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UL C UL

INSTRUCTION MANUAL

S T A R G A T E™

GAME #742

(INSTALL 4 BALLS IN OUTHOLE)

INSTRUCTION MANUAL

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GAME PROM: (TYPE 26C512)	DISPLAY PROM: (TYPE 27C040-25)	SOUND PROM: (TYPE 27C256)	SOUND PROM: (TYPE 27C040-25)
742/GPROM	742/DSPROM	742/DROM1 742/YROM1	742/AROM1

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.

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SUPPLEMENTAL ADDENDUM

ATTACH TO AND A PART OF
STARGATE (GAME #742)
INSTRUCTION MANUAL

GAME AS SHIPPED VARIES FROM THE INSTRUCTION MANUAL AS PRINTED.

CHANGED PAGE 25 AND 56

"F26" SHOULD BE 2-1/2 AMP SLO-BLO FUSE, EL-21

CHANGED PAGE 76

SPACESHIP AND BRACKET ASSEMBLY 31308 (CORRECTED PART NUMBER)

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 a 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).

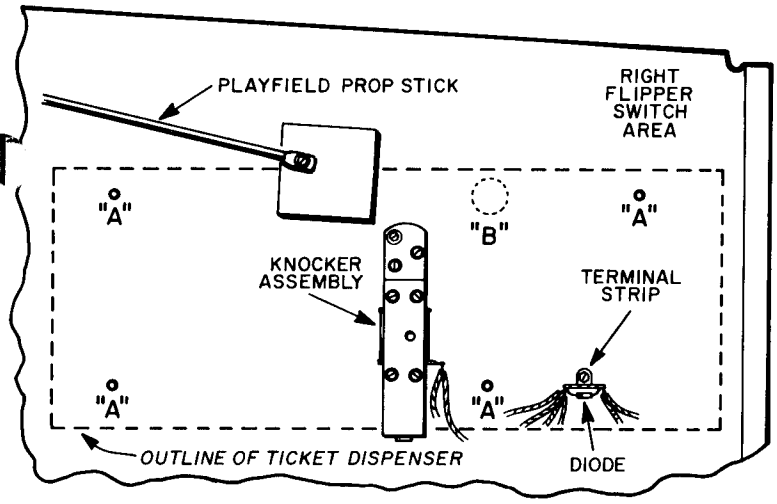


FIGURE 1.

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)

The MARS VFM2-L1 bill acceptor can be easily interfaced to this machine. The unit can easily be mounted to the front door by removing the existing cover plate and bolting the unit to the door. There is also a connector provided on the front door which directly interfaces to the bill acceptor. The game is set at the factory to give the proper amount of credits with the bill acceptor set to output one pulse per dollar. In order to change this configuration, the GAME PRICING adjustment will need to have a CUSTOM value entered. Other bill acceptors may also be interfaced to the game but may require a different mounting or wiring configuration.

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.

S T A R G A T E™

*** PLAYFIELD FEATURES ***

LEFT OUTSIDE ROLLOVER:
SCORE 3000.

RIGHT OUTSIDE ROLLOVER:
SCORE 3000.

AWARD SPECIAL WHEN FLASHING OUT (GAME ADJUSTMENT 61).

LEFT & RIGHT RETURN ROLLOVERS & KICKING RUBBERS:
IF PLAYER'S SCORE IS GREATER THAN OR EQUAL TO 100,000,000, THEN THE RIGHT KICKING RUBBER AND THE LEFT RETURN CLOSE THE SARCOPHAGUS GATE AND THE LEFT KICKING RUBBER AND THE RIGHT RETURN OPEN THE SARCOPHAGUS GATE (GAME ADJUSTMENT 72).

IF PLAYER'S SCORE IS LESS THAN 100,000,000, THEN THE RIGHT KICKING RUBBER AND THE LEFT RETURN OPEN THE SARCOPHAGUS GATE AND THE LEFT KICKING RUBBER AND THE RIGHT RETURN CLOSE THE SARCOPHAGUS GATE (GAME ADJUSTMENT 72).

LEFT RETURN ROLLOVER:
SCORE 30,000.

OPEN RIGHT PIVOT TARGET WHEN LIT.

RIGHT RETURN ROLLOVER:
SCORE 30,000.

OPEN LEFT PIVOT TARGET WHEN LIT.

START HORUS FLASHING OUT DURING NORMAL MODE (GAME ADJUSTMENT 58).

KICKING RUBBERS:
PERFORM THE TOGGLE FUNCTION.

SCORE 30.

LEFT SIDE ROLLOVER:
SCORE 1,000,000.

AWARD EXTRA BALL WHEN FLASHING.

OPEN SARCOPHAGUS GATE IF NOT IN ANY ROUND.

ROLLOVER DROP TARGET:
SCORE 300,000.

RESET TARGET AFTER 10 SECONDS.

AWARD PYRAMID FEATURE WHEN FLASHING.

FLASHOUT SARCOPHAGUS LAMP FOR A TIMED PERIOD DURING NORMAL MODE (GAME ADJUSTMENT 64).

LEFT DROP TARGETS (1-3):
SCORE 30,000.

SCORE CORRESPONDING VALUE IF FLASHING.

MIDDLE TARGET ADDS QUARTZ WHEN LIT.

SCORE RA'S POWER BY COMPLETING ALL TARGETS AT THE SAME TIME.

CENTER DROP TARGETS (1-2):
SCORE 300,000.

SCORE CORRESPONDING VALUE IF FLASHING.

SCORE RA'S POWER BY COMPLETING BOTH TARGETS AT THE SAME TIME.

DOUBLE SCORE WHEN LIT.

POP BUMPERS & LEFT KICKING TARGET:
SCORE 100,000.

START HURRY-UP WHEN COUNTER REACHES 0 (GAME ADJUSTMENT 60).

SCORE 5,000,000 DURING REBELLION ROUND.

LEFT PIVOT TARGET:
SCORE 300,000.

OPEN TARGET AND START HORUS FLASHING OUT DURING NORMAL MODE (GAME ADJUSTMENT 58).

AWARD PYRAMID FEATURE WHEN FLASHING.

SCORE 5,000,000 DURING REBELLION ROUND.

ADD BONUS DURING SANDSTORM ROUND.

RIGHT PIVOT TARGET:
SCORE 300,000.

DURING NORMAL MODE, OPEN TARGET.

AWARD PYRAMID FEATURE WHEN FLASHING.

SCORE 5,000,000 DURING REBELLION ROUND.

ADD BONUS DURING SANDSTORM ROUND.

CENTER KICKING TARGET:
SCORE 3,000.

ADVANCE TRANSPORTER AWARD.

DESTROY GLIDERCRAFT IN GLIDERCRAFT ROUND AND IN STAGE 1 OF EYE OF RA ROUND.

OUTER BULLSEYE TARGET:
SCORE 300.

DESTROY GLIDERCRAFT IN GLIDERCRAFT ROUND AND IN STAGE 1 OF EYE OF RA ROUND.

INNER BULLSEYE TARGET:
SCORE 500,000.

AWARD BULLSEYE SCORE.

RIGHT KICKING TARGET:
SCORE 100,000.

AWARD RA'S BRACELET SCORE WHEN FLASHING OUT (GAME ADJUSTMENT 59).

AWARD PYRAMID FEATURE WHEN FLASHING.

SCORE 3,000,000 AND SERVE ANOTHER BALL INTO PLAY DURING RA'S TEMPLE ROUND (UP TO 2 BALLS MAXIMUM).

DOUBLE SCORE WHEN FLASHING OUT (GAME ADJUSTMENT 59).

WHEN STROBING:
- SCORE JACKPOT DURING MULTIBALL.
- ADD BONUS DURING SANDSTORM.
- SCORE 20,000,000 WHEN STROBING IN STARGATE MULTIBALL.

TOP LEFT RAMP (OPTO):
SCORE 50,000.

FLASH OUT RIGHT KICKING TARGET WHEN LIT (GAME ADJUSTMENT 59).

BEGIN COMBO FEATURE WHEN LIT.

AWARD PYRAMID FEATURE WHEN FLASHING.

WHEN STROBING:
- SCORE JACKPOT DURING MULTIBALL.
- ADD BONUS DURING SANDSTORM.
- ADD 2 QUARTZ DURING QUARTZ ROUND.
- SCORE 20,000,000 WHEN STROBING IN STARGATE MULTIBALL.

TOP RIGHT RAMP (OPTO):
SCORE 3,000.

ADD LETTER TO S-T-A-R-G-A-T-E WHEN LIT.

AWARD COMBO WHEN FLASHING.

AWARD PYRAMID FEATURE WHEN FLASHING.

WHEN STROBING:
- SCORE JACKPOT DURING MULTIBALL.
- ADD BONUS DURING SANDSTORM.
- ADD 1 QUARTZ DURING QUARTZ ROUND.
- SCORE 20,000,000 WHEN STROBING IN STARGATE MULTIBALL.

TOP LEFT UPKICKER:
SCORE 10,000,000 AND ADVANCE HORUS BONUS IF SKILL SHOT IS ACTIVE.

SCORE 300,000.

ADVANCE HORUS BONUS WHEN FLASHING.

AWARD TRANSPORTER AWARD WHEN LIT.

AWARD COMBO WHEN FLASHING.

AWARD PYRAMID FEATURE WHEN FLASHING.

COLLECT AND ADVANCE HORUS BONUS DURING BATTLE ROUND. ADD TIME.

WHEN STROBING:
- SCORE JACKPOT DURING MULTIBALL.
- ADD BONUS DURING SANDSTORM.
- SCORE 20,000,000 WHEN STROBING IN STARGATE MULTIBALL.

TOP CENTER UPKICKER:
SCORE 300,000.

TRADE QUARTZ WHEN LIT.

AWARD COMBO WHEN FLASHING.

AWARD PYRAMID FEATURE WHEN FLASHING.

COLLECT AND ADVANCE HORUS BONUS DURING BATTLE ROUND. ADD TIME.

WHEN STROBING:
SCORE JACKPOT DURING MULTIBALL.
ADD BONUS DURING SANDSTORM.
SCORE 20,000,000 WHEN STROBING IN STARGATE MULTIBALL.

TOP RIGHT UPKICKER:
SCORE 1,000,000.

ACTIVATE SARCOPHAGUS WHEN FLASHING.

AWARD HURRY-UP WHEN FLASHING.

AWARD PYRAMID FEATURE WHEN FLASHING.

COLLECT COUNTDOWN BONUS IN SAVE SARI ROUND.

WHEN STROBING:
SCORE JACKPOT DURING MULTIBALL.
ADD BONUS DURING SANDSTORM.
SCORE 20,000,000 WHEN STROBING IN STARGATE MULTIBALL.

LOWER LEFT KICKER:
SCORE 10,000,000 IF SKILL SHOT IS ACTIVE. OTHERWISE, SCORE 100,000.

AWARD SARCOPHAGUS FEATURE IF ACTIVE.

RE-START COUNTDOWN BONUS AT 50,000,000 IF IN SAVE SARI ROUND (GAME ADJUSTMENT 65).

PYRAMID (OPTO):
SCORE 300,000.

BEGIN CURRENT ROUND WHEN FLASHING.

COMPLETE COMBO FEATURE WHEN FLASHING.

COMPLETE PYRAMID FEATURE WHEN FLASHING.

SCORE 50,000,000 DURING RA'S TEMPLE ROUND WHEN STROBING.

WHEN STROBING:
SCORE JACKPOT DURING MULTIBALL AND COLLECT SUPER JACKPOT.
ADD BONUS DURING SANDSTORM.
SCORE 20,000,000 WHEN STROBING IN STARGATE MULTIBALL.
DESTROY GLIDERCRAFT DURING STAGE 1 OF EYE OF RA ROUND.
ASSEMBLE OR COMPLETE THE BOMB IN STAGE 3 OF EYE OF RA ROUND.

LOWER RAMP (OPTO):
OPEN THE SARCOPHAGUS GATE.

OUTHOLE:
COLLECT SANDSTORM BONUS AT END OF BALL.

COLLECT QUARTZ BONUS AT END OF BALL.

COLLECT STARGATE SEGMENT BONUS AT END OF GAME.

S T A R G A T E™

*** GENERAL GAME FEATURES ***

HORUS FLASHOUT:
THIS FEATURE ESTABLISHES THE BONUS LEVELS FOR THE BATTLE ROUND. WHEN THE PLAYER HITS THE LEFT PIVOT TARGET, IT OPENS AND THE "HORUS" LAMP FLASHES OUT FOR A TIMED PERIOD (GAME ADJUSTMENT 58). IF THE PLAYER SHOOTS THE TOP LEFT UPKICKER, HE ADVANCES THE HORUS BONUS AND CLOSES THE LEFT PIVOT TARGET.

COMBO FEATURE:
SHOOTING THE LEFT RAMP WHEN LIT BEGINS THIS FEATURE. THIS AWARDS THE PLAYER ONE COMBO AND ADVANCES THE COMBO SHOT. THIS CONTINUES UNTIL THE PLAYER MISSES A SHOT (ANY WRONG SWITCH HIT).

COMPLETING THE FIFTH COMBO SHOT GIVES AN AWARD AND ENDS THIS FEATURE.

II. GAME PLAY AND SCORING

AWARD TABLE:
CONSECUTIVE COMBOS

1ST -	5,000,000.
2ND -	STARGATE SEGMENT (1ST TIME ONLY) OR 10,000,000.
3RD -	20,000,000.
4TH -	30,000,000.
5TH -	ADVANCE SUPER JACKPOT.

THRESHHOLD LEVELS:

10	START HURRYUP.
30	FLASH EXTRA BALL.
HIGH TO DATE	PLAYER INITIALS AND SPECIAL (SEE GAME ADJUSTMENT 67 AND 73).

PYRAMID FEATURE:
BEGIN WITH ONE LAMP FLASHING. THIS LAMP IS CHOSEN AT RANDOM. WHEN THE PLAYER COMPLETES THIS SHOT, THEN RANDOMLY CHOOSE ANOTHER UNTIL THE PLAYER COMPLETES THE SIXTH SHOT. FLASH THE SEVENTH SHOT WHICH WILL ALWAYS BE THE PYRAMID. COMPLETING THE SEVENTH SHOT DECODES THE STARGATE SEGMENT AND GIVES AN AWARD. HERE ARE THE AWARDS:

1ST - ADD 5 QUARTZ.
2ND - 30,000,000.
3RD - ADVANCE SUPER JACKPOT.

RA'S BRACELET:
IF THE PLAYER HITS THIS TARGET WHEN LIT SOLID, THEN FLASH OUT THE TARGET FOR A TIMED PERIOD (GAME ADJUSTMENT 59). IF THE PLAYER HITS THIS TARGET WHEN FLASHING OUT, THEN GIVE THE AWARD AND RE-START THE TIMER. THIS FEATURE IS NOT ACTIVE WHEN IN RA'S TEMPLE ROUND.

1ST - 5,000,000.
2ND - 10,000,000.
3RD - 20,000,000.

TRANSPORTER:
COLLECT THE STARGATE SEGMENT. WHEN THE PLAYER GETS AN AWARD, THAT AWARD IS ELIMINATED FROM THE TABLE. CLOSE THE LEFT PIVOT TARGET. THE PLAYER CHANGES THE AWARD BY HITTING THE CENTER KICKING TARGET. WHEN ALL AWARDS HAVE BEEN COMPLETED, THEN THE NEXT AWARD WILL BE SANDSTORM.

TABLE OF AWARDS:

20,000,000
BEGIN HURRY-UP
ADD 3 QUARTZ
MULTIBALL
10,000,000
ADD 3 QUARTZ
ADD 5 QUARTZ
5,000,000
EXTRA BALL (ONCE PER PLAYER PER GAME)
ADVANCE SUPER JACKPOT
30,000,000
TRIPLE SCORING FOR A TIME PERIOD

SOME AWARDS ARE MARKED AS ALREADY COMPLETED UPON PLAYER'S FIRST BALL.

SARCOPHAGUS:
PLAYER IS AWARDED THIS FEATURE FROM A PLUNGER SKILL SHOT OR FROM HITTING THE ROLLOVER DROP TARGET, THEN SHOOTING THE RIGHT UPKICKER BEFORE THE SARCOPHAGUS LAMP TIMES OUT (GAME ADJUSTMENT 64). DECODE STARGATE SEGMENT.

ODD TIMES -	MULTIBALL.
EVEN TIMES -	3 QUARTZ.

HURRY-UP:
SHOOTING THE TOP RIGHT UPKICKER AWARDS THE HURRY-UP IF IT IS SHOT BEFORE TIME HAS RUN OUT (GAME ADJUSTMENT 60). THE STARGATE SEGMENT IS AWARDED ALONG WITH:

1ST - 10,000,000.
2ND - 30,000,000.
3RD - EXTRA BALL.
4TH - 50,000,000.

SPELL S-T-A-R-G-A-T-E:
SHOOTING THE TOP RIGHT RAMP WHEN LIT ADDS A LETTER TO S-T-A-R-G-A-T-E. COMPLETING S-T-A-R-G-A-T-E ALWAYS AWARDS THE STARGATE SEGMENT ALONG WITH:

1ST - ADD 3 QUARTZ.
2ND - ADVANCE SUPER JACKPOT.
3RD - ADD 5 QUARTZ.
4TH - ADVANCE SUPER JACKPOT.

II. GAME PLAY AND SCORING

BULLSEYE:
HITTING THE INNER BULLSEYE TARGET AWARDS:

LAST BALL - 10,000,000
NEXT TO LAST BALL - 5,000,000
OTHER BALLS - 1,000,000

RA'S POWER:
COMPLETING ALL DROP TARGETS AT ONCE ON EITHER BANK SCORES 5M, 10M, 20M, 30M, OR 40M. EACH NEW BALL RESETS THE SCORE VALUE.

TRADE QUARTZ:
THIS FEATURE IS NOT ACTIVE IN BATTLE ROUND. SHOOTING THE CENTER UPKICKER WHEN LIT ADDS 1 QUARTZ AND ALLOWS THE PLAYER TO TRADE HIS ACCUMULATED QUARTZ FOR VARIOUS AWARDS LISTED BELOW. THE STARGATE SEGMENT IS ALWAYS AWARDED.

QUARTZ	ITEM OFFERED
1,2, OR 3	- 10,000,000.
4,5, OR 6	- 50,000,000.
7,8, OR 9	- FLASH EXTRA BALL (1 TIME ONLY), ELSE 100,000,000.
10 THRU 15	- DOUBLE ADVANCE SUPER JACKPOT.
16 THRU 19	- SANDSTORM.
20 THRU 22	- COMPLETE ALL STARGATE SEGMENTS (ALLOWED ONCE).
23 OR MORE	- SUPER JACKPOT.

PLUNGER SKILL SHOT:
SHOOTING THE SARCOPHAGUS OR THE TOP LEFT UPKICKER FROM THE PLUNGER SCORES 10,000,000. SHOOTING THE SARCOPHAGUS ALSO STARTS MULTIBALL, GLIDERCRAFT ROUND OR AWARDS 3 QUARTZ. SHOOTING THE TOP LEFT UPKICKER ALSO ADDS TO HORUS BONUS.

TOGGLE FUNCTION:
ADVANCE CURRENT ROUND. TOGGLE "ENTER ROUND" LAMP IF PLAYER HAS ACHIEVED EYE OF RA ROUND.

SUPER JACKPOT:
SUPER JACKPOT STARTS AT 100,000,000 AND CAN BE ADVANCED BY VARIOUS FEATURES.

MULTIBALL:
MULTIBALL CANNOT BE STARTED IF A ROUND IS ALREADY IN PROGRESS. INSTEAD, AWARD 5 QUARTZ.

MULTIBALL DISABLES THE COMBO FEATURE, THE PYRAMID FEATURE, THE QUARTZ TRADE FEATURE, HURRY-UP, SPELL S-T-A-R-G-A-T-E, SARCOPHAGUS, TRANSPORTER, RA'S BRACELET, AND THE LEFT PIVOT TARGET HURRY-UP FEATURE. THESE FEATURES ARE RESTORED WHEN MULTIBALL ENDS.

MULTIBALL BEGINS BY STROBING THE LEFT PIVOT TARGET, THE RIGHT PIVOT TARGET, AND THE RIGHT KICKING TARGET (GAME ADJUSTMENT 68). COMPLETING A STROBING SHOT SCORES THE JACKPOT OF 10,000,000, ADVANCES TO THE NEXT STROBING SHOT, AND RELEASES ANOTHER BALL INTO PLAY UP TO A MAXIMUM OF 2 ADDITIONAL BALLS (GAME ADJUSTMENT 69). THE LAST STROBING SHOT IS THE PYRAMID, WHICH, WHEN COMPLETED, AWARDS SUPER JACKPOT. ALL OTHER STROBING SHOTS MUST BE COMPLETED BEFORE THE PYRAMID STARTS STROBING.

COMPLETING THE PYRAMID SHOT RESETS THE STROBING SHOTS, BUT NOW ONLY ONE SHOT IS ACTIVE AT A TIME. COMPLETING THE LAST SHOT AGAIN AWARDS DOUBLE SUPER JACKPOT.

OPEN THE SARCOPHAGUS GATE WHEN MULTIBALL ENDS.

SANDSTORM:
PUT 2 ADDITIONAL BALLS INTO PLAY AND STROBE 7 SHOTS. COMPLETING A STROBING SHOT ADDS 10,000,000 TO SANDSTORM BONUS. SANDSTORM BONUS IS COLLECTED AT THE END OF THE BALL, THEN RESET.

STARGATE MULTIBALL:
STARGATE MULTIBALL IS AWARDED FOR COMPLETING ALL 7 SEGMENTS OF THE STARGATE. THE PLAYER ENTERS INTO THREE BALL MULTIBALL PLAY WITH 7 STROBING SHOTS ACTIVE. COMPLETING A SHOT ELIMINATES THAT SHOT AND AWARDS 20,000,000. COMPLETING ALL SEVEN SHOTS AWARDS SUPER JACKPOT.

EYE OF RA ROUND:
SERVE ALL BALLS INTO PLAY. STAGE 1 STARTS BY SENDING OUT THE GLIDERCRAFT. THE PLAYER MUST HIT THE CENTER KICKING TARGET, THE BULLSEYE TARGET OR THE PYRAMID MULTIPLE TIMES TO DESTROY THE GLIDERCRAFT. WHEN THE GLIDERCRAFT IS

DESTROYED, STAGE 2 BEGINS BY SERVING ALL BALLS BACK INTO PLAY. THE PLAYER MUST NOW SHOOT THE TOP AND CENTER UPKICKERS TO DEFEAT THE GUARDS. THE PIVOT TARGETS OPEN AND CLOSE PERIODICALLY TO MAKE THIS MORE CHALLENGING. COMPLETING BOTH SHOTS BEGINS STAGE 3. AT THE START OF STAGE 3, THE PLAYER IS RETURNED TO 4 BALL MULTIBALL AND HIS OBJECTIVE IS TO SHOOT INTO THE PYRAMID IN ORDER TO ASSEMBLE THE BOMB. EACH SHOT INTO THE PYRAMID ADDS A PART TO THE BOMB. WHEN THE BOMB IS COMPLETED, THE PLAYER ENDS THE ROUND AND BEGINS REGULAR MULTIBALL. EYE OF RA ALSO ENDS IF THE PLAYER RETURNS TO 1 BALL IN PLAY DURING ANY STAGE. COMPLETING ANY STAGE AWARDS SUPER JACKPOT.

AWARDS DURING EYE OF RA ROUND:

STAGE 1 GLIDERCRAFT HITS - 5,000,000.

STAGE 2 PIVOT TARGETS - 10,000,000.
STAGE 2 STROBING UPKICKERS - 20M.

STAGE 3 PIECE OF BOMB = 30,000,000
STAGE 3 DETONATION = SUPER JACKPOT

ROUNDS

ONCE THE FIRST SIX ROUNDS HAVE BEEN PLAYED, THE PLAYER CAN ENTER THE EYE OF RA ROUND BY SHOOTING THE PYRAMID WHEN FLASHING.

SAVE SARI ROUND:

PLAYER STARTS WITH A COUNTDOWN BONUS OF 30,000,000. THE PLAYER MUST SHOOT THE TOP RIGHT UPKICKER BEFORE THE BONUS REACHES 10,000,000 IN ORDER TO COLLECT IT (GAME ADJUSTMENT 65). COLLECTING THE COUNTDOWN BONUS RESTARTS THE BONUS AT 50,000,000.

GLIDERCRAFT ROUND:

RELEASE AN ADDITIONAL BALL INTO PLAY, UP TO A MAXIMUM OF 2 ADDITIONAL BALLS (GAME ADJUSTMENT 69), FOR EACH GLIDERCRAFT HIT (CENTER KICKING TARGET OR OUTER BULLSEYE). EACH HIT SCORES:

1ST - 3RD HIT = 5,000,000.
4TH - 6TH HIT = 10,000,000.
7TH - ? HIT = 20,000,000.

BATTLE ROUND:

SHOOTING THE TOP LEFT OR TOP CENTER UPKICKERS COLLECTS AND ADVANCES THE HORUS BONUS AND ADDS TIME TO THE ROUND. THE ROUND ENDS WHEN TIME EXPIRES.

REBELLION ROUND:

SERVE ANOTHER BALL INTO PLAY. EACH POP BUMPER, LEFT KICKING TARGET OR LEFT PIVOT TARGET HIT SCORES 5,000,000. THIS ROUND LASTS UNTIL ONE BALL REMAINS IN PLAY. EACH LEFT PIVOT TARGET HIT RELEASES ANOTHER BALL INTO PLAY (GAME ADJUSTMENT 69), UP TO 2 ADDITIONAL BALLS.

QUARTZ ROUND:

SERVE ANOTHER BALL INTO PLAY. EACH RAMP SHOT AWARDS 1 QUARTZ AND RELEASES ANOTHER BALL INTO PLAY (GAME ADJUSTMENT 69), UP TO 2 ADDITIONAL BALLS. THIS ROUND LASTS UNTIL ONE BALL REMAINS IN PLAY. THE LEFT RAMP AWARDS 1 ADDITIONAL QUARTZ.

RA'S TEMPLE ROUND:

SERVE ANOTHER BALL INTO PLAY. EACH HIT ON THE RIGHT KICKING TARGET SCORES 3,000,000 AND SERVES ANOTHER BALL INTO PLAY. WHEN 2 ADDITIONAL BALLS HAVE BEEN PUT INTO PLAY, THE STROBING OF THIS SHOT STOPS AND THE PYRAMID STARTS STROBING. EACH BALL SHOT INTO THE PYRAMID SCORES 50,000,000. THIS ROUND LASTS UNTIL ONLY ONE BALL REMAINS IN PLAY.

STARGATE™

*** MISCELLANEOUS NOTES ***

BEGINNING OF GAME:

INITIAL VALUE OF HORUS BONUS IS 10,000,000.

INITIAL VALUE OF QUARTZ BONUS IS 1,000,000.

BEGINNING OF BALL:

IF THE PLAYER ATTEMPTS TO DEFEAT AN AUTOMATIC MULTIBALL BALL SERVE BY PRESSING THE MANUAL PLUNGER IN WHILE THE GAME TRIES TO SERVE A MULTIBALL INTO PLAY, THEN ALL SWITCHES ARE DISABLED UNTIL THAT BALL IS SHOT INTO PLAY.

THE FIRST PLAYFIELD SCORING SWITCH CLOSURE RESETS THE RODT, TURNS OFF THE HORUS LAMP, AND CLOSES THE LEFT PIVOT TARGET. THE GLIDERCRAFT ROUND IS STARTED ON THE LAST BALL IF THE PLAYER HAS NOT YET COMPLETED THAT ROUND (GAME ADJUSTMENT 57).

LAST BALL ONLY - THE RIGHT OUTLANE SPECIAL FLASHES OUT FOR A TIMED PERIOD IF THE PLAYER'S SCORE IS LESS THAN 30,000,000 (GAME ADJUSTMENT 61). IF THE PLAYER ENTERS MULTIBALL WHILE THIS IS FLASHING, THEN THIS FEATURE IS CANCELLED.

IF THE PLAYER COMPLETES THE #1 DROP TARGET ON THE 3 BANK WHEN FLASHING FOR 5,000,000 AND THE SHOT DID NOT HIT THE SECOND TARGET, THEN AWARD 5,000,000 AND CHANGE THE FLASHING LAMP TO THE 10,000,000 TARGET. IF THE PLAYER COMPLETES THE SECOND DROP TARGET WHEN FLASHING FOR 10,000,000 AND THE SHOT DID NOT HIT THE LAST TARGET, THEN AWARD 10,000,000 AND CHANGE THE FLASHING LAMP TO THE 20,000,000 LAMP ON THE 3 BANK. IF THE PLAYER HITS THE LAST DROP TARGET ON THE 3 BANK WHEN FLASHING FOR 20,000,000, THEN AWARD 20,000,000, CHANGE THE FLASHING LAMP TO 40,000,000 ON THE 2 BANK FOR A TIMED PERIOD (GAME ADJUSTMENT 62), AND RESET THE TWO BANK UNLESS BOTH TARGETS ARE ALREADY UP. HITTING THE LEFT TARGET ON THE 2 BANK WITHOUT HITTING THE RIGHT TARGET WHEN THE 40,000,000 IS FLASHING AWARDS 40,000,000 AND SWITCHES THE FLASHING OUT LAMP TO THE RIGHT TARGET FOR A TIMED PERIOD (GAME ADJUSTMENT 63). HITTING THE RIGHT TARGET WHEN THE 80,000,000 IS FLASHING AWARDS 80,000,000 AND ENDS THIS FEATURE. HITTING ANY OF THE TARGETS ON THE 2 BANK WHILE THERE IS A FLASHING TARGET ON THE 3 BANK ENDS THIS FEATURE. IF A LAMP IS FLASHING ON THE TWO BANK AND THE PLAYER HITS A TARGET ON THE 3 BANK, THEN THIS FEATURE IS CANCELLED. ANY TIME TWO TARGETS ARE HIT AT THE SAME TIME, THIS FEATURE IS CANCELLED.

ANY TIME A PLAYER COMPLETES BOTH OUTSIDE TARGETS ON THE 3 BANK AND LEAVES THE MIDDLE TARGET STANDING, THEN THE MIDDLE TARGET IS LIT FOR ADDING 1 QUARTZ.

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. In most cases the Credit button can be used to restart each test (see Testmode Flowchart).

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.

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 an 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. Only one lamp at a time should flash during this test.

D. RELAY AND SOLENOID TEST

This test will allow an 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 switch(s) which have not been operated in the course of the last 15 games (INOPERATIVE SWITCHES). The second part of the test will report any switch(s) which are stuck closed. If no switches are closed when this test is started, the message "ALL SWITCHES OPEN" will be displayed. If any switches are closed, the closed switch(s) name and number will continuously 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. SWITCH EDGES TEST

This test will display the name and number of any switch that is actuated. When actuating each switch, a problem exists if either no switch is shown or any switch other than the one actuated is displayed.

G. DISPLAY TEST

This test checks 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. 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.

H. SOUND TEST

This test checks 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. 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.

J. FRONT DOOR TEST

This test checks 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.

K. 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

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

COIN CHUTE SETTING TABLE

Country		Coin Chutes Left 1	Right 2	Center 3	4	Plays/Coin(s)	Chute Adjustment Steps 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
Greece		50D	50D	-	-	1/100 Drachma	01 01 00 00 02 00 00 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	1	5Kr	10Kr	20Kr	-	1/5Kr, 2/10Kr, 4/20Kr	01 02 04 00 01 00 00 00
	2	5Kr	10Kr	20Kr	-	1/10Kr, 3/20 Kroner	01 02 04 00 02 04 01 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

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 #33).** 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.

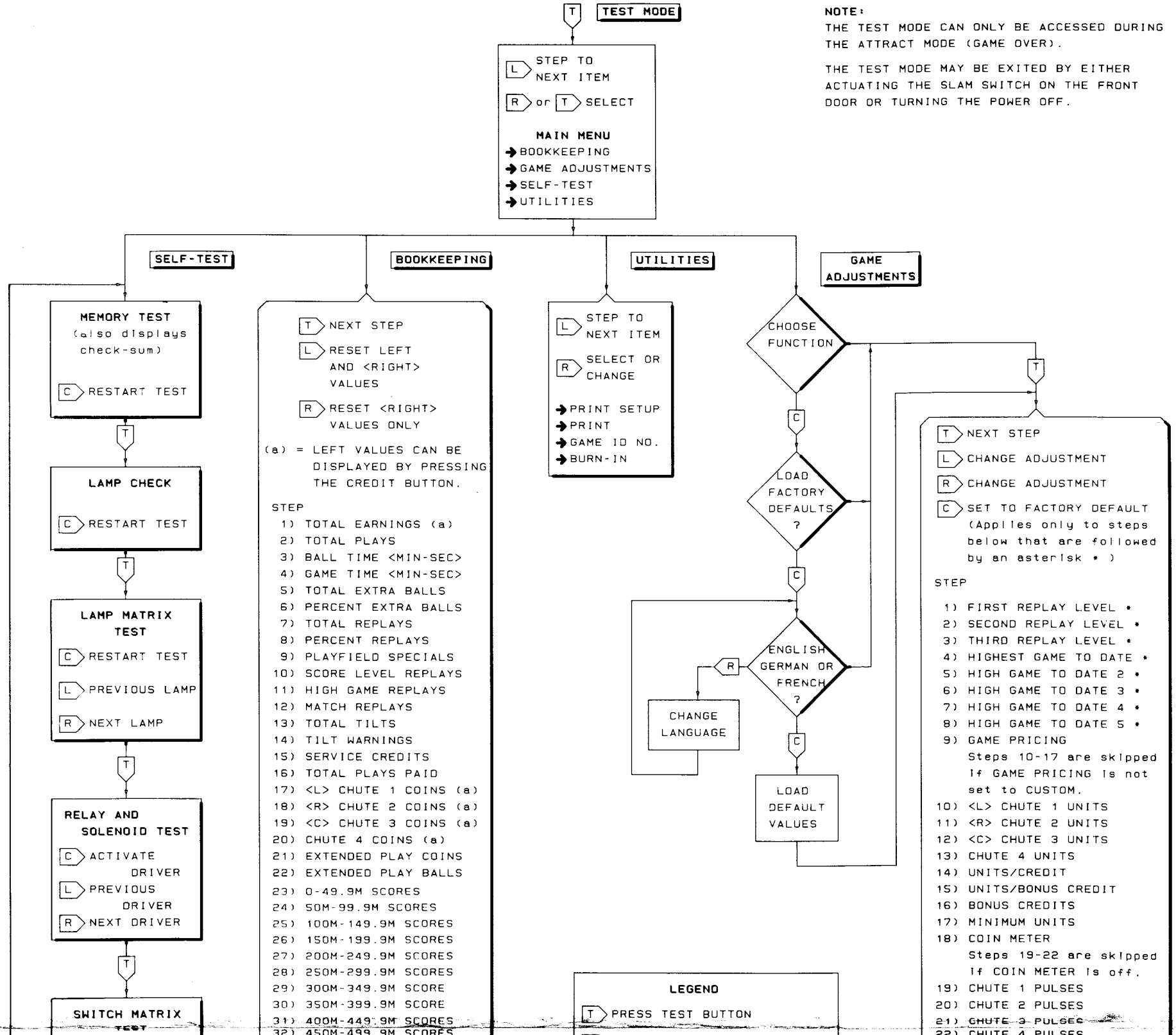
35) HIGH GAME REPLAYS
This step is used to set the number of replays to award when the highest game to date has been beaten.

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.

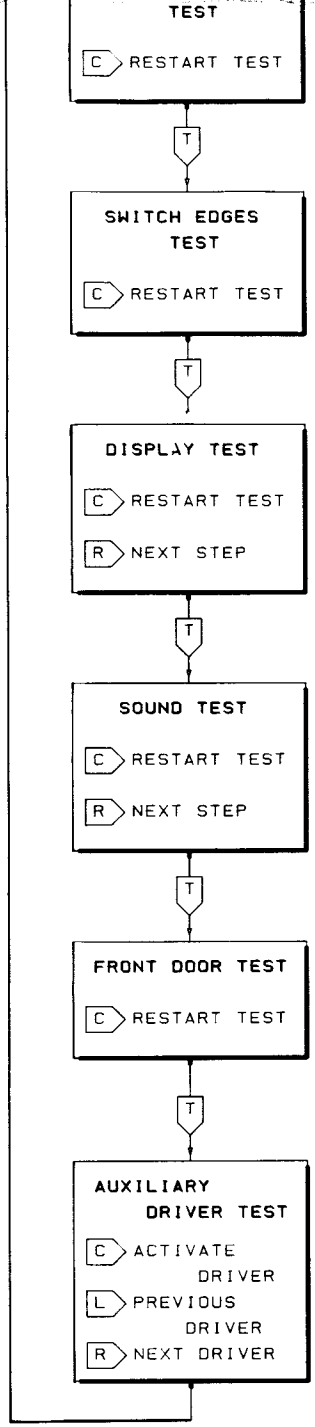
38) BALLS PER GAME
This step sets the number of balls per game to 1-5.

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.



32) 450M-499.9M SCORES
33) 500M-599.9M SCORES
34) 600M+ 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) BATTLE ROUNDS
45) BATTLE BONUS COLLECT
46) GLIDERCRAFT ROUNDS
47) GLIDERCRAFT HITS
48) REBELLION ROUNDS
49) REBELLION HITS
50) RA'S TEMPLE ROUNDS
51) RA'S TEMPLE (TARGET)
52) RA'S TEMPLE (PYRAMID)
53) QUARTZ ROUNDS
54) TOTAL QUARTZ ADDED
55) SAVE SARI ROUNDS
56) FIRST SARI BONUS WON
57) MULTIBALL
58) MULTIBALL JACKPOTS
59) STARGATE MULTIBALL
60) STARGATE JACKPOTS
61) SANDSTORM
62) SANDSTORM JACKPOTS
63) EYE OF RA - STAGE 1
64) EYE OF RA - STAGE 2
65) EYE OF RA - STAGE 3
66) HIGH COMBO SPECIALS
67) HURRY-UP SPECIALS
68) TRANSPORTER EB'S
69) HURRY-UP EXTRA BALLS
70) MIN TIME EXTRA BALLS
71) ROLLOVER EXTRA BALLS
72) PYRAMIDS COMPLETED
73) SARCOPHAGUS SKILLSHOT
74) ADVANCE SUPER JACKPOT
75) SUPER JACKPOTS WON
76) ADD COMBOS
77) 80M AWARDS
78) 3-BANK ADD QUARTZ
79) RA'S POWER AWARDS
80) RA'S BRACELET AWARDS
81) TRANSPORTER AWARDS
82) ENTERED QUARTZ TRADE
83) GLIDERCRAFT ABORT
84) BALL GATE ABORT
85) MISSING BALL COUNT

C PRESS CREDIT BUTTON

L PRESS LEFT FLIPPER BUTTON

R PRESS RIGHT FLIPPER BUTTON

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) HIGH GAMES RESET
54) PRINT BOOK RESET
55) GAME DIFFICULTY
56) ROUND TIMING
57) AUTO GLIDERCRAFT RND
58) HORUS TIME
59) RA'S BRACELET TIME
60) HURRY-UP TIME
61) SPECIAL TIME
62) 40,000,000 TIME
63) 80,000,000 TIME
64) SARCOPHAGUS TIME
65) SARI COUNTDOWN RATE
66) AUTO-SKILL
67) HIGH COMBOS TO DATE *
68) MULTIBALL FEATURE
69) ADD-A-MULTIBALL
70) REDUCED SCORING
71) BALL TIME SAFETY
72) BALL GATE
73) HIGH COMBOS SPECIAL
74) MINIMUM GAME TIME

with each replay. In Tickets Only mode one or more tickets will be issued in place of each replay won. In Add a Ball mode all Score Level Replays and Playfield Specials award an extra ball in place of a replay. Also the Match and High Game To Date awards are disabled. However, after the Add a Ball mode is selected, the PLAYFIELD SPECIAL, MATCH PERCENT PAYOUT, and HIGH GAME REPLAYS adjustments may be individually set to whatever setting may be desired. In Novelty mode all Specials award 200,000,000 points, Extra Balls award 100,000,000 points and the Score Replay Levels, Match, and High Game to Date awards are disabled.

NOTE: If either the Replay + Tickets or Tickets Only setting is selected do not set the COIN METER setting to on.

40) TICKETS TO AWARD
This step allows the operator to set the number of tickets to award when a replay has been won. This setting will only apply when the GAME MODE is set to either Replay + Tickets, or Tickets Only.

41) LANGUAGE
This step allows the Test Mode steps to be displayed in English, German, or French.

42) AUTO-PERCENTAGING
If this step is set to on, the Score Replay Levels will be adjusted periodically so that the Game Percent Payout setting will match the actual Replay Percentage displayed in Bookkeeping.

NOTE: If the GAME MODE is set to Add a Ball, the Extra Ball Percentage in bookkeeping is used in place of the Replay Percentage.

43) REPLAY LIMIT
This step may be set to no limit or one per player per game.

44) HIGH GAMES 2-5
This step will determine if High Games to Date (2-5) will be saved or erased when power is turned off.

45) ATTRACT SOUND
This step determines whether or not sounds are enabled during the attract mode (game over).

46) ATTRACT MESSAGE 1
This step is used to enter, enable, or disable an operator message. The message is permanently stored in memory and will be periodically displayed during the attract mode (game over). To enter a message press the Credit button. The current message will be displayed and the cursor position will be indicated by the flashing character. If the current position is blank, a flashing directional arrow will appear. This type of arrow will indicate which direction the cursor will move if the Credit button is pressed. The characters are chosen using the left and right flipper buttons and then entered into memory by pressing the Credit button.

47) ATTRACT MESSAGE 2
This step is used to enter, enable, or disable an second operator message. See step 43 above for details. When both messages are enabled they will be displayed consecutively.

48) RIGHT BOOKKEEPING AUTO-RESET
If this step is set to on, all the short term bookkeeping steps (in brackets) will reset after 2000 plays. Otherwise they will not reset until 10,000 games have been played on the machine.

49) PLAYFIELD SPECIAL
When a playfield special is won, either a replay or an extra ball is awarded to the player based on the setting of this step.

50) REPLAY LEVEL BOOST
This step may be set anywhere from 0 to 990,000,000 in increments of 10,000,000. If set to zero, the boost is disabled. Otherwise the Replay Level will be increased by the boost value after completing a game where a player has won a replay and his skill level has been determined to be above average. The Replay Level will return back to its base level once all of the replays won have been played.

51) GAME RESTART
This step is used to enable or disable the credit button from starting a new game while currently in a game. If set to ON, a new game will begin when the credit button is pressed if there are any remaining credits. If set to OFF, a new game cannot be started until the current game has ended.

52) GAME INACTIVITY TIMER
This timer can be used to cause a game to go to game over automatically if there is no activity on the playfield for a specified time period. This period can be set from one to nine minutes. Setting this step to zero disables the timer.

53) HIGH GAMES RESET
All the high games to date will reset back to their factory settings automatically when the set number of plays is reached. This step can be set from 100 to 9900 plays. If set to 0 (disabled), the high games can only be reset by hand.

54) PRINT BOOK RESET
If this step is set to on, all the short term bookkeeping steps (in brackets) will reset automatically after any printout of bookkeeping data has finished.

OPERATOR ADJUSTMENT SETTINGS
(*** = ENGLISH & GERMAN FACTORY DEFAULT SETTING)
(** = FRENCH FACTORY DEFAULT SETTING)

55) GAME DIFFICULTY
THE ADJUSTMENTS LISTED IN THE TABLE BELOW ARE AUTOMATICALLY SET AS INDICATED IN THE TABLE UNLESS FINE-TUNE IS SELECTED USING THE RIGHT FLIPPER BUTTON. IF FINE-TUNE IS SELECTED, EACH STEP IN THE TABLE CAN BE ADJUSTED INDIVIDUALLY. OTHERWISE, THESE STEPS ARE SKIPPED. WHEN FINE-TUNE IS SELECTED, ALL SETTINGS REVERT BACK TO THE FACTORY DEFAULT SETTINGS AS SHOWN IN THE TABLE BELOW.

STEP				(ENG.) ***	(FR.) **	(GER.) ***
55	GAME DIFFICULTY	VERY EASY	EASY	MEDIUM	HARD	VERY HARD
56	ROUND TIMING	VERY EASY	EASY	MEDIUM	HARD	VERY HARD
57	AUTO GLIDERCRAFT ROUND	ON	ON	ON	OFF	OFF
58	HORUS TIME	EASY	EASY	MEDIUM	MEDIUM	HARD
59	RA'S BRACELET TIME	EASY	EASY	MEDIUM	MEDIUM	HARD
60	HURRY-UP TIME	EASY	EASY	MEDIUM	MEDIUM	HARD
61	SPECIAL TIME	EASY	EASY	MEDIUM	HARD	HARD
62	40,000,000 TIME	EASY	EASY	MEDIUM	MEDIUM	HARD
63	80,000,000 TIME	EASY	EASY	MEDIUM	MEDIUM	HARD
64	SARCOPHAGUS TIME	EASY	EASY	MEDIUM	MEDIUM	HARD
65	SARI COUNTDOWN RATE	EASY	EASY	EASY	HARD	HARD

56) ROUND TIMING
Controls how fast a round times out.
VERY EASY = Slowest
EASY = Slow
*** MEDIUM = Average
** HARD = Faster
VERY HARD = Fastest

57) AUTO GLIDERCRAFT ROUND
Determines whether or not a player goes into the glidercraft round upon his first scoring switch closure on the last ball in play.
** OFF = NO
*** ON = YES

58) HORUS TIME
Determines how much time the player gets for the Horus flash out feature.
EASY = 30 time units.
*** MEDIUM = 20 time units.
HARD = 10 time units.

59) RA'S BRACELET TIME
Determines how much time the player gets for the Ra's bracelet flash out feature.
EASY = 10 time units.
*** MEDIUM = 5 time units.
HARD = 3 time units.

60) HURRY-UP TIME
Determines how much time the player gets for the hurry-up flash out feature.
EASY = 20 time units.
*** MEDIUM = 15 time units.
HARD = 10 time units.

61) SPECIAL TIME
Determines how much time the player gets for the special flash out feature.
EASY = 20 time units.
*** MEDIUM = 15 time units.
** HARD = 10 time units.

62) 40,000,000 TIME
Determines how much time the player gets for the 40,000,000 flash out feature.
EASY = 15 time units.
*** MEDIUM = 10 time units.
HARD = 5 time units.

63) 80,000,000 TIME
Determines how much time the player gets for the 80,000,000 flash out feature.
EASY = 15 time units.
*** MEDIUM = 10 time units.
HARD = 5 time units.

64) SARCOPHAGUS TIME
Determines how much time the player gets for the sarcophagus flash out feature.
EASY = 20 time units.
*** MEDIUM = 15 time units.
HARD = 10 time units.

65) SARI COUNTDOWN RATE
Determines how fast the Sari bonus counts down.
*** EASY = Slower.
** HARD = Faster.

66) AUTO-SKILL
Various game features become more difficult as the game recognizes a player's increased skill level.
OFF = Disabled
*** ON = Enabled

67) HIGH COMBOS TO DATE
Sets the current high combos to date value (1-99). The factory default value can be reloaded by pressing the credit button while on this step.

68) MULTIBALL FEATURE
Determines how many shots are strobed when player starts regular multiball.
*** EASY = Strobe 3 shots.
** MEDIUM = Strobe 2 shots.
HARD = Strobe 1 shot.

69) ADD-A-MULTIBALL
Determines how many additional balls can be put into play during multiball.
EASY = 2 balls.
*** MEDIUM = 1 ball.
HARD = 0 balls.

70) REDUCED SCORING
Controls whether the game scores using regular or reduced score values.
*** OFF = Regular scoring.
ON = Reduced scoring.

In reduced scoring,
Super Jackpot increments are 50M instead of 100M.
Double Super Jackpot increments are 100M instead of 200M.
Ra's bracelet maximum is 10M instead of 20M.
Sandstorm bonus increments are 5M instead of 10M.
Trade Quartz has 5M and 25M awards instead of 10M and 50M.
Less time for 40M and 80M drop target hurry-up timers.
Battle bonus increments by 5M instead of 10M.
Glidercraft round maximum is 10M instead of 20M.

71) BALL TIME SAFETY
Should a ball drain very quickly, it will be returned to the shooter based upon this setting. This timer is active once per ball.
VERY EASY = 10 SECONDS.
EASY = 8 SECONDS.
*** MEDIUM = 6 SECONDS.
** HARD = 4 SECONDS.
VERY HARD = NO SAFETY TIME.

72) BALL GATE
This step allows you to control the operation of the ball gate.
*** EASY = Gate open at start of ball and is toggled by kicking rubbers and return lanes.
** HARD = Most switches close the ball gate. Gate is opened by lower ramp opto, left side rollover, and left outlane.

73) HIGH COMBOS SPECIAL
Award a special when High Combos to Date has been beaten?
OFF = No
*** ON = Yes

74) MINIMUM GAME TIME
This step allows for continuing play up to an adjusted minimum time (0 - 4 minutes).
*** 0 = no minimum time.

IV. UTILITIES

Use the left flipper button to choose (highlight) a function and then the right flipper button to select or change the value of the function. Each utility is described below.

A. PRINT

Bookkeeping - all values
Short Bookkeeping - first 8 values

CAUTION

After printing is finished, all the short term bookkeeping steps (in brackets) will automatically reset if the PRINT BOOK RESET game adjustment is set to ON.

B. PRINTER SET-UP

Type - NSM DATA or SERIAL
Baud Rate - 1200, 2400, 4800, 9600
Data - 7 bit or 8 bit
Parity - none, even, or odd

C. ID NUMBERS

Two six digit numbers can be entered in permanent memory during this step. One is a GAME ID and the other is an ARCADE ID. These two ID's appear on all printouts. Also the GAME ID number will appear in the display on power-up. The left and right flipper buttons alter the digit value and the credit button enters the displayed value into memory and then proceeds to the next digit position.

D. BURN-IN

This function can be used to continuously exercise all the lamps and solenoids in the game.

V. TOURNAMENT MODE

The Tournament Mode switch provides a simple way to alter some of the normal game settings in order to provide for tournament play. The switch is located on a circut board just inside the front door of the game to the lower left. The game must be in a game over condition in order to recognize the switch changing states. When the switch is moved to the "ON" position with the front door open, four Tournament Mode adjustments will appear on the display. These adjustments can be altered by using the left flipper button to select the function and the right flipper button to alter the current setting. Once these settings have been chosen they will remain in permanent memory so that all that has to be done each subsequent time that tournament play is desired is to move the switch to the "ON" position. When the Tournament Mode settings are in effect they override the normal Game Adjustment settings. When the switch is moved to the "OFF" position, all the normal Game Adjustment settings are back in effect.

NOTE: Even if the game will not be used for tournament play, this switch can be used to provide an easy way to set the game for FREE PLAY without affecting any other game settings by setting the remaining three Tournament Mode adjustments to "NORMAL".

Each Tournament Mode adjustment is described below.

*** = Factory Default Setting

1) FREE PLAY
*** OFF = Credits are required to start a game.
ON = A game may be started without any credits posted.

2) GAME FEATURES
*** NORMAL = Normal play.
TOURNAMENT =
Various game features are altered as described below in order to provide the same odds for all players.
a) No automatic Glidercraft round on last ball.
b) High Combos to Date always set to 99 combos.
c) Round timing is not changed due to player's skill level.
d) Ball time safety disabled.
e) Minimum game time disabled.

3) SPECIAL/REPLAY
*** NORMAL = Normal play.
POINTS =
Playfield Special awards 200,000,000 points. Match, High Game to Date, and Score Replay Level payouts are disabled.

4) EXTRA BALL
*** NORMAL = Normal play.
POINTS =
Extra Ball awards 100,000,000 points.

III. TEST MODE

SERVICE SWITCH

The switch is actuated when the front door is closed. With the front door closed, all bookkeeping steps are incremented normally. When the front door is opened all bookkeeping steps are frozen at their current values. Any credits that are added with the front door open are recorded in the SERVICE CREDITS bookkeeping steps.

AUTO-PRINT FEATURE

If there is a Communications Adapter installed in the game, the printer will immediately begin printing the first eight bookkeeping values as soon as it is plugged in during game over. If a different printout option is required the Test Mode must be entered first before plugging the printer in so that the immediate printout process does not begin. After printing is finished, all the short term bookkeeping steps (in brackets) will automatically reset if the PRINT BOOK RESET game adjustment is set to ON.

INOPERATIVE SWITCH REPORT

An inoperative switch report can be displayed by holding the credit button in during game over if there are no credits remaining and the game is not set for free play. Any switch that has not been operated in any of the last 15 games played will be reported.

SOUND ADJUSTMENTS

The speaker(s) output is controlled by the volume control located on a circuit board just inside the front door of the game to the lower left. Turning the volume control counter-clockwise will decrease the volume. Turning it clockwise will increase the volume.

POST ADJUSTMENTS

The post to the left of the lower pop bumper and the posts at the mouth of the right outlane can be positioned for liberal/conservative play. The smaller openings produce a more liberal game.

IV. THEORY OF OPERATION

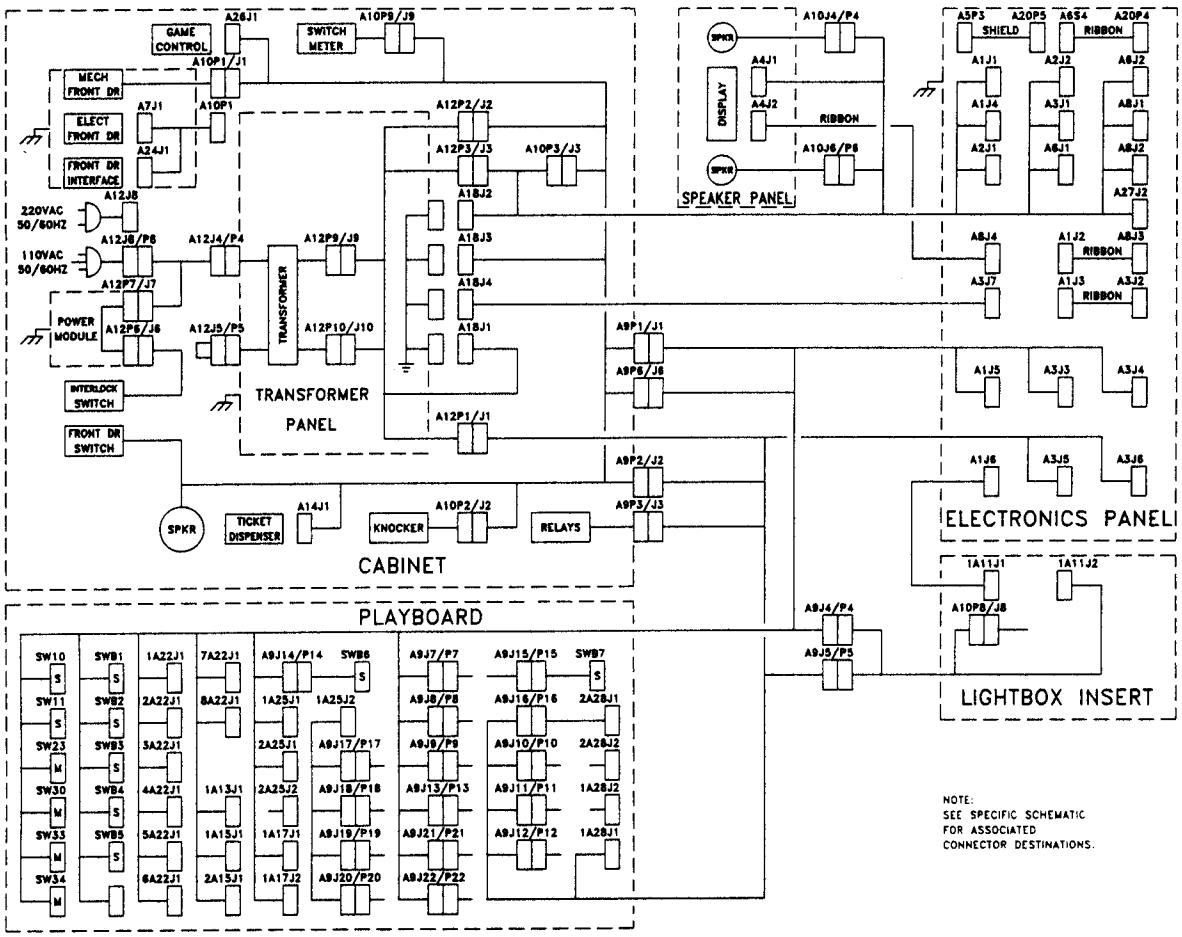


FIGURE 1. INTERCONNECTION DIAGRAM

IV. THEORY OF OPERATION

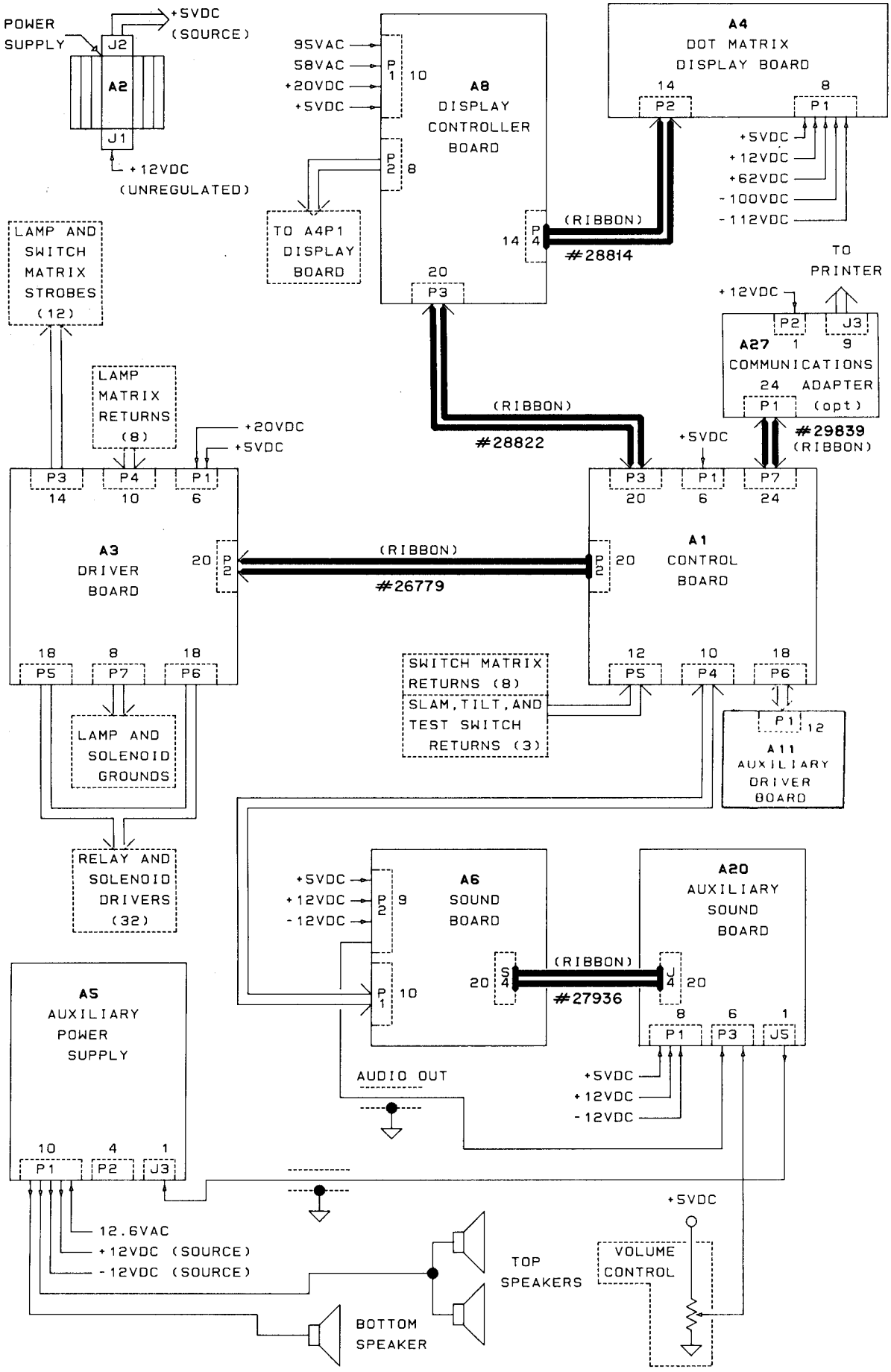


FIGURE 2. SYSTEM 3 BLOCK DIAGRAM

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 accomodate 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

(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'c 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 comparitor (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 comparitor (pins 9 & 10). Because the strobe pulses and receive pulses are out of phase, they cancel at resistors R1 & R3 and keep comparitor

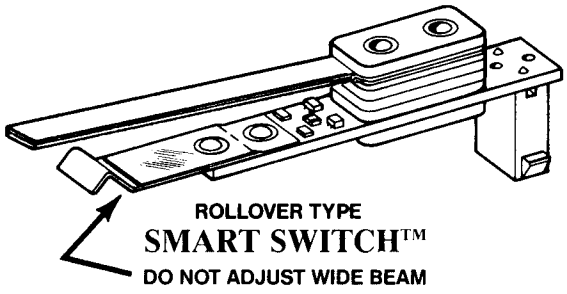
output pin 13 high therefore preventing Q1 from passing strobes on to the switch return line.

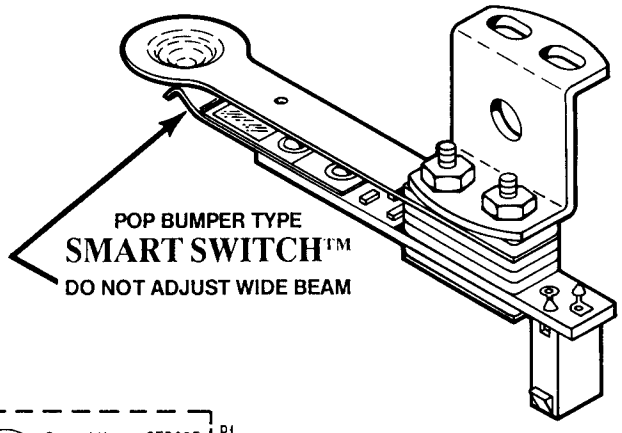
As a ball passes between the opto transmitter and receiver, the light beam is broken. Now, with no out of phase pulses coming from the receiver, the strobe appears at comparitor inputs 9 & 10. Comparitor output pin 13 begins pulsing low and passes the strobes through Q1 to the return line to signal a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

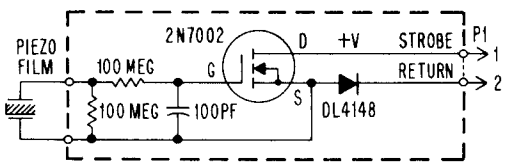
The above principles also apply when using the quad optical interface board with a few exceptions. Four opto switches are processed by only one interface board. The switch strobes are not buffered, but are connected through 120 ohm 5 watt resistors to the opto LEDs. All of the opto switch comparators feed a common return transistor Q5, but still have individual red LEDs to indicate which of the four opto switches are closed.

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.







SCHEMATIC REPRESENTATION

NOTES

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		10 Amp
F9	Playfield Illumination		7-1/2 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	BOTTOM POP BUMPER (Q1)	16570 (GREEN)	5064
F16	1-1/2 AMP SLO-BLO	EL-24	TOP POP BUMPER (Q2)	16570 (GREEN)	5064
F17	1-1/2 AMP SLO-BLO	EL-24	LEFT KICKING RUBBER (Q3)	5195 (WHITE)	5064
F18	1-1/2 AMP SLO-BLO	EL-24	RIGHT KICKING RUBBER (Q4)	5195 (WHITE)	5064
F19	1-1/2 AMP SLO-BLO	EL-24	LEFT KICKING TARGET (Q5)	5195 (WHITE)	5064
F20	1-1/2 AMP SLO-BLO	EL-24	CENTER 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	2-1/2 AMP SLO-BLO	EL-21	TOP RIGHT FLIPPER	25959 (RED)	5065
F25	2 AMP SLO-BLO	EL-7	LOWER LEFT KICKER (Q8)	19300 (ORANGE)	5064
F26	2 AMP SLO-BLO	EL-7	SHOOTER LANE KICKER (Q9)	19300 (ORANGE)	5064
F27	1-1/2 AMP SLO-BLO	EL-24	TOP LEFT UPKICKER (Q10)	16570 (GREEN)	21411
F28	1 AMP SLO-BLO	EL-6	TOP CENTER UPKICKER (Q11)	17876 (TAN)	21411
F29	1 AMP SLO-BLO	EL-6	TOP RIGHT UPKICKER (Q12)	17876 (TAN)	21411
F30	1/2 AMP SLO-BLO	EL-20	LOWER LEFT BALL GATE (Q13)	31272 (BLUE)	5065
F31	1/2 AMP SLO-BLO	EL-20	LEFT PIVOT TARGET (Q14)	31272 (BLUE)	5065
F32	1/2 AMP SLO-BLO	EL-20	RIGHT PIVOT TARGET (Q15)	31272 (BLUE)	5065
F33	1/2 AMP SLO-BLO	EL-20	PYRAMID UNIT (Q16)	31272 (BLUE)	5065
F34	1/2 AMP SLO-BLO	EL-20	BALL RELEASE (Q28)	26451 (YELLOW)	5065
			OUTHOLE (Q29)	26451 (YELLOW)	5065
			ROLLOVER TARGET TRIP (Q20)	26452 (PINK)	----
			ROLLOVER TARGET RESET (Q19)	26450 (PINK)	25605
			2 BANK TARGET RESET (Q18)	26450 (PINK)	25605
F35	1 AMP SLO-BLO	EL-6	3 BANK TARGET RESET (Q17)	26926 (BLUE)	5172

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-31272	GENERAL PURPOSE	44.8/268	2200/3575	#30/#34	BLUE
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

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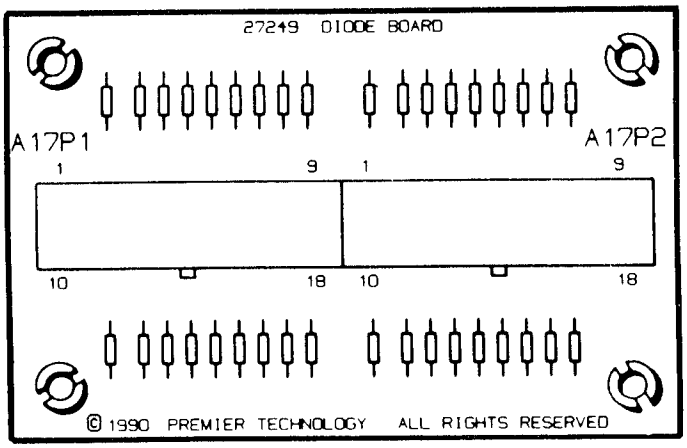
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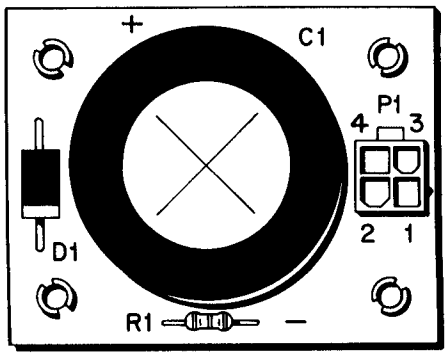
DIODE BOARD (A17) COMPONENT LOCATION



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

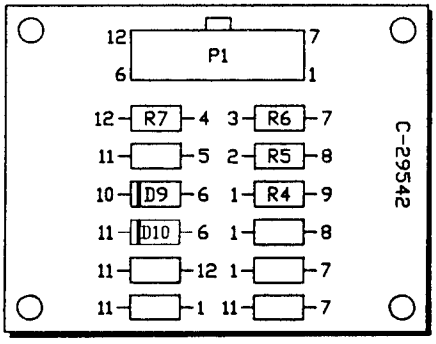
FILTER BOARD (A16) COMPONENT LOCATION



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

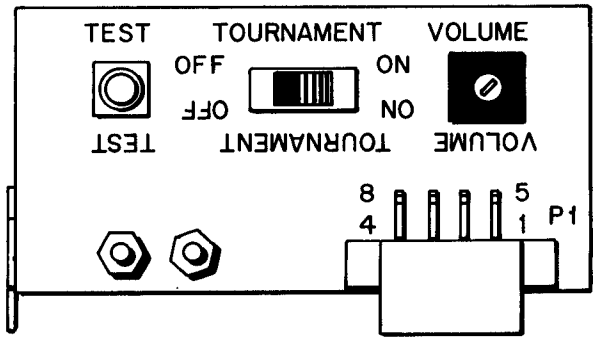
RESISTOR BOARD (A13) COMPONENT LOCATION



RESISTOR BOARD (A13) PARTS LIST

REFERENCE	DESCRIPTION	PART NUMBER
	RESISTOR BOARD (A13)	30987
D9, D10	DIODE, 1N4004	XO-254
R4-R7	RESISTOR, 220 OHM,5%,1/4W	XO-21
P1	HEADER, 12 POSITION	XO-913
	SPACER,(4)	23984

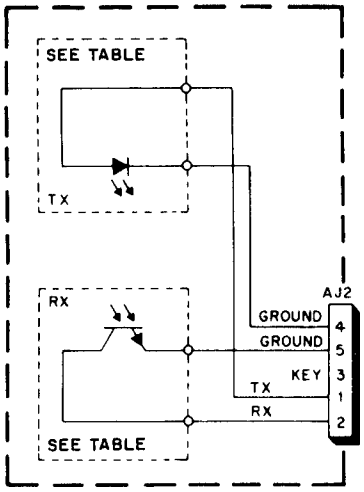
GAME CONTROLS BOARD (A26) COMPONENT LOCATION



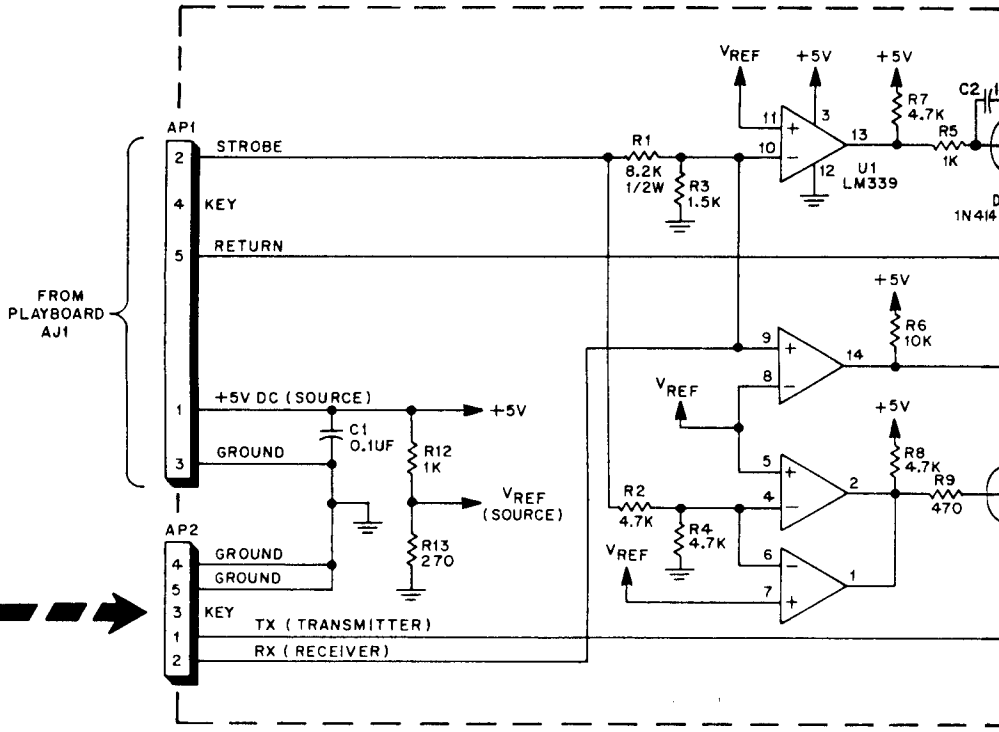
GAME CONTROLS BOARD (A26) PARTS LIST

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

OPTO LED TRANSMITTER BOARD SCHEMATIC DIAGRAM

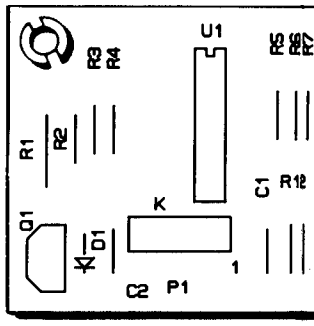


OPTO PHOTOTRANSISTOR RECEIVER BOARD SCHEMATIC DIAGRAM

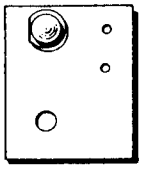


OPTICAL INTERFACE BOARD SCHEMATIC DIA

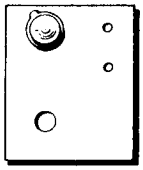
OPTICAL INTERFACE COMPONENT LO



OPTO LED TRANSMITTER BOARD COMPONENT LOCATION



OPTO PHOTOTRANSISTOR RECEIVER BOARD COMPONENT LOCATION



OPTO LED TRANSMITTER BOARD PARTS LIST

REFERENCE	DESCRIPTION	PART NUMBER
	Opto LED Transmitter Assembly	SEE TABLE
TX	Plastic Transmitter LED	XO-994

OPTO PHOTOTRANSISTOR RECEIVER BOARD PARTS LIST

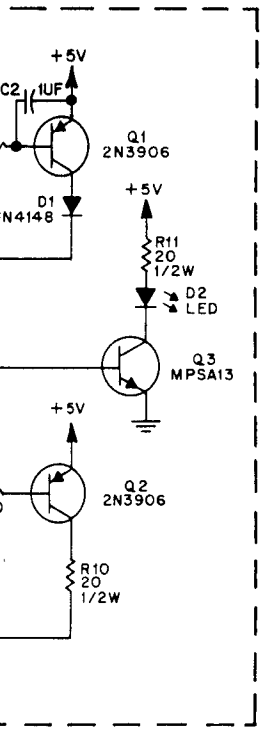
REFERENCE	DESCRIPTION	PART NUMBER
	Opto Phototransistor Receiver Assembly	SEE TABLE
RX	Plastic Phototransistor	XO-993

OPTICAL INTERFACE PARTS LI

REFERENCE	DESCRIPTION
	Optical Interface Boa
AP1,AP2	5 Pin Header
C1	Capacitor, 0.1UF, +8
C2	Capacitor, 1UF, NON-
D1	Diode, 1N4148
D2	Diode, MV5752 (LED, R
Q1,Q2	Transistor, PNP, 2N3
Q3	Transistor, NPN, MPSA
R1	Resistor, 8.2K Ohm,
R2,R4,R7,R8	Resistor, 4.7K Ohm, 5
R3	Resistor, 1.5K Ohm, 5
R5,R12	Resistor, 1K Ohm, 5%,
R6	Resistor, 10K Ohm, 5%
R9	Resistor, 470 Ohm, 5%
R10,R11	Resistor, 20 Ohm, 5%,
R13	Resistor, 270 Ohm, 5%
U1	IC, Quad Comparators,
	Support, SRS-8-6N, (2

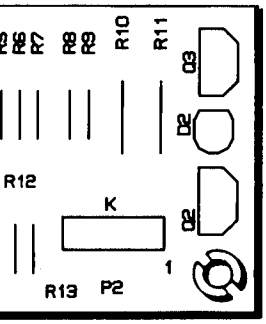
BRACKET AND OPTO BOARD ASSEMBLY REFERENCES					
ASSEMBLY	CONNECTOR NO.	BRACKET NO.	LOCATION	TRANSMITTER	RECEIVER
31184	2A25J1-2,5'	31183	TOP PYRAMID TROUGH	31240	31241

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



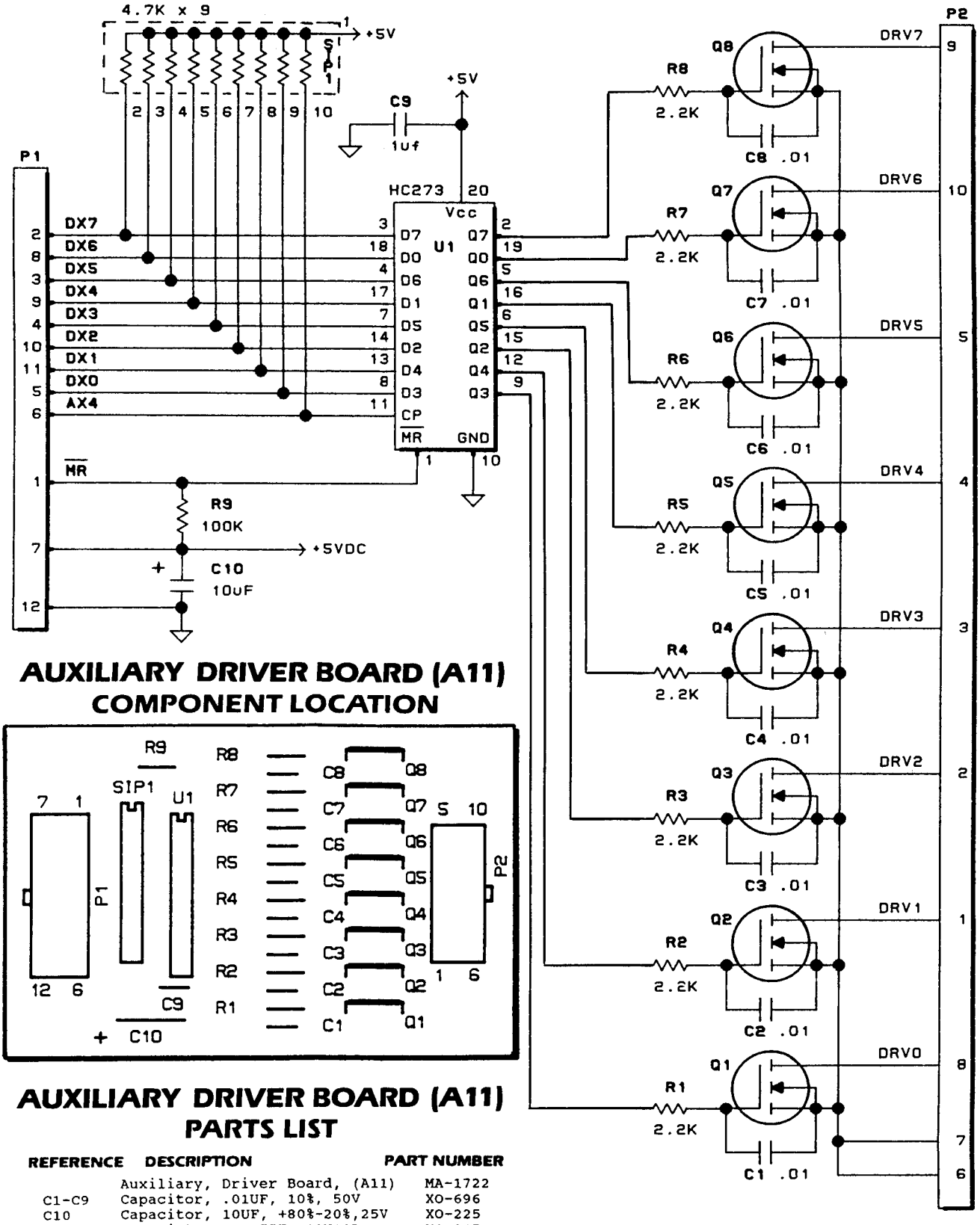
DIAGRAM

ACE BOARD (A25)
T LOCATION



ACE BOARD (A25)
S LIST

	PART NUMBER
e Board Assembly	MA-1558
	XO-1002
, +80%-20%, 50V	XO-230
NON-POLAR, 50V	XO-746
	XO-261
ED, Red)	XO-270
2N3906	XO-588
MPSA13	XO-304
Ohm, 5%, 1/2W	XO-1022
hm, 5%, 1/4W	XO-7
hm, 5%, 1/4W	XO-20
, 5%, 1/4W	XO-5
m, 5%, 1/4W	XO-18
m, 5%, 1/4W	XO-35
, 5%, 1/2W	XO-65
m, 5%, 1/4W	XO-68
tors, LM339	XO-583
N, (2)	23984

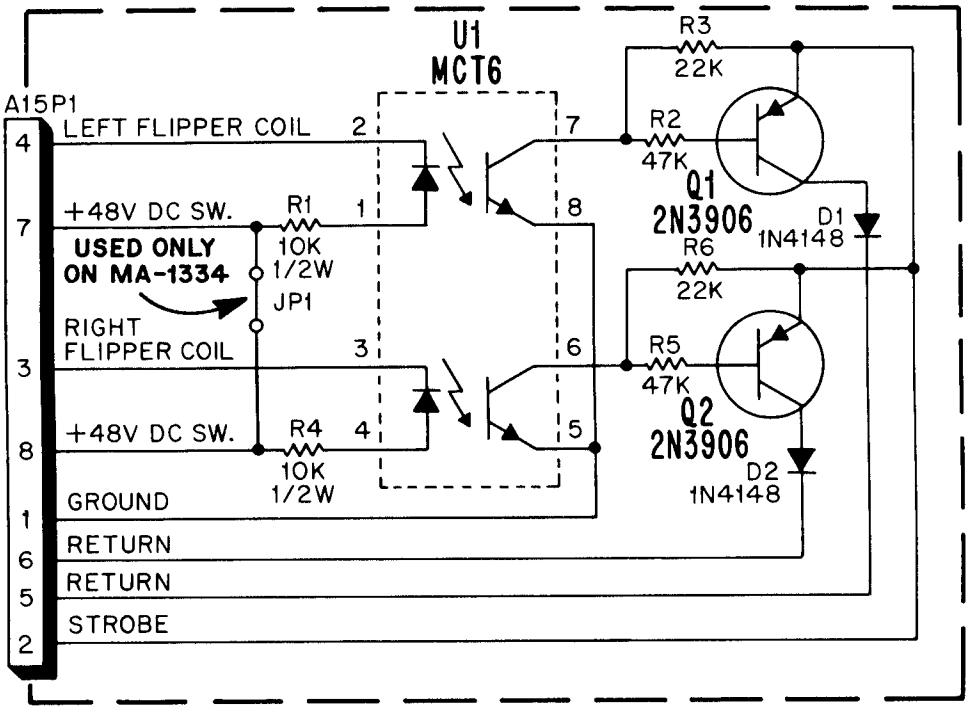


AUXILIARY DRIVER BOARD (A11)
COMPONENT LOCATION

AUXILIARY DRIVER BOARD (A11)
PARTS LIST

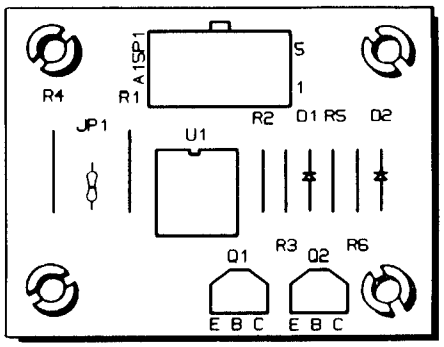
REFERENCE	DESCRIPTION	PART NUMBER
	Auxiliary, Driver Board, (A11)	MA-1722
C1-C9	Capacitor, .01UF, 10%, 50V	XO-696
C10	Capacitor, 10UF, +80%-20%,25V	XO-225
Q1-Q8	Transistor, MOSFET, 12N10L	XO-947
R1-R8	Resistor, 2.2K, OHM, 5%, 1/4W	XO-27
R9	Resistor, 100K OHM, 5%, 1/4W	XO-45
SIP1	Resistor Pack, 4.7 OHM X 9	XO-906
U1	IC,Octal "D" Flip-Flop, 74HC273	XO-949
P1	Header, 12 Position	XO-913
P2	Header, 10 Position	XO-912

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



Premier® Technology			
TITLE: SENSOR BOARD (A15) SCHEMATIC DIAGRAM			
DRAWN	APPROVED	DATE	E-27041
	RHM	10-12-89	

SENSOR BOARD (A15) COMPONENT LOCATION

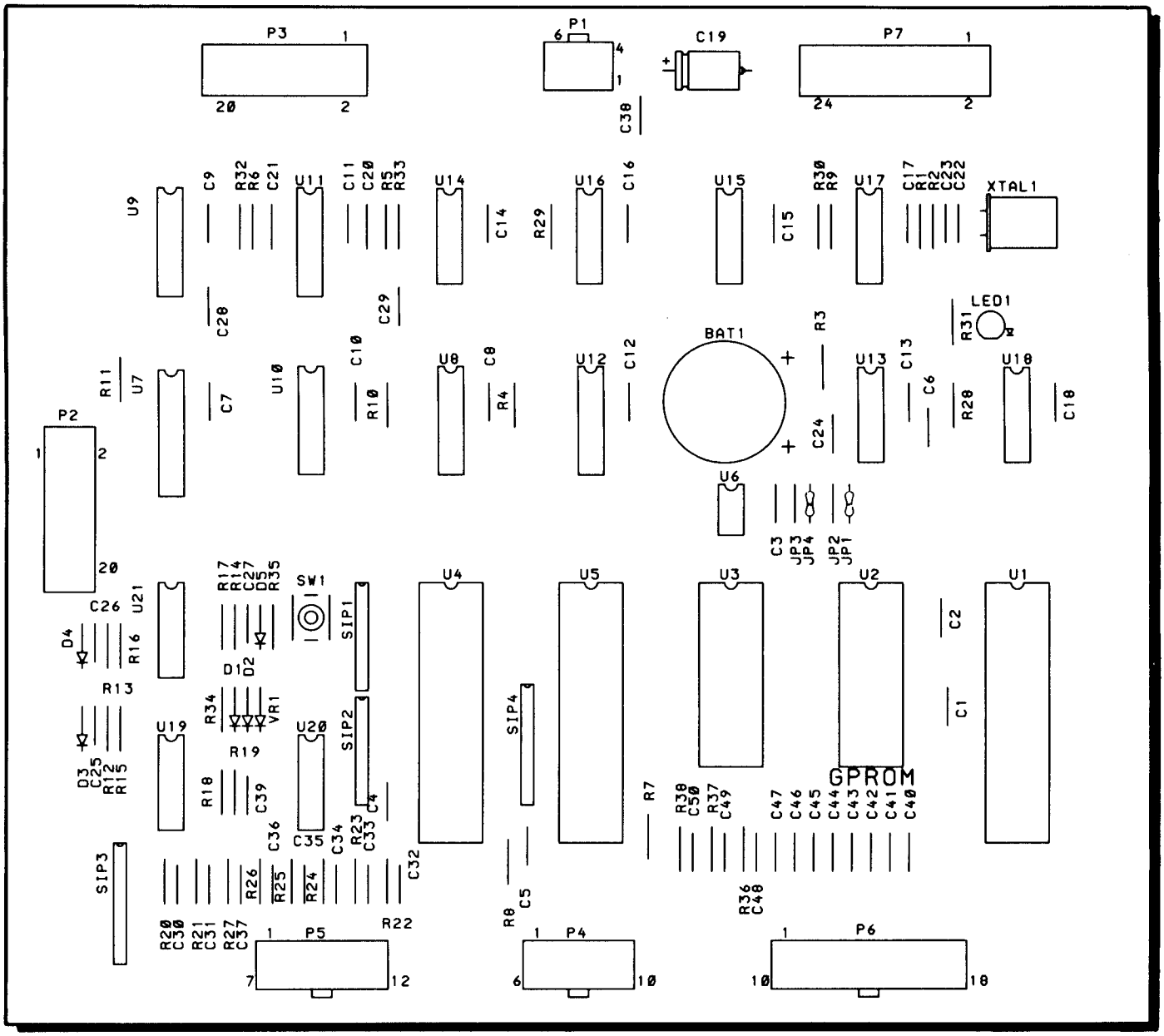


SENSOR BOARD (A15) PARTS LIST

REFERENCE	DESCRIPTION	PART NUMBER	
	Sensor Board Assembly (A15)	MA-1334	MA-2108
D1,D2	Diode, 1N4148	XO-261	XO-261
JP1	Jumper, Resistor, 0 OHM	XO-469	(NOT USED)
Q1,Q2	Transistor, 2N3906 (PNP)	XO-588	XO-588
R1,R4	Resistor, 10K Ohm, 5%, 1/2W	XO-62	XO-62
R2,R5	Resistor, 47K Ohm, 5%, 1/4W	XO-30	XO-30
R3,R6	Resistor, 22K Ohm, 5%, 1/4W	XO-42	XO-42
U1	IC, Optocoupler, MCT6	XO-1000	XO-1000
A15P1	Header, 8 Position	XO-911	XO-911
	Spacer (4)	23984	23984

VI. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS

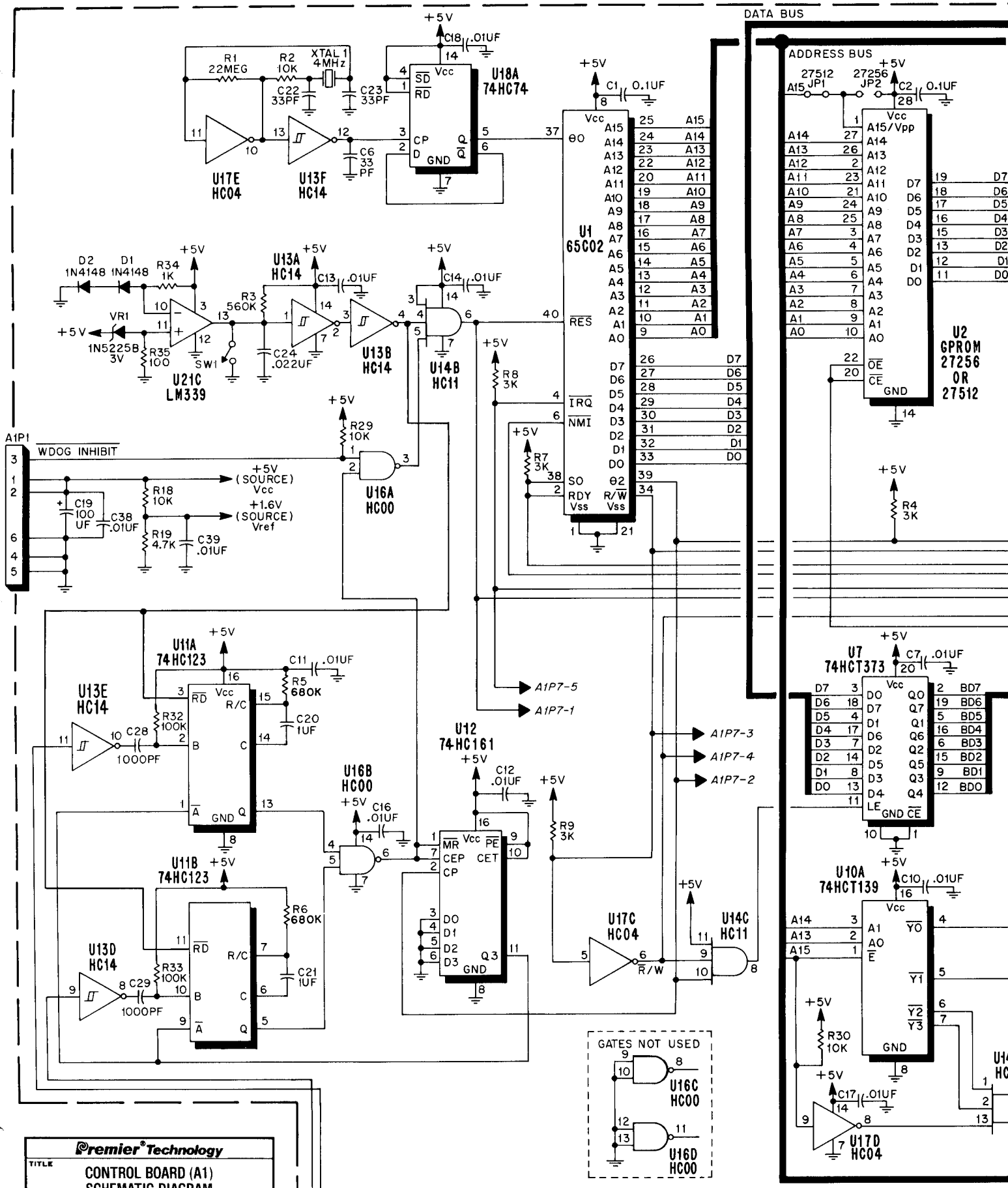
CONTROL BOARD (A1) COMPONENT LOCATION



CONTROL BOARD (A1) PARTS LIST

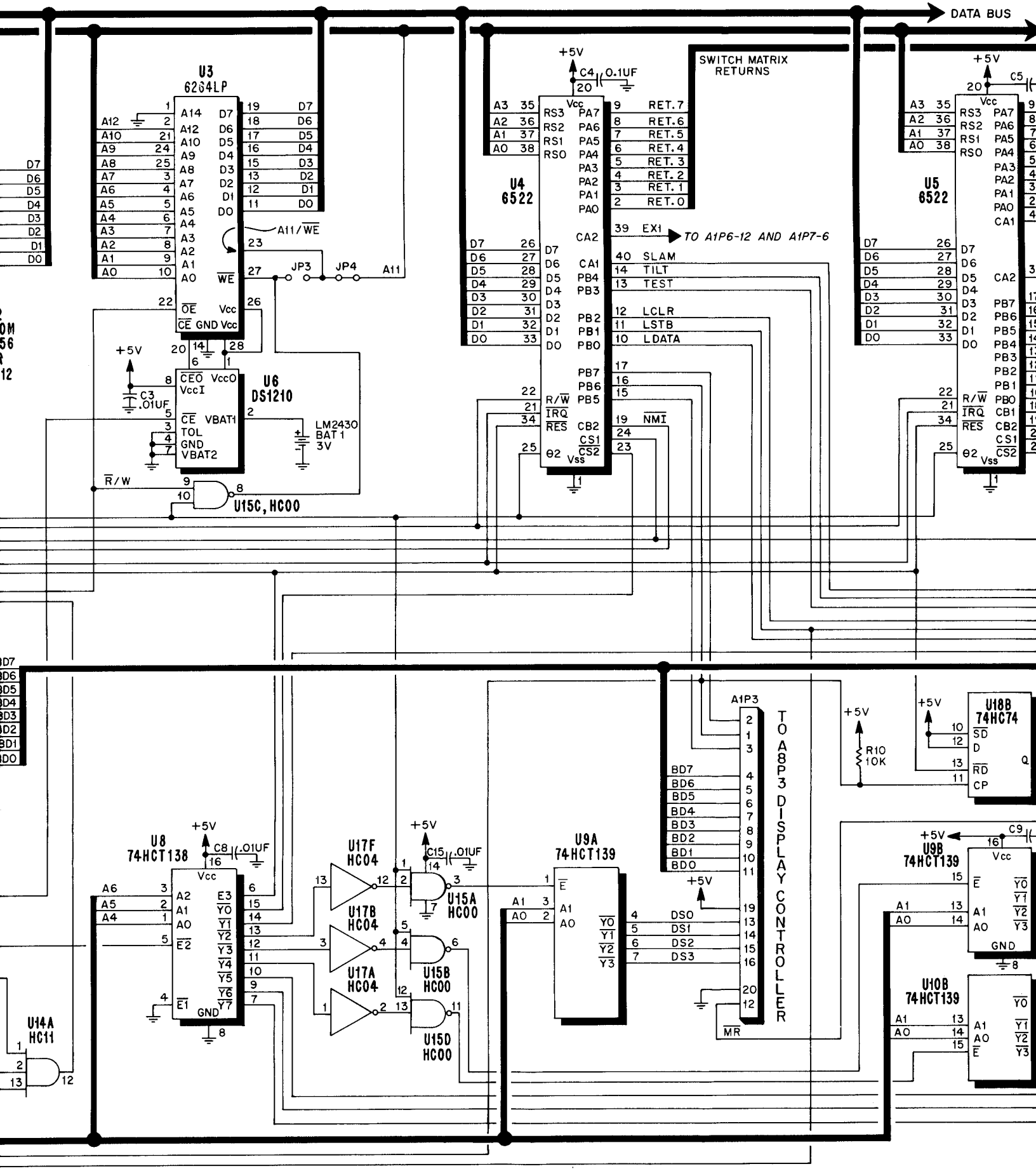
REFERENCE	DESCRIPTION	PART NUMBER
	Control Board Assembly (A1)	MA-1934
BAT 1	Lithium Battery, LM2430, 3V	X0-925
C3, C7-C18, C30-C50	Capacitor, .01UF, +80% -20%, 50V	X0-229
C1,C2,C4 C5,C25,C27	Capacitor, 0.1UF, +80% -20%, 50V	X0-230
C6,C22,C23	Capacitor, 33PF, 10%, 100V	X0-896
C19	Capacitor, 100UF, +80% -20%, 10V	X0-211
C20,C21	Capacitor, 1UF, 20%, 50V	X0-746
C24	Capacitor, .022UF, 10%, 50V	X0-873
C28,C29	Capacitor, 1000PF, 10%, 100V	X0-296
D1-D5	Diode, 1N4148	X0-261
LED 1	LED, MV5752 (Red)	X0-270
R1	Resistor, 22 MEGOHM, 5%, 1/4W	X0-74
R2,R10,R11 R18,R28,R30	Resistor, 10K OHM, 5%, 1/4W	X0-18
R3	Resistor, 560K OHM, 5%, 1/4W	X0-169
R5,R6	Resistor, 680K OHM, 5%, 1/4W	X0-669
R4,R7-R9	Resistor, 3K OHM, 5%, 1/4W	X0-23
R12-R14	Resistor, 2.2K OHM, 5%, 1/4W	X0-27
R15-R17	Resistor, 3.3K OHM, 5%, 1/4W	X0-38
R19-R27, R36-R38	Resistor, 4.7K OHM, 5%, 1/4W	X0-7
R31	Resistor 330 OHM, 5%, 1/4W	X0-34
R32-R33	Resistor, 100K OHM, 5%, 1/4W	X0-45
R34	Resistor, 1K OHM, 5%, 1/4W	X0-5
R35	Resistor, 100 OHM, 5%, 1/4W	X0-28
SIP1,SIP2	Resistor Pack, 10K OHM X 7, 5%, 1/4W	X0-926

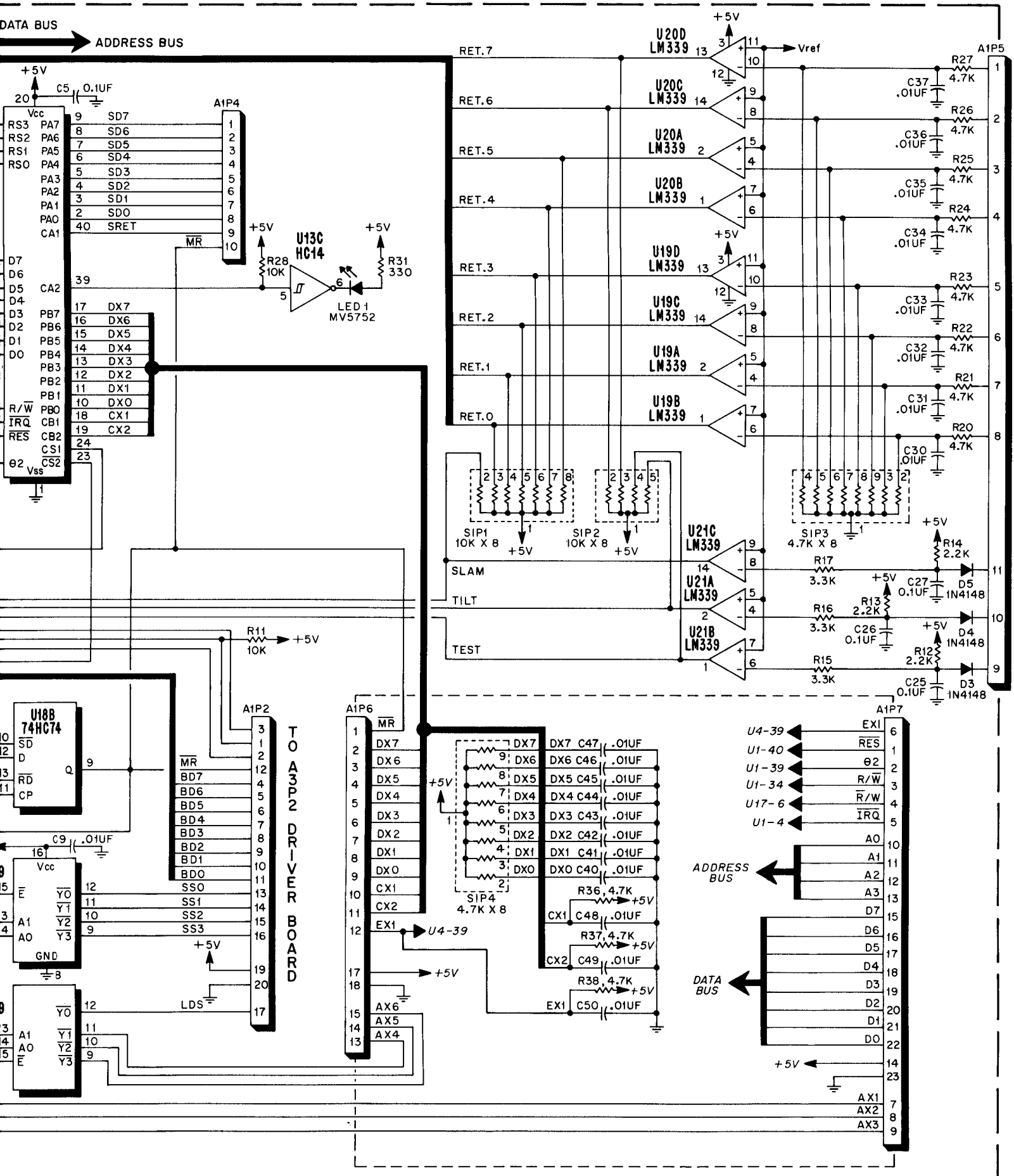
REFERENCE	DESCRIPTION	PART NUMBER
SIP3,SIP4	Resistor Pack, 4.7K OHM X 8	X0-161
SW1	Switch, N.O.	X0-897
U1	IC, 65CO2P2, CPU, 2MHZ	X0-927
U3	IC, 6264LP, 8K X 8, Static Ram	XO-781
U4,U5	IC,6522AP, Versatile Interface Adaptor (VIA)	X0-929
U6	IC, DS1210, Non-Volatile Controller	X0-930
U7	IC, 74HCT373, Octal Latch	X0-931
U8	IC, 74HCT138, Decoder	X0-932
U9,U10	IC, 74HCT139, Dual Decoder	X0-933
U11	IC, 74HC123, Dual Multivibrator	X0-934
U12	IC, 74HC161, Binary Counter	X0-935
U13	IC, 74HC14, Schmitt Hex Inverters	X0-936
U14	IC, 74HC11, Triple "And" Gates	X0-937
U15,U16	IC, 74HC00, Quad "Nand" Gates	X0-782
U17	IC, 74HC04, Hex Inverters	X0-888
U18	IC, 74HC74, Dual "D" Flip-Flop	X0-939
U19,U20,U21	IC, LM339, Quad Comparators	X0-583
VR1	Zener Diode, 1N5225B, 3V, 5%	X0-269
XTAL1	Crystal, 4MHZ	X0-366
A1P1	Header, 6 Position	X0-910
A1P2,A1P3	Header, 20 Position (Ribbon)	XO-940
A1P4	Header, 10 Position	XO-912
A1P5	Header, 12 Position	XO-913
A1P6	Header, 18 Position	XO-916
A1P7	Header, 24 Position	XO-1201
	Jumper, Resistor, 0 OHM (2)	XO-469
	Socket, 28 Pin Dip	XO-536

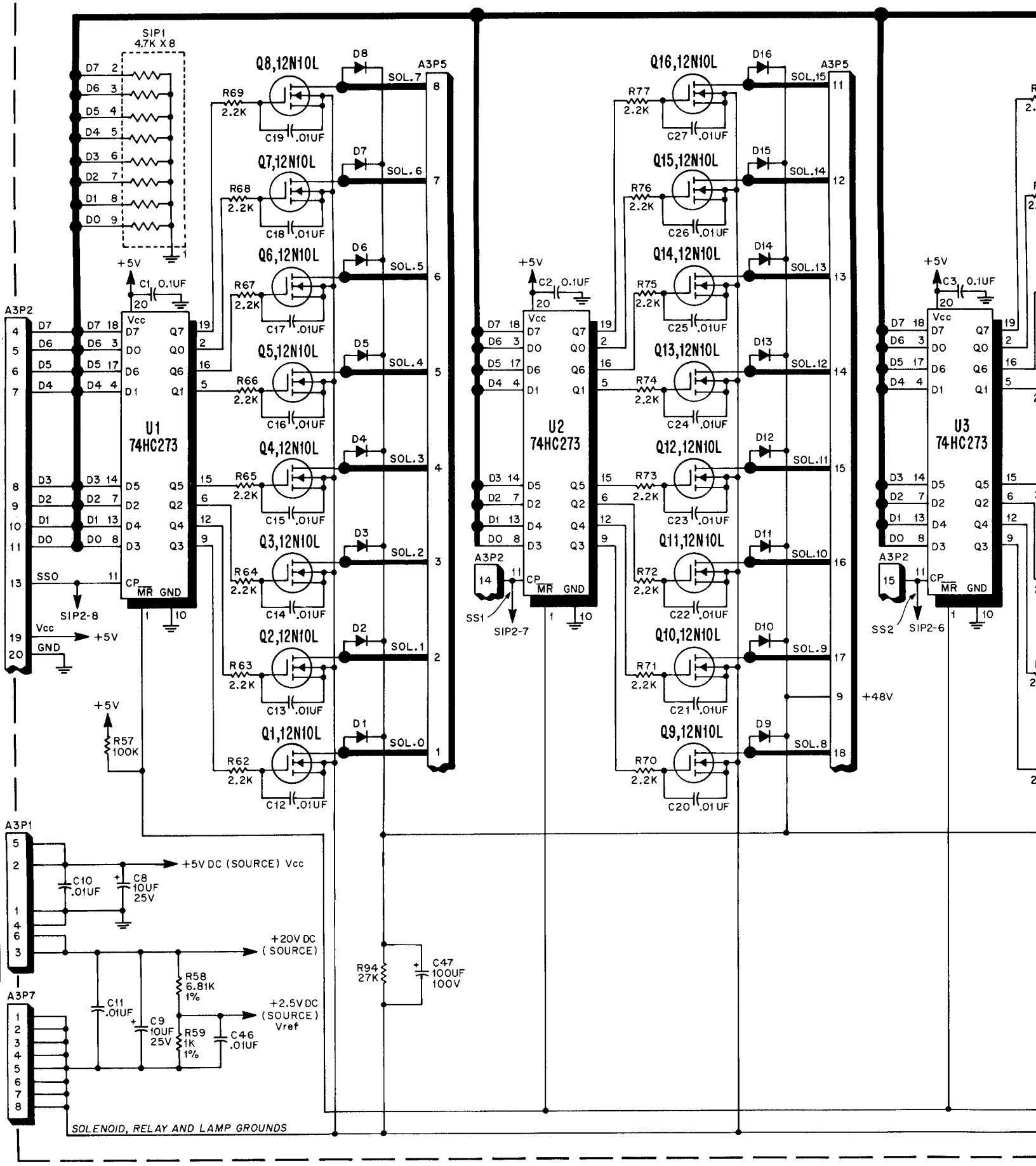


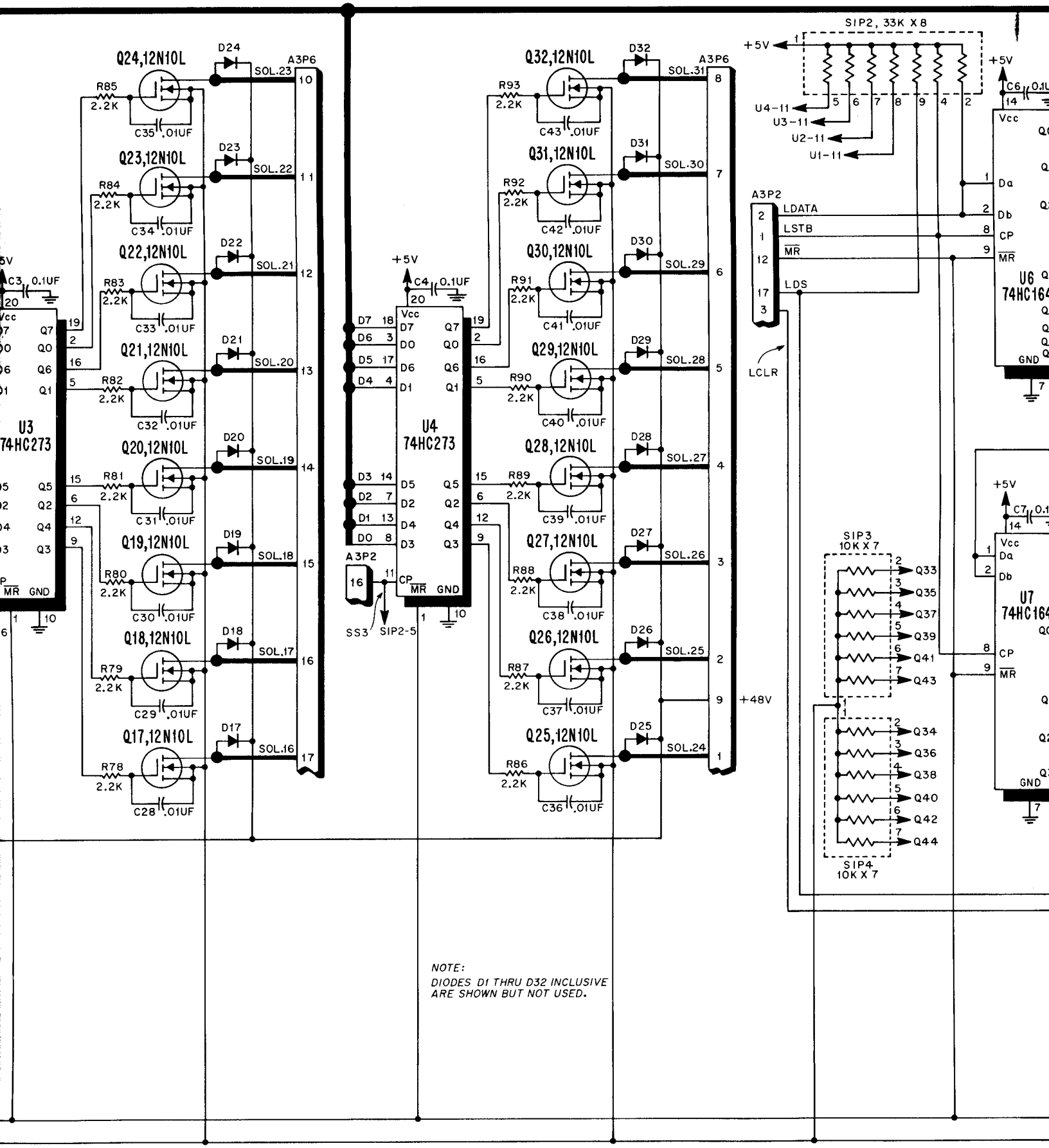
Premier® Technology

TITLE			
CONTROL BOARD (A1) SCHEMATIC DIAGRAM			
DRAWN	APPROVED	DATE	E-27033
	RHM	10-12-89	

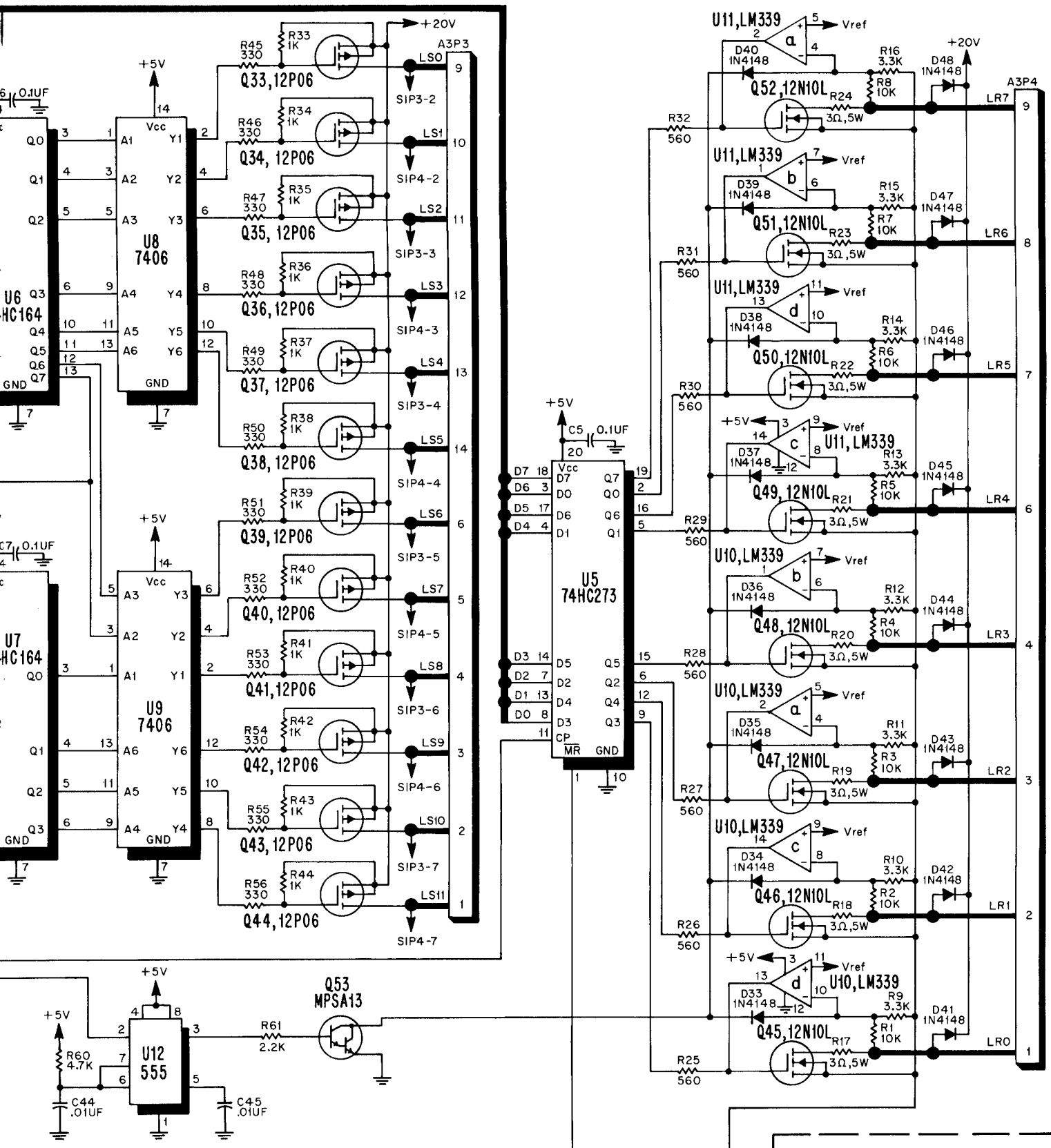

DATA BUS
U3
6264LP
A14 A12 A10 A9 A8 A7 A6 A5 A4 A3 A2 A1 A0
D7 D6 D5 D4 D3 D2 D1 D0
A11/WE
OE CE GND Vcc WE
JP3 JP4 A11
+5V
C3 .01UF
U6
DS1210
CEO VccO VccI CE VBAT1 TOL GND VBAT2
LM2430 BAT 1 3V
R/W
U15C, HC00
+5V
C4 0.1UF
U4
6522
RS3 RS2 RS1 RS0 Vcc Vss
PA7 PA6 PA5 PA4 PA3 PA2 PA1 PA0
PB7 PB6 PB5 PB4 PB3 PB2 PB1 PB0
CA1 CA2 CB1 CB2 CS1 CS2 R/W IRQ RES θ2
SWITCH MATRIX RETURNS
RET.7 RET.6 RET.5 RET.4 RET.3 RET.2 RET.1 RET.0
EX1
TO A1P6-12 AND A1P7-6
SLAM TILT TEST LCLR LSTB LDATA NMI
+5V
C5
U5
6522
U14A
HC11
U8
74HCT138
C8 .01UF
A6 A5 A4 A2 A1 A0 E3 E2 E1 Y0 Y1 Y2 Y3 Y4 Y5 Y6 Y7 GND Vcc
U17F
HC04
U17B
HC04
U17A
HC04
C15 .01UF
U15A
HC00
U15B
HC00
U15D
HC00
U9A
74HCT139
E A1 A0 Y0 Y1 Y2 Y3
DS0 DS1 DS2 DS3
A1P3
BD7 BD6 BD5 BD4 BD3 BD2 BD1 BD0
MR
TO A8P3 DISPLAY CONTROLLER
R10 10K
U18B
74HC74
SD D RD CP Q
U9B
74HCT139
C9
U10B
74HCT139


DATA BUS
ADDRESS BUS
+5V
C5 0.1UF
A1P4
U13C HC14
R28 10K
R31 330
LED 1 MV5752
MR
U20D LM339
U20C LM339
U20A LM339
U20B LM339
U19D LM339
U19C LM339
U19A LM339
U19B LM339
Vref
RET.7
RET.6
RET.5
RET.4
RET.3
RET.2
RET.1
RET.0
A1P5
R27 4.7K
R26 4.7K
R25 4.7K
R24 4.7K
R23 4.7K
R22 4.7K
R21 4.7K
R20 4.7K
C37 .01UF
C36 .01UF
C35 .01UF
C34 .01UF
C33 .01UF
C32 .01UF
C31 .01UF
C30 .01UF
SIP1 10K X 8
SIP2 10K X 8
SIP3 4.7K X 8
SLAM
TILT
TEST
U21C LM339
U21A LM339
U21B LM339
R14 2.2K
R17 3.3K
R13 2.2K
R16 3.3K
R12 2.2K
R15 3.3K
C27 0.1UF
C26 0.1UF
C25 0.1UF
D5 1N4148
D4 1N4148
D3 1N4148
R11 10K
U18B 74HC74
C9 .01UF
A1P2
A1P6
A1P7
TO A3P2 DRIVER BOARD
SIP4 4.7K X 8
R36, 4.7K
R37, 4.7K
R38, 4.7K
C47 .01UF
C46 .01UF
C45 .01UF
C44 .01UF
C43 .01UF
C42 .01UF
C41 .01UF
C40 .01UF
C48 .01UF
C49 .01UF
C50 .01UF
U4-39
U1-40
U1-39
U1-34
U17-6
U1-4
ADDRESS BUS
DATA BUS
LDS
AX1
AX2
AX3
AX4
AX5
AX6


SIP1
4.7K X 8
A3P2
A3P5
U1
74HC273
U2
74HC273
U3
74HC273
Q8,12N10L
Q7,12N10L
Q6,12N10L
Q5,12N10L
Q4,12N10L
Q3,12N10L
Q2,12N10L
Q1,12N10L
Q16,12N10L
Q15,12N10L
Q14,12N10L
Q13,12N10L
Q12,12N10L
Q11,12N10L
Q10,12N10L
Q9,12N10L
D8
D7
D6
D5
D4
D3
D2
D1
D16
D15
D14
D13
D12
D11
D10
D9
SOL.7
SOL.6
SOL.5
SOL.4
SOL.3
SOL.2
SOL.1
SOL.0
SOL.15
SOL.14
SOL.13
SOL.12
SOL.11
SOL.10
SOL.9
SOL.8
+5V
+48V
SSO
SIP2-8
SS1
SIP2-7
SS2
SIP2-6
A3P1
A3P7
+5V DC (SOURCE) Vcc
+20V DC
(SOURCE)
+2.5V DC
(SOURCE)
Vref
SOLENOID, RELAY AND LAMP GROUNDS



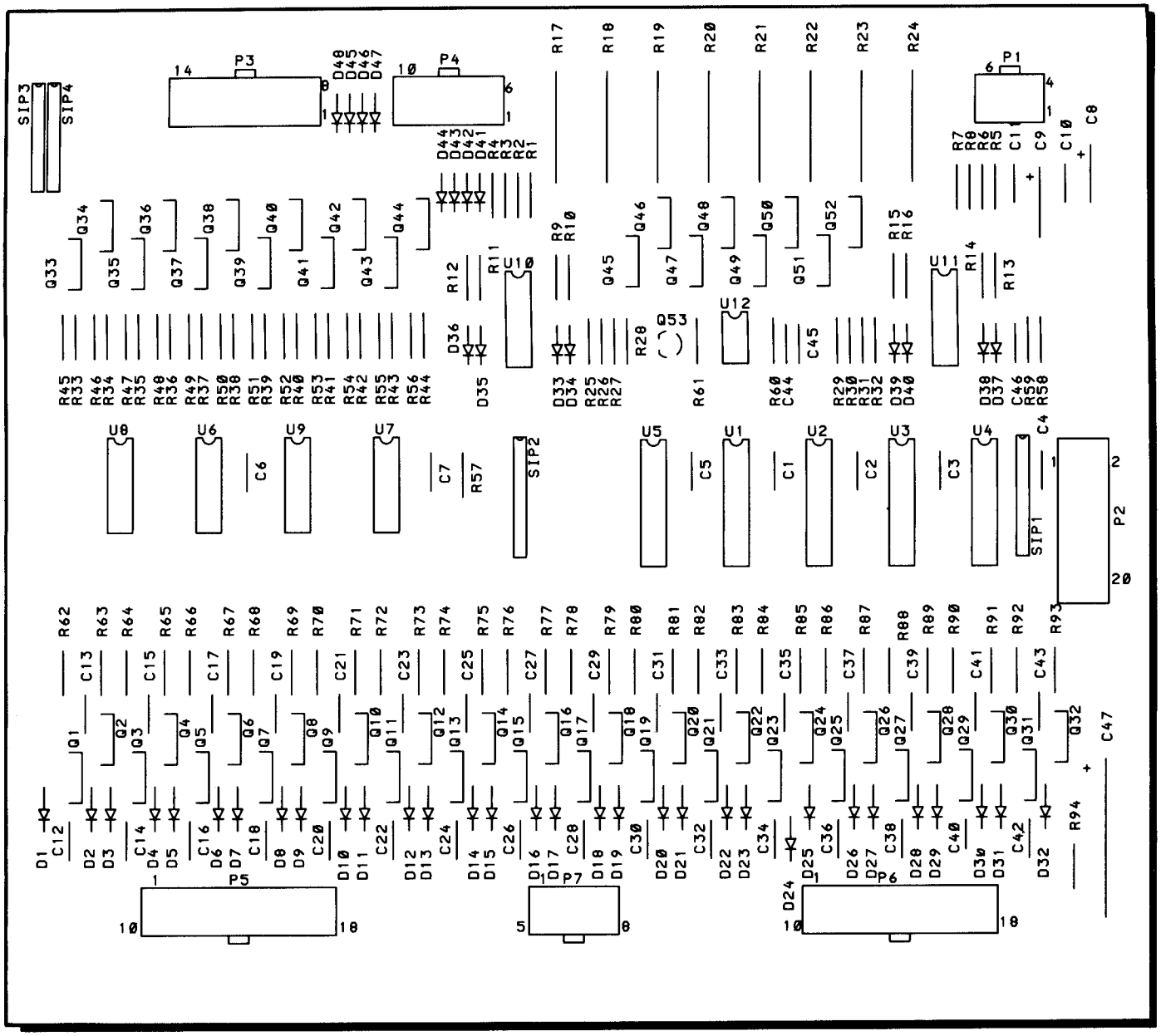
NOTE:
DIODES D1 THRU D32 INCLUSIVE ARE SHOWN BUT NOT USED.



Premier® Technology			
TITLE: DRIVER BOARD (A3) SCHEMATIC DIAGRAM			
DRAWN: A.R.S.	APPROVED: RHM	DATE: 10-12-89	E-27034

VI. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS

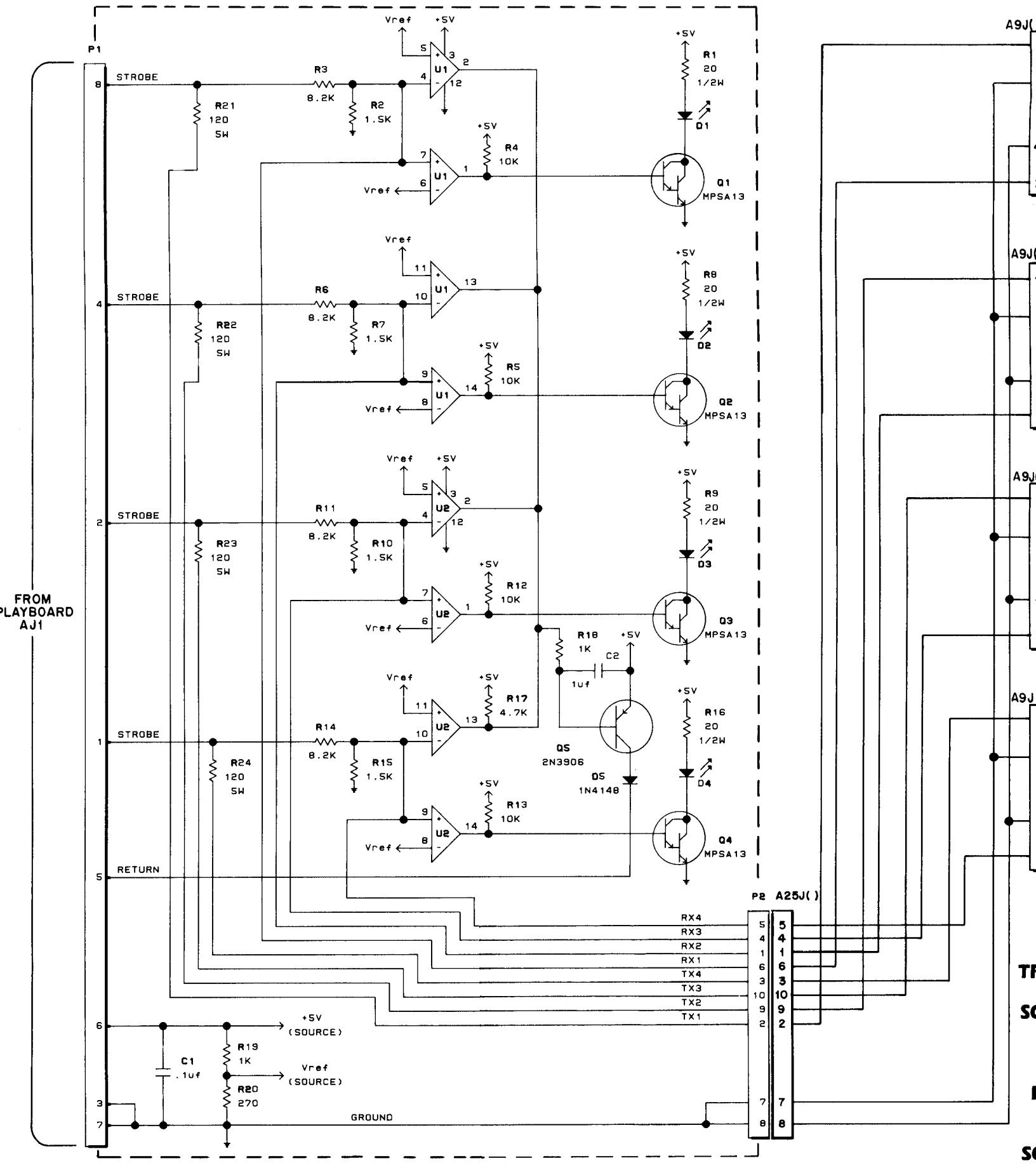
DRIVER BOARD (A3) COMPONENT LOCATION



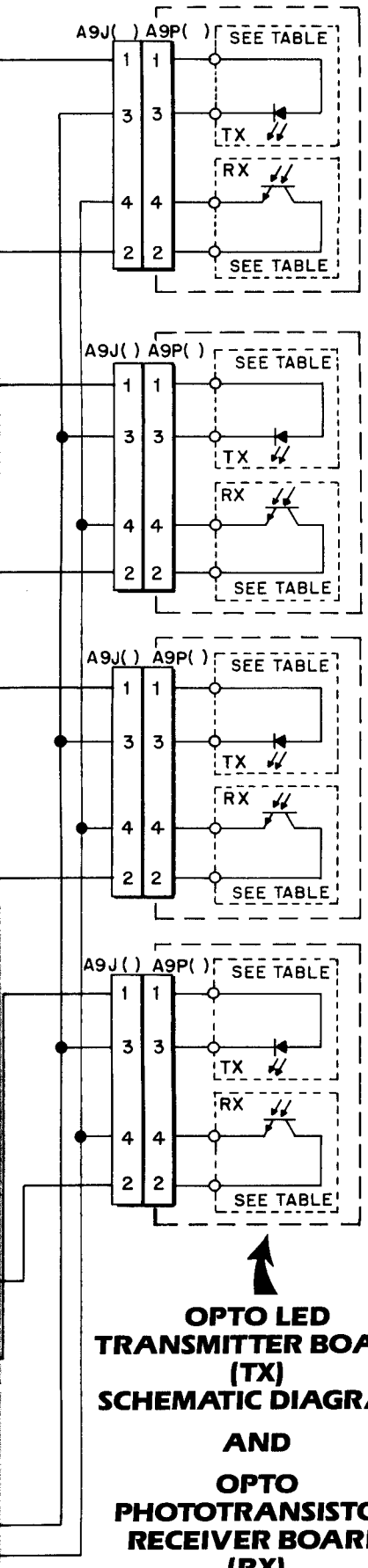
DRIVER BOARD (A3) PARTS LIST

REFERENCE	DESCRIPTION	PART NUMBER
	Driver Board Assembly (A3)	MA-1358
C1-C7	Capacitor, 0.1 UF, +80% -20%, 50V	XO-230
C8	Capacitor, 10UF, 20%, 25V	XO-127
C9	Capacitor, 10UF, +80% -20%, 25V	XO-225
C10,C11	Capacitor, .01UF, +80% - 20%, 50V	XO-229
C45,C46		
C12-C44	Capacitor, .01UF, 10%, 50V	XO-696
C47	Capacitor, 100UF, 20%, 100V	XO-958
D33-D48	Diode, 1N4148	XO-261
Q1-Q32, Q45-Q52,Q54	Transistor, RFP12N10L, OR IRL530, N-Channel MOSFET	XO-947
Q33-Q44	Transistor, RFP12P06, IRF9531 OR MT2955 P-Channel MOSFET	XO-948
Q53	Transistor, MPSA13, Darlington	XO-304
R1-R8	Resistor, 10K Ohm, 5%, 1/4W	XO-18
R9-R16	Resistor, 3.3K Ohm, 5%, 1/4W	XO-38
R17-R24	Resistor, 3 Ohm, 5%, 5W	XO-942
R25-R32	Resistor, 560 Ohm, 5%, 1/4W	XO-36
R33-R44	Resistor, 1K Ohm, 5%, 1/4W	XO-5
R45-R56	Resistor, 330 Ohm, 5%, 1/4W	XO-34
R57	Resistor, 100K Ohm, 5%, 1/4W	XO-45

REFERENCE	DESCRIPTION	PART NUMBER
R58	Resistor, 6.81K Ohm, 1%, 1/4W	XO-943
R59	Resistor, 1K Ohm, 1%, 1/4W	XO-944
R60	Resistor, 4.7K Ohm, 5%, 1/4W	XO-7
R61-R93	Resistor, 2.2K Ohm, 5%, 1/4W	XO-27
R94	Resistor, 27K Ohm, 5%, 1/4W	XO-11
SIP1	Resistor Pack, 4.7K Ohm X 8,5%, 1/4W	XO-161
SIP2	Resistor Pack, 33K Ohm X 8,5%, 1/4W	XO-945
SIP3	Resistor Pack, 10K Ohm X 7,5%, 1/4W	XO-926
SIP4		
U1-U5	IC, Octal "D" Flip-Flops, 74HC273	XO-949
U6-U7	IC, Shift Register, 74HC164	XO-950
U8-U9	IC, Buffer, 7406	XO-85
U10-U11	IC, Quad Comparator, LM339	XO-583
U12	IC, Timer, NE555	XO-631
A3P1	Header, 6 Position	XO-910
A3P2	Header, 20 Position (Ribbon)	XO-940
A3P3	Header, 14 Position	XO-914
A3P4	Header, 10 Position	XO-912
A3P5, A3P6	Header, 18 Position	XO-916
A3P7	Header, 8 Position	XO-911

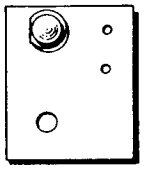


QUAD OPTICAL INTERFACE BOARD SCHEMATIC DIAGRAM



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

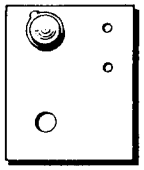
OPTO LED TRANSMITTER BOARD COMPONENT LOCATION



OPTO LED TRANSMITTER BOARD PARTS LIST

REFERENCE	DESCRIPTION	PART NUMBER
	Opto LED Transmitter Assembly	SEE TABLE
TX	Plastic Transmitter LED	XO-994

OPTO PHOTOTRANSISTOR RECEIVER BOARD COMPONENT LOCATION



OPTO PHOTOTRANSISTOR RECEIVER BOARD PARTS LIST

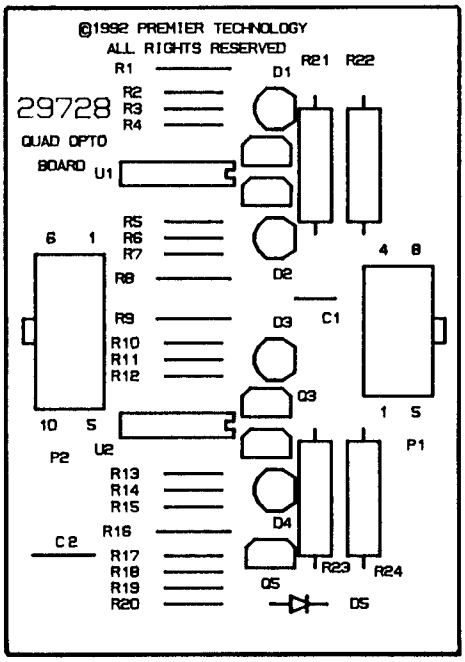
REFERENCE	DESCRIPTION	PART NUMBER
	Opto Phototransistor Receiver Assembly	SEE TABLE
RX	Plastic Phototransistor	XO-993

BRACKET AND OPTO BOARD ASSEMBLY REFERENCES

ASSEMBLY	CONNECTOR NO.	BRACKET NO.	LOCATION	TRANSMITTER	RECEIVER
30465	1A25J1-8	30461	TOP LEFT UPKICKER	MA-1330	MA-1331
30893	1A25J1-4	29662	LOWER LEFT RAMP	MA-1330	MA-1331
31219	1A25J1-2	29641	TOP LEFT RAMP	MA-1330	MA-1331
31235	1A25J1-1,5	31224	TOP RIGHT RAMP	MA-1330	MA-1331

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

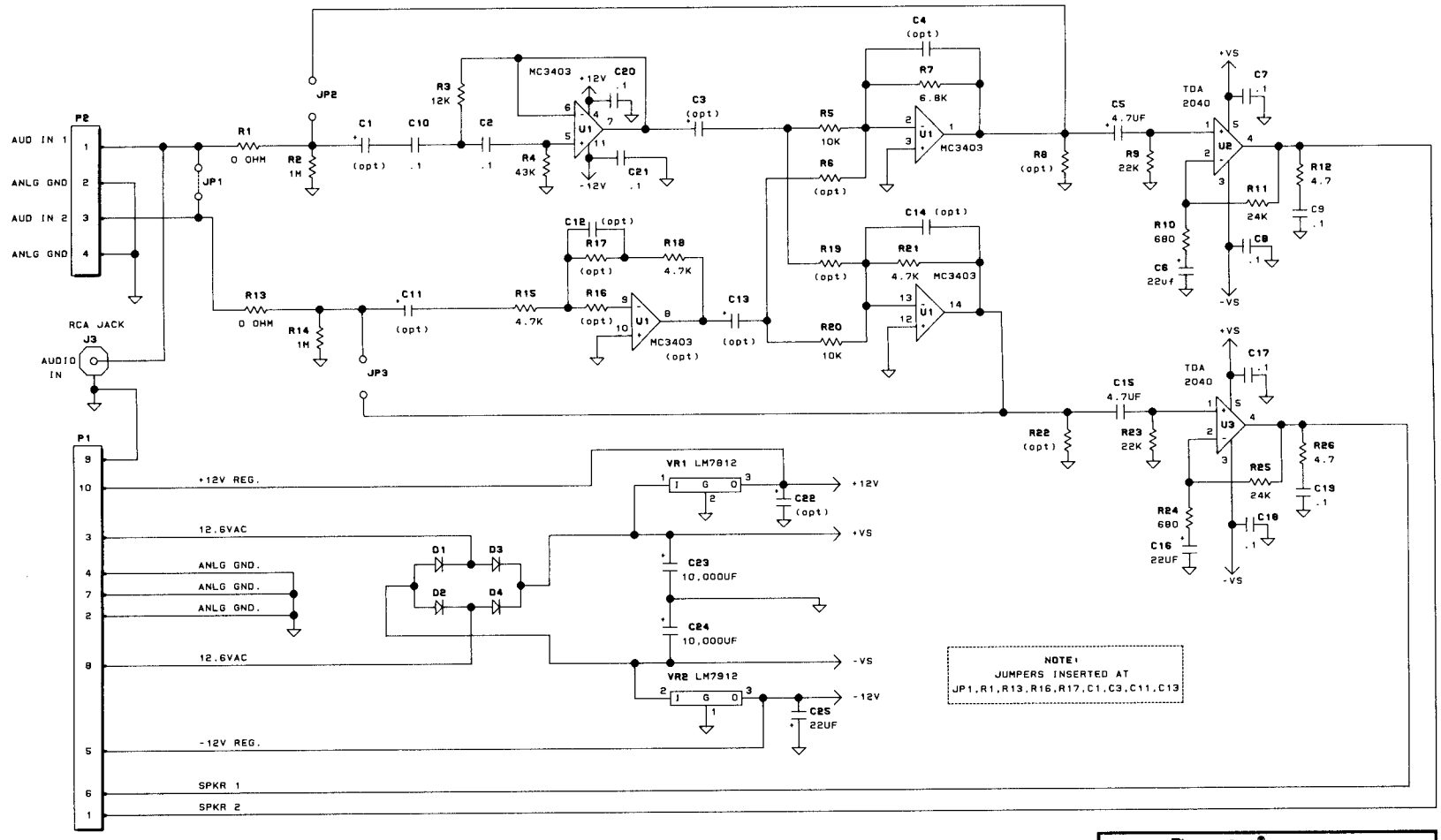
QUAD OPTICAL INTERFACE BOARD COMPONENT LOCATION



QUAD OPTICAL INTERFACE BOARD PARTS LIST

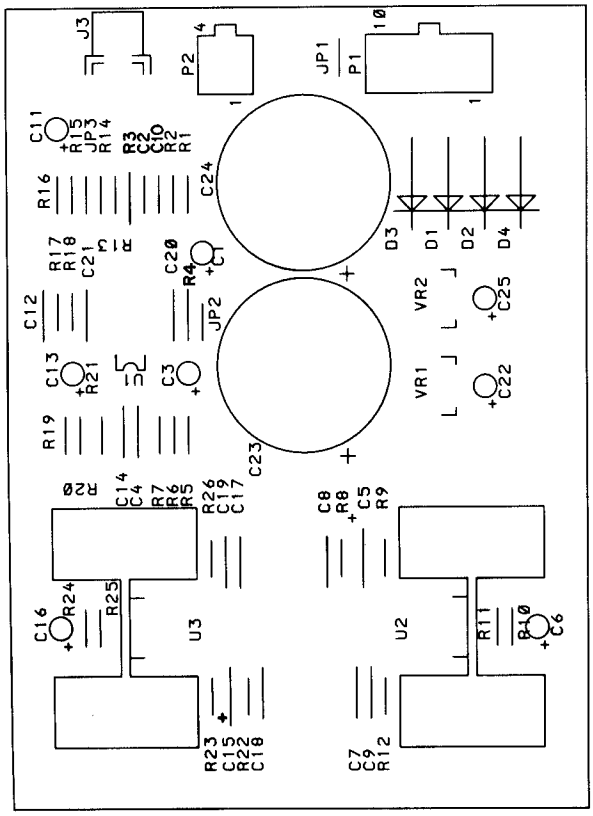
REFERENCE	DESCRIPTION	PART NUMBER
	QUAD OPTICAL INTERFACE BOARD (A25)	MA-1925
C1	CAPACITOR, 0.1UF, +80%-20%, 50V	XO-230
C2	CAPACITOR, 1UF, NON-POLAR, 50V	XO-746
D1-D4	DIODE, MV5752 (LED,RED)	XO-270
Q1-Q4	TRANSISTOR, NPN, MPS-A13	XO-304
Q5	TRANSISTOR, PNP, 2N3906	XO-588
R1,R8,R9,R16	RESISTOR,20 OHM,5%, 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 COMPARITOR,LM339	XO-583
P1	HEADER,8 POSITION	XO-911
P2	HEADER,10 POSITION	XO-912
	SUPPORT,SRS-8-6N,(4)	23984

VI. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS



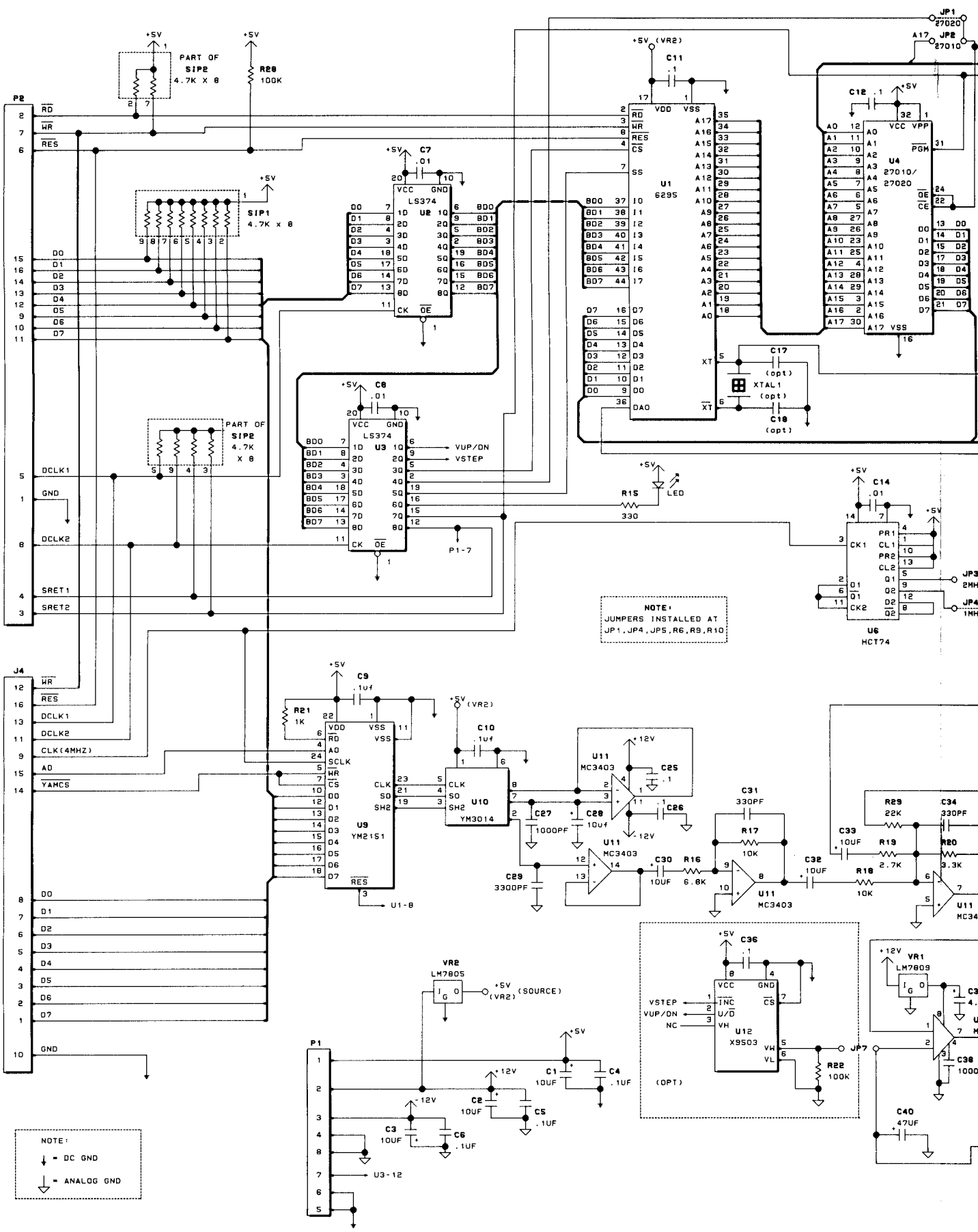
Premier® Technology			
TITLE: AUXILIARY POWER SUPPLY (A5) SCHEMATIC DIAGRAM			
DRAWN: J.B.	APPROVED: RHM	DATE: 4-8-92	MA-1772

AUXILIARY POWER SUPPLY (A5) COMPONENT LOCATION



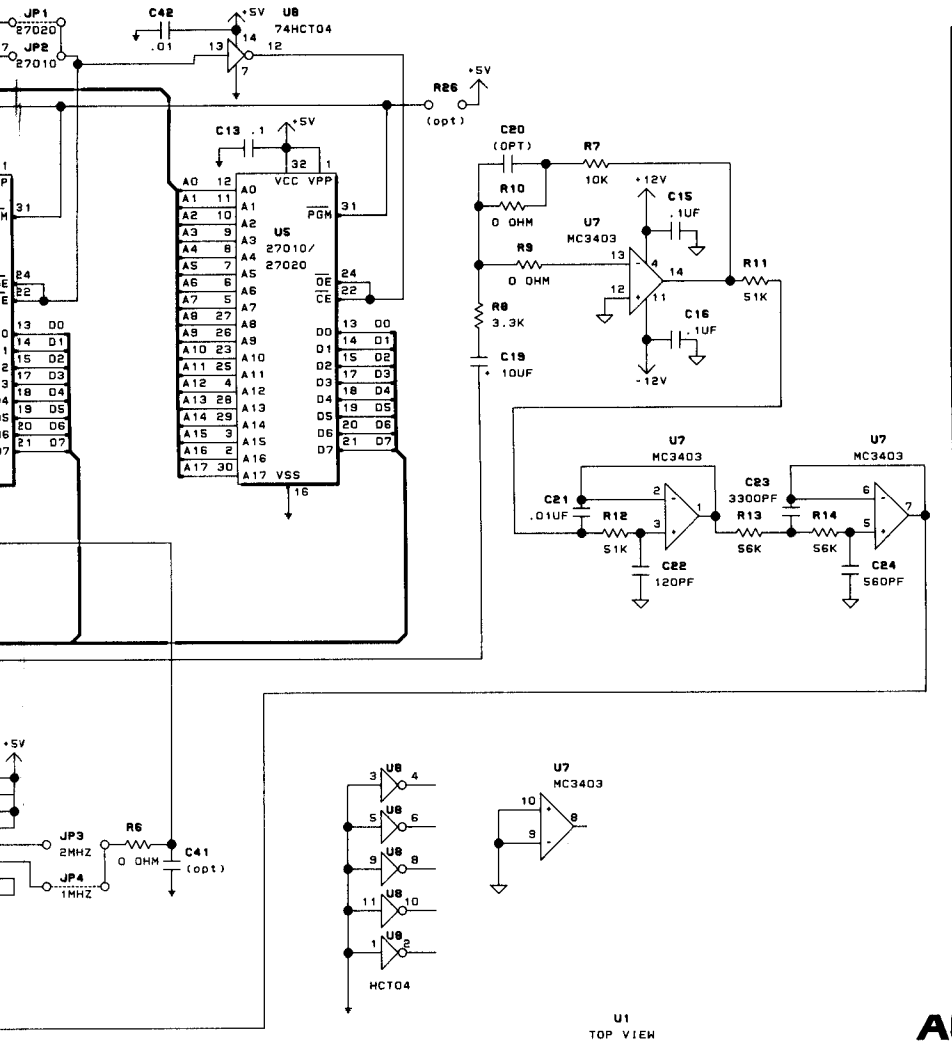
AUXILIARY POWER SUPPLY (A5) PARTS LIST

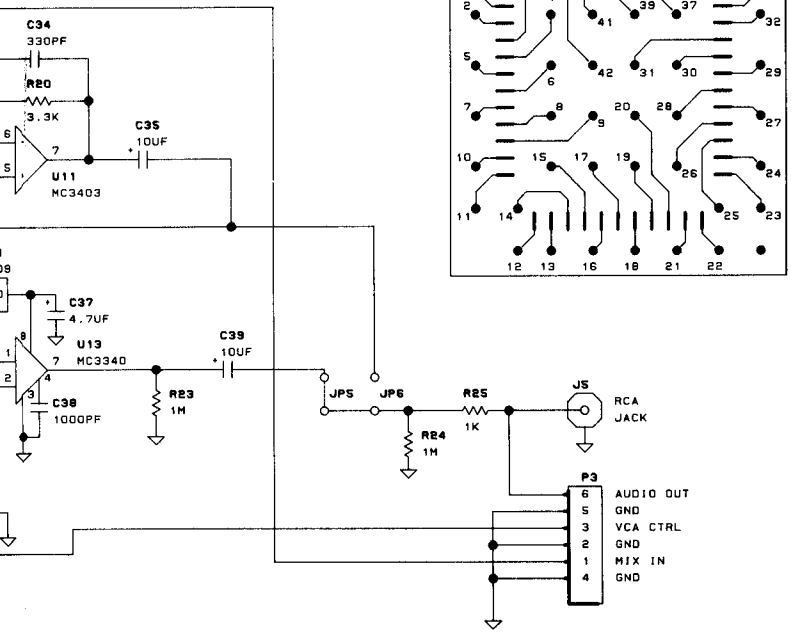
REFERENCE	DESCRIPTION	PART NUMBER
A5	AUXILLIARY POWER SUPPLY	MA-1772
C1,C3,C11, C13	CAPACITOR, 4.7UF, 10%, 10V	XO-469A
C2,C10	CAPACITOR, 0.1UF, 10%, 100V	XO-784
C5,C15	CAPACITOR, 4.7UF, 10%, 10V	XO-226
C6,C16,C25	CAPACITOR, 22UF, +80%-20%, 16V	XO-293
C7,C8,C9, C17,C18,C19, C20,C21	CAPACITOR, 0.1UF, +80%-20%, 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, O 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



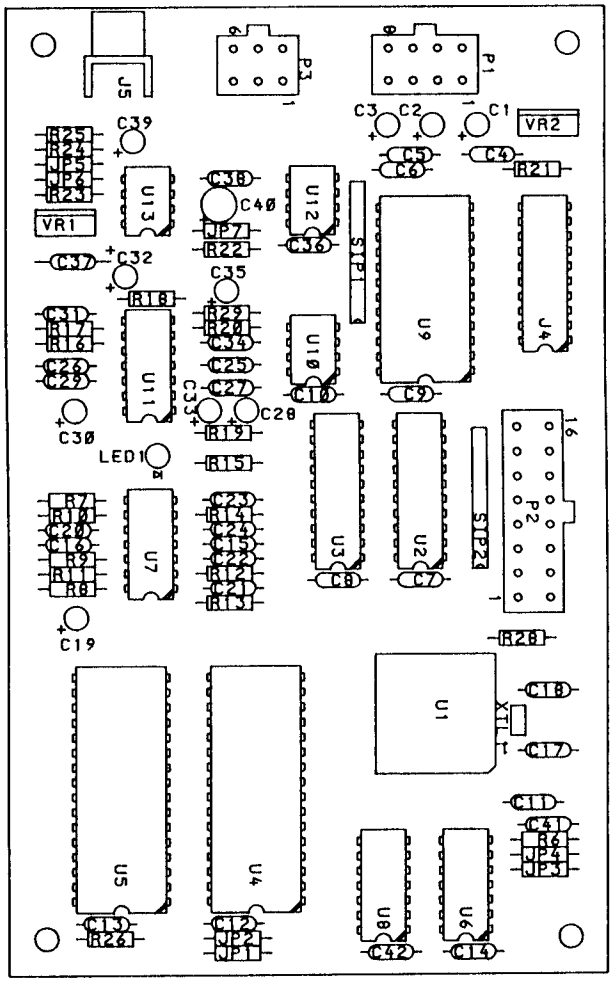
Premier® Technology			
TITLE: AUXILIARY SOUND BOARD (A20) SCHEMATIC DIAGRAM			
DRAWN	APPROVED	DATE	MA-1770
J.B.	RHM	4-8-92	

TIC DIAGRAMS, PARTS LISTS





AUXILIARY SOUND BOARD (A20) COMPONENT LOCATION

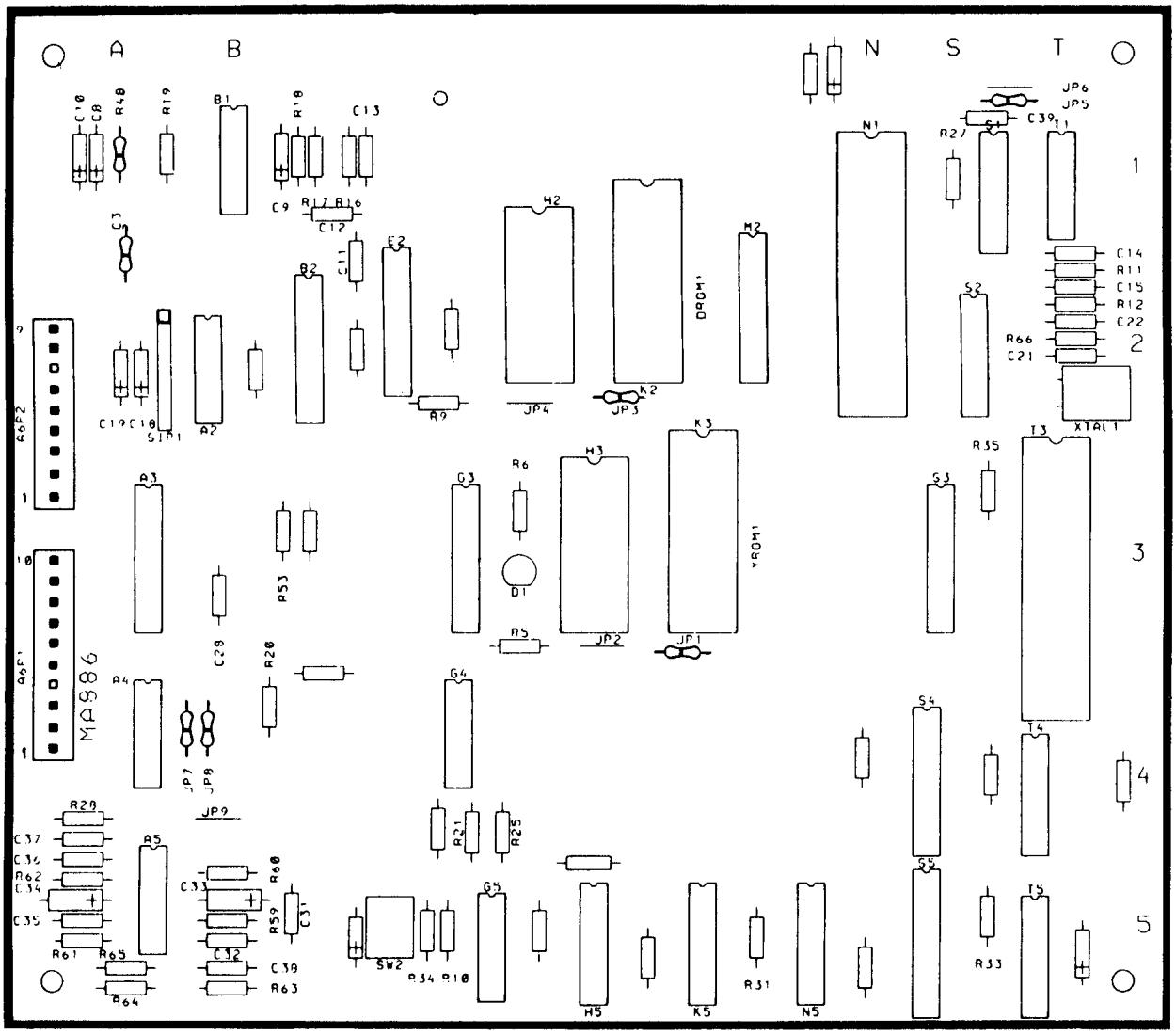


AUXILIARY SOUND BOARD (A20) PARTS LIST

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
C37	CAPACITOR, 4.7UF, 10%, 10V	XO-226
C38	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 UHM, 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, 1MEGOHM, 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
	PCB ASSEMBLY, P/O *XO-1023	27922
VR1	IC, LM7809CT, REGULATOR	XO-1037
VR2	IC, 5V REGULATOR	XO-663

VI. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS

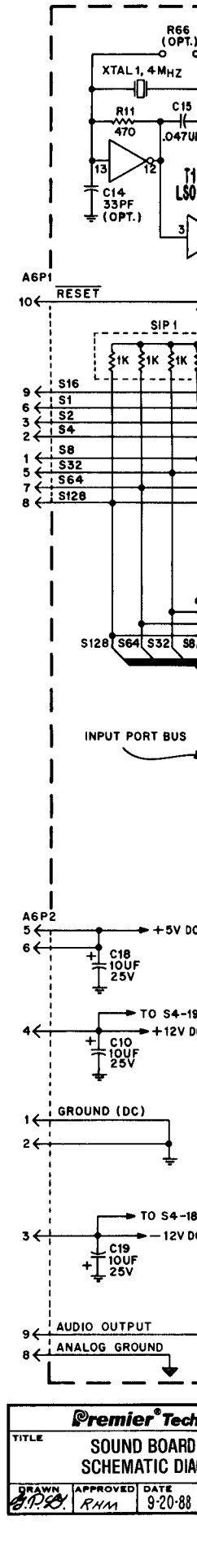
SOUND BOARD (A6) COMPONENT LOCATION

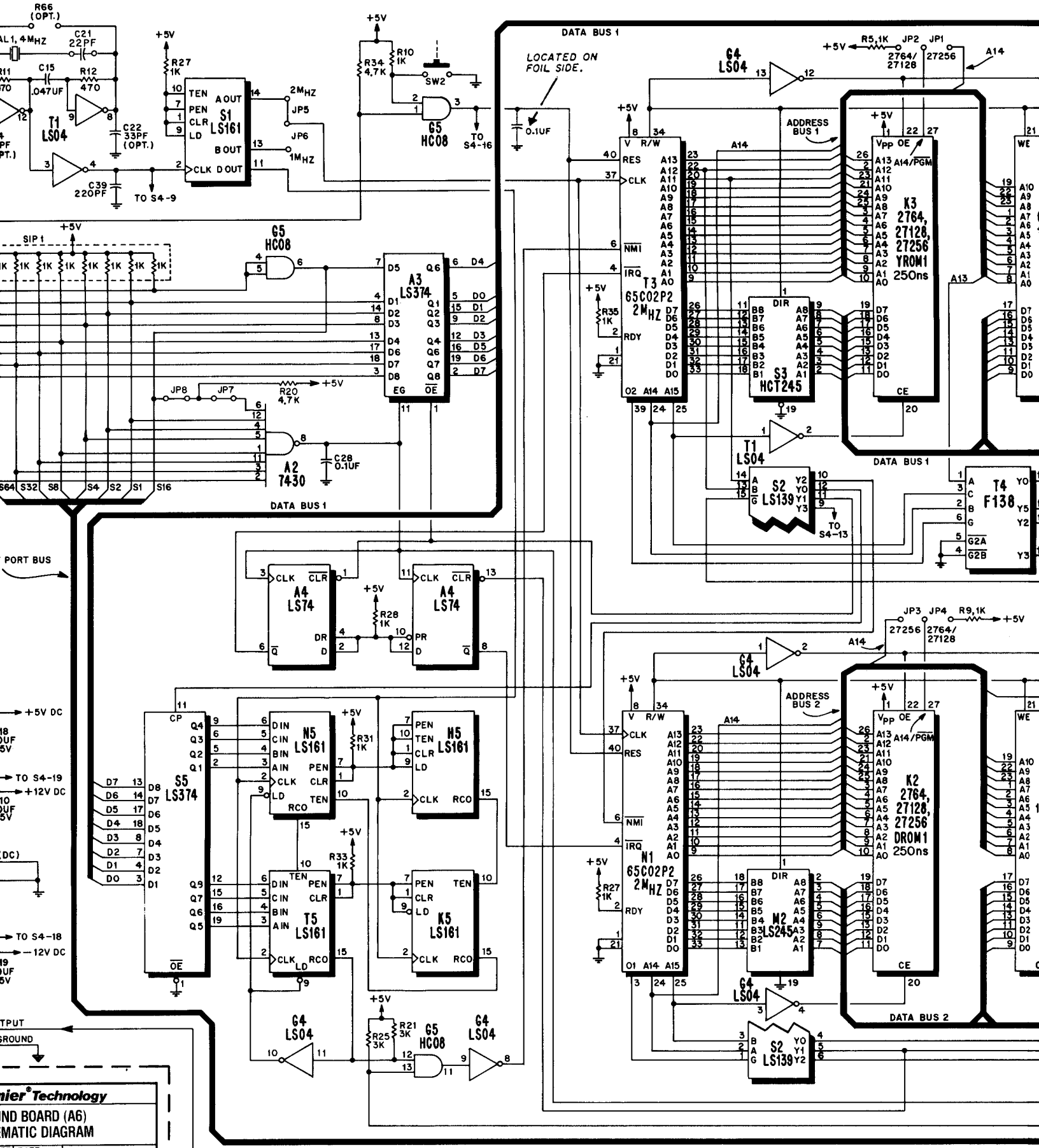


SOUND BOARD (A6) PARTS LIST

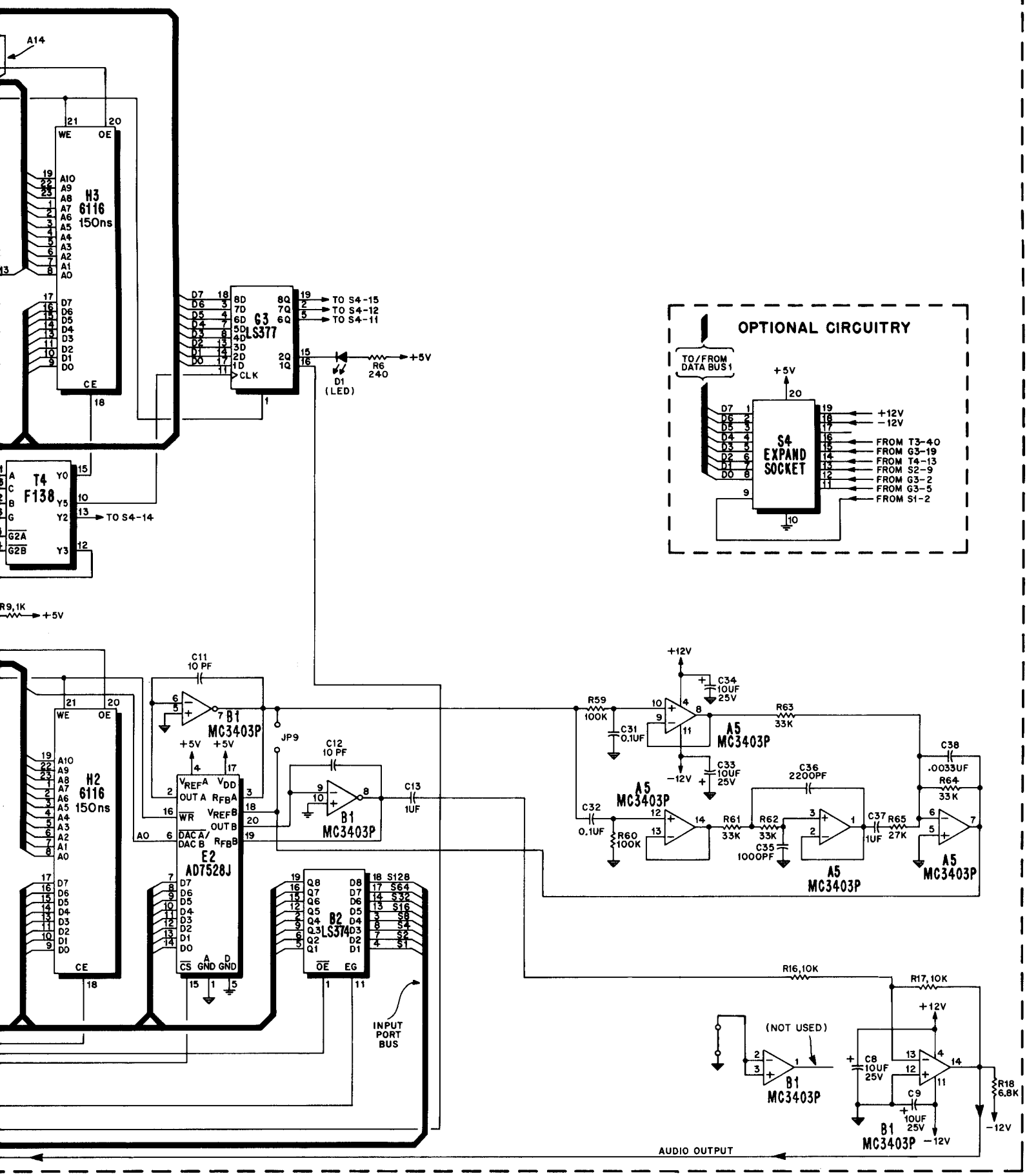
REFERENCE	DESCRIPTION	PART NUMBER
	Sound Board Assembly (1A6)	MA-1629
C13,C37	Capacitor, 1UF, 20%, 50V (Non-polar)	XO-746
C8,C9,C10, C18,C19, C33,C34 AND THREE UNMARKED CAPACITORS	Capacitor, 10UF, 20%, 25V (Tantalum)	XO-127
C11,C12	Capacitor, 10PF, +80%-20%, 50V	XO-635
C14,C22	Capacitor, 33PF, 10%, 100V	XO-896
C15	Capacitor, .047UF, 20%, 50V	XO-638
C21	Capacitor, 22PF, 10%, 50V	XO-633
C28 AND FIFTEEN UNMARKED CAPACITORS	Capacitor, 0.1UF, +80%-20%, 50V	XO-230
C31,C32	Capacitor, 0.1UF, 10%, 100V	XO-784
C35	Capacitor, 1000PF, 10%, 100V	XO-296
C36	Capacitor, 2200PF, 10%, 100V	XO-289
C38	Capacitor, .0033UF, 10%, 100V	XO-600
C39	Capacitor, 220PF, 10%, 100V	XO-694
D1	Diode, MV5752, (LED, Red)	XO-270
R5,R9,R10, R27,R28,R31, R33,R35	Resistor, 1K Ohm, 5%, 1/4W	XO-5
R6	Resistor, 240 Ohm, 5%, 1/4W	XO-173
R11,R12	Resistor, 470 Ohm, 5%, 1/4W	XO-35
R21, R25	Resistor, 3K Ohm, 5%, 1/4W	XO-23
R16,R17	Resistor, 10K Ohm, 5%, 1/4W	XO-18
R18	Resistor, 6.8K Ohm, 5%, 1/4W	XO-8

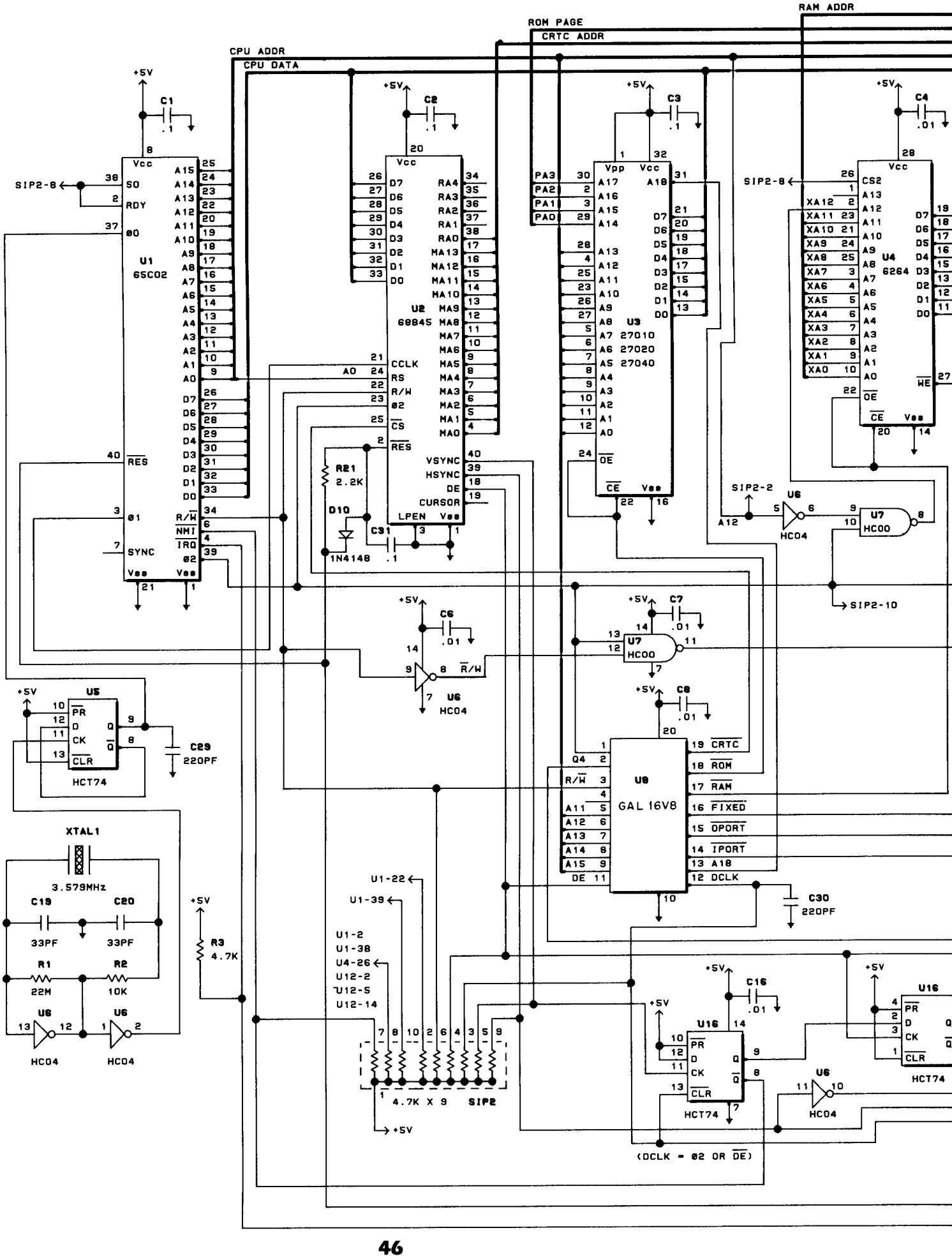
REFERENCE	DESCRIPTION	PART NUMBER
R20,R34	Resistor, 4.7K Ohm, 5%, 1/4W	XO-7
R61-R64	Resistor, 33K Ohm, 5%, 1/4W	XO-43
R59,R60	Resistor, 100K Ohm, 5%, 1/4W	XO-45
R65	Resistor, 27K Ohm, 5%, 1/4W	XO-11
A2	IC, 7430, 8 Input NAND Gate	XO-643
A3,B2,S5	IC, 74LS374, Octal "D" Flip Flop	XO-96
A4	IC, 74LS74, Dual "D" Flip Flop	XO-434
A5, B1	IC, MC3403P, Quad Op-Amp	XO-953
E2	IC, AD7528J, Multiplier DAC	XO-647
G3	IC, 74LS377, Octal "D" Flip Flop	XO-97
G4,T1	IC, 74LS04, Hex Inverter	XO-418
G5	IC, 74HC08, Quad 2 Input "AND" Gate	XO-872
H2,H3	IC, 6116LP-15, 2K X 8 RAM	XO-928
H5,K5,N5	IC, 74LS161, Synchronous Presettable Binary Counter	XO-440
S1,T5	IC, Specified Per Game	
K2,K3	IC, 74LS245, Octal Bus Transceiver	XO-79
M2	IC, 65CO2P2 or 6502A, CPU XO-927 or	XO-893
N1,T3	IC, 74LS139, Dual 1 of 4 Decoder	XO-419
S2	IC, 74HCT245, Octal Bus Tranceiver	XO-891
S3	IC, 74F138 , 1 of 8 Decoder	XO-1041
T4	Resistor Pack 1K Ohm X 8	XO-493
SIP 1	Switch, Pushbutton	XO-897
SW2	Crystal, 4 MHZ	XO-366
XTAL 1	Connector (2)	XO-879
A6P1,A6P2	28 Pin Dip Socket (2)	XO-536
	Jumper, Resistor, 0 OHM (7)	XO-469
	20 Pin Dip Socket	XO-491

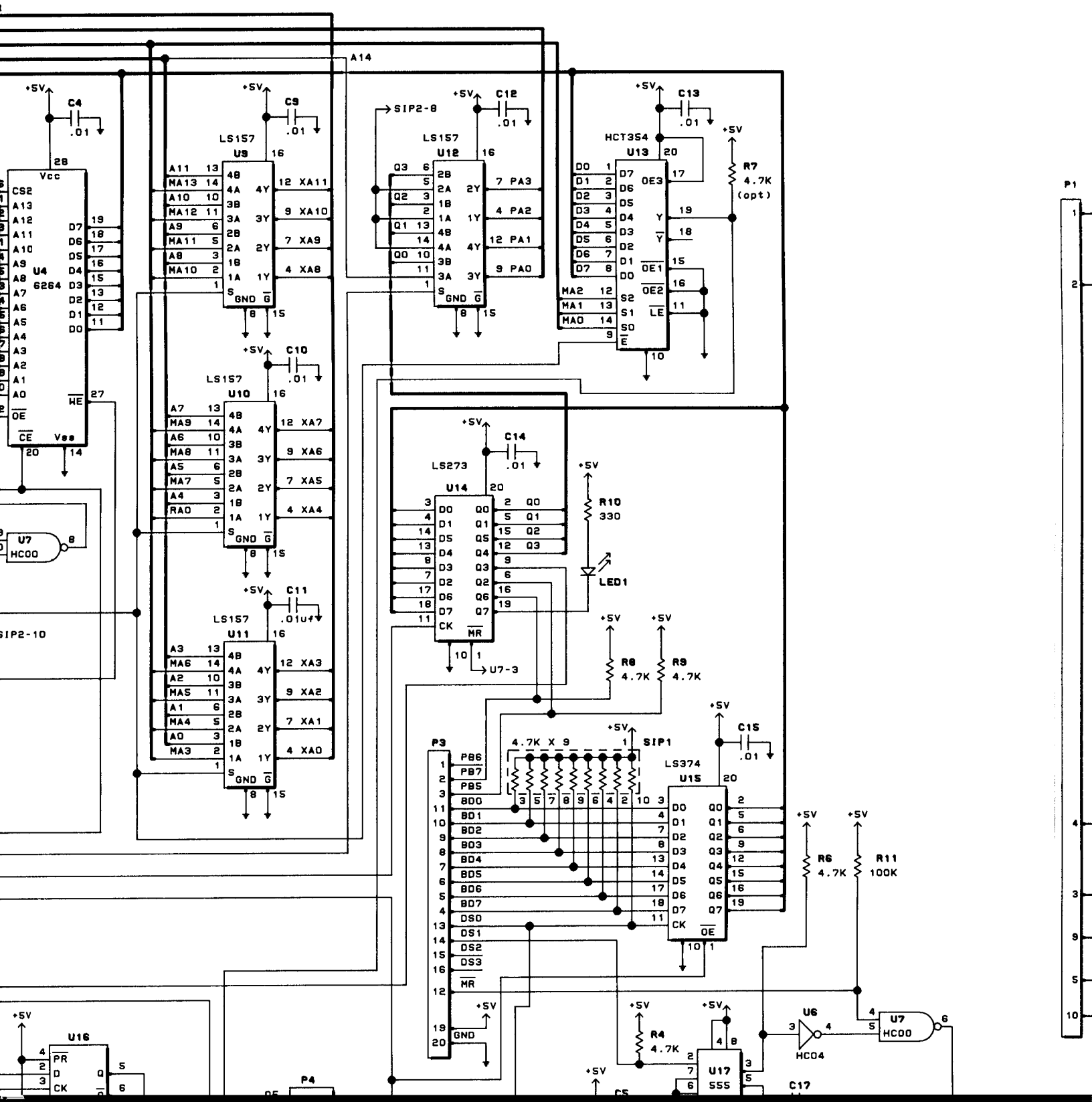


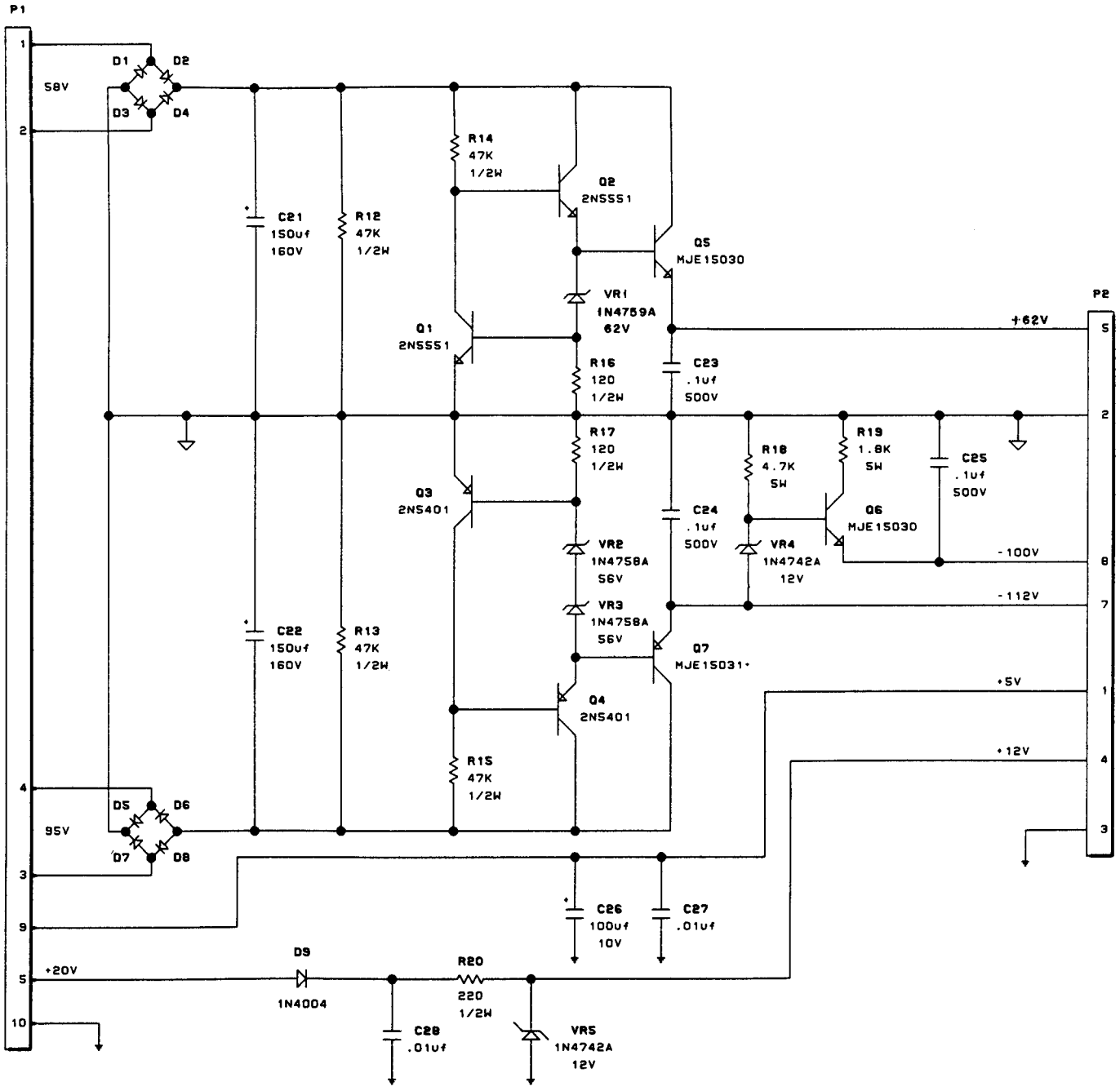


nier® Technology	
IND BOARD (A6)	
EMATIC DIAGRAM	
ED DATE 9-20-88	E-26146


A14
H3
6116
150ns
G3
LS377
TO S4-15
TO S4-12
TO S4-11
R6
240
D1
(LED)
+5V
T4
F138
TO S4-14
OPTIONAL CIRCUITRY
TO/FROM DATA BUS1
S4
EXPAND
SOCKET
+12V
-12V
FROM T3-40
FROM G3-19
FROM T4-13
FROM S2-9
FROM G3-2
FROM G3-5
FROM S1-2
R9,1K
C11
10 PF
B1
MC3403P
JP9
C12
10 PF
C13
1UF
H2
6116
150ns
E2
AD7528J
B2
LS374
INPUT
PORT
BUS
C34
10UF
25V
R59
100K
C31
0.1UF
R63
33K
A5
MC3403P
C33
10UF
25V
C36
2200PF
C38
.0033UF
R64
33K
C32
0.1UF
R60
100K
R61
33K
R62
33K
C35
1000PF
C37
1UF
R65
27K
R16,10K
R17,10K
(NOT USED)
C8
10UF
25V
C9
10UF
25V
R18
6.8K
AUDIO OUTPUT

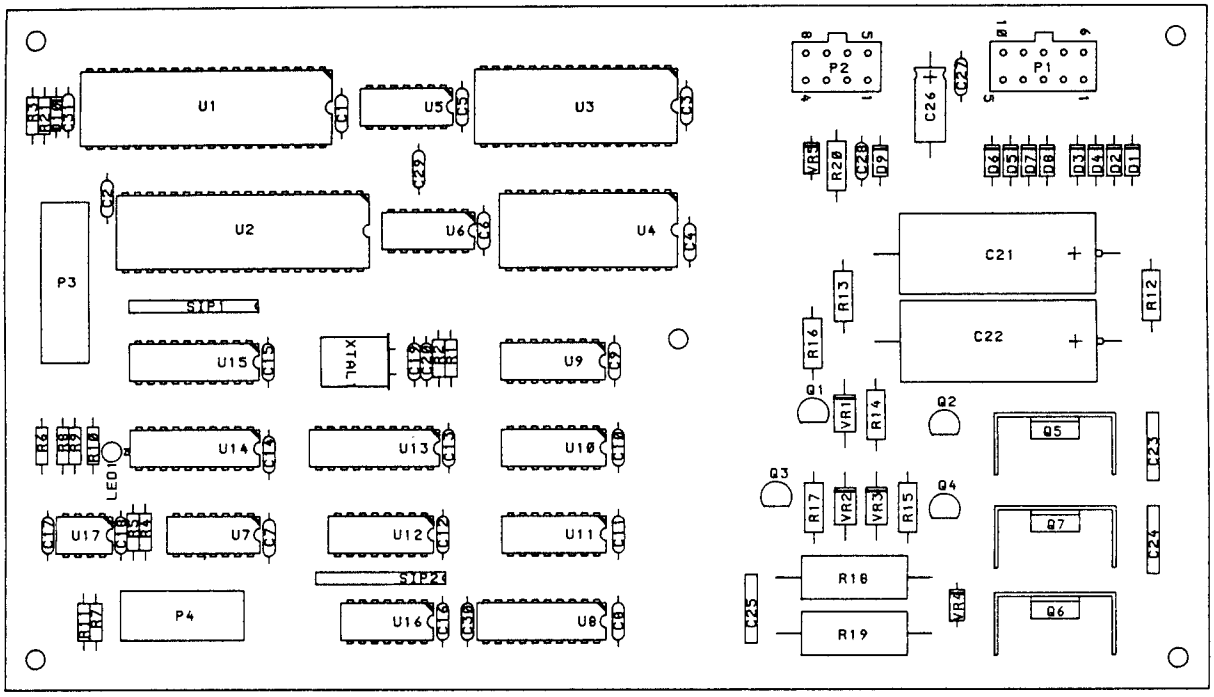

RAM ADDR
ROM PAGE
CRTC ADDR
CPU ADDR
CPU DATA
U1
6502
U2
6845
U3
27010
27020
27040
U4
6264
U5
HCT74
U6
HC04
U7
HC00
U8
GAL 16V8
U16
HCT74
SIP2-8
SIP2-2
SIP2-10
R21
2.2K
D10
1N4148
R1
22M
R2
10K
R3
4.7K
XTAL1
3.579MHz
C19
33PF
C20
33PF
C29
220PF
C30
220PF
4.7K X 9 SIP2
(DCLK = Ø2 OR DE)


A14
+5V
C4
.01
U4
6264
Vcc
Vss
CS2
OE
WE
CE
U7
HC00
SIP2-10
C9
LS157
U9
XA11
XA10
XA9
XA8
C10
U10
XA7
XA6
XA5
XA4
C11
.01uf
U11
XA3
XA2
XA1
XA0
SIP2-8
C12
U12
PA3
PA2
PA1
PA0
C13
HCT354
U13
R7
4.7K
(opt)
C14
LS273
U14
R10
330
LED1
U7-3
R8
4.7K
R9
4.7K
P3
PB6
PB7
PB5
BD0
BD1
BD2
BD3
BD4
BD5
BD6
BD7
DS0
DS1
DS2
DS3
MR
GND
4.7K X 9
SIP1
C15
LS374
U15
R6
4.7K
R11
100K
U16
PR
D
CK
P4
R4
4.7K
U17
555
C5
C17
U6
HC04
P1

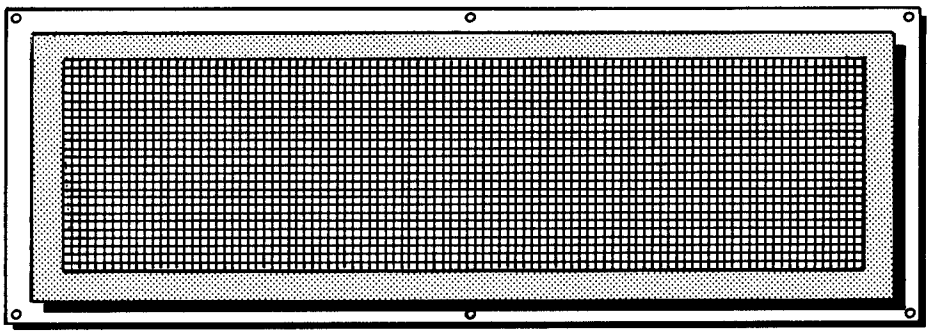


Premier® Technology			
TITLE: DISPLAY CONTROLLER (A8) SCHEMATIC DIAGRAM			
DRAWN: C.B.	APPROVED: RHM	DATE: 4-8-92	MA-1739

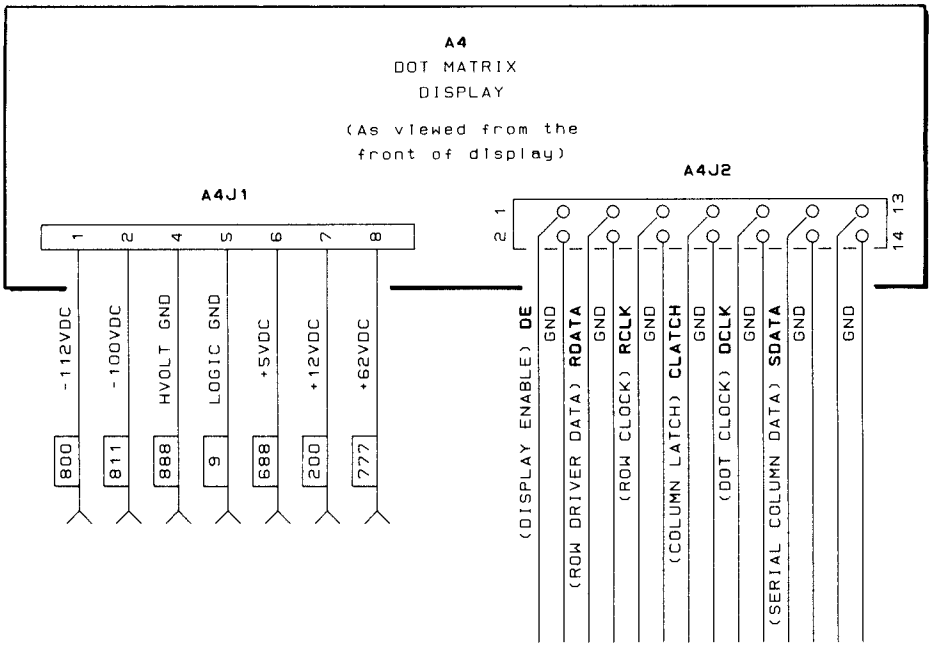
DISPLAY CONTROLLER (A8) COMPONENT LOCATION



DOT MATRIX DISPLAY (A4)



DESCRIPTION	PART NUMBER
DOT MATRIX DISPLAY	29151

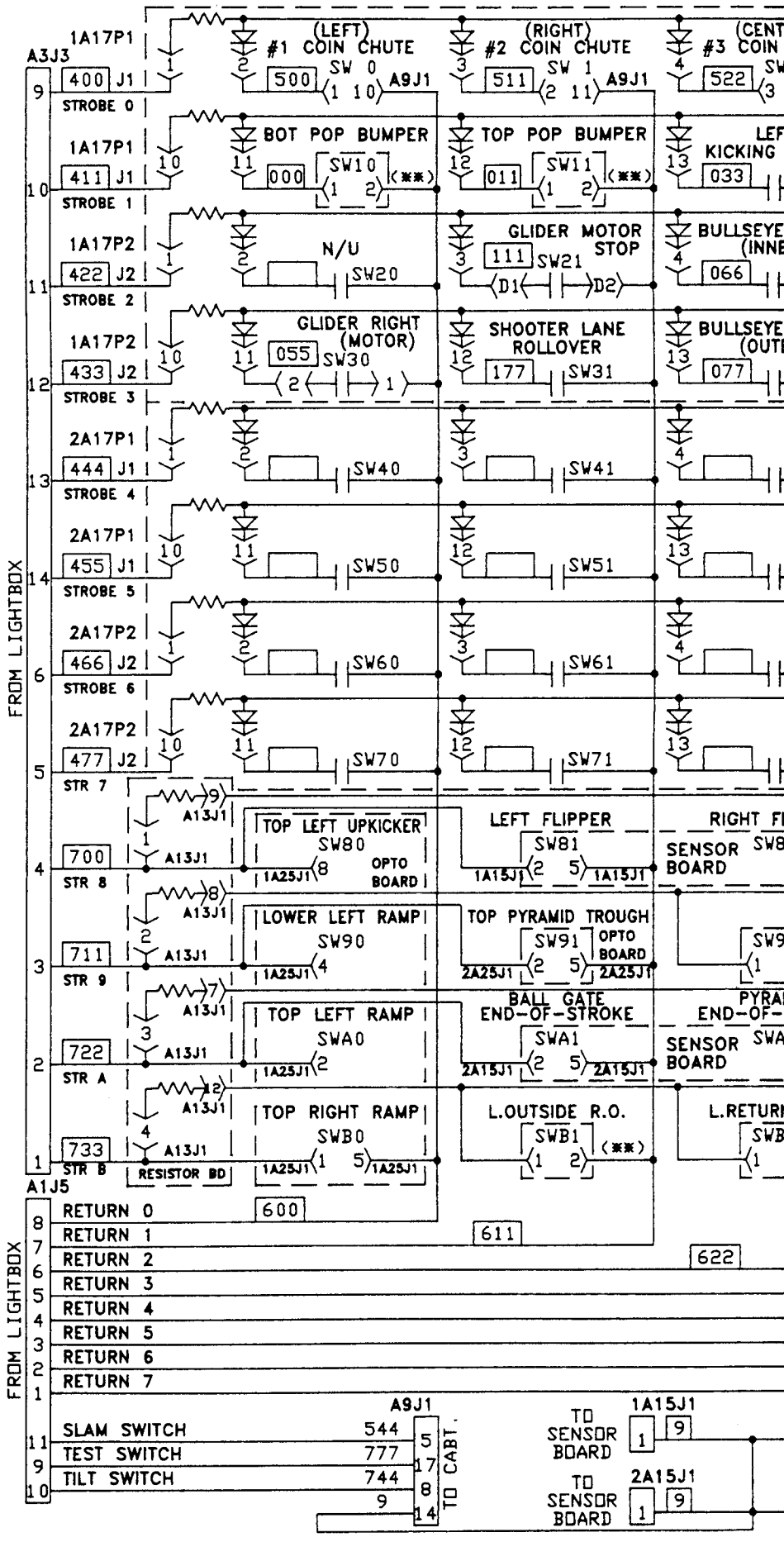


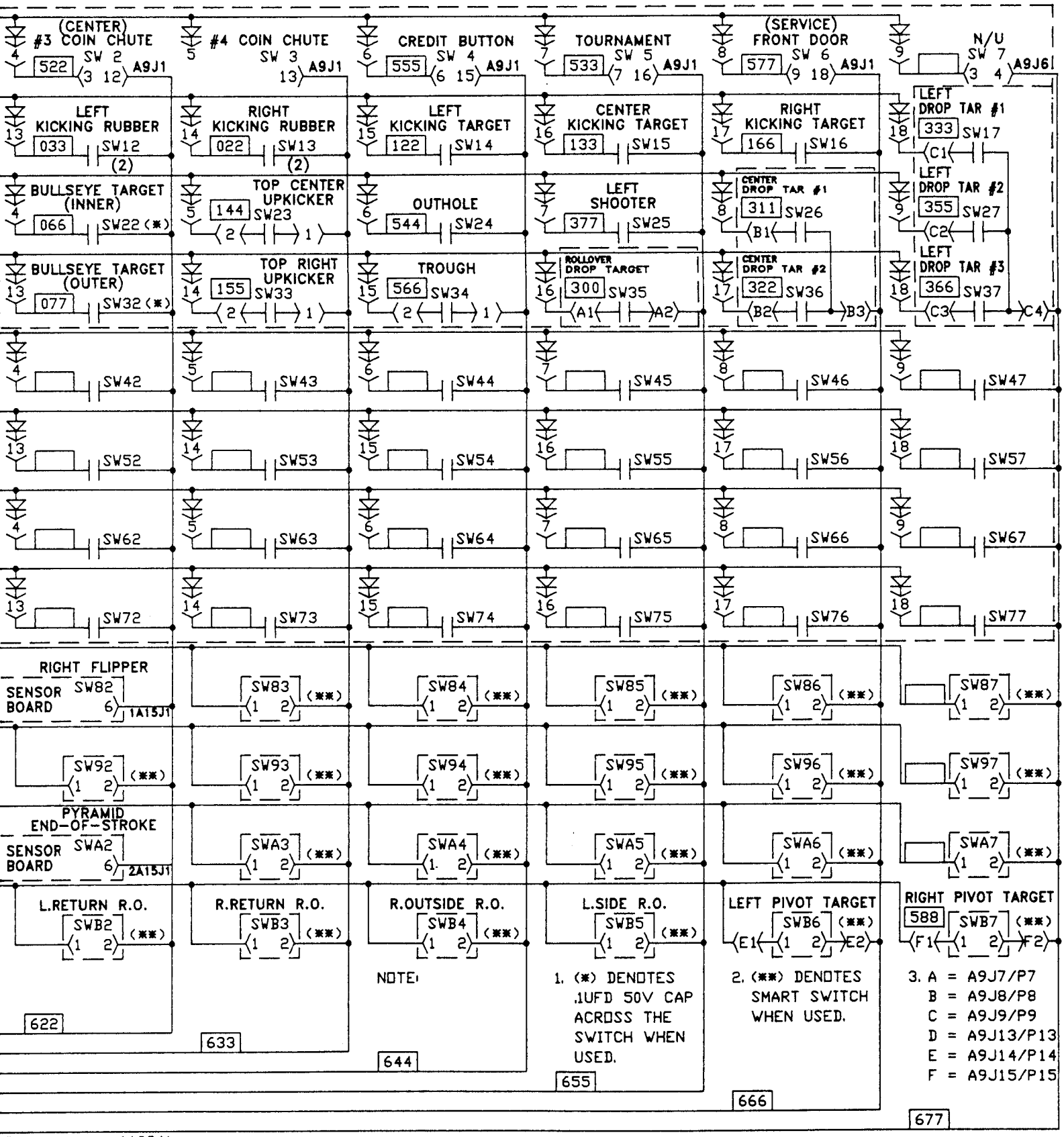
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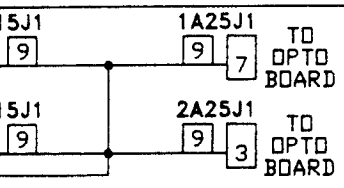
REFERENCE	DESCRIPTIO
A8	DISPLAY C
C1-C3	CAPACITOR,
C4-C18	CAPACITOR,
C27, C28	
C19, C20	CAPACITOR,
C21, C22	CAPACITOR,
C23, C25	CAPACITOR,
C26	CAPACITOR,
C29, C30	CAPACITOR,
C31	CAPACITOR,
D1-D9	DIODE, 1N4
D10	DIODE, 1N4
LED 1	DIODE, LE
Q1, Q2	TRANSISTO
Q3, Q4	TRANSISTO
Q5, Q6	TRANSISTO
Q7	TRANSISTO
R1	RESISTOR,
R2	RESISTOR,
R3-R6, R8, R9	RESISTOR,
R10	RESISTOR,
R11	RESISTOR,
R12-R15	RESISTOR,
R16-R17	RESISTOR,
R18	RESISTOR,
R19	RESISTOR,
R20	RESISTOR,
R21	RESISTOR,
SIP1, SIP2	RESISTOR
U1	IC, 65C02
U2	IC, 68B45,
U4	IC, 6264L
U5,U16	IC, 74HCT
U6	IC, 74HC0
U7	IC, 74HC0
U8	IC, GAL16
U9-U12	IC, 74LS1
U13	IC, 74HCT
U14	IC, 74LS2
U15	IC, 74LS3
U17	IC, NE555,
VR1	DIODE, ZE
VR2,VR3	DIODE, ZE
VR4,VR5	DIODE, ZE
XTAL1	CRYSTAL,
P1	HEADER, 1
P2	HEADER, 8
P3	HEADER, 2
P4	HEADER, 1
	HEATSINK,
	SOCKET, 3
	SOCKET, 2

SPLAY CONTROLLER (A8) PARTS LIST

RIPTION	PART NUMBER
LAY CONTROLLER	MA-1739
CITOR, 0.1UF, +80%-20%	XO-230
CITOR, .01UF, +80%-20%	XO-229
CITOR, 33PF, 10%, 100V	XO-896
CITOR, 150UF, 160V	XO-1133
CITOR, 0.1UF, 500V	XO-886
CITOR, 100UF, 10V	XO-211
CITOR, 220PF, 10%, 100V	XO-694
CITOR, 0.1UF, 100V	XO-784
E, 1N4004	XO-254
E, 1N4148	XO-261
E, LED, RED, MV5752	XO-270
SISTOR, NPN, 2N5551	XO-1141
SISTOR, PNP, 2N5401	XO-1142
SISTOR, NPN, MJE15030	XO-1143
SISTOR, PNP, MJE15031	XO-1144
STOR, 22 MEGOHM, 5%, 1/4W	XO-74
STOR, 10K OHM, 5%, 1/4W	XO-18
STOR, 4.7K OHM, 5%, 1/4W	XO-7
STOR, 330 OHM, 5%, 1/4W	XO-34
STOR, 100K OHM, 5%, 1/4W	XO-45
STOR, 47K OHM, 5%, 1/4W	XO-1135
STOR, 120 OHM, 5%, 1/4W	XO-1136
STOR, 4.7K OHM, 5%, 5W	XO-1137
STOR, 1.8K OHM, 5%, 1/4W	XO-1138
STOR, 220 OHM, 5%, 1/4W	XO-185
STOR, 2.2K OHM, 5%, 1/4W	XO-27
STOR PACK, 4.7 OHM	XO-906
5C02P2, CPU, 2MHZ	XO-927
8B45, 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
AL16V8-25L	U8-G
4LS157, QUAD 1 OF 2 MULTIPLEXER	XO-390
4HCT354, 1 OF 8 MULTIPLEXER	XO-1140
4LS273, OCTAL DATA LATCH	XO-94
4LS374, OCTAL "D" FLIP-FLOP	XO-96
E555, TIMER	XO-631
, ZENER, 1N4759A, 62V, 5%	XO-267
, ZENER, 1N4758A, 56V, 5%	XO-1164
, ZENER, 1N4742A, 12V, 5%	XO-257
AL, 3.579MHZ	XO-1166
R, 10 POSITION	XO-912
R, 8 POSITION	XO-911
R, 20 POSITION, RIBBON	XO-940
R, 14 POSITION, RIBBON	XO-1134
INK, 6038	XO-472
T, 32 PIN	XO-1036
T, 20 PIN	XO-491





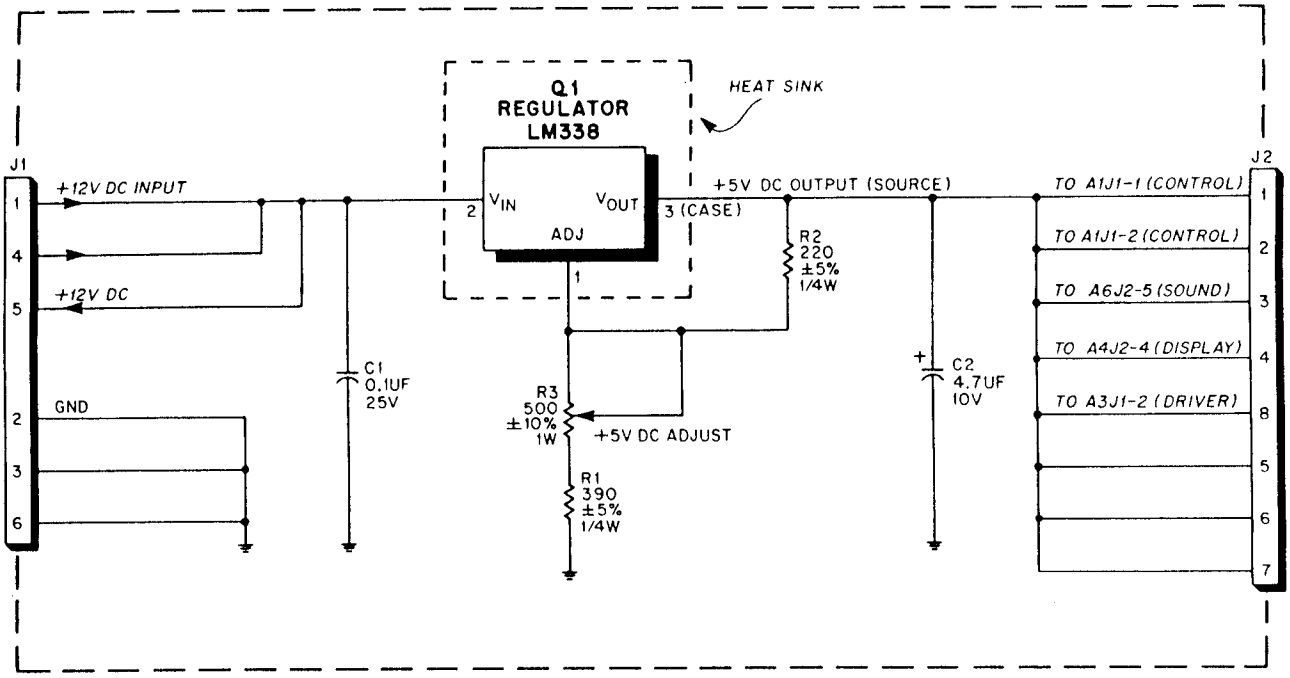


COLOR CODE			
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2	RED	7	VIOLET
3	ORANGE	8	GRAY
4	YELLOW	9	WHITE

Premier Technology

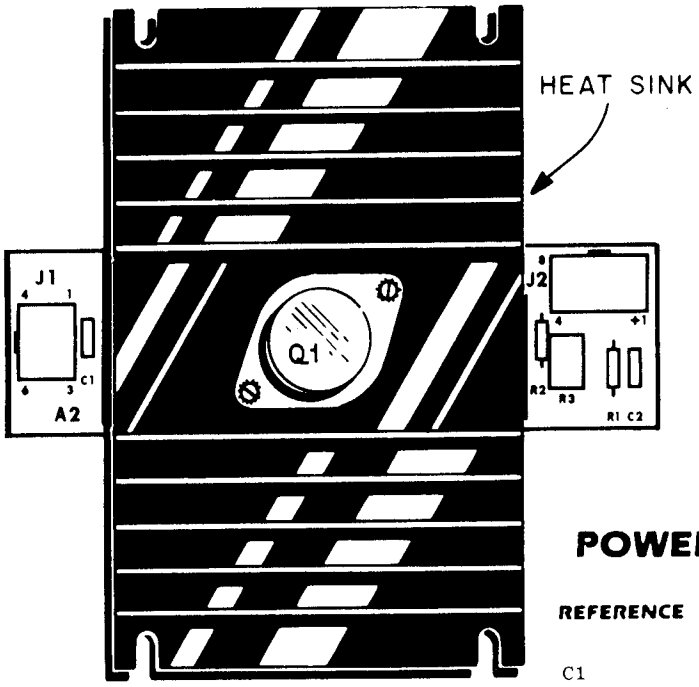
TITLE			
SWITCH MATRIX SCHEMATIC DIAGRAM			
USED ON	DRAWN	DATE	
#742	RLM	01-24-95	30697

VI. WIRING AND SCHEMATIC DIAGRAMS, PARTS LISTS



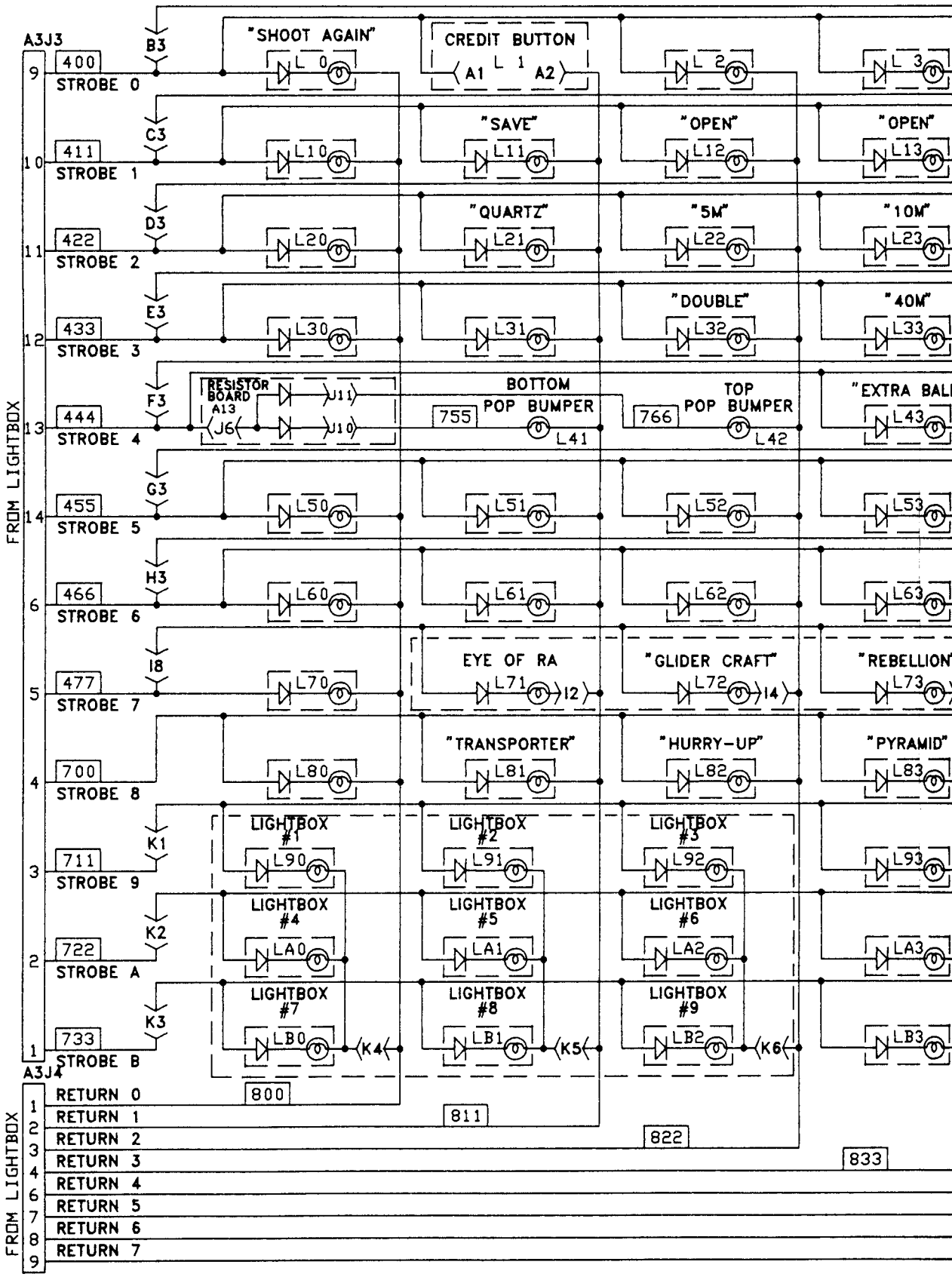
Premier® Technology			
TITLE: POWER SUPPLY (A2) SCHEMATIC DIAGRAM			
DRAWN	APPROVED	DATE	E-24441
	RHM	12 FEB 85	

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
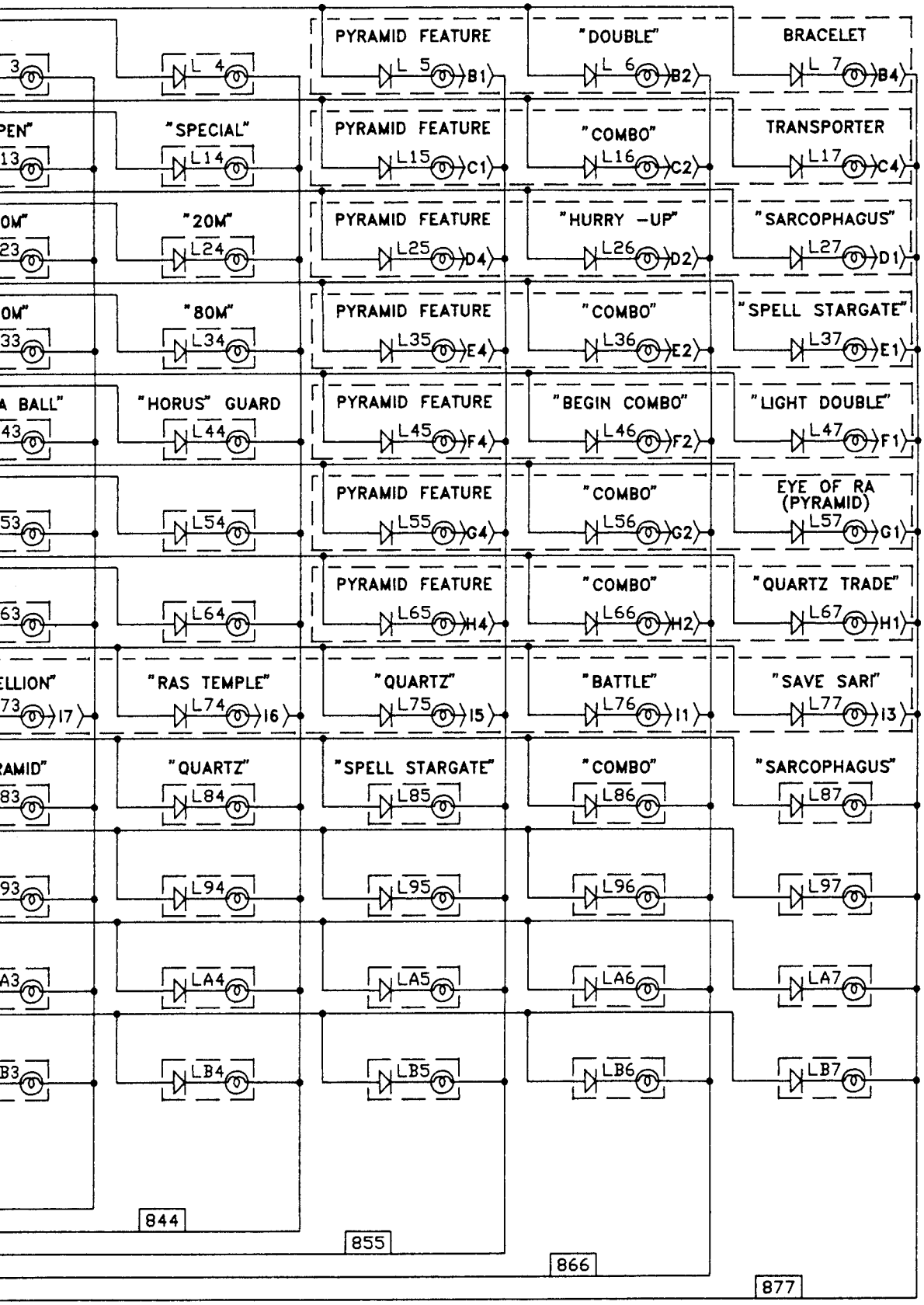


NOTE: 1. ALL LAMP DIODES ARE TYPE 1N4004.

2. ALL LAMPS ARE TYPE #44.

2. A = A9J6
J = 1A13J1
K = A9J4/P4

B = 1A22J1
C = 2A22J1
D = 3A22J1
E = 4A22J1



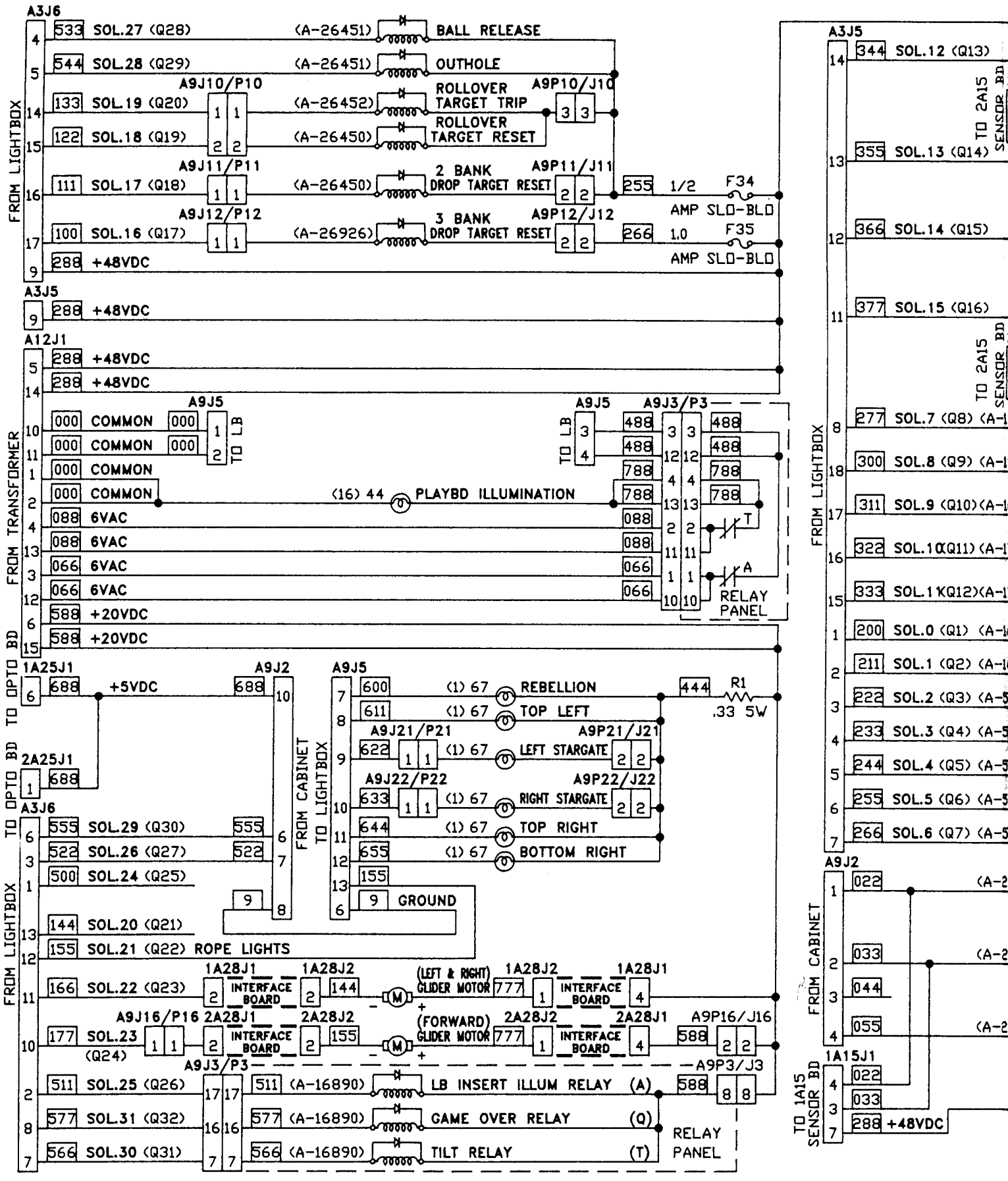
F = 5A22J1
G = 6A22J1
H = 7A22J1
I = 8A22J1

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2	RED	7	VIOLET
3	ORANGE	8	GRAY
4	YELLOW	9	WHITE

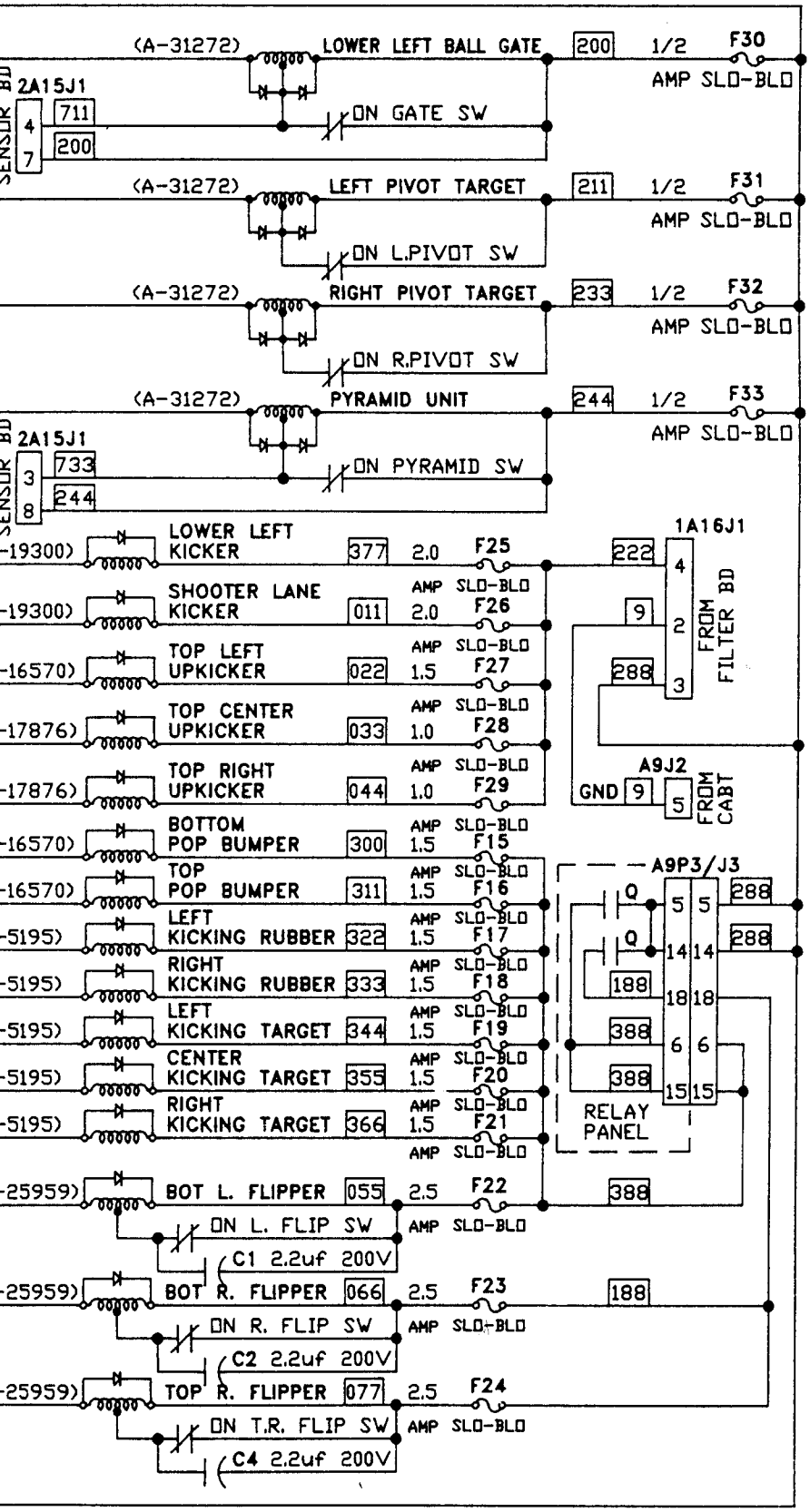
Premier Technology

TITLE: LAMP MATRIX SCHEMATIC DIAGRAM

USED ON	DRAWN	DATE	
#742	RLM	01-24-95	30698



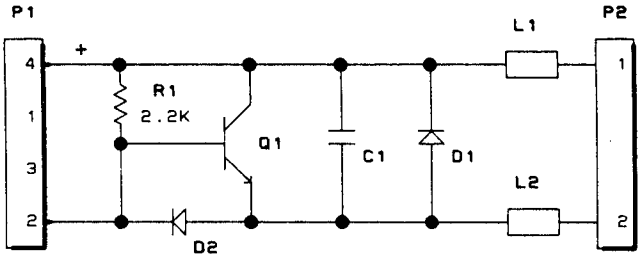
NOTE:
1. ALL DIODES ARE TYP



COLOR CODE			
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2	RED	7	VIOLET
3	ORANGE	8	GRAY
4	YELLOW	9	WHITE

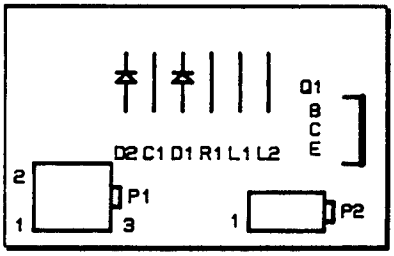
TYPE 1N4004.

Premier Technology			
TITLE: PLAYBOARD SCHEMATIC DIAGRAM			
USED ON: #742	DRAWN: RLM	DATE: 01-24-95	30699



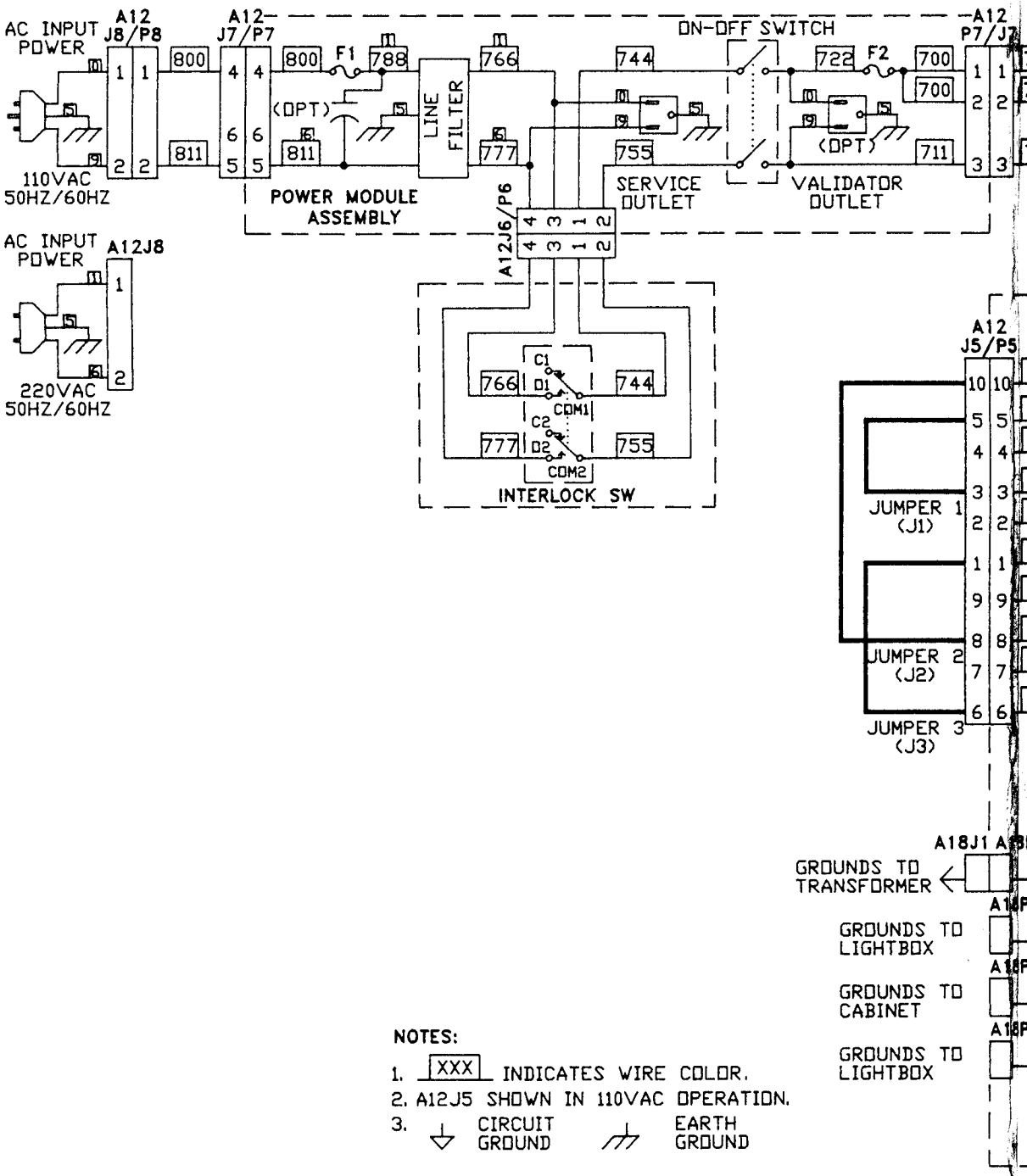
Premier Technology			
TITLE: MOTOR INTERFACE BOARD (A28) SCHEMATIC DIAGRAM			
DRAWN: J.B.	APPROVED: J.B.	DATE: JAN.9'94	MA-2026

MOTOR INTERFACE BOARD (A28) COMPONENT LOCATION



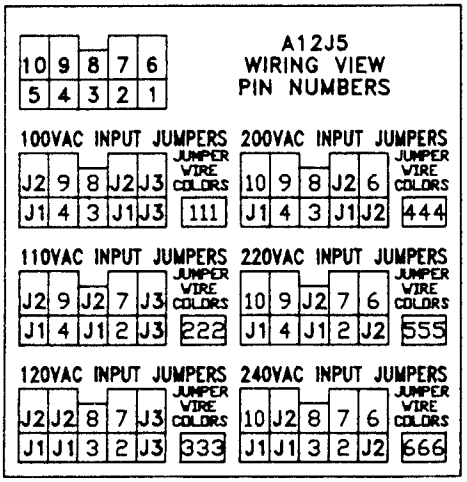
MOTOR INTERFACE BOARD (A28) PARTS LIST

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

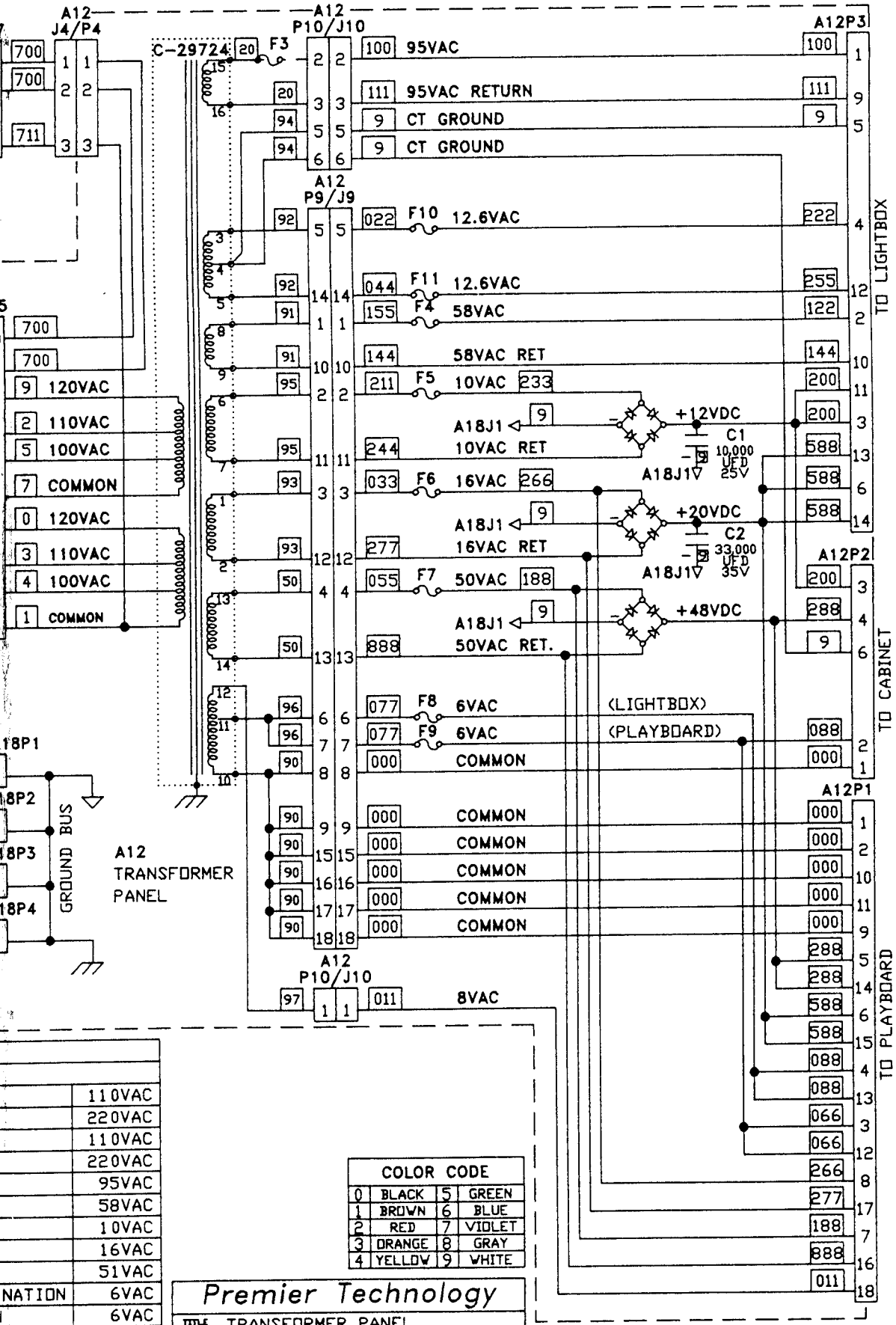


NOTES:

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



FUSE DESIGNATIONS TABLE			
FUSE	RATING	PART NO.	USAGE
F1	8.0A SLO-BLO	EL26	LINE INPUT
	4.0A SLO-BLO	EL33	LINE INPUT
F2	5.0A SLO-BLO	EL 8	PRIMARY POWER
	2.5A SLO-BLO	EL21	PRIMARY POWER
F3	3/8A SLO-BLO	EL31	DISPLAY
F4	3/8A SLO-BLO	EL31	DISPLAY
F5	2.5A SLO-BLO	EL21	POWER SUPPLY
F6	10 A SLO-BLO	EL36	CONTROLLED LAMPS
F7	8.0A SLO-BLO	EL26	SOLENOIDS
F8	10 A	EL23	LIGHTBOX INSERT ILLUMINA
F9	7.5A	EL22	PLAYBOARD ILLUMINATION
F10	3.0A SLO-BLO	EL 9	AUXILLIARY POWER SUPPLY
F11	3.0A SLO-BLO	EL 9	AUXILLIARY POWER SUPPLY
F12			

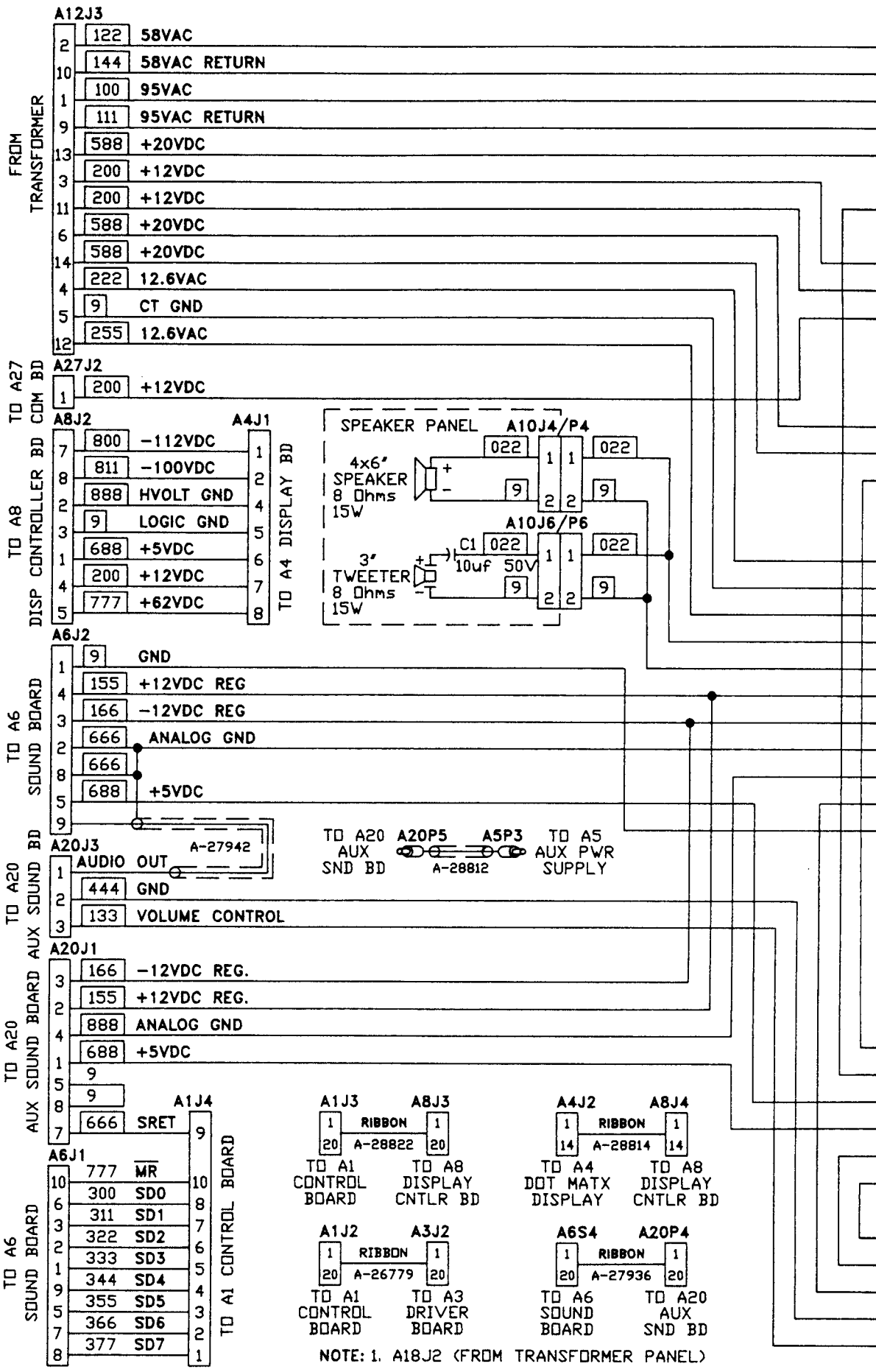


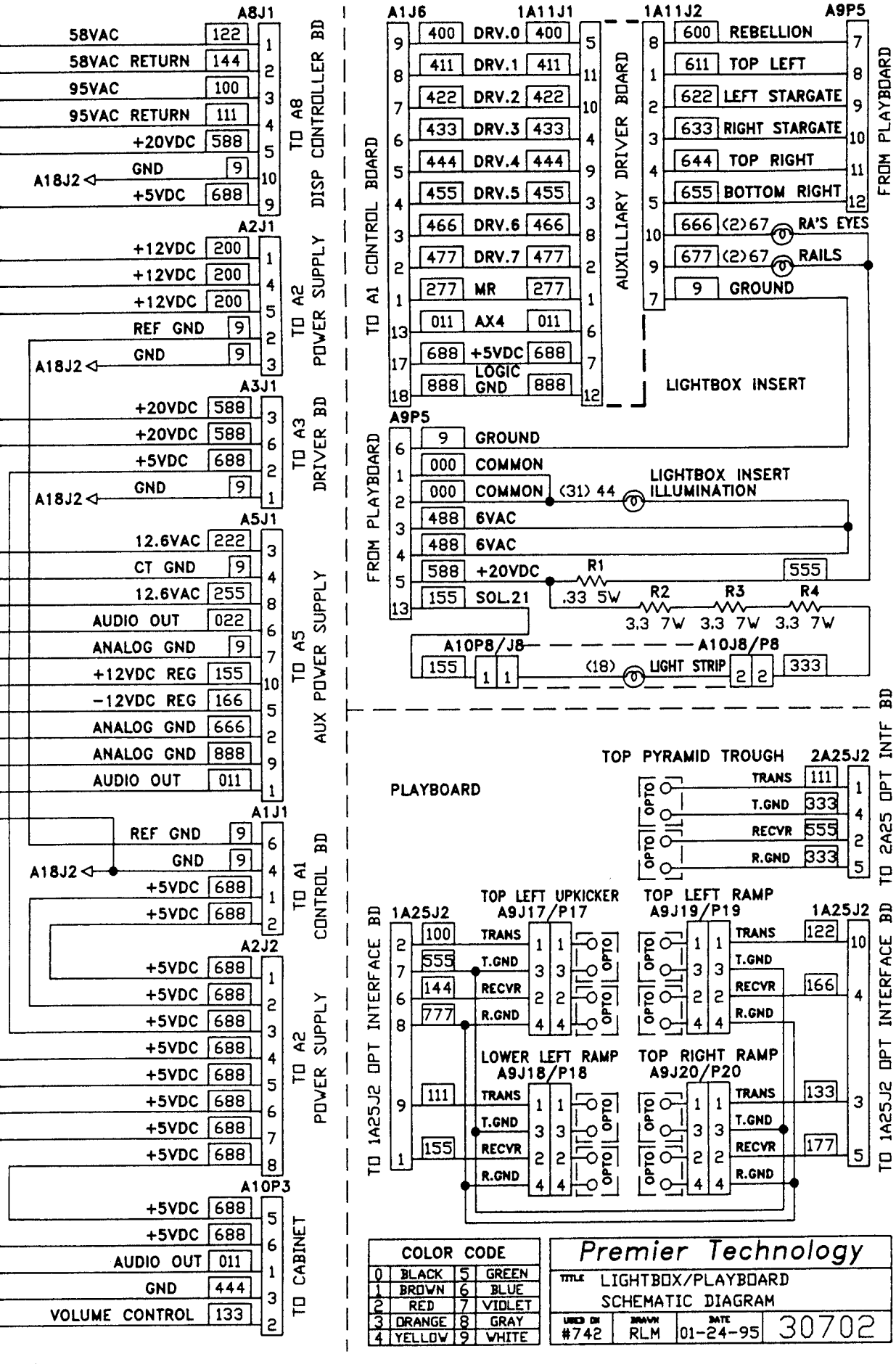
	110VAC
	220VAC
	110VAC
	220VAC
	95VAC
	58VAC
	10VAC
	16VAC
	51VAC
NATION	6VAC
	6VAC
Y	12.6VAC
Y	12.6VAC

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			
TRANSFORMER PANEL SCHEMATIC DIAGRAM			
USED ON	DRAWN	DATE	
#742	RLM	01-24-95	30700


A12J3
FROM TRANSFORMER
122 58VAC
144 58VAC RETURN
100 95VAC
111 95VAC RETURN
588 +20VDC
200 +12VDC
200 +12VDC
588 +20VDC
588 +20VDC
222 12.6VAC
9 CT GND
255 12.6VAC
A27J2
TO A27 COM BD
200 +12VDC
A8J2
TO A8 DISP CONTROLLER BD
800 -112VDC
811 -100VDC
888 HVOLT GND
9 LOGIC GND
688 +5VDC
200 +12VDC
777 +62VDC
A4J1
TO A4 DISPLAY BD
SPEAKER PANEL
A10J4/P4
4x6" SPEAKER 8 Ohms 15W
A10J6/P6
3" TWEETER 8 Ohms 15W
C1 10uf 50V
022
9
A6J2
TO A6 SOUND BOARD
9 GND
155 +12VDC REG
166 -12VDC REG
666 ANALOG GND
666
688 +5VDC
A20J3
TO A20 AUX SOUND BD
A-27942
AUDIO OUT
444 GND
133 VOLUME CONTROL
TO A20 AUX SND BD
A20P5
A-28812
A5P3
TO A5 AUX PWR SUPPLY
A20J1
TO A20 AUX SOUND BOARD
166 -12VDC REG.
155 +12VDC REG.
888 ANALOG GND
688 +5VDC
9
9
666 SRET
A1J4
TO A1 CONTROL BOARD
A6J1
TO A6 SOUND BOARD
777 MR
300 SD0
311 SD1
322 SD2
333 SD3
344 SD4
355 SD5
366 SD6
377 SD7
A1J3
A8J3
RIBBON
A-28822
TO A1 CONTROL BOARD
TO A8 DISPLAY CNTLR BD
A4J2
A8J4
RIBBON
A-28814
TO A4 DOT MATX DISPLAY
TO A8 DISPLAY CNTLR BD
A1J2
A3J2
RIBBON
A-26779
TO A1 CONTROL BOARD
TO A3 DRIVER BOARD
A6S4
A20P4
RIBBON
A-27936
TO A6 SOUND BOARD
TO A20 AUX SND BD
NOTE: 1. A18J2 (FROM TRANSFORMER PANEL)

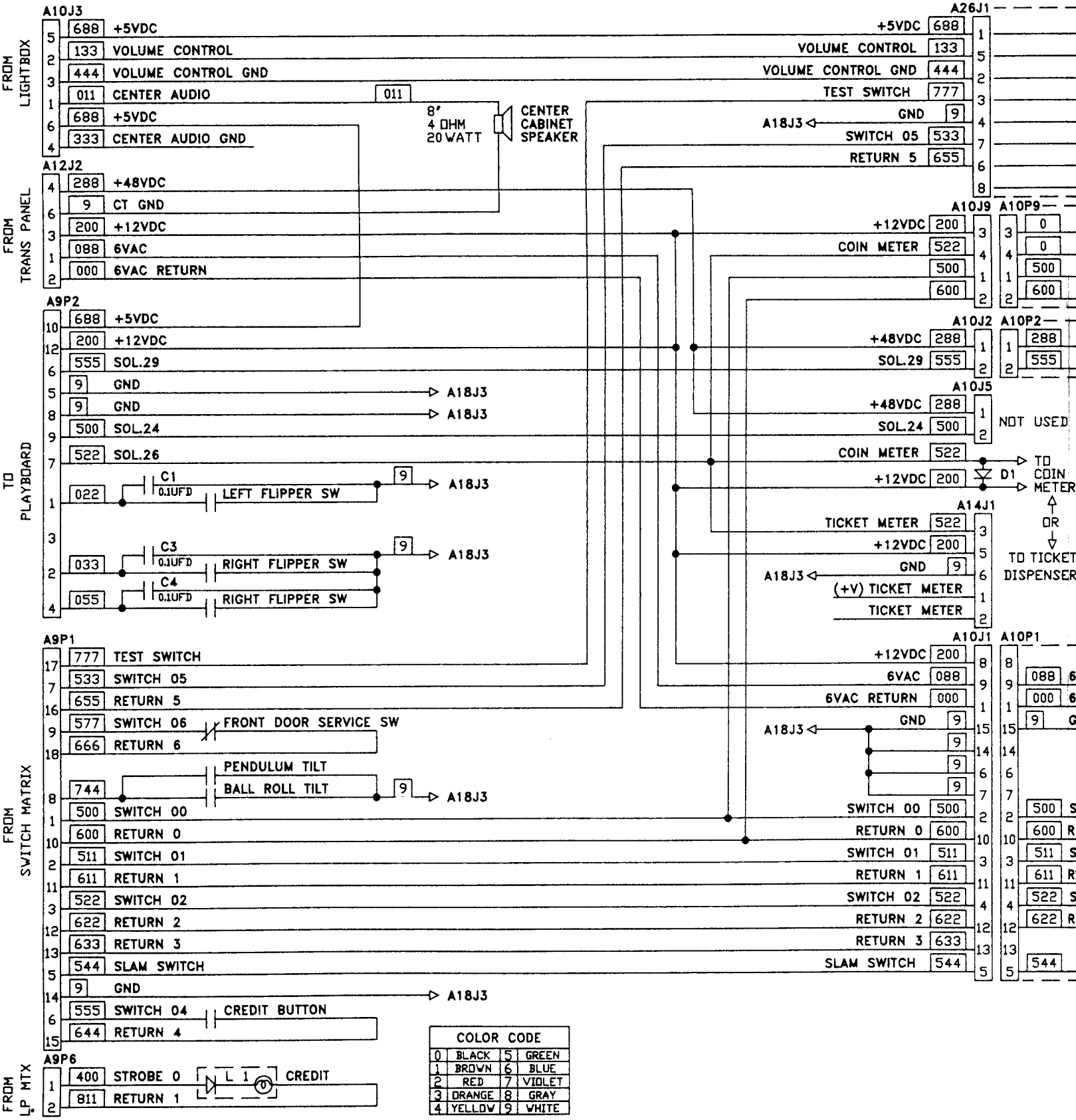


COLOR CODE			
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1	BROWN	6	BLUE
2	RED	7	VIOLET
3	ORANGE	8	GRAY
4	YELLOW	9	WHITE

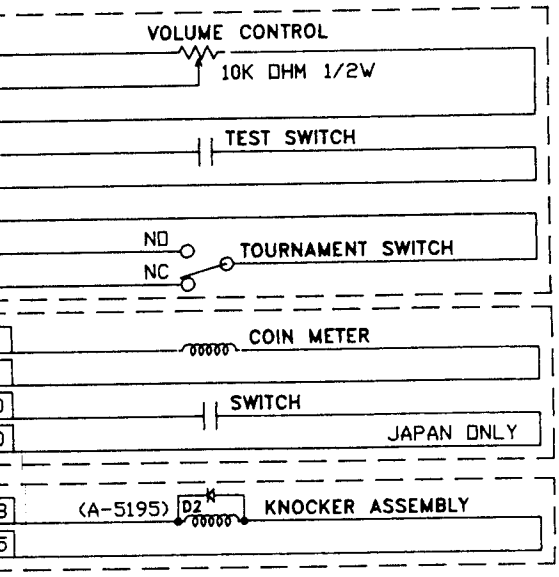
Premier Technology

TITLE: LIGHTBOX/PLAYBOARD SCHEMATIC DIAGRAM

USED ON	DRAWN	DATE	
#742	RLM	01-24-95	30702



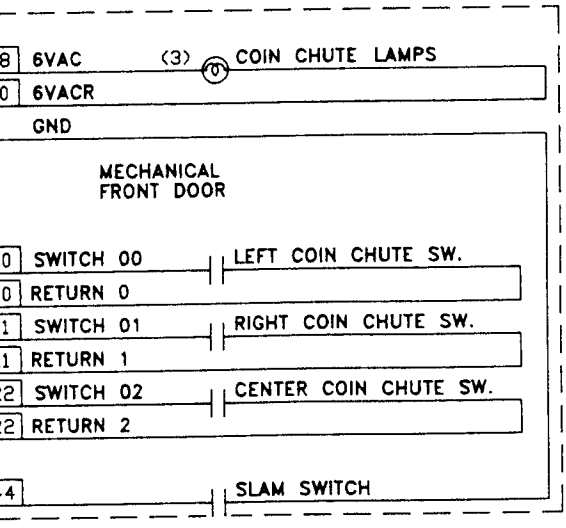
COLOR CODE			
0	BLACK	5	GREEN
1	BROWN	6	BLUE
2	RED	7	VIOLET
3	ORANGE	8	GRAY
4	YELLOW	9	WHITE



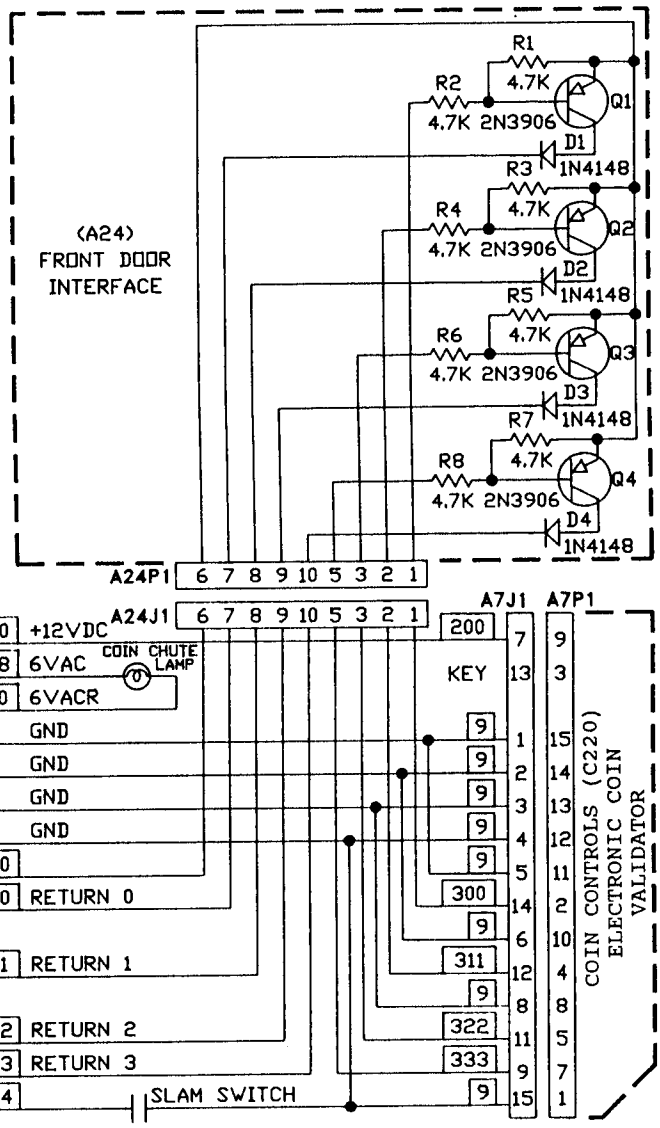
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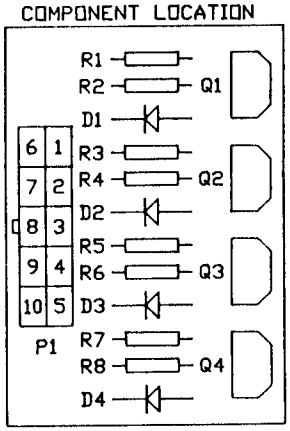
NOTE:
1. AMOUNT OF PARTS VARIES PER GAME.
2. ALL DIODES ARE TYPE IN4004.
3. A18J3 (FROM TRANSFORMER PANEL).



Premier Technology			
TITLE CABINET/FRONT DOOR SCHEMATIC DIAGRAM			
USED ON #742	DRAWN RLM	DATE 01-24-95	30701



(A24)
FRONT DOOR INTERFACE
COMPONENT LOCATION



(A24)
FRONT DOOR INTERFACE
PARTS LIST

REFERENCE	DESCRIPTION	PART NO.
	FRONT DOOR INTERFACE ASSEMBLY	MA1645
D1-D4	DIODE, 1N4148	XD-261
Q1-Q4	TRANSISTOR, PNP, 2N3906	XD-588
R1-R8	RESISTOR, 4.7K OHM, 1/4W, 5%	XD-7
A24P1	HEADER,10 POSITION	XD-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

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PIVOT POST MECHANISM ASSEMBLY
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LIGHTBOX INSERT ASSEMBLY
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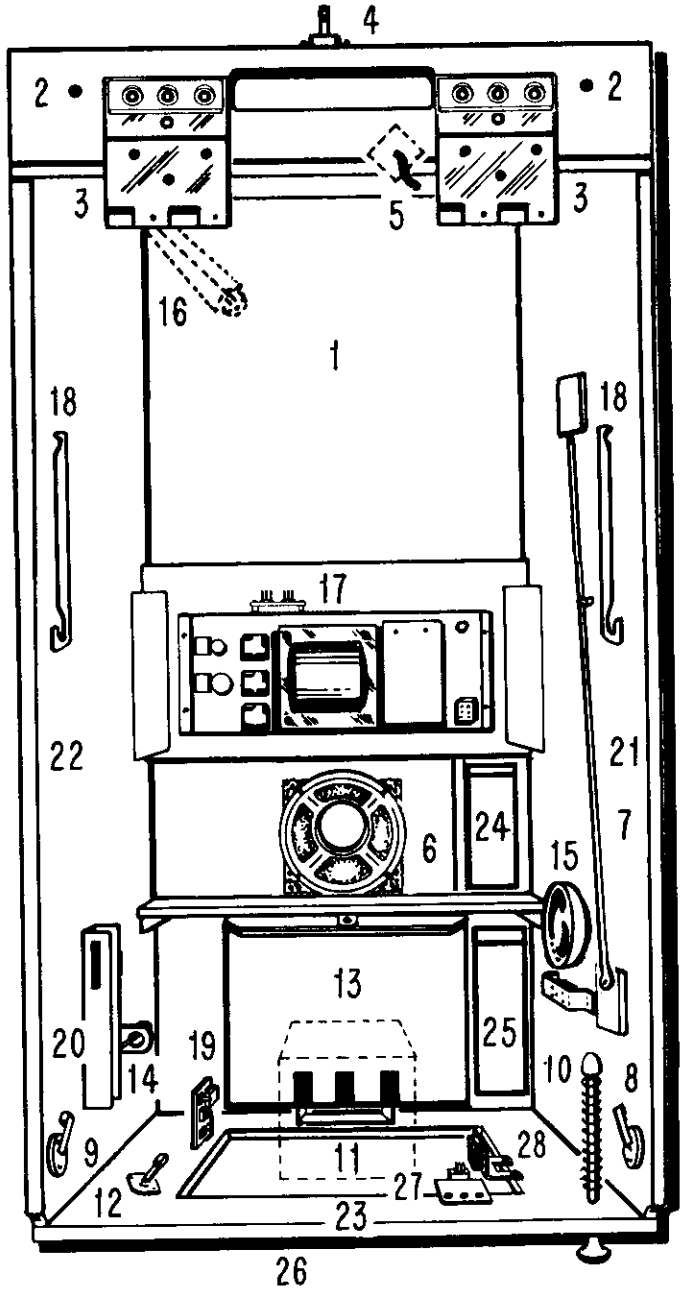
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LAMP IDENTIFICATION.....81

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VII. PARTS INFORMATION

CABINET PARTS

ITEM	DESCRIPTION	PART NO.
1	Cabinet Screened	30738-742
2	Lightbox Mounting Thumb Screw (2)	FA-162
	(Not Shown for Reference Only, Part of Lightbox Assembly)	
3	Butt Hinge (2)	26449
	(Attached to Lightbox)	
4	"U" Bolt (P/O Lightbox)	24659
	Latch Assembly (P/O Cabinet)	21969
5	Line Cord (Domestic)	23365
	Line Cord Cover Plate	23364
6	Speaker, 4 Ohm, 8"	28934
	Speaker Grille	28935
7	Prop Stick, Playfield	23940
8	Right Flipper Switch Assembly	28693
	(Switch with Bracket)	28668
	(Switch Only)	
9	Left Flipper Switch Assembly	28690
	(Switch with Bracket)	28691
	(Switch Only)	26314
10	Ball Shooter Assembly	29106
11	Front Door Assembly (Universal)	MA-2043
	Cable Assembly	26130
	Slam Switch (N/O)	LA-2
	6V DC Lamp, Wedge Base, #555	FD-24
	Lampholder	18092
12	Replay Switch Assembly	28032
13	Cashbox	*SEE NOTE
	Cover	
14	Plumb Bob Tilt Switch Assembly	358
	Strike Plate	30879
	Carbon, Tilt Bob	357
	Rod, Tilt	22043
	Bracket	14653
	Clip	MA-12
15	Knocker Assembly	27591
	5" Bell Assembly (When Used)	3768
16	Cabinet Leg (4), 31"	3775
	Leg Bolt (8)	30121
	1-1/2" Leg Adjuster (4)	FA-665
	3/8-16", Jam Nut (8)	MA-2037
17	Transformer Panel Assembly	EL-42
	Bridge Rectifier (3)	XO-830
	Capacitor, (10,000UF), 25V	XO-957
	Capacitor, (33,000UF), 35V	EL-78
	Fuse Holder and Cap	EL-10
	Fuse Block (8 Pole)	EL-31
	F3, 3/8 Amp, SLO-BLO	EL-31
	F4, 3/8 Amp, SLO-BLO	EL-21
	F5, 2-1/2 Amp, SLO-BLO	EL-36
	F6, 10 Amp, SLO-BLO	EL-26
	F7, 8 Amp, SLO-BLO	EL-23
	F8, 10 Amp	EL-22
	F9, 7-1/2 Amp	EL-9
	F10, 3 Amp, SLO-BLO	EL-9
	F11, 3 Amp, SLO-BLO	29724
	Transformer	
18	Cabinet Pivot Bracket (Left)	25658
	Cabinet Pivot Bracket (Right)	25657
19	Game Controls Board (A26)	MA-1851
20	Ball Roll Tilt	
	Housing and Switch Assembly	24394
	Switch	24393
21	Right Moulding (Not Shown)	28700
22	Left Moulding (Not Shown)	28701
23	Front Moulding (Not Shown)	16951
24	Relay Strip Assembly	MA-1872
	"Q" Relay	MA-1172
	"T" Relay	MA-25
	"A" Relay	MA-1021
25	Power Module Assembly (110V AC)	MA-1928
	Double Throw Switch	23799
	Fuse Holder And Cap (2)	EL-78
	Line Filter	EL-50
	Power Module Assembly (FRANCE)	30255A
	Power Module Assembly (GERMANY)	30255B
	Power Module Assembly (JAPAN)	30255C
	Power Module Assembly (220V AC)	30255D
	F1, 8 Amp SLO-BLO, 110V AC	EL-26
	4 Amp SLO-BLO, 220V AC	EL-33
	F2, 5 Amp SLO-BLO, 110V AC	EL-8
	2.5 Amp SLO-BLO, 220V AC	EL-21

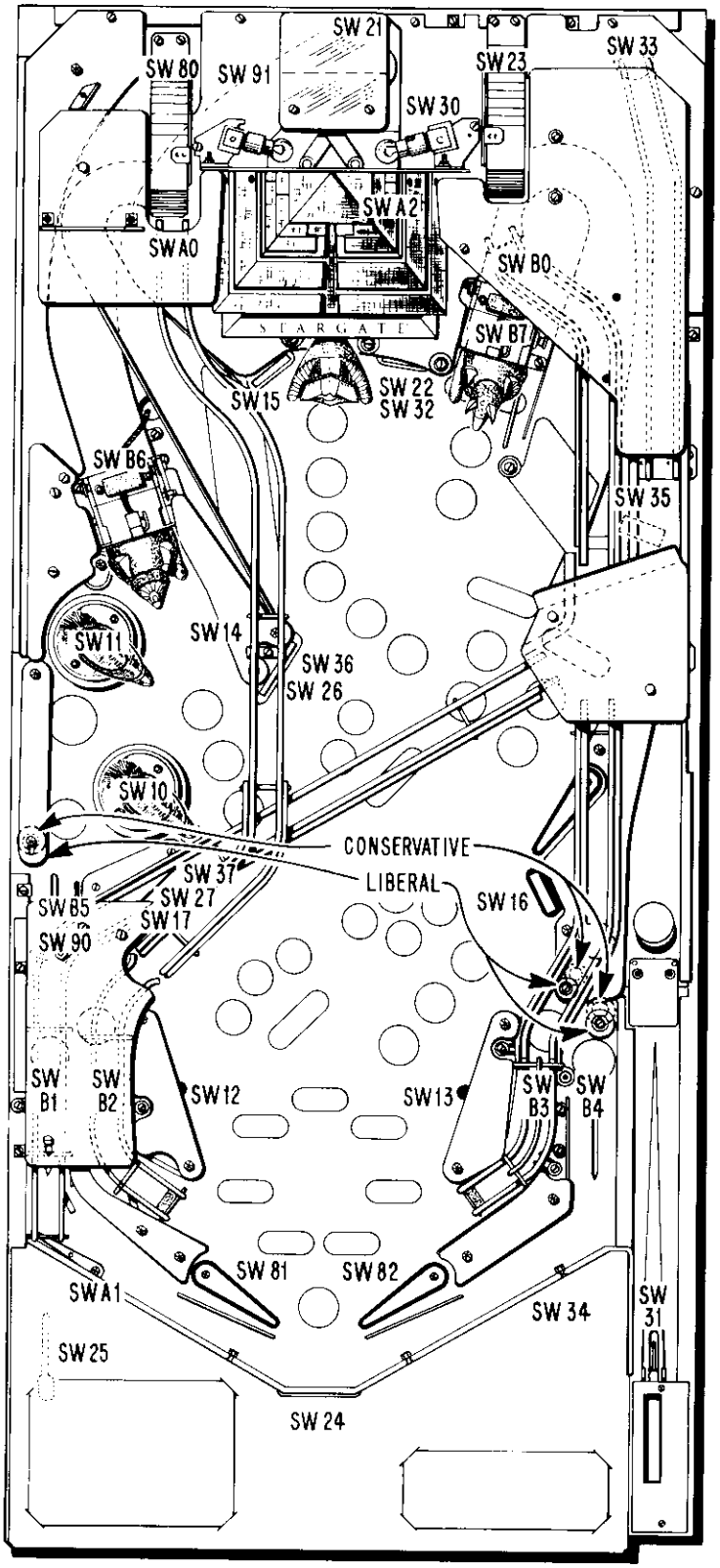


ITEM	DESCRIPTION	PART NO.
26	Lock Bar (Not Shown)	29759
	Lock Bracket (Not Shown)	29760
	Lock Bar Bracket (Not Shown)	29761
27	Front Door Service Switch Assembly	
	Switch Bracket	29451
	Switch	29305
28	Interlock Switch Assembly	
	Switch Bracket	29148
	Switch Cover	29145
	Switch	EL-66
	Insulator	24145

*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

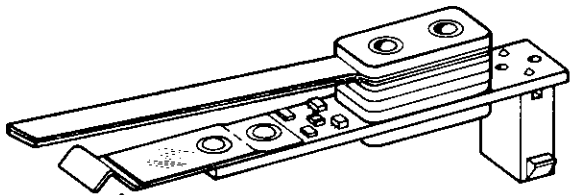
VII. PARTS INFORMATION



PLAYBOARD SWITCH ASSIGNMENTS

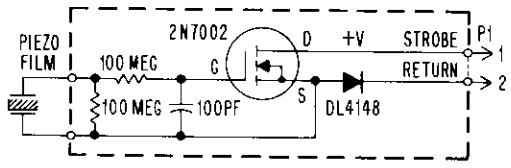
SWITCH MATRIX NUMBER	SWITCH ASSIGNMENT	PART NO.
SW 0	LEFT COIN CHUTE (#1)	P/O FRONT DOOR
SW 1	RIGHT COIN CHUTE (#2)	P/O FRONT DOOR
SW 2	CENTER COIN CHUTE (#3)	P/O FRONT DOOR
SW 3	COIN CHUTE (#4)	P/O ELECTRONIC DOOR
SW 4	START (CREDIT) BUTTON	18092
SW 5	TOURNAMENT	X0-1193
SW 6	FRONT DOOR (SERVICE)	29305
SW 7	(NOT USED)	
*SW 10	BOTTOM POP BUMPER	29819
*SW 11	TOP POP BUMPER	29819
SW 12	LEFT KICKING RUBBER (2)	27702
SW 13	RIGHT KICKING RUBBER (2)	27702
SW 14	LEFT KICKING TARGET	28511
SW 15	CENTER KICKING TARGET	28511
SW 16	RIGHT KICKING TARGET	28511
SW 17	LEFT DROP TARGET #1	18094
SW 20	(NOT USED)	
SW 21	GLIDER MOTOR STOP	27667A
*SW 22	BULLSEYE TARGET (INNER)	P/O 27544
SW 23	TOP CENTER UPKICKER	27667A
SW 24	OUTHOLE	26927
SW 25	LOWER LEFT KICKER	25938
SW 26	CENTER DROP TARGET #1	25896
SW 27	LEFT DROP TARGET #2	18095
SW 30	GLIDER RIGHT (MOTOR)	27667A
SW 31	SHOOTER LANE ROLLOVER	25938
*SW 32	BULLSEYE TARGET (OUTER)	P/O 27544
SW 33	TOP RIGHT UPKICKER	27667A
SW 34	TROUGH	25938
SW 35	ROLLOVER DROP TARGET	25895
SW 36	CENTER DROP TARGET #2	25897
SW 37	LEFT DROP TARGET #3	18093
SW 40 THRU SW 77	(NOT USED)	
SW 80	TOP LEFT UPKICKER (OPTICAL INTERFACE)	P/O MA-1925
SW 81	LEFT FLIPPER (SENSOR BOARD)	P/O MA-1334
SW 82	RIGHT FLIPPER (SENSOR BOARD)	P/O MA-1334
SW 83 THRU SW 87	(NOT USED)	
SW 90	LOWER LEFT RAMP (OPTICAL INTERFACE)	P/O MA-1925
SW 91	TOP PYRAMID TROUGH (OPTICAL INTERFACE)	P/O MA-1558
SW 92 THRU SW 97	(NOT USED)	
SW A0	TOP LEFT RAMP (OPTICAL INTERFACE)	P/O MA-1925
SW A1	BALL GATE (END OF STROKE)	31232
SW A2	PYRAMID (END OF STROKE)	31185
SW A3 THRU SW A7	(NOT USED)	
SW B0	TOP RIGHT RAMP (OPTICAL INTERFACE)	P/O MA-1925
*SW B1	LEFT OUTSIDE ROLLOVER	28625
*SW B2	LEFT RETURN ROLLOVER	28625
*SW B3	RIGHT RETURN ROLLOVER	28625
*SW B4	RIGHT OUTSIDE ROLLOVER	28625
*SW B5	LEFT SIDE ROLLOVER	28625
*SW B6	LEFT PIVOT TARGET	30726
*SW B7	RIGHT PIVOT TARGET	30726

* SMART SWITCH™



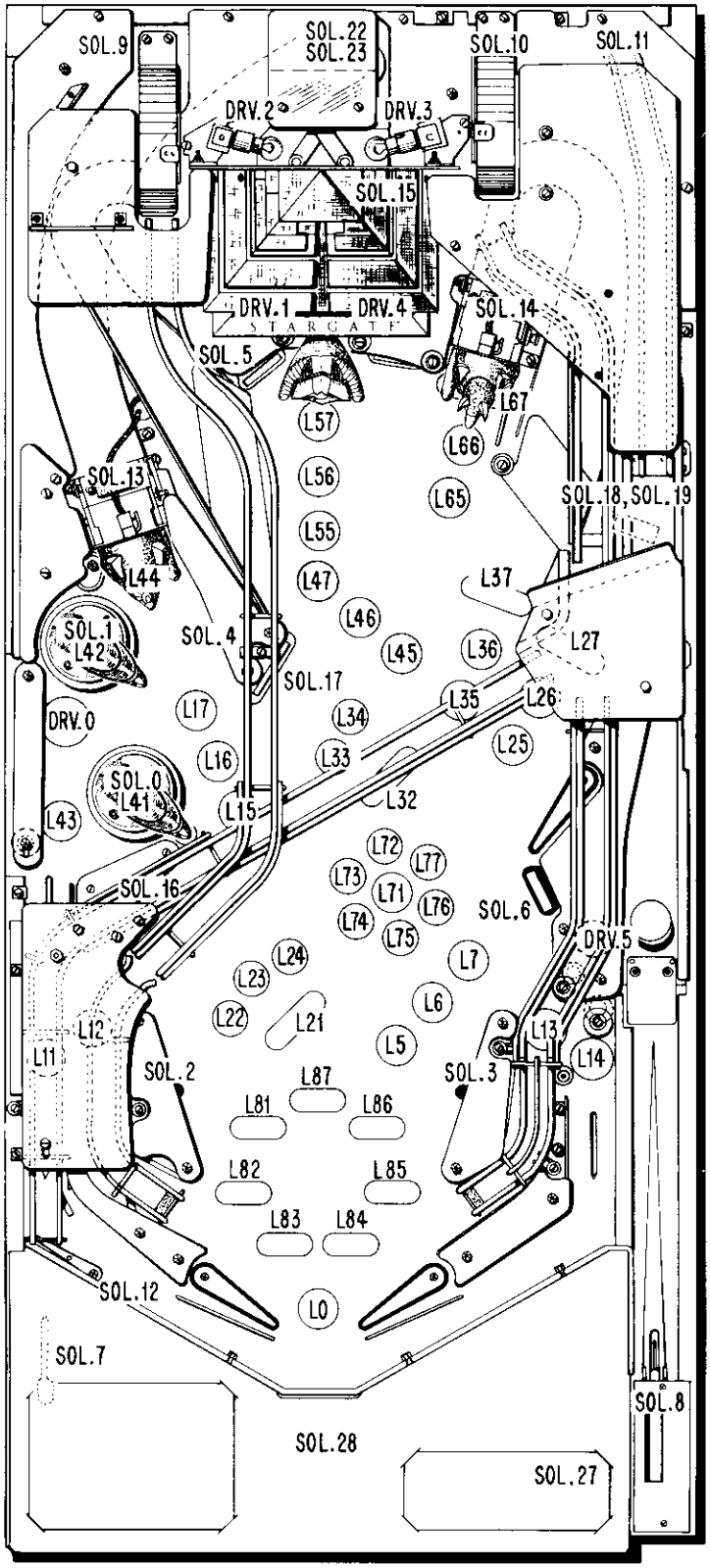
ROLLOVER TYPE
SMART SWITCH™
DO NOT ADJUST WIDE BEAM

SEE PAGE 22



SCHEMATIC REPRESENTATION

VII. PARTS INFORMATION



SOLENOID, DRIVER FUNCTIONS/LOCATIONS

SOL. 0	BOTTOM POP BUMPER	SOL. 20	(NOT USED)
SOL. 1	TOP POP BUMPER	*SOL. 21	ROPE LIGHTS
SOL. 2	LEFT KICKING RUBBER	SOL. 22	(LEFT & RIGHT) GLIDER MOTOR
SOL. 3	RIGHT KICKING RUBBER	SOL. 23	(FORWARD) GLIDER MOTOR
SOL. 4	LEFT KICKING TARGET	SOL. 24	(NOT USED)
SOL. 5	CENTER KICKING TARGET	SOL. 25	LIGHTBOX ILLUM. RELAY (A)
SOL. 6	RIGHT KICKING TARGET	SOL. 26	TICKET/COIN METER ENABLE
SOL. 7	LOWER LEFT KICKER	SOL. 27	BALL RELEASE
SOL. 8	SHOOTER LANE KICKER	SOL. 28	OUTHOLE
SOL. 9	TOP LEFT UPKICKER	SOL. 29	KNOCKER
SOL. 10	TOP CENTER UPKICKER	SOL. 30	TILT RELAY (T)
SOL. 11	TOP RIGHT UPKICKER	SOL. 31	GAME OVER RELAY (Q)
SOL. 12	LOWER LEFT BALL GATE	DRV. 0	REBELLION, #67
SOL. 13	LEFT PIVOT TARGET	DRV. 1	TOP LEFT, #67
SOL. 14	RIGHT PIVOT TARGET	DRV. 2	LEFT STARGATE, #67
SOL. 15	PYRAMID UNIT	DRV. 3	RIGHT STARGATE, #67
SOL. 16	3 BANK TARGET RESET	DRV. 4	TOP RIGHT, #67
SOL. 17	2 BANK TARGET RESET	DRV. 5	BOTTOM RIGHT, #67
SOL. 18	ROLLOVER TARGET RESET	*DRV. 6	RA'S EYES, #67 (2)
SOL. 19	ROLLOVER TARGET TRIP	*DRV. 7	RAILS, #67 (2)

PLAYBOARD LAMP ASSIGNMENTS

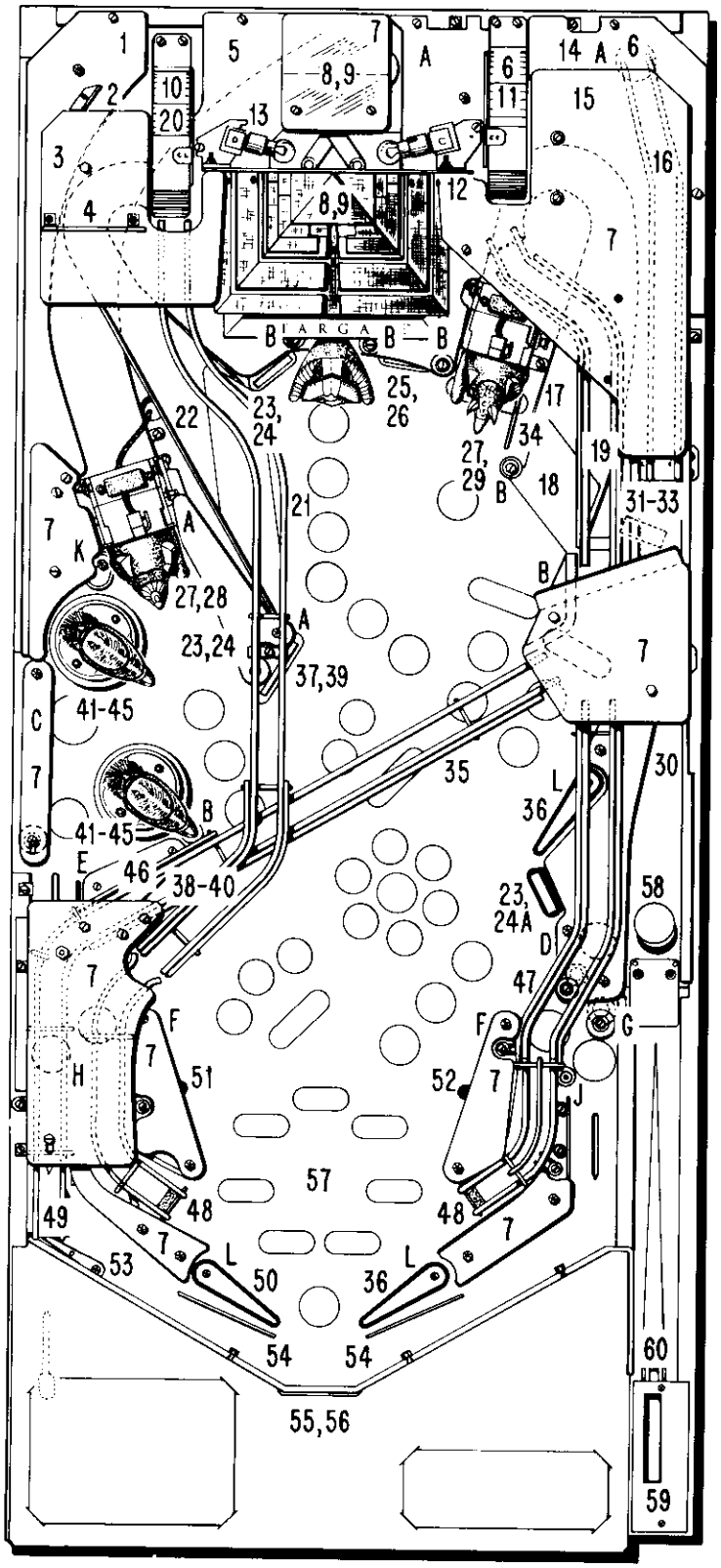
LAMP NUMBER	LAMP ASSIGNMENT
L0	"SHOOT AGAIN"
L1	Credit Button
L2	
THRU	(Not Used)
L4	
L5	Pyramid Feature
L6	"DOUBLE"
L7	Bracelet
L10	(Not Used)
L11	"SAVE"
L12	"OPEN"
L13	"OPEN"
L14	"SPECIAL"
L15	Pyramid Feature
L16	"COMBO"
L17	Transporter
L20	(Not Used)
L21	"QUARTZ"
L22	"5M"
L23	"10M"
L24	"20M"
L25	Pyramid Feature
L26	"HURRY-UP"
L27	"SARCOPHAGUS"
L30	(Not Used)
L31	(Not Used)
L32	"DOUBLE"
L33	"40M"
L34	"80M"
L35	Pyramid Feature
L36	"COMBO"
L37	"SPELL STARGATE"
L41	Bottom Pop Bumper
L42	Top Pop Bumper
L43	"EXTRA BALL"
L44	"HORUS" Guard
L45	Pyramid Feature
L46	"BEGIN"
L47	"LIGHT DOUBLE"
L50	
THRU	(Not Used)
L54	
L55	Pyramid Feature
L56	"COMBO"
L57	Eye of Ra (Pyramid)
L60	
THRU	(Not Used)
L64	
L65	Pyramid Feature
L66	"COMBO"
L67	"QUARTZ TRADE"
L70	(Not Used)
L71	Eye of Ra
L72	"GLIDER CRAFT"
L73	"REBELLION" Round 2
L74	"RA'S TEMPLE"
L75	"QUARTZ"
L76	"BATTLE"
L77	"SAVE SARI"
L80	(Not Used)
L81	"TRANSPORTER"
L82	"HURRY-UP"
L83	"PYRAMID"
L84	"QUARTZ"
L85	"SPELL STARGATE"
L86	"COMBO"
L87	"SARCOPHAGUS"
*L90	Lightbox #1
*L91	Lightbox #2
*L92	Lightbox #3
L93	
THRU	(Not Used)
L97	
*LA0	Lightbox #4
*LA1	Lightbox #5
*LA2	Lightbox #6
LA3	
THRU	(Not Used)
LA7	
*LB0	Lightbox #7
*LB1	Lightbox #8
*LB2	Lightbox #9
LB3	
THRU	(Not Used)
LB7	

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 81 FOR LOCATION.

VII. PARTS INFORMATION



PLAYBOARD PARTS INFORMATION

PARTS LIST

ITEM	DESCRIPTION	PART NO.
1	PLASTIC SHIELD ASSEMBLY #1-742	30751-E
2	BALL DEFLECTOR	25594
3	PLASTIC SHIELD ASSEMBLY #1-742	30751-G
4	PLASTIC SHIELD ASSEMBLY #1-742	30751-H
5	PLASTIC SHIELD ASSEMBLY #1-742	37051-A
6	UPKICKER ASSEMBLY (2) (SEE EXPLODED VIEW ILLUSTRATION)	MA-1789
7	PLASTIC SHIELD SET, #1-742	30751
8	SPACESHIP AND BRACKET ASSEMBLY MOTOR AND SUPPORT ASSEMBLY PYRAMID AND MECHANICAL ASSEMBLY (SEE ASSEMBLY ILLUSTRATION)	31108 31122 31239
9	MOTOR AND SUPPORT ASSEMBLY (SEE ASSEMBLY ILLUSTRATION)	31121
10	UPKICKER SCOOP AND SHIELD ASSEMBLY	31182
11	UPKICKER SCOOP AND SHIELD ASSEMBLY	31180
12	SPACESHIP SUPPORT ASSEMBLY	31308
13	SPACESHIP SUPPORT PLATE BRACKET (2)	31259
14	PLASTIC SHIELD ASSEMBLY #1-742	30751-F
15	PLASTIC SHIELD ASSEMBLY #1-742	30751-B-D
16	WIREFORM RAMP AND PEM STUDS ASSEMBLY	31244
17	METAL RAMP AND OPTO ASSEMBLY	31235
18	RAMP FLAP (MEDIUM)	31242
19	WIREFORM RAMP	31157
20	UPKICKER AND OPTO ASSEMBLY	30465
21	WIREFORM RAMP	31160
22	METAL RAMP AND FLAP ASSEMBLY	31251
23	KICKING TARGET ASSEMBLY (3) (SEE EXPLODED VIEW ILLUSTRATION)	MA-2107
24	TARGET DECAL (2)	31249
24A	TARGET DECAL	31250
25	TARGET ASSEMBLY (SEE EXPLODED VIEW ILLUSTRATION)	29714
26	TARGET DECAL	31248
27	PIVOT UNIT AND TARGET ASSEMBLY (2)	30728
28	MOLDED "HORUS" FIGURE	31221
29	MOLDED "ANUBIS" FIGURE	31222
30	MOLDED RAMPS AND BRACKET ASSEMBLY	31166
31	ROLLOVER DROP TARGET ASSEMBLY (SEE EXPLODED VIEW ILLUSTRATION)	MA-1504
32	ROLLOVER DROP TARGET (WHITE)	20892Z
33	ROLLOVER DROP TARGET DECAL	31254
34	BALL GUIDE RAIL	3722
35	WIREFORM RAMP	31161
36	RIGHT SIDE FLIPPER ASSEMBLIES (2) (SEE EXPLODED VIEW ILLUSTRATION) COIL AND DIODE ASSEMBLY (2) FLIPPER SWITCH ASSEMBLY (2)	MA-1791 25959 26438
37	DROP TARGET ASSEMBLY (2 BANK) (SEE EXPLODED VIEW ILLUSTRATION)	MA-2042
38	DROP TARGET (WHITE) NYLON (5)	11905Z
39	DROP TARGET DECAL (5)	31253
40	DROP TARGET ASSEMBLY (3 BANK) (SEE EXPLODED VIEW ILLUSTRATION)	MA-2106
41	POP BUMPER ASSEMBLY (SEE EXPLODED VIEW ILLUSTRATION)	-----
42	POP BUMPER BRACKET AND COIL ASSEMBLY (2)	MA-1375
43	POP BUMPER COIL AND DIODE (2)	16570
44	POP BUMPER SWITCH AND BRACKET	29819
45	POP BUMPER BODY AND SOCKET	MA-1467
46	BALL SNUBBER	30713
47	WIREFORM RAMP	31159
48	CELLULAR BUMPER (2)	29974
49	POLYURETHANE BUMPER	28274
50	LEFT SIDE FLIPPER ASSEMBLY (SEE EXPLODED VIEW ILLUSTRATION) COIL AND DIODE ASSEMBLY FLIPPER SWITCH ASSEMBLY	MA-1790 25959 26439
51	KICKER ASSEMBLY	MA-1083
52	KICKER ASSEMBLY	MA-1373
53	PIVOT POST MECHANISM ASSEMBLY (SEE ASSEMBLY ILLUSTRATION)	31287
54	SNUBBER RAIL (2)	13798
55	CARDHOLDER AND FENCE ASSEMBLY	31173
56	CARDHOLDER SCREENED	30796
57	MYLAR OVERLAY	30739
58	STEEL BALL, 1-1/16" DIAMETER	21864
59	SHOOTER GAUGE AND PLASTIC ASSEMBLY	27980-742
60	BALL SHOOTER ASSEMBLY	30972

RUBBER RINGS

ITEM	DESCRIPTION	PART NO.
A	1"	10219
B	BUMPER, TAPERED (BLK)	30003Y
C	2-1/2"	10222
D	1-1/2" (BLK)	10220Y
E	2"	10221
F	2-1/2" (BLK)	10222Y
G	3/8"	10217
H	MINI-POST, LARGE	15705
J	MINI-POST, SMALL	14793
K	SIAMESE	17493
L	FLIPPER, (BLK)	28546

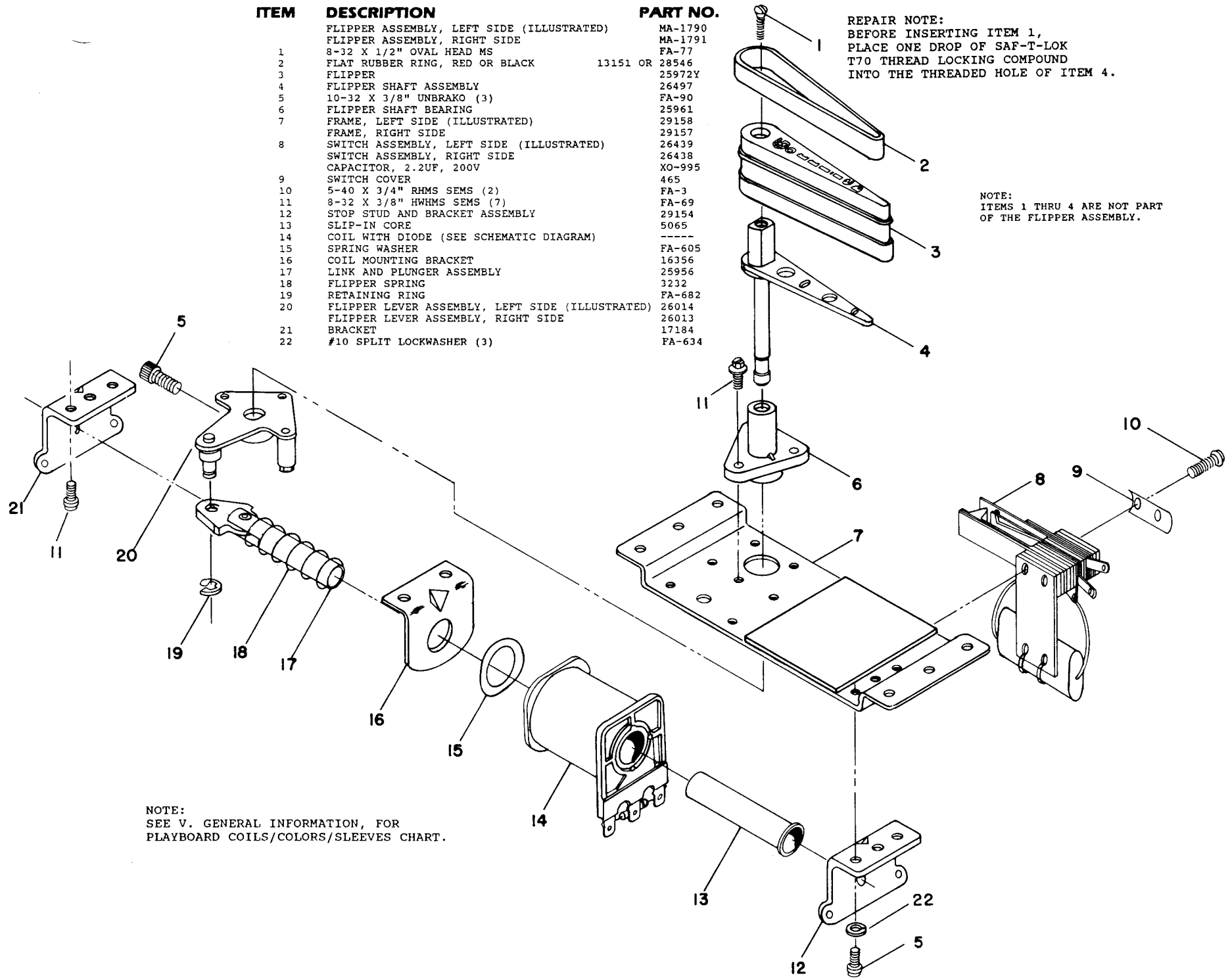
MISCELLANEOUS PARTS

DESCRIPTION	PART NO.
MINI-POST SCREW	14792
HAIRPIN CLIP	6947
RUBBER GROMMET	5240
HEX POST WITH GRIP	26531
PLASTIC RIVET (BLK)	MP-10
PLASTIC POST, 1" (RED)	11561U
PLASTIC POST (RED)	20635U
SIAMESE POST (CLEAR)	17492P

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

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

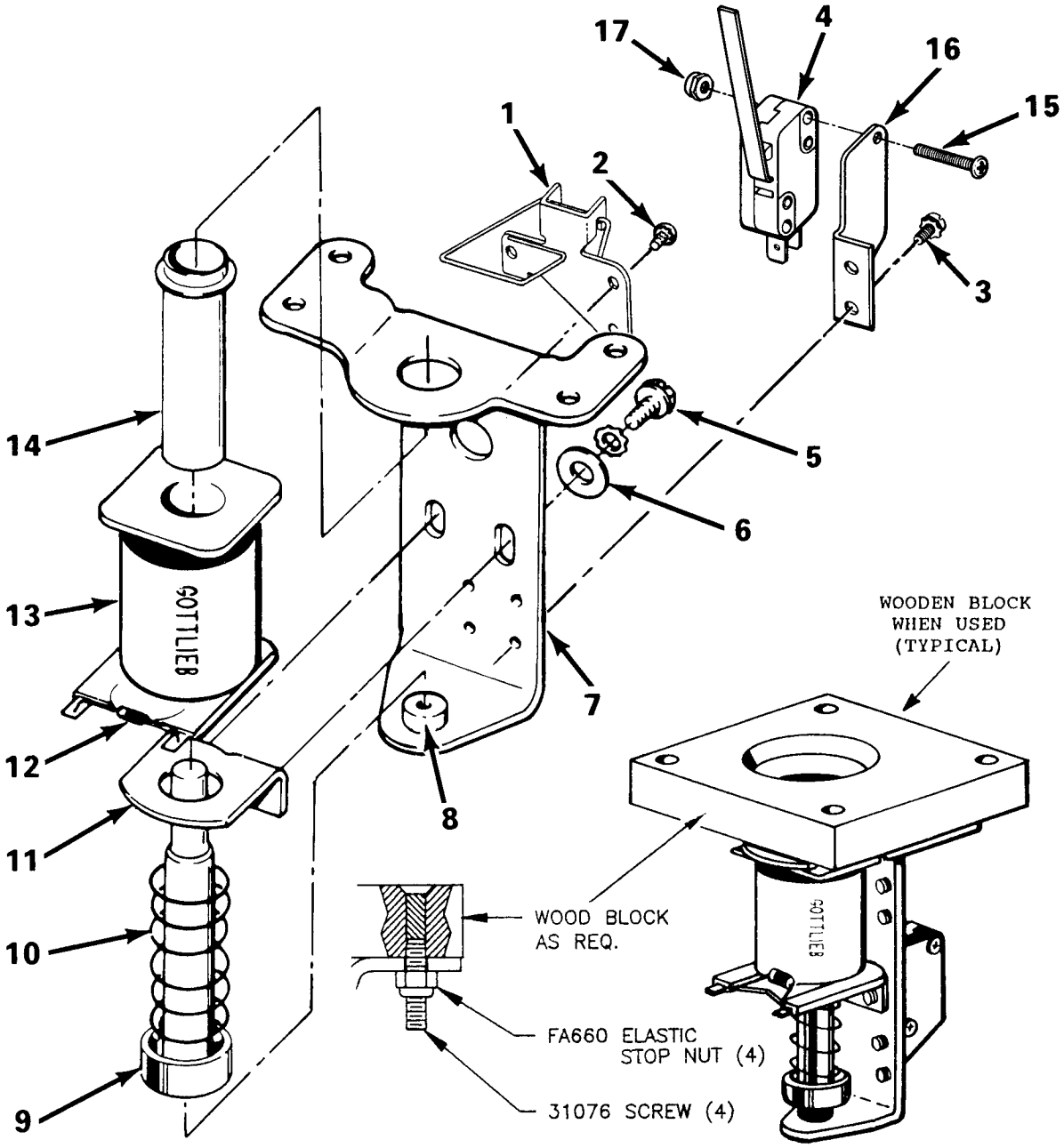
NOTE:
ITEMS 1 THRU 4 ARE NOT PART
OF THE FLIPPER ASSEMBLY.



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

VII. PARTS INFORMATION

UPKICKER PARTS

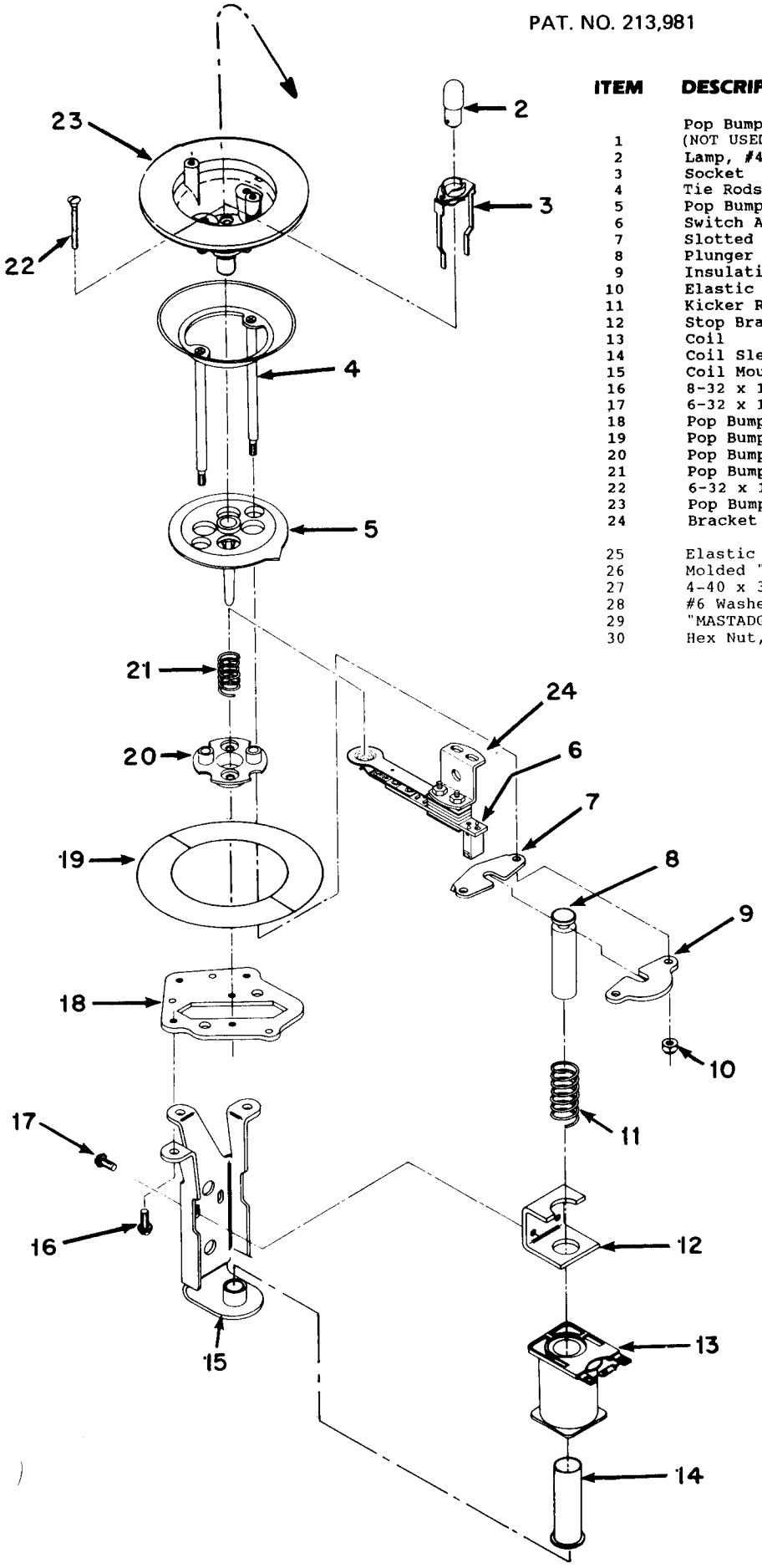


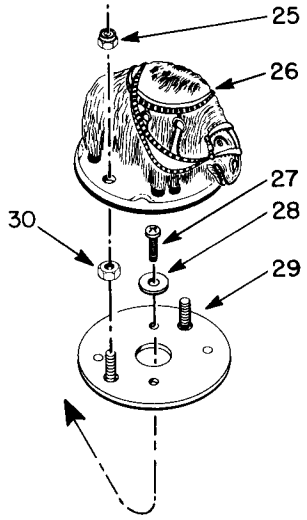
ITEM	DESCRIPTION	PART NO.
	UPKICKER ASSEMBLIES WITH ASSOCIATED COILS	MA-1743, 16570 COIL MA-1747, 26450 COIL MA-1789, 17876 COIL
1	WIREFORM AND BRACKET	28953
2	RHMS-SEMS 6-32 X 3/16" (3)	FA-30
3	RHMS 5-40 X 1/4" SEMS (2)	FA-10
4	MICROSWITCH WITH ACTUATOR	27667A
5	HWHMS-SEMS 8-32 X 5/16"(2)	FA-67
6	#8 WASHER (2)	FA-617
7	FRAME	21416
8	RUBBER GROMMET	5240
9	PLUNGER AND TIP ASSEMBLY	21412
10	SPRING	26739
11	COIL MOUNTING BRACKET	15409
12	DIODE, 1N4004	XO-254
13	COIL	(SEE SCHEMATIC)
14	SLIP-IN-CORE	21411
15	PAN HEAD 4-40 X 5/8"(2)	FA-107
16	MICROSWITCH MOUNTING BRACKET	27870
17	ELASTIC STOP NUT, 4-40 (2)	FA-648

VII. PARTS INFORMATION

POP BUMPER PARTS

PAT. NO. 213,981

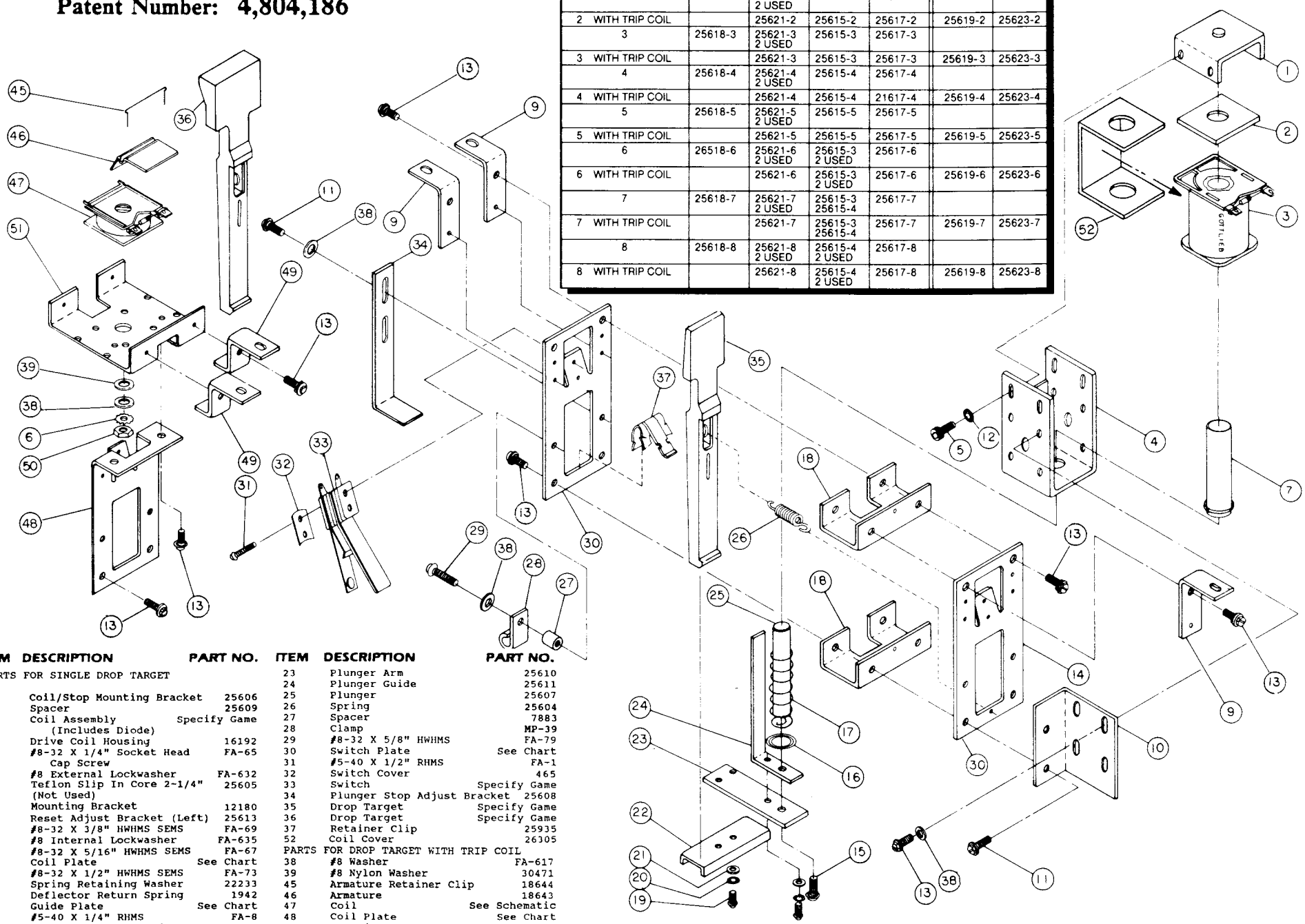




ITEM	DESCRIPTION	PART NO.
	Pop Bumper Assembly	Specify Game
1	(NOT USED)	
2	Lamp, #44	LA-0
3	Socket	PS-0
4	Tie Rods And Ring	16634
5	Pop Bumper Skirt (Specify Color)	10433
6	Switch Assembly	Specify Game
7	Slotted Yoke	12149
8	Plunger	2663
9	Insulating Yoke	2662
10	Elastic Stop Nut, 6-32	FA-660
11	Kicker Return Spring	21643
12	Stop Bracket	8571
13	Coil	Specify Game
14	Coil Sleeve	5064
15	Coil Mounting Bracket and Stop	17906
16	8-32 x 1/4 HHMS SEMS	FA-64
17	6-32 x 1/4 HHMS SEMS	FA-53
18	Pop Bumper Pad	16632
19	Pop Bumper Trim Platter	25732
20	Pop Bumper Base	10432
21	Pop Bumper Spring	10430
22	6-32 x 1-1/8 Oval HMS	FA-43
23	Pop Bumper Body(Specify Color)	26860
24	Bracket and Switch Assembly	29819 (ILLUSTRATED) 29818 (OPPOSITE BRACKET)
25	Elastic Stop Nut, 6-32	FA-660
26	Molded "MASTADGE" Figure	31220
27	4-40 x 3/8 Pan Head Phillips	FA-800
28	#6 Washer	FA-623
29	"MASTADGE" Pedestal Assembly	31293A
30	Hex Nut, 10-32	FA-653

Patent Number: 4,804,186

DROP TARGETS	WITHOUT TRIP COIL				WITH TRIP COIL	
	ITEM 14	ITEM 18	ITEM 22	ITEM 30	ITEM 48	ITEM 51
	COIL PLATE	GUIDE PLATE	RESET ARM	SWITCH PLATE	COIL PLATE	GUIDE PLATE
1	25618-1	25621-1	25615-2	25617-1		
1 WITH TRIP COIL		25621-1	25615-2	25617-1	25619-1	25623-1
2	25618-2	25621-2 2 USED	25615-2	25617-2		
2 WITH TRIP COIL		25621-2	25615-2	25617-2	25619-2	25623-2
3	25618-3	25621-3 2 USED	25615-3	25617-3		
3 WITH TRIP COIL		25621-3	25615-3	25617-3	25619-3	25623-3
4	25618-4	25621-4 2 USED	25615-4	25617-4		
4 WITH TRIP COIL		25621-4	25615-4	21617-4	25619-4	25623-4
5	25618-5	25621-5 2 USED	25615-5	25617-5		
5 WITH TRIP COIL		25621-5	25615-5	25617-5	25619-5	25623-5
6	26518-6	25621-6 2 USED	25615-3 2 USED	25617-6		
6 WITH TRIP COIL		25621-6	25615-3 2 USED	25617-6	25619-6	25623-6
7	25618-7	25621-7 2 USED	25615-3 25615-4	25617-7		
7 WITH TRIP COIL		25621-7	25615-3 25615-4	25617-7	25619-7	25623-7
8	25618-8	25621-8 2 USED	25615-4 2 USED	25617-8		
8 WITH TRIP COIL		25621-8	25615-4 2 USED	25617-8	25619-8	25623-8

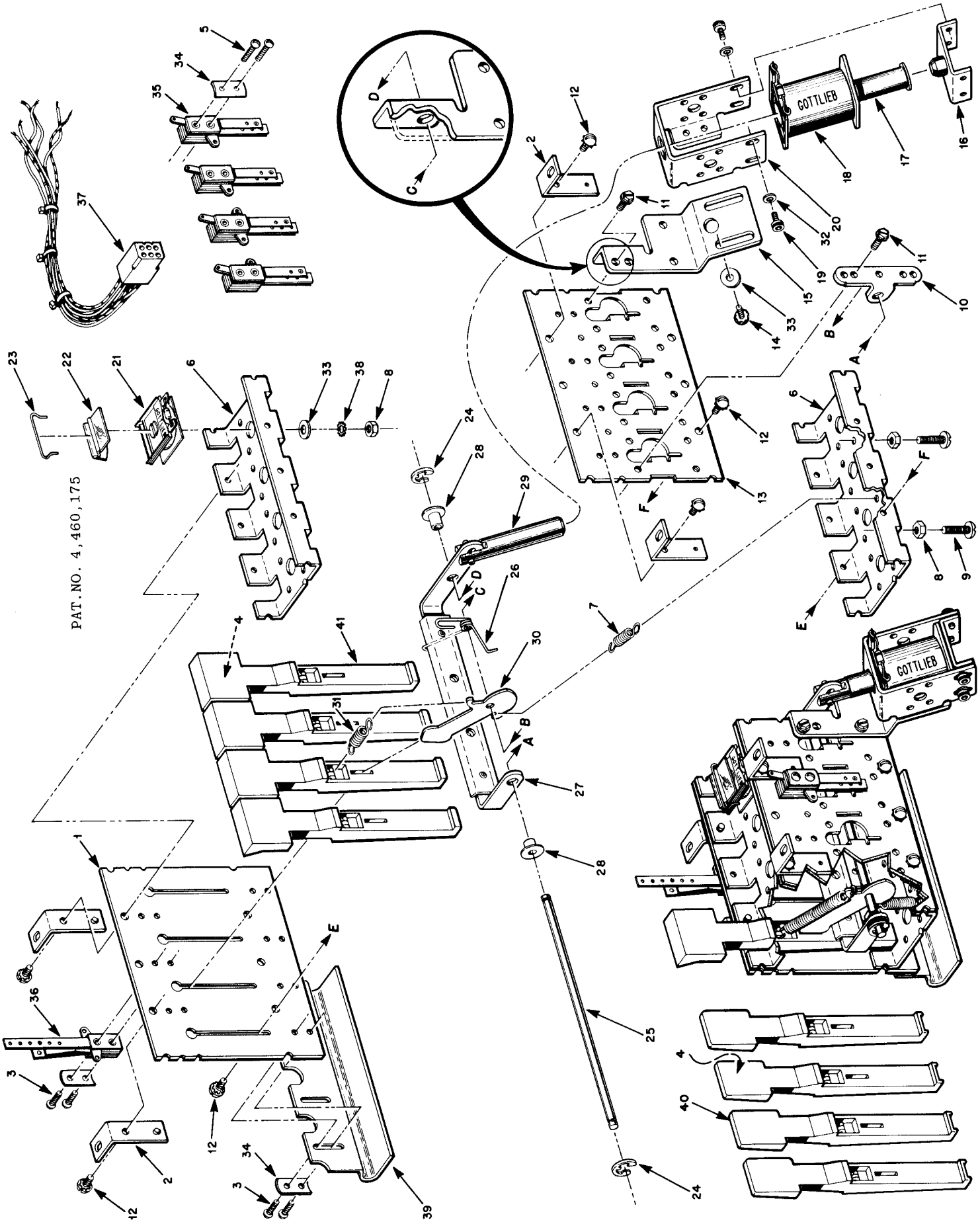


ITEM	DESCRIPTION	PART NO.
PARTS FOR SINGLE DROP TARGET		
1	Coil/Stop Mounting Bracket	25606
2	Spacer	25609
3	Coil Assembly (Includes Diode)	Specify Game
4	Drive Coil Housing	16192
5	#8-32 X 1/4" Socket Head Cap Screw	FA-65
6	#8 External Lockwasher	FA-632
7	Teflon Slip In Core 2-1/4"	25605
8	(Not Used)	
9	Mounting Bracket	12180
10	Reset Adjust Bracket (Left)	25613
11	#8-32 X 3/8" HWHMS SEMS	FA-69
12	#8 Internal Lockwasher	FA-635
13	#8-32 X 5/16" HWHMS SEMS	FA-67
14	Coil Plate	See Chart
15	#8-32 X 1/2" HWHMS SEMS	FA-73
16	Spring Retaining Washer	22233
17	Deflector Return Spring	1942
18	Guide Plate	See Chart
19	#5-40 X 1/4" RHMS	FA-8
20	#5 External LockwasHer	FA-630
21	#5 Washer	FA-622
22	Reset Arm	See Chart

ITEM	DESCRIPTION	PART NO.
23	Plunger Arm	25610
24	Plunger Guide	25611
25	Plunger	25607
26	Spring	25604
27	Spacer	7883
28	Clamp	MP-39
29	#8-32 X 5/8" HWHMS	FA-79
30	Switch Plate	See Chart
31	#5-40 X 1/2" RHMS	FA-1
32	Switch Cover	465
33	Switch	Specify Game
34	Plunger Stop Adjust Bracket	25608
35	Drop Target	Specify Game
36	Drop Target	Specify Game
37	Retainer Clip	25935
52	Coil Cover	26305
PARTS FOR DROP TARGET WITH TRIP COIL		
38	#8 Washer	FA-617
39	#8 Nylon Washer	30471
45	Armature Retainer Clip	18644
46	Armature	18643
47	Coil	See Schematic
48	Coil Plate	See Chart
49	Mounting Bracket (Formed)	25612
50	#8-32 Hex Nut	FA-652
51	Guide Plate	See Chart

VII. PARTS INFORMATION

DROP TARGET PARTS



VII. PARTS INFORMATION

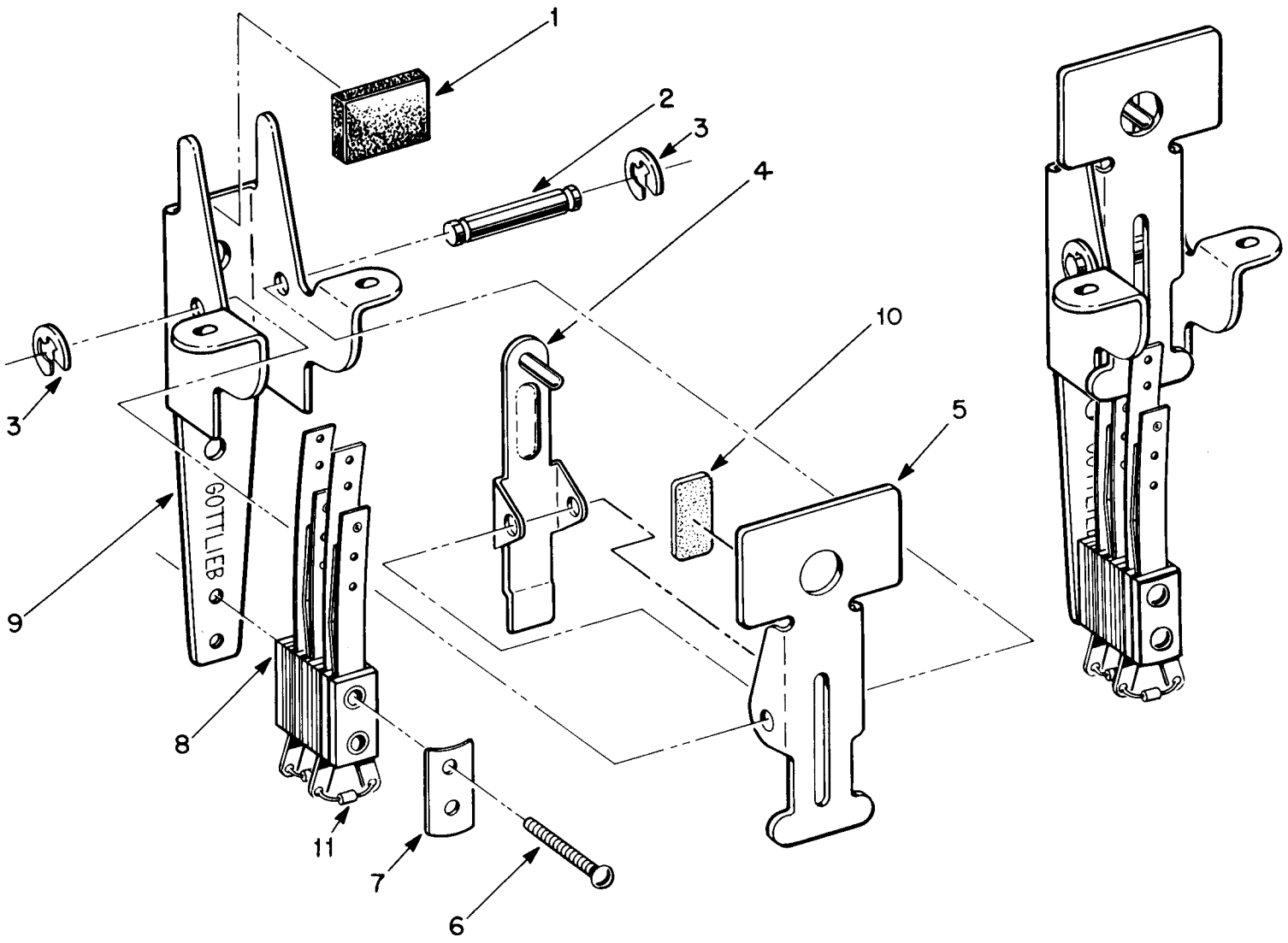
DROP TARGET PARTS

ITEM	DESCRIPTION	PART NO.
1	Switch Plate	Refer to Chart
2	Mounting Plate	12180
3	RHMS, #5-40 x 3/4	FA-3
4	Decals	Specify Game
5	RHMS, #5-40 x 5/8	FA-2
6	Guide Plate	Refer to Chart
7	Spring	517
8	Hex Nut, #8-32	FA-652
9	RHMS, #8-32 x 5/8	FA-75
10	Outboard Bearing Bracket	15696
11	HWHSMS, #8-32 x 3/8	FA-69
12	RHMS, #8-32 x 1/4	FA-62
13	Pivot Plate	Refer to Chart
14	HWHSMS, #8-32 x 5/16	FA-67
15	Coil Setup Bracket	15505 (Shown) 15504 (Opposite)
16	Coil Mount Bracket	17958
17	Plastic Slip in Core 2 1/2"	5172
18	Coil	Specify Game
19	Socket Head, #8-32 x 1/4	FA-65
20	Coil Housing	16194
21	Coil	19217
22	Armature	18643
23	Clip	18644
24	Retaining Ring	FA-681
25	Shaft	Refer to Chart
26	Reset Arm Return Spring	13455
27	Reset Arm	Refer to Chart
28	Reset Arm Bearing	15687
29	Drive Coil Plunger	262
30	Trigger	12181
31	Spring	18995
32	Internal Lockwasher, #8	FA-635
33	Washer, #8	FA-617
34	Switch Cover	465
35	Switch(s)	Specify Game
36	Switch(s), (10 Point)	18096
37	Cable Assembly	Specify Game
38	External Lockwasher, #8	FA-632
39	Stop Bracket	20937
40	Drop Target	Specify Game
41	Rollover Target	Specify Game

DROP TARGETS	ITEM 1 SWITCH PLATE	ITEM 6 GUIDE PLATE	ITEM 13 PIVOT PLATE	ITEM 25 SHAFT	ITEM 27 RESET ARM
3	20936	20934	20935	20938	20941
4	13411	13413	13409	13402	15689
5	13412	13414	13410	13403	15691
5 (TRIP ARM)	13412	13414	13410	15878	15691
6	17938	17937	17939	17932	17936
7	14531	14532	14530	14527	15693
9	15621	15622	15620	15617	15619
9 (TRIP ARM)	15621	15622	15620	16406	15619
10	12187	12188	12186	12179	15503

VII. PARTS INFORMATION

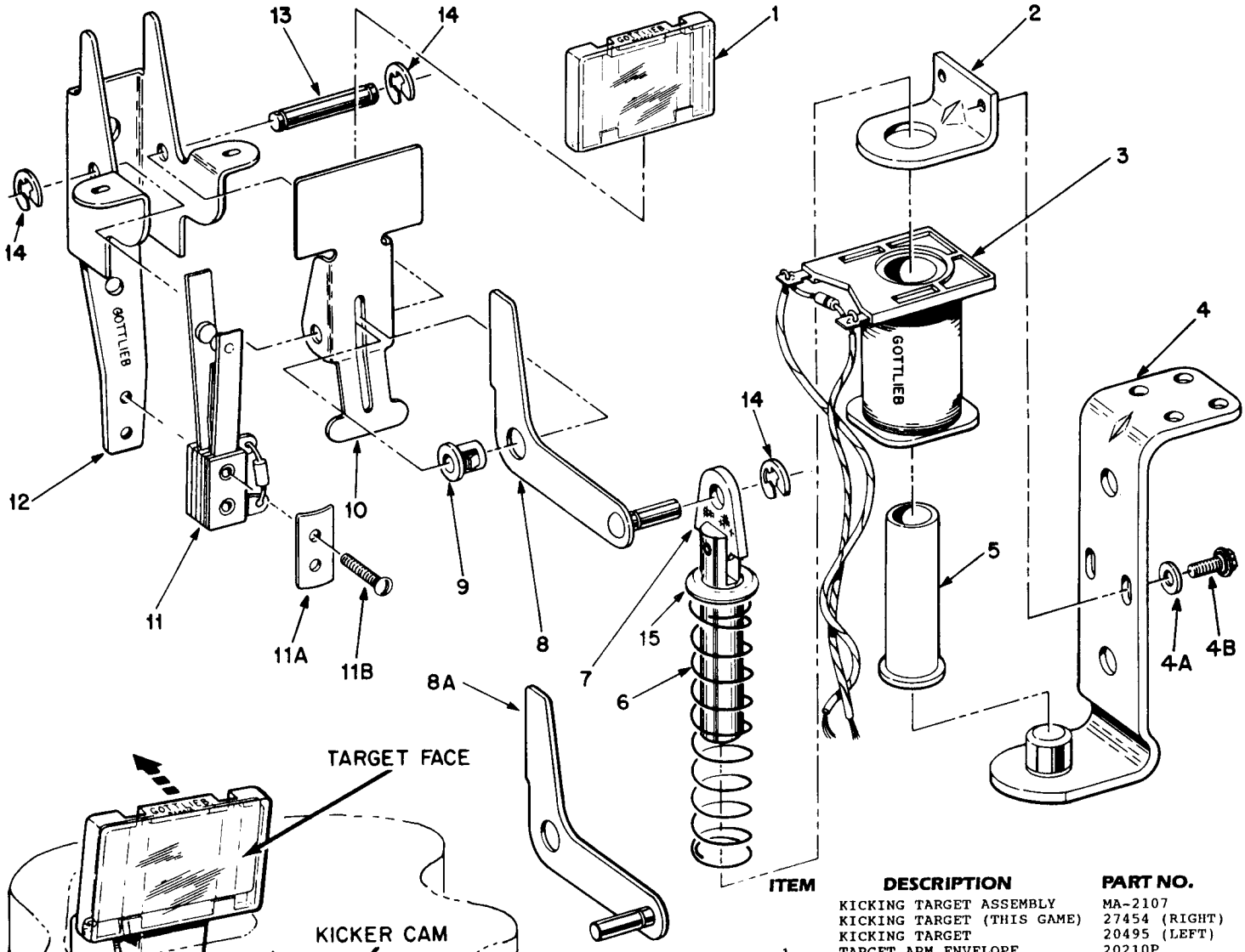
TARGET ASSEMBLY

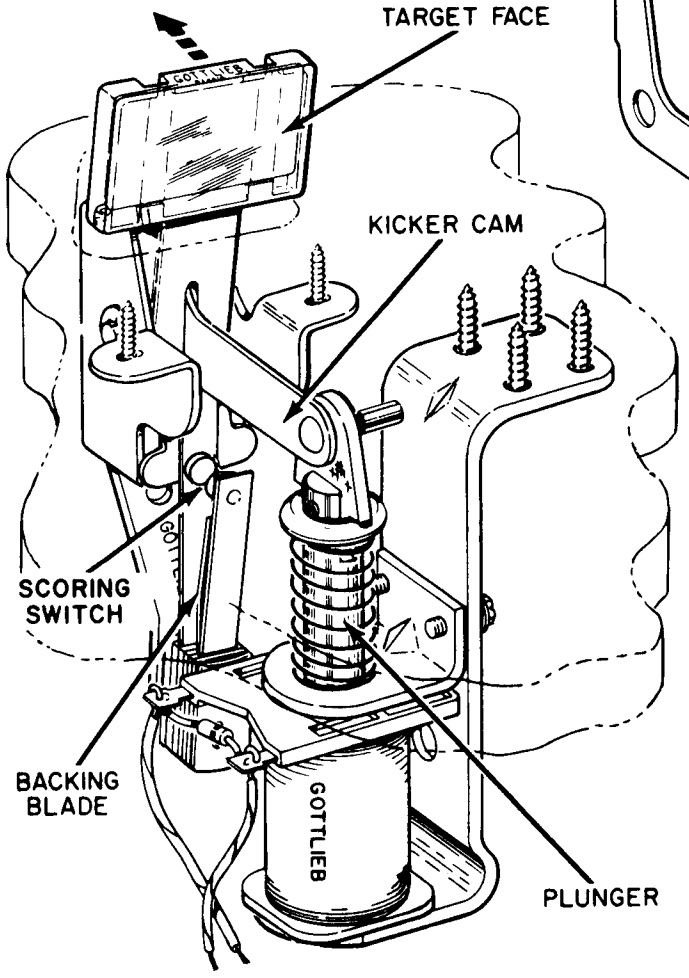


ITEM	DESCRIPTION	PART NO.
	TARGET ASSEMBLY	29714
1	RUBBER STRIP	24290B
2	TARGET SHAFT	20211
3	E-RING (2)	FA-682
4	TARGET ARM SUB-ASSEMBLY	27443
5	TARGET ARM	27444
6	SCREW, #5-40X 1" RHMS, (2)	FA-4
7	SWITCH COVER	465
8	SWITCH ASSEMBLY	27544
9	TARGET HOUSING	29712
10	URETHANE BUMPER (2)	29758
11	CAPACITOR, 0.1UF, +80-20%, 50V,(2)	XO-230
	DECAL (NOT SHOWN)	31248

VII. PARTS INFORMATION

KICKING TARGET ASSEMBLY





ITEM	DESCRIPTION	PART NO.
	KICKING TARGET ASSEMBLY	MA-2107
	KICKING TARGET (THIS GAME)	27454 (RIGHT)
	KICKING TARGET	20495 (LEFT)
1	TARGET ARM ENVELOPE	20210P
2	MOUNTING BRACKET	15409
3	COIL	5195
4	COIL STOP AND MTG. BRACKET	20597
4A	WASHER, #8 STANDARD (2)	FA-617
4B	8-32 X 5/16" HWHMS SEMS (2)	FA-67
5	COIL SLEEVE	5064
6	RETURN SPRING	1636
7	LINK AND PLUNGER ASSEMBLY	22425
8	TARGET KICKER CAM	20209 (RIGHT)
8A	TARGET KICKER CAM	20494 (LEFT)
9	SNAP BRUSHING	MP-15
10	TARGET ARM	20207
11	SCORING SWITCH ASSEMBLY	28511
11A	SWITCH COVER	465
11B	5-40 X 5/8" RHMS (2)	FA-2
12	TARGET HOUSING	20206
13	TARGET SHAFT	20211
14	E-RING (3)	FA-682
15	SPRING RETAINING WASHER	22233
	DECAL (NOT SHOWN)	31249 (2)
		31250

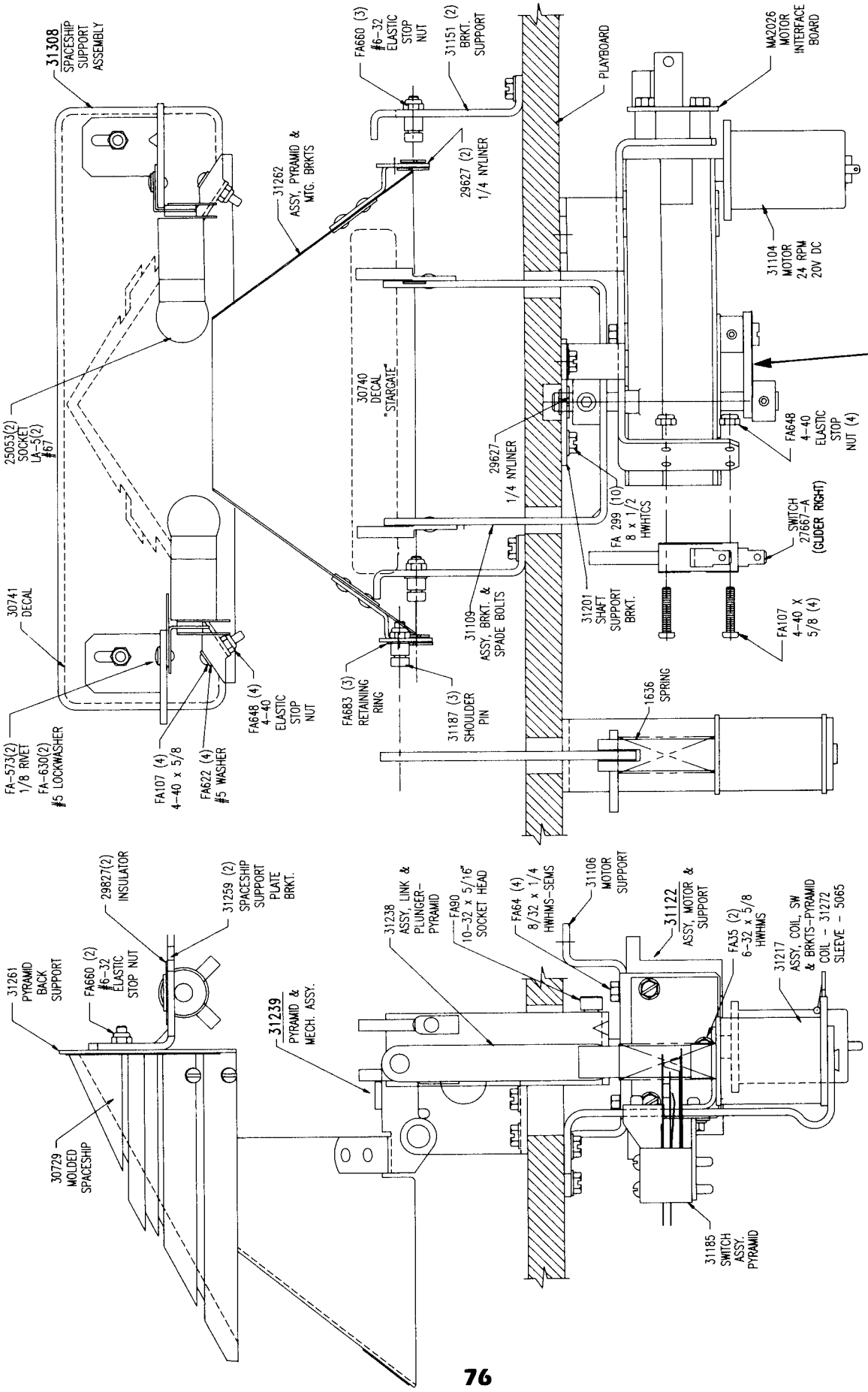
KICKING TARGET ADJUSTMENT

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

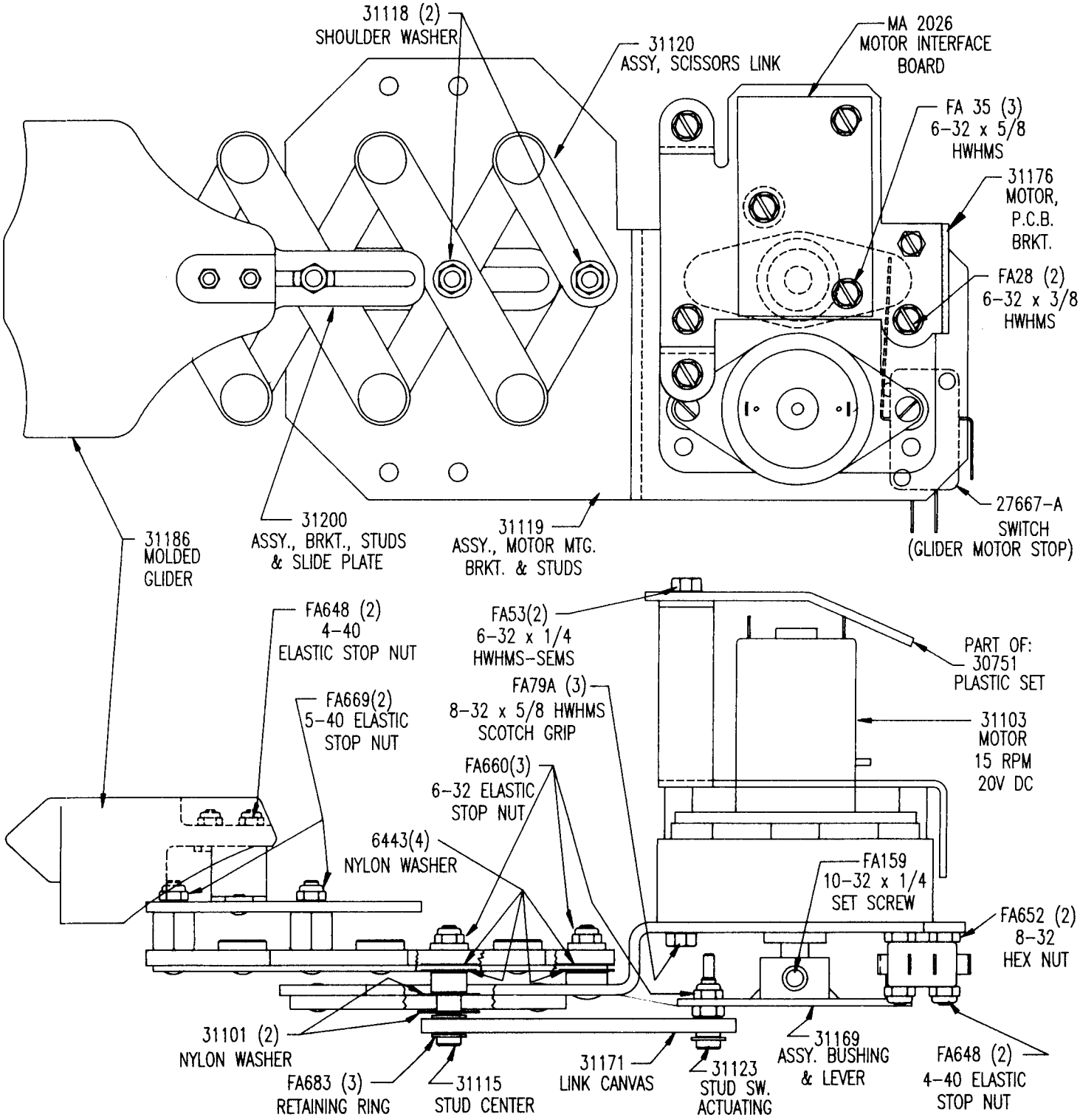
SPACESHIP AND BRACKET ASSEMBLY 31108, MOTOR AND SUPPORT ASSEMBLY 31122, PYRAMID AND MECHANICAL ASSEMBLY 31239



NOTE:
FOR SERVICE REPLACEMENT OF BAKELITE LINK, USE PART NO. 31367.

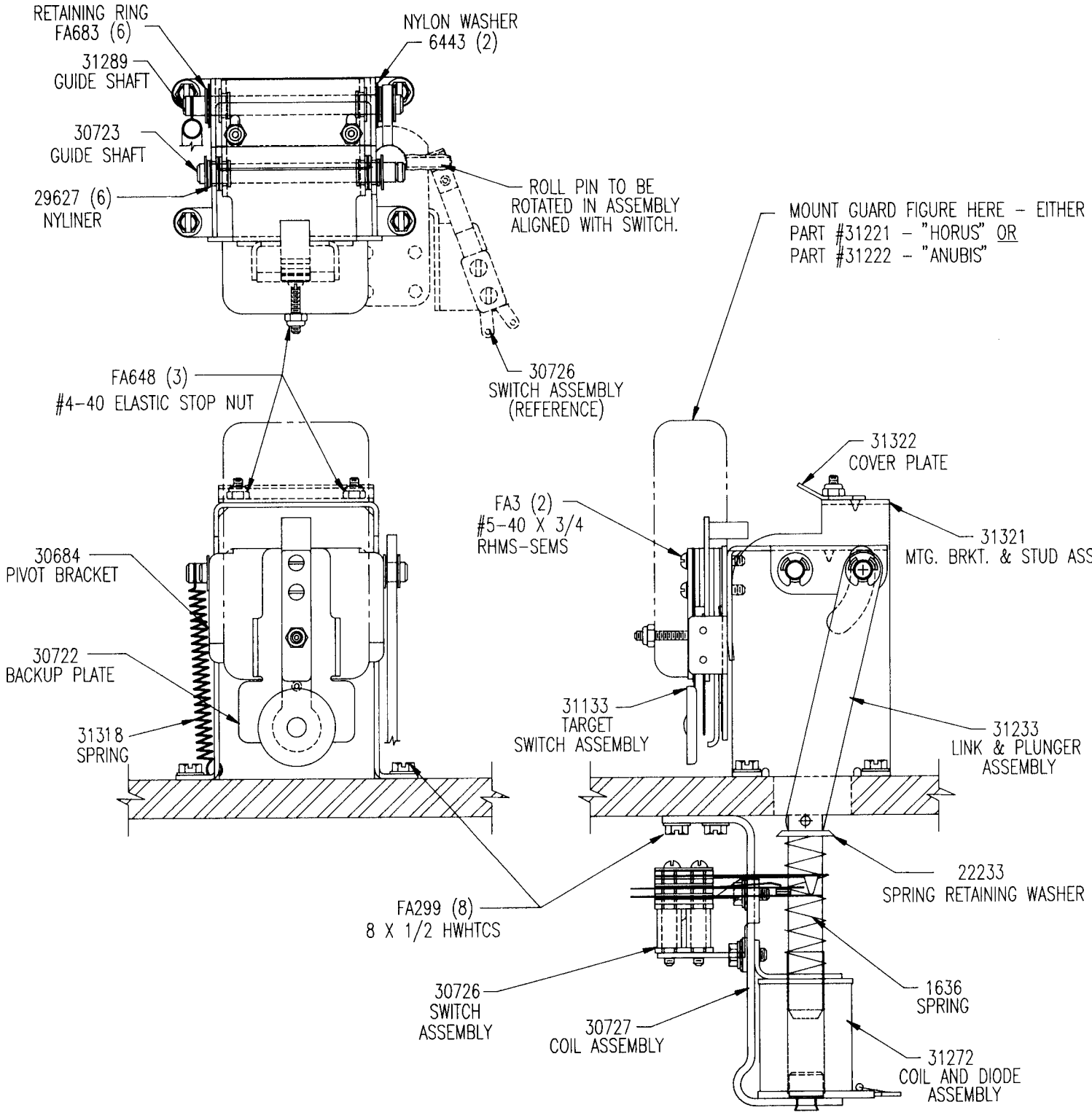
VII. PARTS INFORMATION

MOTOR AND SUPPORT ASSEMBLY 31121



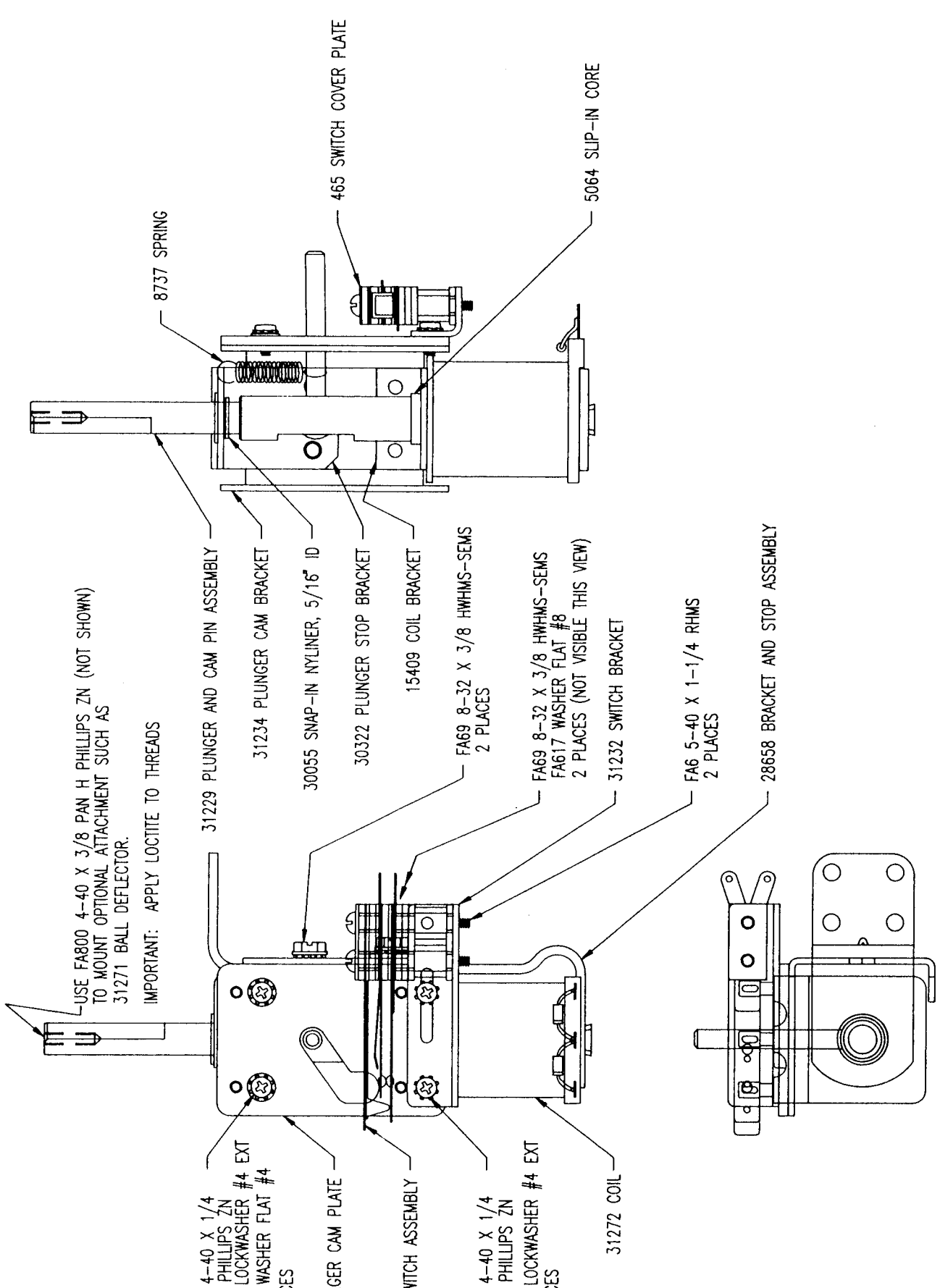
VII. PARTS INFORMATION

PIVOT UNIT AND TARGET ASSEMBLY 30728



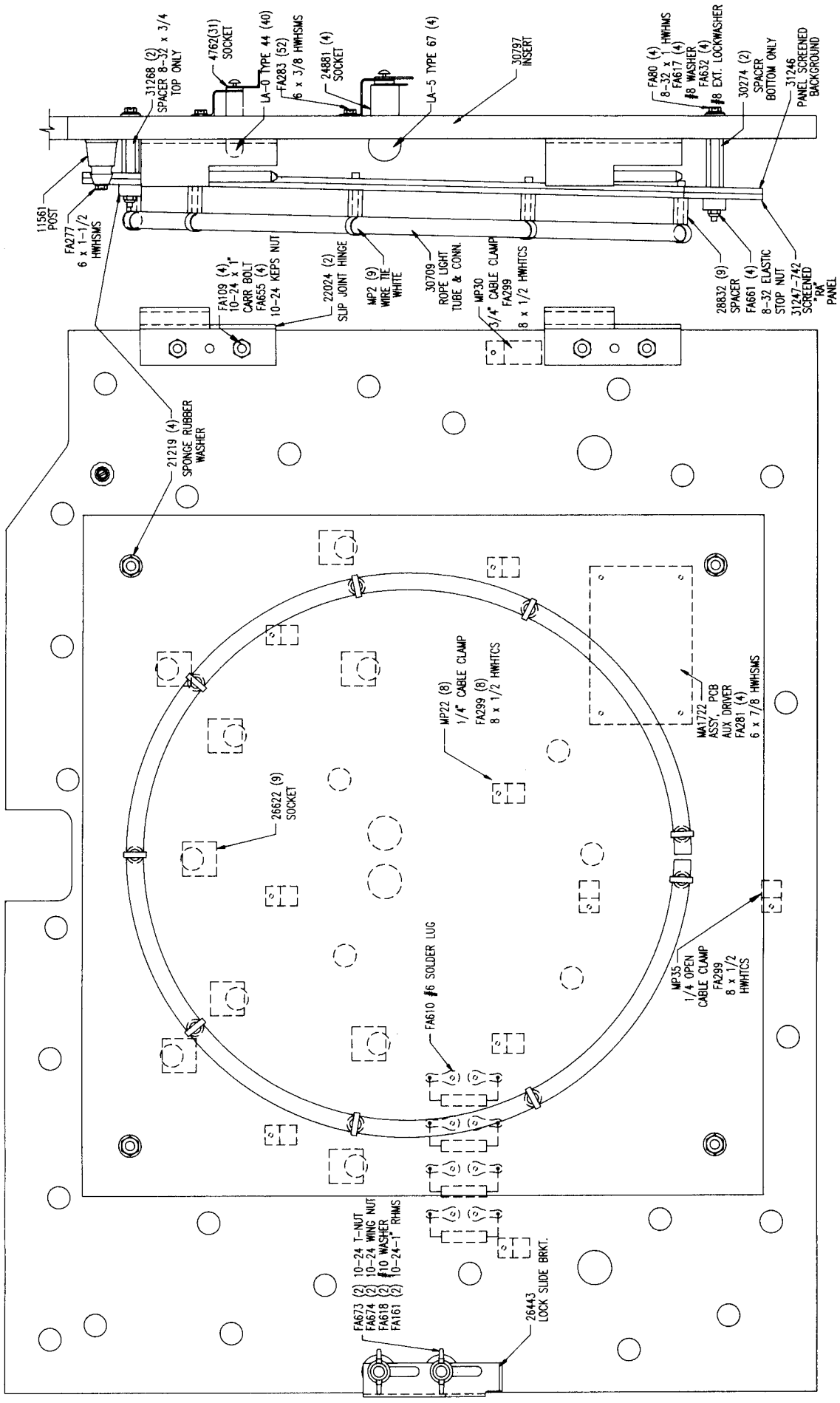
VII. PARTS INFORMATION

PIVOT POST MECHANISM ASSEMBLY 31287



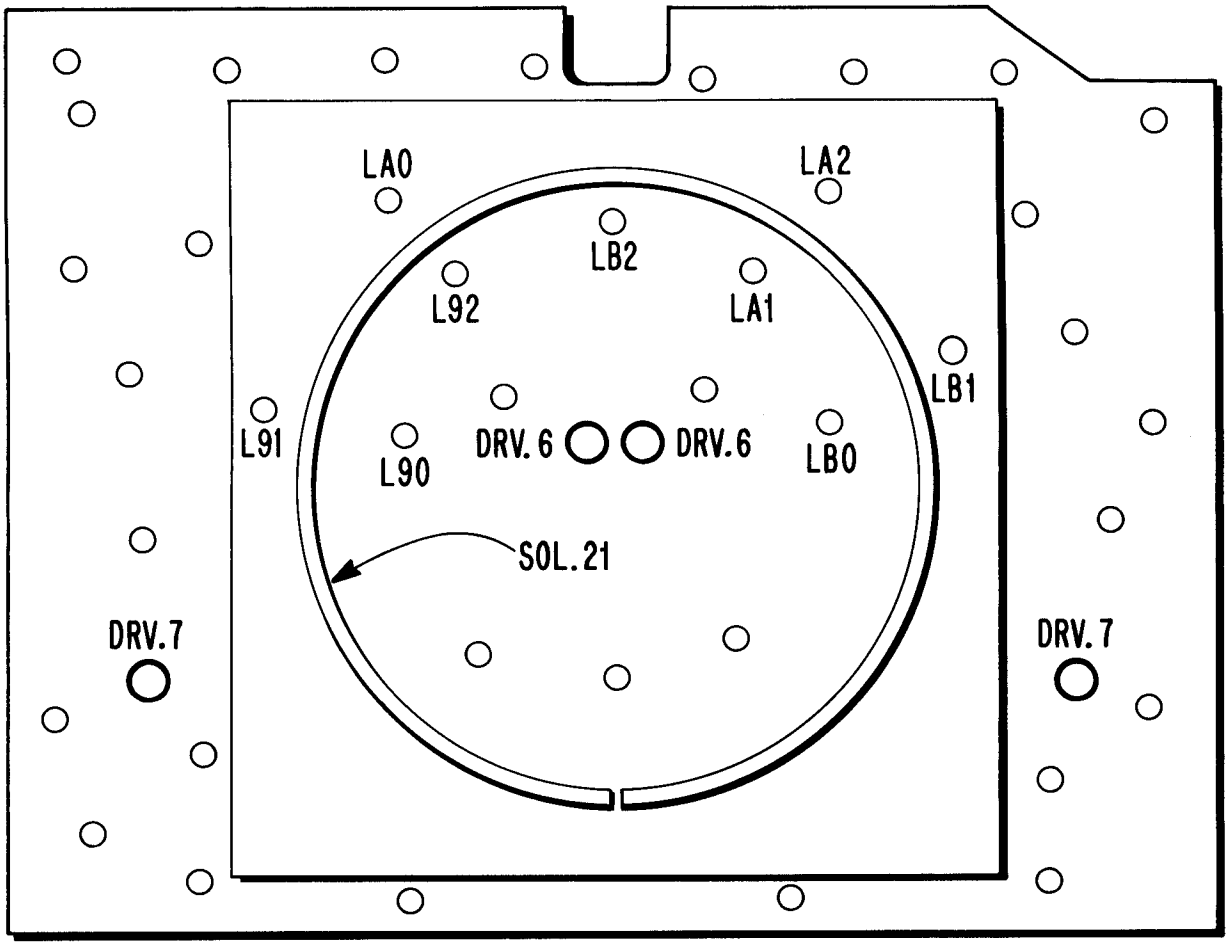
VII. PARTS INFORMATION

LIGHTBOX INSERT ASSEMBLY MA-2038



VII. PARTS INFORMATION

LIGHTBOX INSERT LAMP IDENTIFICATION



NOTE:

DRIVER LAMPS ARE TYPE #67, WITH THE EXCEPTION OF THE ROPE LIGHT ASSEMBLY PART NO. 30709 (SOL.21), ALL OTHER LAMPS ARE TYPE #44.

VII. PARTS INFORMATION

UNIQUE PARTS

The following denotes new parts and assemblies unique to STARGATE, GAME #742. Part numbers prefixed with an asterisk (*) will be illustrated or can be located on pages 28 thru 81. Numbers in parenthesis ( ) indicates multiple quantities.

PLAYBOARD

ITEM/DESCRIPTION	PART NO.
SWITCH ASSEMBLY	*30726
PIVOT UNIT AND TARGET ASSEMBLY (2)	*30728
MYLAR OVERLAY	*30739
PLASTIC SHIELD SET, #1-742	*30751
(INCLUDES ASSEMBLIES 30751-A THRU 30751-I)	
SPACESHIP AND BRACKET ASSEMBLY	*31108
MOTOR AND SUPPORT ASSEMBLY (GLIDER, SCISSORS)	*31121
MOTOR AND SUPPORT ASSEMBLY (GLIDER, OSCILLATING)	*31122
WIREFORM RAMP	*31157
WIREFORM RAMP	*31159
WIREFORM RAMP	*31160
WIREFORM RAMP	*31161
MOLDED RAMPS AND BRACKET ASSEMBLY	*31166
CARDHOLDER AND FENCE ASSEMBLY	*31173
UPKICKER SCOOP AND SHIELD ASSEMBLY	*31180
UPKICKER SCOOP AND SHIELD ASSEMBLY	*31182
END OF STROKE SWITCH ASSEMBLY	*31185
MOLDED "MASTADGE" FIGURE	*31220
MOLDED "HORUS" FIGURE	*31221
MOLDED "ANUBIS" FIGURE	*31222
END OF STROKE SWITCH ASSEMBLY	*31232
METAL RAMP AND OPTO ASSEMBLY	*31235
PYRAMID AND MECHANICAL ASSEMBLY	*31239
RAMP FLAP (MEDIUM)	*31242
WIREFORM RAMP AND PEM STUDS ASSEMBLY	*31244
TARGET DECAL	*31248
TARGET DECAL (2)	*31249
TARGET DECAL	*31250
METAL RAMP AND FLAP ASSEMBLY	*31251
DROP TARGET DECAL (5)	*31253
ROLLOVER DROP TARGET DECAL	*31254
SPACESHIP SUPPORT PLATE BRACKET (2)	*31259
COIL AND DIODE ASSEMBLY (4)	*31272
PIVOT POST MECHANISM ASSEMBLY	*31287
PLASTIC SHIELD SET, #2-742	*31293
SPACESHIP SUPPORT ASSEMBLY	*31308
DROP TARGET ASSEMBLY (3 BANK)	*MA-2106
KICKING TARGET ASSEMBLY (3)	*MA-2107
DROP TARGET ASSEMBLY (2 BANK)	*MA-2042

CABINET

CABINET SCREENED	*30738-742

LIGHTBOX

SPEAKER PANEL, PLEXI-SCREENED	28827-742
STYRENE, BACKGLASS ART	28833-742
LIGHTBOX SCREENED	30708-742
LIGHTBOX INSERT ASSEMBLY	*MA-2038

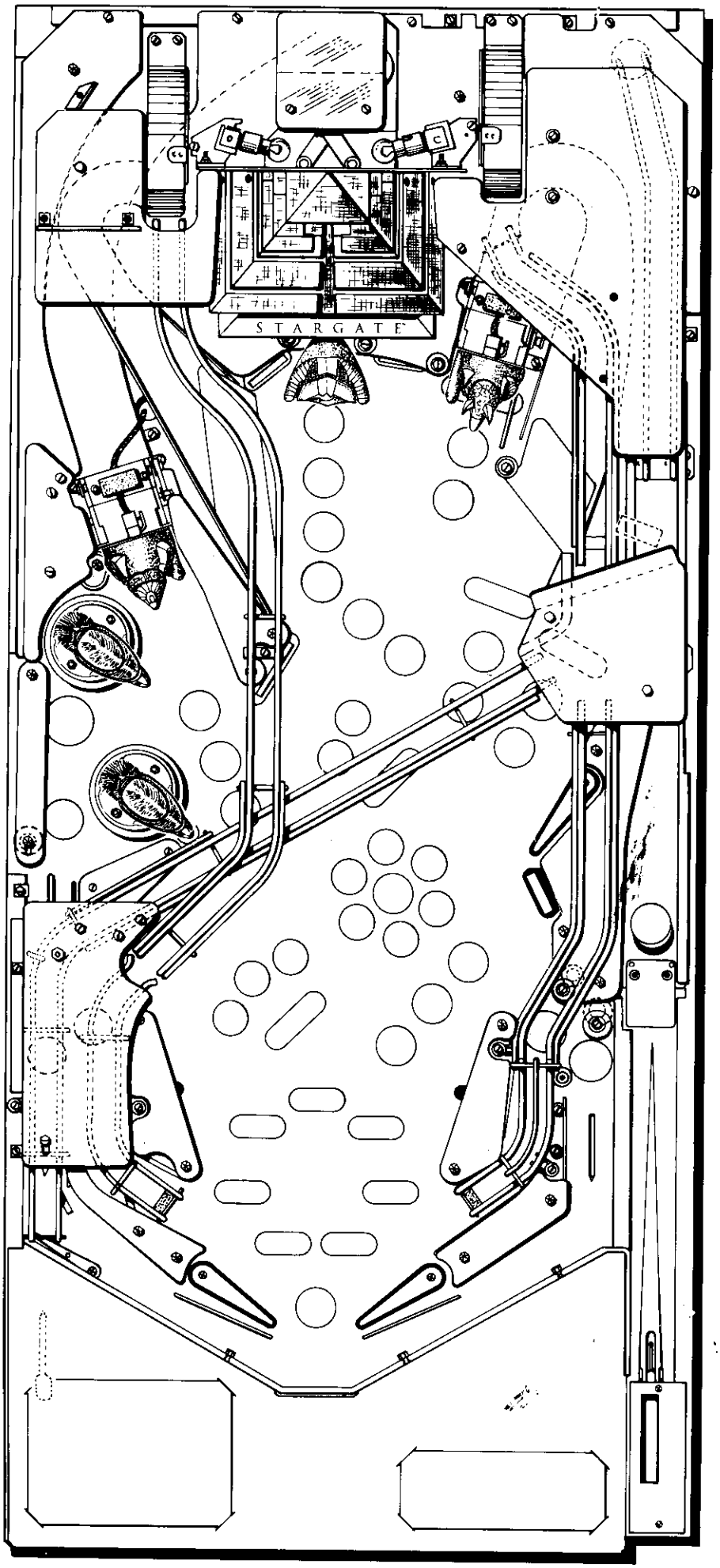
BASIC TROUBLESHOOTING GUIDE

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 or fuse keeps blowing	* 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.



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