

GAME NO. 0E35

FORM NO. 0E35-00300-0100

STRANGE SCIENCE



Operating Manual

Bally/MIDWAY MFG. CO.

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WARNING

**THIS GAME MUST BE GROUNDED. FAILURE TO DO SO MAY
RESULT IN DESTRUCTION TO ELECTRONIC COMPONENTS.**

WARNING: This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a CLASS A computing device pursuant to SUBPART J of PART 15 of FCC RULES, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

ELECTRICAL BULLETIN: FOR ALL APPARATUS COVERED BY THE CANADIAN STANDARDS ASSOCIATION (CSA) STANDARD C22.2 NO. 1, WHICH EMPLOYS A SUPPLY CORD TERMINATED WITH A POLARIZED 2-PRONG ATTACHMENT PLUG.

CAUTION: TO PREVENT ELECTRIC SHOCK DO NOT USE THIS (POLARIZED) PLUG WITH AN EXTENSION CORD, RECEPTACLE OR OTHER OUTLET UNLESS THE BLADES CAN BE FULLY INSERTED TO PREVENT BLADE EXPOSURE.

ATTENTION: POUR PREVENIR CHOCS ELECTRIQUES NE PAS UTILISER CETTE FICHE POLARISEE AVEC UN PROLONGATEUR. UNE PRISE DE COURANT OU UNE AUTRE SORTIE DE COURANT, SAUF SI LES LAMES PEUVENT ETRE INSEREES A FOND SANS EN LAISSER AUCUNE PARTIE A DECOUVERT.

***Bally*/MIDWAY**
T.M.

Invites You To Use

**OUR TOLL FREE NUMBER FOR
SERVICE INFORMATION CONCERNING THIS GAME, OR ANY
OTHER BALLY/MIDWAY™ GAME YOU NOW HAVE ON LOCATION.**

**CALL US FOR PROMPT, COURTEOUS
ANSWERS TO YOUR PROBLEMS.**

Video or Pinball - Continental U.S. 800-323-7182

***Bally*/MIDWAY**
T.M.

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BLOCK DIAGRAM—ELECTRONIC PINBALL GAME

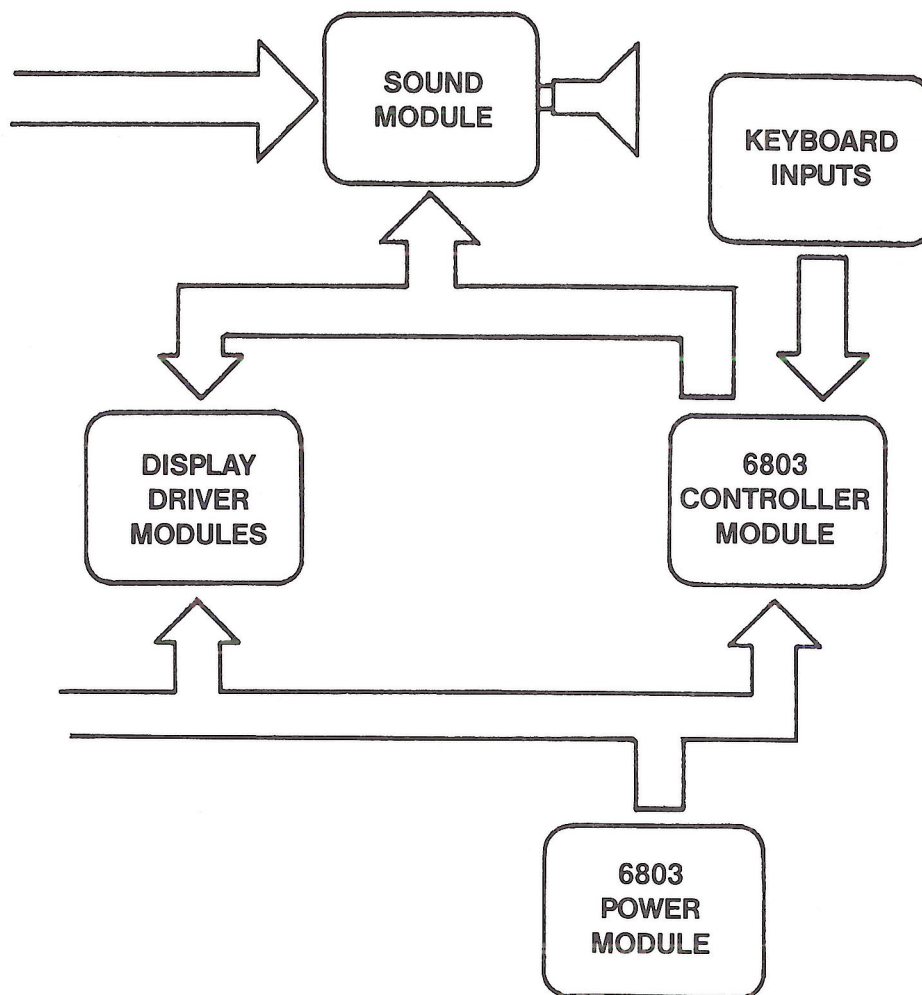


FIGURE I.

CAUTION

When moving your Strange Science Pinball Game, allow clearance for the neon tube and its plastic cover which are mounted on top of the back box. We recommend that you detach the back box, pivot it forward on its hinges, and lay the back box on the cabinet before moving the game.

WARNING

Remove power to the game & disconnect the cable going to the primary of the high voltage transformer, which is located behind the shield in the back box, when:

1. Servicing the neon tube.
2. The neon tube breaks or fails (when this occurs, the cable must remain disconnected before powering the game up).
3. Removing this shield for any reason.

Disconnect the 2-pin connector for this cable (marked "CAUTION HIGH VOLTAGE") located in the lower left corner of the back box.

DETACHING OF PIN-GAME BACK BOX

When the back box is in a upright position and the 3/8" hold-down bolts are removed, the back box can be removed from the main cabinet by lifting the right corner of the back box (about 3/4") and pulling it slightly towards you. Now both hinges are disengaged and the back box can be removed.

"IMPORTANT NOTICE-5 BALL"

**ALL 5 PLAYFIELD BALLS MUST BE INSERTED
IN THE OUTHOLE TROUGH.**

**GAME WILL NOT START IF THERE IS A
BALL IN SHOOTER LANE IN GAME OVER MODE.**

M051-00385-A045

SECTION 1

I. INSTALLATION

First, bolt legs to cabinet. Second, feed line cord between back box and cabinet then lift the back box and secure with bolts. Insert the smaller ball (15/16" dia.) into the ball tilt assembly, and adjust the bracket so the ball will roll free to the contact switch blade, if the front of the cabinet is raised.

On all games these are certain items that should be checked after shipment.

1. Check that all cable connectors are completely seated on printed circuit assemblies.
2. Check that all cables are clear of moving parts.
3. Check for wires that may have been disconnected.
4. Check switches for loose solder or other foreign material that may have come loose in shipment and could cause shorting of contacts.
5. Check coils for proper soldering. Cold solder connections may not show up in factory inspection, but vibration in shipment may break contact.
6. Check that fuses are firmly seated and making good contact.
7. Check and adjust the plumb bob tilt on the left side of the cabinet.
8. Check wiring of the plug on the transformer to correspond to location voltage.
 - 115 VAC 2-8, 3-6, 7-10
 - 120 VAC 2-8, 4-6, 7-11
 - 220 VAC 4-8, 7-9
 - 240 VAC 4-8, 7-11
9. Place ball into playfield by outhole (or balls if the game requires more than one ball).
10. Plug in line cord.

II. GENERAL GAME OPERATION

Move the ON/OFF switch at the bottom right front corner of the cabinet to "ON" position. The game will play a power-up sequence and reset the drop targets. If any switches are stuck they will be displayed at this time. After a short delay "1-4 can play" will indicate that the game is ready to play. The game should accept the coin and post the appropriate credits. Pressing the credit button on the cabinet will cause the outhole kicker to serve the ball to the shooter alley. A game-up sequence is played to announce play-readiness.

Each time the credit button is pressed it posts one player and the credits are reduced by one.

Shooting the ball initiates play.

The game awards all points earned by the player. If a spinner is turned and scoring when the ball hits a target, the spinner and the target scores are awarded.

When the ball enters the outhole, the bonus score is added to the total score. The player-up and/or ball in play is advanced one position. The outhole kicker serves the ball to the shooter alley and play is resumed. This continues until each player has played the allowable number of balls per game. At this time a random Match number appears. If the number is the same as the last two digits in a player's score, a free game is awarded.

Extra balls won during the course of the game are played immediately after the player's regular ball enters the outhole. The player-up and/or ball in play are not advanced for extra score before the game serves the extra ball for play.

Slamming the machine results in loss of the game. This causes all feature lights to go out, the game goes "dead" and a time delay occurs. This occurs anytime either one of the slam switches make contact. This is to discourage unnecessary abuse to the game. After the delay, "1 to 4 can play" is displayed followed by the power-up sound sequence.

Any number of slam switches could be installed by the operator, to meet his individual requirement. The switch should be adjusted to have approximately 1/16" gap between the contacts. The weighted blade should be adjusted to attain the desired sensitivity. Decreasing the gap between contacts will make the switch more sensitive. Opening the gap will reduce sensitivity.

If at the end of the game either the "High Score to Date" is beaten or if the score is over 10,000,000 free games will be awarded according to the "High Score to Date" register setting.

Tilting the game results in loss of a ball. Bonus points are not scored. The flippers, thumper bumpers, etc. go 'dead'. The purpose of the tilt penalty is to discourage the player from jostling the machine in an attempt to prolong play. Game action becomes normal after the ball kicker assembly serves the ball to the shooter alley.

NOTE: These are general instructions. Therefore, if a spinner or Drop Target is not used on your specific pinball game, please disregard any operating instructions related to these devices.

III. TAILORING & TESTING THE GAME

INTRODUCTION

We at Bally/Midway are very proud to introduce our new system which not only provides more information to the operator but it also communicates with the player thru the use of alphanumerics.

It was our aim to design a system which could be used without a manual. This will come to light the moment you press the Self-test button and the displays come to life with their messages of assistance. This allows you to change game features, awards and threshold settings and monitor specific special awards, game percent and income just by reading what is displayed. The registers are now described with useful titles such as "Book-keeping Data" or "Self-Testing."

If you've ever changed the replay thresholds on a machine and you forgot to change the replay card because you were distracted by a customer, listen to this: "It will never happen again!" For when you change this replay threshold to 2,000,000 in "Percent Options" the corresponding message; "First Replay at 2,000,000" will be displayed on Game Over.

OPERATION

The keyboard is located on the right inside wall of the game near the front door. The cable is long enough, so that once the keyboard is removed, it may be operated from outside the machine. **Note:** The keypad is mounted with a 1/4" Hex screw for shipping purposes.

1. Press the Test button located on the front door. This tells the processor to do the following;
 - A. It checks the switches wired in parallel with the keypad. If any switches are closed the game automatically jumps to Stuck Switch Test and displays a stuck switch message.
 - B. If there were no stuck switches you will be welcomed with "Bally's Testing Is Easy As ABC."
2. When appropriate heading appears on backglass display, press "Enter" on keypad once.
Within each heading, there are categories which are operator selectable. When the appropriate category appears on the backglass display, press "Enter" once to access that category.
3. Set your registers with keypad.
4. Press "Enter" again to advance to next category setting. Press "CLR" to re-start Self-Test. Press "Game" to lock-in option settings.

STEPPING THROUGH

To choose a category quickly once the Test Mode has been selected just use the "A" button to step to the desired category. If you pass by the category you desired, use the "B" button to back-up to the appropriate position. Once you read the category desired, press the "ENTER" button to select that topic. The display will now show the first item in that category.

Again, use the "A" and "B" buttons to quickly step to the item you wish to look at or change. The "A" button allows you to step to the end of a category and then out to the next category. The "B" button allows you to step backwards in the same manner. **Please note:** When in the Self-Test category, the display will cycle automatically from one test to the next. Because the "A", "B", and "C" buttons are used for different functions in this category. They cannot be used to step from one test to another properly. To exit a test in this category just press the ENTER button & step to the next test.

SELF-PERCENTAGING

1. The term Self-Percentaging refers to the game's ability to automatically adjust the score level of Threshold 1 to attain a desired replay percentage, also known as the TARGET PERCENT. (see article #8)
2. Self-Percentaging also applies to extra balls, when used instead of replays.
3. Initially, a minimum of 200 games must be played before the Self-Percentaging Process goes into effect. It then monitors the current replay percentage of Threshold 1 ONLY and makes an adjustment, if necessary, every 50 games.
4. The Self-Percentaging Process will automatically adjust the score level of Threshold 1 ONLY. It makes NO adjustments to OTHER "Award" features in the game.
5. Located within the "PERCENT OPTIONS" category of your game's test mode are the following registers:
 - THRESHOLD 1
 - SELF PERCENT
 - TARGET PERCENT
 - THRESHOLD 1 PERCENT

Each of these registers are explained in detail further in this text.

6. To set or check the current score level of Threshold 1:
 - A. "Step through" your game's test mode, using the "A" or "B" button on the keypad, until you reach a category titled: "PERCENT OPTIONS."
 - B. Press the "ENTER" button to select this category.
 - C. The first register displayed will be THRESHOLD 1.

THRESHOLD 1—This register displays the current score level of the 1st Replay Threshold. Enter any value from 0 to 9,999,999 to set the desired score level.

7. To activate the Self-Percentaging Process:
 - A. "Step through" your game's test mode, using the "A" or "B" button on the keypad, until you reach a category titled "PERCENT OPTIONS."
 - B. Press the "ENTER" button to select this category.
 - C. Again, use the "A" button to "step through" until you reach a register titled: "SELF PERCENT."

SELF PERCENT—This register displays whether the Self-Percentaging Process is OFF or ON. Enter "O" to turn OFF or "1" to turn ON.

8. To adjust the desired Replay Percentage for Threshold 1:
 - A. "Step through" your game's test mode, using the "A" or "B" button on the keypad, until you reach a category titled "PERCENT OPTIONS."
 - B. Press the "ENTER" button to select this category.
 - C. Again, use the "A" button to "step through" until you reach a register titled: "TARGET PERCENT."

TARGET PERCENT—This register displays the desired percentage of replays to be awarded for reaching Threshold 1. For example, if you want Threshold 1 to award a replay in 15% of the games played, you would press keys "1," "5" and then "ENTER." This register will then display "15%" as your goal or "TARGET PERCENT."

NOTE: This register automatically defaults to a factory setting of "10%," when the "FACTORY RESET" register is enabled.

9. The TOTAL Replay Percentage will be 10% or 15% higher with the addition of Match, Special and High Score to Date credits.
10. To manually check the current replay percentage of Threshold 1 ONLY:
 - A. "Step through" your game's test mode, using the "A" or "B" button on the keypad, until you reach a category titled "PERCENT OPTIONS."
 - B. Press the "ENTER" button to select this category.
 - C. Again, use the "A" button to "step through" until you reach a register titled: "THRESHOLD 1 PERCENT."

THRESHOLD 1 PERCENT—The figure displayed in this register is the actual percentage of replays awarded for reaching Threshold 1. Progress of the Self-Percentaging Process may be monitored by comparing the current value displayed in this register with the "TARGET PERCENT."

11. The size of adjustment, made by the Self-Percentaging Process to the score level of Threshold 1, is determined by the current difference between the "TARGET PERCENT" (entered by the operator) and the actual percentage of replays awarded for reaching Threshold 1.
 - A difference of 10% or more will result in a 10% adjustment.
 - A difference equal to or greater than 5%, but less than 10%, will result in a 5% adjustment.
 - A difference less than 5% will result in a 1% adjustment.
12. To check the current score level of Threshold 1, refer to article #6.
13. When the "CLEAR BOOKKEEPING" register is enabled, the Self-Percentaging Process is reinitiated.

IV. GAME REGISTERS & OPTIONS

BOOKKEEPING DATA

Total Coins	Number of coins thru chutes 1, 2, & 3
Game Percent	Percentage of replays
Coins Chute 1	# of coins thru chute 1
Coins Chute 2	# of coins thru chute 2
Coins Chute 3	# of coins thru chute 3
Bonus Credits	Number of Bonus Credits Given
Total Plays	Number of plays both paid and replays
Total Replays	Number of awarded games
Service Meter	Total # of service credits
Game Credits	Current game credits—Enter 0 thru 5 Added to Service Meter Not added to current Game Credits.
Special Meter	Total # of Playfield Specials awarded
Clear Booking	To clear bookkeeping press "65" then "Enter"

SELF-TESTING

Single Lamp	Steps one lamp at a time, and Connector I.D. Press "A" to advance, "B" to backup, and "C" to cycle
All Lamps	All lamps light alternately, 1st "A" phase then "B"
Display	Steps thru alphanumeric character set
Solenoid	Fires one driver at a time, and Displays Driver and Connector I.D.
Single Solenoid	Fires one driver at a time. Press A for same solenoid B for next
Sound	Plays game sounds
Game Rom I.D.	Displays your Rom or Roms I.D.
Switch Test	Displays stuck switch by description PRESS TEST BUTTON ON DOOR TO EXIT SWITCH TEST

PERCENT DATA VALUES

Game Percent	Percentage of replays
Total Plays	Number of plays both paid and replays
Game Time	Total number of minutes
Total Replays	Total number of replays
Threshold 1	# of times the first threshold was beaten
Threshold 2	# of times the second threshold was beaten
Threshold 3	# of times the third threshold was beaten
Timed Special	# of timed Specials awarded by completing each Outlane
HiScore Beaten	Total number of times the high score was beaten
Extra Balls	# of non-timed extra balls that were awarded
Timed X-Balls	# of timed extra balls that were awarded
Hold Bonus	# of times Hold Bonus was awarded
Strange Science	# of times S-T-R-A-N-G-E S-C-I-E-N-C-E was completed
Outlane Special	# of non-timed Specials awarded by completing each Outlane
Anti-Gravity	# of times Anti-Gravity was completed
Particle Separator	# of times Particle Separator was completed
Brain Transfer	# of times Brain Transfer was completed
Load Ball	# of times each ball was loaded in Atom Smasher
Unload Ball	# of times each ball was unloaded from Atom Smasher
All Load	# of times all 5 balls were loaded in Atom Smasher
Multi-Release	# of times a ball was loaded during Multi-Ball play

PERCENT OPTIONS

Threshold 1	Enter 0 thru 9,999,999; sets award level and display
Self Percent	Enter 0 or 1; 0 disables Self-Percentaging Process, 1 enables Self-Percentaging Process
Target Percent	Enter desired percentage of replays awarded for reaching Threshold 1.
Threshold 1 Percent	Displays actual percentage of replays awarded reaching Threshold 1.
Threshold 2	Enter 0 thru 9,999,999; sets award level and display
Threshold 3	Enter 0 thru 9,999,999; sets award level and display
Highest Score	Enter 0 thru 9,999,999; sets the HiScore replay level

FACTORY SETTINGS

1,500,000
1
10
Unchanged
3,500,000
00
5,555,555

BASIC OPTION VALUES

Credit Limit	Enter 1 thru 40	10
Balls per Game	Enter 1 thru 5	3
Threshold Mode	Enter 0 thru 3; 0=0, 1=Points, 2=Extra Ball, 3=Replay	3
Special Mode	Enter 0 thru 3; 0=0, 1=Points, 2=Extra Ball, 3=Replay	3
HiScore Mode	Enter 0 thru 3; 0=0, 1=1 Replay, 2=2 Replays, 3=3 Replays	3
Sound Mode	Enter 0 thru 3; 0=Chimes w/o background, 2=Sounds w/o background 1=Chimes with background, 3=Sounds with background	3
German Prize	German Meter	0
Match Option	Enter 0 or 1; 0 disables match, 1 enables match	1
Credit Display	Enter 0 or 1; 0=No credits displayed, 1=Displayed credits	1
No Limit Replays	Enter 0 or 1; 0=Only 1 award per game, 1=More than 1 per game	1
Free Play	Enter 0 or 65; 0=Coins, 65=Free Play	0
Slingshot	Enter 0 or 1; 0=No slingshots, 1=slingshots	1
Tilt Warning	Enter 0 thru 3; 0=No warning, 1=1, 2=2, 3=3	1

FEATURE OPTIONS

Reset Factory Enter 65 for factory selected scores and features.
 Power Saver Enter 0 thru 5; This entry controls # of new balls to which Power Saver feature is initially provided.

ENTER NEW BALL

0	None
1	1
2*	1 & 2
3	1, 2 & 3
4	1 thru 4
5	1 thru 5

Award Count Enter 0 thru 3; This entry controls number of times on Anti-Gravity (when lit) required to active Extra Ball light, award Extra Ball, and to active Special light.

<u>ENTER</u>	<u>EXTRA BALL LIGHT</u>	<u>EXTRA BALL</u>	<u>SPECIAL LIGHT</u>
0	6 times	7 times	8 times
1	5 times	6 times	7 times
2	4 times	5 times	6 times
3*	3 times	4 times	5 times

Extra Ball Timer Enter 0 thru 2; This controls length of time Extra Ball light flashes after being activated.
 0=8 sec. 1*=16 sec. 2=24 sec.

Special Timer Enter 0 thru 3; This controls length of time Special light flashes after being activated.
 0=8 sec. 1*=16 sec. 2=24 sec. 3=until end of current ball

Attract Sound Enter 0 or 1*; When game is over, this entry enables or disables Attract Sound Mode while displaying hi scores and instructions.
 0=No Sound 1=Sound

*Factory Setting

PRICING OPTIONS

Chute 1 Options

XX coin for yy credit; Coins (xx) will flash first. Enter 1 thru 99 coins. Then credits (yy) will flash. Enter 1 thru credit limit. Then coins will flash again. Either press Enter if the values are correct or repeat the data entry.

Chute 1 Bonus; Enter 0 thru 40; 0=No Bonus Credit
 1 thru 40 sets the number of credits at which 1 Bonus Credit will be awarded.

Chute 2 Options

XX coin for yy credit; Coins (xx) will flash first. Enter 1 thru 99 coins. Then credits (yy) will flash. Enter 1 thru credit limit. Then coins will flash again. Either press Enter if the values are correct or repeat the data entry.

Chute 2 Bonus; Enter 0 thru 40; 0=No Bonus Credit
 1 thru 40 sets the number of credits at which 1 Bonus Credit will be awarded.

Chute 3 Options

XX coin for yy credit; Coins (xx) will flash first. Enter 1 thru 99 coins. Then credits (yy) will flash. Enter 1 thru credit limit. Then coins will flash again. Either press Enter if the values are correct or repeat the data entry.

Chute 3 Bonus; Enter 0 thru 40; 0=No Bonus Credit
 1 thru 40 sets the number of credits at which 1 Bonus Credit will be awarded.

Example:

To set Coin Chute 1 for 3 credits/2 Coins with no credits on the first coin;

Enter 02 Coin for 03 Credit Chute

Chute 1 Bonus 00

To set it for 3 Credits/2 Coins with one credit delivered on the 1st coin and 2 credits delivered on the second.

Enter 01 Coin for 01 Credit

Chute 1 Bonus 02

If all 3 Chute Options and Bonus Registers are set the same, then all Chutes will work "together."

V. RECOMMENDED 3 & 5 BALL OPTION SETTINGS

REPLAYS	3-BALL	5-BALL
Special Mode	3	3
Match Option	1	1
High Score Mode	3	3
1st replay at	1,500,000	2,500,000
2nd replay at	3,500,000	4,500,000
X-BALL		
Special Mode	2	2
Match Option	0	0
High Score Mode	0	0
1st Extra Ball at	1,500,000	2,500,000
2nd Extra Ball at	3,500,000	4,500,000
NOVELTY		
Special Mode	1	1
Match Option	0	0
High Score Mode	0	0
HIGH GAME TO DATE (reset periodically)		
3-BALL5,555,555	5-BALL5,555,555	

STRANGE SCIENCE OPTION SETTINGS

FEATURE OPTIONS	3-BALL	5-BALL
REGISTER		
POWER SAVER	2	2
AWARD COUNT	3	3
EXTRA BALL TIMER	1	1
SPECIAL TIMER	1	1
GAME OVER ATTRACT SOUND	1	1
In Basic Options:		
SLINGSHOT	1	1
TILT WARNING	1	1

VI. TROUBLESHOOTING ON LOCATION

SYMPTOM: WON'T POWER UP

Game does not play power-up tune when power is turned on. General illumination is present.

ACTION:

- A. Check Fuses.
- B. Turn power OFF. Open back box. Locate light emitting diode (LED) on Control Board.
- C. Turn power ON. LED must flash 9X to indicate that the module is good. Correct sequence is flash-pause-flash and then seven more flashes and LED goes out.
- D. If LED does not come on or does not flash, or flashes, but less than 9X, turn off power. Check fuses. If fuses are good, replace Control Board.

CAUTION: Replacement Control Board must have same Part Number or incorrect operation will result! See Parts List for Control Board.

Turn power ON.

- E. If game is correct, it is now ready for play. If game is not correct, contact the Bally-Midway service department.

SYMPTOM: LAMPS

One or some switched lamps always ON or not all feature lamps light during play.

ACTION:

- A. With power ON, open front door. Select SELF TEST-Lamp Tests with keyboard. If game is correct all feature lamps flash ON and OFF.
- B. Carefully raise playfield or open back box to gain access to lamps.
- C. Replace bulbs that do not flash.
- D. If game is correct, it is now ready for play.
- E. If game is not correct, turn power OFF. Replace Control Board. Turn power ON and repeat A.
- F. If game is correct, it is now ready for play. If game is not correct, contact Bally-Midway service department.

SYMPTOM: DISPLAYS

- I. Display digits improper on **one** or **several**, but less than all Display Driver Module(s). Improper: One or several segments always OFF, digits mottled or several segments or digit(s) always ON.

ACTION:

- A. With power ON, open front door. Select SELF TEST-Display Test with keyboard. If the game is correct, each digit on each Display displays the count 0 through 9 and alphabet in all 7 digit positions. Note defective Display Driver modules.
- B. Turn power OFF.

WARNING: High Voltage is supplied to the Display Driver Modules, from the Power Module. Wait 30 seconds for High Voltage to Bleed Off.

- C. Replace Display Driver module(s). Turn power ON. Repeat A.
- D. If game is correct, it is now ready for play. If game is not correct contact Bally-Midway service department.

- II. All displays improper. Improper: Digit(s) always on or off/segment(s) always on or off, all displays.

ACTION:

- A. With power ON, open front door. Select SELF TEST-Display Test with keyboard. If the game is correct, each digit on each Display displays the count 0 through 9 and alphabet in all 7 digit positions. Note defective Display Driver modules.
- B. Replace Control Board. Turn power ON. Repeat A.

CAUTION: Replacement Control Board must have same Part Number or incorrect operation will result! See Parts List for Control Board.

- C. If game is correct, it is now ready to play. If game is not correct, contact Bally-Midway service department.

- III. One or several displays always off.

ACTION:

- A. With power ON, open front door. Select SELF TEST-Display Test with keyboard. If the game is correct, each digit on each Display displays the count 0 through 9 and alphabet in all 7 digit positions. Note defective Display Driver modules.
- B. Turn power OFF.
- C. Replace Display Driver module(s). Turn power ON. Repeat A.
- D. If game is correct, it is now ready for play. If game is not correct contact Bally-Midway service department.

SYMPTOM: SOLENOIDS

I. One or more solenoids do not pull-in during course of game.

ACTION:

- A. With power ON, open front door. Select SELF TEST-Solenoid Test with keyboard.
- B. If game was correct, each solenoid would be energized. The Solenoid name appears with the Driver Q Number and connector jack and pin numbers. (**NOTE:** If most of the Playfield Solenoids DO NOT operate, check the Playfield Fuse to see if it is blown. It is generally found near the Flipper Assemblies.)
- C. Carefully lift the playfield (or open the back box) to gain access to the solenoid. Turn power OFF. Inspect the solenoid.
- D. If a lead is broken off, repair. Repeat A & B. If game is correct, it is now ready for play. If solenoid wiring was correct, turn power OFF.
- E. Replace Control board. See CAUTION NOTE.
- F. Repeat A & B. If game is correct, it is now ready to play. If game is not correct, turn power OFF.
- G. Replace Sound Module A8.
- H. Repeat A & B. If game is correct it is now ready to play. If game is not correct, contact the Bally-Midway service department.

II. Solenoid(s) are always energized. **NOTE:** If impulse solenoids (ball ejects, slingshots, thumper-bumpers, etc.) are energized continuously, they are subject to damage. Limit troubleshooting to one minute with power ON, followed by **five minutes with power OFF**. Repeat as necessary. Replace damaged solenoids. (**NOTE:** When troubleshooting Playfield Solenoid Circuits, be advised that a constantly energized Solenoid (i.e. Thumper-Bumper) will blow the Playfield Fuse in a few seconds. To avoid replacing the Fuse repeatedly, try to isolate the faulty Solenoid Circuit as soon as the game power switch is flipped ON.)

ACTION:

- A. With power ON, open front door. Select SELF TEST-Solenoid Test with keyboard.
- B. If game was correct, each solenoid would be energized. The Solenoid name appears with the Driver Q Number and connector jack and pin numbers. (**NOTE:** If most of the Playfield Solenoids DO NOT operate, check the Playfield Fuse to see if it is blown. It is generally found near the Flipper Assemblies.)
- C. Carefully lift the playfield (or open the back box) to gain access to the solenoid. Turn power OFF. Inspect the solenoid.
- D. If a lead is broken off, repair. Repeat A & B. If game is correct, it is now ready for play. If Solenoid wiring was correct, turn power OFF.
- E. Replace Control Board. See CAUTION NOTE.
- F. Repeat A & B. If game is correct, it is now ready to play. If game is not correct, turn power OFF.
- G. Replace Sound Module A8.
- H. Repeat A & B. If game is correct, it is now ready to play. If game is not correct contact the Bally-Midway service department.

SYMPTOM: NO SOUND

ACTION:

- A. With power ON, open front door. Select SELF TEST-Sound Test with the keyboard.
- B. Turn volume control clockwise to Max.
- C. If correct, sound will be heard. If incorrect, try seating speaker lead connector (J2) and input connector (J1).
- D. If correct, sound will be heard. If incorrect, contact the Bally-Midway service department.

SYMPTOM: SWITCHES

Feature (Drop Targets, Stand-up, etc.) does not score.

ACTION:

- A. With power ON, open front door. Select SELF TEST-Switch Test with the keyboard.
- B. If game is correct, "All Switches Open" is displayed. Otherwise, the name of the switch(es) will be displayed with jack and pin numbers.
- C. Carefully lift the playfield. Locate the switch assembly identified from the display. Visually inspect the switch assembly. If the contacts are stuck, re-gap them to 1/16." Repeat A & B. If the game is correct, it is now ready to play. If the game is not correct, turn power OFF.
- D. Replace Control board. See CAUTION NOTE.
- E. Repeat A & B. If game is correct, it is now ready to play. If game is not correct, contact the Bally-Midway service department.

CAUTION: Replacement Control Board must have the same Part Number or incorrect operation will result! See Parts List for Control Board.

GAME: MOTORDOME PINBALL & FUTURE GAMES

SUBJECT: 6803 CONTROL BOARD POWER UP TEST SEQUENCE

The following is an abbreviated self-test routine for the 6803 Control Board used in Motordome and future pinballs:

- 1st Flash—(U1) Determine if the internal RAM is good. (6803)
- 2nd Flash—(U2) Checks to see if the program ROM is good. (27128)
- 3rd Flash—(U3) Checks to see if the program ROM is good. (27128)
- 4th Flash—(U4) Checks the C-MOS RAM. (6116P-3)
- 5th Flash—(U8) Tests PIA0. (6821)
- 6th Flash—(U7) Tests PIA1. (6821)
- 7th Flash—(U1) Checks the internal display interrupt generator. (6803)
- 8th Flash—(U12 & U8) Verifies operation of the phase B switched ill. voltage. NOTE: F5 fuse on the Power Module provides the phase B signal to the Control Board. (U12, 14584) (U8, 6821)
- 9th Flash—(U1, U11 & U12) Verifies operation of the Phase A switched ill. voltage. NOTE: F4 fuse on the Power Module provides the phase A signal to the Control Board. (U1, 6803) (U11, 4011) (U12, 14584)

The following is an abbreviated self-test routine for the 6809 Sound Board:

- 1st Flash—(U7) Determines if the ROM is good.
- 2nd Flash—(U6) Checks to see if the RAM is good.
- 3rd Flash—(U8) Checks the PIA. (68B21)

The following is an abbreviated self-test routine for the Sounds Deluxe Board:

- 1st Flash—Determines if the ROM (U11) is good.
- 2nd Flash—Determines if the ROM (U12) is good.
- 3rd Flash—Determines if the ROM (U13) is good.
- 4th Flash—Determines if the ROM (U14) is good.
- 5th Flash—Checks to see if the RAM (U9, U10) is good.
- 6th Flash—Checks the PIA (6821) (U7).

STRANGE SCIENCE VII

SOLENOID IDENTIFICATION TABLE

SELF
TEST #
SEQUENCE

SOLENOID IDENTIFICATION

1	NOT USED
2	THUMPER BUMPER MIDDLE
3	THUMPER BUMPER LEFT
4	THUMPER BUMPER RIGHT
5	LEFT SLINGSHOT
6	RIGHT SLINGSHOT
7	LEFT BALL SAVE
8	NOT USED
9	RIGHT SAUCER
10	OPEN ATOM SMASHER (LOWER-BALL STOP)
11	CLOSE ATOM SMASHER (RAISE-BALL STOP)
12	OUT KICKER
13	RESERVED FOR GERMAN USE
14	OUTHOLE
15	KNOCKER
16	NOT USED
17	NEON
18	BACKBOX LIGHT
19	FLIPPER (BACKBOX)



SWITCH ASSEMBLY IDENTIFICATION TABLE

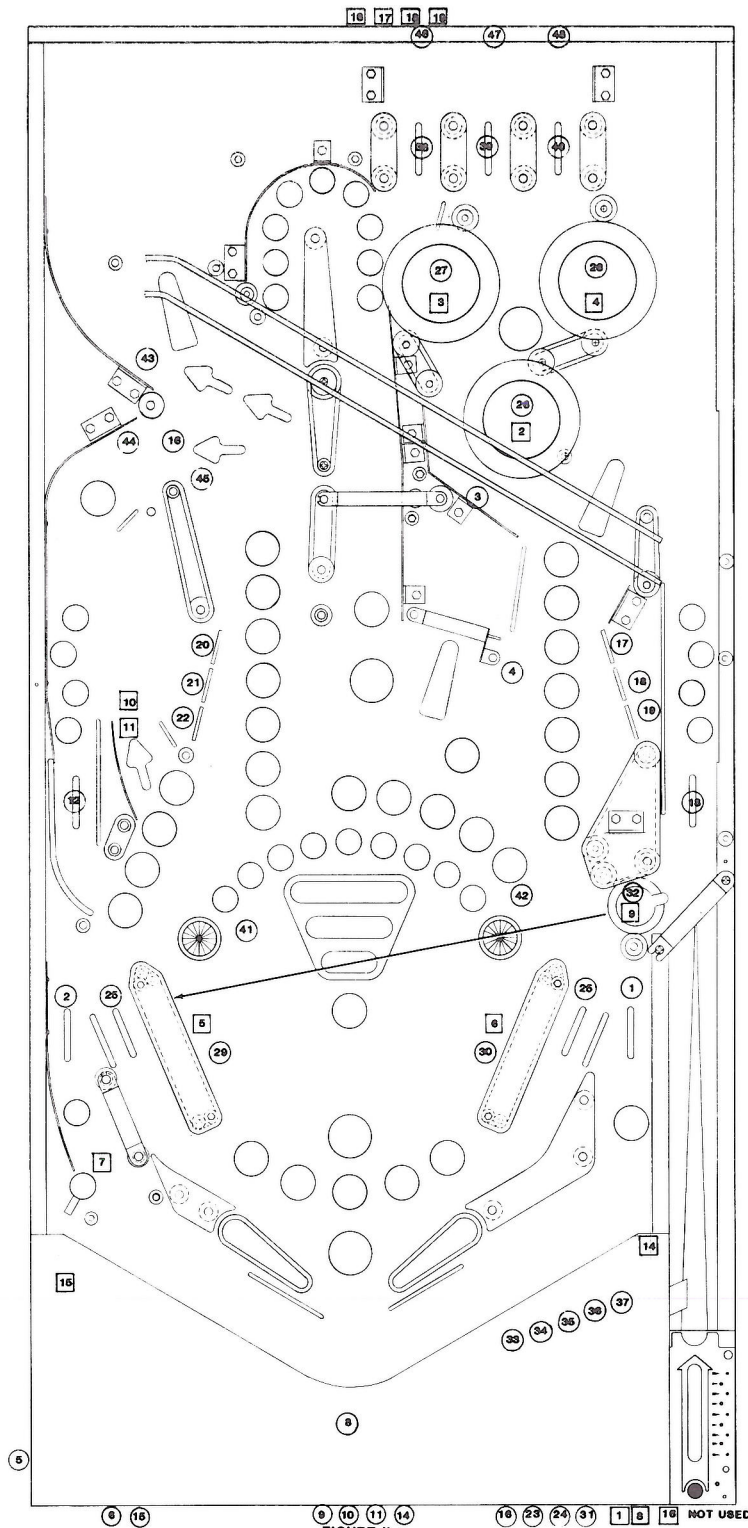
SWITCH
SELF
TEST #
SEQUENCE

DESCRIPTION

1	RIGHT OUTLANE
2	LEFT OUTLANE
3	EXIT ANTI-GRAVITY
4	ENTER ANTI-GRAVITY
5	BUTTON LEFT
6	CREDIT
7	BUTTON RIGHT
8	OUTHOLE
9	COINS RIGHT
10	COINS LEFT
11	COINS MIDDLE
12	LEFT BUBBLE LANE
13	RIGHT BUBBLE LANE
14	SLAM
15	TILT
16	NOT USED
17	SCIENCE TARGET TOP
18	SCIENCE TARGET MIDDLE
19	SCIENCE TARGET BOTTOM
20	STRANGE TARGET TOP
21	STRANGE TARGET MIDDLE
22	STRANGE TARGET BOTTOM
23	NOT USED
24	NOT USED
25	RETURN LANES
26	THUMPER BUMPER MIDDLE
27	THUMPER BUMPER LEFT
28	THUMPER BUMPER RIGHT
29	SLINGSHOT LEFT
30	SLINGSHOT RIGHT
31	NOT USED
32	SAUCER RIGHT
33	OUT BALL LEFT-5
34	OUT BALL 4
35	OUT BALL 3
36	OUT BALL 2
37	OUT BALL RIGHT-1
38	(LOWER) LAB 'L'
39	(LOWER) LAB 'A'
40	(LOWER) LAB 'B'
41	BRAIN ROLLOVER LEFT
42	BRAIN ROLLOVER RIGHT
43	UNLOAD BALL LANE
44	LOAD BALL LANE
45	REBOUND
46	(UPPER) LAB 'L'
47	(UPPER) LAB 'A'
48	(UPPER) LAB 'B'

*NOTE: SEQUENCE NUMBERS SHOWN HERE ARE USED AS AN AID IN LOCATING FAULTY SOLENOID OR SWITCH USING DRAWING SHOWN.

VECTOR SHOWING FOR EJECT SAUCER BALL. SHOULD EXIT AS SHOWN.



VIII. ROUTINE MAINTENANCE ON LOCATION:

After successful completion of the Self Diagnostic Test Procedure, set the game up for play. Exercise each roll-over, thumper bumper, slingshot, etc., by hand until each switch assembly on the playfield has been checked for proper operation. If actuating a switch assembly results in intermittent or no response, clean contacts by gently closing them on a clean business card or piece of paper and wiping until they wipe clean. Re-gap, if necessary, to 1/16". Do not burnish or file Gold Plated Switch Contacts.

IX. SWITCH ASSEMBLY ADJUSTMENTS:

GENERAL:

All switch assemblies consist of leaf springs, contacts, separators, plastic tubing and screws to hold them to the mounting surface. Before attempting to adjust a switch assembly, make sure that these screws are tight. If not, tighten screw closest to the contact end of the leaf spring first. This will prevent the assembly from being secured in such a manner that the leaf springs tend to fan out. In general, all leaf springs are adjusted for a 1/16" gap in the open position and .010" over-travel or wipe in the closed position. All contacts should be in good condition. Unless otherwise instructed, they should be dry or non-lubricated. All contacts should be free of dust and dirt. Contacts, with the exception of the flipper button switch assemblies are plated to resist corrosion. Filing or burnishing breaks the finish and encourages corrosion. Clean by closing the contacts over a clean piece of paper (e.g. a lint free business card) and wiping gently until the contacts are clean. For the flipper button switch assemblies **ONLY**: Tarnish can be removed with a contact file followed by burnishing tool. Severely pitted contacts must be placed and adjusted only when they are found to be a source of game malfunction.

X. SERVICE HINTS:

The Bally playfield has an improved tuff-coat finish with excellent wearing properties. Life expectancy of the playfield as well as play appeal, can be extended by periodic cleaning.

DO: Bally recommends you clean your playfield with Wildcat #125 (Wildcat Chemical Co. 1349 East Seminary Drive; Fort Worth, Texas 76115; Phone 1-817/924-8321). Wildcat #125 is a combination cleaner and polish. Bally has tried and tested this product and found it to be very effective. If Wildcat #125 is not available, Bally suggests you ask your distributor to order it. Inspect and hand polish the ball in a clean cloth. A chipped ball must be replaced. It can ruin the finish on the playfield in a short period of time.

DON'T: Use water in large quantities, highly caustic cleaners, abrasive cleaners and cleaning pads on the playfield, or allow a wax or polish build up. Waxes yellow with age and spoil appeal.

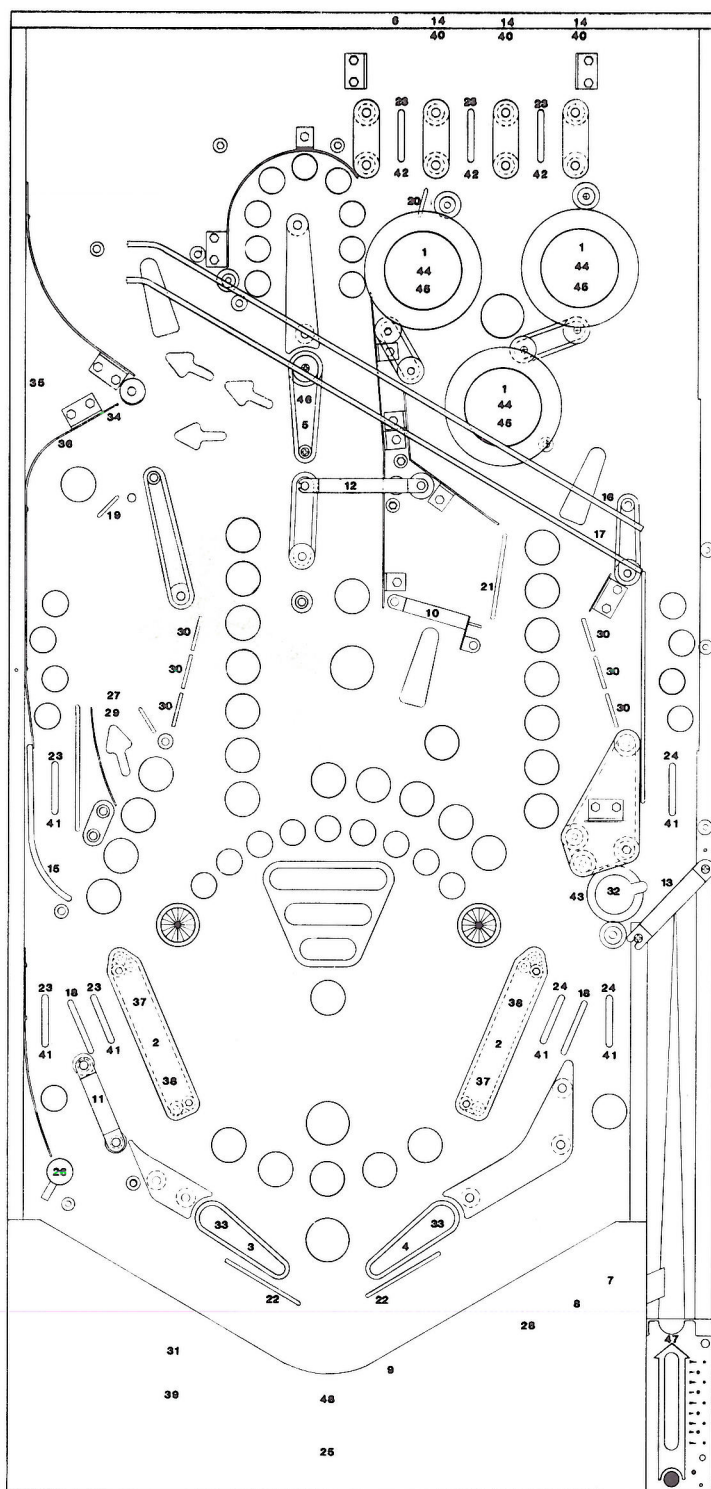


FIGURE II b

**OE35 STRANGE SCIENCE
PANEL TOP PARTS (WITHOUT RAMPS)**

1. THUMPER BUMPER	A967-00053-0100
2. SLINGSHOT KICKER ASSY.	A967-00059-0000
3. FLIPPER ASSY. SINGE SW. LT.	AC70-00022-0200
4. FLIPPER ASSY. SINGE SW. RT.	AC70-00022-0100
5. FLIPPER ASSY. DOUBLE SW. RT.	AC70-00023-0100
6. BACKBOARD ASSY.	AE35-00021-0000
7. BALL GATE ASSY.	AA40-00019-0000
8. BALL CHANNEL GATE ASSY.	AA40-00027-0000
9. BOTTOM ARCH EXTENSION	0370-00918-0300
10. OFFSET GATE ASSY.	AE35-00020-0000
11. GATE BRACKET & WIRE-FORM ASSY.	AE35-00053-0000
12. GATE BRACKET & WIRE-FORM ASSY.	A360-00214-0000
13. GATE BRACKET & WIRE-FORM ASSY.	A391-00029-0000
14. ROLLOVER-WIRE & BRACKET ASSY.	AE35-00024-0000
15. WIRE: BALL GUIDE	OE35-00918-0000
16. WIRE-FORM FRONT GUIDE	OE35-00920-01XF
17. WIRE-FORM REAR GUIDE	OE35-00920-02XF
18. WIRE-FORM BALL GUIDE	0360-00175-5300
19. WIRE-FORM BALL GUIDE	0365-00151-2375
20. WIRE-FORM BALL GUIDE	0365-00151-4000
21. WIRE-FORM BALL GUIDE	0365-00151-6000
22. WIRE-FORM	0365-00157-0000
23. WIRE ACTUATOR W/BRKT. ASSY. LT.	A331-00042-0000
24. WIRE ACTUATOR W/BRKT. ASSY. RT.	A360-00216-0000
25. WIRE ACTUATOR W/BRKT. ASSY. LT.	A360-00217-0000
26. KICKER POST ASSY.	AE35-00012-0000
27. 5-BALL CHANNEL & SWITCH ASSY.	AE35-00013-0000
28. FRONT-BALL CHANNEL ASSY.	AE35-00016-0000
29. BALL-STOP & COIL ASSY.	AE35-00043-0000
30. TARGET ASSY. W/MTG. BRACKET (YELLOW)	AE35-00056-0000
31. TOP-MTG. KICKER ASSY.	A360-00234-0000
32. EJECT HOLE ASSY.	A360-00295-0000
33. MOLDED FLIPPER ASSY. (BLACK)	A967-00031-0100
34. SWITCH & WIRE ASSY.	AE35-00030-0000
35. MICRO-SWITCH & BRKT. ASSY.	AE35-00031-0000
36. SWITCH & WIRE ASSY.	AE35-00032-0000
37. SLINGSHOT SWITCH & BRACKET ASSY.	A360-00230-0000
38. SWITCH & DIODE ASSY.	A360-00239-0000
39. SWITCH & DIODE ASSY. (OUTHOLE)	A360-00241-0000
40. SWITCH, DIODE & PLATE ASSY. W/CAP	A360-00245-0100
41. SWITCH, DIODE & PLATE ASSY.	A365-00035-0000
42. SWITCH, DIODE & PLATE ASSY. W/CAP	A365-00035-0100
43. SWITCH, DIODE & PLASTIC ASSY. (EJECT HOLE)	A365-00036-0000
44. THUMPER BUMPER CAP ASSY.	AE35-00050-0000
45. COLLAR: THUMPER BUMPER (RED)	0017-00042-0566
46. MOLDED FLIPPER ASSY. (WHITE)	A967-00031-0000
47. SHOOTER GAUGE	OE35-00142-00XF
48. BOTTOM ARCH.	OE35-00922-00XF

OE35 STRANGE SCIENCE XII

RAMP PARTS

1. ANTI-GRAVITY VERTICAL RAMP ASSY. (NOT SHOWN) AE35-00019-0000
2. ATOM SMASHER MULTI-BALL RAMP ASSY. (NOT SHOWN) AE35-00028-0000
3. RAMP & COVER ASSY. (NOT SHOWN) AE35-00033-0000
4. DRAIN ASSY. LEFT (NOT SHOWN) AE35-00035-0000
5. ATOM SMASHER FRONT ENTRANCE ASSY. (NOT SHOWN) AE35-00036-0000
6. ATOM SMASHER REAR ENTRANCE ASSY. (NOT SHOWN) AE35-00037-0000
7. BUBBLE BONUS ASSY. AE35-00038-0000

RUBBER RINGS

- | | |
|----------------------|-----------------|
| A. RING: | 0017-00041-0633 |
| B. RING: 5/16" | 0017-00041-0637 |
| C. RING: 15/64" | 0017-00041-0641 |
| D. RING: 1" | 0017-00041-0643 |
| E. RING: 1-1/2" | 0017-00041-0644 |
| F. RING: 2" | 0017-00041-0645 |
| G. RING: 2-1/2" | 0017-00041-0646 |
| H. RING: (YELLOW) 3" | 0017-00041-0653 |

POST

- | | |
|--|-----------------|
| J. POST (BLUE PLASTIC) | 0017-00042-0594 |
| K. POST (RED PLASTIC) | 0017-00042-0596 |
| L. METAL MINI-POST (W/THREADS FOR WOOD) | 0360-00732-00XF |
| M. NICKEL POST (NO THREADS) | 0360-00733-00XF |
| N. METAL MINI-POST (W/THREADS FOR 10-32 NUT) | 0365-00700-00XF |

RUBBER BUMPER FOR

- | | |
|---------------------|-----------------|
| L&N—METAL MINI-POST | 0017-00041-0633 |
| J&K—PLASTIC POST | 0017-00041-0637 |
| M—NICKEL POST | 0017-00041-0641 |

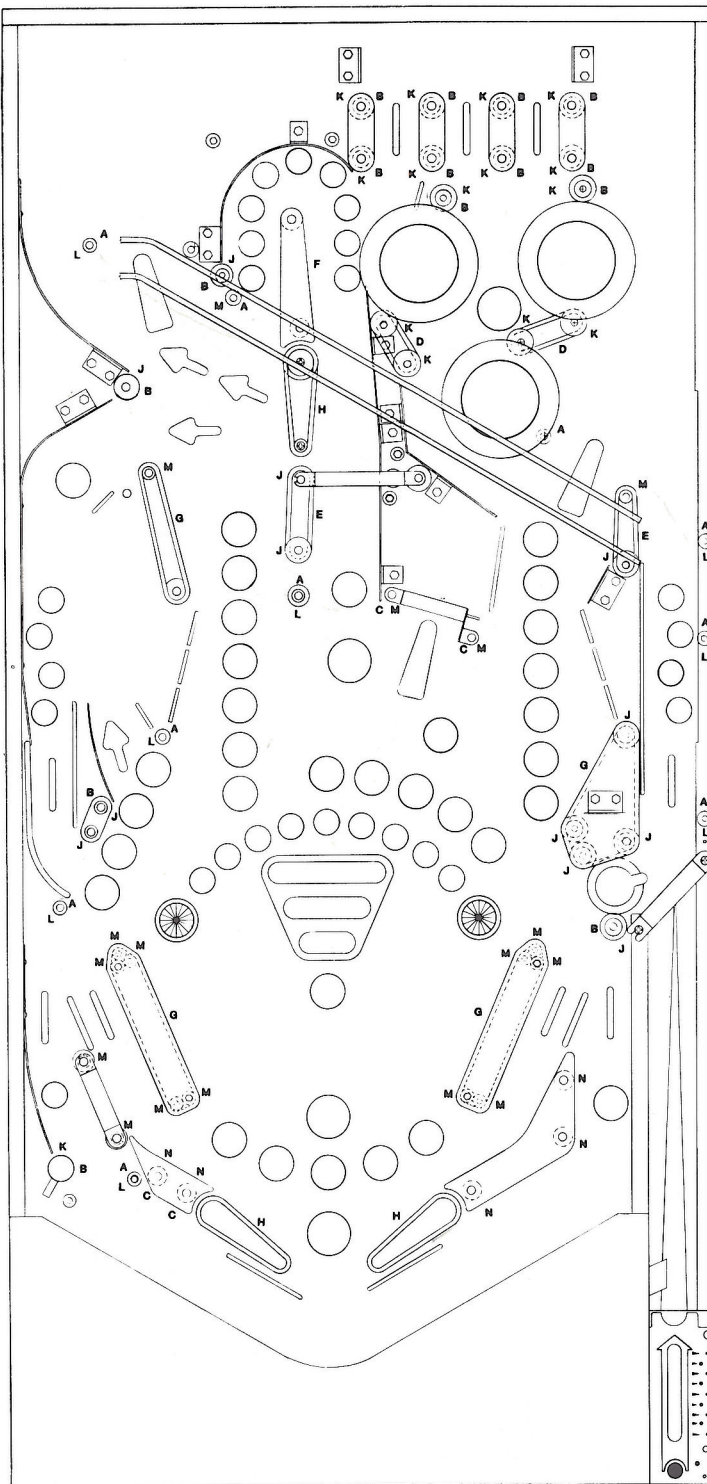


FIGURE II c

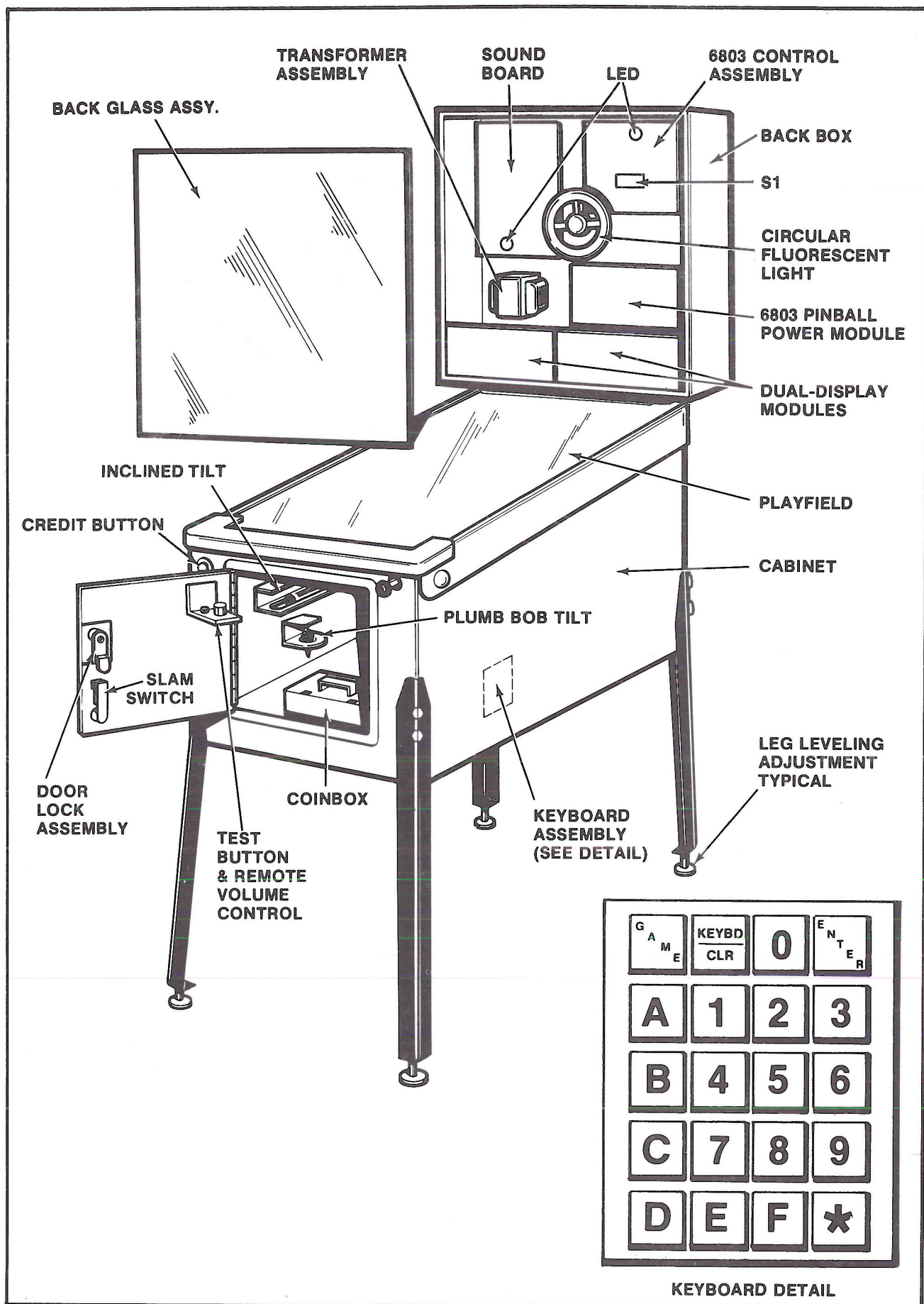


FIGURE III. ELECTRONIC PIN BALL MACHINE

XIV. STRANGE SCIENCE FEATURE OPERATION AND SCORING

1. BUBBLE BONUS FEATURE

Two Bubble Bonus switches are in this game. One rollover switch is located on the left side of the playfield and the other rollover switch is located in the Shooter Lane on the right side. The Bubble Bonus Value Lights flash sequentially at a constant rate from 5,000 points to 10,000 points to 20,000 points to a maximum of 50,000 points. When the ball makes the rollover switch, the moving value freezes and is awarded. At the start of each ball, a skill shot is scored by trying to make the Shooter Lane's Bubble Bonus switch when its' value is 50,000 points.

2. PARTICLE SEPARATOR & BONUS MULTIPLIER FEATURES

In the Particle Separator tray are three holes which correspond to the letters "L-A-B" (in the back board) and the three lanes below (on the playfield). Each hole has a wire-actuated switch. Each lane has a rollover switch. One of the letters is lit when the ball falls through the hole or rolls through the lane corresponding to that letter. The push button below the right flipper push button on the cabinet allows you to shift lit letter(s) in "L-A-B" to the right. This provides you with Hole Change and Lane Change while attempting to spell "L-A-B" (making any combination of holes and lanes).

At the start of each ball:

1. The Particle Separator flashes two upper Collect Spark Bonus Lights.
2. The Particle Separator is made when the ball closes any of the three hole switches scoring the Collect Spark Bonus (see Spark Bonus Feature). Lighting a letter awards 5,000 points and also 3,000 points are awarded to the Bonus.
3. By initially making the flashing Particle Separator, both the Anti-gravity and it's Collect Spark Bonus Light flash. Completing the flashing Anti-gravity (see Anti-gravity Feature) in turn flashes the Particle Separator again and also flashes the Particle Separator's left Collect Spark Bonus Light.

When it is not flashing, making the Particle Separator awards 10,000 points and adds 3,000 points to the Bonus.

When the ball makes a hole switch or lane switch, "L-A-B" letters score:

1. 5,000 points for lighting the first or second letter in "L-A-B".
2. 1,000 points for a letter already lit.
3. 10,000 points for spelling "L-A-B".

Spelling "L-A-B" also advances the Bonus Multiplier 2X through 6X.

3. ANTI-GRAVITY, EXTRA BALL, & SPECIAL FEATURES

Completing the Anti-gravity shot requires making both the entrance switch and exit switch within three seconds. If flashing, completion of the Anti-gravity awards its flashing Collect Spark Bonus and also adds 5,000 points to the Bonus. If not flashing, completion of the Anti-gravity awards 10,000 points and also adds 1,000 points to the Bonus.

Making the entrance switch alone awards 1,000 points. Making the exit switch alone awards 1,000 points with an additional 1,000 points for each Voltage Level Light lit (see Atomic Generator Feature) and also adds 1,000 points to the Bonus. The exit switch can be made by a direct shot up the center of the game without involving the entrance switch.

The following features are earned by completing the Anti-gravity a certain number of times:

OF COMPLETIONS REQUIRED

Every Time
2 Times
3 Times (adjustable)
4 Times (adjustable)
5 Times (adjustable)

FEATURES EARNED

Collect Bonus Light activated
Hold Bonus Light activated
Extra Ball Light activated
Extra Ball awarded
Special Light activated

* REGISTER "Award Count" controls the number of times on the Anti-gravity (when lit) required to activate the Extra Ball Light, to award the Extra Ball, and to activate the Special Light.

EXTRA BALL LIGHT

6 Times
5 Times
4 Times
3 Times

EXTRA BALL

7 Times
6 Times
5 Times
4 Times

SPECIAL LIGHT

8 Times
7 Times
6 Times
5 Times

ENTER

0
1
2
3

4. ATOM SMASHER, PLAYFIELD VALUE MULTIPLIER, & TIMED EXTRA BALL FEATURES

Up to five balls can be loaded into the Atom Smasher through its rear entrance by using the top Flipper. Every ball loaded collects the upper left Collect Spark Bonus. As the first ball is loaded, a pair of ball stop pins spring up at the Atom Smasher's front entrance to hold the ball on the ramp.

One or more balls loaded can be released as follows:

1. Balls stored can be released one at a time by "smashing" the ball in play into the leading held ball at the Atom Smasher's front entrance. This knocks one held ball up the ramp and out across a pair of guide wires from the left side to the right side of the playfield awarding the Collect Spark Bonus and resulting in Multiball play. If, during this type of multiball play, there are remaining stored balls in the Atom Smasher and a ball is loaded through its' rear entrance, the stored balls are released when the ball stop pins are pulled down. When no balls are loaded, a ball can pass through the front entrance and up the ramp. This is the same as "smashing" a ball out and collects the Spark Bonus. "Smashing" a ball out of the Atom Smasher also lights the Extra Ball Light (on a timer which is adjustable) located near the Anti-gravity.
2. When the fifth ball is loaded, the ball stop pins are pulled down and all five balls are released for multiball play awarding 120,000 points. As a result, the ball stop pins will always remain pulled down during this second type of multiball play and every ball loaded will automatically be released.
3. Awards for releasing balls stored in the Atom Smasher are:

<u># OF BALLS RELEASED</u>	<u>AWARD</u>
2	30,000 points
3	60,000 points
4	90,000 points
5	120,000 points

The Playfield Value Multiplier increases with the number of balls in play at any one time:

<u># OF BALLS IN PLAY</u>	<u>PLAYFIELD VALUE MULTIPLIER</u>
2	3X
3	6X
4	9X
5	12X

* REGISTER "Extra Ball Timer" controls the length of time the Extra Ball Light flashes after being activated.

<u>LENGTH OF TIME</u>	<u>ENTER</u>
8 seconds	0
16 seconds	1
32 seconds	2

5. "S-T-R-A-N-G-E S-C-I-E-N-C-E", SPARK BONUS, & TIMED SPECIAL FEATURES

Located on either side of the center playfield area are three stand up bullseye targets: left side - "S-T-R-A-N-G-E" lights, right side - "S-C-I-E-N-C-E" lights. When the game begins, one light is on in "S-T-R-A-N-G-E" and one light is on in "S-C-I-E-N-C-E". Each of these lights sweep downwards. The sweep rate is controlled by the "Voltage Level" of the Atomic Generator (see Atomic Generator Feature). The three bullseyes are connected to the center three letters of each word. When a bullseye is hit the corresponding light lights if it was off, and then instantly begins sweeping too. Spelling "S-T-R-A-N-G-E" (or "S-C-I-E-N-C-E") awards 10,000 points. Lighting a letter awards 5,000 points and adds 1,000 points to the Bonus. Hitting a lit letter awards 1,000 points and adds 1,000 points to the Bonus.

Spelling "S-T-R-A-N-G-E S-C-I-E-N-C-E" completely earns the following:

1. The Power Saver is activated (see Power Saver Feature).
2. The Spark Bonus Value is advanced starting from 25,000 points to 50,000 points to a maximum of 75,000 points. This value is reset to 25,000 points for each new ball. The Spark Bonus turns into a moving value during multiball.
3. In the right Outlane a timed Special light is lit (adjustable).

A letter in "S-T-R-A-N-G-E S-C-I-E-N-C-E" is spotted each time.

1. The Anti-gravity is completed by making the entrance switch and exit switch within three seconds.
2. The Particle Separator is made by closing one of its hole switches. Also, one extra letter in "S-T-R-A-N-G-E S-C-I-E-N-C-E" is spotted whenever a letter in "L-A-B" is lit (See Particle Separator Feature).
3. A ball is loaded into the Atom Smasher (see Atom Smasher Feature).

* REGISTER "Special Timer" controls the length of time the Special Light flashes after being activated.

<u>LENGTH OF TIME</u>	<u>ENTER</u>
8 seconds	0
16 seconds	1
32 seconds	2
Until end of current ball	3

6. ATOMIC GENERATOR FEATURE

The Atomic Generator area consists of three Thumper Bumpers ("Atomic Generators") and nine Voltage Level Lights ("Volt Meter"). Each time a Thumper Bumper is hit 1,000 points is awarded. Thirteen hits advance the Voltage level to the next light. The Voltage Level Lights range from 100 volts to 900 volts. The Voltage Level is carried over from ball to ball. The Voltage Level Value times ten is awarded each time the Anti-gravity exit switch is made. The Voltage Level controls the sweep rate of the lights on the playfield. The faster the lights sweep, the easier it is to spell "S-T-R-A-N-G-E S-C-I-E-N-C-E". Each Voltage Level has a different background sound.

7. POWER SAVER FEATURE

The Power Saver Feature is initially provided to the first ball (adjustable). When the Power Saver is on, a ball draining through the left Outlane can be saved by pressing the push button below the left Flipper push button on the cabinet. This pulses the Kicker Post at the right moment to knock the ball into the left Flipper Return Lane. After the left Outlane switch is hit, the Power Saver remains on for four seconds. Spelling "S-T-R-A-N-G-E S-C-I-E-N-C-E" will light the Power Saver if it is off.

* REGISTER "Power Saver" controls the number of new balls to which the Power Saver feature is initially provided.

<u>NEW BALL #</u>	<u>ENTER</u>
None	0
1	1
1 & 2	2
1,2 & 3	3
1 thru 4	4
1 thru 5	5

8. BRAIN TRANSPLANT AND COLLECT BONUS SAUCER FEATURES

The Brain Transplant begins by flashing the left Star Rollover Target when at least 1,000 points of Bonus has been earned (see the Particle Separator feature and the Anti-gravity feature). The left Star Rollover Target scores 130 points when not lit and scores 2,000 points when it's flashing. The Bonus Lights begin to strobe from left to right when the left Star Rollover Target is made. The right Star Rollover Target begins flashing when the Bonus reaches 9,000 points. The right Star Rollover Target scores 130 points when not lit. When it's flashing, making the right Star Rollover Target "completes the Brain Transplant" and collects the Bonus (not including the Bonus Multiplier).

The Collect Bonus Saucer awards 5,000 points when not lit. When lit, the Bonus (including the Bonus Multiplier) is awarded.

9. MISCELLANEOUS FEATURES

The left Outlane awards 3,000 points.
The right Outlane awards 20,000 points.
Each Flipper Return Lane awards 5,000 points
Each Sling Shot awards 130 points.
The Rebound awards 230 points.

* REGISTER "Attract Sound" enables or disables, when the game is over, the Sound Mode while displaying Hi-score or instructions.

ENABLES SOUND MODE

ENTER

No	0
Yes	1

In Basic Options:

* REGISTER "Sling Shot" controls the Sling Shot:

SLING SHOTS: ACTIVE

ENTER

No	0
Yes	1

* REGISTER "Tilt Warning" controls the number of Tilt Warnings:

OF TILT WARNINGS

ENTER

None	0
1	1
2	2
3	3

STRANGE SCIENCE OPERATING MANUAL REVISIONS

On page 1-5, in the "Feature Options" section of "GAME REGISTERS & OPTIONS":

- 1) The factory setting for the "Power Saver" register is shown as "2". This setting should read as "1".
- 2) For the "Extra Ball Timer" register, "2=24 sec." should read as "2=32 sec."
- 3) The factory setting for the "Special Timer" register is shown as "1". This setting should read as "0".
- 4) For the "Special Timer" register, "2=24 sec." should read as "2=32 sec."

SECTION 2
**Component Layouts,
Schematics & Wiring Diagrams**

6803 PINBALL POWER MODULE
A084-91785-D000
M051-00C53-D001

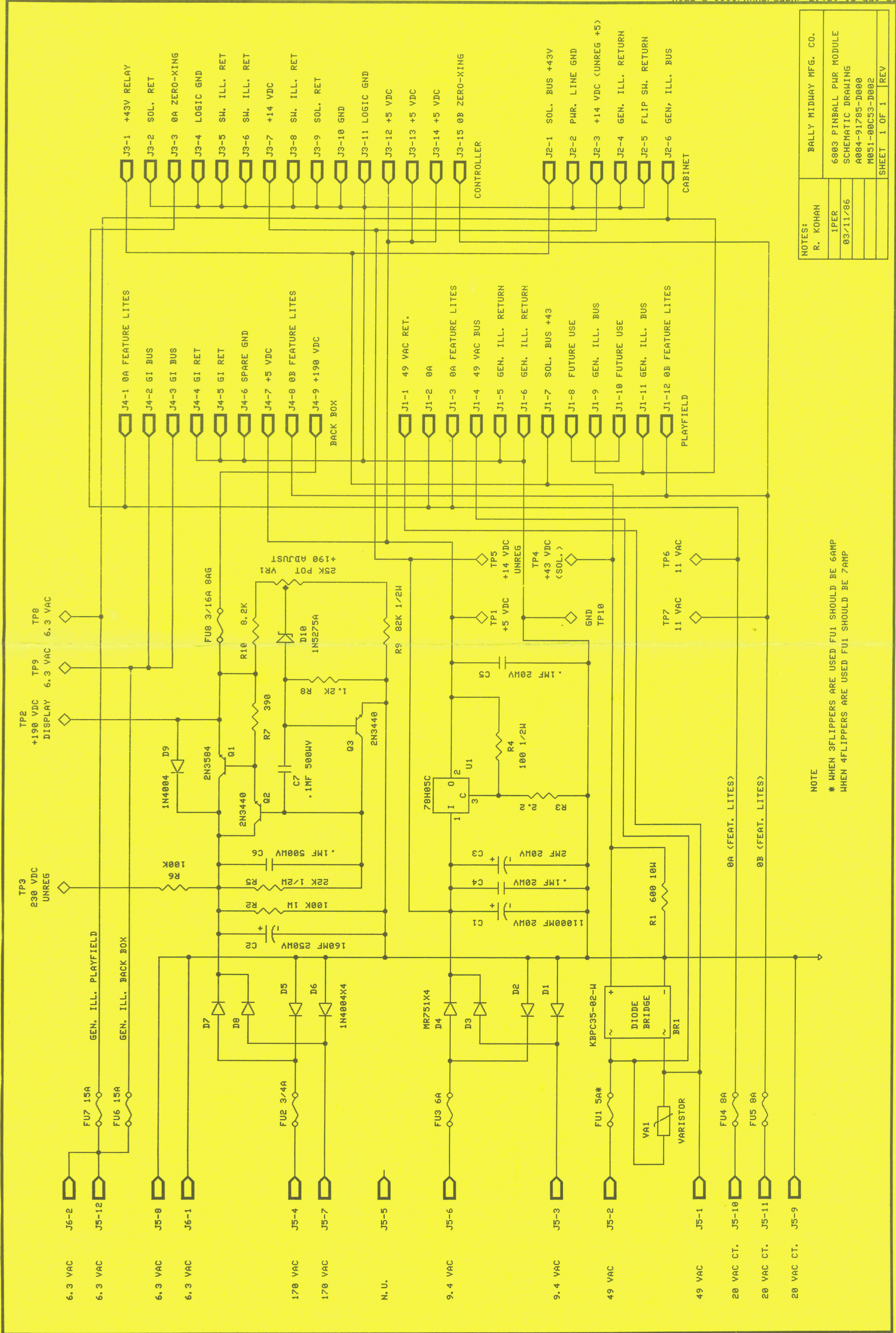
CROSS REFERENCE LIST

DESCRIPTION	QTY.	DESIGNATION NO.	PART NOS.
•01UF 500V CER.	2	C6,C7	0360-00800-0013
•1UF 25V CER.	2	C4,C5	0360-00800-0026
2UF 25V ELEC.	1	C3	0360-00800-0019
160UF 350V ELEC.	1	C2	0360-00800-0020
11,000UF 20V ELEC.	1	C1	0360-00800-0024
2.2 OHM 1/4W 5%	1	R3	100E-00005-0003
100 OHM 1/2W 5%	1	R4	100E-00006-0021
390 OHM 1/4W 5%	1	R7	100E-00005-0049
600 OHM 10W 10%	1	R1	100E-00002-0049
1.2K 1/4W 5%	1	R8	100E-00005-0063
8.2K 1/4W 5%	1	R10	100E-00005-0086
22K 1/2W 5%	1	R5	100E-00006-0065
82K 1/2W 5%	1	R9	100E-00006-0072
100K 1/4W 5%	1	R6	100E-00005-0115
100K 1W 5%	1	R2	100E-00007-0037
0-25K 1/4W POT	1	VR1	0360-00804-0004
MR 751	4	D1-D4	103E-00003-0016
1N4004	5	D5-D9	103E-00003-0005
1N5275	1	D10	103E-00001-0027
KRPG-35-02-W	1	RR1	103E-00005-0005
2N3440	2	02,03	104E-00003-0002
2N3584	1	01	104E-00005-0002
78H05C REG	1	U1	0360-00803-0021
VARISTOR METAL OXIDE 60V	1	VA1	115E-00001-0002
TY-WRAP	4	P/O C1,C2	0017-00042-0048
ZERO OHM RES. JUMPER	16	JW1-JW16	117E-00001-0001
TEST POINTS	10	TP1-TP10	0017-00007-0131
SOLDER LUG	2	P/O C1	0017-00021-0257
JUMPER WIRE 20AWG	2	P/O C1	0017-00033-0448
INSULATOR T0-3	1	P/O U1	0017-00042-0119
INSULATOR T0-5	2	P/O 02,03	0017-00042-0151
INSULATOR T0-66	1	P/O 01	0017-00042-0158
HEX SPACER	2	P/O 01	0017-00042-0248
SHIELD	1	P/O 01	0365-00952-0000
HEATSINK 1	1	P/O U1	112E-00001-0003
HEATSINK 2	1	P/O 01	112E-00001-0002
HEATSINK 3	1	P/O 03	112E-00001-0004
BRIDGE SPACER	1	P/O BR1	118E-00001-0001
6-32 X 12 SCREW	4	P/O 01,U1	0017-00101-0132
6-32 X 5 SCREW	2	P/O 01	0017-00101-0555
6-32 HEX NUT	4	P/O 01,U1	0017-00103-0005
LOCKWASHER INT.	4	P/O 01,	0017-00104-0008
LOCKWASHER EXT.	4	P/O 01,U1	0017-00104-0009
FLAT WASHER	4	P/O 01,U1	0017-00104-0106
FUSE CLIP	8	FC1A-FC3B,	0017-00071-0033
		FC8A,FC8R	
FUSE CLIP	8	FC4A-FC7A	0017-00071-0034
3/16 AMP 8AG FUSE	1	F8	0017-00003-0206
3/4 AMP 3AG FUSE	1	F2	0017-00003-0010
5 AMP 3AG FUSE	1	F1*	0017-00003-0175
6 AMP 3AG FUSE	1	F3	0017-00003-0008

CROSS REFERENCE LIST

DESCRIPTION	QTY.	DESIGNATION NO.	PART NOS.
8 AMP 3AG FUSE	2	F4,F5	0017-00003-0387
15 AMP 3AG FUSE	2	F6,F7	0017-00003-0011
12 PIN M-N-L CONN. FEMALE	1	J1	0017-00021-0532
6 PIN M-N-L CONN. MALE	1	J2	0017-00021-0424
15 PIN M-N-L CONN. MALE	1	J3	0017-00021-0434
9 PIN M-N-L CONN. MALE	1	J4	0017-00021-0425
12 PIN M-N-L CONN. MALE	1	J5	0017-00021-0426
2 PIN M-N-L CONN. MALE	1	J6	0017-00021-0488
6803 POWER MODULE P.C.B.	1		A080-91785-D000

* TWO FLIPPER GAMES ONLY - SEE SCHEMATIC



NOTES:	BALLY MIDWAY MFG. CO.		
	R. KOHAN		
	1PER	6803 PINBALL PWR MODULE	
	03/11/86	SCHEMATIC DRAWING	
		A084-91785-D000	
		M051-00C53-D002	
		SHEET	1 OF 1
		REV	

NOTE
* WHEN 3FLIPPERS ARE USED FU1 SHOULD BE 6AMP
WHEN 4FLIPPERS ARE USED FU1 SHOULD BE 7AMP

DESIGNATION LIST

DESIGNATION LIST

DESIGNATION NO.

DESCRIPTION

C1	NOT INSERTED
C2	10 UF 20V TANT
C3	4700 UF 25V AX FLEC
C4	4.7 UF 25V TANT
C5	.01 UF 50V AX CER
C6	4.7 UF 25V TANT
C7	.01 UF 50V AX CER
C8	6.8 UF 25V TANT
C9	NOT INSERTED
C10, C11	.22 UF 50V AX CER
C12	1000 UF 16V AX FLEC
C13	.1 UF 50V AX CER
C14	470 UF 6V AX FLEC
C15	.05 UF CER
C16	1 UF 20V TANT
C17	.1 UF 50V AX CER
C18-C22	NOT INSERTED
C23	150 PF 50V AX CER
C24	270 PF 50V AX CER
C25	1 UF 20V TANT
C26	470 PF 50V AX CER
C27	.003 UF 50V AX CER
C28	1 UF 20V TANT
C29	270 PF 50V AX CER
C30	47 UF 16V AX FLEC
C31	.01 UF 50V AX CER
C32	18 PF 50V AX CER
C33-C36	100 PF 50V AX CER
C37	470 PF 50V AX CER
C38, C39	.1 UF 50V AX CER
C40-C43	NOT INSERTED
CP1-CP10	.01 UF 50V AX CER

DESIGNATION NO.

DESCRIPTION

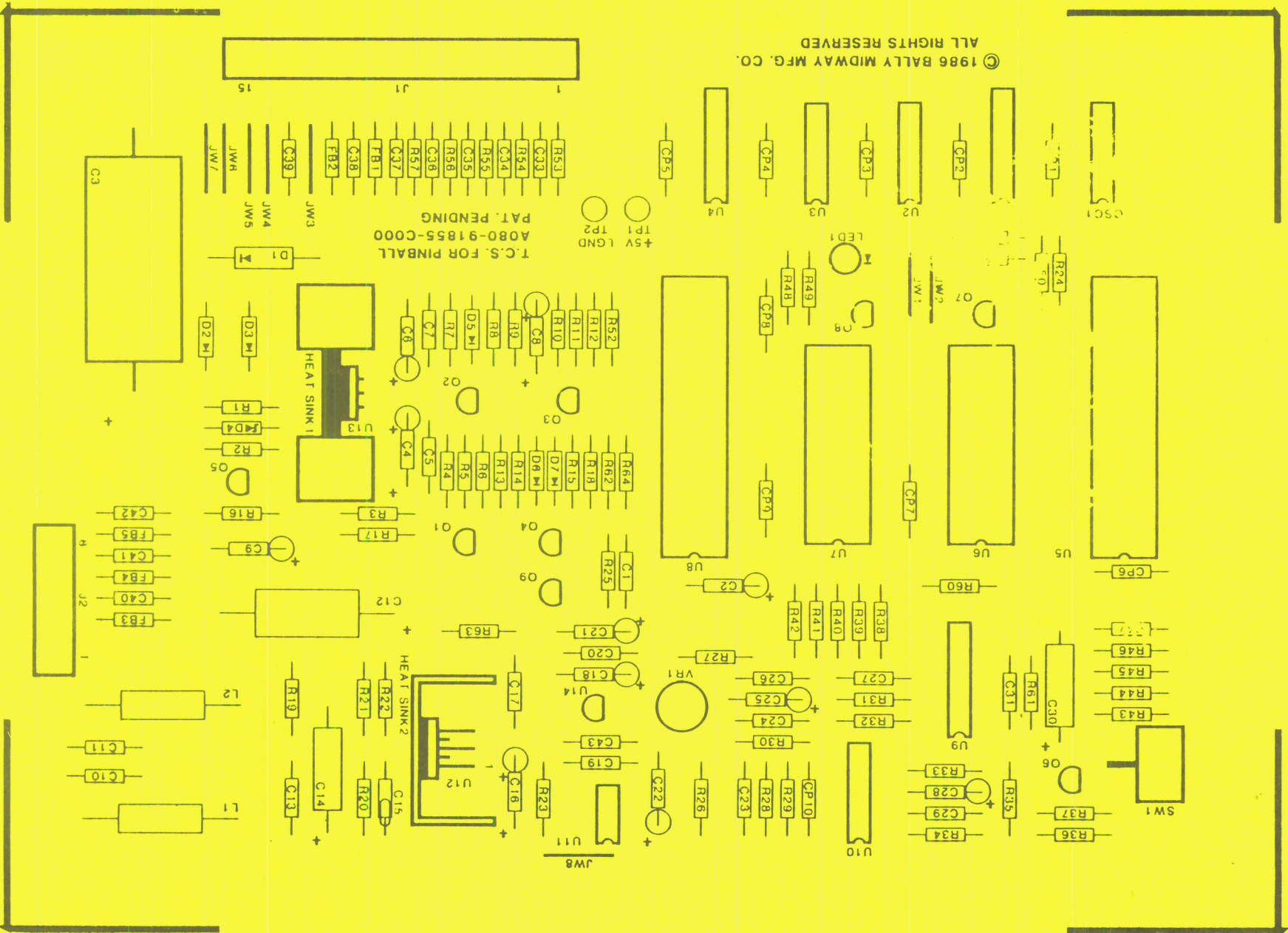
R16-R18	NOT INSERTED
R19	1 OHM 1/4W 5% CRBN.
R20	430 OHM 1/4W 5% CRBN.
R21	2.2 OHM 1/4W 5% CRBN.
R22	220 OHM 1/4W 5% CRBN.
R23	NOT INSERTED
R24	4.7K OHM 1/4W 5% CRBN.
R25	NOT INSERTED
R26	5.1K OHM 1/4W 5% CRBN.
R27	0 OHM RESISTOR (JUMPER WIRE)
R28	150K OHM 1/4W 5% CRBN.
R29	82K OHM 1/4W 5% CRBN.
R30	150K OHM 1/4W 5% CRBN.
R31	33K OHM 1/4W 5% CRBN.
R32	18K OHM 1/4W 5% CRBN.
R33	33K OHM 1/4W 5% CRBN.
R34	120K OHM 1/4W 5% CRBN.
R35	62K OHM 1/4W 5% CRBN.
R36	68 OHM 1/4W 5% CRBN.
R37	180 OHM 1/4W 5% CRBN.
R38	75K OHM 1/4W 5% CRBN.
R39	47K OHM 1/4W 5% CRBN.
R40	200K OHM 1/4W 5% CRBN.
R41-R47	4.7K OHM 1/4W 5% CRBN.
R48	47K OHM 1/4W 5% CRBN.
R49	100 OHM 1/4W 5% CRBN.
R50	150 OHM 1/4W 5% CRBN.
R51	3.3K OHM 1/4W 5% CRBN.
R52	100K OHM 1/4W 5% CRBN.
R53-R57	10K OHM 1/4W 5% CRBN.
R58, R59	NOT USED
R60	1K OHM 1/4W 5% CRBN.
R61	2.7K OHM 1/4W 5% CRBN.
R62-R64	NOT INSERTED

VR1 1K OHM POT

L1, L2 10 UH INDUCTOR

D1 VR330 DIODE
D2, D3 1N4004 DIODE
D4 1N958B DIODE
D5-D7 1N4606 DIODE
LED 1 GREEN LED

R1	1K OHM 1/4W 5% CRBN.
R2, R3	2.7K OHM 1/4W 5% CRBN.
R4	7.5K OHM 1/4W 5% CRBN.
R5	39K OHM 1/4W 5% CRBN.
R6	9.1K OHM 1/4W 5% CRBN.
R7	82 OHM 1/4W 5% CRBN.
R8	100 OHM 1/4W 5% CRBN.
R9	47K OHM 1/4W 5% CRBN.
R10, R11	10K OHM 1/4W 5% CRBN.
R12	82K OHM 1/4W 5% CRBN.
R13	62K OHM 1/4W 5% CRBN.
R14	5.6K OHM 1/4W 5% CRBN.
R15	910 OHM 1/4W 5% CRBN.



DESIGNATION LIST

DESIGNATION NO.

DESCRIPTION

Q1	2N3904 XSTR.	
Q2	2N4403 XSTR.	
Q3	2N3904 XSTR.	
Q4	2N4403 XSTR.	
Q5	NOT INSERTED	
Q6	2N5305 XSTR.	
Q7	MPS3646 XSTR.	
Q8	2N5305 XSTR.	
Q9	NOT INSERTED	
OSC1	8 MHZ COSC	
IC U1	74LS76	
IC U2	74LS00	
IC U3	74LS02	
IC U4	74LS139	
IC U5	MC68R09E	
IC U6	6116 2KX8 RAM 200NS.	
IC U7	PROG EPROM 128K 250NS.	
IC U8	MC68R21	
IC U9	AD7533	
IC U10	LM3900	
IC U11	NOT INSERTED	
IC U12	TDA2002	
IC U13	MC7805	
IC U14	NOT INSERTED	
ICS U5	40 PIN IC SOCKET (.600)	
ICS U6,U7	28 PIN IC SOCKET (.600)	
ICS U8	40 PIN IC SOCKET (.600)	
ICS U9	16 PIN IC SOCKET (.300)	
HS U12	6030B-TT HEAT SINK	
HS U13	6100B HEAT SINK	
MH U12	1 SCREW, 1 WASHER, 1 NUT	
MH U13	1 SCREW, 1 WASHER, 1 NUT	
INS U12, U13	SIL PAD THERMAL WASHER, TO 220	
FB1,FB2	FERRITE BEAD	
FB3-FB5	NOT INSERTED	
SW1	SWITCH PC. MTG.	
JW1-JW8	JUMPER	
J1,J2	AUTO INSERT PINS TIN .045 SQ. PIN	
TP1,TP2	TEST POINTS	
T.C.S. FOR PINBALL	A080-91855-C000	

CROSS REFERENCE LIST

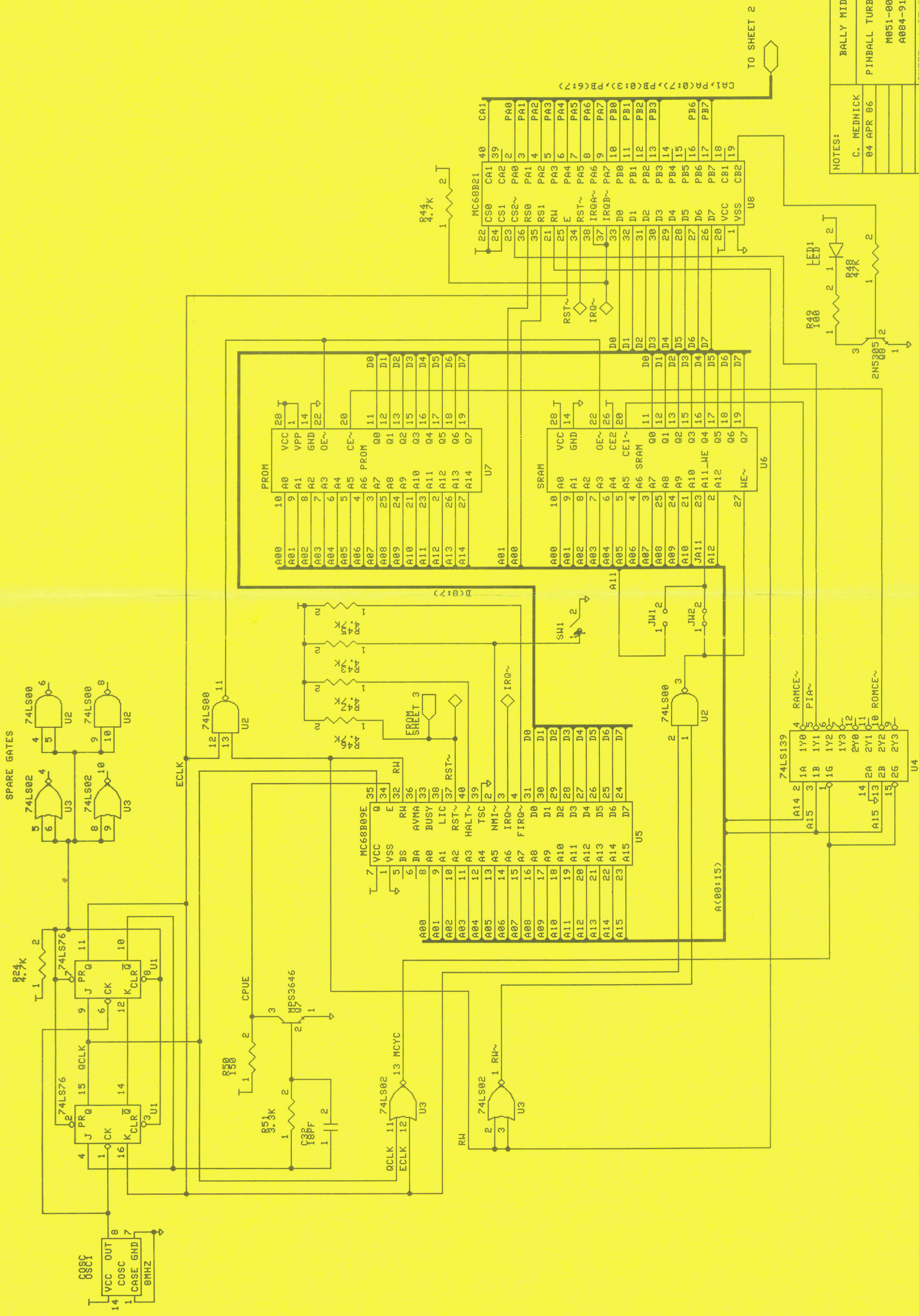
DESCRIPTION	QTY.	DESIGNATION NO.	PART NOS.
18 PF 50V AX CER.	1	C32	0365-00800-0026
100 PF 50V AX CER.	4	C33-C36	0360-00800-0046
150 PF 50V AX CER.	1	C23	0360-00800-0053
270 PF 50V AX CER.	2	C24,C29	0307-00800-0009
470 PF 50V AX CER.	2	C26,C37	0307-00800-0008
.003 UF 50V AX CER.	1	C27	0360-00800-0056
.01 UF 50V AX CER.	13	C5,C7,C31,CP1-CP10	0360-00800-0005
.05 UF CER.	1	C15	0360-00800-0006
.1 UF 50V AX CER.	4	C13,C17,C38,C39	0360-00800-0058
.22 UF 50V AX CER.	2	C10,C11	0360-00800-0057
1 UF 20V TANT.	3	C16,C25,C28	0986-00800-1400
4.7 UF 25V TANT.	2	C4,C6	0360-00800-0008
6.8 UF 25V TANT.	1	C8	0360-00800-0048
10 UF 20V TANT.	1	C2	0986-00800-0700
47 UF 16V AX ELEC.	1	C30	0360-00800-0042
470 UF 6V AX ELEC.	1	C14	0360-00800-0021
1000 UF 16V AX ELEC.	1	C12	0360-00800-0044
4700 UF 25V AX ELEC.	1	C3	0360-00800-0023
1 OHM 1/4W 5% CRBN.	1	R19	100E-00005-0002
2.2 OHM 1/4W 5% CRBN.	1	R21	100E-00005-0003
68 OHM 1/4W 5% CRBN.	1	R36	100E-00005-0029
82 OHM 1/4W 5% CRBN.	1	R7	100E-00005-0031
100 OHM 1/4W 5% CRBN.	2	R8,R49	100E-00005-0033
150 OHM 1/4W 5% CRBN.	1	R50	100E-00005-0037
180 OHM 1/4W 5% CRBN.	1	R37	100E-00005-0039
220 OHM 1/4W 5% CRBN.	1	R22	100E-00005-0041
430 OHM 1/4W 5% CRBN.	1	R20	100E-00005-0050
910 OHM 1/4W 5% CRBN.	1	R15	100E-00005-0059
1K OHM 1/4W 5% CRBN.	2	R1,R60	100E-00005-0061
2.7K OHM 1/4W 5% CRBN.	3	R2, R3,R61	100E-00005-0071
3.3K OHM 1/4W 5% CRBN.	1	R51	100E-00005-0074
4.7K OHM 1/4W 5% CRBN.	8	R24,R41-R47	100E-00005-0079
5.1K OHM 1/4W 5% CRBN.	1	R26	100E-00005-0080
5.6K OHM 1/4W 5% CRBN.	1	R14	100E-00005-0082
7.5K OHM 1/4W 5% CRBN.	1	R4	100E-00005-0085
9.1K OHM 1/4W 5% CRBN.	1	R6	100E-00005-0087
10K OHM 1/4W 5% CRBN.	7	R10,R11,R53-R57	100E-00005-0088
18K OHM 1/4W 5% CRBN.	1	R32	100E-00005-0093
33K OHM 1/4W 5% CRBN.	2	R31,R33	100E-00005-0100
39K OHM 1/4W 5% CRBN.	1	R5	100E-00005-0102
47K OHM 1/4W 5% CRBN.	3	R9,R39,R48	100E-00005-0104
62K OHM 1/4W 5% CRBN.	2	R13,R35	100E-00005-0107
75K OHM 1/4W 5% CRBN.	1	R38	100E-00005-0110
82K OHM 1/4W 5% CRBN.	2	R12,R29	100E-00005-0112
100K OHM 1/4W 5% CRBN.	1	R52	100E-00005-0115
120K OHM 1/4W 5% CRBN.	1	R34	100E-00005-0118
150K OHM 1/4W 5% CRBN.	2	R28,R30	100E-00005-0120
200K OHM 1/4W 5% CRBN.	1	R40	100E-00005-0123

CROSS REFERENCE LIST

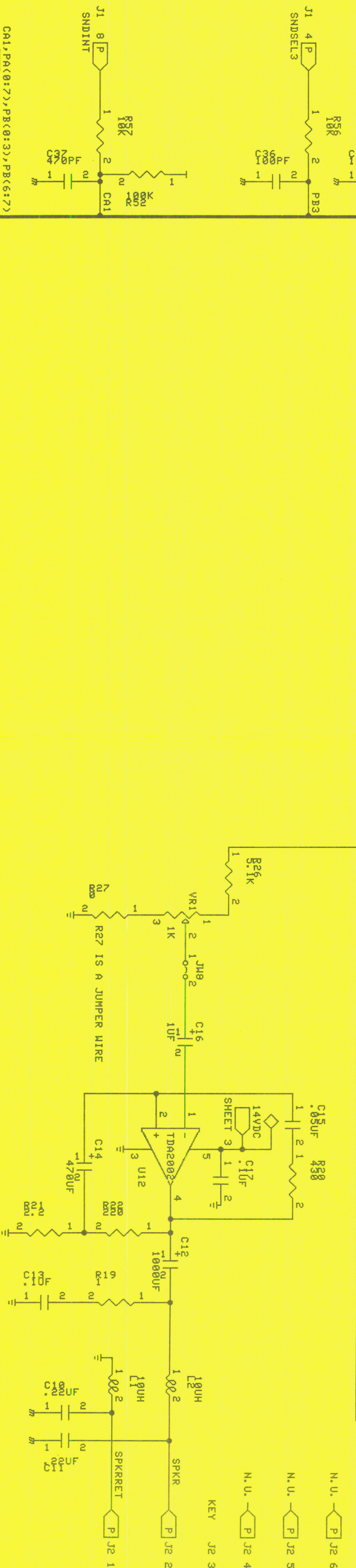
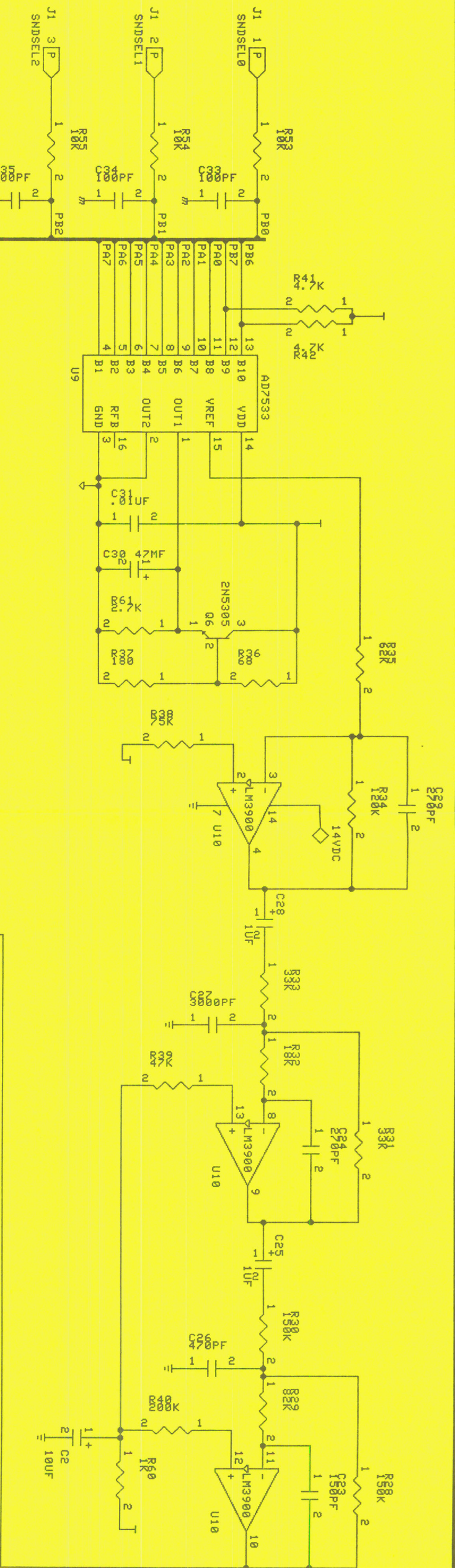
DESCRIPTION	QTY.	DESIGNATION NO.	PART NOS.
1K OHM POT	1	VR1	0360-00804-0003
10 UH INDUCTOR	2	L1,L2	0360-00804-0031
1N958B DIODE	1	D4	103E-00001-0002
1N4004 DIODE	2	D2,D3	103E-00003-0005
1N4606 DIODE	3	D5-D7	103E-00002-0006
VR330 DIODE	1	D1	0360-00801-0007
LED, GREEN	1	LED1	119E-00001-0001
2N3904	2	Q1,Q3	104E-00001-0006
2N4403	2	Q2,Q4	104E-00002-0006
2N5305	2	Q6,Q8	0360-00802-0012
MPS3646	1	Q7	104E-00001-0019
COSC, 8 MHZ	1	OSC1	119E-00002-0009
6116 2KX8 RAM 200NS.	1	IC U6	0304-00803-0057
74LS00	1	IC U2	0A15-00803-0046
74LS02	1	IC U3	0986-00803-7400
74LS76	1	IC U1	0A15-00803-0072
74LS139	1	IC U4	0A15-00803-0051
AD7533	1	IC U9	0304-00803-0055
LM3900	1	IC U10	0360-00803-0002
MC68809E	1	IC U5	0C48-00803-0001
MC68821	1	IC U8	0A15-00803-0074
MC7805	1	IC U13	0360-00803-0050
PROG EPROM	1	U7	SEE ROM/EPROM SHEET
TDA2002	1	IC U12	0360-00803-0009
16 PIN I.C. SOCKET	1	ICS U9	110E-00001-0003
28 PIN I.C. SOCKET	2	ICS U6,U7	110E-00001-0010
40 PIN I.C. SOCKET	2	ICS U5,U8	110E-00001-0011
6030B-TT HEAT SINK	1	HS U12	112E-00001-0011
6100B HEAT SINK	1	HS U13	0360-00804-0032
SCREW, 6-32	1	MH U12	0017-00101-0339
NUT, 6-32	1	MH U12	0017-00103-0005
WASHER, #6 STAR	1	MH U12	0017-00104-0009
SCREW, 4-40	1	MH U13	0017-00101-0731
NUT, 4-40	1	MH U13	0017-00103-0002
WASHER, #4 STAR	1	MH U13	0017-00104-0071
SIL PAD THERMAL WASHER	2	INS U12,U13	0017-00042-0319
FERRITE BEAD	2	FB1,FB2	0316-00804-0002
SWITCH, PC. MTG.	1	SW1	0986-00804-3100

DESCRIPTION	QTY.	DESIGNATION NO.	PART NOS.
JUMPER (0 OHM RESISTOR)	9	JW1-JW8,R27	117E-00001-0003
AUTO INSERT PINS TIN .045 SQ. PIN	14	J1	0304-00804-0010
AUTO INSERT PINS TIN .045 SQ. PIN	5	J2	0304-00804-0010
TEST POINTS	2	TP1 TP2	0017-00007-0131

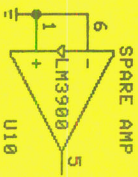
P.C. BOARD	A080-91855-C000
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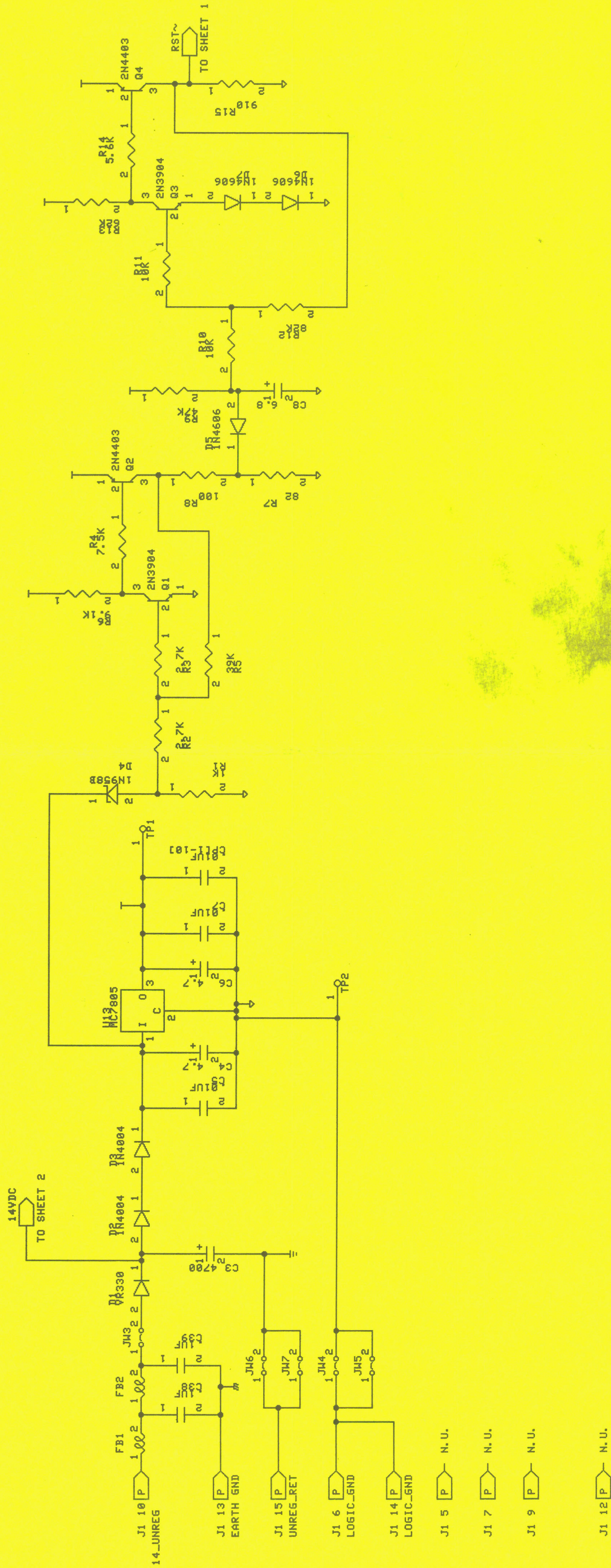
NOTES:	BALLY MIDWAY MFG. CO.
C. MEDNICK	PINBALL TURBO CHEAP SQUEAK
04 APR 86	M051-00114-C147
	A084-91855-C000
	SHEET 1 OF 3 REV



CA1,PA(0:7),PB(0:3),PB(6:7)
FROM SHEET 1

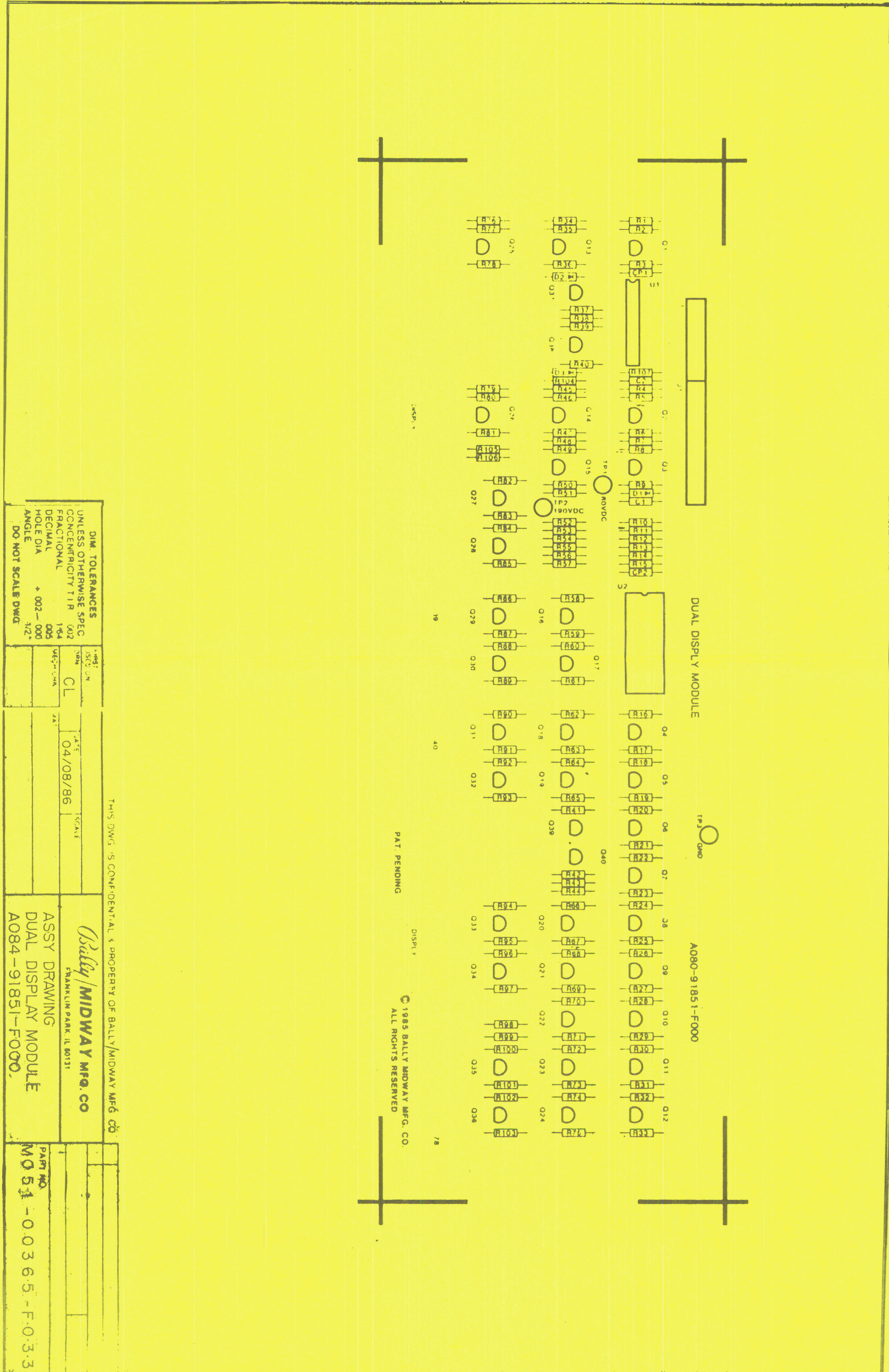


4/22/86 Reversed numbering of J2		NOTES:	
C. MEDNICK		BALLY MIDWAY MFG. CO.	
04 APR 86		PINBALL TURBO CHEAP SQUEAK	
		M051-00114-C147	
		A084-91855-C000	
		SHEET 2 OF 3 REV	



NOTES:	BALLY MIDWAY MFG. CO.
C. MEDNICK	PINBALL TURBO CHEAP SQUEAK
04 APR 86	
	M051-00114-C147
	A084-91855-C000
	SHEET 3 OF 3 REV

LAST USED: C43,CPI0,D7,FB5,J2,JH8,L2,LED1,OSC1,Q9,R64,SH1,TP2,U14,VR1
NOT INSERTED: C1,C9,C18-C22,C40-C43,FB3-FB5,Q5,Q9,R16-R18,R23,R25,R62-R64,U11,U14
NOT USED: R58,R59



DIM. TOLERANCES	
UNLESS OTHERWISE SPEC	
CONCENTRICITY TIR	0.02
FRACTIONAL	1/64
DECIMAL	0.005
HOLE DIA	+ 0.02 - 0.00
ANGLE	1/2°
DO NOT SCALE DWG	

ISO ON	CL
DATE	04/08/86
SCALE	

ASSY DRAWING
DUAL DISPLAY MODULE
A084-91851-F000

PART NO.
M051-00365-F0033

THIS DWG. IS CONFIDENTIAL & PROPERTY OF BALLY/MIDWAY MFG CO.

DESIGNATION LIST

DESIGNATION NO.

R1
R2
R3
R4
R5
R6
R7
R8
R9
R10 - R15
R16
R17
R18
R19
R20
R21
R22
R23
R24
R25
R26
R27
R28
R29
R30
R31
R32
R33
R34
R35
R36
R37
R38
R39
R40
R41
R42
R43
R44
R45
R46
R47
R48
R49
R50
R51
R52 - R57
R58

DESCRIPTION

1.5K 1/4W 5% CARBON
820 OHM 1/4W 5% CARBON
300K 1/4W 5% CARBON
1.5K 1/4W 5% CARBON
510 OHM 1/4W 5% CARBON
300K 1/4W 5% CARBON
1.5K 1/4W 5% CARBON
820 OHM 1/4W 5% CARBON
300K 1/4W 5% CARBON
20K 1/4W 5% CARBON
9.1K 1/4W 5% CARBON
100K 1/4W 5% METAL FILM
2.2K 1/4W 5% CARBON
300K 1/4W 5% CARBON
9.1K 1/4W 5% CARBON
100K 1/4W 5% METAL FILM
2.2K 1/4W 5% CARBON
300K 1/4W 5% CARBON
9.1K 1/4W 5% CARBON
100K 1/4W 5% METAL FILM
2.2K 1/4W 5% CARBON
300K 1/4W 5% CARBON
9.1K 1/4W 5% CARBON
100K 1/4W 5% METAL FILM
2.2K 1/4W 5% CARBON
300K 1/4W 5% CARBON
1.5K 1/4W 5% CARBON
820 OHM 1/4W 5% CARBON
300K 1/4W 5% CARBON
300K 1/4W 5% CARBON
1.5K 1/4W 5% CARBON
1K 1/4W 5% CARBON
100K 1/4W 5% CARBON
100K 1/4W 5% CARBON
1K 1/4W 5% CARBON
1.5K 1/4W 5% CARBON
300K 1/4W 5% CARBON
1.5K 1/4W 5% CARBON
820 OHM 1/4W 5% CARBON
300K 1/4W 5% CARBON
1.5K 1/4W 5% CARBON
820 OHM 1/4W 5% CARBON
300K 1/4W 5% CARBON
1.5K 1/4W 5% CARBON
300K 1/4W 5% CARBON
100K 1/4W 5% CARBON
2.2M 1/4W 5% METAL FILM
9.1K 1/4W 5% CARBON

DESIGNATION LIST

DESIGNATION NO.

R59
R60
R61
R62
R63
R64
R65
R66
R67
R68
R69
R70
R71
R72
R73
R74
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R94
R95
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R99
R100
R101
R102
R103
R104
R105
R106
R107

DESCRIPTION

100K 1/4W 5% METAL FILM
100K 1/4W 5% METAL FILM
9.1K 1/4W 5% CARBON
9.1K 1/4W 5% CARBON
100K 1/4W 5% METAL FILM
9.1K 1/4W 5% CARBON
100K 1/4W 5% METAL FILM
9.1K 1/4W 5% CARBON
100K 1/4W 5% METAL FILM
9.1K 1/4W 5% CARBON
100K 1/4W 5% METAL FILM
300K 1/4W 5% CARBON
2.2K 1/4W 5% CARBON
300K 1/4W 5% CARBON
2.2K 1/4W 5% CARBON
300K 1/4W 5% CARBON
2.2K 1/4W 5% CARBON
1.5K 1/4W 5% CARBON
820 OHM 1/4W 5% CARBON
300K 1/4W 5% CARBON
1.5K 1/4W 5% CARBON
820 OHM 1/4W 5% CARBON
300K 1/4W 5% CARBON
300K 1/4W 5% CARBON
2.2K 1/4W 5% CARBON
100K 1/4W 5% METAL FILM
9.1K 1/4W 5% CARBON
300K 1/4W 5% CARBON
2.2K 1/4W 5% CARBON
2.2K 1/4W 5% CARBON
300K 1/4W 5% CARBON
300K 1/4W 5% CARBON
2.2K 1/4W 5% CARBON
300K 1/4W 5% CARBON
2.2K 1/4W 5% CARBON
10M 1/4W 5% CARBON
1M 1/4W 5% CARBON
300K 1/4W 5% CARBON
2.2K 1/4W 5% CARBON
100K 1/4W 5% METAL FILM
9.1K 1/4W 5% CARBON
150K 1/4W 5% CARBON
10M 1/4W 5% CARBON
1M 1/4W 5% CARBON
10K 1/4W 5% CARBON

DESIGNATION LIST

DESIGNATION NO.

DESCRIPTION

C1 .01UF 500V CER.
C2 100PF 50V AX. CER.
CP1, CP2 .01UF 50V CER.
D1 1M10ZS10 110V ZENER DIODE
D2,D3 1N4148 DIODE
Q1 - Q4 MPS-A-42 NPN XSTR
Q5 2N5401 PNP XSTR
Q6 MPS-A-42
Q7 2N5401
Q8 MPS-A-42
Q9 2N5401
Q10 - Q21 MPS-A-42
Q22 - Q24 2N5401
Q25 MPS-A-42
Q26 MPS-A-42
Q27 2N5401
Q28 MPS-A-42
Q29 - Q35 2N5401
Q36 - Q40 MPS-A-42
U1 74HC373 CMOS OCTAL LATCH
U2 14514 1-16 DECODER
DISPLAY 1 14 DIGIT, 9 SEGMENT GAS DISCHARGE DISPLAY
J1 .025 SQ. PINS
TP1, TP2, TP3 TEST LOOPS
FOAM TAPE FOAM TAPE
BUMPER BUMPER
DISPLAY MTG. CLIPS DISPLAY MTG. CLIPS
SCREWS DISPLAY MTG. PROCEDURE
M051-00365- A014
A080-91851-F000 DUAL DISPLAY MODULE P.C.B.

CROSS REFERENCE LIST

DESCRIPTION QTY.

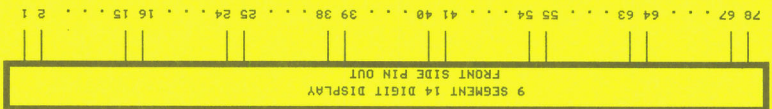
DESIGNATION NO.

PART NOS.

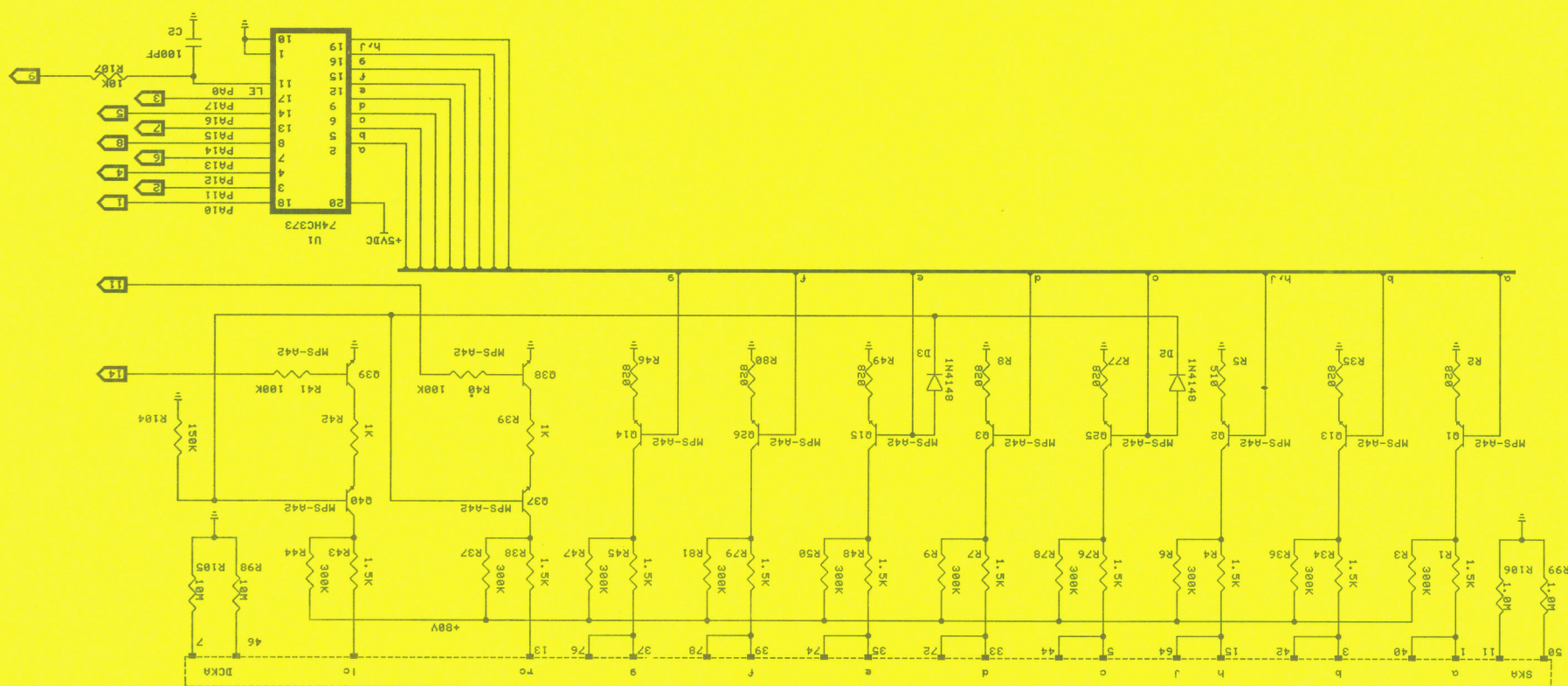
510 OHM 1/4W 5% CARBON 1
820 OHM 1/4W 5% CARBON 7
1K 1/4W 5% CARBON 2
1.5K 1/4W 5% CARBON 10
2.2K 1/4W 5% CARBON 14
9.1K 1/4W 5% CARBON 14
10K 1/4W 5% CARBON 1
20K 1/4W 5% CARBON 6
100K 1/4W 5% CARBON 2
100K 1/4W 5% METAL FILM 15
150K 1/4W 5% CARBON 1
300K 1/4W 5% CARBON 24
1.0M OHM 1/4W 5% CARBON 2
2.2M OHM 1/4W 5% CARBON 6
10.0M OHM 1/4W 5% CARBON 2
100PF AX. CER. 1
.01UF 2
.01UF 500V 1
1N4148 2
1M10ZS10 110V ZENER DIODE 1
2N5401 PNP XSTR 14

MPS-A-42 NPN XSTR 26
14514 1-16 DECODER 1
74HC373 OCTAL LATCH 1
.025SQ. PINS 23
14 DIGIT, 9 SEGMENT
GAS DISCHARGE DISPLAY 1
TEST LOOPS 3
FOAM TAPE 2
BUMPER 1
DISPLAY MTG. CLIP 2
SCREW 2
DISPLAY MTG. PROCEDURE 1
DUAL DISPLAY MODULE PCB 1

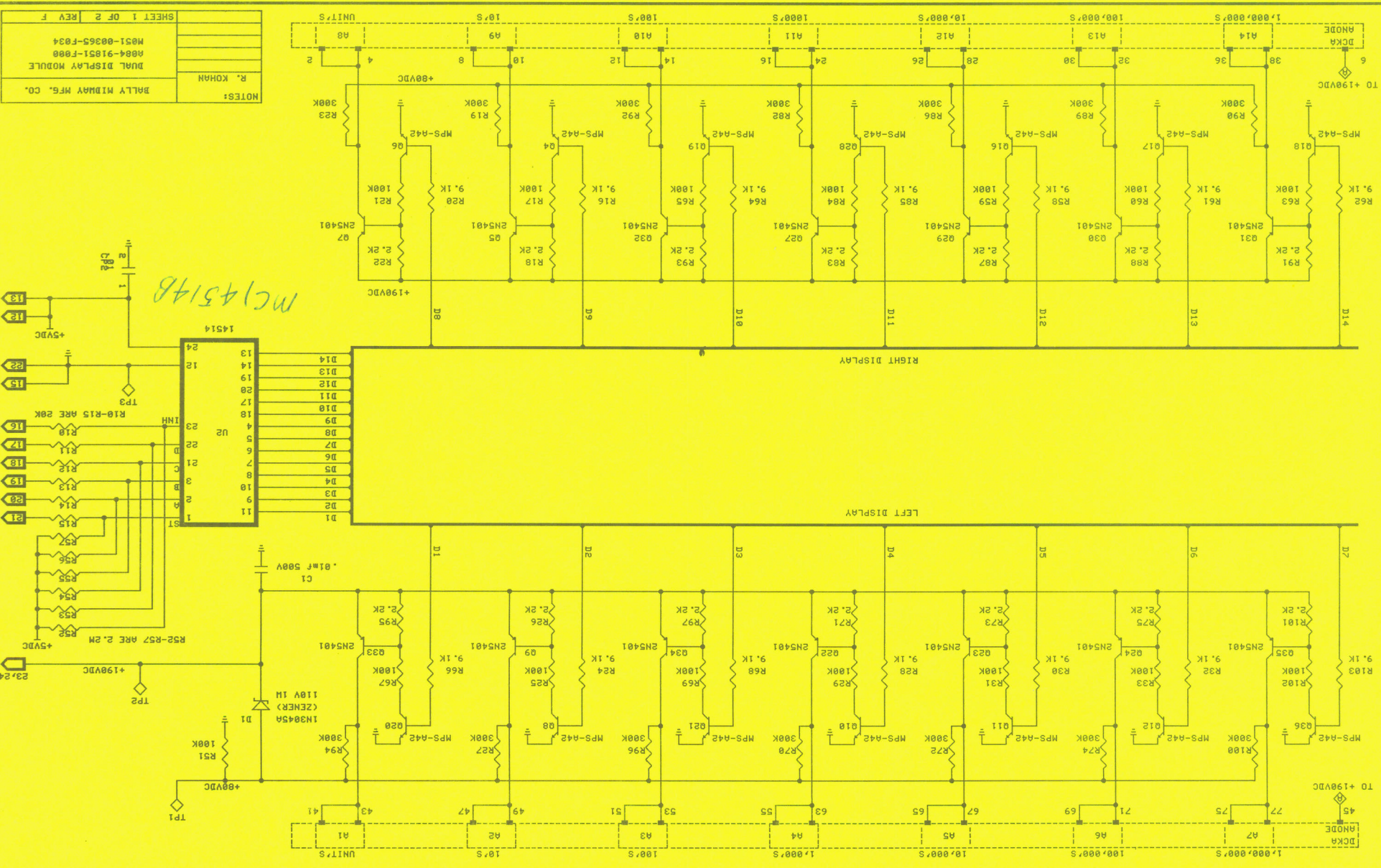
Q1-Q4, Q6, Q8, Q10- 0360-00802-0007
Q21, Q25, Q26, Q28
Q36-Q40
U2 0360-00803-0013
U1 0365-00803-0015
J1. 0304-00804-0009
DISPLAY 1 119E-00002-0006
TP1 - TP3 0017-00007-0131
0017-00081-0289
0017-00041-0598
0365-00174-00XF
0017-00101-0175
M051-00365-A014
A080-91851-F000

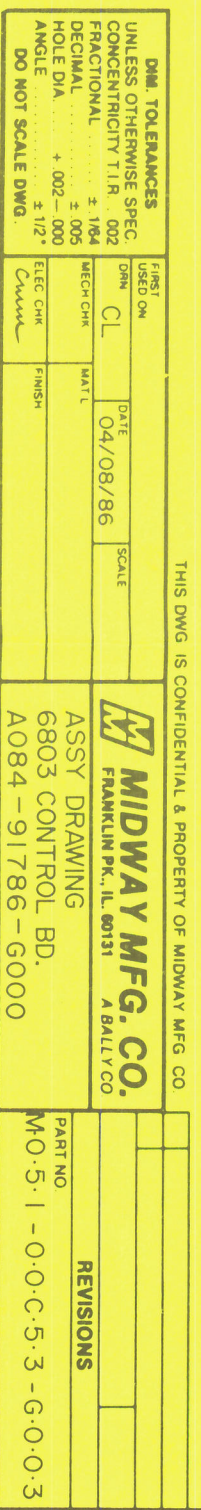


NOTES:	R. KOHAN
DUAL DISPLAY MODULE	MS31-00365-F034
MS31-00365-F034	
SHEET 2 OF 2	REV F



NOTES:	R. KOHAN
DUAL DISPLAY MODULE	MS31-00365-F034
MS31-00365-F034	
SHEET 1 OF 2	REV F





6803 CONTROL BOARD
A084-91786-G000
M051-00C53-G003

CROSS REFERENCE LIST

DESCRIPTION	QTY.	DESIGNATION NO.	PART NOS.	DESCRIPTION	QTY.	DESIGNATION NO.	PART NOS.
27pf 50V CER.	2	C2, C3	0360-00800-0052	7.5 1/4W 5%	1	R5	100E-00005-0085
47pf 50V CER.	1	C7	0360-00800-0027	9.1 1/4W 5%	1	R4	100E-00005-0087
390pf 50V CER.	25	C24-C30, C57-C71 C88-C90	0360-00800-0001	10K 1/4W 5%	4	R12, R13, R30, R33	100E-00005-0088
				15K 1/4W 5%	2	R31, R34	100E-00005-0092
470pf 1KV CER.	27	C17-C23, C31-C36, C91	0307-00800-0008	39K 1/4W 5%	1	R7	100E-00005-0102
.002uf 1KV CER.	19	C38-C41, C48-C56, C91		47K 1/4W 5%	2	R10, R11	100E-00005-0104
.003uf 1KV CER.	1	C44-C47, C73-C87	0360-00800-0012	56K 1/4W 5%	14	R62, R64, R66, R68	100E-00005-0106
.01uf 50V CER.	24	C43	0360-00800-0025			R70, R125-R132, R229	100E-00005-0106
		C6, C9, C10, C12, C13	0365-00800-0014	62K 1/4W 5%	1	R15	100E-00005-0107
.05uf 16V CER.	1	C15, C16, C42, CP1-CP16	0360-00800-0006	82K 1/4W 5%	1	R14	100E-00005-0112
.1uf 50V CER.	1	C37	0360-00800-0008	100K 1/4W 5%	2	R26, R237	100E-00005-0115
4.7uf 25V TANT	2	C4	0360-00800-0058	270K 1/4W 5%	1	R77	100E-00005-0126
6.8uf 25V TANT	1	C5, C14	0360-00800-0008	82 OHM 1W 10%	1	R27	100E-00007-0014
470uf 16V ELEC	1	C1	0360-00800-0048				
470uf 25V ELEC	1	C8	0360-00800-0022	IN958R ZENER	1	D1	103E-00001-0002
82 OHM 1/4W 5%	1	C11	0360-00800-0024	IN4004	20	D19-D38	103E-00003-0005
100 OHM 1/4W 5%	1	R9	100E-00005-0031	IN4148	13	D3, D6, D9-D18, D39	103E-00002-0005
110 OHM 1/4W 5%	1	R8	100E-00005-0033	IN4606	5	D2, D4, D5, D7, D8	103E-00002-0006
120 OHM 1/4W 5%	21	R83	100E-00005-0034	2N3904	3	O2, O4, O6	104E-00001-0006
		R24, R85, R87, R89, R91, R121, R136-R138	100E-00005-0035	2N4403	2	O3, O5	104E-00002-0006
				2N5060	35	O23-O33, O37, O41-O50, O51-O53	104E-00015-0001

CROSS REFERENCE LIST

DESCRIPTION	QTY.	DESIGNATION NO.	PART NOS.
7.5 1/4W 5%	1	R5	100E-00005-0085
9.1 1/4W 5%	1	R4	100E-00005-0087
10K 1/4W 5%	4	R12, R13, R30, R33	100E-00005-0088
15K 1/4W 5%	2	R31, R34	100E-00005-0092
39K 1/4W 5%	1	R7	100E-00005-0102
47K 1/4W 5%	2	R10, R11	100E-00005-0104
56K 1/4W 5%	14	R62, R64, R66, R68 R70, R125-R132, R229	100E-00005-0106
62K 1/4W 5%	1	R15	100E-00005-0107
82K 1/4W 5%	1	R14	100E-00005-0112
100K 1/4W 5%	2	R26, R237	100E-00005-0115
270K 1/4W 5%	1	R77	100E-00005-0122
82 OHM 1W 10%	1	R27	100E-00007-0014
IN958R ZENER	1	D1	103E-00001-0002
IN4004	20	D19-D38	103E-00003-0005
IN4148	13	D3, D6, D9-D18, D39	103E-00002-0005
IN4606	5	D2, D4, D5, D7, D8	103E-00002-0006
2N3904	3	D2, D4, D6	104E-00001-0006
2N4403	2	D3, D5	104E-00002-0006
2N5060	35	D23-D33, D37, D41-D50, D54-D64, D69, D70	104E-00015-0001
2N5305	1	D1	104E-00007-0003
MCR106-1	10	D34-D36, D51-D53 D65-D68	0360-00802-0009
SE9302	19	D7-D22, D38-D40	0360-00802-0008
4011	1	U11	0360-00803-0010
4502	1	U13	0360-00803-0005
4514B	3	U15-U17	0360-00803-0013
4584	1	U12	0066-090RX-XXDX
6116 RAM	1	U4	0365-00803-0013
6803 MPU	1	U1	0360-00803-0048
6821 PIA	2	U7, U8	0360-00803-0017
74LS04	1	U10	0A15-00803-0010
74LS10	1	U9	0A89-00803-0007
75LS154	1	U14	0360-00803-0024
74HCT245	1	U5	0365-00803-0014
74LS373	1	U6	0A89-00803-0006
CA3081	3	U18-U20	0360-00803-0007
3.580 MHZ CRYSTAL	1	XTAL-1	109F-00001-0003
LED GREEN	1	LED 1	0017-00007-0131
TEST POINTS	7	TP1-TP7	0017-00007-0131
SWITCH P.R.	1	SW1	0017-00032-0038
BATTERY 3.6V	1	BATT-1	0017-00003-0172
ZERO OHM RES. JUMPER	5	JW2, JW4, JW6, JW8, JW10	117E-00001-0001
RELAY 48VDC	1	K1	114E-00001-0011
40 PIN I.C. SOCKET	3	XU1, XU7, XU8	110E-00001-0011
28 PIN I.C. SOCKET	2	XU2, XU3	110E-00001-0010
24 PIN I.C. SOCKET	1	XU4	110E-00001-0007
FERRITE BEAD	4	FR1-FR4	0316-00804-0002

DESIGNATION LIST

6803 CONTROL BOARD
A084-91786-G000
M051-00C53-G003

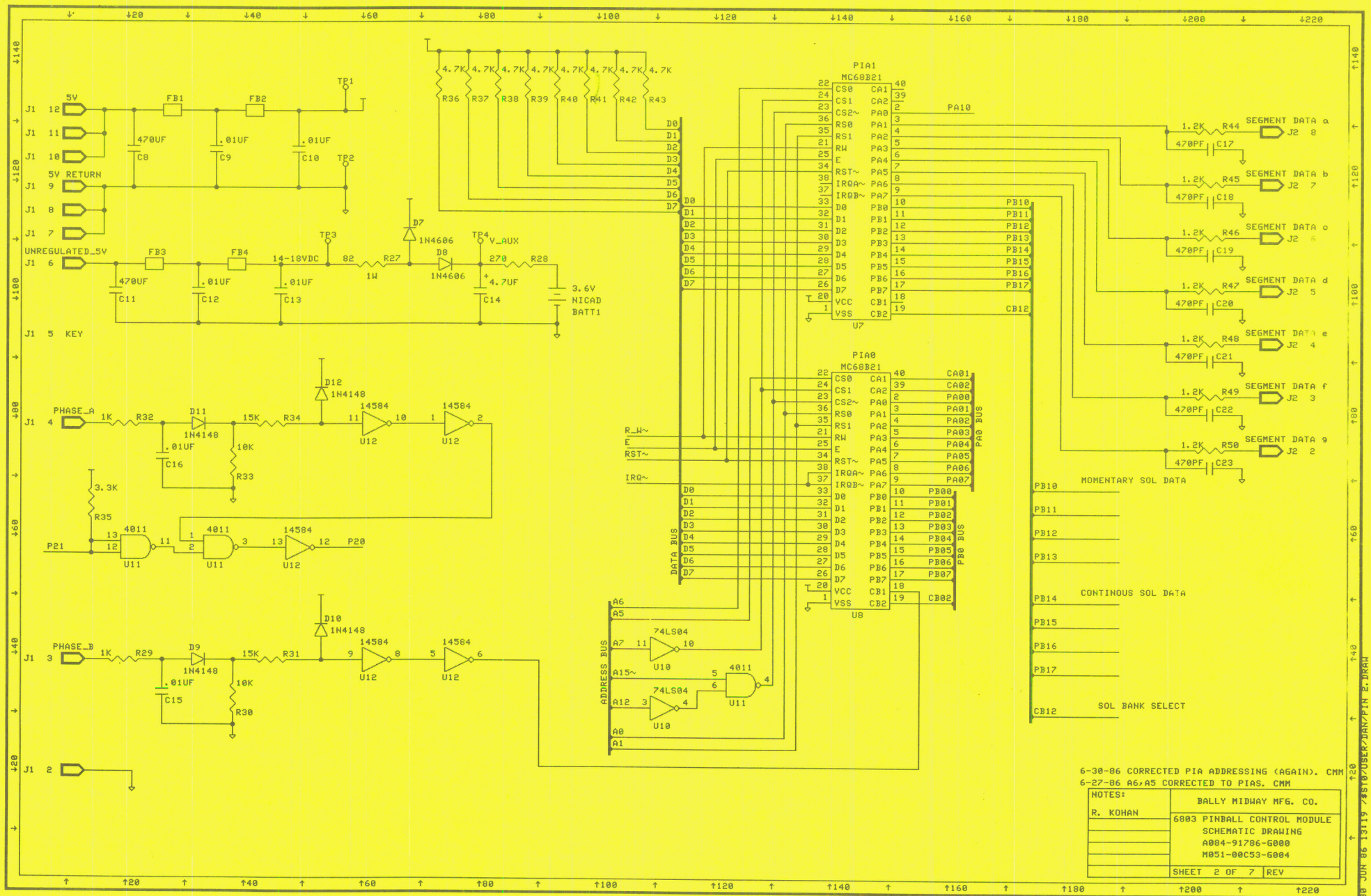
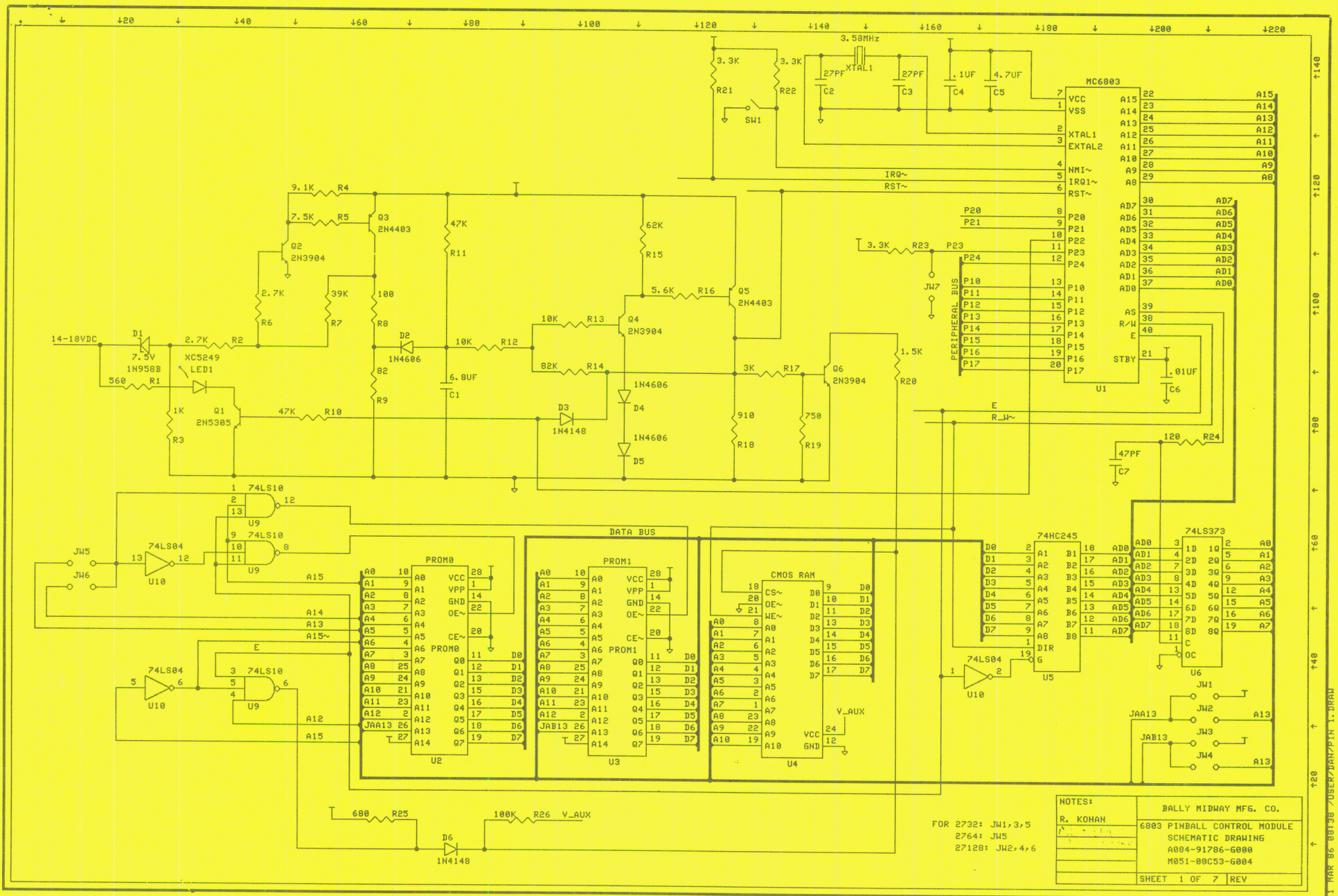
DESIGNATION	DESCRIPTION	DESIGNATION	DESCRIPTION	DESIGNATION	DESCRIPTION	DESIGNATION	DESCRIPTION
C1	6.8UF 25V TANT.	R28	270 OHM 1/4W 5%	R165 - R168	120 OHM 1/4W 5%	U15 - U17	4514B
C2,C3	27PF 50V CER.	R29	1K 1/4W 5%	R169 - R172	330 OHM 1/4W 5%	U18 - U20	CA3081
C4	.1UF 50V CER.	R30	10K 1/4W 5%	R173 - R187	2K 1/4W 5%	XTAL-1	3.580 MHZ CRYSTAL
C5	4.7UF 25V TANT.	R31	15K 1/4W 5%	R188 - R190	1.2K 1/4W 5%	LED 1	LED GREEN
C6	.01UF 50V CER.	R32	1K 1/4W 5%	R191 - R193	120 OHM 1/4W 5%	TP1 - TP7	TEST POINTS
C7	47PF 50V CER.	R33	10K 1/4W 5%	R194 - R196	330 OHM 1/4W 5%	SW1	SWITCH P.B.
C8	470UF 16V FLEC.	R34	15K 1/4W 5%	R197 - R226	2K 1/4W 5%	BATT-1	BATTERY 3.6V
C9,C10	.011UF 50V CER.	R35	3.3K 1/4W 5%	R227,R228	1.2K 1/4W 5%	JW2	ZERO OHM RES. JUMPER
C11	470UF 25V FLEC.	R36 - R43	4.7K 1/4W 5%	R229	56K 1/4W 5%	JW4	ZERO OHM RES. JUMPER
C12,C13	.011UF 50V CER.	R44 - R50	1.2K 1/4W 5%	R230	1.2K 1/4W 5%	JW6	ZERO OHM RES. JUMPER
C14	4.7UF 25V TANT.	R51 - R58	3.3K 1/4W 5%	R231 - R234	330 OHM 1/4W 5%	JW8	ZERO OHM RES. JUMPER
C15,C16	.01UF 50V CER.	R59 - R61	1.2K 1/4W 5%	R235	3.3K 1/4W 5%	JW10	ZERO OHM RES. JUMPER
C17 - C23	470PF 1KV CER.	R62	56K 1/4W 5%	R236	1.2K 1/4W 5%	K1	RELAY 48V DC
C24 - C30	390PF 50V CER.	R63	1.2K 1/4W 5%	R237	100K OHM 1/4W 5%	XU1,XU7,XU8	40 PIN IC SOCKET
C31 - C36	470PF 1KV CER.	R64	56K 1/4W 5%	D1	1N958B	XU2, XU3	28 PIN IC SOCKET
C37	.05UF 16V CER.	R65	1.2K 1/4W 5%	D2	1N4606	XU4	24 PIN IC SOCKET
C38 - C41	470PF 1KV CER.	R66	56K 1/4W 5%	D3	1N4148	FB1 - FB4	FERRITE BEAD
C42	.01UF 50V CER.	R67	1.2K 1/4W 5%	D4,D5	1N4606	J1	11 - .045 SO. PINS
C43	.003UF 1KV CER.	R68	56K 1/4W 5%	D6	1N4148	J2	18 - .025 SO. PINS
C44 - C47	.002UF 1KV CER.	R69	1.2K 1/4W 5%	D7,D8	1N4606	J3	14 - .025 SO. PINS
C48 - C56	470PF 1KV CER.	R70	56K 1/4W 5%	D9 - D18	1N4148	J4	14 - .025 SO. PINS
C57 - C71	390PF 50V CER.	R71 - R76	1.2K 1/4W 5%	D19 - D38	1N4004	J5	14 - .025 SO. PINS
C73 - C87	.002 1KV CER.	R77	270K 1/4W 5%	D39	1N4148	J6	8 - .045 SO. PINS
C88 - C90	390PF 50V CER.	R78 - R82	1.2K 1/4W 5%	01	2N5305	J7	7 - .045 SO. PINS
C91	470PF 1KV CER.	R83	110 OHM 1/4W 5%	02	2N5305	J8	6 - .045 SO. PINS
CP1 - CP16	.01 50V CER.	R84	3.9K 1/4W 5%	03	2N4403	J9	10 - .045 SO. PINS
R1	560 OHM 1/4W 5%	R85	120 OHM 1/4W 5%	04	2N3904	J10	18 - .025 SO. PINS
R2	2.7K 1/4W 5%	R86	3.9K 1/4W 5%	05	2N4403	J11	17 - .025 SO. PINS
R3	1K 1/4W 5%	R87	120 OHM 1/4W 5%	06	2N3904	J12	16 - .025 SO. PINS
R4	9.1K 1/4W 5%	R88	3.9K 1/4W 5%	07 - 022	SE9302	J13	12 - .025 SO. PINS
R5	7.5K 1/4W 5%	R89	120 OHM 1/4W 5%	023 - 033	2N5060	J14	5 - .045 SO. PINS
R6	2.7K 1/4W 5%	R90	3.9K 1/4W 5%	034 - 036	MCR 106-1	P/O RATT-1	TY-WRAP
R7	39K 1/4W 5%	R91	120 OHM 1/4W 5%	037	2N5060	6803 CONTROL BD.	P.C. BOARD
R8	100 OHM 1/4W 5%	R92 - R95	330 OHM 1/4W 5%	038 - 040	SE9302		
R9	82 OHM 1/4W 5%	R96 - R104	470 OHM 1/4W 5%	041 - 050	2N5060		
R10,R11	47K 1/4W 5%	R105 - R119	1.2K 1/4W 5%	051 - 053	MCR 106-1		
R12,R13	10K 1/4W 5%	R121	120 OHM 1/4W 5%	054 - 064	2N5060		
R14	82K 1/4W 5%	R122	1.2K 1/4W 5%	065 - 068	MCR 106-1		
R15	62K 1/4W 5%	R123	2K 1/4W 5%	069,070	2N5060		
R16	5.6K 1/4W 5%	R124	3.3K 1/4W 5%	U1	6803		
R17	3K 1/4W 5%	R125 - R132	56K 1/4W 5%	U4	6116 RAM		
R18	910 OHM 1/4W 5%	R133 - R135	1.2K 1/4W 5%	U5	74HCT245		
R19	750 OHM 1/4W 5%	R136 - R138	120 OHM 1/4W 5%	U6	74LS373		
R20	1.5K 1/4W 5%	R139 - R141	330 OHM 1/4W 5%	U7,U8	6821		
R21 - R23	3.3K 1/4W 5%	R142 - R145	3.3K 1/4W 5%	U9	74LS10		
R24	120 OHM 1/4W 5%	R146 - R150	1.2K 1/4W 5%	U10	74LS04		
R25	680 OHM 1/4W 5%	R151 - R155	120 OHM 1/4W 5%	U11	4011		
R26	100K 1/4W 5%	R156 - R160	330 OHM 1/4W 5%	U12	4584		
R27	82 OHM 1W 10%	R161 - R164	1.2K OHM 1/4W 5%	U13	4502		
				U14	74LS154		

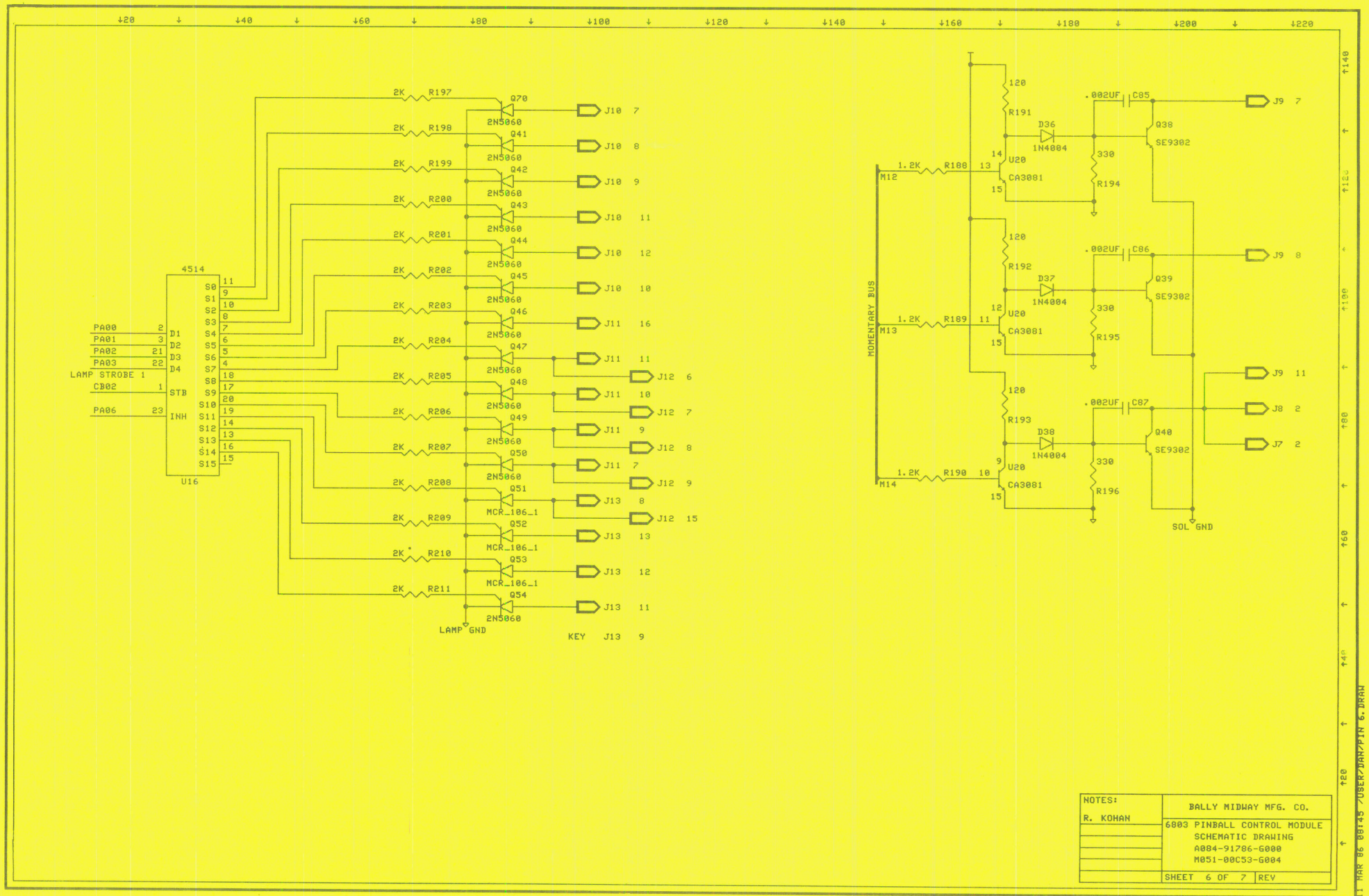
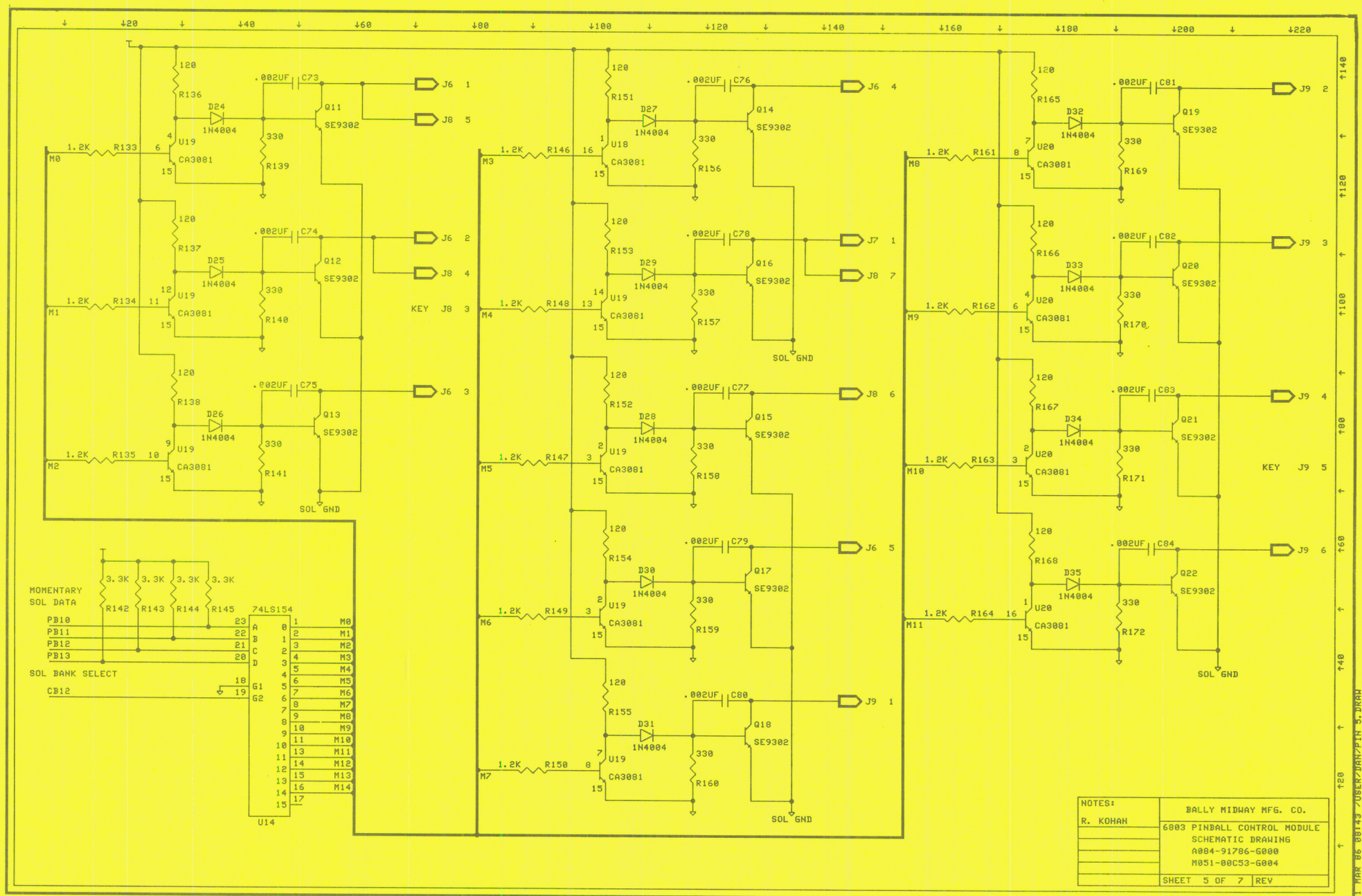
6803 CONTROL BOARD
A084-91786-G000
M051-000C53-G003

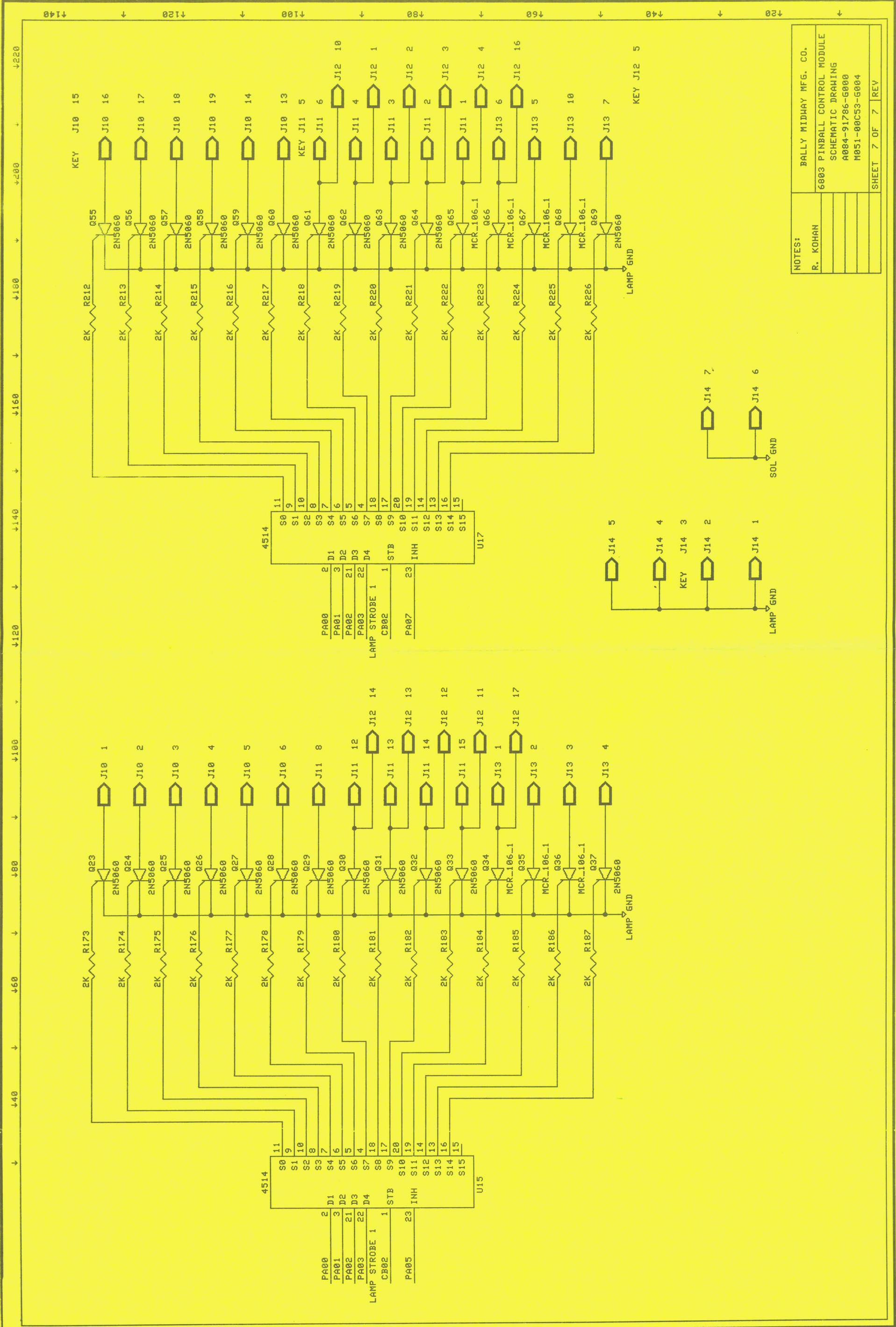
CROSS REFERENCE LIST

DESCRIPTION	QTY.	DESIGNATION NO.	PART NOS.
.025 S0. PINS	123	J2, J3, J4, J5, J10, J11, J12, J13	0304-00804-0009
.045 S0. PINS	47	J1, J6, J7, J8, J9, J14	0304-00804-0010
TY-WRAP	1	P/O BATT-1	0017-00042-0622
P.C. BOARD	1	6803 CONTROL BOARD	A080-91786-G000

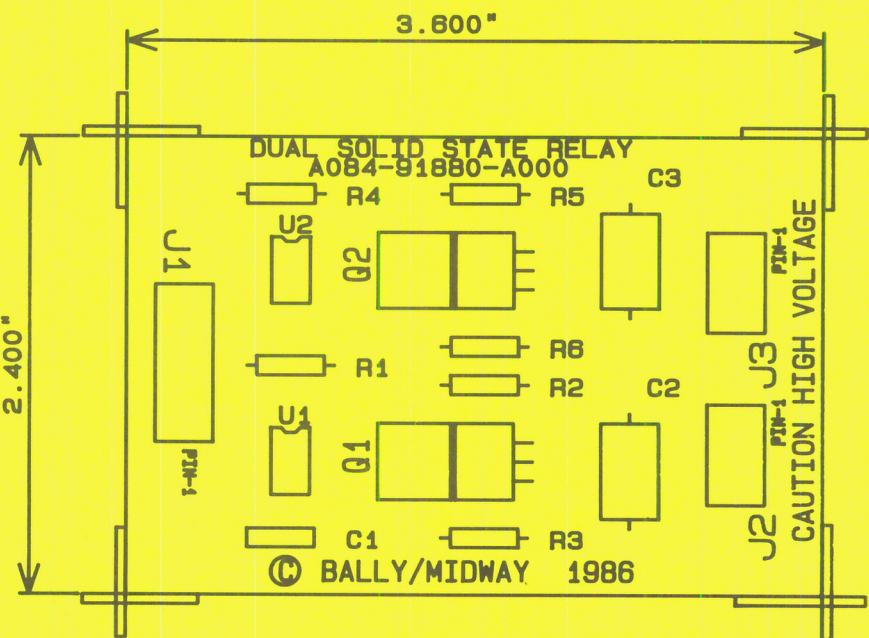
4-23-86 REV. 1.0 Fixed Part Number for 470PF Cap.







NOTES:	BALLY MIDWAY MFG. CO.
	6803 PINBALL CONTROL MODULE
	SCHEMATIC DRAWING
	A084-91786-G000
	M051-00C53-G004
SHEET 7 OF 7 REV	



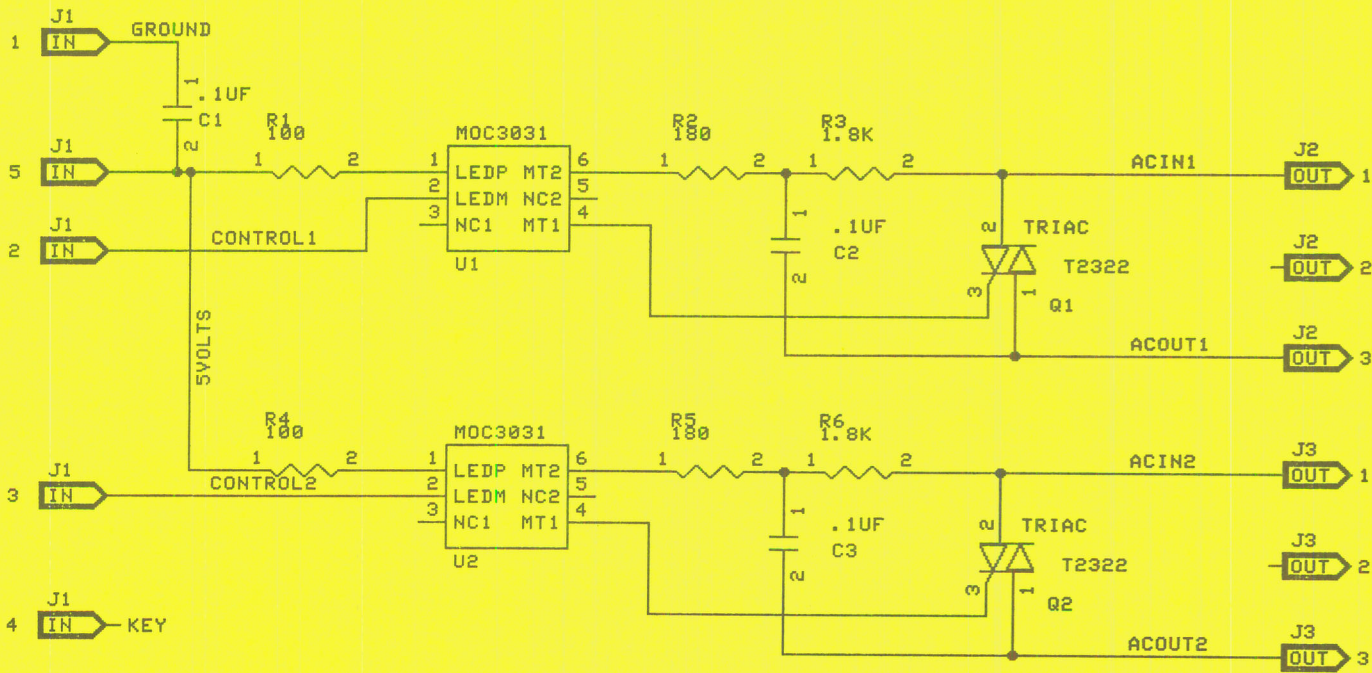
DUAL SOLID STATE RELAY BOARD
CROSS REFERENCE DESIGNATION LIST
A084-91880-A000
M051-00114-A178

DESCRIPTION	QTY	DESIGNATION	PART NUMBER
BLANK P.C.B.	1		A080-91880-A000
.1mF CAP	1	C1	0C68-00800-0005
.1mF CAP	2	C2,C3	0E35-00800-0001
100 OHM RES.	2	R1,R4	100E-00005-0033
180 OHM RES.	2	R2,R5	100E-00005-0039
1.8K OHM RES.	2	R3,R6	100E-00005-0067
TRIAC T2322-B	2	Q1,Q2	104E-00016-0015
OPTO-COUPLER MOC3031	2	U1,U2	120E-00002-0002
.045 PINS	8	J1,J2,J3	0304-00804-0010
SPACER	4		0017-00042-0020

REV. 1 CHANGED U1 AND U2 FROM MOC3011 TO MOC3031

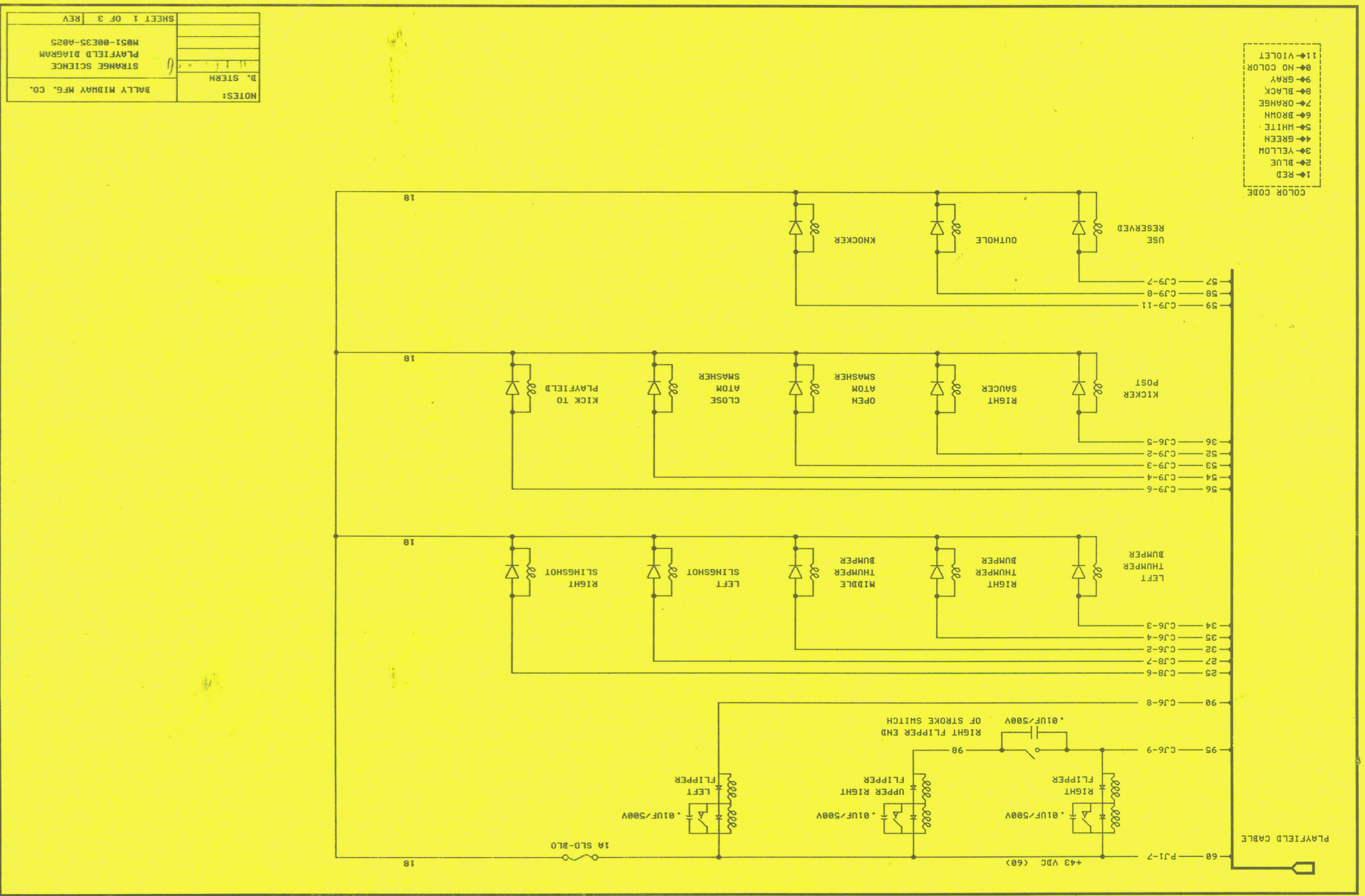
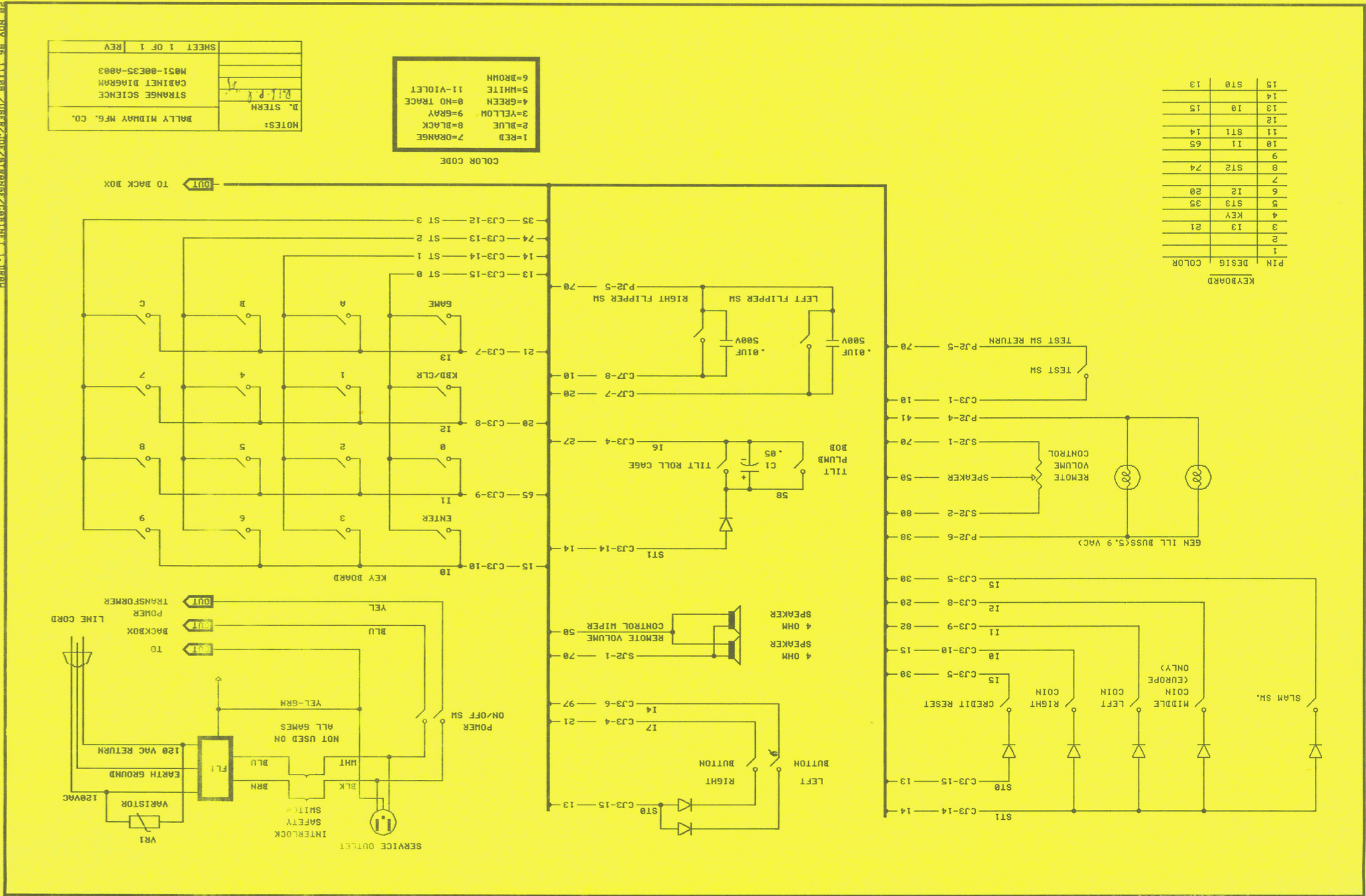
BALLY MIDWAY MFG. CO.

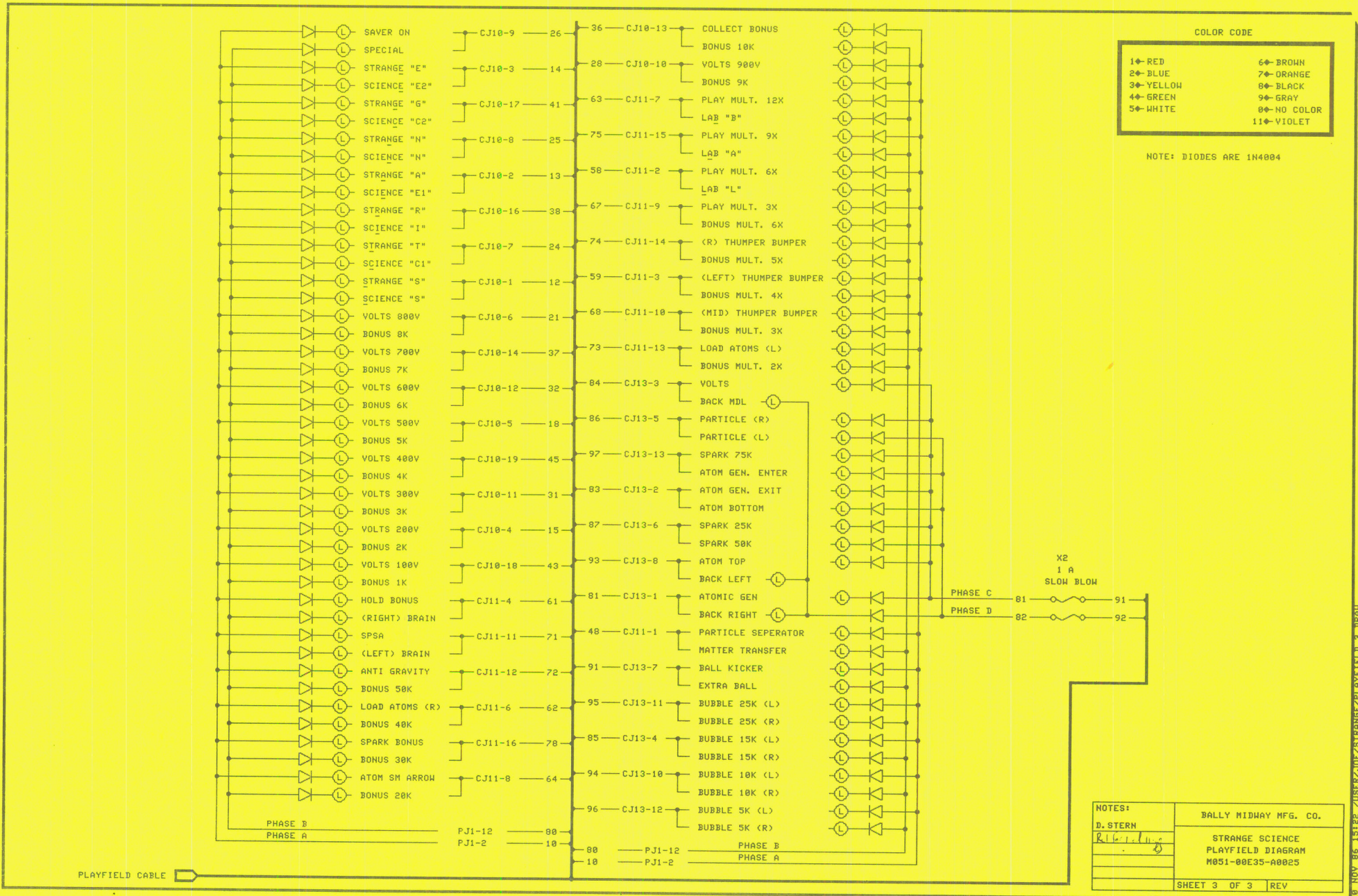
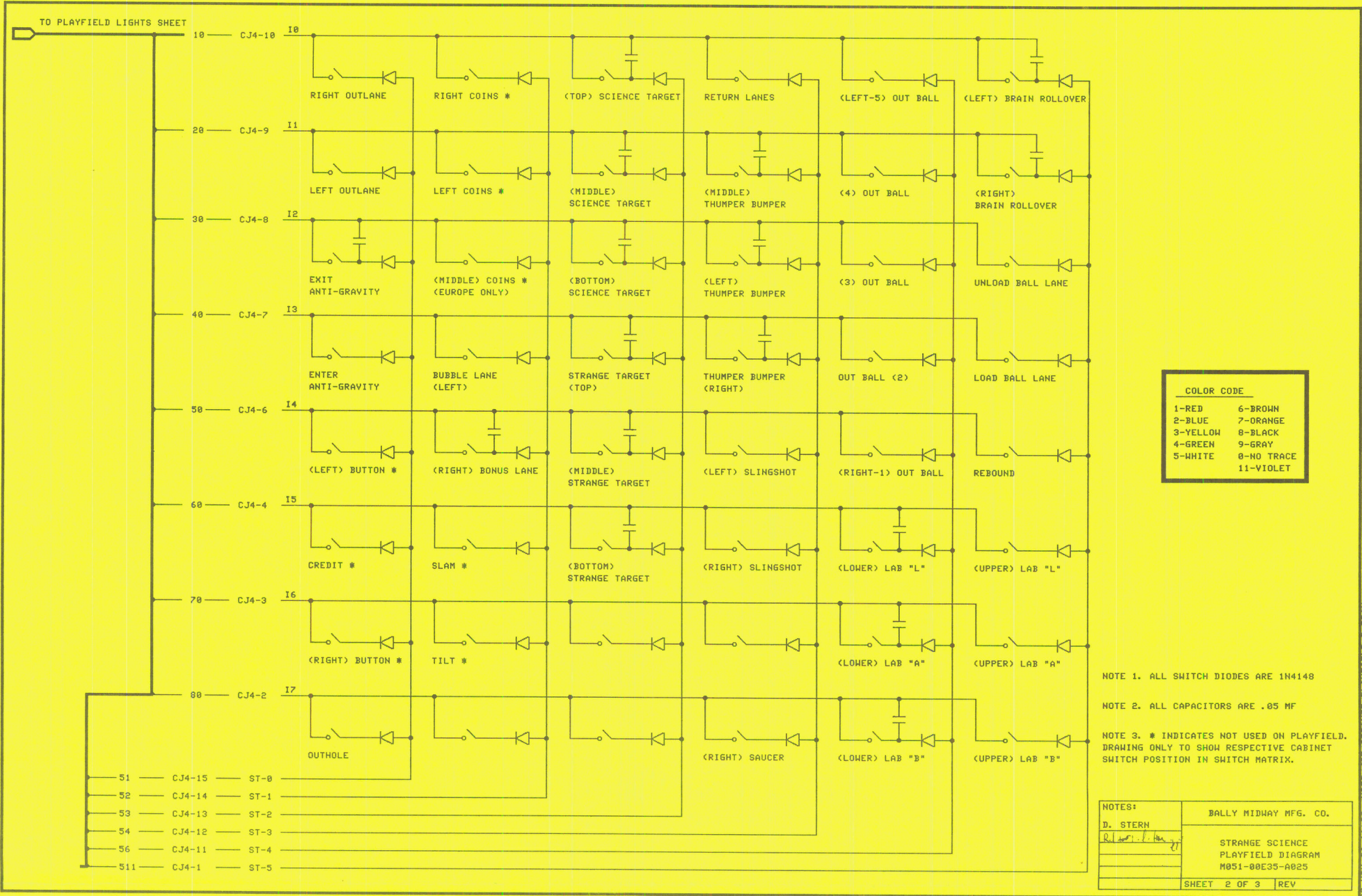
.062" FR-400	J.S. 10/21/86	ASSEMBLY DRAWING DUAL SS-RELAY PC A084-91880-A000	M051-00114-A177
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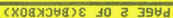


REV. 1 CHANGED FROM MOC3011 TO MOC3031

NOTES:	BALLY MIDWAY MFG. CO.
R. A. PLOUSSARD	
NOV 05 1986	DUAL SOLID STATE RELAY
	A084-91880-A000
	M051-00114-A179
	SHEET 1 OF 1
	REV







DISPLAYS-D

PLYR 1&2

D1J1

12	—	CJ2-9	—	1
13	—	CJ2-8	—	2
14	—	CJ2-2	—	3
15	—	CJ2-7	—	4
18	—	CJ2-3	—	5
20	—	CJ2-6	—	6
21	—	CJ2-4	—	7
23	—	CJ2-5	—	8
24	—	CJ2-13	—	9
KEY	—	KEY	—	10
18	—	CJ2-3	—	11
28	—	PJ4-7	—	12
N/U	—	N/U	—	13
14	—	CJ2-2	—	14
N/U	—	N/U	—	15
30	—	CJ2-1	—	16
31	—	CJ2-18	—	17
32	—	CJ2-17	—	18
34	—	CJ2-16	—	19
35	—	CJ2-14	—	20
24	—	CJ2-13	—	21
40	—	PJ4-6	—	22
10	—	PJ4-9	—	23
N/U	—	N/U	—	24

PLYR 3&4

D2J1

12	—	CJ2-9	—	1
13	—	CJ2-8	—	2
14	—	CJ2-2	—	3
15	—	CJ2-7	—	4
18	—	CJ2-3	—	5
20	—	CJ2-6	—	6
21	—	CJ2-4	—	7
23	—	CJ2-5	—	8
38	—	CJ2-12	—	9
KEY	—	KEY	—	10
23	—	CJ2-5	—	11
28	—	PJ4-7	—	12
N/U	—	N/U	—	13
21	—	CJ2-4	—	14
N/U	—	N/U	—	15
30	—	CJ2-1	—	16
31	—	CJ2-18	—	17
32	—	CJ2-17	—	18
34	—	CJ2-16	—	19
35	—	CJ2-14	—	20
24	—	CJ2-13	—	21
40	—	PJ4-6	—	22
10	—	PJ4-9	—	23
N/U	—	N/U	—	24

SOUND MODULE-S

SJ1

20	1	—	CJ5-7
25	2	—	CJ5-8
28	3	—	CJ5-9
21	4	—	CJ5-10
5	—	—	—
40	6	—	PJ4-6
10	7	—	PJ4-3
27	8	—	CJ5-15
9	—	—	—
98	10	—	PJ3-7
11	—	KEY	—
12	—	—	—
13	—	—	—
14	—	—	—
50	15	—	PJ4-4

SJ2

6	5	4	3	2	1
---	---	---	---	---	---

70 80

TO CABINET

PAGE 3 OF 3(BACKBOX)

COLOR CODE			
1 - RED	6 - BROWN		
2 - BLUE	7 - ORANGE		
3 - YELLOW	8 - BLACK		
4 - GREEN	9 - GRAY		
5 - WHITE	0 - NO TRACE		
	11 - VIOLET		

NOTES:

D. STERN

Delaney

STRANGE SCIENCE
BACKBOX

M051-00E35-A026

BALLY MIDWAY MFG. CO.

SHEET 3 OF 3 REV

STRANGE SCIENCE LAMP & SOLENOID DRIVER LOCATIONS LISTING
M051-Q0E35-A014

LAMP DRIVER LOCATIONS

DRIVER	CONNECTOR	PIN	PHASE	WIRE	DESCRIPTION
Q52	J13	13	D	97	A-G. ENTRANCE
Q35	J13	2	C	83	A-G. EXIT
Q30	J11	12	A	72	ANTI GRAVITY
Q35	J13	2	D	83	ATOM BOTTOM
Q29	J11	8	A	64	ATOM SM ARROW
Q51	J13	8	C	93	ATOM TOP
Q34	J13	1	C	81	ATOMIC GEN
Q51	J13	8	D	93	BACK LEFT
Q36	J13	3	D	84	BACK MIDDLE
Q34	J13	1	D	81	BACK RIGHT
Q69	J13	7	A	91	BALL KICKER
Q57	J10	18	B	43	BONUS 1K
Q26	J10	4	B	15	BONUS 2K
Q43	J10	11	B	31	BONUS 3K
Q58	J10	19	B	45	BONUS 4K
Q27	J10	5	B	18	BONUS 5K
Q44	J10	12	B	32	BONUS 6K
Q59	J10	14	B	37	BONUS 7K
Q28	J10	6	B	21	BONUS 8K
Q45	J10	10	B	28	BONUS 9K
Q60	J10	13	B	36	BONUS 10K
Q29	J11	8	B	64	BONUS 20K
Q46	J11	16	B	78	BONUS 30K
Q61	J11	6	B	62	BONUS 40K
Q30	J11	12	B	72	BONUS 50K
Q31	J11	13	B	73	BONUS MULT 2X
Q48	J11	10	B	68	BONUS MULT 3X
Q63	J11	3	B	59	BONUS MULT 4X
Q32	J11	14	B	74	BONUS MULT 5X
Q49	J11	9	B	67	BONUS MULT 6X
Q47	J11	11	B	71	BRAIN (LEFT)
Q62	J11	4	B	61	BRAIN (RIGHT)
Q53	J13	12	A	96	BUBBLE 5K (LEFT)
Q53	J13	12	B	96	BUBBLE 5K (RIGHT)
Q68	J13	12	A	94	BUBBLE 10K (LEFT)
Q68	J13	12	B	94	BUBBLE 10K (RIGHT)
Q37	J13	4	A	85	BUBBLE 15K (LEFT)
Q37	J13	4	B	85	BUBBLE 15K (RIGHT)
Q54	J13	11	A	95	BUBBLE 25K (LEFT)
Q54	J13	11	B	95	BUBBLE 25K (RIGHT)
Q60	J10	13	A	36	COLLECT BONUS
Q69	J13	7	B	91	EXTRA BALL
Q62	J11	4	A	61	HOLE BONUS
Q33	J11	15	B	75	LAB "A"

LAMP DRIVER LOCATIONS

DRIVER	CONNECTOR	PIN	PHASE	WIRE	DESCRIPTION
Q50	J11	7	B	63	LAB "B"
Q64	J11	2	B	58	LAB "L"
Q31	J11	13	A	73	LOAD ATOMS (LEFT)
Q61	J11	6	A	62	LOAD ATOMS (RIGHT)
Q65	J11	1	B	48	MATTER TRANS
Q67	J13	5	D	86	PARTICLE (LEFT)
Q67	J13	5	C	86	PARTICLE (RIGHT)
Q65	J11	1	A	48	PARTICLE SEP
Q49	J11	9	A	67	PLAY MULT 3X
Q64	J11	2	A	58	PLAY MULT 6X
Q33	J11	15	A	75	PLAY MULT 9X
Q50	J11	7	A	63	PLAY MULT 12X
Q42	J10	9	A	26	SAVER ON
Q70	J10	7	B	24	SCIENCE "C"(1)
Q56	J10	17	B	41	SCIENCE "C"(2)
Q24	J10	2	B	13	SCIENCE "E"(1)
Q25	J10	3	B	14	SCIENCE "E"(2)
Q55	J10	16	B	38	SCIENCE "I"
Q41	J10	8	B	25	SCIENCE "N"
Q23	J10	1	B	12	SCIENCE "S"
Q46	J11	16	A	78	SPARK BONUS
Q42	J10	9	B	26	SPECIAL
Q66	J13	6	C	87	SPARK 25K
Q66	J13	6	D	87	SPARK 50K
Q52	J13	13	C	97	SPARK 75K
Q47	J11	11	A	71	SPSA
Q24	J10	2	A	13	STRANGE "A"
Q25	J10	3	A	14	STRANGE "E"
Q56	J10	17	A	41	STRANGE "G"
Q41	J10	8	A	25	STRANGE "N"
Q55	J10	16	A	38	STRANGE "R"
Q23	J10	1	A	12	STRANGE "S"
Q70	J10	7	A	24	STRANGE "T"
Q63	J11	3	A	59	THUMPER BUMPER LEFT
Q48	J11	10	A	68	THUMPER BUMPER MIDDLE
Q32	J11	14	A	74	THUMPER BUMPER RIGHT
Q36	J13	3	C	84	VOLTS
Q57	J10	18	A	43	VOLTS 100V
Q26	J10	4	A	15	VOLTS 200V
Q43	J10	11	A	31	VOLTS 300V
Q58	J10	19	A	45	VOLTS 400V
Q27	J10	5	A	18	VOLTS 500V
Q44	J10	12	A	32	VOLTS 600V
Q59	J10	14	A	37	VOLTS 700V
Q28	J10	6	A	21	VOLTS 800V
Q45	J10	10	A	28	VOLTS 900V

SOLENOID DRIVER LOCATIONS

TRANSISTOR	CONNECTOR	PIN	WIRE	DESCRIPTION
Q8	J8	1	24	BACK BOX LIGHTS (THROUGH SOLID STATE RELAY BD.)
Q17	J6	5	36	BALL SAVE
Q21	J9	4	54	CLOSE ATOM SMASHER
Q22	J9	6	56	KICKER
Q40	J9	11	59	KNOCKER
Q7	J6	8	90	LEFT FLIPPER (THROUGH FLIPPER RELAY K1)
Q10	J6	7	311	NEON DISPLAY (THROUGH SOLID STATE RELAY BOARD)
Q20	J9	3	53	OPEN ATOM SMASHER
Q39	J9	8	58	OUTHOLE
Q38	J9	7	57	RESERVED FOR GERMAN USE
Q7	J6	9	95	RIGHT FLIPPER (THROUGH FLIPPER RELAY K1)
Q19	J9	2	52	SAUCER
Q16	J8	7	27	SLINGSHOT (LEFT)
Q15	J8	6	25	SLINGSHOT (RIGHT)
Q13	J6	3	34	THUMPER BUMPER (LEFT)
Q12	J6	2	32	THUMPER BUMPER (MIDDLE)
Q14	J6	4	35	THUMPER BUMPER (RIGHT)

WIRE COLOR CODE	
1-RED	6-BROWN
2-BLUE	7-ORANGE
3-YELLOW	8-BLACK
4-GREEN	9-GREY
5-WHITE	0-NO TRACER
J-JUMPER	11-VIOLET
1-FIRST NUMBER-BODY COLOR	
2-SECOND NUMBER-TRACER COLOR	
EXAMPLE: 50-WHITE	
51-WHITE-RED	

BALLY/MIDWAY'S STRANGE SCIENCE

#E35

ROM/EPROM PART NUMBERS

UNPROGRAMMED CONTROL BOARD A084-91786-G000

PROGRAMMED CONTROL BOARD A084-91786-AE35

POS.	MIDWAY PART NUMBER
U2	0E35-00803-0001
U3	0E35-00803-0002

JUMPERS	IN	OUT
JW1		**
JW2	**	
JW3		**
JW4	**	
JW5		**
JW6	**	
JW7		**
JW8		**
JW9	**	
JW10	**	
JW11		**

UNPROGRAMMED TURBO CHEAP SQUEAK FOR PINBALL A084-91855-C000

PROGRAMMED TURBO CHEAP SQUEAK FOR PINBALL A084-91855-AE35

POS.	MIDWAY PART NUMBER
U7	0E35-00803-0003

JUMPERS	IN	OUT
JW1		**
JW2	**	
JW3	**	
JW4	**	
JW5	**	
JW6	**	
JW7	**	
JW8	**	

M051-00E35-A008	REVISIONS
11-24-86	RELEASE FOR PRODUCTION

