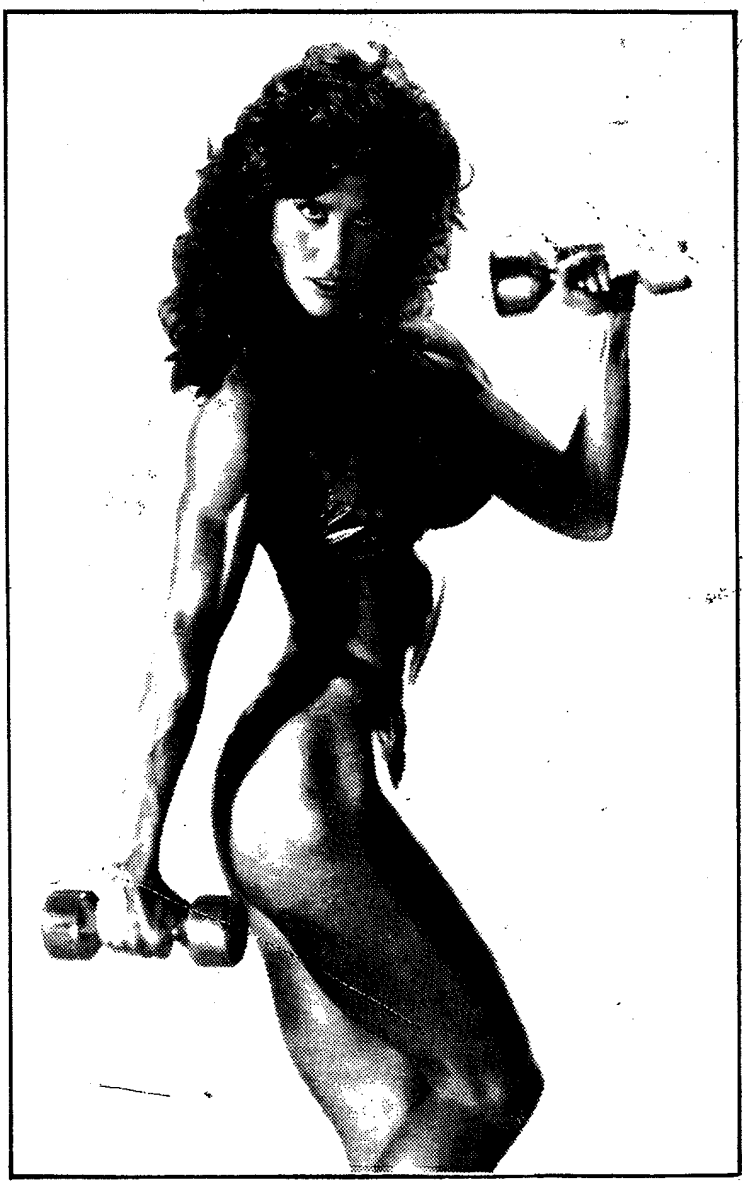
GAME 0E94
FORM NO. 0E94-00300-0100

HARDBODY™



Operating Manual

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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.

Printed in U.S.A.

HARDBODY
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BLOCK DIAGRAM—ELECTRONIC PINBALL GAME

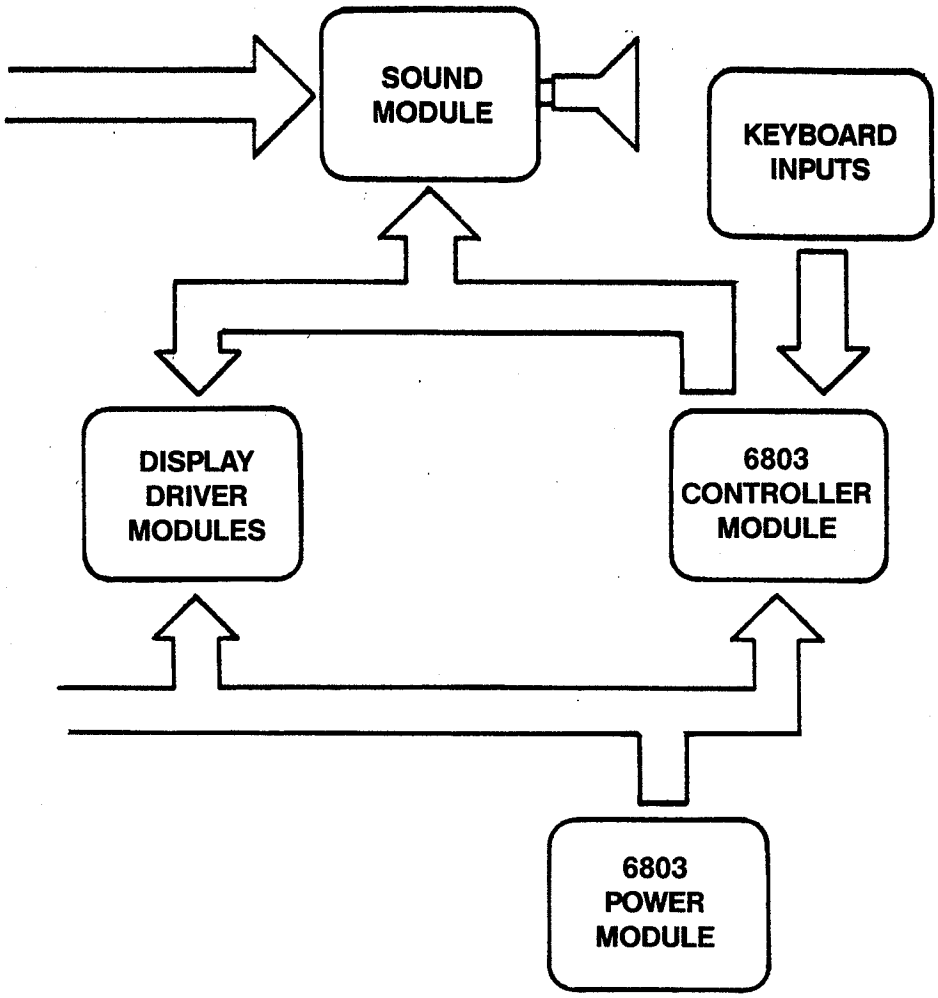


FIGURE I.

DETACHING OF PIN-GAME BACK BOX

When the back box is in an up-right positon 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 - 1 BALL"

THE PLAYFIELD BALL MUST BE INSERTED IN THE OUTHOLE TROUGH.

GAME WILL START IF THERE IS A BALL IN SHOOTER LANE IN GAME OVER MODE.

M051-00365-A055

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.

HARDBODY
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 back up, 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
HiScore Beaten	Total number of times the high score was beaten
Free Balls	# of non-timed extra balls that were awarded
Top Special	# of specials awarded by making flashing Special rollover switch
Bottom Special	# of specials awarded by completing Tournament light columns
Top Hoop Made	# of times Top Hoop ("Blaster Loop") was completed
Bottom Hoop Made	# of times Bottom Hoop was completed (to raise or lower ramps)
Lower Ramp Completed	# of times "Power Reps" Loop was completed
Novice Level	# of times "Muscle Beach" Tournament light column was completed
Amateur Level	# of times "North Shore" Tournament light column was completed
Pro Level	# of times "Hardbody" Tournament light column was completed
Inline X-balls	# of extra balls awarded by completing all inline targets
Hoop X-balls	# of "Blaster Loop" extra balls that were awarded
Ramp X-balls	# of "Power Reps" extra balls that were awarded

PERCENT OPTIONS

		FACTORY SETTINGS
Threshold 1	Enter 0 thru 9,999,999; sets award level and display	900,000
Self Percent	Enter 0 or 1; 0 disables Self-Percentaging Process, 1 enables Self-Percentaging Process	1
Target Percent	Enter desired percentage of replays awarded for reaching Threshold 1	10
Threshold 1 Percent	Displays actual percentage of replays awarded reaching Threshold 1	Unchanged
Threshold 2	Enter 0 thru 9,999,999; sets award level and display	1,800,000
Threshold 3	Enter 0 thru 9,999,999; sets award level and display	00
Highest Score	Enter 0 thru 9,999,999; sets the HiScore replay level	3,624,360

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

Center Special
Enter 0 thru 2; This entry controls number of tournament light column completions required to award special

ENTER	TOURNAMENT LIGHT COLUMN
0	3
1	2
2*	1

Inline X-ball
Enter 0 or 1*; This entry controls method of completion of inline targets required to award extra ball
0=Conservative: make all 4 inline targets to qualify flashing X-ball light; hit standing target again to award extra ball
1=Liberal: make 3 inline drop targets to qualify flashing X-ball light; hit standing target to award extra ball

Top Special Timer
Enter 0 thru 4; This entry controls length of time Top Special light remains flashing after it's activated

ENTER	LENGTH OF TIME
0	4 seconds
1	6 seconds
2*	8 seconds
3	10 seconds

Reset Top Hoop
Enter 0* or 1; This entry controls whether or not Blaster Loop's Weight Meter value is reset after this value is collected by completing all 3 orange stand-up targets
0=Reset 1=No Reset

Top Hoop Advance
Enter 0 or 1*; This entry controls whether or not Blaster Loop's Weight Meter value advances each time all 3 orange drop targets are completed
0=No Advance 1=Advance

Auto Saver
Enter 0 thru 3; This entry controls level of total game points beyond which Auto Saver feature is disabled

ENTER	GAME POINT LEVEL
0	None
1	100,000
2*	200,000
3	300,000

Circle Timer
Enter 0 thru 3; This entry controls length of time allowed for each completion of "Power Reps Loop" (with ramps raised) required to advance "Power Reps" value

ENTER	LENGTH OF TIME
0	6 seconds
1*	8 seconds
2	10 seconds
3	12 seconds

Unlimited X-balls
Enter 0 or 1*; This entry controls whether one extra ball only is awarded or an unlimited number of extra balls are awarded by completing any feature which awards extra ball
0=one extra ball 1=unlimited extra balls

Recall Station
Enter 0 or 1*; This entry recalls all station stand-up target lights
0=No Memory 1=Memory

SPSA Recall
Enter 0 or 1*; After the "Shoot Again" light is activated, all features' positions are recalled for the next new ball
0=No Memory 1=Memory

Gate On Timer
Enter 0 thru 7; This entry sets initial length of time (for each player) either manual Return Lane Gate remains closed after being activated. During game, this time length is also controlled by Control Gate Time option (See Note)

ENTER	LENGTH OF TIME
0	0.83 second
1	1.00 second
2	1.16 seconds
3	1.33 seconds
4*	1.50 seconds
5	1.66 seconds
6	1.83 seconds
7	2.00 seconds

Control Gate Time
Enter 0 thru 7*; For each player, this entry controls length of time (along with Gate On Timer option), either manual Return Lane Gate remains closed after being activated (See Note)

ENTER	RETURN LANE GATE ACTIVATED
0	6 times
1	8 times
2	10 times
3	12 times
4*	14 times
5	16 times
6	18 times
7	20 times

Game Over Attract Sound
Enter 0 thru 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

NOTE: Gate On Timer is initialized for each player at beginning of game (See Gate On Timer Option). Game counts number of times Return Lane Gates are activated by a particular player. If a match is found when compared to number of times allowed as set in Control Gate Time Option, next lower time setting in Gate On Timer Option is selected.

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	900,000	1,500,000
2nd replay at	1,800,000	3,000,000
X-BALL		
Special Mode	2	2
Match Option	0	0
High Score Mode	0	0
1st Extra Ball at	900,000	900,000
2nd Extra Ball at	1,800,000	1,800,000
NOVELTY		
Special Mode	1	1
Match Option	0	0
High Score Mode	0	0

HIGH GAME TO DATE (reset periodically)
3-BALL 3,624,360 5-BALL 3,624,360

HARDBODY OPTION SETTINGS

FEATURE OPTIONS

REGISTER	3-BALL	5-BALL
CENTER SPECIAL	2	0
INLINE X-BALL	1	0
TOP SPECIAL TIMER	2	2
RESET TOP HOOP	0	0
TOP HOOP ADVANCE	1	1
AUTO SAVER	2	2
CIRCLE TIMER	1	1
UNLIMITED X-BALLS	1	0
RECALL STATION	1	0
SPSA RECALL	1	1
GATE ON TIMER	4	4
CONTROL GATE TIME	4	4
GAME OVER ATTRACT SOUND	1	1
In Basic Options:		
SLINGSHOT	1	1
TILT WARNING	2	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) Determines 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 T.C.S. (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 (68000) 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).

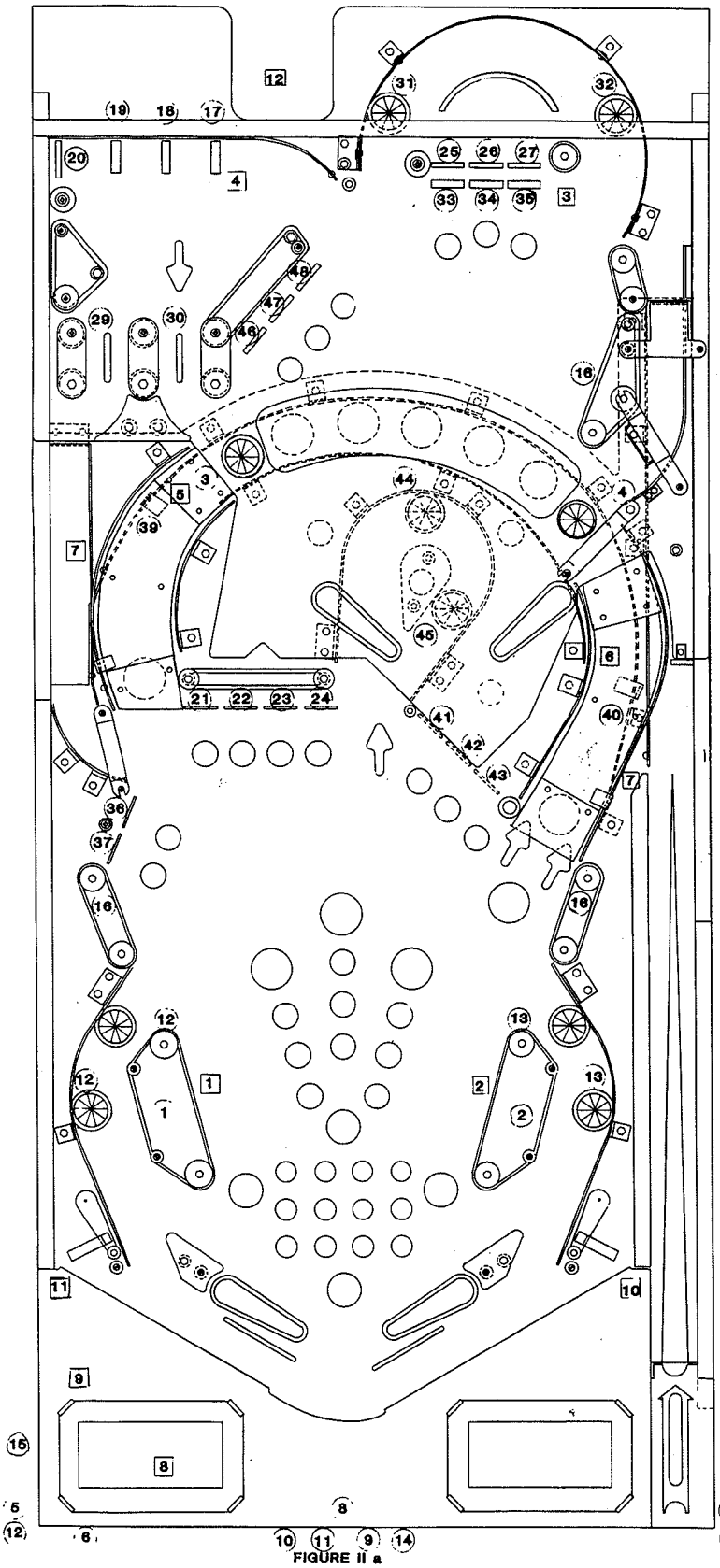


FIGURE II a

VII
OE94 HARDBODY

SOLENOID IDENTIFICATION TABLE

SELF TEST #	SEQUENCE
1	SLINGSHOT LEFT
2	SLINGSHOT RIGHT
3	ORANGE DROP TARGETS
4	IN-LINE DROP TARGETS
5	RAMP UP LEFT
6	RAMP UP RIGHT
7	RAMP DOWN
8	OUTHOLE
9	KNOCKER
10	RIGHT GATE
11	LEFT GATE
12	FLIPPER (BACKBOX)

SWITCH ASSEMBLY IDENTIFICATION TABLE

SELF TEST #	SEQUENCE
1	LEFT SLINGSHOT
2	RIGHT SLINGSHOT
3	LEFT RAMP R.O.
4	RIGHT RAMP R.O.
5	LEFT CABINET (FLIPPER)
6	NEW GAME (CABINET)
7	RIGHT CABINET (FLIPPER)
8	OUTHOLE
9	RIGHT COIN (DOOR)
10	LEFT COIN (DOOR)
11	MIDDLE COIN (DOOR)
12	LEFT RETURN LANE
13	RIGHT RETURN LANE
14	SLAM
15	TILT (CABINET)
16	REBOUND
17	IN-LINE DROP TARGET RIGHT
18	IN-LINE DROP TARGET MIDDLE
19	IN-LINE DROP TARGET LEFT
20	SWITCH BEHIND IN-LINE DROP TARGET
21	BLUE TARGET QUADS
22	BLUE TARGET HAMS
23	BLUE TARGET GLUTES
24	BLUE TARGET CALVES
25	ORANGE TARGET BICEPS
26	ORANGE TARGET TRICEPS
27	ORANGE TARGET DELTOIDS
28	NOT USED
29	TOP 50K LANE
30	TOP SPECIAL LANE
31	HOOP TOP LEFT
32	HOOP TOP RIGHT
33	ORANGE DROP TARGET BICEPS
34	ORANGE DROP TARGET TRICEPS
35	ORANGE DROP TARGET DELTOIDS
36	DOUBLE POWER
37	NORMAL POWER
38	NOT USED
39	RAMP SENSE LEFT
40	RAMP SENSE RIGHT
41	YELLOW TARGET TRANS ABS
42	YELLOW TARGET RECT ABS
43	YELLOW TARGET OBLIQUE ABS
44	HOOP MIDDLE LEFT
45	HOOP MIDDLE RIGHT
46	GREEN TARGET PECS
47	GREEN TARGET LATS
48	GREEN TARGET TRAPS

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

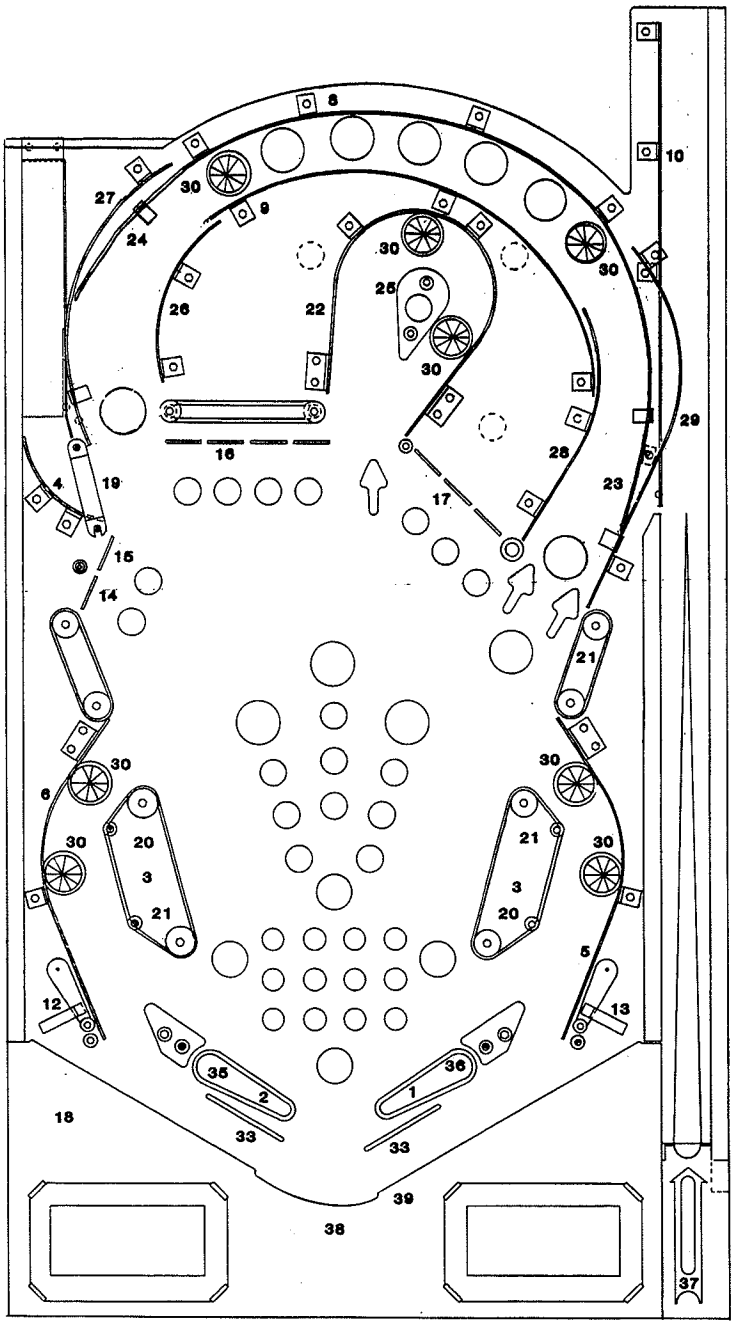


FIGURE II b

XI
OE94 HARDBODY
PANEL TOP PARTS

1.	FLIPPER ASSY. DOUBLE SW. RT.	AC70-00023-0100
2.	FLIPPER ASSY. DOUBLE SW. LT.	AC70-00023-0200
3.	SLINGSHOT KICKER ASSY.	A967-00059-0000
4.	BALL-GUIDE ASSY.: LEFT-CENTER	AE94-00017-0000
5.	BALL-GUIDE ASSY.: SPRING, RT.	AE94-00018-0000
6.	BALL-GUIDE ASSY.: SPRING, LT.	AE94-00018-0200
7.	EXIT RAMP ASSY.: LEFT	AE94-00024-0000
8.	POWER-REPS ASSY.: REAR	AE94-00025-0000
9.	POWER-REPS ASSY.: FRONT	AE94-00026-0000
10.	LANE-ENTRANCE RAIL ASSY.	AE94-00029-0000
11.	TOP PLATFORM ASSY. (SEE PAGE 1-14)	AE94-00038-0000
12.	BALL-SAVER ASSY.: LT.	AE94-00040-0000
13.	BALL-SAVER ASSY.: RT.	AE94-00041-0000
14.	TARGET, SWITCH, BRKT., DIODE & CAP: RED LG.-RT.	A365-R0300-F111
15.	TARGET, SWITCH, BRKT., DIODE & CAP: WHITE LG.-RT.	A365-R0300-F115
16.	TARGET, SWITCH, BRKT., DIODE & CAP: BLUE LG.-RT.	A365-R0300-F112
17.	TARGET, SWITCH, BRKT., DIODE & CAP: YELLOW LG.-RT.	A365-R0307-F113
18.	TOP MOUNTED KICKER-ASSY.	A360-00234-0000
19.	GATE-BRKT. & WIRE-FORM ASSY.	A967-00058-0000
20.	SWITCH W/BRKT. & PLATE ASSY.: SLINGSHOT	A360-00230-0000
21.	SWITCH W/BRKT. & DIODE ASSY.: SLINGSHOT	A360-00239-0000
22.	BALL-SCOOP ASSY.: CENTER	AE94-00013-0000
23.	RAMP-LIFT ASSY.: RIGHT	AE94-00044-0000
24.	RAMP-LIFT ASSY.: LEFT	AE94-00045-0000
25.	TEAR-DROP ASSY.	AE94-00050-0000
26.	SCOOP ASSY.: INSIDE, LEFT	AE94-00051-0000
27.	SCOOP ASSY.: OUTSIDE, LEFT	AE94-00052-0000
28.	SCOOP ASSY.: INSIDE, RIGHT	AE94-00053-0000
29.	SCOOP ASSY.: OUTSIDE, RIGHT	AE94-00054-0000
30.	ROLLOVER BUTTON SWITCH	A360-00603-0002
31.	WIRE-FORM: BALL GUIDE	OE94-00101-0000
32.	WIRE-FORM: BALL GUIDE	0365-00151-1125
33.	WIRE-FORM: BALL GUIDE	0360-00175-5300
34.	GUIDE: BALL RETURN	0365-00190-00XF
35.	MOLDED FLIPPER W/CAP ASSY. (WHITE) LT.	A365-00312-0100
36.	MOLDED FLIPPER W/CAP ASSY. (WHITE) RT.	A365-00312-0200
37.	SHOOTER GAUGE	OE94-00117-00XF
38.	BOTTOM ARCH	OE94-00118-00XF
39.	BOTTOM ARCH EXTENSION	0370-00918-0300

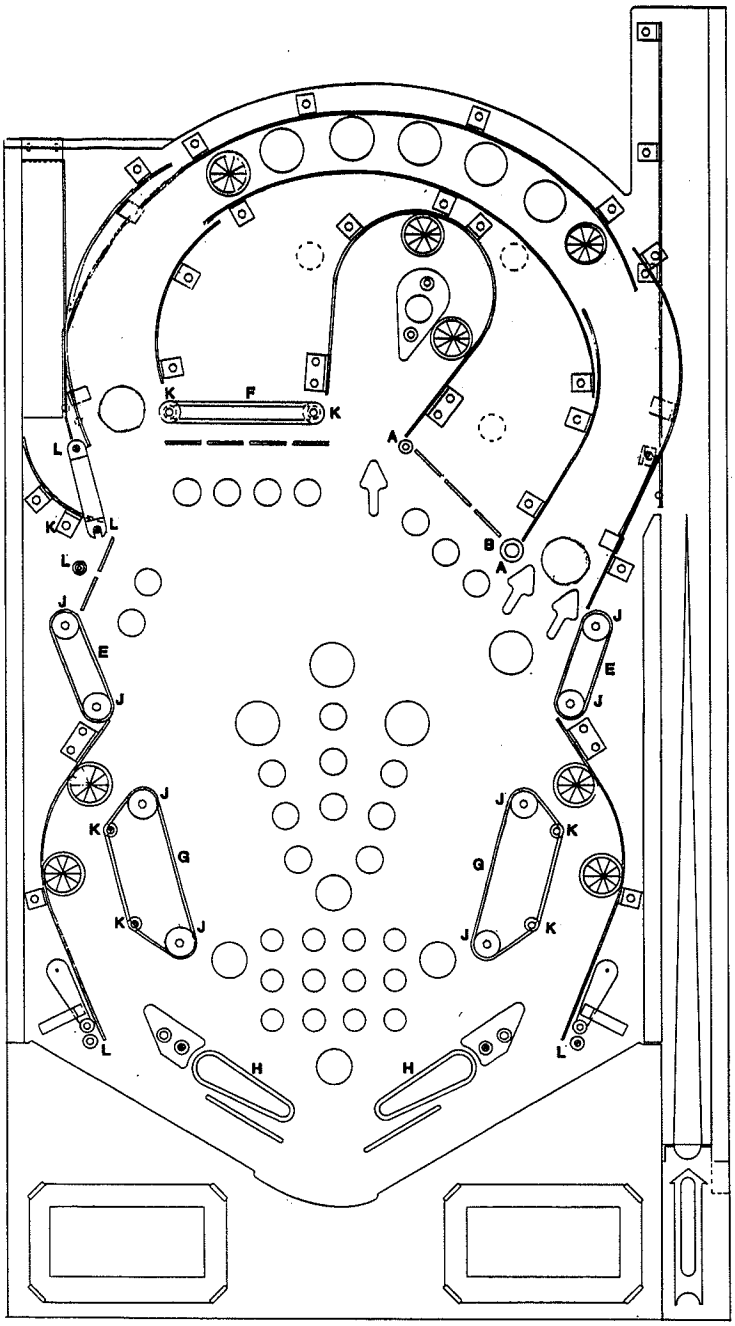


FIGURE II c

XII
OE94 HARDBODY
PANEL TOP

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: (RED) 3"	0017-00041-0682

POSTS

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

RUBBER BUMPER FOR

L.	–METAL MINI-POST	0017-00041-0633
J.	–PLASTIC POST	0017-00041-0637
K.	–NICKEL POST	0017-00041-0641

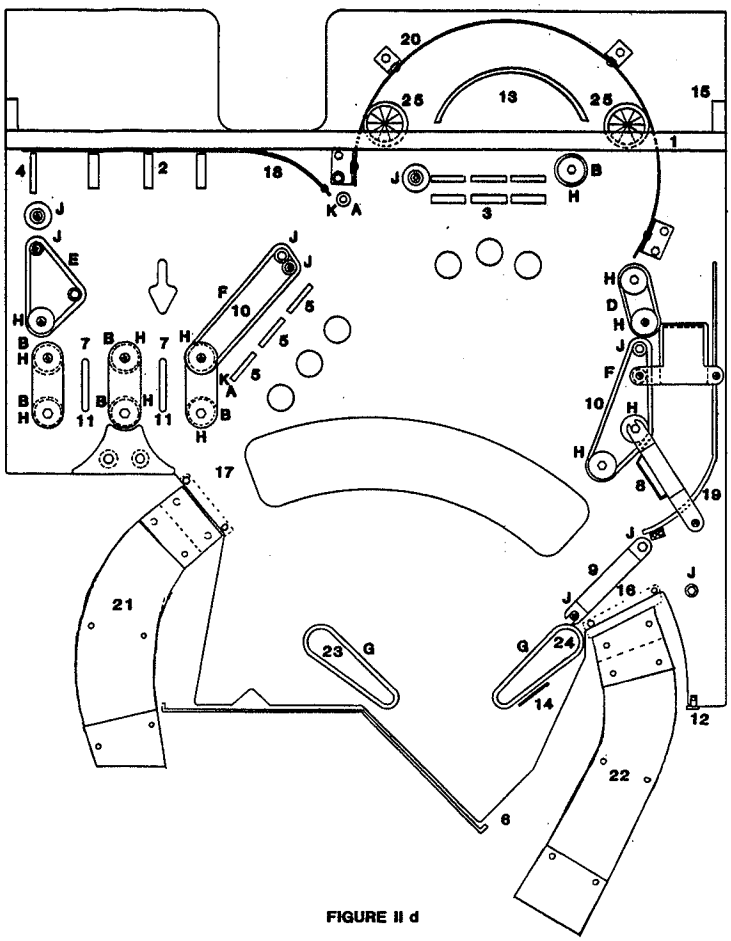


FIGURE II d

XIII
OE94 HARDBODY
TOP PLATFORM ASSEMBLY

1.	BACKBOARD ASSY.	AE94-00009-0000
2.	DROP TARGET ASSY.: 3-IN-LINE (YELLOW)	AE94-00033-0000
3.	DROP TARGET ASSY.: 3-SIDE-BY-SIDE (ORANGE)	AE94-00035-0000
4.	TARGET W/SPECIAL MTG. BRKT.: RED LG-RT.	AE94-00042-0000
5.	TARGET, SWITCH, BRKT., DIODE & CAP: GREEN LG-RT.	A365-R0307-F114
6.	BRKT.-TO-GUARD ASSY.	AE94-00027-0000
7.	BRKT. W/WIRE-FORM ASSY.: ROLLOVER LT.	A331-00042-0000
8.	GATE-BRKT. & WIRE-FORM ASSY.	AE94-00047-0000
9.	GATE-BRKT. & WIRE-FORM ASSY.	A391-00027-0000
10.	SWITCH W/BRKT. & DIODE ASSY.: SLINGSHOT	A360-00239-0000
11.	SWITCH W/DIODE & PLATE ASSY.	A365-00035-0000
12.	FACE-PLATE ASSY.	AE94-00055-0000
13.	WIRE-FORM: BALL GUIDE	OE94-00101-0000
14.	WIRE-FORM: BALL GUIDE	0365-00151-1125
15.	GUSSET BRKT.	OE52-00109-00XF
16.	RAMP LOCK BRKT. ASSY.-RIGHT	AE94-00058-0000
17.	RAMP LOCK BRKT. ASSY.-LEFT	AE94-00059-0000
18.	BALL-SCOOP ASSY.: UPPER-LEFT	AE94-00014-0000
19.	BALL-SCOOP ASSY.: UPPER-RIGHT	AE94-00015-0000
20.	BALL-SCOOP ASSY.: TOP	AE94-00016-0000
21.	RAMP ASSY.: LEFT	AE94-00064-0000
22.	RAMP ASSY.: RIGHT	AE94-00063-0000
23.	MOLDED FLIPPER W/CAP ASSY. (WHITE) LT.	AE94-00049-0100
24.	MOLDED FLIPPER W/CAP ASSY. (WHITE) RT.	AE94-00049-0200
25.	ROLLOVER BUTTON SWITCH	A360-00603-0002

RUBBER RINGS

A.	RING:	0017-00041-0633
B.	RING: 5/16"	0017-00041-0637
C.	RING: .23"	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: (RED) 3"	0017-00041-0682

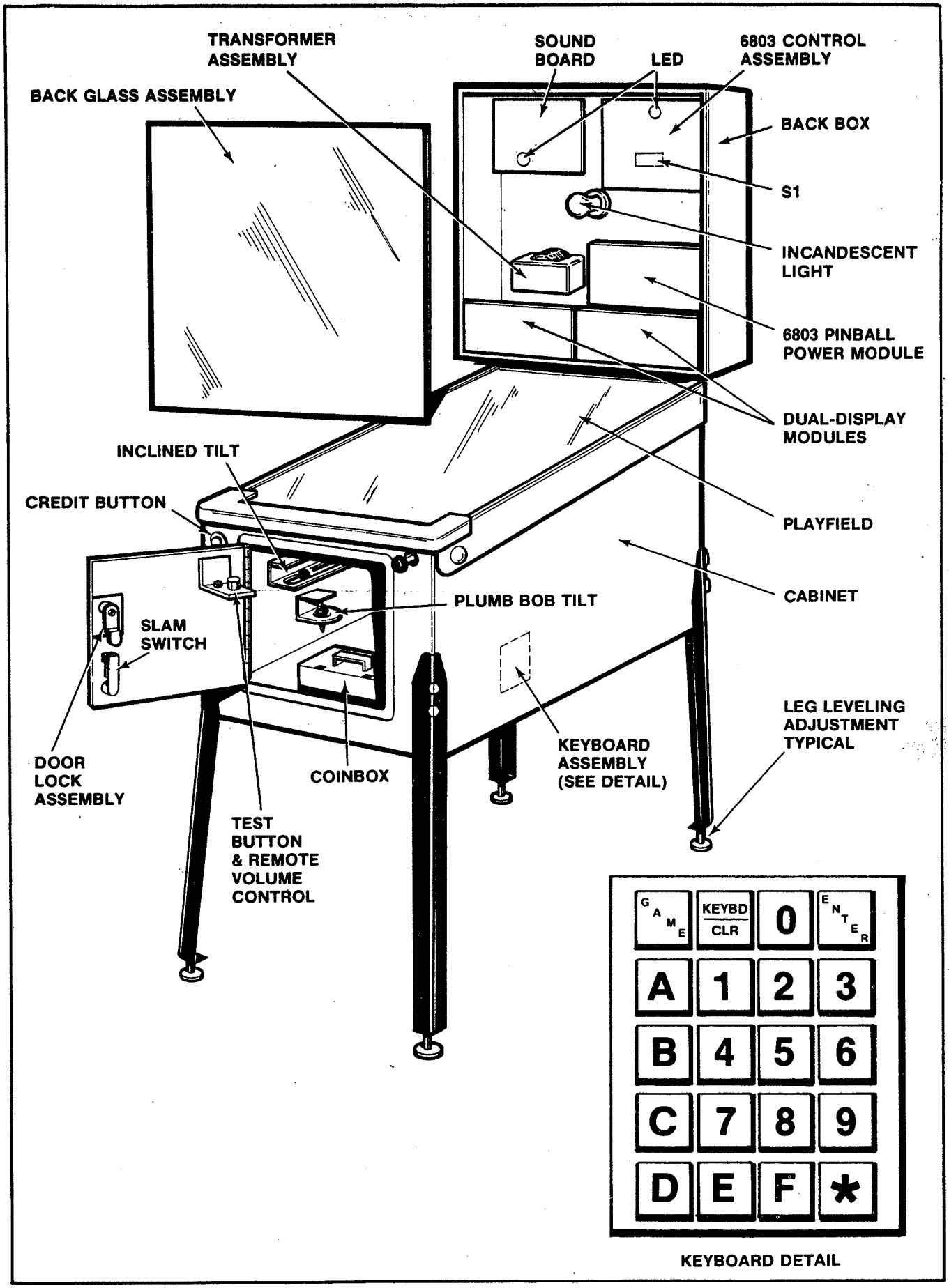


FIGURE III. ELECTRONIC PIN BALL MACHINE

XIV. HARDBODY FEATURE OPERATION AND SCORING

1. BONUS FEATURE & CENTER SPECIAL FEATURE

Bonus points are awarded when a "Circuit" light is activated in any one of the three "Tournament" columns located in the center lower playfield area. A "Circuit" is awarded by completing all targets of Work-out Stations 1 thru 4 or by completing all targets of any one Station three times. Work-out Station target awards are as follows:

WORK-OUT STATION	TARGET COLOR	STAND-UP TARGETS	AWARD PER HIT		DROP TARGETS	AWARD PER HIT
			LIT	UNLIT		
1: ARMS & SHOULDERS	ORANGE	3	10,000 points	2,000 points	3	10,000 pts.
2: CHEST & BACK	GREEN	3	10,000 points	2,000 points		
3: LEGS	BLUE	4	10,000 points	2,000 points		
4: ABDOMINALS	YELLOW	3	10,000 points	2,000 points		

An additional 10,000 points are awarded when all stand-up targets (or drop targets) are completed at each Station.

Bonus Awards for Tournament Circuit Completions are as follows:

TOURNAMENT	LEVEL	CIRCUIT BONUS AWARD VALUE			
		FIRST	SECOND	THIRD	FINAL
MUSCLE BEACH	NOVICE	20,000 points	20,000 points	20,000 points	40,000 points
NORTH SHORE	AMATEUR	20,000 points	20,000 points	20,000 points	40,000 points
HARD BODY	PRO	25,000 points	25,000 points	25,000 points	350,000 points

The completion of all Circuits in the Muscle Beach Tournament column awards the Center Special. (Adjustable—see **REGISTER Center Special.**)

- **REGISTER "Center Special"** controls the number of Tournament light column completions:

TOURNAMENT LIGHT COLUMNS	ENTER
All 3	0
2 (Novice & Amateur)	1
1 (Novice)	2

- **REGISTER "Recall Station"** recalls all Station stand-up target lights.

STATION RECALL	ENTER
No	0
Yes	1

2. RETURN LANE GATE FEATURE & AUTO SAVER FEATURE

Two flexible Return Lanes are in this game. Two rollover buttons are in each one of these combination return/out lanes. Each lane contains a flexible spring steel ball guide which can be moved to a closed position by a Return Lane Gate. The left Return Lane Gate is manually activated with a pushbutton located under the left Flipper pushbutton on the cabinet. The right Return Lane Gate is manually activated with a pushbutton located under the right Flipper pushbutton. When either Return Lane Gate is manually activated, its respective lane changes from being an "outlane" to a "return lane" for a fixed length of time (adjustable—see **REGISTER "Gate on Timer"** and **REGISTER "Control Gate Time"**) after which it returns to being an "outlane."

Whenever the two rollover button lights are flashing in either Return Lane and after the ball passes over both buttons, the Auto Saver feature automatically activates the Return Lane Gate to close the lane's flexible ball guide, for a fixed length of time, returning the ball to the Flipper.

At the start of each ball, the Auto Saver feature remains active (two flashing rollover button lights in each Return Lane) until the game score is greater than 200,000 points (adjustable—see **REGISTER "Auto Saver"**). The Auto Saver feature is then disabled for both Return Lanes but the player can still earn one Auto Save per lane at a time. Completing all four stand-up targets of Station 3 awards the left Return Lane's Auto Save. Completing all three stand-up targets of Station 4 awards the right Return Lane's Auto Save. The player can retain a Return Lane's Auto Save if he can manually activate the Return Lane Gate before the Auto Save is used.

Completing either Return Lane with its rollover buttons flashing awards 10,000 points. Completing either Return Lane with its rollover buttons unlit awards 5,000 points.

• **REGISTER "Auto Saver"** controls the level of game points beyond which the Auto Saver feature is disabled.

GAME POINT LEVEL	ENTER
None	0
100,000	1
200,000	2
300,000	3

• **REGISTER "Gate on Timer"** sets the initial length of time (for each player) either Return Lane Gate remains closed after being manually activated. During the game, this time length is also controlled by the REGISTER "Control Gate Time" (see note).

LENGTH OF TIME	ENTER
0.83 second	0
1.00 second	1
1.16 seconds	2
1.33 seconds	3
1.50 seconds	4
1.66 seconds	5
1.83 seconds	6
2.00 seconds	7

• **REGISTER "Control Gate Time"** for each player, controls the length of time (along with **REGISTER "Gate on Timer"**) either Return Lane Gate remains closed after being manually activated (see note).

RETURN LANE GATE MANUALLY ACTIVATED	ENTER
6 times	0
8 times	1
10 times	2
12 times	3
14 times	4
16 times	5
18 times	6
20 times	7

NOTE: The Gate on Timer is initialized for each player at the beginning of the game (see **REGISTER "Gate on Timer"**). The game counts the number of times the Return Lane Gates are manually activated by a particular player. If a match is found when compared to the number of times allowed as set in **REGISTER "Control Gate Time,"** the next lower time setting in the **REGISTER "Control Gate Time"** is selected.

3. BONUS MULTIPLIER FEATURE & TOP SPECIAL FEATURE

In-line targets in the upper left corner of the playfield consist of three yellow drop targets and one red stand-up target. Points, Bonus Multiplier values and an extra ball are scored as follows:

TARGET POSITION	TYPE	POINT AWARD	BONUS MULTIPLIER VALUE AWARD	FLASHING "EXTRA BALL" LIGHT
1st In-line	Drop	25,000 pts.		
2nd In-line	Drop	30,000 pts.	2X	
3rd In-line	Drop	35,000 pts.	3X	Activated*
4th In-line	Stand-up	50,000 pts.		Extra Ball Awarded*

*Adjustable—see **REGISTER "In-line X-ball"**

NOTE: If the drop targets are hit out of sequence, "2X" is awarded for any two drop targets knocked down, and "3X" (with the flashing "Extra Ball" light*) is awarded for all three drop targets knocked down in any order.

The Top Special is scored as follows:

A. Complete the top three in-line drop targets.
B. Complete the rollover buttons in the left Return Lane to activate the timed flashing "Special" light located above the "25K" rollover switch.
C. Complete the "25K" rollover switch before the timed "Special" light stops flashing (adjustable—see **REGISTER "Top Special Timer"**).

• **REGISTER "In-line X-ball"** controls the method of completion of in-line targets required to award the extra ball.

METHOD OF COMPLETION	ENTER
Conservative: Make all 4 in-line targets to qualify the flashing "Extra Ball" light; hit the stand-up target again to award the extra ball.	0
Liberal: Make all 3 in-line drop targets to qualify the flashing "Extra Ball" light; hit stand-up target to award the extra ball.	1

• **REGISTER "Top Special Timer"** controls the length of time the top "Special" light remains flashing after it's activated.

LENGTH OF TIME	ENTER
4 seconds	0
6 seconds	1
8 seconds	2
10 seconds	3

4. POWER RAMP FEATURE & POWER REPS FEATURE

Two Power Ramps are in this game to provide paths to move the ball from the lower playfield area to the upper playfield area. The "Power Reps" feature is available only when the Power Ramps are raised.

The Ramps are raised as follows:

A. Completing any one of the four Circuits lights the Center Hoop ("Raise Ramps When Lit") arrow.
B. Making either one of the Center Hoop's rollover buttons raises both Ramps and exposes the Power Reps lights. (At this point, the Center Hoop arrow is flashing. Making either one of the Center Hoop's rollover buttons will lower both Ramps.)

With the Power Ramps raised, each time the ball passes thru the Power Reps Loop within a set time limit (by completing two rollover buttons), points and an extra ball are awarded as follows:

POWER REPS LOOP COMPLETION	POWER REPS LIGHT LIT	POWER REPS VALUE AWARD	ROLLOVER BUTTONS AWARD	TIME ALLOWED BETWEEN LOOP COMPLETIONS*
1st time	50K	50,000 pts.	5,000 pts.	8 seconds
2nd time	100K	100,000 pts.	5,000 pts.	8 seconds
3rd time	200K	200,000 pts.	5,000 pts.	8 seconds
4th time	400K	400,000 pts. & Extra Ball	5,000 pts.	8 seconds

*Adjustable—see **REGISTER "Circle Timer"**

NOTE: If successive Power Reps Loop completions fall behind the set time limit, the Power Reps value will decrease in steps back to the "50K" level.

Each Center Hoop (or Power Reps Loop) rollover button scores 5,000 points separately. But when both are made together, in completing the Center Hoop (or the Power Reps Loop), only 5,000 points for the first rollover button is awarded.

• **REGISTER "Circle Timer"** controls the length of time allowed for each completion of the Power Reps Loop (with ramps raised) required to advance the Power Reps value.

LENGTH OF TIME	ENTER
6 seconds	0
8 seconds	1
10 seconds	2
12 seconds	3

5. BLASTER LOOP FEATURE

The Blaster Loop is located in the upper right area of the playfield behind Station 1 (Arms & Shoulders). The Blaster Loop is completed by making both of its rollover buttons (with each button always awarding 5,000 points).

The Weight Meter's initial value is 20,000 points (20 pounds). Completing the Blaster Loop advances the Weight Meter value from 20,000 points thru 100,000 points and, finally, an extra ball. Completing all three Station 1 drop targets will not prevent further Blaster Loop completions from advancing the Weight Meter value unless a register option setting is changed (see **REGISTER "Top Hoop Advance"**).

The Weight Meter value is collected by completing all three Station 1 stand-up targets. The Weight Meter value is then reset to 20,000 points (adjustable—see **REGISTER "Reset Top Hoop"**).

• **REGISTER "Top Hoop Advance"** controls whether or not the Blaster Loop's Weight Meter value will advance after all three Station 1 drop targets are completed.

WEIGHT METER VALUE ADVANCE	ENTER
No	0
Yes	1

• **REGISTER "Reset Top Hoop"** controls whether or not the Blaster Loop's Weight Meter value is reset after the value is collected by completing all three Station 1 stand-up targets.

WEIGHT METER VALUE RESET	ENTER
Yes	0
No	1

6. MUSCLE POWER FEATURE

The Muscle Power feature consists of a red "Normal" stand-up target and a white "Double Playfield Values" stand-up target. At the beginning of each new ball, only the red target's light is lit ("normal" playfield values are awarded during this time). Hitting either target awards 2,000 points.

Completing either Return Lane qualifies the white target (its light flashes while the red target's light is still lit). If the white target is hit:

A. 8,000 points are awarded.
B. The white target's light remains lit.
C. The red target's light remains lit.
D. Subsequent playfield values double.

Hitting the lit white target now awards 4,000 points but if the unlit red target is hit:

A. 4,000 points are awarded.
B. The red target's light turns on.
C. The white target's light turns off.
D. Subsequent playfield values return to "normal."

Hitting either target will once again award 2,000 points.

7. MISCELLANEOUS FEATURES

Each Sling Shot awards 10 points.
Each Rebound awards 100 points.

• **REGISTER "Unlimited X-balls"** controls whether one extra ball only or an unlimited number of extra balls are awarded by completing any feature which awards extra balls.

# OF EXTRA BALLS	ENTER
One	0
Unlimited	1

• **REGISTER "SPSA Recall"** recalls, after the "Shoot Again" light is activated, all features for the next new ball.

RECALL ALL FEATURES	ENTER
No	0
Yes	1

• **REGISTER "Attract Sound"** enables or disables, after 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:

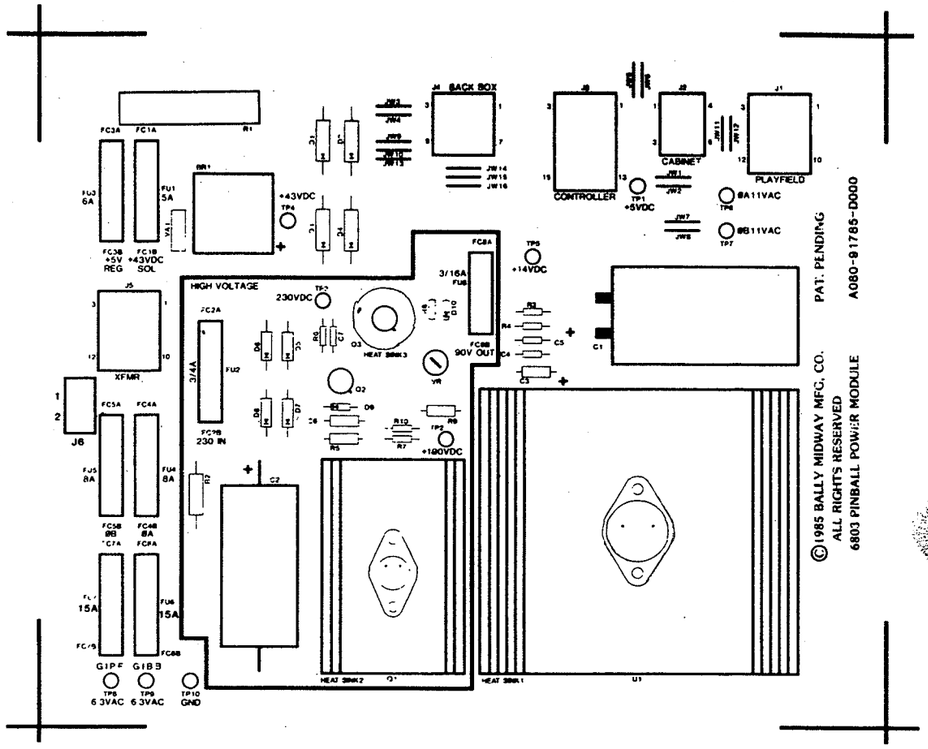
SLINGS SHOTS: ACTIVE	ENTER
No	0
Yes	1

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

# OF TILT WARNINGS	ENTER
None	0
1	1
2	2
3	3

SECTION 2

Component Layouts, Schematics & Wiring Diagrams



THIS DWG IS CONFIDENTIAL & PROPERTY OF MIDWAY MFG. CO

DIMS. TOLERANCES UNLESS OTHERWISE SPEC. CONCENTRICITY T.I.R. .002 FRACTIONAL ± 1/64 DECIMAL ± .005 HOLE DIA. + .002 − .000 ANGLE ± 1/2° DO NOT SCALE DWG.	FIRST USED ON	MIDWAY MFG. CO. FRANKLIN PK., IL. 60131 A BALLY CO	
	DRN. CL DATE 04/08/86 SCALE		
	MECH CHK. MAT'L	ASSY DRAWING 6803 PINBALL PWR MODULE A084-91785-D000	REVISIONS
	ELEC CHK. FINISH		PART NO M051-00C53-D001

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

DESIGNATION LIST

DESIGNATION	DESCRIPTION
C1	11,000uf 20V ELEC.
P/O C1	TY-WRAP
P/O C1	SOLDER LUG
P/O C1	WIRE 20AWG
C2	160uf 350V ELEC.
P/O C2	TY-WRAP
C3	2uf 25V ELEC.
C4, C5	.1uf 25V CER.
C6, C7	.01uf 500V CER.
R1	600 OHM 10W
R2	100K 1W 5%
R3	2.2 OHM 1/4W 5%
R4	100 OHM 1/2W 5%
R5	22K 1/2W 5%
R6	100K 1/4W 5%
R7	390 OHM 1/4W 5%
R8	1.2K 1/4W 5%
R9	82K 1/2W 5%
R10	8.2K 1/4W 5%
VR1	0 - 25K 1/4W POT.
D1 - D4	MR751
D5 - D9	IN4004
D10	IN5275A ZENER
BR1	KBPC-35-02-W
P/O BR1	BRIDGE SPACER
Q1	2N3584
P/O Q1	SHIELD
P/O Q1	HEX SPACER
P/O Q1	6-32 X 5 SCREW
P/O Q1	6-32 X 12 SCREW
P/O Q1	LOCKWASHER EXT.
P/O Q1	LOCKWASHER INT.
P/O Q1	FLAT WASHER
P/O Q1	6-32 HEX NUT
P/O Q1	LABEL - CAUTION HIGH VOLT.
P/O Q1	HEATSINK 2
P/O Q1	INSULATOR TO-66
Q2, Q3	2N3440
P/O Q2, Q3	INSULATOR TO-5
P/O Q3	HEATSINK 3
U1	78H05C REG.
P/O U1	6-32 X 12 SCREW
P/O U1	6-32 HEX NUT
P/O U1	LOCKWASHER EXT.
P/O U1	FLAT WASHER
P/O U1	HEATSINK 1
P/O U1	INSULATOR TO-3
VA1	VARISTOR

DESIGNATION	DESCRIPTION
JW1 - JW16	ZERO OHM RES. JUMPER
TP1 - TP10	TEST POINTS
F1*	5 AMP 3AG FUSE
F2	3/4 AMP 3AG FUSE
F3	6 AMP 3AG FUSE
F4, F5	8 AMP 3AG FUSE
F6, F7	15 AMP 3AG FUSE
F8	3/16 AMP 8AG FUSE
FC1A - FC3B, FC8A	FUSE CLIPS
FC8B	
FC4A - FC7B	FUSE CLIPS
J1	12 PIN M-N-L CONN. FEMALE
J2	6 PIN M-N-L CONN. MALE
J3	15 PIN M-N-L CONN. MALE
J4	9 PIN M-N-L CONN. MALE
J5	12 PIN M-N-L CONN. MALE
J6	2 PIN M-N-L CONN. MALE
6803 POWER MODULE	P.C. BOARD

4-23-86 REV. 1.0 FIXED R2, R6

* TWO FLIPPER GAMES ONLY - SEE SCHEMATIC

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

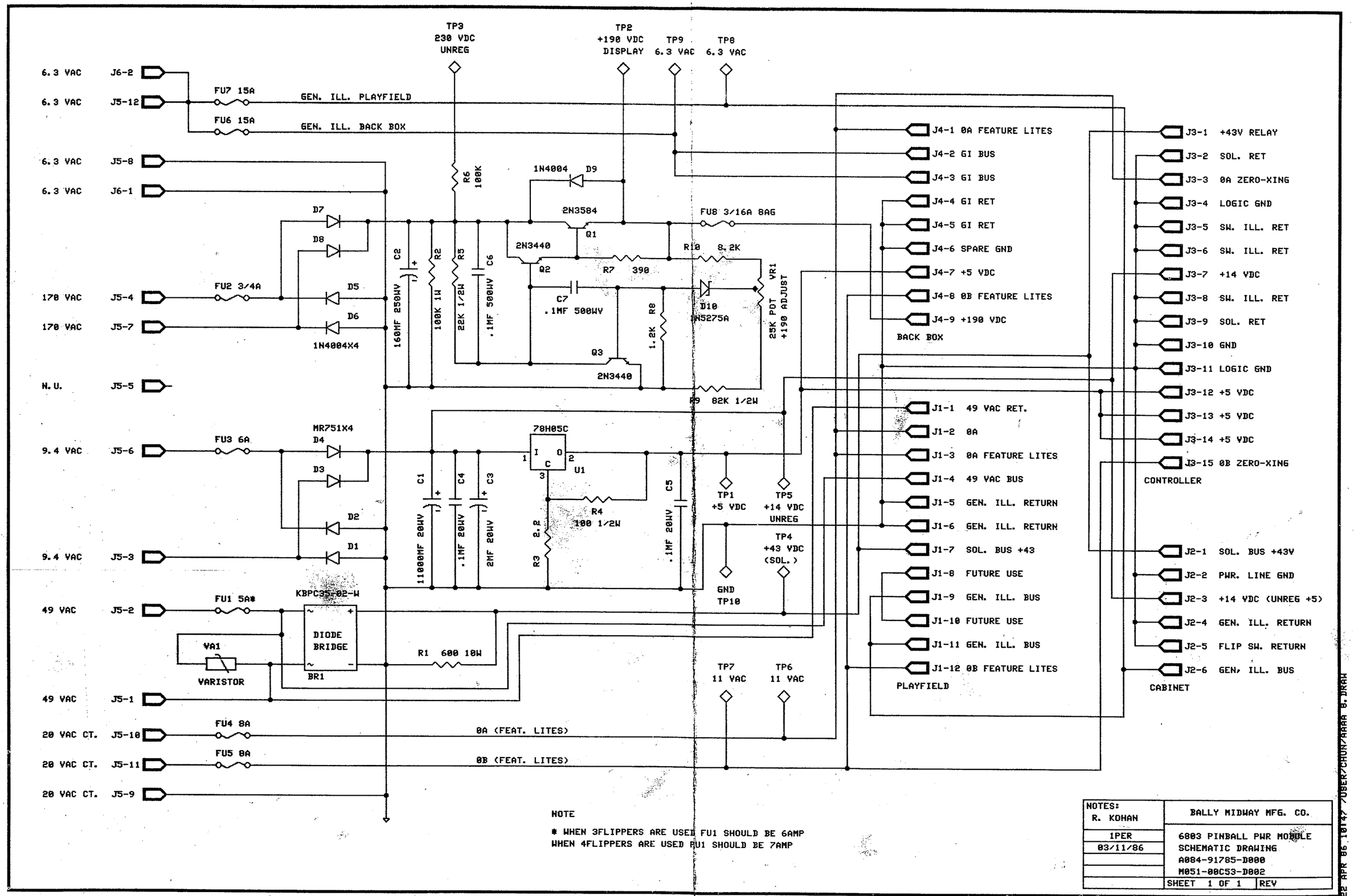
CROSS REFERENCE LIST

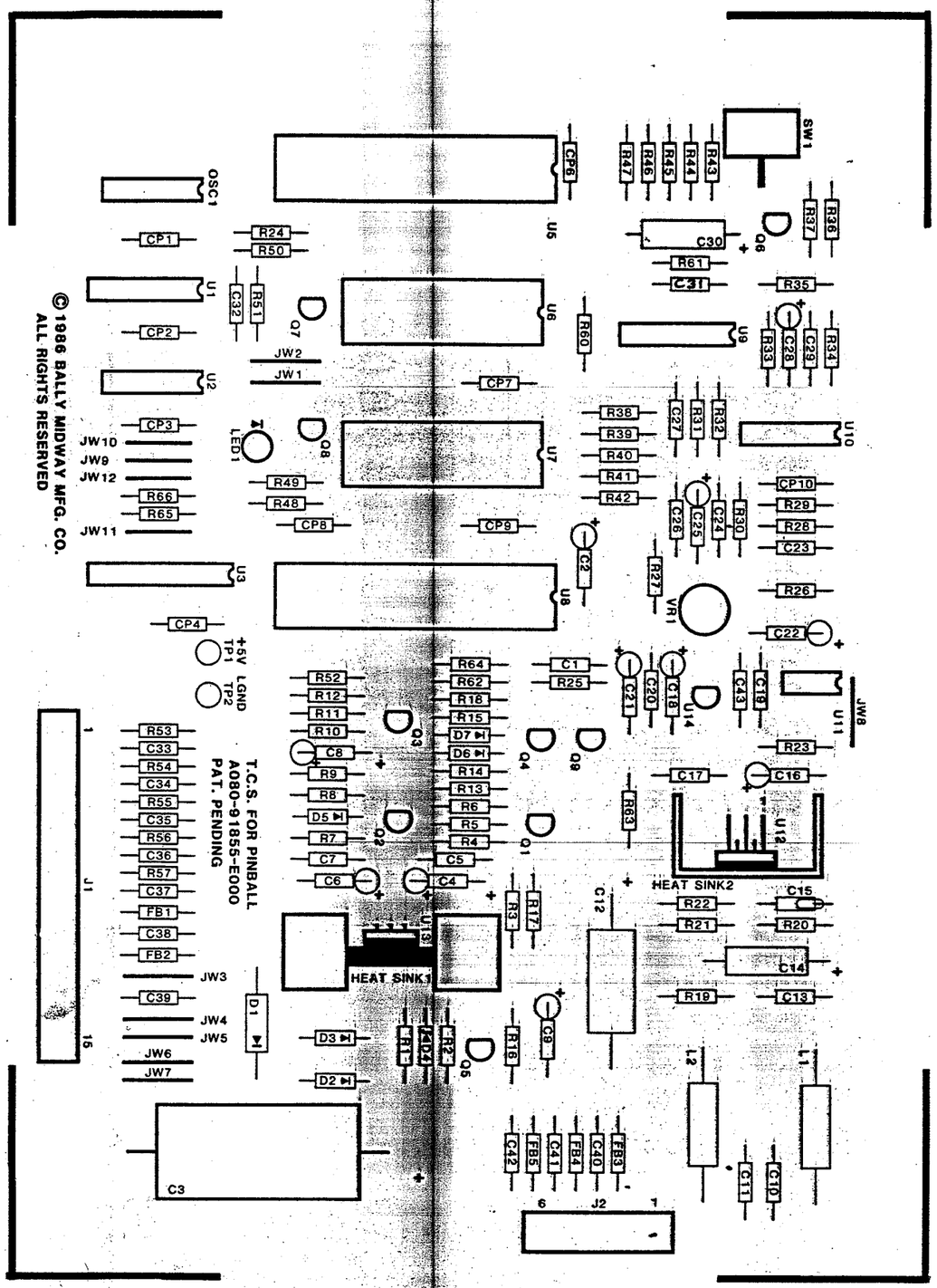
DESCRIPTION	QTY.	DESIGNATION NO.	PART NOS.
.01UF 500V CER.	2	C6,C7	0360-00800-0013
.1UF 25V CER.	2	C4,C5	0360-00800-0026
2UF 25V ELEC.	1	C3	0360-00800-0019
160UF 350V ELEC.	1	C2	0360-00800-0020
11,000UF 20V ELEC.	1	C1	0360-00800-0024
2.2 OHM 1/4W 5%	1	R3	100E-00005-0003
100 OHM 1/2W 5%	1	R4	100E-00006-0021
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
KBPC-35-02-W	1	BR1	103E-00005-0005
2N3440	2	Q2,Q3	104E-00003-0002
2N3584	1	Q1	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 TO-3	1	P/O U1	0017-00042-0119
INSULATOR TO-5	2	P/O Q2,Q3	0017-00042-0151
INSULATOR TO-66	1	P/O Q1	0017-00042-0158
HEX SPACER	2	P/O Q1	0017-00042-0248
SHIELD	1	P/O Q1	0365-00952-0000
HEATSINK 1	1	P/O U1	112E-00001-0003
HEATSINK 2	1	P/O Q1	112E-00001-0002
HEATSINK 3	1	P/O Q3	112E-00001-0004
BRIDGE SPACER	1	P/O BR1	118E-00001-0001
6-32 X 12 SCREW	4	P/O Q1,U1	0017-00101-0132
6-32 X 5 SCREW	2	P/O Q1	0017-00101-0555
6-32 HEX NUT	4	P/O Q1,U1	0017-00103-0005
LOCKWASHER INT.	4	P/O Q1,	0017-00104-0008
LOCKWASHER EXT.	4	P/O Q1,U1	0017-00104-0009
FLAT WASHER	4	P/O Q1,U1	0017-00104-0106
FUSE CLIP	8	FC1A-FC3B, FC8A,FC8B	0017-00071-0033
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


TP3
230 VDC
UNREG
TP2
+190 VDC
DISPLAY
TP9
6.3 VAC
TP8
6.3 VAC
6.3 VAC J6-2
6.3 VAC J5-12
FU7 15A
GEN. ILL. PLAYFIELD
FU6 15A
GEN. ILL. BACK BOX
6.3 VAC J5-8
6.3 VAC J6-1
R6 100K
1N4004 D9
2N3584
Q1
FU8 3/16A 8AG
D7
D8
2N3440
Q2
R10 8.2K
R7 390
C2
R2
R5
C6
VR1
25K POT
+190 ADJUST
170 VAC J5-4
170 VAC J5-7
FU2 3/4A
D5
D6
1N4004X4
160MF 250WV
100K 1W
22K 1/2W
.1MF 500WV
C7
.1MF 500WV
D10
1N5275A
R8
1.2K
Q3
2N3440
N.U. J5-5
R9 82K 1/2W
MR751X4
9.4 VAC J5-6
FU3 6A
D4
D3
D2
D1
9.4 VAC J5-3
78H05C
I
O
C
1
2
3
U1
C1
C4
C3
C5
11000MF 20WV
.1MF 20WV
2MF 20WV
.1MF 20WV
R4
100 1/2W
2.2
R3
TP1
+5 VDC
TP5
+14 VDC
UNREG
TP4
+43 VDC
(SOL.)
GND
TP10
KBPC35-02-W
49 VAC J5-2
FU1 5A*
DIODE
BRIDGE
BR1
VA1
VARISTOR
R1 600 10W
49 VAC J5-1
TP7
11 VAC
TP6
11 VAC
20 VAC CT. J5-10
FU4 8A
0A (FEAT. LITES)
20 VAC CT. J5-11
FU5 8A
0B (FEAT. LITES)
20 VAC CT. J5-9
J4-1 0A FEATURE LITES
J4-2 GI BUS
J4-3 GI BUS
J4-4 GI RET
J4-5 GI RET
J4-6 SPARE GND
J4-7 +5 VDC
J4-8 0B FEATURE LITES
J4-9 +190 VDC
BACK BOX
J1-1 49 VAC RET.
J1-2 0A
J1-3 0A FEATURE LITES
J1-4 49 VAC BUS
J1-5 GEN. ILL. RETURN
J1-6 GEN. ILL. RETURN
J1-7 SOL. BUS +43
J1-8 FUTURE USE
J1-9 GEN. ILL. BUS
J1-10 FUTURE USE
J1-11 GEN. ILL. BUS
J1-12 0B FEATURE LITES
PLAYFIELD
J3-1 +43V RELAY
J3-2 SOL. RET
J3-3 0A ZERO-XING
J3-4 LOGIC GND
J3-5 SW. ILL. RET
J3-6 SW. ILL. RET
J3-7 +14 VDC
J3-8 SW. ILL. RET
J3-9 SOL. RET
J3-10 GND
J3-11 LOGIC GND
J3-12 +5 VDC
J3-13 +5 VDC
J3-14 +5 VDC
J3-15 0B ZERO-XING
CONTROLLER
J2-1 SOL. BUS +43V
J2-2 PWR. LINE GND
J2-3 +14 VDC (UNREG +5)
J2-4 GEN. ILL. RETURN
J2-5 FLIP SW. RETURN
J2-6 GEN. ILL. BUS
CABINET
NOTE
WHEN 3FLIPPERS ARE USED FU1 SHOULD BE 6AMP
WHEN 4FLIPPERS ARE USED FU1 SHOULD BE 7AMP
NOTES:
R. KOHAN
1PER
03/11/86
BALLY MIDWAY MFG. CO.
6803 PINBALL PWR MODULE
SCHEMATIC DRAWING
A084-91785-D000
M051-00C53-D002
SHEET 1 OF 1
REV
22 APR 86 10:47 /USER/CHUN/AAAA 8.DRAW



A084-91855-E000
M051-00114-E146

DESIGNATION LIST

DESIGNATION NO.	DESCRIPTION
C1	NOT INSERTED
C2	10 UF 20V TANT
C3	4700 UF 25V AX ELEC
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 ELEC
C13	.1 UF 50V AX CER
C14	470 UF 6V AX ELEC
C15	.05 UF CER
C16	1 UF 20V TANT
C17	.1 UF 50V AX CER
C18-C22	NOT INSERTED
C23	82 PF AX CER 5%
C24	68 PF AX CER 5%
C25	1 UF 20V TANT
C26	.001 UF AX CER 10%
C27	.01 UF AX CER 10%
C28	1 UF 20V TANT
C29	470 PF AX CER 10%
C30	47 UF 16V AX ELEC
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-CP4, CP6-CP10	.01 UF 50V AX CER
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
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	33K 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,R66	NOT INSERTED
R65	4.7K 1/4W 5% CRBN.
VR1	10K 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

T.C.S. FOR PINBALL
A084-91855-E000
M051-00114-E176

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	16L8A-2 PAL
IC U5	MC68B09E
IC U6	6116 2KX8 RAM 200NS.
IC U7	PROG EPROM 512K 250NS.
IC U8	MC68B21
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-JW11	JUMPER
JW12	NOT INSERTED
J1,J2	AUTO INSERT PINS TIN .045 SQ. PIN
TP1,TP2	TEST POINTS
T.C.S. FOR PINBALL	A080-91855-E000

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
82 PF 50V AX CER.	1	C23	0E47-00800-0002
68 PF 50V AX CER.	1	C24	0360-00800-0028
470 PF 50V AX CER.	2	C29,C37	0307-00800-0008
.001 AX. CER. 10%	1	C26	0E47-00800-0003
.01 UF 50V AX CER.	1	C27	0E47-00800-0001
.01 UF 50V AX CER.	12	C5,C7,C31,CP1-CP4, CP6-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.	9	R24,R41-R47,R65	100E-00005-0079
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.	3	R31,R33,R26	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

T.C.S FOR PINBALL
A084-91855-E000
M051-00114-E176

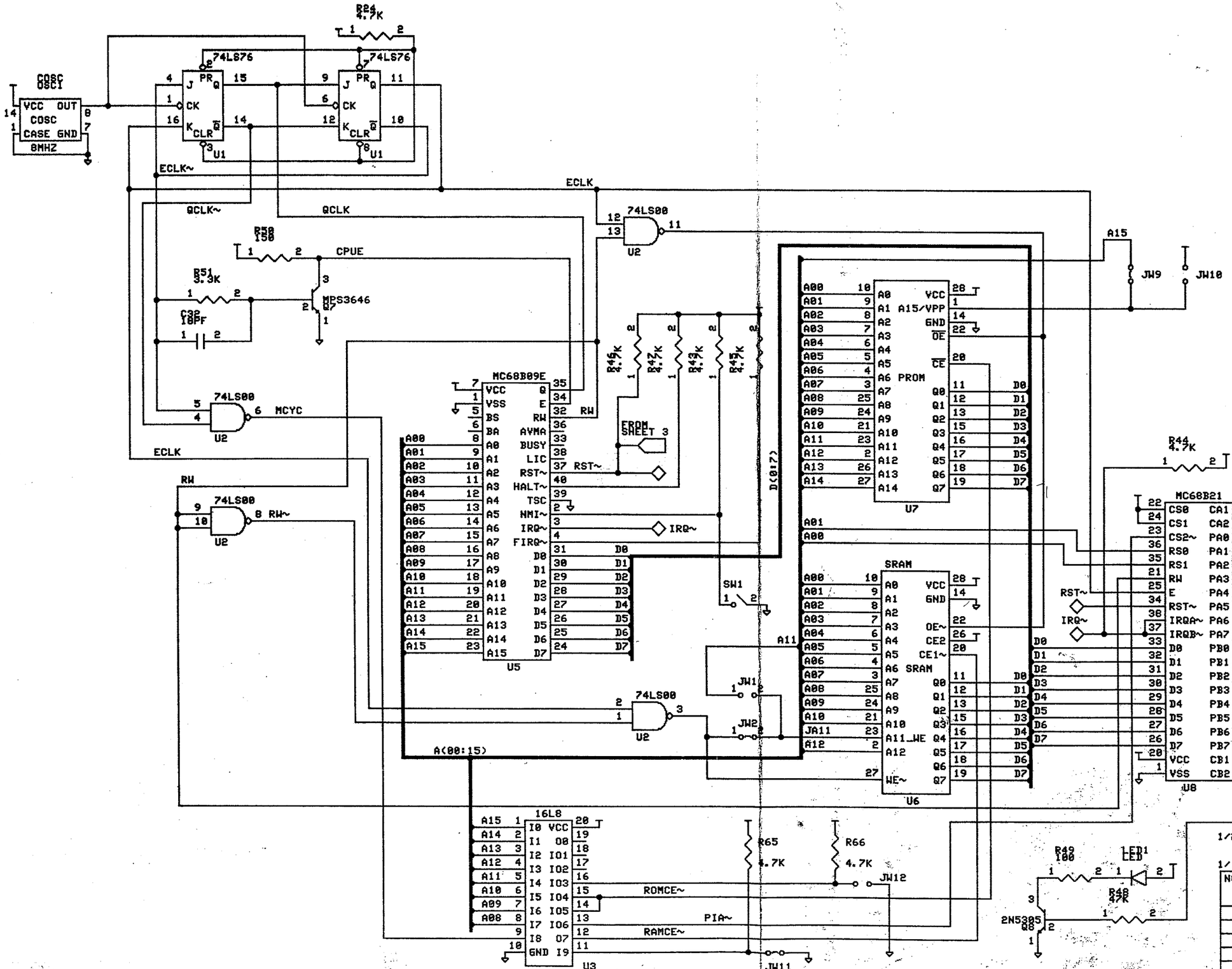
CROSS REFERENCE LIST

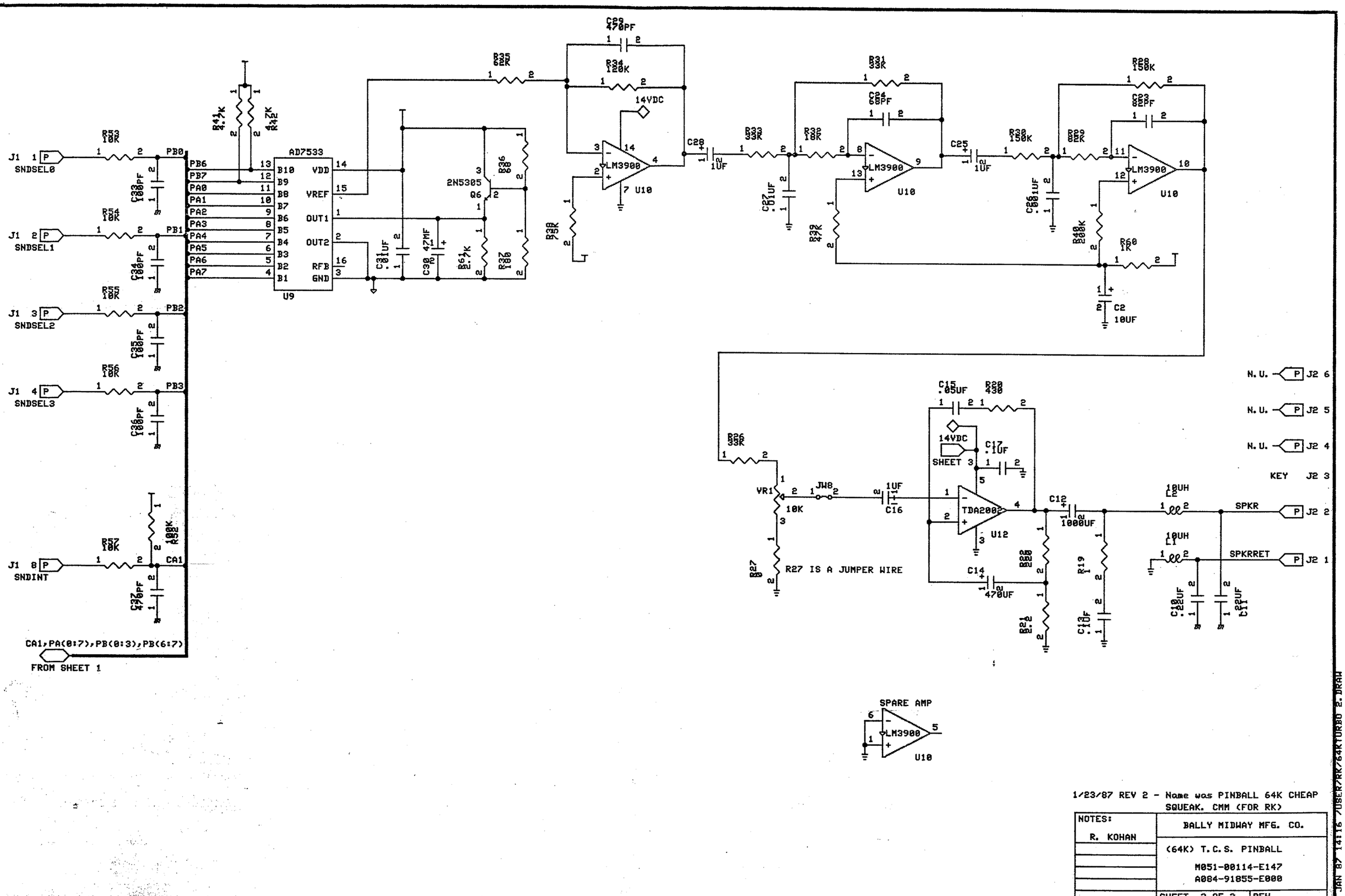
DESCRIPTION	QTY.	DESIGNATION NO.	PART NOS.
10K OHM POT	1	VR1	0360-00804-0024
10 UH INDUCTOR	2	L1,L2	0360-00804-0031
1N958B DIODE	1	D4	103E-00001-0002
1N4004 DIODE	2	D2,D3	103E-00003-0005
1N4606 DIODE	3	D5-D7	103E-00002-0006
VR330 DIODE	1	D1	0360-00801-0007
LED, GREEN	1	LED1	119E-00001-0001
2N3904	2	Q1,Q3	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
16L8A-2 PAL	1	IC U3	0E79-00803-0001
6116 2KX8 RAM 200NS.	1	IC U6	0304-00803-0057
74LS00	1	IC U2	0A15-00803-0046
74LS76	1	IC U1	0A15-00803-0072
AD7533	1	IC U9	0304-00803-0055
LM3900	1	IC U10	0360-00803-0002
MC68B09E	1	IC U5	0C48-00803-0001
MC68B21	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

CROSS REFERENCE LIST

DESCRIPTION	QTY.	DESIGNATION NO.	PART NOS.
JUMPER (0 OHM RESISTOR)	12	JW1-JW11,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-E000

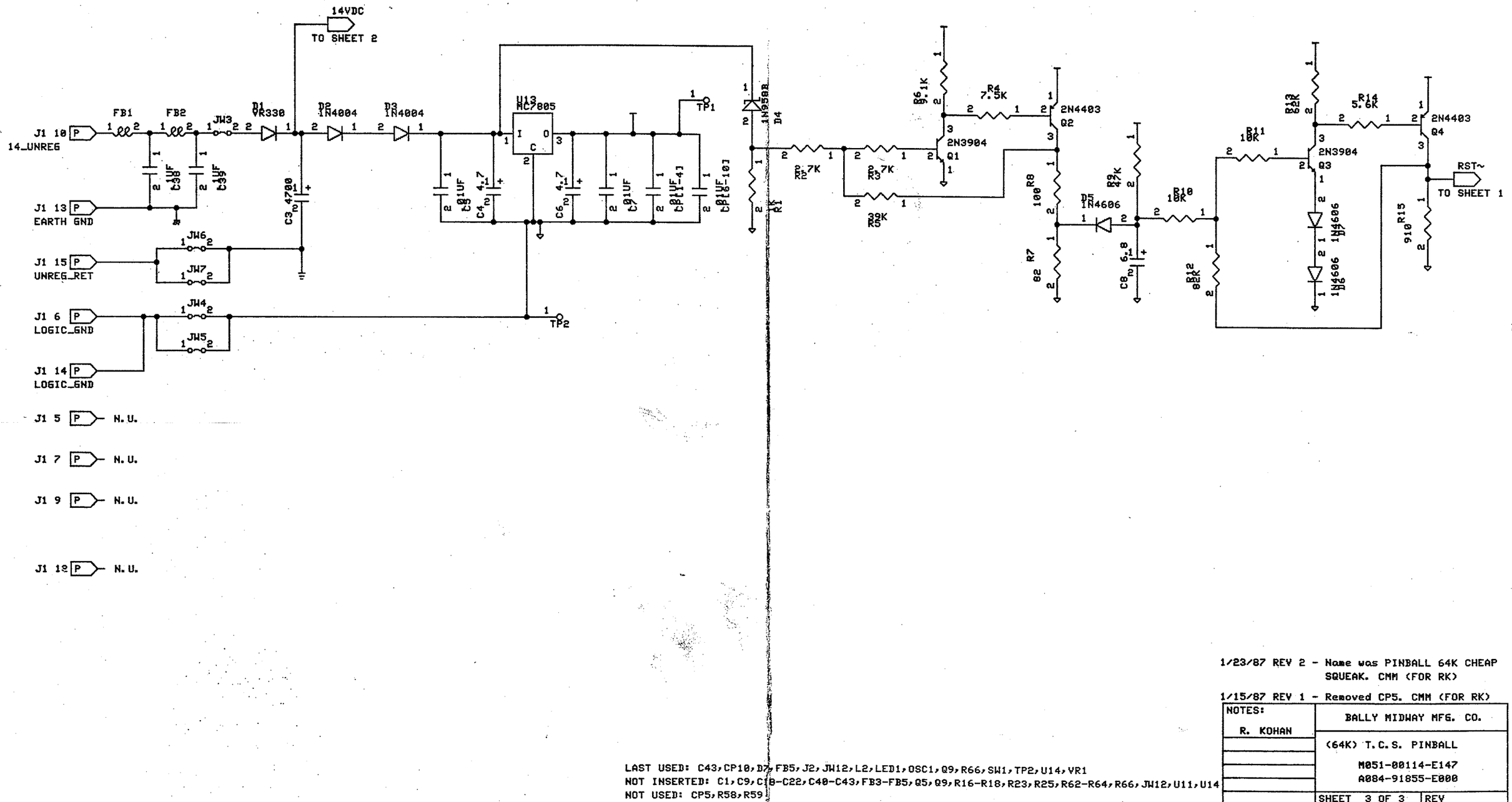
REV. 1 - 25 NOV. 1986 - CHANGED C24 QTY. TO 1 ON PAGE 5. RK/CMM
REV. 2 - 15 JAN. 1987 - CHANGED CP1-CP10 to CP1-CP4, CP6-CP10 on page 1. and page 5. .01uf cap. qty. changed to 12 on page 5. RK/CMM


COSC
OSC1
VCC OUT
COSC
CASE GND
8MHZ
74LS876
U1
ECLK~
QCLK~
QCLK
ECLK
74LS00
U2
MCYC
RW
RW~
R50
150
CPUE
R51
3.3K
C30
18PF
MPS3646
Q7
MC68B09E
VCC
VSS
BS
BA
A0
A1
A2
A3
A4
A5
A6
A7
A8
A9
A10
A11
A12
A13
A14
A15
Q
E
RW
AVMA
BUSY
LIC
RST~
HALT~
TSC
NMI~
IRQ~
FIRQ~
D0
D1
D2
D3
D4
D5
D6
D7
U5
FROM SHEET 3
IRQ~
SW1
JW1
JW2
A(00:15)
D(0:7)
R45 4.7K
R47 4.7K
R43 4.7K
R45 4.7K
A00
A01
A02
A03
A04
A05
A06
A07
A08
A09
A10
A11
A12
JA11
A11_WE
WE~
OE~
CE2
CE1~
SRAM
U6
PROM
VCC
A15/VPP
GND
OE
CE
Q0
Q1
Q2
Q3
Q4
Q5
Q6
Q7
U7
A15
JW9
JW10
R44
4.7K
MC68B21
CS0
CS1
CS2~
RS0
RS1
RW
E
RST~
IRQA~
IRQB~
CA1
CA2
PA0
PA1
PA2
PA3
PA4
PA5
PA6
PA7
PB0
PB1
PB2
PB3
PB4
PB5
PB6
PB7
CB1
CB2
U8
CA1,PA(0:7),PB(0:3),PB(6:7)
TO SHEET 2
16L8
I0 VCC
I1 O0
I2 IO1
I3 IO2
I4 IO3
I5 IO4
I6 IO5
I7 IO6
I8 O7
GND I9
U3
ROMCE~
RAMCE~
PIA~
R65
4.7K
R66
4.7K
JW12
JW11
R49
100
LED1
LED
R48
47K
2N5305
Q8
1/23/87 REV 2 - Name was PINBALL-64K CHEAP SQUEAK. CMM (FOR RK)
1/15/87 REV 1 - Changed Page 3. CMM (FOR RK)
NOTES:
R. KOHAN
BALLY MIDWAY MFG. CO.
(64K) T.C.S. PINBALL
M051-00114-E147
A084-91855-E000
SHEET 1 OF 3
REV
23 JAN 87 14:11 /USER/RK/64KTURBO 1.DRAW



1/23/87 REV 2 - Name was PINBALL 64K CHEAP SQUEAK. CMM (FOR RK)

NOTES:	BALLY MIDWAY MFG. CO.	
R. KOHAN	(64K) T.C.S. PINBALL	
	M051-00114-E147	
	A084-91855-E000	
	SHEET 2 OF 3	REV



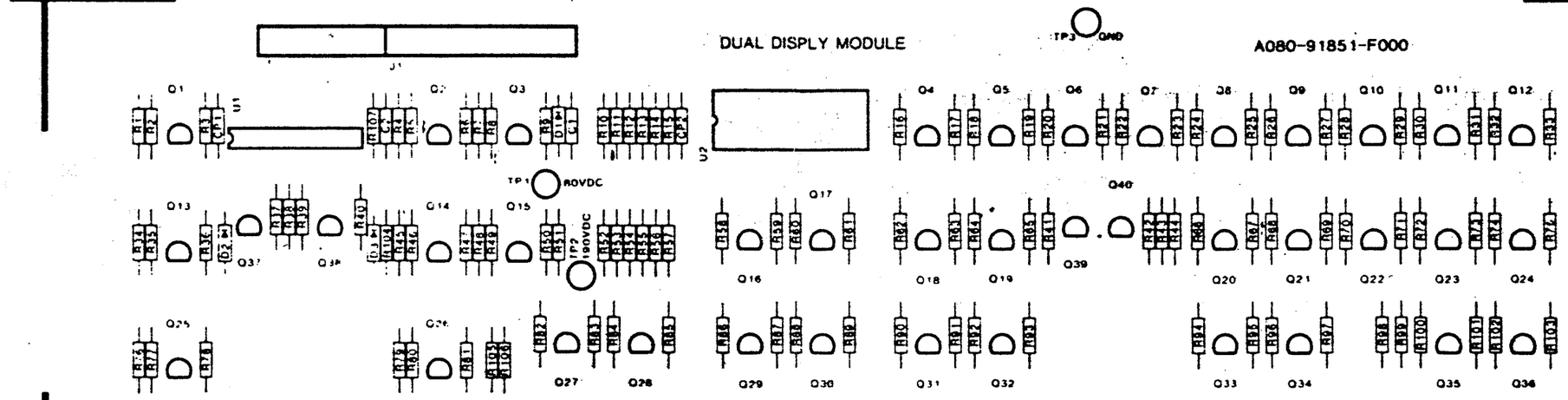
1/23/87 REV 2 - Name was PINBALL 64K CHEAP SQUEAK. CMM (FOR RK)

1/15/87 REV 1 - Removed CP5. CMM (FOR RK)

LAST USED: C43,CP10,D7,FB5,J2,JW12,L2,LED1,OSC1,Q9,R66,SW1,TP2,U14,VR1
NOT INSERTED: C1,C9,C18-C22,C40-C43,FB3-FB5,Q5,Q9,R16-R18,R23,R25,R62-R64,R66,JW12,U11,U14
NOT USED: CP5,R58,R59

NOTES:	BALLY MIDWAY MFG. CO.
R. KOHAN	(64K) T.C.S. PINBALL
	M051-00114-E147
	A084-91855-E000
	SHEET 3 OF 3 | REV

23 JAN 87 14:23 /USER/RK/64K/U1R3U 3.DRAW



DIM. TOLERANCES UNLESS OTHERWISE SPEC CONCENTRICITY T I R .002 FRACTIONAL 1/64 DECIMAL .005 HOLE DIA +.002 −.000 ANGLE ±1/2° DO NOT SCALE DWG	DRN CL MECH CHK	DATE 04/08/86 SCALE APP	Bally/MIDWAY MFG. CO FRANKLIN PARK, IL 60131 ASSY DRAWING DUAL DISPLAY MODULE A084-91851-F000	PART NO. M084-00365-F-03

DESIGNATION LIST

DESIGNATION NO.	DESCRIPTION
R1	1.5K 1/4W 5% CARBON
R2	820 OHM 1/4W 5% CARBON
R3	300K 1/4W 5% CARBON
R4	1.5K 1/4W 5% CARBON
R5	510 OHM 1/4W 5% CARBON
R6	300K 1/4W 5% CARBON
R7	1.5K 1/4W 5% CARBON
R8	820 OHM 1/4W 5% CARBON
R9	300K 1/4W 5% CARBON
R10 - R15	20K 1/4W 5% CARBON
R16	9.1K 1/4W 5% CARBON
R17	100K 1/4W 5% METAL FILM
R18	2.2K 1/4W 5% CARBON
R19	300K 1/4W 5% CARBON
R20	9.1K 1/4W 5% CARBON
R21	100K 1/4W 5% METAL FILM
R22	2.2K 1/4W 5% CARBON
R23	300K 1/4W 5% CARBON
R24	9.1K 1/4W 5% CARBON
R25	100K 1/4W 5% METAL FILM
R26	2.2K 1/4W 5% CARBON
R27	300K 1/4W 5% CARBON
R28	9.1K 1/4W 5% CARBON
R29	100K 1/4W 5% METAL FILM
R30	9.1K 1/4W 5% CARBON
R31	100K 1/4W 5% METAL FILM
R32	9.1K 1/4W 5% CARBON
R33	100K 1/4W 5% METAL FILM
R34	1.5K 1/4W 5% CARBON
R35	820 OHM 1/4W 5% CARBON
R36	300K 1/4W 5% CARBON
R37	300K 1/4W 5% CARBON
R38	1.5K 1/4W 5% CARBON
R39	1K 1/4W 5% CARBON
R40	100K 1/4W 5% CARBON
R41	100K 1/4W 5% CARBON
R42	1K 1/4W 5% CARBON
R43	1.5K 1/4W 5% CARBON
R44	300K 1/4W 5% CARBON
R45	1.5K 1/4W 5% CARBON
R46	820 OHM 1/4W 5% CARBON
R47	300K 1/4W 5% CARBON
R48	1.5K 1/4W 5% CARBON
R49	820 OHM 1/4W 5% CARBON
R50	300K 1/4W 5% CARBON
R51	100K 1/4W 5% METAL FILM
R52 - R57	2.2M 1/4W 5% CARBON
R58	9.1K 1/4W 5% CARBON

DESIGNATION LIST

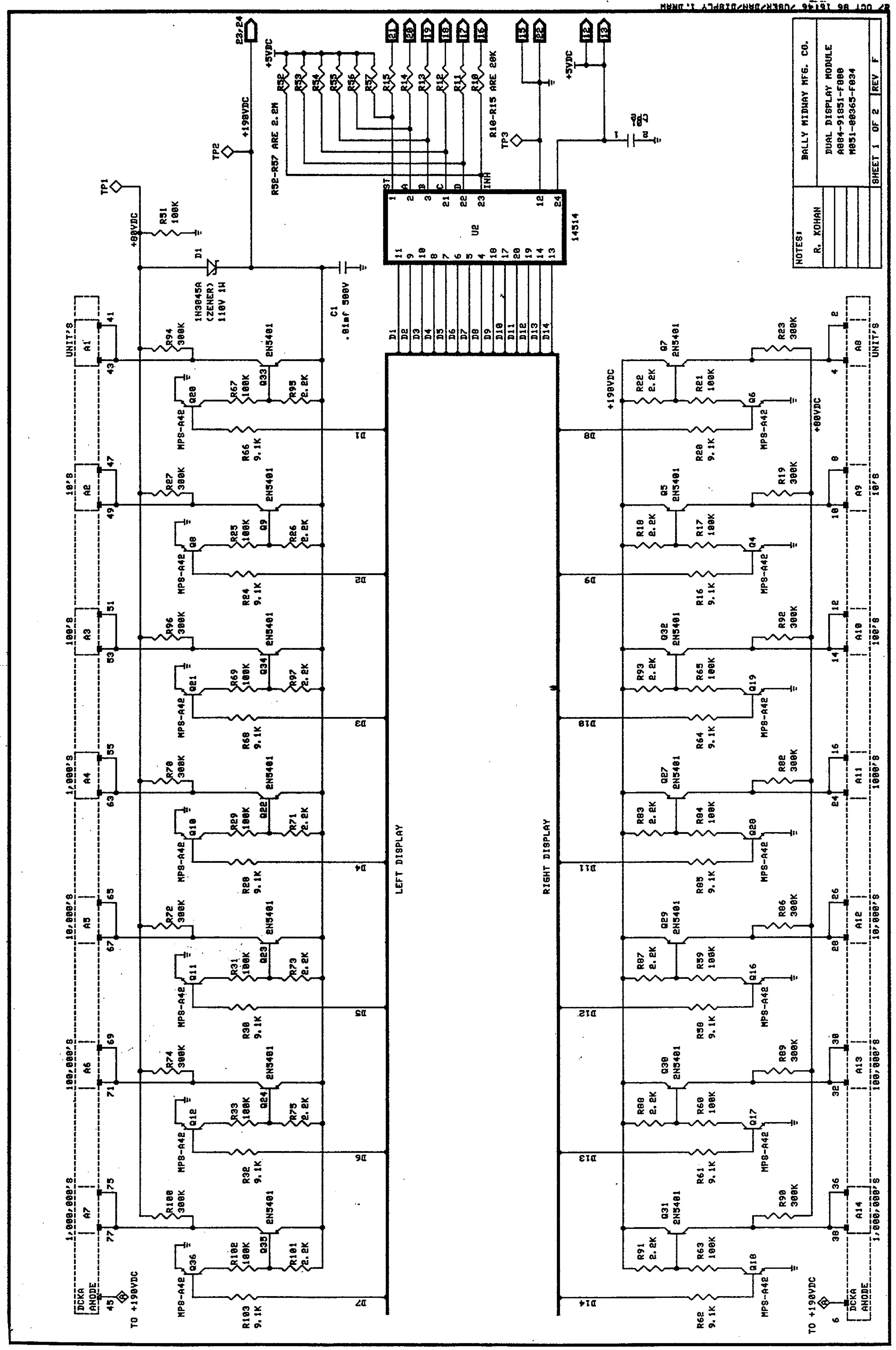
DESIGNATION NO.	DESCRIPTION
R59	100K 1/4W 5% METAL FILM
R60	100K 1/4W 5% METAL FILM
R61	9.1K 1/4W 5% CARBON
R62	9.1K 1/4W 5% CARBON
R63	100K 1/4W 5% METAL FILM
R64	9.1K 1/4W 5% CARBON
R65	100K 1/4W 5% METAL FILM
R66	9.1K 1/4W 5% CARBON
R67	100K 1/4W 5% METAL FILM
R68	9.1K 1/4W 5% CARBON
R69	100K 1/4W 5% METAL FILM
R70	300K 1/4W 5% CARBON
R71	2.2K 1/4W 5% CARBON
R72	300K 1/4W 5% CARBON
R73	2.2K 1/4W 5% CARBON
R74	300K 1/4W 5% CARBON
R75	2.2K 1/4W 5% CARBON
R76	1.5K 1/4W 5% CARBON
R77	820 OHM 1/4W 5% CARBON
R78	300K 1/4W 5% CARBON
R79	1.5K 1/4W 5% CARBON
R80	820 OHM 1/4W 5% CARBON
R81	300K 1/4W 5% CARBON
R82	300K 1/4W 5% CARBON
R83	2.2K 1/4W 5% CARBON
R84	100K 1/4W 5% METAL FILM
R85	9.1K 1/4W 5% CARBON
R86	300K 1/4W 5% CARBON
R87	2.2K 1/4W 5% CARBON
R88	2.2K 1/4W 5% CARBON
R89	300K 1/4W 5% CARBON
R90	300K 1/4W 5% CARBON
R91	2.2K 1/4W 5% CARBON
R92	300K 1/4W 5% CARBON
R93	2.2K 1/4W 5% CARBON
R94	300K 1/4W 5% CARBON
R95	2.2K 1/4W 5% CARBON
R96	300K 1/4W 5% CARBON
R97	2.2K 1/4W 5% CARBON
R98	10M 1/4W 5% CARBON
R99	1M 1/4W 5% CARBON
R100	300K 1/4W 5% CARBON
R101	2.2K 1/4W 5% CARBON
R102	100K 1/4W 5% METAL FILM
R103	9.1K 1/4W 5% CARBON
R104	150K 1/4W 5% CARBON
R105	10M 1/4W 5% CARBON
R106	1M 1/4W 5% CARBON
R107	10K 1/4W 5% CARBON

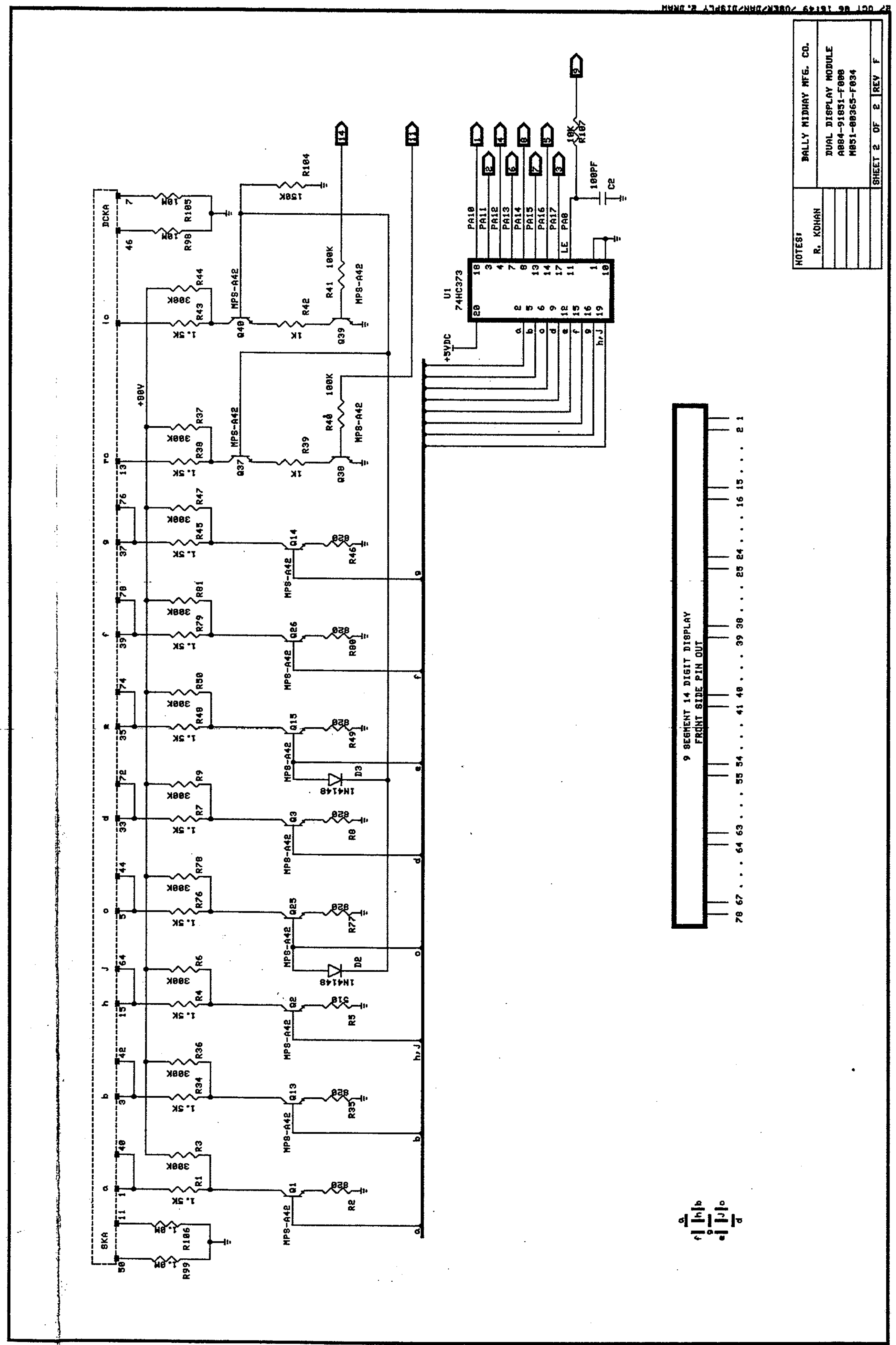
DESIGNATION LIST

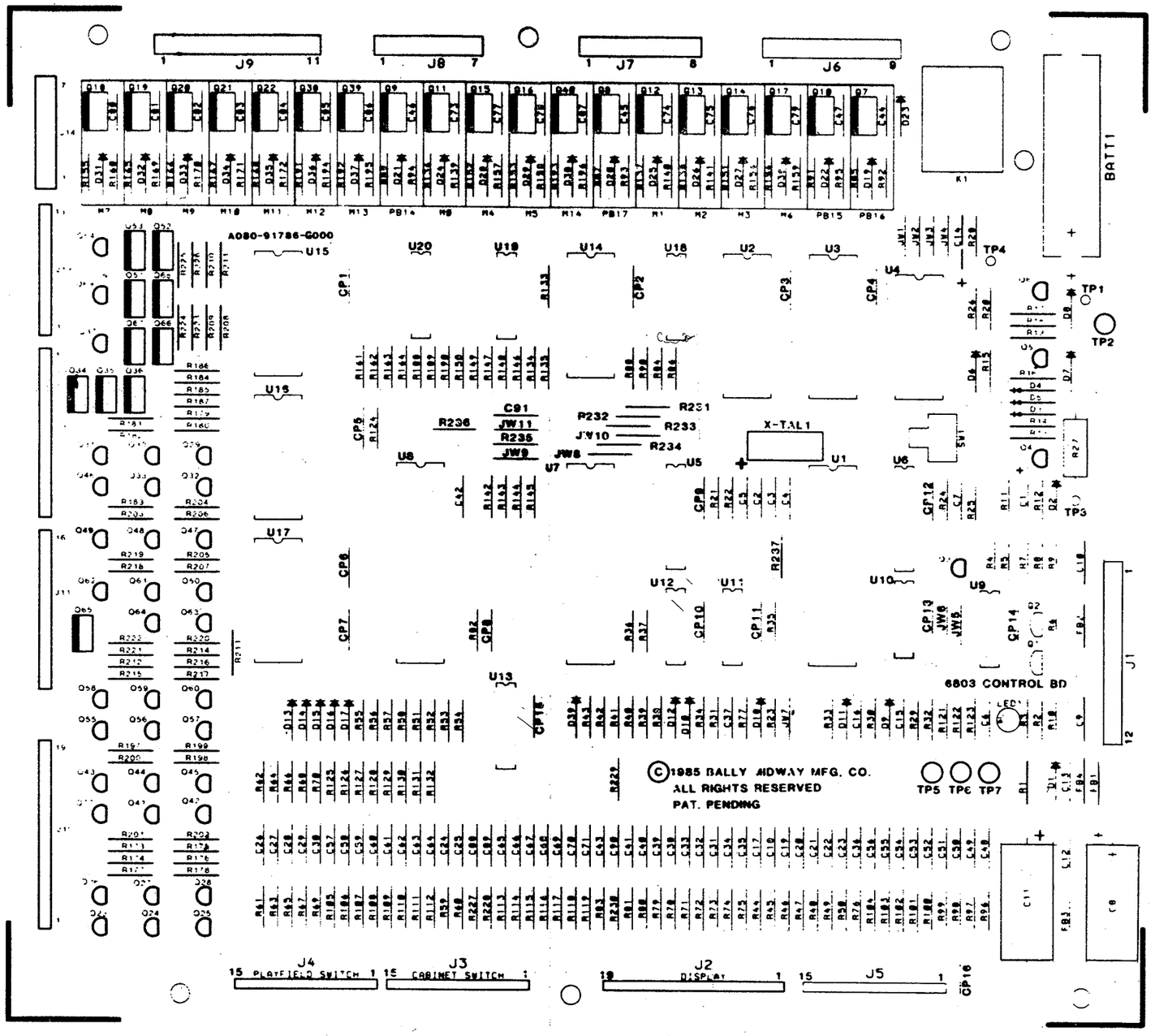
DESIGNATION NO.	DESCRIPTION
C1	.01UF 500V CER.
C2	100PF 50V AX. CER.
CP1, CP2	.01UF 50V CER.
D1	1M110ZS10 110V ZENER DIODE
D2,D3	1N4148 DIODE
Q1 - Q4	MPS-A-42 NPN XSTR
Q5	2N5401 PNP XSTR
Q6	MPS-A-42
Q7	2N5401
Q8	MPS-A-42
Q9	2N5401
Q10 - Q21	MPS-A-42
Q22 - Q24	2N5401
Q25	MPS-A-42
Q26	MPS-A-42
Q27	2N5401
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
	BUMPER
	DISPLAY MTG. CLIPS
	SCREWS
M051-00365- A014	DISPLAY MTG. PROCEDURE
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	R5	100E-00005-0053
820 OHM 1/4W 5% CARBON	7	R2,R8,R35,R46 R49,R77,R80	100E-00005-0058
1K 1/4W 5% CARBON	2	R39,R42	100E-00005-0061
1.5K 1/4W 5% CARBON	10	R1,R4,R7,R34,R38 R43,R45,R48 R76,R79	100E-00005-0065
2.2K 1/4W 5% CARBON	14	R18,R22,R26,R71 R73,R75,R83,R87 R88,R91,R93,R95 R97,R101	100E-00005-0069
9.1K 1/4W 5% CARBON	14	R16,R20,R24,R28 R30,R32,R58,R61 R62,R64,R66,R68 R85,R103	100E-00005-0087
10K 1/4W 5% CARBON	1	R107	100E-00005-0088
20K 1/4W 5% CARBON	6	R10 - R15	100E-00005-0095
100K 1/4W 5% CARBON	2	R40,R41	100E-00005-0115
100K 1/4W 5% METAL FILM	15	R17,R21,R25,R29 R31,R33,R51,R59 R60,R63,R65,R67 R69,R84,R102	100E-00001-0011
150K 1/4W 5% CARBON	1	R104	100E-00005-0120
300K 1/4W 5% CARBON	24	R3,R6,R9,R19,R23 R27,R36,R37,R44, R47,R50,R70,R72, R74,R78,R81,R82, R86,R89,R90,R92, R94,R96,R100	100E-00005-0127
1.0M OHM 1/4W 5% CARBON	2	R99,R106	100E-00005-0140
2.2M OHM 1/4W 5% CARBON	6	R52 - R57	100E-00005-0147
10.0M OHM 1/4W 5% CARBON	2	R98,R105	100E-00005-0162
100PF AX. CER.	1	C2	0639-00800-0003
.01UF	2	CP1,CP2	0360-00800-0005
.01UF 500V	1	C1	0360-00800-0013
1N4148	2	D2,D3	103E-00002-0005
1M110ZS10 110V ZENER DIODE	1	D1	103E-00001-0028
2N5401 PNP XSTR	14	Q5,Q7,Q9,Q22,Q23 Q24,Q27,Q29,Q30 Q31,Q32,Q33,Q34 Q35	0360-00802-0006
MPS-A-42 NPN XSTR	26	Q1-Q4,Q6,Q8,Q10- Q21,Q25,Q26,Q28 Q36-Q40	0360-00802-0007
14514 1-16 DECODER	1	U2	0360-00803-0013
74HC373 OCTAL LATCH	1	U1	0365-00803-0015
.025SQ. PINS	23	J1	0304-00804-0009
14 DIGIT, 9 SEGMENT GAS DISCHARGE DISPLAY	1	DISPLAY 1	119E-00002-0006
TEST LOOPS	3	TP1 - TP3	0017-00007-0131
FOAM TAPE	2		0017-00081-0289
BUMPER	1		0017-00041-0598
DISPLAY MTG. CLIP	2		0365-00174-00XF
SCREW	2		0017-00101-0175
DISPLAY MTG. PROCEDURE	1		M051-00365-A014
DUAL DISPLAY MODULE PCB	1		A080-91851-F000


BALLY MIDWAY MFG. CO.
DUAL DISPLAY MODULE
A084-91851-F000
M051-00365-F034
SHEET 1 OF 2
REV F
NOTES:
R. KOHAN
LEFT DISPLAY
RIGHT DISPLAY


BALLY MIDWAY MFG. CO.
DUAL DISPLAY MODULE
A084-91851-F000
M051-00365-F034
SHEET 2 OF 2
REV F
NOTES:
R. KOHAN
9 SEGMENT 14 DIGIT DISPLAY
FRONT SIDE PIN OUT



THIS DWG IS CONFIDENTIAL & PROPERTY OF MIDWAY MFG CO.

DIM. TOLERANCES UNLESS OTHERWISE SPEC. CONCENTRICITY T.I.R. . 002 FRACTIONAL ..... ±.1/64 DECIMAL ..... ±.005 HOLE DIA. .... +.002—.000 ANGLE ..... ±1/2° DO NOT SCALE DWG.	FIRST USED ON DRN CL — DATE 04/08/86 — SCALE MECH CHK — MAT'L ELEC CHK — FINISH	MIDWAY MFG. CO. FRANKLIN PK., IL. 60131 A BALLY CO. ASSY DRAWING 6803 CONTROL BD. A084-91786-G000	REVISIONS PART NO. M0·5·1-0·0·C·5·3-G·0·0·3

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

CROSS REFERENCE LIST

DESCRIPTION	QTY.	DESIGNATION NO.	PART NOS.
27pf 50V CER.	2	C2, C3	0360-00800-0052
47pf 50V CER.	1	C7	0360-00800-0027
390pf 50V CER.	25	C24-C30, C57-C71 C88-C90	0360-00800-0001
470pf 1KV CER.	27	C17-C23, C31-C36, C38-C41, C48-C56, C91	0307-00800-0008
.002uf 1KV CER.	19	C44-C47, C73-C87	0360-00800-0012
.003uf 1KV CER.	1	C43	0360-00800-0025
.01uf 50V CER.	24	C6, C9, C10, C12, C13 C15, C16, C42, CP1-CP16	0365-00800-0014
.05uf 16V CER.	1	C37	0360-00800-0006
.1uf 50V CER.	1	C4	0360-00800-0058
4.7uf 25V TANT	2	C5, C14	0360-00800-0008
6.8uf 25V TANT	1	C1	0360-00800-0048
470uf 16V ELEC	1	C8	0360-00800-0022
470uf 25V ELEC	1	C11	0360-00800-0024
82 OHM 1/4W 5%	1	R9	100E-00005-0031
100 OHM 1/4W 5%	1	R8	100E-00005-0033
110 OHM 1/4W 5%	1	R83	100E-00005-0034
120 OHM 1/4W 5%	21	R24, R85, R87, R89, R91, R121, R136-R138, R151-R155, R165-R168, R191-R193	100E-00005-0035
270 OHM 1/4W 5%	1	R28	100E-00005-0044
330 OHM 1/4W 5%	23	R92-R95, R139-R141, R156-R160, R169-R172, R194-R196, R231-R234	100E-00005-0047
470 OHM 1/4W 5%	9	R96-R104	100E-00005-0051
560 OHM 1/4W 5%	1	R1	100E-00005-0054
680 OHM 1/4W 5%	1	R25	100E-00005-0056
750 OHM 1/4W 5%	1	R19	100E-00005-0057
910 OHM 1/4W 5%	1	R18	100E-00005-0059
1K 1/4W 5%	3	R3, R29, R32	100E-00005-0061
1.2K 1/4W 5%	60	R44-R50, R59-R61, R63, R65, R67, R69, R71-R76 R78-R82, R105-R119, R122 R133-R135, R146-R150, R161-R164, R188-R190, R227, R228, R230, R236	100E-00005-0063
1.5K 1/4W 5%	1	R20	100E-00005-0065
2K 1/4W 5%	46	R123, R173-R187 R197-R226	100E-00005-0068
2.7K 1/4W 5%	2	R2, R6	100E-00005-0071
3K 1/4W 5%	1	R17	100E-00005-0073
3.3K 1/4W 5%	18	R21-R23, R35, R51-R58, R124, R142-R145, R235	100E-00005-0074
3.9K 1/4W 5%	4	R84, R86, R88, R90	100E-00005-0077
4.7K 1/4W 5%	8	R36-R43	100E-00005-0079
5.6 1/4W 5%	1	R16	100E-00005-0082

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-00005-0126
82 OHM 1W 10%	1	R27	100E-00007-0014
IN958B 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	Q2, Q4, Q6	104E-00001-0006
2N4403	2	Q3, Q5	104E-00002-0006
2N5060	35	Q23-Q33, Q37, Q41-Q50, Q54-Q64, Q69, Q70	104E-00015-0001
2N5305	1	Q1	104E-00007-0003
MCR106-1	10	Q34-Q36, Q51-Q53 Q65-Q68	0360-00802-0009
SE9302	19	Q7-Q22, Q38-Q40	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	0066-090BX-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	109E-00001-0003
LED GREEN	1	LED 1	0017-00007-0131
TEST POINTS	7	TP1-TP7	0017-00007-0131
SWITCH P.B.	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	FB1-FB4	0316-00804-0002

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

DESIGNATION LIST

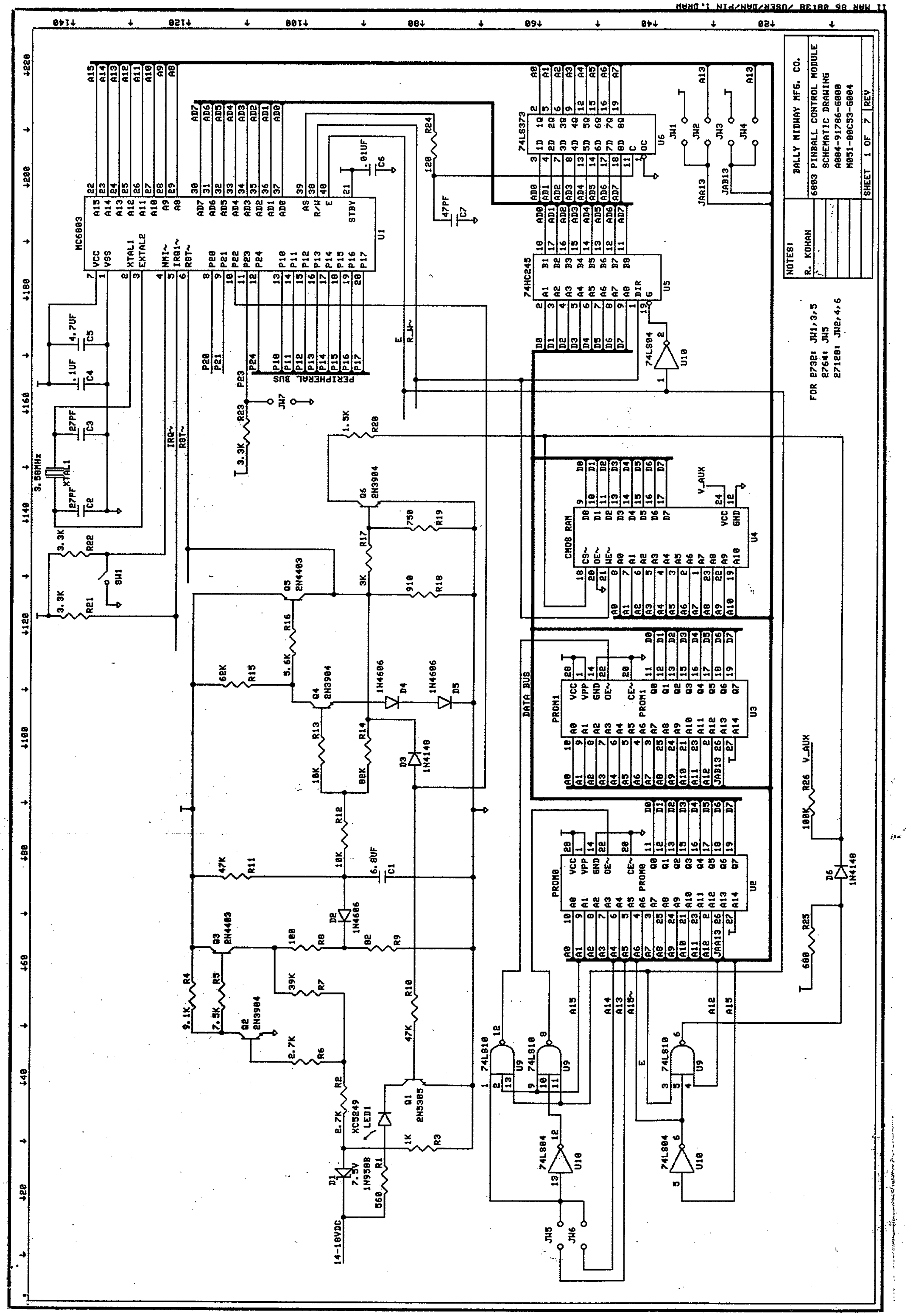
DESIGNATION	DESCRIPTION
C1	6.8UF 25V TANT.
C2,C3	27PF 50V CER.
C4	.1UF 50V CER.
C5	4.7UF 25V TANT.
C6	.01UF 50V CER.
C7	47PF 50V CER.
C8	470UF 16V ELEC.
C9,C10	.01UF 50V CER.
C11	470UF 25V ELEC.
C12,C13	.01UF 50V CER.
C14	4.7UF 25V TANT.
C15,C16	.01UF 50V CER.
C17 - C23	470PF 1KV CER.
C24 - C30	390PF 50V CER.
C31 - C36	470PF 1KV CER.
C37	.05UF 16V CER.
C38 - C41	470PF 1KV CER.
C42	.01UF 50V CER.
C43	.003UF 1KV CER.
C44 - C47	.002UF 1KV CER.
C48 - C56	470PF 1KV CER.
C57 - C71	390PF 50V CER.
C73 - C87	.002 1KV CER.
C88 - C90	390PF 50V CER.
C91	470PF 1KV CER.
CP1 - CP16	.01 50V CER.
R1	560 OHM 1/4W 5%
R2	2.7K 1/4W 5%
R3	1K 1/4W 5%
R4	9.1K 1/4W 5%
R5	7.5K 1/4W 5%
R6	2.7K 1/4W 5%
R7	39K 1/4W 5%
R8	100 OHM 1/4W 5%
R9	82 OHM 1/4W 5%
R10,R11	47K 1/4W 5%
R12,R13	10K 1/4W 5%
R14	82K 1/4W 5%
R15	62K 1/4W 5%
R16	5.6K 1/4W 5%
R17	3K 1/4W 5%
R18	910 OHM 1/4W 5%
R19	750 OHM 1/4W 5%
R20	1.5K 1/4W 5%
R21 - R23	3.3K 1/4W 5%
R24	120 OHM 1/4W 5%
R25	680 OHM 1/4W 5%
R26	100K 1/4W 5%
R27	82 OHM 1W 10%
R28	270 OHM 1/4W 5%
R29	1K 1/4W 5%
R30	10K 1/4W 5%
R31	15K 1/4W 5%
R32	1K 1/4W 5%
R33	10K 1/4W 5%
R34	15K 1/4W 5%
R35	3.3K 1/4W 5%
R36 - R43	4.7K 1/4W 5%
R44 - R50	1.2K 1/4W 5%
R51 - R58	3.3K 1/4W 5%
R59 - R61	1.2K 1/4W 5%
R62	56K 1/4W 5%
R63	1.2K 1/4W 5%
R64	56K 1/4W 5%
R65	1.2K 1/4W 5%
R66	56K 1/4W 5%
R67	1.2K 1/4W 5%
R68	56K 1/4W 5%
R69	1.2K 1/4W 5%
R70	56K 1/4W 5%
R71 - R76	1.2K 1/4W 5%
R77	270K 1/4W 5%
R78 - R82	1.2K 1/4W 5%
R83	110 OHM 1/4W 5%
R84	3.9K 1/4W 5%
R85	120 OHM 1/4W 5%
R86	3.9K 1/4W 5%
R87	120 OHM 1/4W 5%
R88	3.9K 1/4W 5%
R89	120 OHM 1/4W 5%
R90	3.9K 1/4W 5%
R91	120 OHM 1/4W 5%
R92 - R95	330 OHM 1/4W 5%
R96 - R104	470 OHM 1/4W 5%
R105 - R119	1.2K 1/4W 5%
R121	120 OHM 1/4W 5%
R122	1.2K 1/4W 5%
R123	2K 1/4W 5%
R124	3.3K 1/4W 5%
R125 - R132	56K 1/4W 5%
R133 - R135	1.2K 1/4W 5%
R136 - R138	120 OHM 1/4W 5%
R139 - R141	330 OHM 1/4W 5%
R142 - R145	3.3K 1/4W 5%
R146 - R150	1.2K 1/4W 5%
R151 - R155	120 OHM 1/4W 5%
R156 - R160	330 OHM 1/4W 5%
R161 - R164	1.2K OHM 1/4W 5%
R165 - R168	120 OHM 1/4W 5%
R169 - R172	330 OHM 1/4W 5%
R173 - R187	2K 1/4W 5%
R188 - R190	1.2K 1/4W 5%
R191 - R193	120 OHM 1/4W 5%
R194 - R196	330 OHM 1/4W 5%
R197 - R226	2K 1/4W 5%
R227,R228	1.2K 1/4W 5%
R229	56K 1/4W 5%
R230	1.2K 1/4W 5%
R231 - R234	330 OHM 1/4W 5%
R235	3.3K 1/4W 5%
R236	1.2K 1/4W 5%
R237	100K OHM 1/4W 5%
D1	1N958B
D2	1N4606
D3	1N4148
D4,D5	1N4606
D6	1N4148
D7,D8	1N4606
D9 - D18	1N4148
D19 - D38	1N4004
D39	1N4148
Q1	2N5305
Q2	2N3904
Q3	2N4403
Q4	2N3904
Q5	2N4403
Q6	2N3904
Q7 - Q22	SE9302
Q23 - Q33	2N5060
Q34 - Q36	MCR 106-1
Q37	2N5060
Q38 - Q40	SE9302
Q41 - Q50	2N5060
Q51 - Q53	MCR 106-1
Q54 - Q64	2N5060
Q65 - Q68	MCR 106-1
Q69,Q70	2N5060
U1	6803
U4	6116 RAM
U5	74HCT245
U6	74LS373
U7,U8	6821
U9	74LS10
U10	74LS04
U11	4011
U12	4584
U13	4502
U14	74LS154
U15 - U17	4514B
U18 - U20	CA3081
XTAL-1	3.580 MHZ CRYSTAL
LED 1	LED GREEN
TP1 - TP7	TEST POINTS
SW1	SWITCH P.B.
BATT-1	BATTERY 3.6V
JW2	ZERO OHM RES. JUMPER
JW4	ZERO OHM RES. JUMPER
JW6	ZERO OHM RES. JUMPER
JW8	ZERO OHM RES. JUMPER
JW10	ZERO OHM RES. JUMPER
K1	RELAY 48V DC
XU1,XU7,XU8	40 PIN IC SOCKET
XU2, XU3	28 PIN IC SOCKET
XU4	24 PIN IC SOCKET
FB1 - FB4	FERRITE BEAD
J1	11 - .045 SQ. PINS
J2	18 - .025 SQ. PINS
J3	14 - .025 SQ. PINS
J4	14 - .025 SQ. PINS
J5	14 - .025 SQ. PINS
J6	8 - .045 SQ. PINS
J7	7 - .045 SQ. PINS
J8	6 - .045 SQ. PINS
J9	10 - .045 SQ. PINS
J10	18 - .025 SQ. PINS
J11	17 - .025 SQ. PINS
J12	16 - .025 SQ. PINS
J13	12 - .025 SQ. PINS
J14	5 - .045 SQ. PINS
P/O BATT-1	TY-WRAP
6803 CONTROL BD.	P.C. BOARD

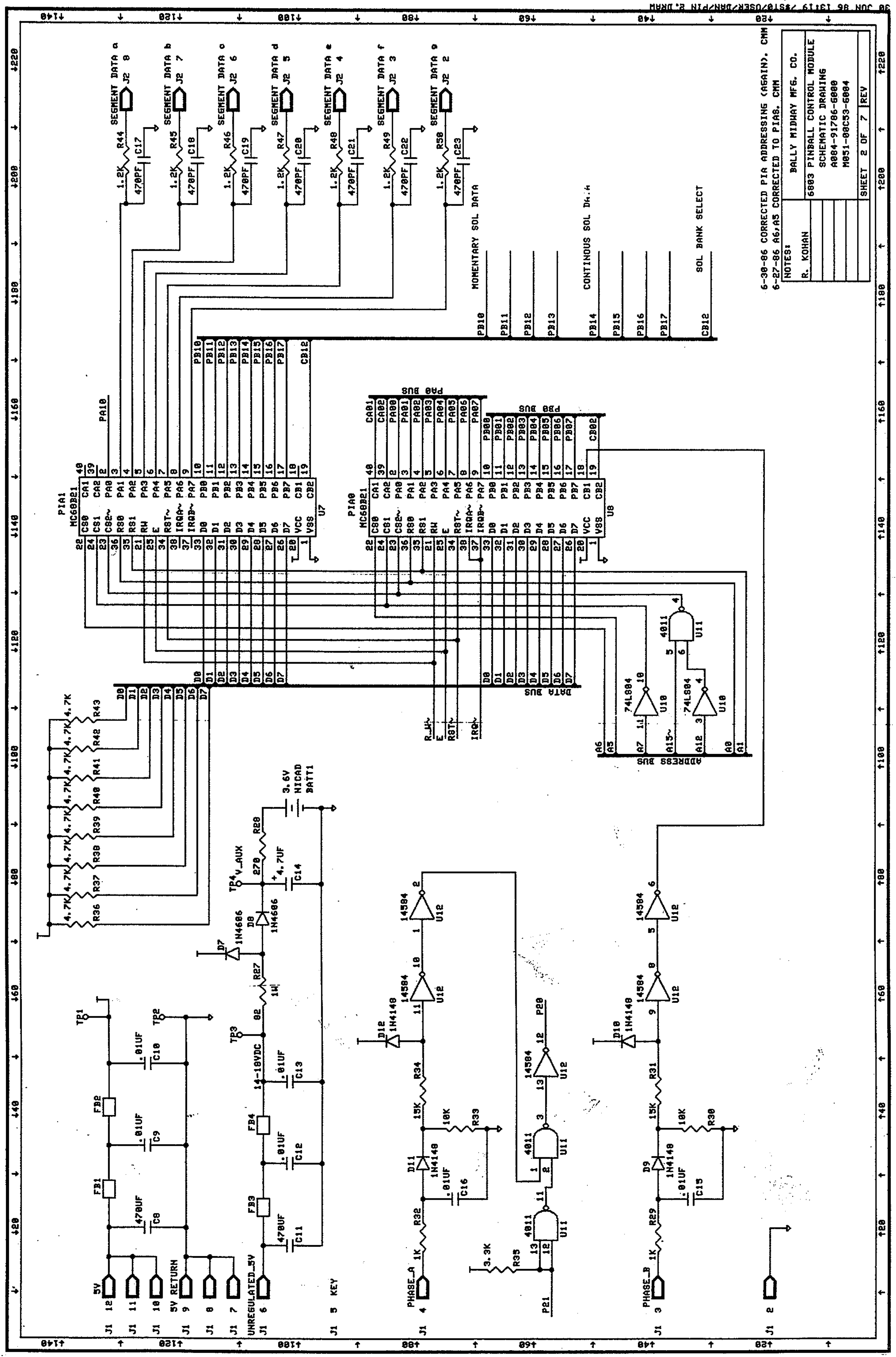
6803 CONTROL BOARD
A084-91786-G000
M051-000C53-G003

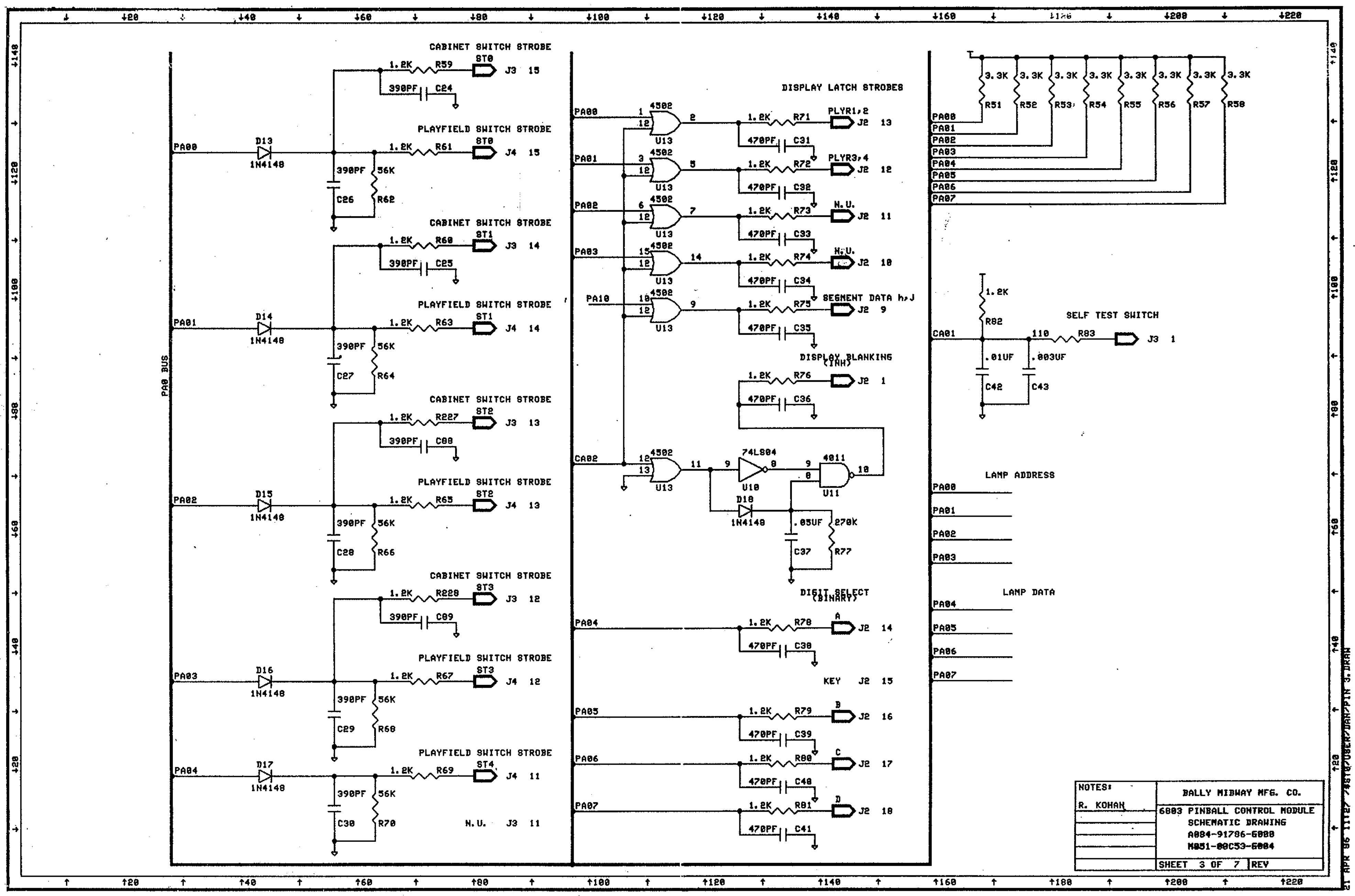
CROSS REFERENCE LIST

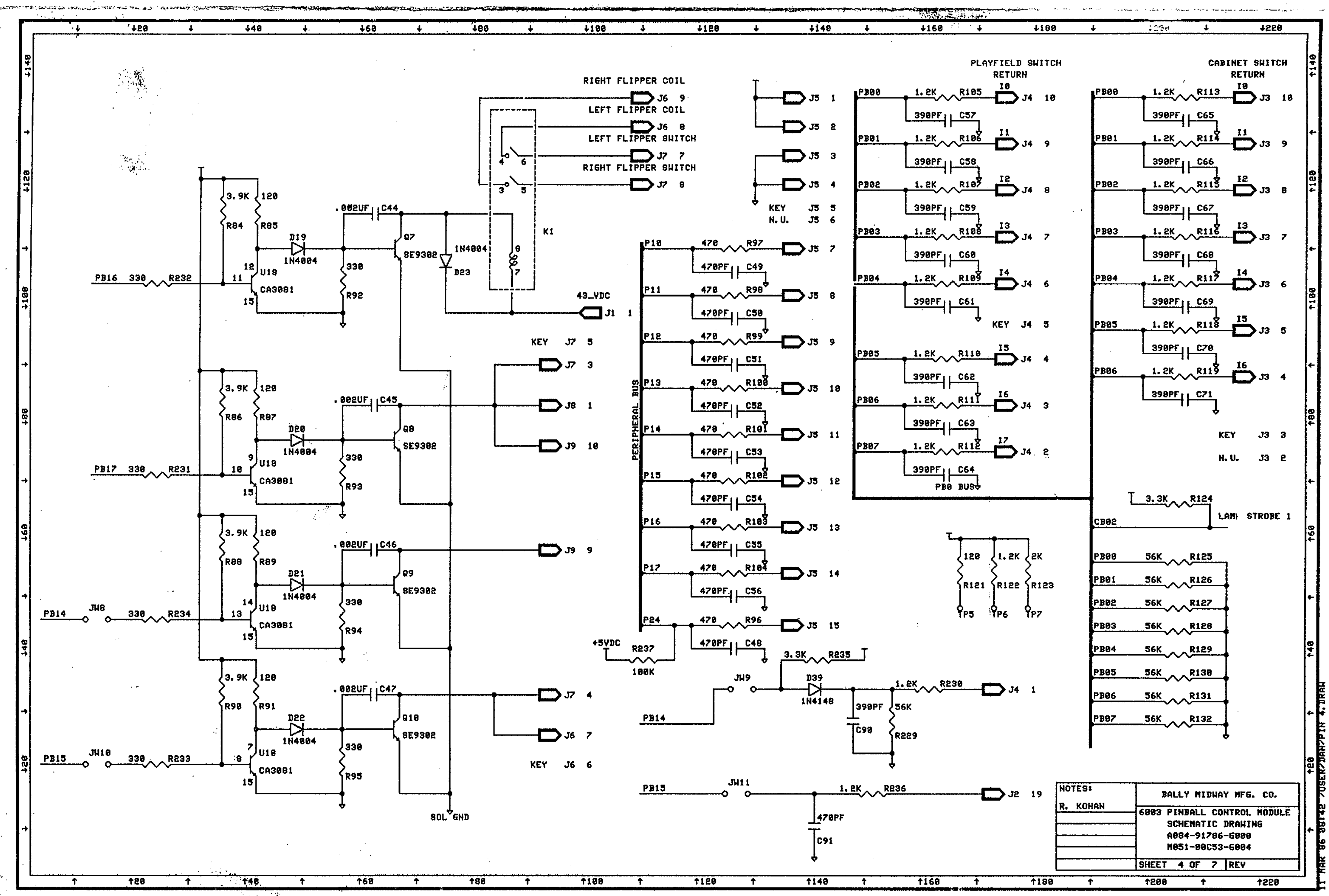
DESCRIPTION	QTY.	DESIGNATION NO.	PART NOS.
.025 SQ. PINS	123	J2, J3, J4, J5, J10, J11, J12, J13	0304-00804-0009
.045 SQ. PINS	47	J1, J6, J7, J8, J9, J14	0304-00804-0010
TY-WRAP	1	P/O BATT-1	0017-00042-0622
P.C. BOARD	1	6803 CONTROL BOARD	A080-91786-G000

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

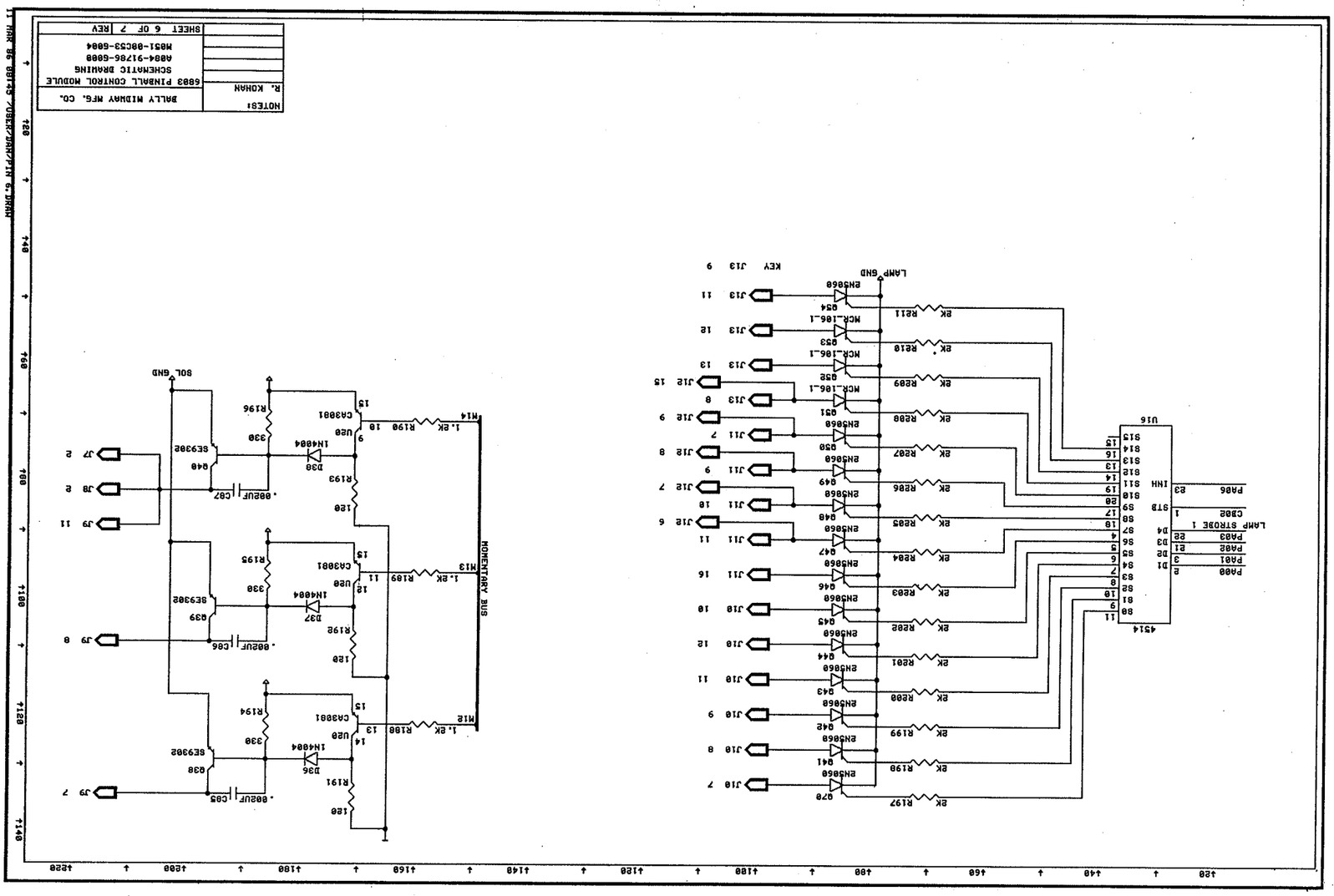

BALLY MIDWAY MFG. CO.
6803 PINBALL CONTROL MODULE
SCHEMATIC DRAWING
A084-91786-G000
M051-00C53-G004
SHEET 1 OF 7
REV
NOTES:
R. KOHAN
FOR 2732: JW1,3,5
2764: JW5
27128: JW2,4,6


BALLY MIDWAY MFG. CO.
6803 PINBALL CONTROL MODULE
SCHEMATIC DRAWING
A084-91786-G000
M051-00C53-G004
SHEET 2 OF 7
REV
NOTES:
R. KOHAN
6-30-86 CORRECTED PIA ADDRESSING (AGAIN). CMM
6-27-86 A6,A5 CORRECTED TO PIAS. CMM

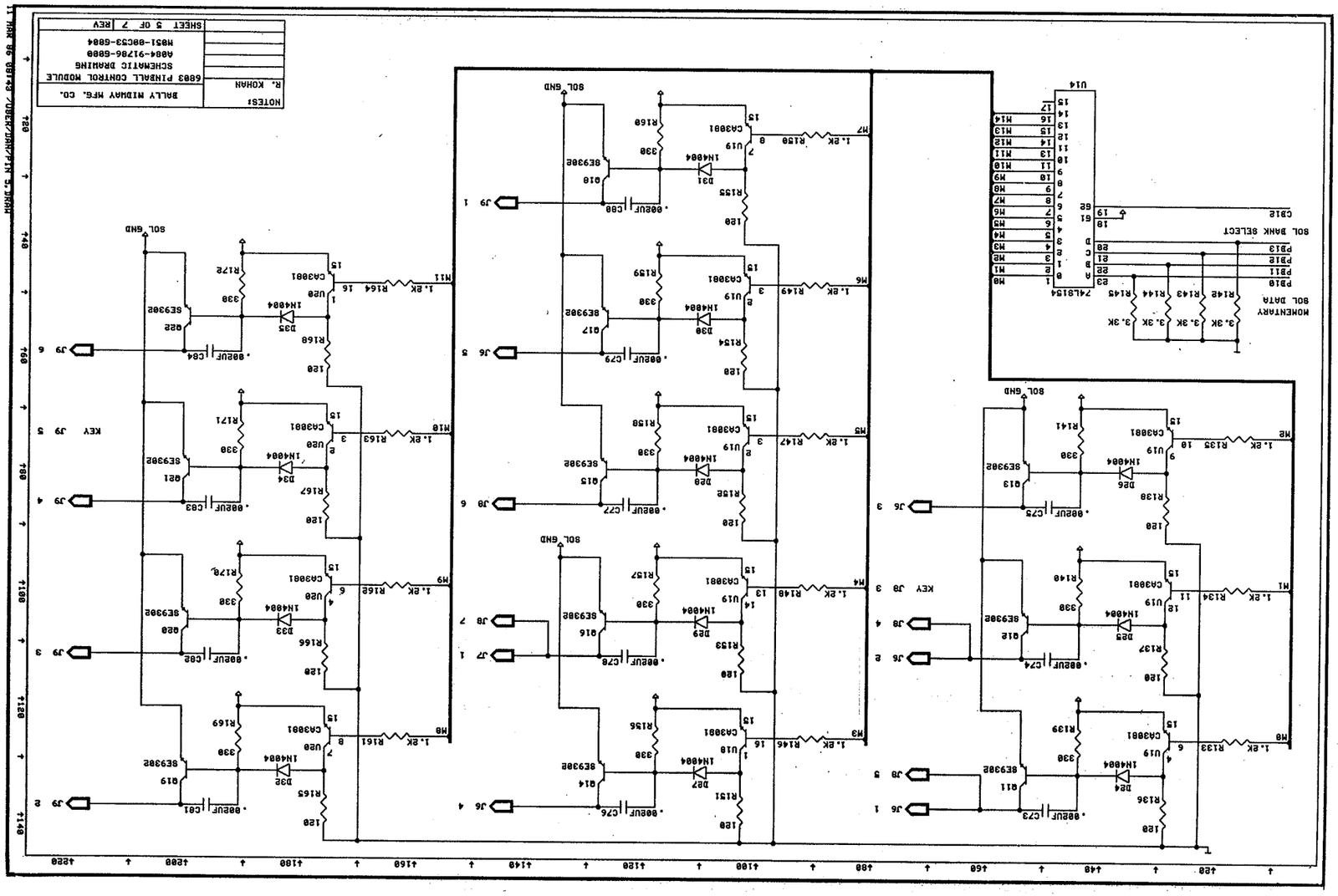

BALLY MIDWAY MFG. CO.
6803 PINBALL CONTROL MODULE
SCHEMATIC DRAWING
A084-91706-G000
M051-00C53-G004
SHEET 3 OF 7
NOTES:
R. KOHAN
CABINET SWITCH STROBE
PLAYFIELD SWITCH STROBE
DISPLAY LATCH STROBES
SEGMENT DATA h,J
DISPLAY BLANKING
DIGIT SELECT
SELF TEST SWITCH
LAMP ADDRESS
LAMP DATA
PA0 BUS


BALLY MIDWAY MFG. CO.
6803 PINBALL CONTROL MODULE
SCHEMATIC DRAWING
A084-91706-G000
M051-00C53-G004
SHEET 4 OF 7
NOTES:
R. KOHAN
RIGHT FLIPPER COIL
LEFT FLIPPER COIL
LEFT FLIPPER SWITCH
RIGHT FLIPPER SWITCH
PLAYFIELD SWITCH RETURN
CABINET SWITCH RETURN
PERIPHERAL BUS
PB0 BUS
LAMP STROBE 1
SOL GND
43_VDC
+5VDC

NOTES:	
R. KOHAN	BALLY MIDWAY MFG. CO.
	6803 PINBALL CONTROL MODULE
	A804-91786-6808
	SCHEMATIC DRAWING
	M851-80C53-6804
	SHEET 6 OF 7 REV



NOTES:	
R. KOHAN	BALLY MIDWAY MFG. CO.
	6803 PINBALL CONTROL MODULE
	A804-91786-6808
	SCHEMATIC DRAWING
	M851-80C53-6804
	SHEET 5 OF 7 REV



HARDBODY
M051-00E94-A012

LAMP DRIVER LOCATIONS

DRIVER	CONNECTOR	PIN	PHASE	WIRE	DESCRIPTION
Q55	J10	16	A	38	BLUE BONUS BOTTOM
Q33	J11	15	A	75	BLUE BONUS MIDDLE
Q63	J11	3	A	59	BLUE BONUS TOP
Q62	J11	4	A	61	BLUE TARGET CALVES
Q47	J11	11	A	71	BLUE TARGET GLUTES
Q30	J11	12	A	72	BLUE TARGET HAMS
Q61	J11	6	A	62	BLUE TARGET QUADS
Q37	J13	4	A	85	BONUS 2X
Q54	J13	11	A	95	BONUS 3X
Q45	J10	10	A	28	BONUS MIDDLE 25K BOTTOM
Q60	J10	13	A	36	BONUS MIDDLE 25K MIDDLE
Q29	J11	8	A	64	BONUS MIDDLE 25K TOP
Q46	J11	16	A	78	BONUS MIDDLE 300K
Q65	J11	1	D	48	BRIGHT BLUE
Q52	J13	13	C	97	BRIGHT DT INLINE
Q34	J13	1	D	81	BRIGHT GREEN
Q67	J13	5	C	86	BRIGHT LEFT SLING
Q67	J13	5	D	86	BRIGHT LEFT UP RAMP
Q35	J13	2	C	83	BRIGHT MIDDLE HOOP
Q66	H13	6	D	87	BRIGHT RAMP LEFT 1
Q35	J13	2	D	83	BRIGHT RAMP LEFT 2
Q65	J11	1	C	48	BRIGHT RAMP MIDDLE
Q34	J13	1	C	81	BRIGHT RAMP RIGHT 2
Q51	J13	8	C	93	BRIGHT RAMP RIGHT 1
Q36	J13	3	C	84	BRIGHT RIGHT SLING
Q36	J13	3	D	84	BRIGHT RIGHT UP RAMP
Q66	J13	6	C	87	BRIGHT TOP HOOP
Q52	J13	13	D	97	BRIGHT TOP LANE
Q51	J13	8	D	93	BRIGHT YELLOW
Q25	J10	3	A	14	CENTER SPECIAL
Q41	J10	8	A	25	DOUBLE POWER
Q70	J10	7	A	24	GREEN BONUS BOTTOM
Q64	J11	2	A	58	GREEN BONUS MIDDLE
Q48	J11	10	A	68	GREEN BONUS TOP
Q59	J10	14	B	37	GREEN TARGET LATS
Q44	J10	12	B	32	GREEN TARGET PECS
Q28	J10	6	B	21	GREEN TARGET TRAPS
Q56	J10	17	B	41	HOOP 100K
Q23	J10	1	B	12	HOOP 20K

HARDBODY
M051-00E94-A012

LAMP DRIVER LOCATIONS

DRIVER	CONNECTOR	PIN	PHASE	WIRE	DESCRIPTION
Q70	J10	7	B	24	HOOP 35K
Q55	J10	16	B	38	HOOP 50K
Q24	J10	2	B	13	HOOP 65K
Q41	J10	8	B	25	HOOP 80K
Q69	J13	7	A	91	HOOP ARROW
Q25	J10	3	B	14	HOOP EXTRA BALL
Q31	J11	13	B	73	INLINE DT 25K
Q48	J11	10	B	68	INLINE DT 2X
Q63	J11	3	B	59	INLINE DT 3X
Q32	J11	14	B	74	INLINE DT EXTRA BALL
Q57	J10	18	A	43	LEFT BONUS 20K BOTTOM
Q26	J10	4	A	15	LEFT BONUS 20K MIDDLE
Q43	J10	11	A	31	LEFT BONUS 20K TOP
Q58	J10	19	A	45	LEFT BONUS 40K
Q53	J13	12	A	96	LEFT RETURN
Q56	J10	17	A	41	NORMAL POWER
Q23	J10	1	A	12	ORANGE BONUS BOTTOM
Q49	J11	9	A	67	ORANGE BONUS MIDDLE
Q31	J11	13	A	73	ORANGE BONUS TOP
Q69	J13	7	B	91	ORANGE DT DELTOID
Q37	J13	4	B	85	ORANGE DT TRICEPS
Q54	J13	11	B	95	ORANGE DT TRICEPS
Q57	J10	18	B	43	RAMP 50K
Q26	J10	4	B	15	RAMP 100K
Q43	J10	11	B	31	RAMP 200K
Q58	J10	19	B	45	RAMP EXTRA BALL
Q59	J10	14	A	37	RIGHT BONUS 20K TOP
Q27	J10	5	A	18	RIGHT BONUS 20K BOTTOM
Q44	J10	12	A	32	RIGHT BONUS 20K MIDDLE
Q28	J10	6	A	21	RIGHT BONUS 40K
Q68	J13	10	A	94	RIGHT RETURN
Q42	J10	9	A	26	SHOOT AGAIN
Q42	J10	9	B	26	SPECIAL ARROW
Q24	J10	2	A	13	YELLOW BONUS BOTTOM
Q50	J11	7	A	63	YELLOW BONUS MIDDLE
Q32	J11	14	A	74	YELLOW BONUS TOP
Q62	J11	4	B	61	YELLOW TARGET OBLIQUE
Q47	J11	11	B	71	YELLOW TARGET RECTABS
Q30	J11	12	B	72	YELLOW TARGET TRANSAB

NOTE: C&D PHASES ARE BRIGHT LIGHTS

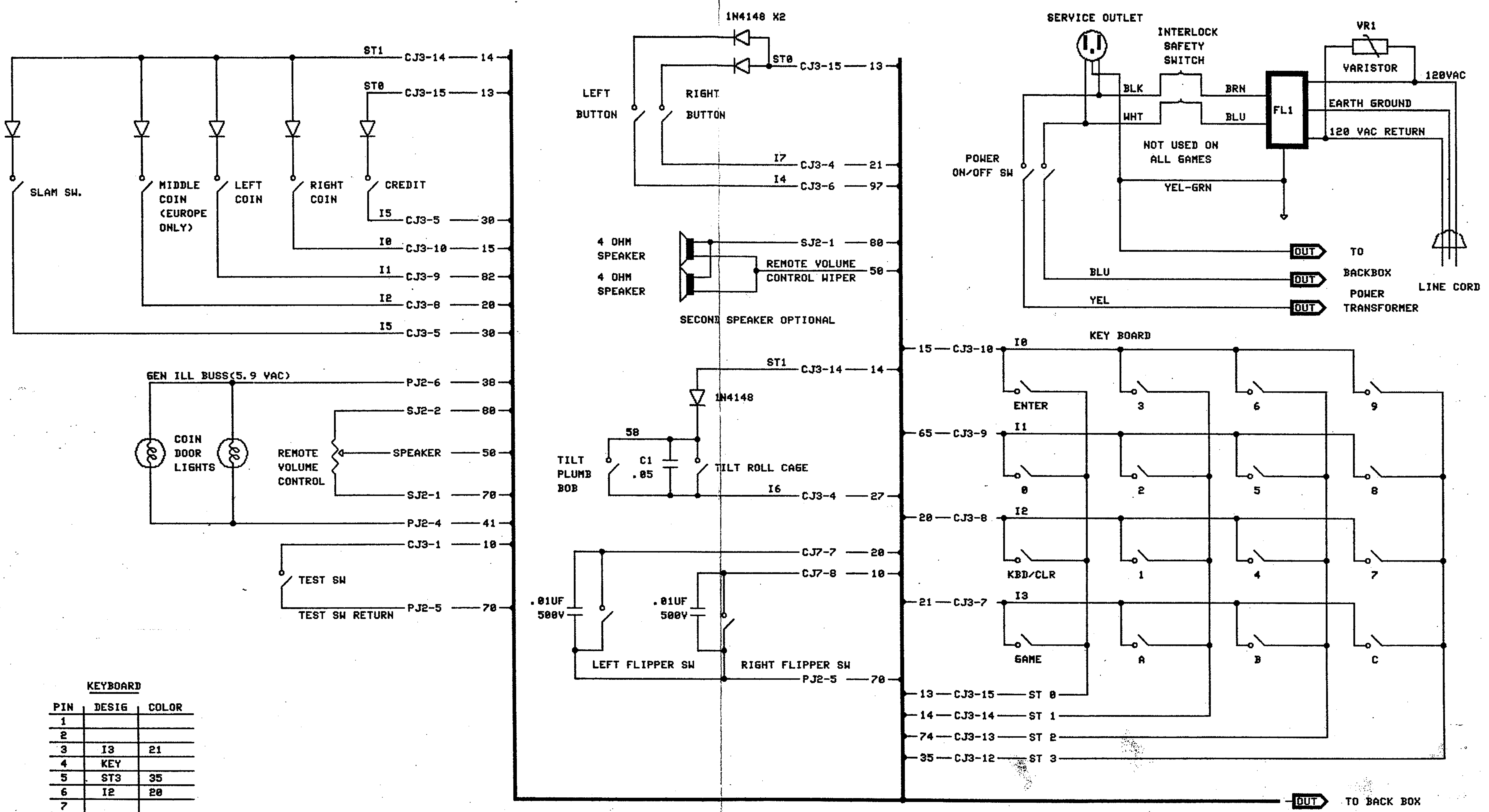
HARDBODY
M051-00E94-A012

SOLENOID DRIVER LOCATIONS

TRANSISTOR	CONNECTOR PIN	DESCRIPTION	WIRE CODE
Q7	J6-8	* LEFT FLIPPER	90
Q15	J8-6	LEFT RAMP UP	25
Q8	J8-1	LEFT RETURN LANE	24
Q11	J6-1	LEFT SLINGSHOT	31
Q40	J9-11	KNOCKER	59
Q39	J9-8	OUTHOLE	58
Q17	J6-5	RAMPS DOWN	36
Q38	J9-7	RESERVED FOR GERMAN	57
Q16	J8-7	RESET INLINE DT	27
Q13	J6-3	RESET TOP DT	34
Q7	J6-9	* RIGHT FLIPPER	95
Q10	J6-7	RIGHT RETURN LANE	311
Q18	J9-1	RIGHT RAMP UP	51
Q12	J6-2	RIGHT SLINGSHOT	32

* FLIPPERS CONNECTED THROUGH K1, THE FLIPPER RELAY.

WIRE 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



KEYBOARD

PIN	DESIG	COLOR
1		
2		
3	I3	21
4	KEY	
5	ST3	35
6	I2	20
7		
8	ST2	74
9		
10	I1	65
11	ST1	14
12		
13	I0	15
14		
15	ST0	13

COLOR CODE

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

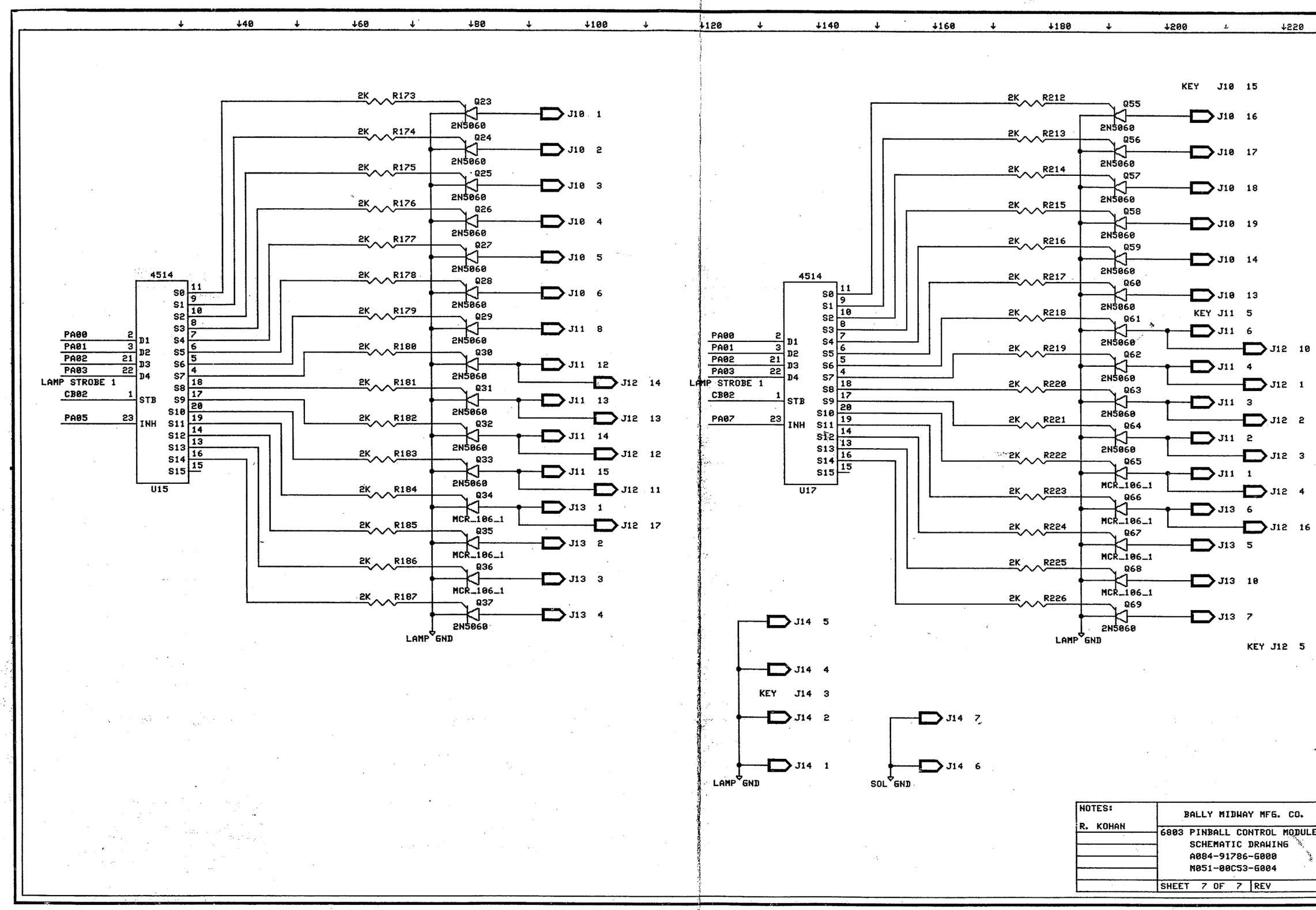
NOTES:
D. STERN
2/20/87

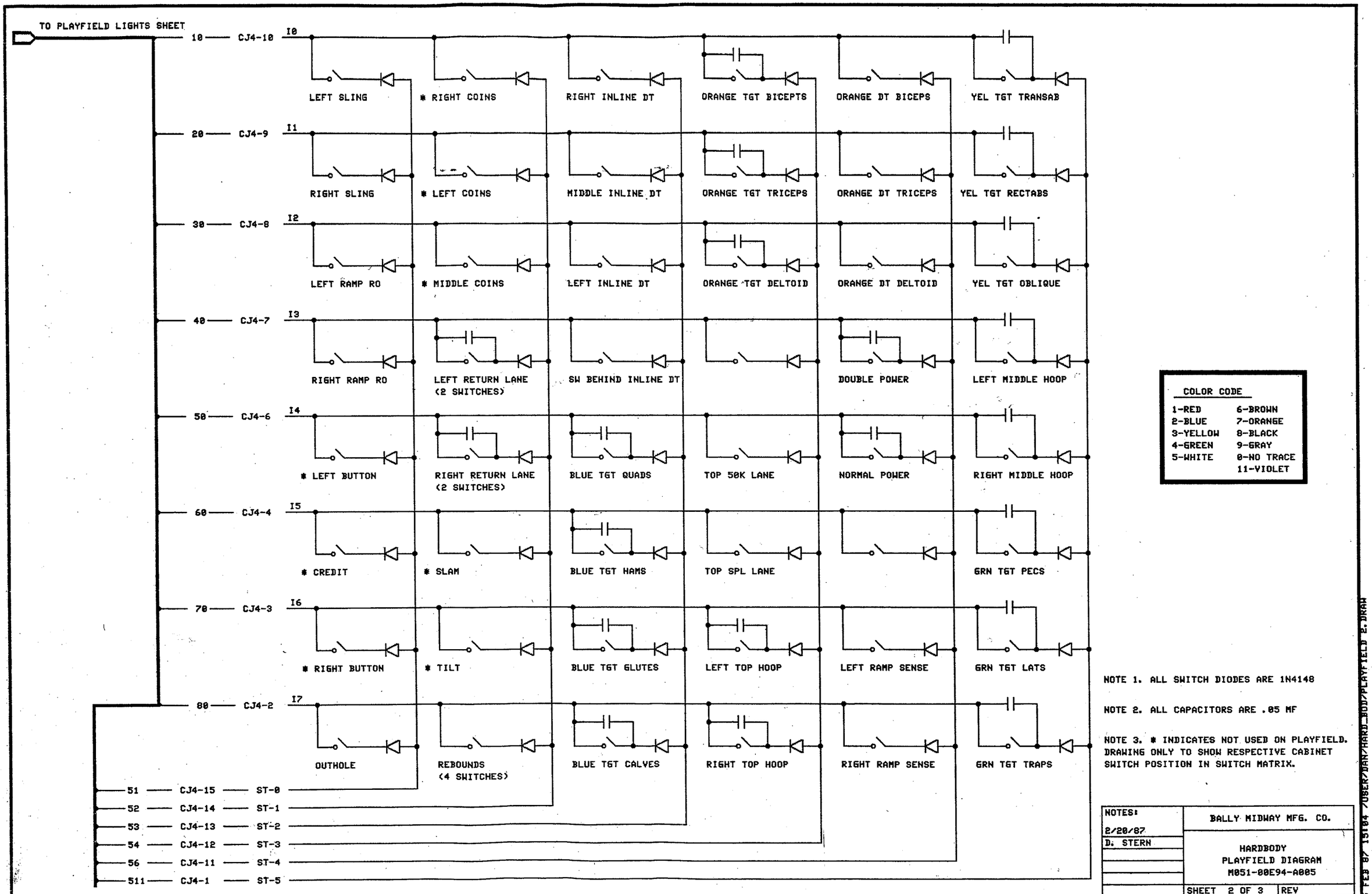
BALLY MIDWAY MFG. CO.

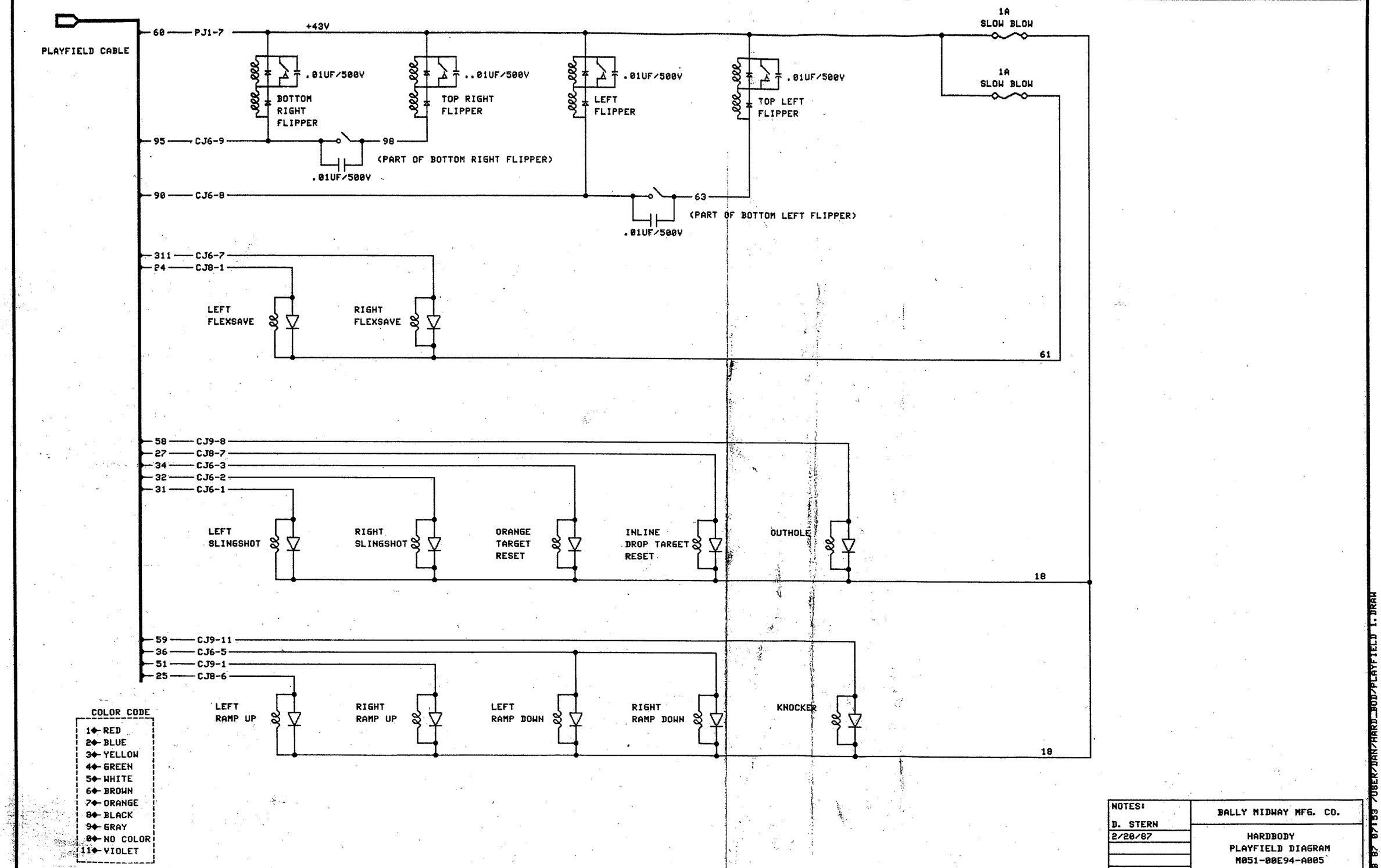
HARDBODY
CABINET DIAGRAM
M051-00E94-A003

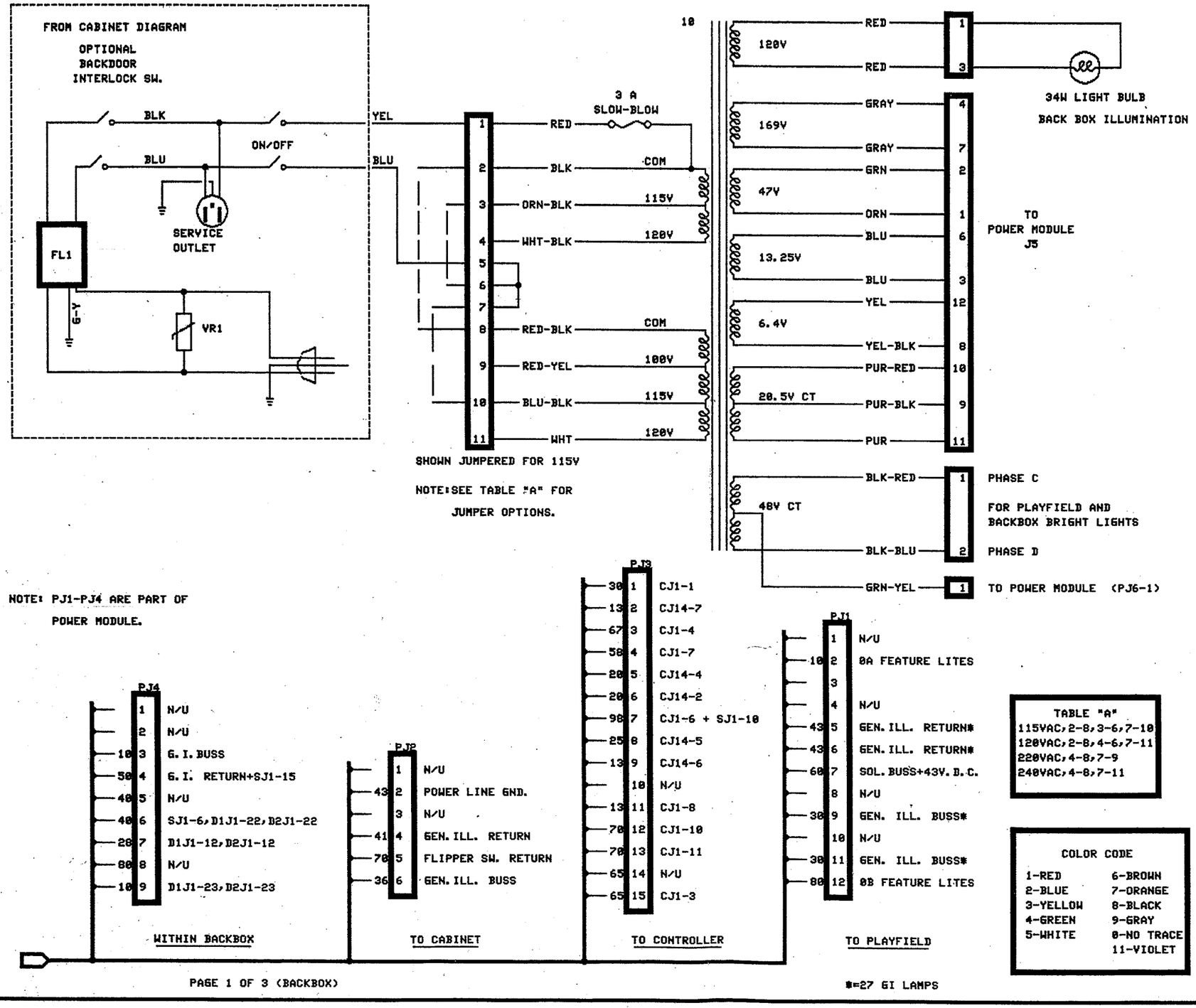
SHEET 1 OF 1 REV

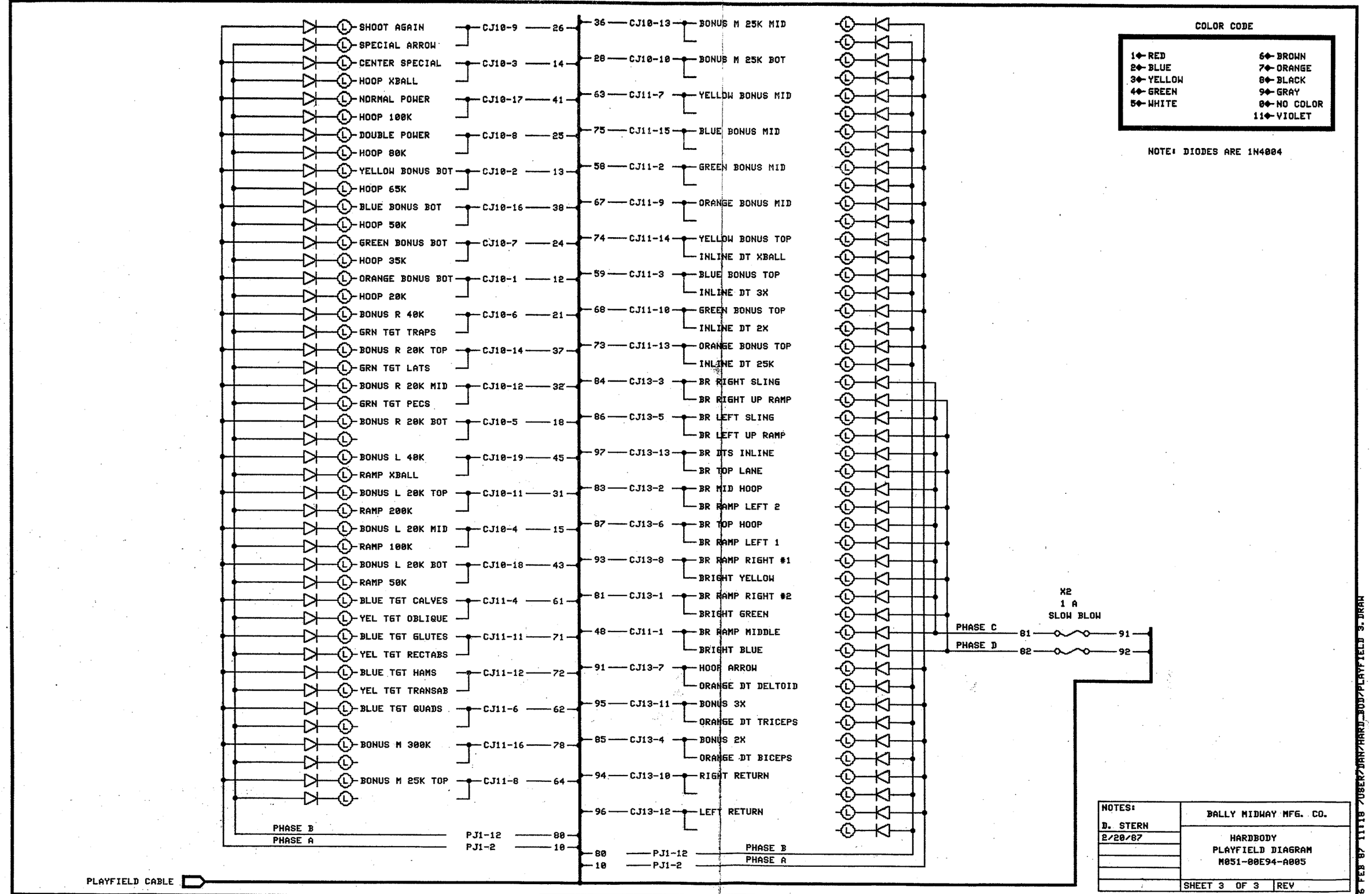
25 FEB 87 07:57 /USER/DAN/HARD_BOD/CABINET 1.DRAW


4514
U15
PA00 2
PA01 3
PA02 21
PA03 22
LAMP STROBE 1
CB02 1
PA05 23
D1
D2
D3
D4
STB
INH
S0 11
S1 9
S2 10
S3 8
S4 7
S5 6
S6 5
S7 4
S8 18
S9 17
S10 20
S11 19
S12 14
S13 13
S14 16
S15 15
2K R173
2K R174
2K R175
2K R176
2K R177
2K R178
2K R179
2K R180
2K R181
2K R182
2K R183
2K R184
2K R185
2K R186
2K R187
Q23 2N5060
Q24 2N5060
Q25 2N5060
Q26 2N5060
Q27 2N5060
Q28 2N5060
Q29 2N5060
Q30 2N5060
Q31 2N5060
Q32 2N5060
Q33 2N5060
Q34 MCR_106_1
Q35 MCR_106_1
Q36 MCR_106_1
Q37 2N5060
J10 1
J10 2
J10 3
J10 4
J10 5
J10 6
J11 8
J11 12
J12 14
J11 13
J12 13
J11 14
J12 12
J11 15
J12 11
J13 1
J12 17
J13 2
J13 3
J13 4
LAMP GND
U17
PA07 23
2K R212
2K R213
2K R214
2K R215
2K R216
2K R217
2K R218
2K R219
2K R220
2K R221
2K R222
2K R223
2K R224
2K R225
2K R226
Q55 2N5060
Q56 2N5060
Q57 2N5060
Q58 2N5060
Q59 2N5060
Q60 2N5060
Q61 2N5060
Q62 2N5060
Q63 2N5060
Q64 2N5060
Q65 MCR_106_1
Q66 MCR_106_1
Q67 MCR_106_1
Q68 MCR_106_1
Q69 2N5060
KEY J10 15
J10 16
J10 17
J10 18
J10 19
J10 14
J10 13
KEY J11 5
J11 6
J12 10
J11 4
J12 1
J11 3
J12 2
J11 2
J12 3
J11 1
J12 4
J13 6
J12 16
J13 5
J13 10
J13 7
KEY J12 5
J14 5
J14 4
KEY J14 3
J14 2
J14 1
LAMP GND
J14 7
J14 6
SOL GND
NOTES:
R. KOHAN
BALLY MIDWAY MFG. CO.
6803 PINBALL CONTROL MODULE
SCHEMATIC DRAWING
A084-91786-G000
M051-00C53-G004
SHEET 7 OF 7
REV
11 MAR 86 08:46 /USER/DAN/PIN 7.DRAW


TO PLAYFIELD LIGHTS SHEET
10 CJ4-10 I0
LEFT SLING
* RIGHT COINS
RIGHT INLINE DT
ORANGE TGT BICEPTS
ORANGE DT BICEPS
YEL TGT TRANSAB
20 CJ4-9 I1
RIGHT SLING
* LEFT COINS
MIDDLE INLINE DT
ORANGE TGT TRICEPS
ORANGE DT TRICEPS
YEL TGT RECTABS
30 CJ4-8 I2
LEFT RAMP RO
* MIDDLE COINS
LEFT INLINE DT
ORANGE TGT DELTOID
ORANGE DT DELTOID
YEL TGT OBLIQUE
40 CJ4-7 I3
RIGHT RAMP RO
LEFT RETURN LANE (2 SWITCHES)
SW BEHIND INLINE DT
DOUBLE POWER
LEFT MIDDLE HOOP
50 CJ4-6 I4
* LEFT BUTTON
RIGHT RETURN LANE (2 SWITCHES)
BLUE TGT QUADS
TOP 50K LANE
NORMAL POWER
RIGHT MIDDLE HOOP
60 CJ4-4 I5
* CREDIT
* SLAM
BLUE TGT HAMS
TOP SPL LANE
GRN TGT PECS
70 CJ4-3 I6
* RIGHT BUTTON
* TILT
BLUE TGT GLUTES
LEFT TOP HOOP
LEFT RAMP SENSE
GRN TGT LATS
80 CJ4-2 I7
OUTHOLE
REBOUNDS (4 SWITCHES)
BLUE TGT CALVES
RIGHT TOP HOOP
RIGHT RAMP SENSE
GRN TGT TRAPS
51 CJ4-15 ST-0
52 CJ4-14 ST-1
53 CJ4-13 ST-2
54 CJ4-12 ST-3
56 CJ4-11 ST-4
511 CJ4-1 ST-5
COLOR CODE
1-RED
2-BLUE
3-YELLOW
4-GREEN
5-WHITE
6-BROWN
7-ORANGE
8-BLACK
9-GRAY
0-NO TRACE
11-VIOLET
NOTE 1. ALL SWITCH DIODES ARE 1N4148
NOTE 2. ALL CAPACITORS ARE .05 MF
NOTE 3. * INDICATES NOT USED ON PLAYFIELD. DRAWING ONLY TO SHOW RESPECTIVE CABINET SWITCH POSITION IN SWITCH MATRIX.
NOTES:
2/20/87
D. STERN
BALLY MIDWAY MFG. CO.
HARDBODY
PLAYFIELD DIAGRAM
M051-00E94-A005
SHEET 2 OF 3
REV
25 FEB 87 15:04 /USER2/DAN/HARD_BOD/PLAYFIELD 2.DRAW


PLAYFIELD CABLE
60 PJ1-7
+43V
1A SLOW BLOW
1A SLOW BLOW
.01UF/500V
BOTTOM RIGHT FLIPPER
..01UF/500V
TOP RIGHT FLIPPER
.01UF/500V
LEFT FLIPPER
.01UF/500V
TOP LEFT FLIPPER
95 CJ6-9
98
(PART OF BOTTOM RIGHT FLIPPER)
.01UF/500V
90 CJ6-8
63
(PART OF BOTTOM LEFT FLIPPER)
.01UF/500V
311 CJ6-7
24 CJ8-1
LEFT FLEXSAVE
RIGHT FLEXSAVE
61
58 CJ9-8
27 CJ8-7
34 CJ6-3
32 CJ6-2
31 CJ6-1
LEFT SLINGSHOT
RIGHT SLINGSHOT
ORANGE TARGET RESET
INLINE DROP TARGET RESET
OUTHOLE
18
59 CJ9-11
36 CJ6-5
51 CJ9-1
25 CJ8-6
LEFT RAMP UP
RIGHT RAMP UP
LEFT RAMP DOWN
RIGHT RAMP DOWN
KNOCKER
18
COLOR CODE
1 RED
2 BLUE
3 YELLOW
4 GREEN
5 WHITE
6 BROWN
7 ORANGE
8 BLACK
9 GRAY
0 NO COLOR
11 VIOLET
NOTES:
D. STERN
2/20/87
BALLY MIDWAY MFG. CO.
HARDBODY
PLAYFIELD DIAGRAM
M051-00E94-A005
SHEET 1 OF 3
REV
25 FEB 87 07:33 /USER/DAN/HARD_BOD/PLAYFIELD 1.DRAW


FROM CABINET DIAGRAM
OPTIONAL
BACKDOOR
INTERLOCK SW.
BLK
BLU
ON/OFF
YEL
BLU
SERVICE
OUTLET
FL1
6-V
VR1
10
3 A
SLOW-BLOW
1 RED
2 BLK COM
3 ORN-BLK 115V
4 WHT-BLK 120V
5
6
7
8 RED-BLK COM
9 RED-YEL 100V
10 BLU-BLK 115V
11 WHT 120V
SHOWN JUMPERED FOR 115V
NOTE:SEE TABLE "A" FOR
JUMPER OPTIONS.
120V
RED
RED
34W LIGHT BULB
BACK BOX ILLUMINATION
169V
GRAY
GRAY
GRN
47V
ORN
BLU
TO
POWER MODULE
J5
13.25V
BLU
YEL
6.4V
YEL-BLK
PUR-RED
28.5V CT
PUR-BLK
PUR
48V CT
BLK-RED
PHASE C
FOR PLAYFIELD AND
BACKBOX BRIGHT LIGHTS
BLK-BLU
PHASE D
GRN-YEL
TO POWER MODULE (PJ6-1)
NOTE: PJ1-PJ4 ARE PART OF
POWER MODULE.
PJ4
1 N/U
2 N/U
10 3 G.I.BUSS
50 4 G.I. RETURN+SJ1-15
40 5 N/U
40 6 SJ1-6,D1J1-22,D2J1-22
28 7 D1J1-12,D2J1-12
80 8 N/U
10 9 D1J1-23,D2J1-23
WITHIN BACKBOX
PJ2
1 N/U
43 2 POWER LINE GND.
3 N/U
41 4 GEN. ILL. RETURN
70 5 FLIPPER SW. RETURN
36 6 GEN. ILL. BUSS
TO CABINET
PJ3
30 1 CJ1-1
13 2 CJ14-7
67 3 CJ1-4
58 4 CJ1-7
20 5 CJ14-4
20 6 CJ14-2
90 7 CJ1-6 + SJ1-10
25 8 CJ14-5
13 9 CJ14-6
10 N/U
13 11 CJ1-8
70 12 CJ1-10
70 13 CJ1-11
65 14 N/U
65 15 CJ1-3
TO CONTROLLER
PJ1
1 N/U
10 2 0A FEATURE LITES
3
4 N/U
43 5 GEN. ILL. RETURN*
43 6 GEN. ILL. RETURN*
60 7 SOL. BUSS+43V. D.C.
8 N/U
30 9 GEN. ILL. BUSS*
10 N/U
30 11 GEN. ILL. BUSS*
80 12 0B FEATURE LITES
TO PLAYFIELD
*=27 GI LAMPS
TABLE "A"
115VAC,2-8,3-6,7-10
120VAC,2-8,4-6,7-11
220VAC,4-8,7-9
240VAC,4-8,7-11
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
2/20/87
BALLY MIDWAY MFG. CO.
HARDBODY
BACKBOX
M051-00E94-A006
SHEET 1 OF 3
REV
PAGE 1 OF 3 (BACKBOX)
25 FEB 87 07:59 /USER/DAN/HARD_BOD/BACKBOX 1.DRAW


SHOOT AGAIN
SPECIAL ARROW
CENTER SPECIAL
HOOP XBALL
NORMAL POWER
HOOP 100K
DOUBLE POWER
HOOP 80K
YELLOW BONUS BOT
HOOP 65K
BLUE BONUS BOT
HOOP 50K
GREEN BONUS BOT
HOOP 35K
ORANGE BONUS BOT
HOOP 20K
BONUS R 40K
GRN TGT TRAPS
BONUS R 20K TOP
GRN TGT LATS
BONUS R 20K MID
GRN TGT PECS
BONUS R 20K BOT
BONUS L 40K
RAMP XBALL
BONUS L 20K TOP
RAMP 200K
BONUS L 20K MID
RAMP 100K
BONUS L 20K BOT
RAMP 50K
BLUE TGT CALVES
YEL TGT OBLIQUE
BLUE TGT GLUTES
YEL TGT RECTABS
BLUE TGT HAMS
YEL TGT TRANSAB
BLUE TGT QUADS
BONUS M 300K
BONUS M 25K TOP
CJ10-9 26
CJ10-3 14
CJ10-17 41
CJ10-8 25
CJ10-2 13
CJ10-16 38
CJ10-7 24
CJ10-1 12
CJ10-6 21
CJ10-14 37
CJ10-12 32
CJ10-5 18
CJ10-19 45
CJ10-11 31
CJ10-4 15
CJ10-18 43
CJ11-4 61
CJ11-11 71
CJ11-12 72
CJ11-6 62
CJ11-16 78
CJ11-8 64
PHASE B
PHASE A
PJ1-12 80
PJ1-2 10
PLAYFIELD CABLE
36 CJ10-13 BONUS M 25K MID
28 CJ10-10 BONUS M 25K BOT
63 CJ11-7 YELLOW BONUS MID
75 CJ11-15 BLUE BONUS MID
58 CJ11-2 GREEN BONUS MID
67 CJ11-9 ORANGE BONUS MID
74 CJ11-14 YELLOW BONUS TOP
INLINE DT XBALL
59 CJ11-3 BLUE BONUS TOP
INLINE DT 3X
68 CJ11-10 GREEN BONUS TOP
INLINE DT 2X
73 CJ11-13 ORANGE BONUS TOP
INLINE DT 25K
84 CJ13-3 BR RIGHT SLING
BR RIGHT UP RAMP
86 CJ13-5 BR LEFT SLING
BR LEFT UP RAMP
97 CJ13-13 BR DTS INLINE
BR TOP LANE
83 CJ13-2 BR MID HOOP
BR RAMP LEFT 2
87 CJ13-6 BR TOP HOOP
BR RAMP LEFT 1
93 CJ13-8 BR RAMP RIGHT #1
BRIGHT YELLOW
81 CJ13-1 BR RAMP RIGHT #2
BRIGHT GREEN
48 CJ11-1 BR RAMP MIDDLE
BRIGHT BLUE
91 CJ13-7 HOOP ARROW
ORANGE DT DELTOID
95 CJ13-11 BONUS 3X
ORANGE DT TRICEPS
85 CJ13-4 BONUS 2X
ORANGE DT BICEPS
94 CJ13-10 RIGHT RETURN
96 CJ13-12 LEFT RETURN
80 PJ1-12 PHASE B
10 PJ1-2 PHASE A
X2
1 A
SLOW BLOW
PHASE C 81 91
PHASE D 82 92
COLOR CODE
1 RED
2 BLUE
3 YELLOW
4 GREEN
5 WHITE
6 BROWN
7 ORANGE
8 BLACK
9 GRAY
0 NO COLOR
11 VIOLET
NOTE: DIODES ARE 1N4004
NOTES:
D. STERN
2/20/87
BALLY MIDWAY MFG. CO.
HARDBODY
PLAYFIELD DIAGRAM
M051-00E94-A005
SHEET 3 OF 3
REV
26 FEB 87 11:18 /USER7/DAN/HARD_BOD/PLAYFIELD 3.DRAW

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	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	24

SOUND MODULE

SJ1

20	1	CJ5-7
25	2	CJ5-8
28	3	CJ5-9
21	4	CJ5-10
	5	
40	6	PJ4-6
	7	
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

50 80

TO CABINET
(SPEAKERS & VOLUME CONTROL)

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 - VOILET

NOTES: D. STERN 2/20/87	BALLY MIDWAY MFG. CO.
	HARDBODY BACKBOX M851-00E94-A006
	SHEET 3 OF 3 | REV

25 FEB 87 08:02 /USER/DAN/HARD_BOD/BACKBOX 3.DRAW

CJ-10

			"A"PHASE	"B"PHASE
12	1	←	ORANGEBON BOT	HOOP 20K
13	2	←	YELLOWBON BOT	HOOP 65K
14	3	←	CENTER SPECIAL	HOOP XBALL
15	4	←	BONUS L 20K MID	RAMP 30K
18	5	←	BONUS R 20K BOT	
21	6	←	BONUS R 40K	GRN TGT TRAPS
24	7	←	GREENBON BOT	HOOP 35K
25	8	←	DOUBLE POWER	HOOP 80K
26	9	←	SHOOT AGAIN	SPECIAL ARROW
28	10	←	BONUS M25K BOT	
31	11	←	BONUS L 20K TOP	RAMP 50K
32	12	←	BONUS R 20K MID	GRN TGT PECS
36	13	←	BONUS M25K MID	
37	14	←	BONUS R 20K TOP	GRN TGT LATS
	15	←	KEY	
38	16	←	BLUEBON BOT	HOOP 100K
41	17	←	NORMAL POWER	HOOP 200K
43	18	←	BONUS L 20K BOT	RAMP 50K
45	19	←	BONUS L 40K	RAMP XBALL

"A"PHASE * DENOTES "C" PHASE — "B"PHASE ** DENOTES "D" PHASE

CJ-11

48	1	←	BR RAMP MID*	BRIGHT BLUE**
58	2	←	GREEN BON MID	
59	3	←	BLUE BON TOP	INLINE DT 3X
61	4	←	BLU TGT CALVES	YEL TGT OBLIQUE
	5	←	KEY	
62	6	←	BLU TGT QUADS	
63	7	←	YELLOW BON MID	
64	8	←	BONUS M 25K TOP	
67	9	←	ORANGE BON MID	
68	10	←	GREEN BON TOP	INLINE DT 2X
71	11	←	BLU TGT GLUTES	YEL TGTRECTABS
72	12	←	BLU TGT HAMS	YEL TGT TRANSAB
73	13	←	ORANGE BON TOP	INLINE DT 25K
74	14	←	YELLOW BON TOP	INLINE DT XBALL
75	15	←	BLUE BON MID	
78	16	←	BONUS M300 K	

LAMP OUTPUTS

CJ-12

			"A"PHASE	"B"PHASE
	1	←		
	2	←		
	3	←		
	4	←		
	5	←	KEY	
	6	←		
	7	←		
	8	←		
	9	←		
	10	←		
	11	←		
	12	←		
	13	←		
	14	←		
	15	←		
	16	←		
	17	←		

"A"PHASE * DENOTES "C" PHASE — "B"PHASE ** DENOTES "D" PHASE

CJ-13

81	1	←	BR RAMP R #2 *	BRIGHT GREEN**
83	2	←	BR MID HOOP*	BR RAMP LEFT 2**
84	3	←	BR RIGHT SLING*	BR RT UP RAMP**
85	4	←	BONUS 2X	ORNG DT TRICEPS
86	5	←	BR LEFT SLING*	BR LEFTUP RAMP**
87	6	←	BR TOP HOOP*	BR RAMP LEFT 1**
91	7	←	HOOP ARROW	ORNG DT DELTOID
93	8	←	BR RAMP R #1 *	BRIGHT YELLOW**
	9	←	KEY	
94	10	←	RIGHT RETURN	
95	11	←	BONUS 3X	ORN DT TRICEPS
96	12	←	LEFT RETURN	
97	13	←	BR DT INLINE*	BR TOP LANE**

CJ-6

31	1	←	LEFT SLING
32	2	←	RIGHT SLING
34	3	←	ORANGE DTS RESET
35	4	←	
36	5	←	RAMPS DOWN
	6	←	KEY
311	7	←	RIGHT FLEXSAVE
90	8	←	LEFT FLIPPER
95	9	←	RIGHT FLIPPER

CJ-8

24	1	←	LEFT FLEXSAVE
	2	←	
	3	←	KEY
	4	←	
	5	←	
25	6	←	RAMP UP LEFT
27	7	←	INLINE DT RESET

CJ-7

	1	←	
	2	←	
	3	←	
	4	←	
	5	←	
	6	←	
20	7	←	
10	8	←	

CJ-9

51	1	←	RAMP UP RIGHT
52	2	←	
53	3	←	
54	4	←	
	5	←	
56	6	←	
57	7	←	RESERVED FOR GERMAN
58	8	←	OUTHOLE
511	9	←	
24	10	←	
59	11	←	KNOCKER

SOLENOID OUTPUTS

CJ-5

	1	←	
	2	←	
	3	←	
	4	←	
	5	←	KEY
	6	←	
20	7	←	SJ1-1
25	8	←	SJ1-2
28	9	←	SJ1-3
21	10	←	SJ1-4
	11	←	
	12	←	
	13	←	
	14	←	
27	15	←	SJ1-8

SOUND INFO. OUTPUT

CJ-4

511	1	←	ST5
80	2	←	I7
70	3	←	I6
60	4	←	I5
	5	←	KEY
50	6	←	I4
40	7	←	I3
30	8	←	I2
20	9	←	I1
10	10	←	I0
56	11	←	ST4
54	12	←	ST3
53	13	←	ST2
52	14	←	ST1
51	15	←	ST0

PLAYFIELD SWITCHES

CJ-3

10	1	←	TEST BUTTON
	2	←	
	3	←	KEY
27	4	←	I6
30	5	←	I5
97	6	←	I4
21	7	←	I3
20	8	←	I2
65	9	←	I1
15	10	←	I0
	11	←	
35	12	←	ST3
74	13	←	ST2
14	14	←	ST1
13	15	←	ST0

CABINET SWITCHES

CJ-2

30	1	←	D1J1-16 + D2J1-16
14	2	←	D1J1-3,D1J1-14,D2J1-3
18	3	←	D1J1-5,D2J1-5,D1J1-11
21	4	←	D1J1-7,D2J1-7,D2J1-14
23	5	←	D1J1-8,D2J1-8,D2J1-11
20	6	←	D1J1-6,D2J1-6
15	7	←	D1J1-4,D2J1-4
13	8	←	D1J1-2,D2J1-2
12	9	←	D1J1-1,D2J1-1
	10	←	N/U
	11	←	N/U
38	12	←	D2J1-9
24	13	←	D1J1-9,D1J1-21,D2J1-21
35	14	←	D1J1-20,D2J1-20
	15	←	KEY
34	16	←	D1J1-19,D2J1-19
32	17	←	D1J1-18,D2J1-18
31	18	←	D1J1-17,D2J1-17
	19	←	N/U

DIGITAL DISPLAY OUTPUTS

CJ-1

30	1	←	PJ3-1
	2	←	
65	3	←	PJ3-15
67	4	←	PJ3-3
	5	←	KEY
98	6	←	PJ3-7
58	7	←	PJ3-4
13	8	←	PJ3-11
	9	←	
70	10	←	PJ3-12
70	11	←	PJ3-13
	12	←	

CJ-14

	1	←	
20	2	←	PJ3-6
	3	←	KEY
20	4	←	PJ3-5
25	5	←	PJ3-8
13	6	←	PJ3-9
13	7	←	PJ3-2

POWER INPUTS

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

CJ-12 NOT USED
BRIGHT LIGHTS TYPE 912 BULBS (C&D PHASE)
OTHER LIGHTS TYPE 555 BULBS (A&B PHASE)
CJ1 THROUGH CJ14 LOCATED ON CONTROLLER BOARD

NOTES:	BALLY MIDWAY MFG. CO.	
D. STERN	HARDBODY BACKBOX M851-00E94-A006	
2/20/87		
	SHEET 2 OF 3	REV

26 FEB 87 11:08 /USER/DAN/HARD_BOD/BACKBOX 2.DRAW

BALLY/MIDWAY'S HARD BODY
#E94
ROM/EPROM PART NUMBERS

UNPROGRAMMED CONTROL BOARD A084-91786-G000
PROGRAMMED CONTROL BOARD A084-91786-AE94

POS.	MIDWAY PART NUMBER
U2	E94A-12601-0000
U3	E94A-12602-0000

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

UNPROGRAMMED TURBO CHEAP SQUEAK FOR PINBALL A084-91855-E000
PROGRAMMED TURBO CHEAP SQUEAK FOR PINBALL A084-91855-AE94

POS.	MIDWAY PART NUMBER
U7	E94A-12603-0000

JUMPERS	IN	OUT
JW1		**
JW2	**	
JW3	**	
JW4	**	
JW5	**	
JW6	**	
JW7	**	
JW8	**	
JW9	**	
JW10		**
JW11	**	
JW12		**

M051-00E94-A008	REVISIONS
02-09-87	RELEASE FOR PRODUCTION