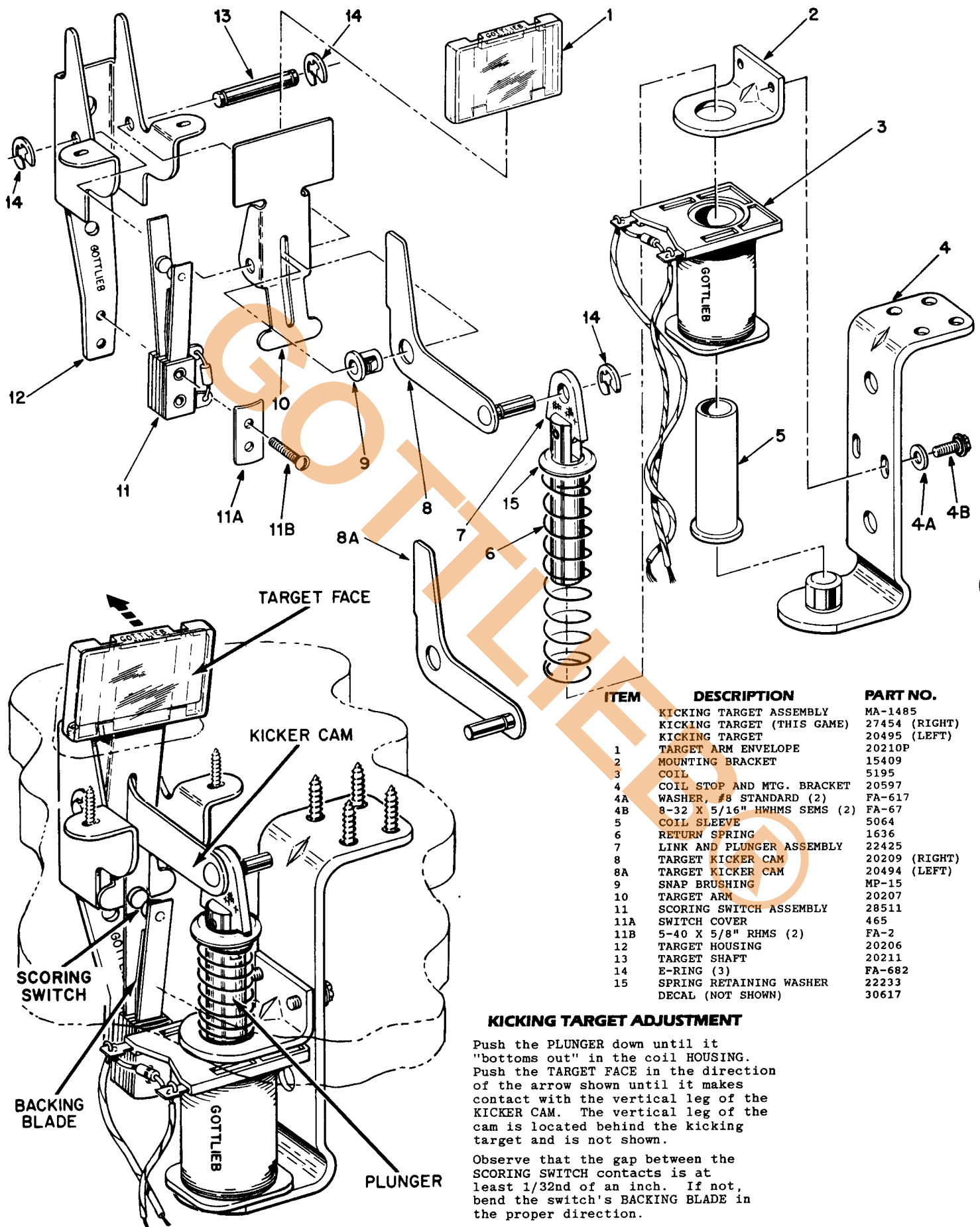
NOTE:

ITEMS 23 AND 27 ARE INTERCHANGEABLE.



VII. PARTS INFORMATION

KICKING TARGET ASSEMBLY



ITEM	DESCRIPTION	PART NO.
1	KICKING TARGET ASSEMBLY	MA-1485
2	KICKING TARGET (THIS GAME)	27454 (RIGHT)
3	KICKING TARGET	20495 (LEFT)
4	TARGET ARM ENVELOPE	20210P
4A	MOUNTING BRACKET	15409
4B	COIL	5195
5	COIL STOP AND MTG. BRACKET	20597
6	WASHER, #8 STANDARD (2)	FA-617
7	8-32 X 5/16" HWHMS SEMS (2)	FA-67
8	COIL SLEEVE	5064
8A	RETURN SPRING	1636
9	LINK AND PLUNGER ASSEMBLY	22425
10	TARGET KICKER CAM	20209 (RIGHT)
11	TARGET KICKER CAM	20494 (LEFT)
11A	SNAP BRUSHING	MP-15
11B	TARGET ARM	20207
12	SCORING SWITCH ASSEMBLY	28511
13	SWITCH COVER	465
14	5-40 X 5/8" RHMS (2)	FA-2
15	TARGET HOUSING	20206
	TARGET SHAFT	20211
	E-RING (3)	FA-682
	SPRING RETAINING WASHER	22233
	DECAL (NOT SHOWN)	30617

KICKING TARGET ADJUSTMENT

Push the PLUNGER down until it "bottoms out" in the coil HOUSING. Push the TARGET FACE in the direction of the arrow shown until it makes contact with the vertical leg of the KICKER CAM. The vertical leg of the cam is located behind the kicking target and is not shown.

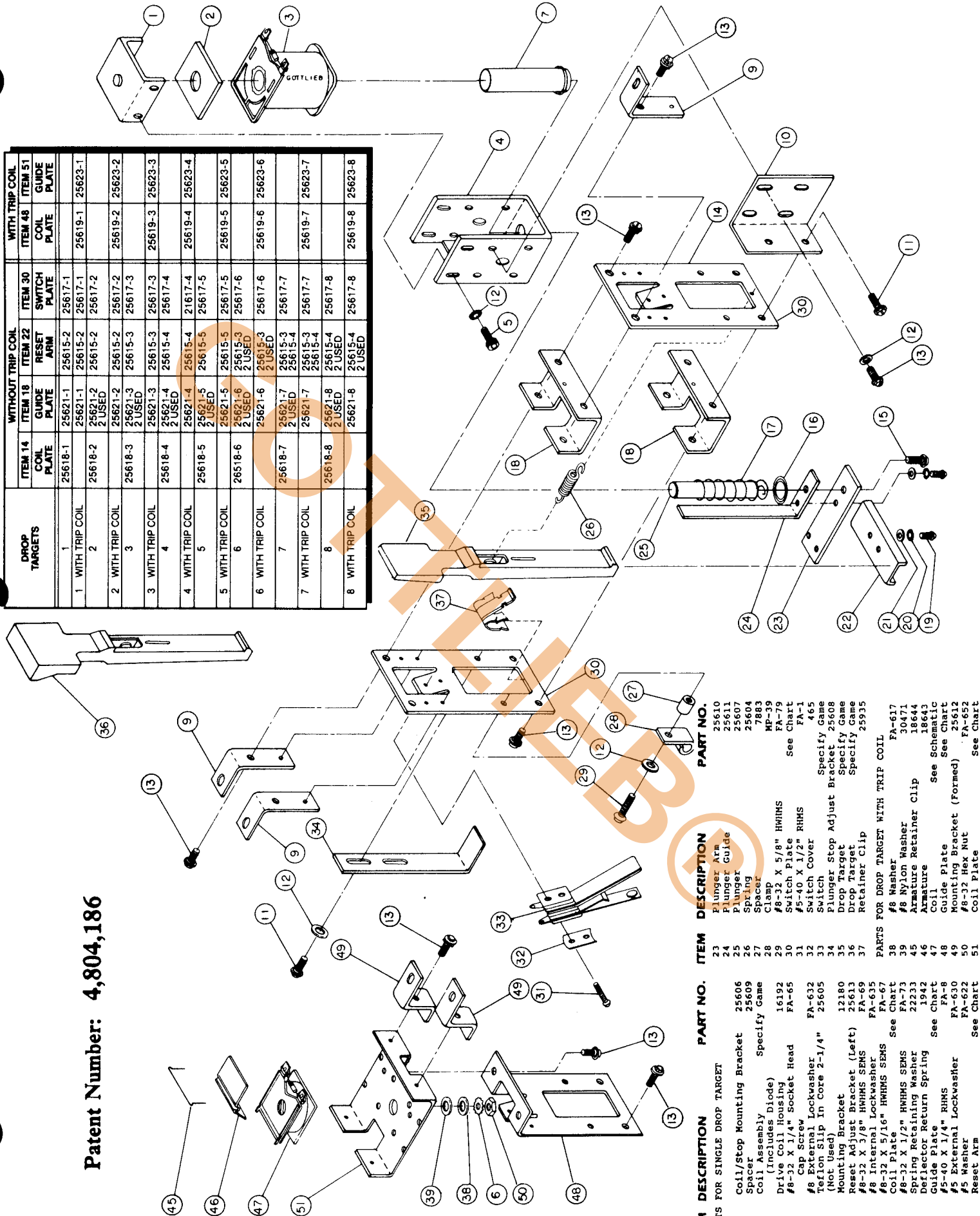
Observe that the gap between the SCORING SWITCH contacts is at least 1/32nd of an inch. If not, bend the switch's BACKING BLADE in the proper direction.

VII. PARTS INFORMATION

DROP TARGET PARTS

Patent Number: 4,804,186

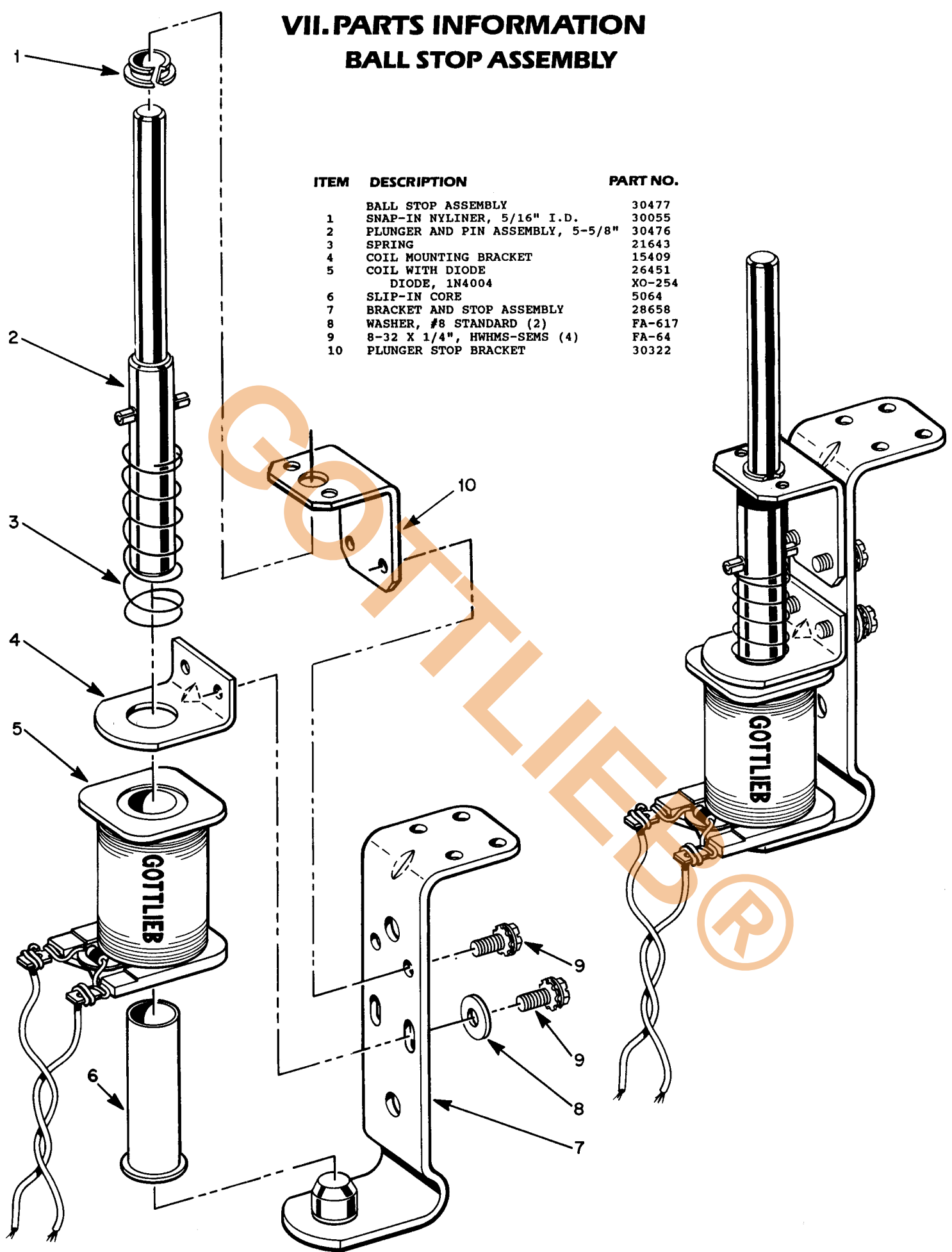
DROP TARGETS	WITHOUT TRIP COIL				WITH TRIP COIL			
	ITEM 14 COIL PLATE	ITEM 18 GUIDE PLATE	ITEM 22 RESET ARM	ITEM 30 SWITCH	ITEM 48 COIL PLATE	ITEM 51 GUIDE PLATE		
1 WITH TRIP COIL	25618-1	25621-1	25615-2	25617-1	25619-1	25623-1		
2 WITH TRIP COIL	25618-2	25621-2	25615-2	25617-2	25619-2	25623-2		
3 WITH TRIP COIL	25618-3	25621-3	25615-3	25617-3	25619-3	25623-3		
4 WITH TRIP COIL	25618-4	25621-4	25615-4	25617-4	25619-4	25623-4		
5 WITH TRIP COIL	25618-5	25621-5	25615-5	25617-5	25619-5	25623-5		
6 WITH TRIP COIL	25618-6	25621-6	25615-3 2 USED	25617-6	25619-6	25623-6		
7 WITH TRIP COIL	25618-7	25621-7	25615-3 2 USED	25617-7	25619-7	25623-7		
8 WITH TRIP COIL	25618-8	25621-8	25615-4 2 USED	25617-8	25619-8	25623-8		



VII. PARTS INFORMATION

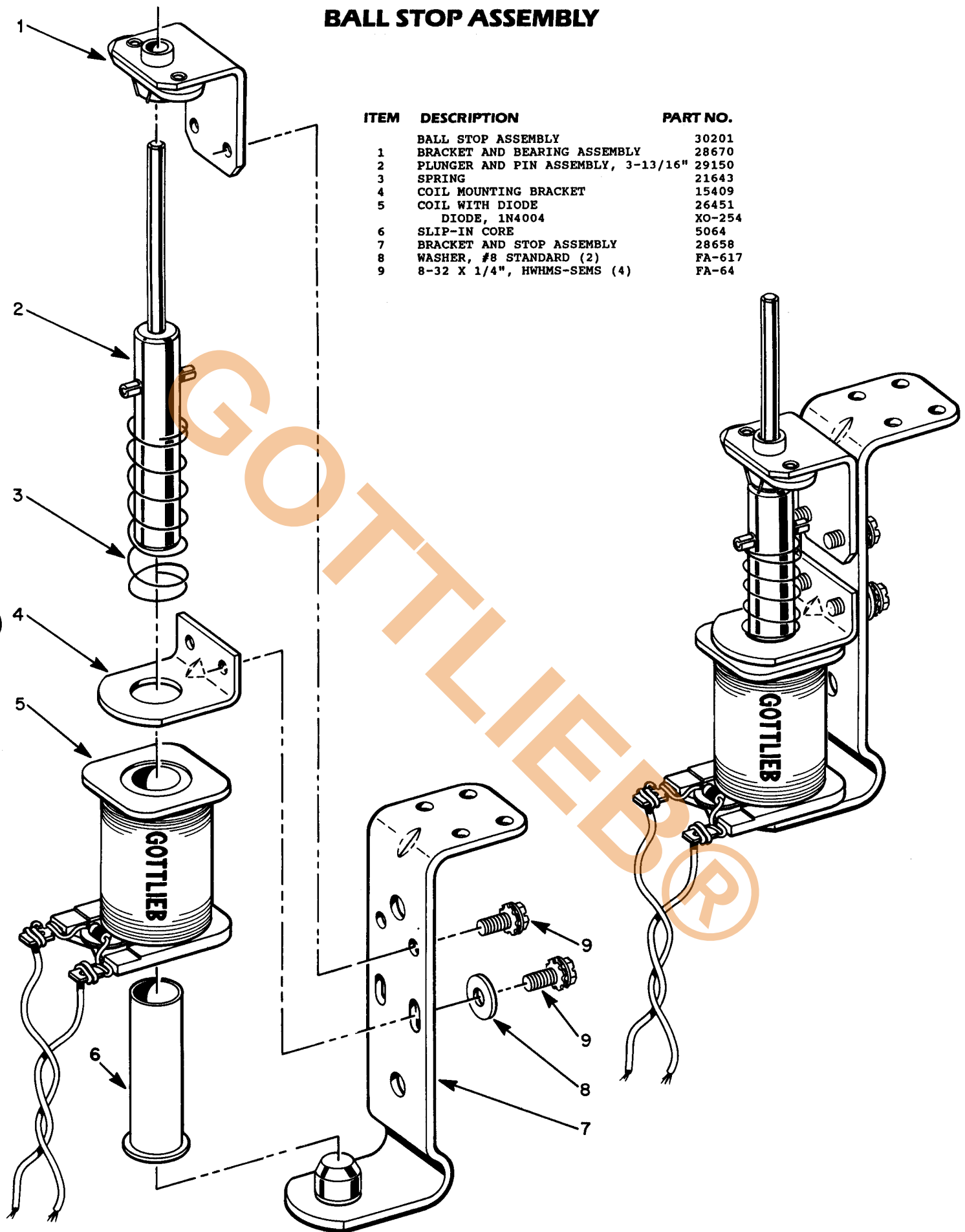
BALL STOP ASSEMBLY

ITEM	DESCRIPTION	PART NO.
	BALL STOP ASSEMBLY	30477
1	SNAP-IN NYLINER, 5/16" I.D.	30055
2	PLUNGER AND PIN ASSEMBLY, 5-5/8"	30476
3	SPRING	21643
4	COIL MOUNTING BRACKET	15409
5	COIL WITH DIODE	26451
	DIODE, 1N4004	XO-254
6	SLIP-IN CORE	5064
7	BRACKET AND STOP ASSEMBLY	28658
8	WASHER, #8 STANDARD (2)	FA-617
9	8-32 X 1/4", HWHMS-SEMS (4)	FA-64
10	PLUNGER STOP BRACKET	30322



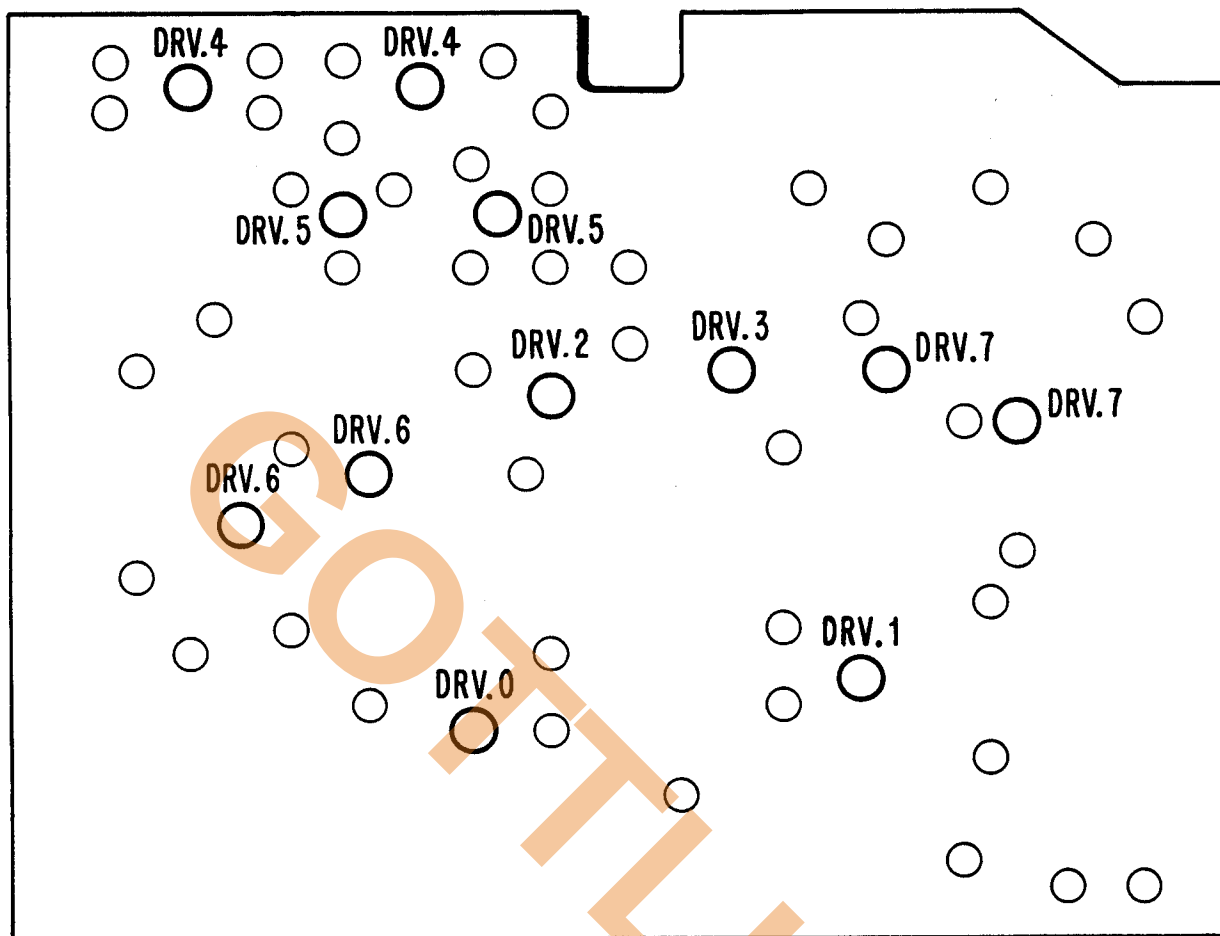
VII. PARTS INFORMATION

BALL STOP ASSEMBLY



VII. PARTS INFORMATION

LIGHTBOX INSERT LAMP IDENTIFICATION



DRIVER FUNCTIONS

DRIVER 0, LEFT HEADLIGHT	#904 WEDGE BASE
DRIVER 1, RIGHT HEADLIGHT	#904 WEDGE BASE
DRIVER 2, LEFT LIGHTBAR	#904 WEDGE BASE
DRIVER 3, RIGHT LIGHTBAR	#904 WEDGE BASE
DRIVER 4, RESCUE	#904 WEDGE BASE (2)
DRIVER 5, 911	#904 WEDGE BASE (2)
DRIVER 6, FIRE #1	#904 WEDGE BASE (2)
DRIVER 7, FIRE #2	#904 WEDGE BASE (2)

NOTE:

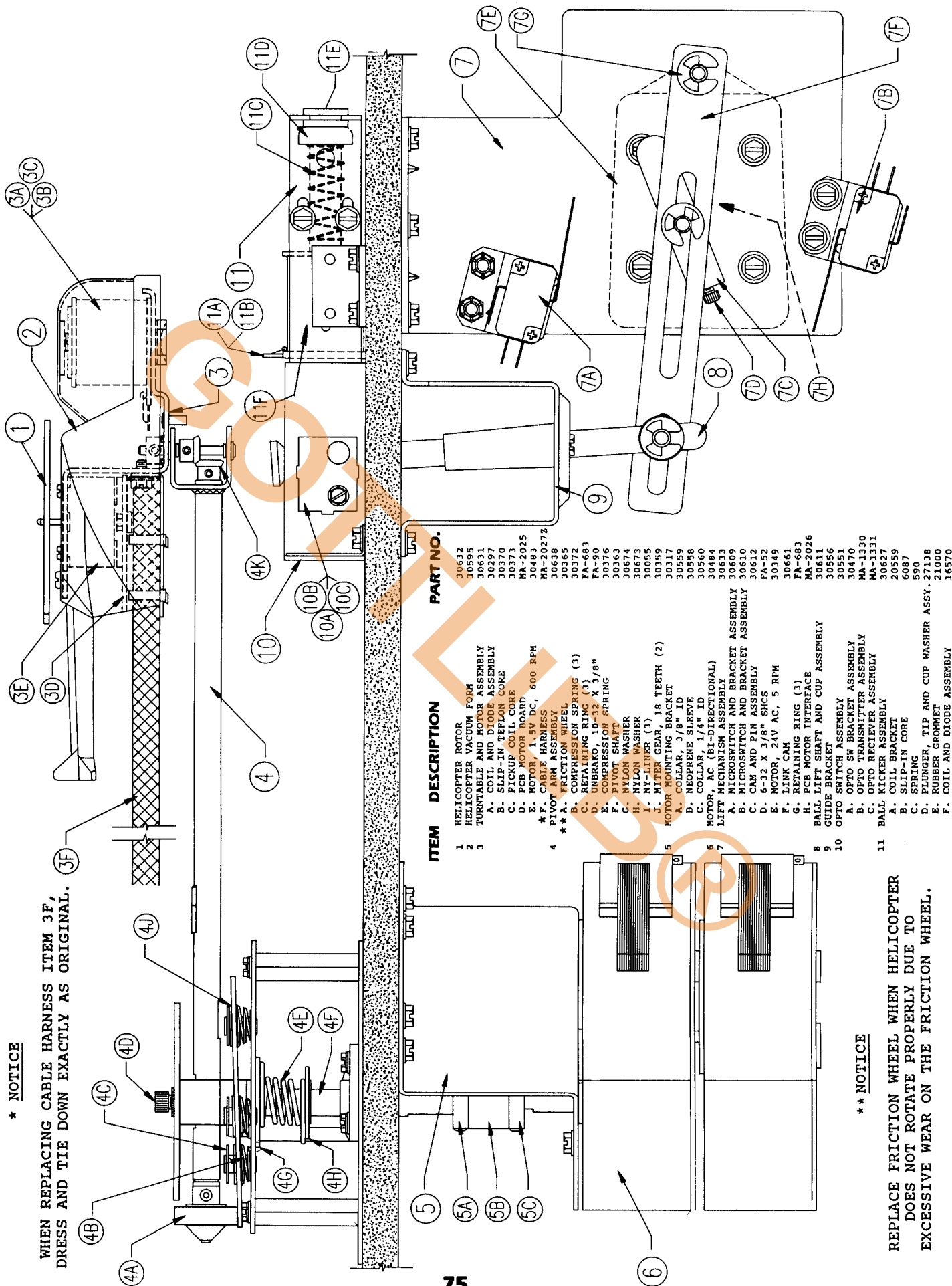
1. LAMPS NOT DESIGNATED ARE GENERAL ILLUMINATION, TYPE #555 WEDGE BASE.

VII. PARTS INFORMATION

LIFT AND PIVOT ARM ASSEMBLY

* NOTICE

WHEN REPLACING CABLE HARNESS ITEM 3F, DRESS AND TIE DOWN EXACTLY AS ORIGINAL.



PART NO.

ITEM DESCRIPTION

1	HELICOPTER ROTOR	30632
2	HELICOPTER VACUUM FORM	30595
3	TURNABLE AND MOTOR ASSEMBLY	30631
	A. COIL AND DIODE ASSEMBLY	30297
	B. SLIP-IN TEFLON CORE	30370
	C. PICKUP COIL CORE	30373
	D. PCB MOTOR BOARD	MA-2025
	E. MOTOR, 1.5V DC, 600 RPM	30483
	* F. CABLE HARNESS	MA-20272
4	PIVOT ARM ASSEMBLY	30638
	** A. FRICTION WHEEL	30365
	B. COMPRESSION SPRING (3)	30372
	C. RETAINING RING (3)	FA-683
	D. UNBRAKE, 10-32 X 3/8"	FA-90
	E. COMPRESSION SPRING	30376
	F. PIVOT SHAFT	30363
	G. NYLON WASHER	30674
	H. NYLON WASHER	30673
	I. MITER GEAR, 18 TEETH (2)	30359
	J. MOTOR MOUNTING BRACKET	30317
	A. COLLAR, 3/8" ID	30559
	B. NEOPRENE SLEEVE	30560
	C. COLLAR, 1/4" ID	30484
	MOTOR, AC (BI-DIRECTIONAL)	30633
5	LIFT MECHANISM ASSEMBLY	30609
6	A. MICROSWITCH AND BRACKET ASSEMBLY	30610
7	B. MICROSWITCH AND BRACKET ASSEMBLY	30612
8	C. CAM AND PIN ASSEMBLY	FA-32
9	D. C-32 X 3/8" SHCS	30349
10	E. MOTOR, 24V AC, 5 RPM	30661
11	F. LINK CAM	FA-683
	G. RETAINING RING (3)	MA-2026
	H. PCB MOTOR INTERFACE	30611
	I. BALL LIFT SHAFT AND CUP ASSEMBLY	30556
	J. GUIDE BRACKET ASSEMBLY	30551
	K. OPTO SWITCH ASSEMBLY	30470
	L. OPTO SW BRACKET ASSEMBLY	MA-1330
	M. OPTO TRANSMITTER ASSEMBLY	MA-1331
	N. OPTO RECEIVER ASSEMBLY	30627
	O. BALL KICKER ASSEMBLY	20559
	P. COIL BRACKET	6087
	Q. SLIP-IN CORE	590
	R. SPRING	27138
	S. PLUNGER, TIP AND CUP WASHER ASSY.	21000
	T. RUBBER GROMMET	16570
	U. COIL AND DIODE ASSEMBLY	

* NOTICE

REPLACE FRICTION WHEEL WHEN HELICOPTER DOES NOT ROTATE PROPERLY DUE TO EXCESSIVE WEAR ON THE FRICTION WHEEL.

VII. PARTS INFORMATION

UNIQUE PARTS

The following denotes new parts and assemblies unique to Rescue 911, Game #740. Part numbers prefixed with an asterisk (*) will be illustrated or can be located on pages 28 thru 75. Numbers in parenthesis () indicates multiple quantities.

PLAYBOARD

ITEM/DESCRIPTION	PART NO.
BALL STOP ASSEMBLY.....	*30201
MOTOR MOUNTING BRACKET.....	*30317
WIREFORM RAMP.....	*30458
WIREFORM RAMP.....	*30459
UPKICKER AND OPTO ASSEMBLY.....	*30465
RAMP FLAP.....	*30474
BALL STOP ASSEMBLY.....	*30477
OPTO SWITCH ASSEMBLY.....	*30479
MOLDED CITYSCAPE.....	*30480
CARDHOLDER ASSEMBLY.....	*30481
ACRYLIC BALL, 1" DIAMETER.....	*30482
MOTOR, 50V AC (BI-DIRECTIONAL).....	*30484
OPTO SWITCH AND BRACKET (2).....	*30487
VACUUM FORM CAVE.....	*30490
BALL DEFLECTOR.....	*30492
VACUUM FORM RAMP ASSEMBLY.....	*30493
OPTO SWITCH ASSEMBLY.....	*30551
GUIDE BRACKET.....	*30556
BALL DEFLECTOR.....	*30562
OPTO SWITCH COVER.....	*30588
OPTO SWITCH AND BRACKET ASSEMBLY.....	*30590
MYLAR OVERLAY.....	*30591
VACUUM FORM RAMP ASSEMBLY.....	*30592
TROUGH AND LAMPS ASSEMBLY.....	*30593
HELICOPTER VACUUM FORM.....	*30595
PLASTIC SHIELD SET.....	*30596
BALL DROP PLATE.....	*30606
BALL LIFT SHAFT AND CUP ASSEMBLY.....	*30611
KICKING TARGET DECAL (2).....	*30617
DROP TARGET DECAL (2).....	*30618
DECAL.....	*30619
BALL KICKER ASSEMBLY.....	*30627
BALL SNUBBER.....	*30629
TURNTABLE AND MOTOR ASSEMBLY.....	*30631
HELICOPTER ROTOR.....	*30632
LIFT MECHANISM ASSEMBLY.....	*30633
PIVOT ARM ASSEMBLY.....	*30638
TARGET BANK ASSEMBLY, 2 POSITION.....	*MA-2029

CABINET

CABINET SCREENED.....	*30520-740
TRANSFORMER PANEL.....	*MA-2016

LIGHTBOX

LIGHTBOX SCREENED.....	29028-740
SPEAKER PANEL, PLEXI SCREENED.....	28827-740
STYRENE (BACKGLASS ART).....	28833-740
REVOLVING SIGNAL LAMP.....	27742
REVOLVING SIGNAL LAMP BRACKET.....	27743
REVOLVING SIGNAL LAMP, HOLE PLATE COVER.....	30644

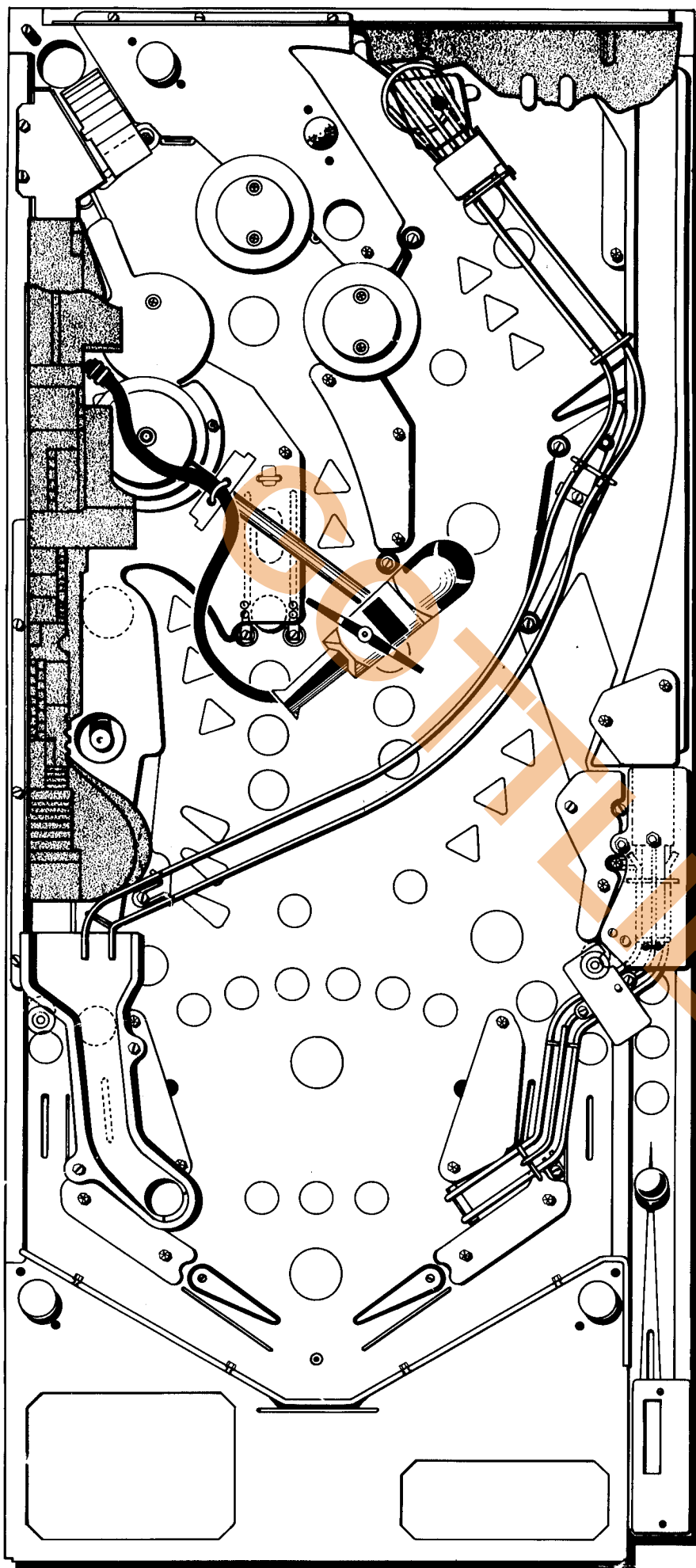
BASIC TROUBLESHOOTING GUIDE

CONDITION	POSSIBLE CAUSE
Game does not power up	* Line fuse (F1) blown * Primary fuse (F2) blown
Game does not power up but general illumination lamps light	* Power supply fuse (F5) blown
SWITCH SHORT message appears in display on power up	* Check for a voltage >0v shorted to switch return number shown in display * Bad Control Board (A1) * Bad Driver Board (A3)
Lightbox illumination lamps do not light	* Fuse (F8) blown
Playfield illumination lamps do not light	* Fuse (F9) blown
All controlled lamps, flash lamps, relays, and switches not working	* Fuse (F6) blown * Bad Driver Board (A3)
All controlled lamps work but some switches do not work	* Bad diode associated with the switch (contact point type switch only)
Some controlled lamps and some switches do not work	* Short circuit on associated strobe line on playfield * Bad Driver Board (A3)
Display not working (blank) but LED on Dot Matrix Controller Board (A8) is flashing	* Display fuse (F3) or (F4) blown * Bad Dot Matrix Display Board (A4) * Bad Display Controller Board (A8)
Display not working and LED on Control Board is flickering rapidly	* Bad Dot Matrix Controller Board (A8) * Bad Control Board (A1)
Display not working and LED on Dot Matrix Controller Board (A8) is glowing bright to dim	* Bad Dot Matrix Controller Board (A8)
A solenoid operated device does not work. (Pop Bumper, Kicker, etc.)	* Associated fuse on playfield is blown * Bad Driver Board (A3)
All flippers and solenoids do not work	* Solenoid fuse (F7) blown
A flipper coil overheats and burns	* End of stroke switch on flipper unit not opening when the flipper button is held in. * Shorted capacitor on flipper unit
Flipper chatters when flipper button is held in	* Open hold winding (small diameter wire) on flipper coil
No sound or speech	* Bad Auxiliary Power Supply fuse (F10 or F11) * Bad Auxiliary Power Supply Board (A5) * Bad Auxiliary Sound Board (A20) * Bad Sound Board (A6)
Some sounds or speech missing	* Bad Auxiliary Sound Board (A20) * Bad Sound Board (A6)
An optical switch does not work or works intermittently	* Misalignment of LED transmitter to receiver * Bad LED transmitter and/or receiver * Bad Optical Interface Board (A25)

IMPORTANT NOTICE

THIS SHIPMENT HAS BEEN CAREFULLY INSPECTED AND
PROPERLY PACKED BEFORE LEAVING THE FACTORY.

WE CANNOT ASSUME RESPONSIBILITY FOR BREAKAGE
THAT MAY OCCUR IN TRANSPORTATION. IF THIS SHIPMENT IS
DAMAGED IN ANY WAY, IMMEDIATELY NOTIFY THE CARRIER AND
FILE DAMAGE REPORT SO THAT A SATISFACTORY ADJUSTMENT
CAN BE MADE BY THEM.



Premier[®] **Technology**

759 INDUSTRIAL DRIVE
BENSENVILLE, IL 60106

1-708-350-0400

FAX: 1-708-350-1097

THE PREMIER HOTLINE
1-800-444-0761