GAME NO. 0E52
Form No. 0E52-00300-0100

BLACK BELT™



Operating Manual

Bally/MIDWAY MFG. CO.

10601 W Belmont Ave. Franklin Park, Illinois 60131
Telephone (312) 451-9200

WARNING

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

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

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

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

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

Bally/MIDWAY T.M.

Invites You To Use

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

CALL US FOR PROMPT, COURTEOUS ANSWERS TO YOUR PROBLEMS.

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

Bally/MIDWAY T.M. 10601 West Belmont Avenue Franklin Park, Illinois, 60131 phone (312) 451-9200

©COPYRIGHT MCMLXXXVI BY BALLY MIDWAY MFG. CO. ALL RIGHTS RESERVED.

NO PART OF THIS PUBLICATION MAY BE REPRODUCED BY ANY MECHANICAL, PHOTOGRAPHIC, OR ELECTRONIC PROCESS, OR IN THE FORM OF A PHONOGRAPHIC RECORDING, NOR MAY IT BE TRANSMITTED, OR OTHERWISE COPIED FOR PUBLIC OR PRIVATE USE, WITHOUT PERMISSION FROM THE PUBLISHER. THIS MANUAL IS FOR SERVICE USE ONLY, AND NOT FOR GENERAL DISTRIBUTION. FOR PERMISSION REQUESTS, WRITE: BALLY MIDWAY MFG. CO., 10601 W. BELMONT AVE., FRANKLIN PARK, IL 60131.

Printed in U.S.A.

TABLE OF CONTENTS

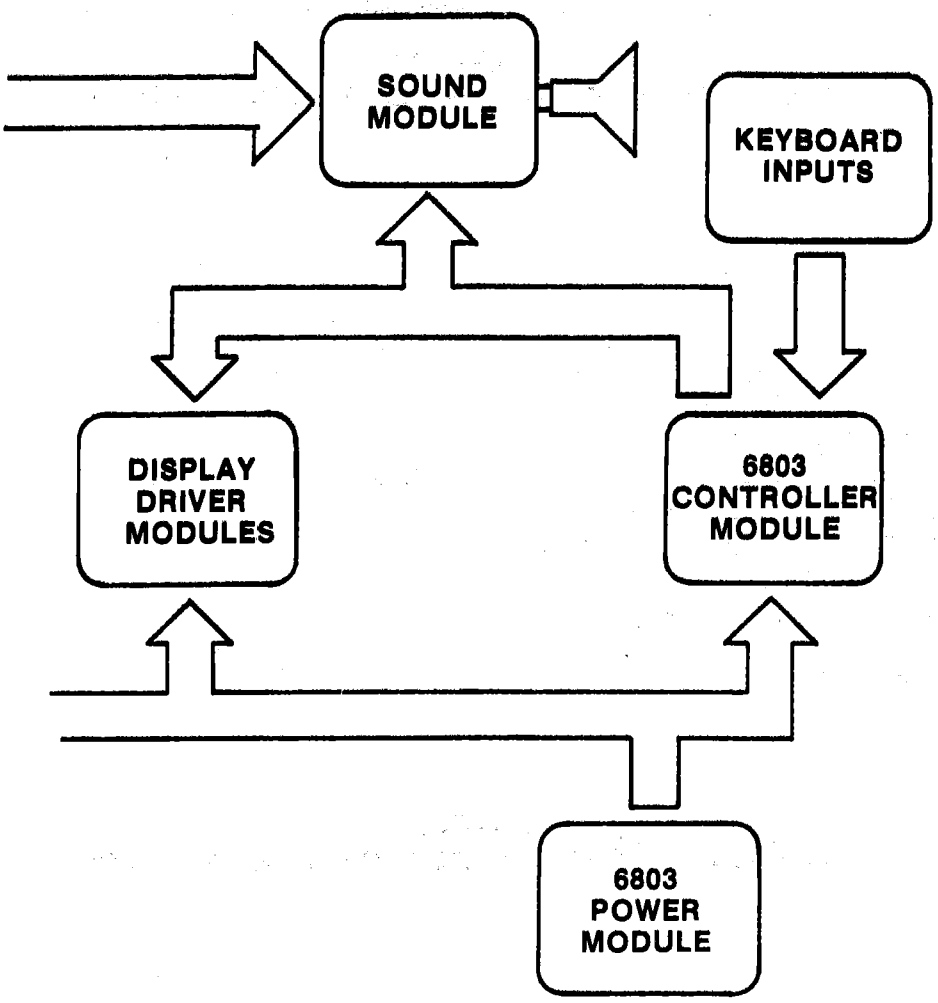
SECTION 1
INSTALLATION AND GENERAL GAME OPERATION INSTRUCTIONS

DESCRIPTION	PAGE
I. INSTALLATION	1-1
II. GENERAL GAME OPERATION	1-1
III. TAILORING & TESTING THE GAME	1-2
IV. KEYBOARD GAME ADJUSTMENTS	1-3
V. RECOMMENDED 3 & 5 BALL REGISTER OPTION SETTINGS	1-5
VI. TROUBLESHOOTING ON LOCATION	1-6
VII. SOLENOID & SWITCH IDENTIFICATION TABLES	1-9
VIII. ROUTINE MAINTENANCE ON LOCATION	1-10
IX. SWITCH ASSEMBLY ADJUSTMENTS	1-10
X. SERVICE HINTS	1-10
XI. FEATURE OPERATION AND SCORING	1-14

SECTION 2
COMPONENT LAYOUTS, SCHEMATICS & WIRING DIAGRAMS

DESCRIPTION	PAGE
6803 PINBALL MODULE P.C.B. - COMPONENT LAYOUT	2-1 - 2-2
6803 PINBALL MODULE P.C.B. - SCHEMATIC	2-3
PINBALL SOUND P.C.B. - COMPONENT LAYOUT	2-4 - 2-6
PINBALL SOUND P.C.B. - SCHEMATIC	2-7
DUAL DISPLAY P.C.B. - COMPONENT LAYOUT	2-8 - 2-10
DUAL DISPLAY P.C.B. - SCHEMATIC	2-11
6803 CONTROL BOARD P.C.B. - COMPONENT LAYOUT	2-12 - 2-15
6803 CONTROL BOARD P.C.B. - SCHEMATIC	2-16 - 2-17
WIRING DIAGRAM - CABINET	2-18
WIRING DIAGRAM - PLAYFIELD	2-18
WIRING DIAGRAM - BACKBOX	2-19
SOLENOID EXPANDER P.C.B. - COMPONENT LAYOUT	2-20
SOLENOID EXPANDER P.C.B. - SCHEMATIC	2-20
EPROM LIST	INSIDE BACK COVER

BLOCK DIAGRAM—ELECTRONIC PINBALL GAME



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.

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.

Switch Test

IV. GAME REGISTERS & OPTIONS

BOOKKEEPING DATA

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

SELF-TESTING

Single Lamp	Steps one lamp at a time, and Connector I.D. Press "A" to advance, "B" to backup, and "C" to cycle
All Lamps	All lamps light alternately, 1st "A" phase then "B"
Display	Steps thru alphanumeric character set
Solenoid	Fires one driver at a time, and Displays Driver and Connector I.D.
Single Solenoid	Fires one driver at at 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 extra balls that were awarded
Specials	# of Specials awarded by the playfield

PERCENT OPTIONS

Threshold 1	Enter 0 thru 9,999,999; sets award level and display
Threshold 2	Enter 0 thru 9,999,999; sets award level and display
Threshold 3	Enter 0 thru 9,999,999; sets award level and display
Highest Score	Enter 0 thru 9,999,999; sets the HiScore replay level

BASIC OPTION VALUES

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

FEATURE OPTIONS

Reset Factory — Enter 65 for factory selected scores and features

Save Body Parts — Enter 0 thru 1; 0=Clear at end of ball
1=Save for next ball

Ramp Count — Enter 0 thru 3; This entry controls CONSECUTIVE number of times on ramp required to activate Hold Bonus, Extra Ball, or Special

	HOLD BONUS	EXTRA BALL	SPECIAL
0=	10 times	15 times	17 times
1=	8 times	13 times	15 times
2=	6 times	11 times	13 times
3=	3 times	9 times	11 times

Outlane Special — Enter 0 thru 1; 0=1 Outlane Special per game
1=Any number per game

Attract Sound — Enter 0 thru 1; 0=Attract Sound Mode Off
1=Attract Sound Mode On

Extra Ball Timer — EXTRA BALL
Enter 0 thru 2; 0=Short (6 seconds)
1=Medium (12 seconds)
2=Long (18 seconds)

GATE
0=Short (Varies with
1=Medium Ball # and
2=Long Belt Level)

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

HIGH GAME TO DATE (reset periodically)
3-BALL 4,000,000 5-BALL 6,000,000

BLACK BELT OPTION SETTINGS

FEATURE OPTIONS REGISTER	**3-BALL**	**5-BALL**
SAVE BODY	1	0
RAMP COUNT	2	2
OUTLANE SPECIAL	1	1
ATTRACT SOUND	1	1
X-BALL TIMER	1	1
In Basic Options:		
SLINGSHOT	1	1
TILT WARNING	1	1

VI. TROUBLESHOOTING ON LOCATION

SYMPTOM: WON'T POWER UP
Game does not play power-up tune when power is turned on. General illumination is present.

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

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

Turn power ON.

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

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

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

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

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

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

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

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

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

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

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

III. One or several displays always off.

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

SYMPTOM: SOLENOIDS

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

ACTION:

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

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

ACTION:

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

SYMPTOM: NO SOUND

ACTION:

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

SYMPTOM: SWITCHES

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

ACTION:

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

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

GAME: MOTORDOME PINBALL & FUTURE GAMES

SUBJECT: 6803 CONTROL BOARD POWER UP TEST SEQUENCE

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

1st Flash– (U6) Determine if the internal RAM is good. (6803)

2nd Flash–(U2) Checks to see if the program ROM is good (27128)

3rd Flash– (U3) Checks to see if the program ROM is good (27128)

4th Flash– (U4) Checks the C-MOS RAM. (6116P-3)

5th Flash– (U8) Tests PIA0 (6821)

6th Flash– (U7) Tests PIA1 (6821)

7th Flash– (U6) Checks the internal display interrupt generator (6803)

8th Flash– (U12 & U8) Verifies operation of the phase B switched ill. voltage. NOTE: F5 fuse on the Power Module provides the phase B signal to the Control Board. (U12, 14584) (U8, 6821)

9th Flash– (U1, U11 & U12) Verifies operation of the Phase A switched ill. voltage. NOTE: F4 fuse on the Power Module provides the phase A signal to the Control Board. (U1, 6803) (U11, 4011) (U12, 14584)

The following is an abbreviated self-test routine for the 6809 Sound Board used in Motordome and future pinballs:

1st Flash– (U7) Determine if the external ROM is good.

2nd Flash–(U6) Checks to see if the external RAM is good.

3rd Flash– (U8) Checks the PIA. (68B21)

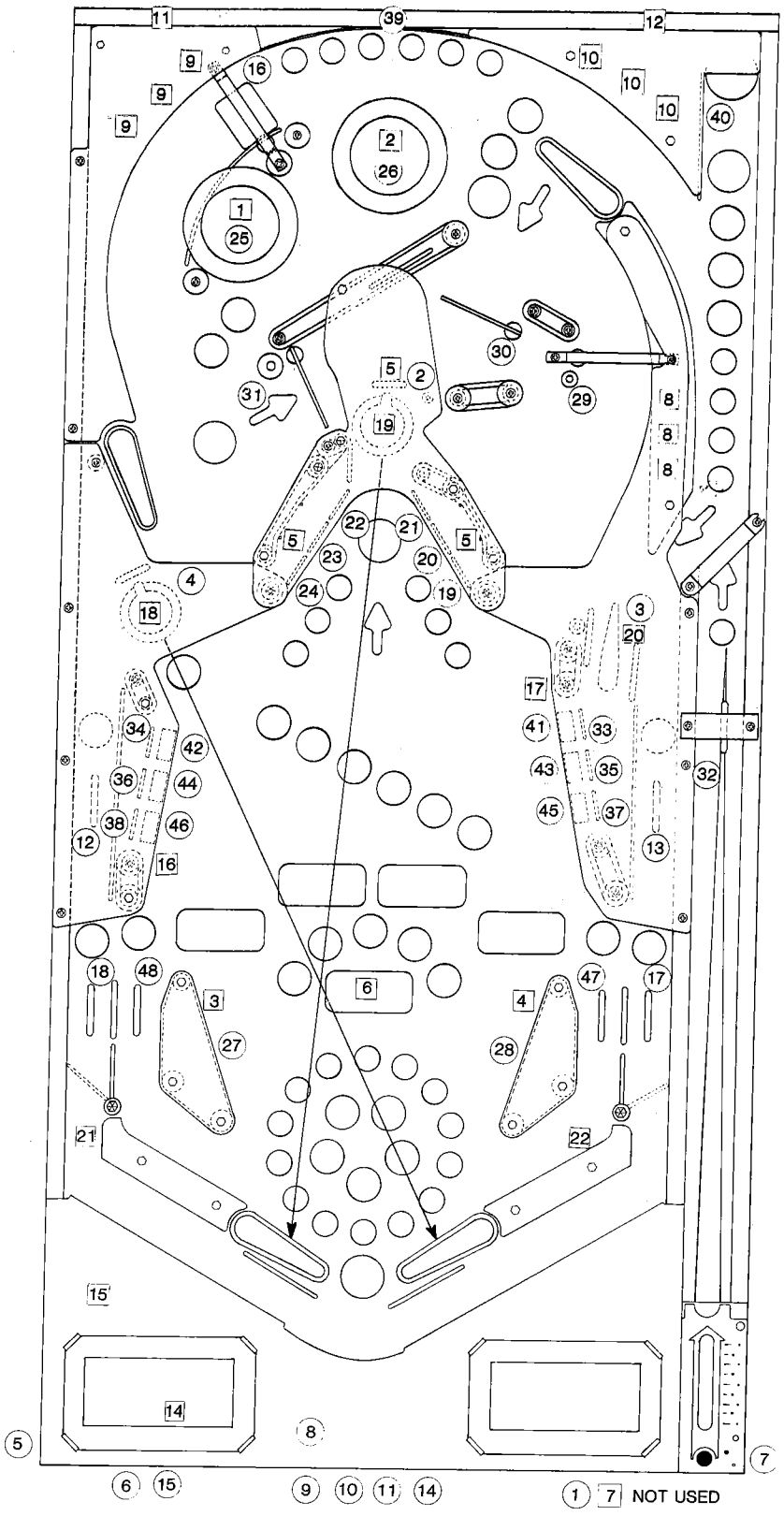


FIGURE I

BLACK BELT
VII

SOLENOID IDENTIFICATION TABLE

SELF TEST # SEQUENCE	SOLENOID IDENTIFICATION
1	THUMPER BUMPER LEFT
2	THUMPER BUMPER RIGHT
3	SLINGSHOT LEFT
4	SLINGSHOT RIGHT
5	BRIGHT LIGHT 'MAN'
6	BRIGHT LIGHT 'SUN'
7	NOT USED
8	BRIGHT LIGHT RIGHT
9	BRIGHT LIGHT TOP LEFT
10	BRIGHT LIGHT TOP RIGHT
11	BRIGHT LIGHT BACK LEFT
12	BRIGHT LIGHT BACK RIGHT
13	RESERVED FOR GERMAN
14	OUTHOLE
15	KNOCKER
16	LEFT DROP TARGET RESET
17	RIGHT DROP TARGET RESET
18	SAUCER LEFT
19	SAUCER MIDDLE
20	KICKER RIGHT
21	LEFT GATE
22	RIGHT GATE
23	FLIPPER (BACKBOX)

SWITCH ASSEMBLY IDENTIFICATION TABLE

SWITCH SELF TEST # SEQUENCE	DESCRIPTION
1	NOT USED
2	SAUCER MIDDLE
3	KICKER RIGHT
4	SAUCER LEFT
5	FLIPPER LEFT (CABINET)
6	CREDIT (CABINET)
7	FLIPPER RIGHT (CABINET)
8	OUTHOLE
9	COINS RIGHT (DOOR)
10	COINS LEFT (DOOR)
11	COINS MIDDLE (DOOR)
12	OPEN GATE RIGHT
13	OPEN GATE LEFT
14	SLAM
15	TILT (CABINET)
16	SPINNER
17	OUTLANE RIGHT
18	OUTLANE LEFT
19	CALF RIGHT
20	KNEE RIGHT
21	THIGH RIGHT
22	THIGH LEFT
23	KNEE LEFT
24	CALF LEFT
25	BUMPER LEFT
26	BUMPER RIGHT
27	SLINGSHOT LEFT
28	SLINGSHOT RIGHT
29	CHOP SIDE
30	RIGHT RAMP
31	LEFT RAMP
32	SHOOTER LANE
33	TARGET RIGHT TOP
34	TARGET LEFT TOP
35	TARGET RIGHT MIDDLE
36	TARGET LEFT MIDDLE
37	TARGET RIGHT BOTTOM
38	TARGET LEFT BOTTOM
39	TOP ARC
40	MUSHROOM
41	DROP TARGET RIGHT TOP
42	DROP TARGET LEFT TOP
43	DROP TARGET RIGHT MIDDLE
44	DROP TARGET LEFT MIDDLE
45	DROP TARGET RIGHT BOTTOM
46	DROP TARGET LEFT BOTTOM
47	RETURN LANE RIGHT
48	RETURN LANE LEFT

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

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

VIII. ROUTINE MAINTENANCE ON LOCATION:

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

IX. SWITCH ASSEMBLY ADJUSTMENTS:

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

X. SERVICE HINTS:

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

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

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

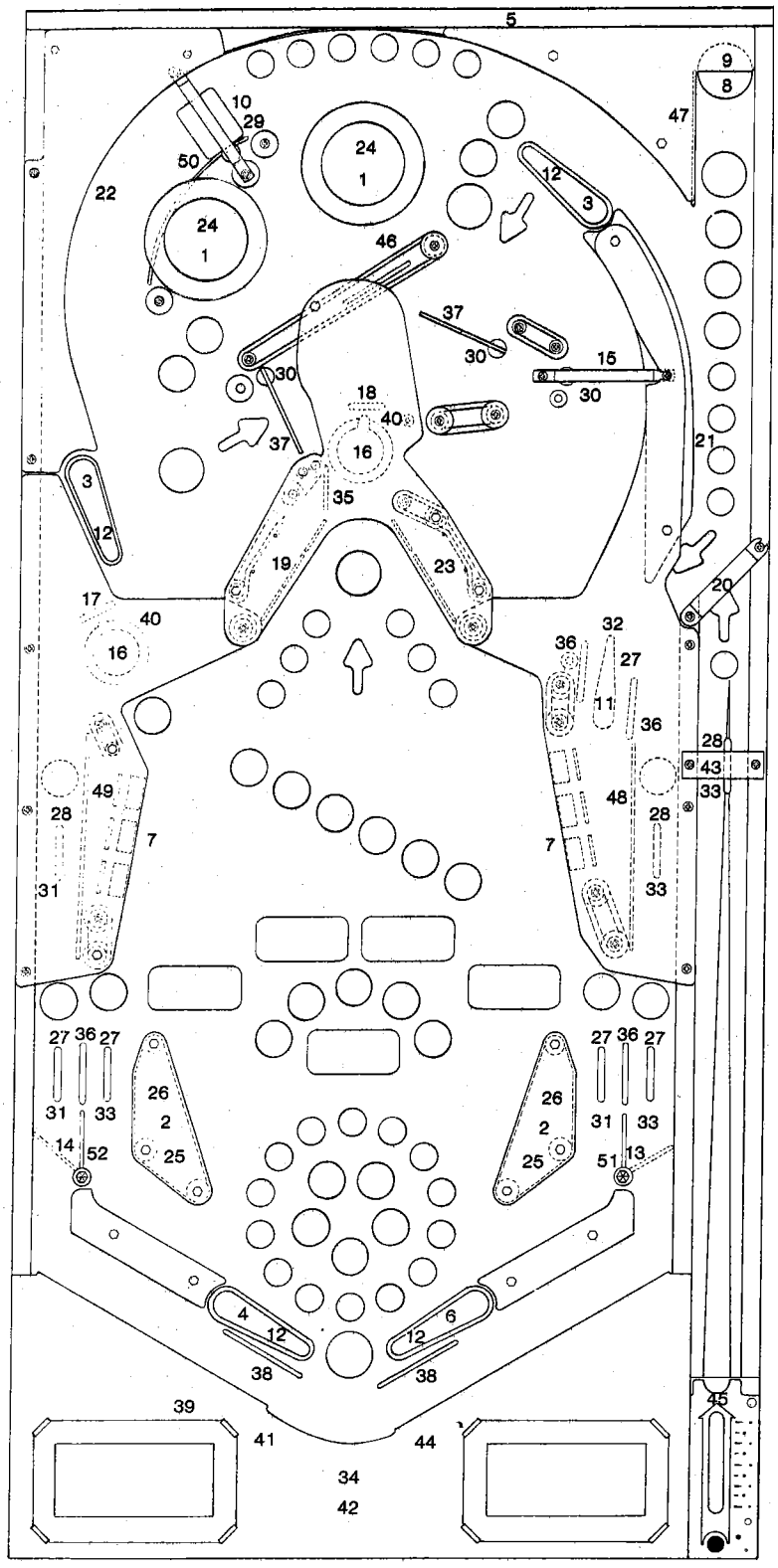


FIGURE II

OE52 BLACK BELT
PANEL TOP PARTS (Without Ramps)

1.	THUMPER BUMPER ASSY.	A967-00053-0000
2.	SLINGSHOT KICKER ASSY.	A967-00059-0000
3.	FLIPPER ASSY. SINGLE SW. LT.	AC70-00022-0200
4.	FLIPPER ASSY. DOUBLE SW. LT.	AC70-00023-0200
5.	BACKBOARD ASSY.: PLAYFIELD	AE52-00021-0000
6.	FLIPPER ASSY. DOUBLE SW. RT.	AC70-00023-0100
7.	DROP TARGET ASSY.	AE52-00013-0000
8.	MUSHROOM-BUMPER ASSY.	A365-00091-0300
9.	SWITCH ASSY. MUSHROOM BUMPER)	AA40-00032-0000
10.	SPINNER & GATE ASSY.	AE52-00016-0000
11.	BALL KICK-BACK ASSY.	A369-00017-0000
12.	MOLD-FLIPPER (BLACK)	A967-00031-0100
13.	FREE GATE RELAY ASSY. (C.W.)	A365-00085-0000
14.	FREE GATE RELAY ASSY. (C.C.W.)	A365-00086-0000
15.	ONE-WAY SCORING WIRE ASSY.	A365-00089-0000
16.	EJECT HOLE ASSY.	A967-00054-0000
17.	BRACKET: BALL-STOP	OE52-00101-00XF
18.	BRACKET: BALL-STOP	0360-00147-00XF
19.	TARGET/SWITCH/DIODE/ CAP ASSY.	AE52-00028-0000
20.	GATE & FREE WIRE ASSY.	AA40-00033-0000
21.	BALL-GUIDE ASSY.	AE52-00018-0000
22.	BALL-GUIDE ASSY.	AE52-00015-0000
23.	TARGET/SWITCH/DIODE/ CAP ASSY.	AE52-00028-0100
24.	THUMPER-BUMPER CAP ASSY.	AE52-00022-0000
25.	SLINGSHOT SWITCH & BRKT. ASSY.	A360-00230-0000
26.	SWITCH & DIODE ASSY.	A360-00239-0000
27.	SWITCH, DIODE & PLATE ASSY.	A365-00035-0000
28.	SWITCH, DIODE & PLATE ASSY. W/CAP	A365-00035-0100
29.	SWITCH, DIODE & PLATE ASSY.	A360-00245-0000
30.	SWITCH, DIODE & PLATE ASSY. W/CAP	A360-00245-0100
31.	WIRE-ACTUATOR ASSY. LT.	A331-00042-0000
32.	WIRE-ACTUATOR ASSY. RT.	A360-00215-0100
33.	WIRE-ACTUATOR ASSY. RT.	A360-00216-0000
34.	WIRE-ACTUATOR ASSY.	A360-00217-0000
35.	WIRE-FORM BALL GUIDE	0365-00151-1125
36.	WIRE-FORM 1½" LG.	0365-00157-0000
37.	WIRE-FORM SCORING GATE	0365-00154-0000
38.	WIRE-FORM BALL GUIDE	0360-00175-5300
39.	TOP-MTG. KICKER ASSY.	A360-00234-0000
40.	BALL EJECT HOLE SWITCH ASSY.	A365-00036-0000
41.	SWITCH & DIODE ASSY.	A360-00241-0000
42.	BOTTOM ARCH	OE52-00105-00XF
43.	SHOOTER LANE HOOD	0967-00107-00XF
44.	BOTTOM ARCH EXTENSION	0370-00918-0300
45.	BALL GAUGE	OE52-00104-00XF
46.	WIRE-FORM 2" LG.	0356-00151-2000
47.	WIRE-FORM 3⅝" LG.	0365-00151-3625
48.	WIRE-FORM 5½" LG.	0365-00151-5500
49.	WIRE-FORM 6⅛" LG.	0365-00151-6062
50.	WIRE-FORM BALL GUIDE	0365-00152-0000
51.	WIRE-FORM FREE BALL GATE	0390-00110-0000
52.	WIRE-FORM FREE BALL GATE	0A17-00106-0000

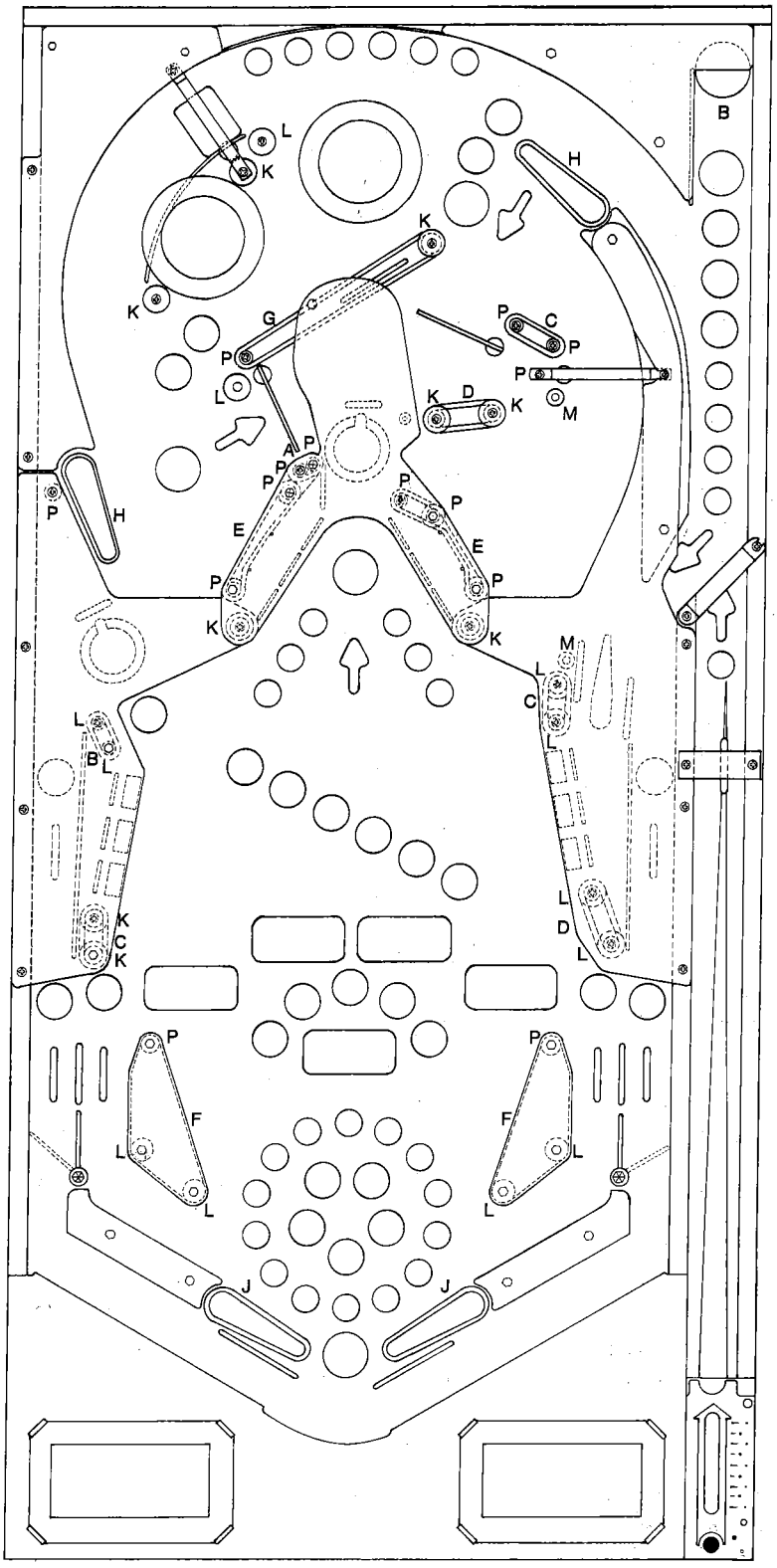


FIGURE IIA

OE52 BLACK BELT
PLASTIC RAMP PARTS

1.	RAMP NETWORK ASSY. (NOT SHOWN)	AE14-00030-0000

RUBBER RINGS

A.	RING: 5/16"	0017-00041-0637
B.	RING: 15/32"	0017-00041-0716
C.	RING: 3/4"	0017-00041-0642
D.	RING: 1"	0017-00041-0643
E.	RING: 1-1/2"	0017-00041-0644
F.	RING: 2-1/2"	0017-00041-0646
G.	RING: 3"	0017-00041-0647
H.	RING: (YELLOW): 3"	0017-00041-0643
J.	RING: (RED): 3"	0017-00041-0682

POSTS

K.	POST (RED PLASTIC): 1"	0017-00042-0588
L.	POST (RED PLASTIC): 1-3/16"	0017-00042-0596
M.	METAL MINI POST (W/THREADS FOR METAL)	0365-00700-00XF
N.	METAL MINI-POST (W/THREADS FOR WOOD)	0360-00732-00XF
P.	METAL POST (NO THREADS)	0360-00733-00XF

RUBBER BUMPERS FOR

M & N–	METAL MINI-POST	0017-00041-0633
K & L–	PLASTIC RED POST	0017-00041-0637
P–	METAL POST	0017-00041-0641

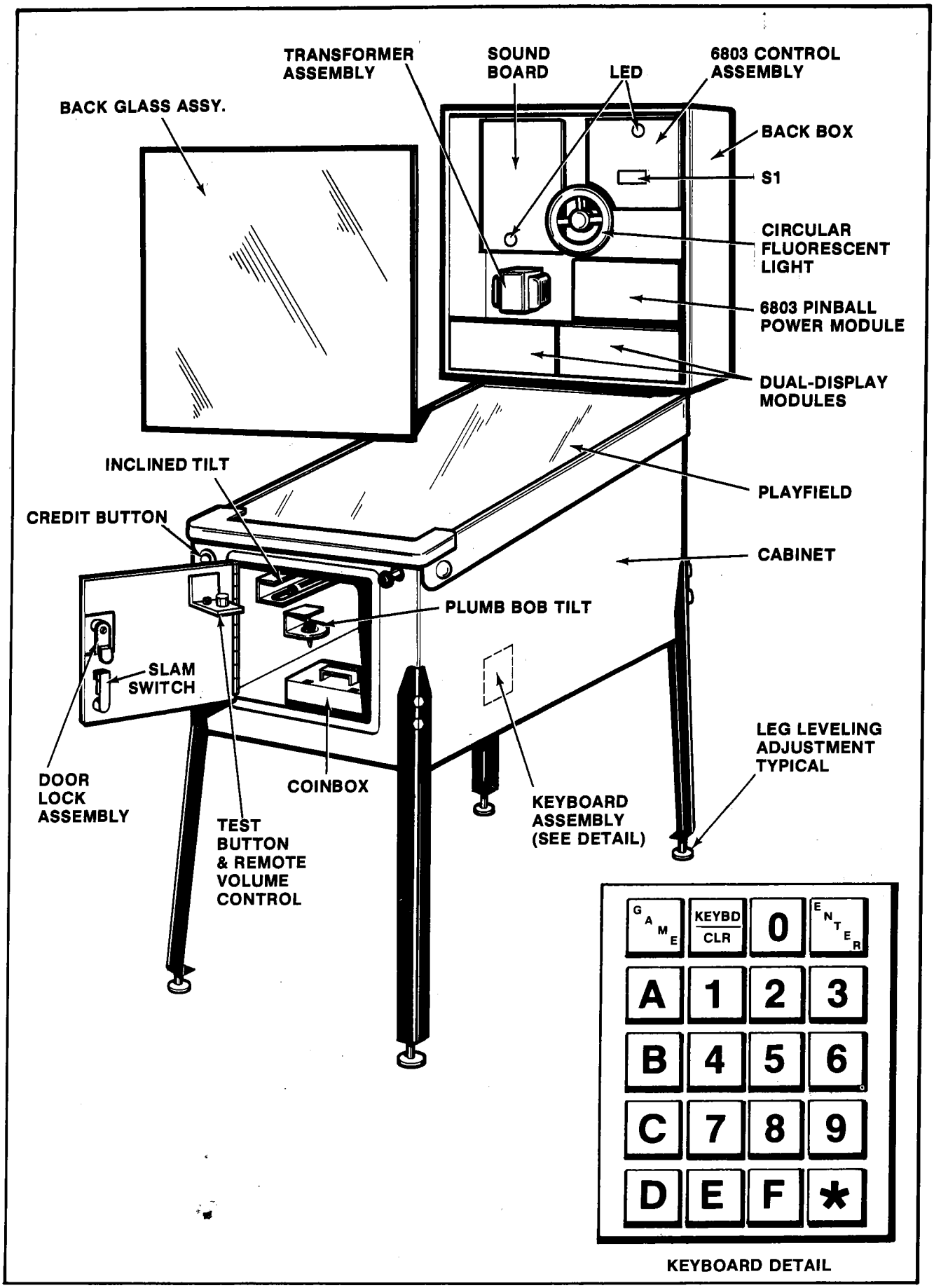
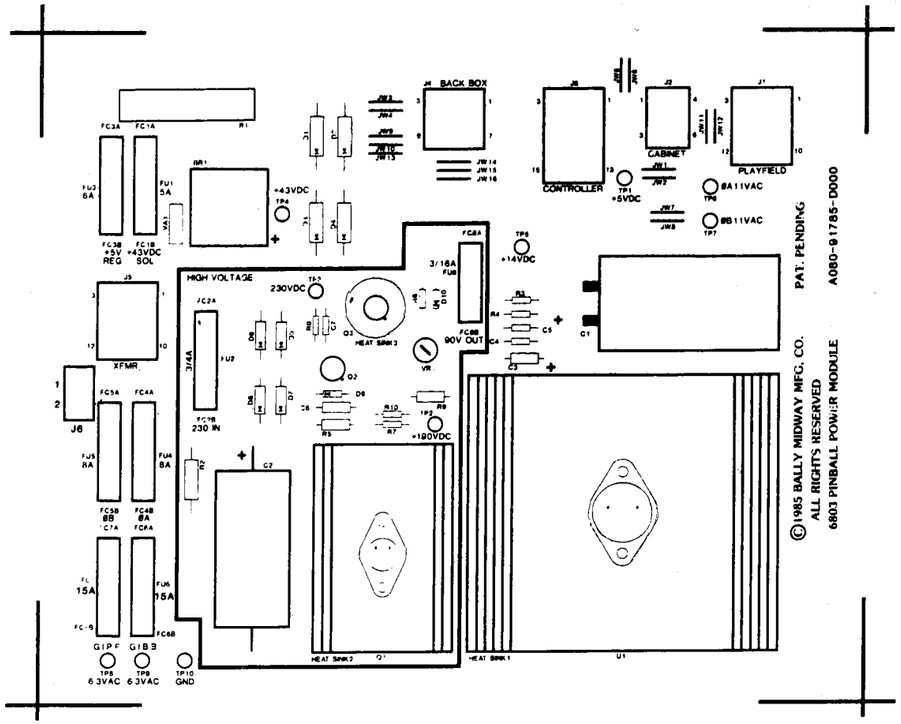


FIGURE III. ELECTRONIC PIN BALL MACHINE

SECTION 2

Component Layouts, Schematics & Wiring Diagrams



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.	THIS DWG IS CONFIDENTIAL & PROPERTY OF MIDWAY MFG. CO. FIRST USED ON	MIDWAY MFG. CO. FRANKLIN PK., IL. 60131 A BALLY CO	REVISIONS
	DRN CL DATE 04/08/86 SCALE	ASSY DRAWING 6803 PINBALL PWR MODULE A084-91785-D000	PART NO M051-00C53-D001
	MECH CHK MAT'L		
	ELEC CHK FINISH		

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

DESIGNATION LIST

DESIGNATION	DESCRIPTION	DESIGNATION	DESCRIPTION
C1	11,000uf 20V ELEC.	JW1 - JW16	ZERO OHM RES. JUMPER
P/O C1	TY-WRAP	TP1 - TP10	TEST POINTS
P/O C1	SOLDER LUG	F1*	5 AMP 3AG FUSE
P/O C1	WIRE 20AWG	F2	3/4 AMP 3AG FUSE
C2	160uf 350V ELEC.	F3	6 AMP 3AG FUSE
P/O C2	TY-WRAP	F4, F5	8 AMP 3AG FUSE
C3	2uf 25V ELEC.	F6, F7	15 AMP 3AG FUSE
C4, C5	.1uf 25V CER.	F8	3/16 AMP 8AG FUSE
C6, C7	.01uf 500V CER.	FC1A - FC3B, FC8A FC8B	FUSE CLIPS
R1	600 OHM 10W	FC4A - FC7B	FUSE CLIPS
R2	100K 1W 5%	J1	12 PIN M-N-L CONN. FEMALE
R3	2.2 OHM 1/4W 5%	J2	6 PIN M-N-L CONN. MALE
R4	100 OHM 1/2W 5%	J3	15 PIN M-N-L CONN. MALE
R5	22K 1/2W 5%	J4	9 PIN M-N-L CONN. MALE
R6	100K 1/4W 5%	J5	12 PIN M-N-L CONN. MALE
R7	390 OHM 1/4W 5%	J6	2 PIN M-N-L CONN. MALE
R8	1.2K 1/4W 5%	6803 POWER MODULE	P.C. BOARD
R9	82K 1/2W 5%		
R10	8.2K 1/4W 5%		
VR1	0 - 25K 1/4W POT.	4-23-86 REV. 1.0 FIXED R2, R6	
D1 - D4	MR751		
D5 - D9	IN4004		
D10	IN5275A ZENER		
BR1	KBPC-35-02-W		
P/O BR1	BRIDGE SPACER		
Q1	2N3584	* TWO FLIPPER GAMES ONLY - SEE SCHEMATIC	
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		

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
2N3440 Q2
R7 390
R10 8.2K
C7 .1MF 500WV
D10 1N5275A
VR1 25K POT +190 ADJUST
R8 1.2K
Q3 2N3440
R9 82K 1/2W

D7
D8
D5
D6
1N4004X4
FU2 3/4A
170 VAC J5-4
170 VAC J5-7
C2 160MF 250WV
R2 100K 1W
R5 22K 1/2W
C6 .1MF 500WV

N.U. J5-5

MR751X4
D4
D3
D2
D1
9.4 VAC J5-6
9.4 VAC J5-3
FU3 6A

78H05C
U1
C1 11000MF 20WV
C4 .1MF 20WV
C3 2MF 20WV
R3 2.2
R4 100 1/2W
C5 .1MF 20WV

TP1 +5 VDC
TP5 +14 VDC UNREG
TP4 +43 VDC (SOL.)
GND TP10

KBPC35-02-W
DIODE BRIDGE
BR1
FU1 5A*
49 VAC J5-2
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

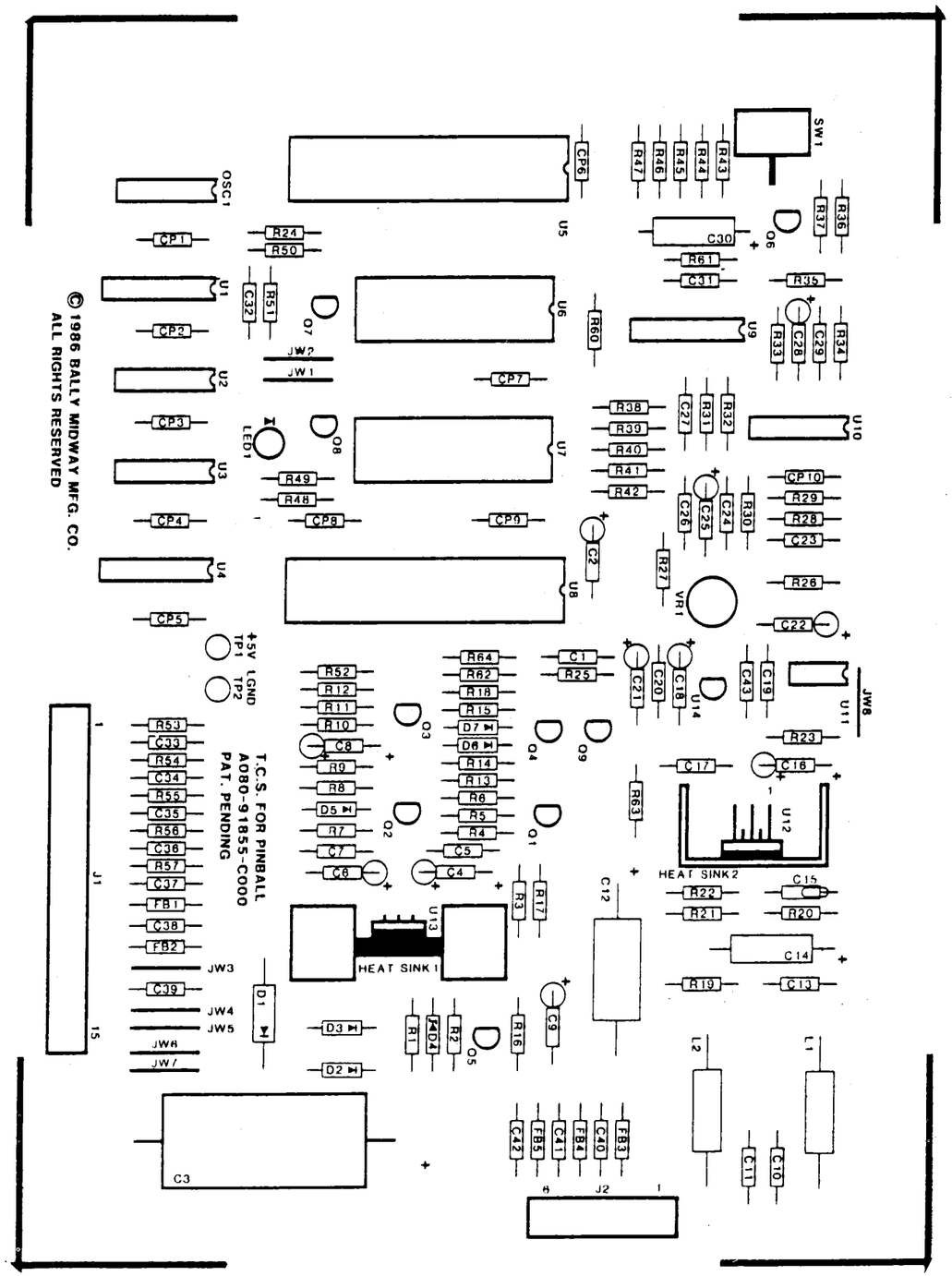
J2-1 SOL. BUS +43V
J2-2 PWR. LINE GND
J2-3 +14 VDC (UNREG +5)
J2-4 GEN. ILL. RETURN
J2-5 FLIP SW. RETURN
J2-6 GEN. ILL. BUS
CABINET

NOTE

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

NOTES: R. KOHAN	BALLY MIDWAY MFG. CO.
1PER	6803 PINBALL PWR MODULE
03/11/86	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 - C000
M051 - 00114 - C146

T.C.S. FOR PINBALL
A084-91855-C000
M051-00114-C146

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	150 PF 50V AX CER
C24	270 PF 50V AX CER
C25	1 UF 20V TANT
C26	470 PF 50V AX CER
C27	.003 UF 50V AX CER
C28	1 UF 20V TANT
C29	270 PF 50V AX CER
C30	47 UF 16V AX 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-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	5.1K OHM 1/4W 5% CRBN.
R27	0 OHM RESISTOR (JUMPER WIRE)
R28	150K OHM 1/4W 5% CRBN.
R29	82K OHM 1/4W 5% CRBN.
R30	150K OHM 1/4W 5% CRBN.
R31	33K OHM 1/4W 5% CRBN.
R32	18K OHM 1/4W 5% CRBN.
R33	33K OHM 1/4W 5% CRBN.
R34	120K OHM 1/4W 5% CRBN.
R35	62K OHM 1/4W 5% CRBN.
R36	68 OHM 1/4W 5% CRBN.
R37	180 OHM 1/4W 5% CRBN.
R38	75K OHM 1/4W 5% CRBN.
R39	47K OHM 1/4W 5% CRBN.
R40	200K OHM 1/4W 5% CRBN.
R41-R47	4.7K OHM 1/4W 5% CRBN.
R48	47K OHM 1/4W 5% CRBN.
R49	100 OHM 1/4W 5% CRBN.
R50	150 OHM 1/4W 5% CRBN.
R51	3.3K OHM 1/4W 5% CRBN.
R52	100K OHM 1/4W 5% CRBN.
R53-R57	10K OHM 1/4W 5% CRBN.
R58,R59	NOT USED
R60	1K OHM 1/4W 5% CRBN.
R61	2.7K OHM 1/4W 5% CRBN.
R62-R64	NOT INSERTED
VR1	1K OHM POT
L1,L2	10 UH INDUCTOR
D1	VR330 DIODE
D2,D3	1N4004 DIODE
D4	1N958B DIODE
D5-D7	1N4606 DIODE
LED 1	GREEN LED

DESIGNATION LIST

DESIGNATION NO.	DESCRIPTION
Q1	2N3904 XSTR.
Q2	2N4403 XSTR.
Q3	2N3904 XSTR.
Q4	2N4403 XSTR.
Q5	NOT INSERTED
Q6	2N5305 XSTR.
Q7	MPS3646 XSTR.
Q8	2N5305 XSTR.
Q9	NOT INSERTED
OSC1	8 MHZ COSC
IC U1	74LS76
IC U2	74LS00
IC U3	74LS02
IC U4	74LS139
IC U5	MC68B09E
IC U6	6116 2KX8 RAM 200NS.
IC U7	PROG EPROM 128K 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-JW8	JUMPER
J1,J2	AUTO INSERT PINS TIN .045 SQ. PIN
TP1,TP2	TEST POINTS
T.C.S. FOR PINBALL	A080-91855-C000

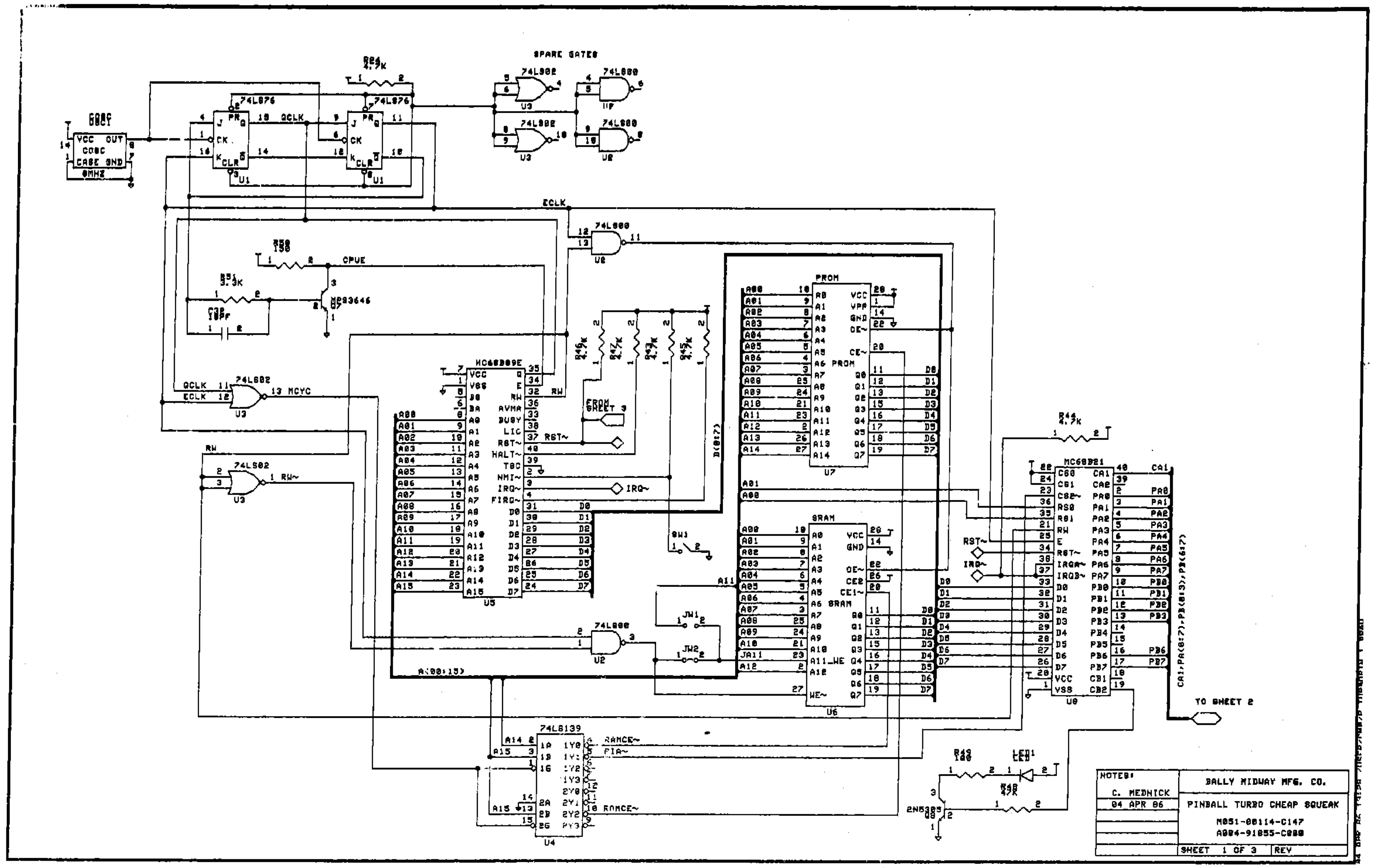
CROSS REFERENCE LIST

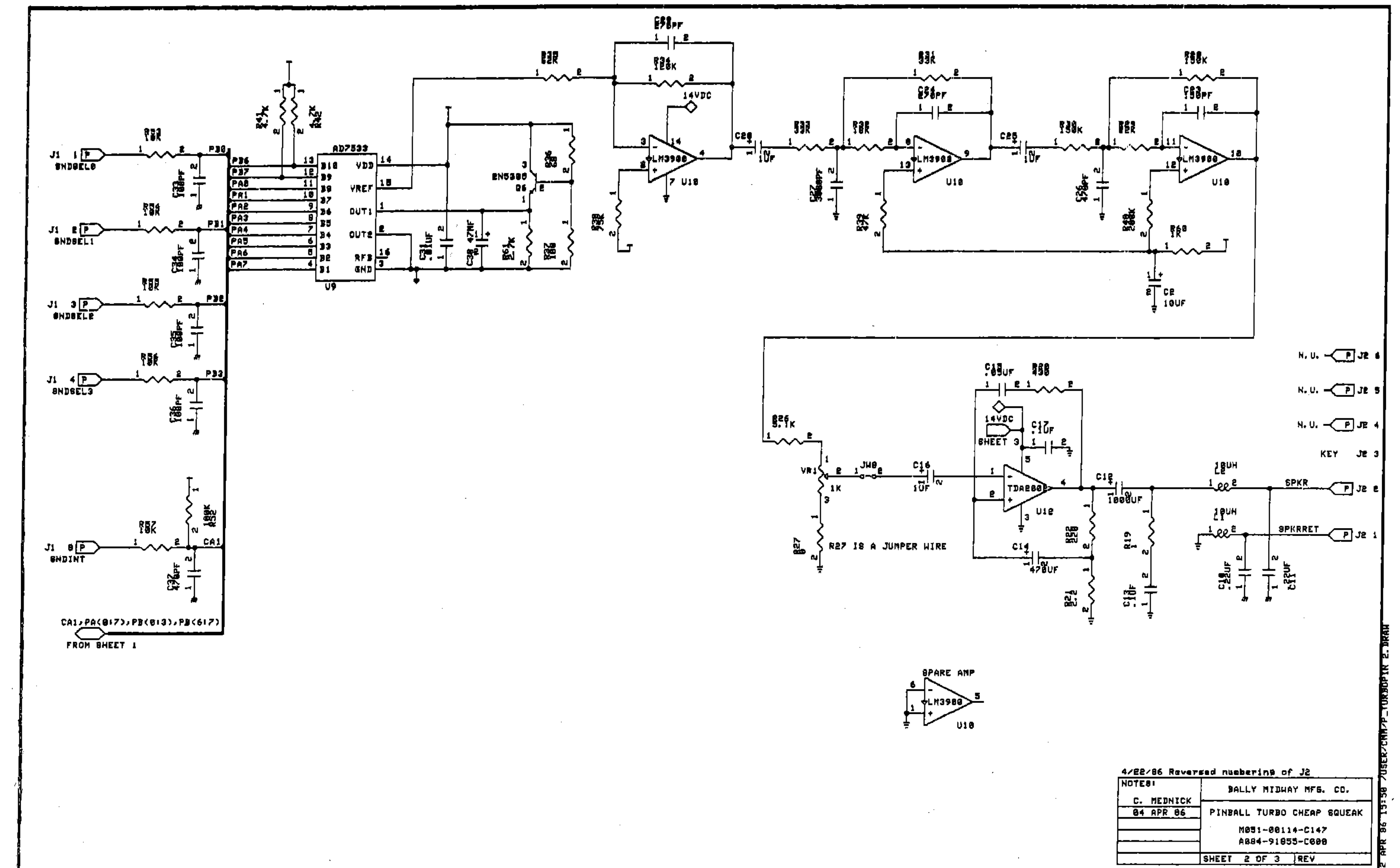
DESCRIPTION	QTY.	DESIGNATION NO.	PART NOS.
18 PF 50V AX CER.	1	C32	0365-00800-0026
100 PF 50V AX CER.	4	C33-C36	0360-00800-0046
150 PF 50V AX CER.	1	C23	0360-00800-0053
270 PF 50V AX CER.	2	C24,C29	0307-00800-0009
470 PF 50V AX CER.	2	C26,C37	0307-00800-0008
.003 UF 50V AX CER.	1	C27	0360-00800-0056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

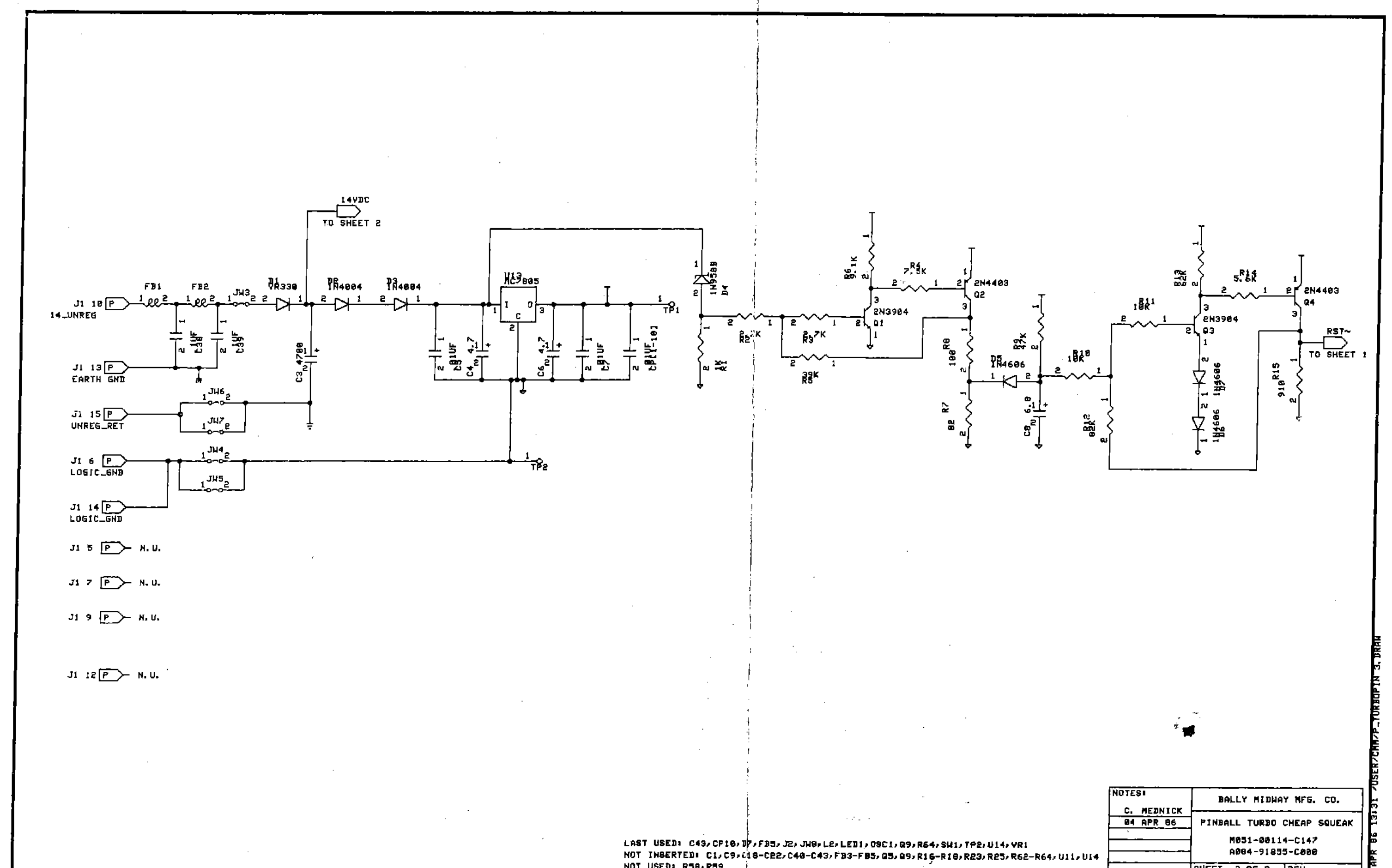
CROSS REFERENCE LIST

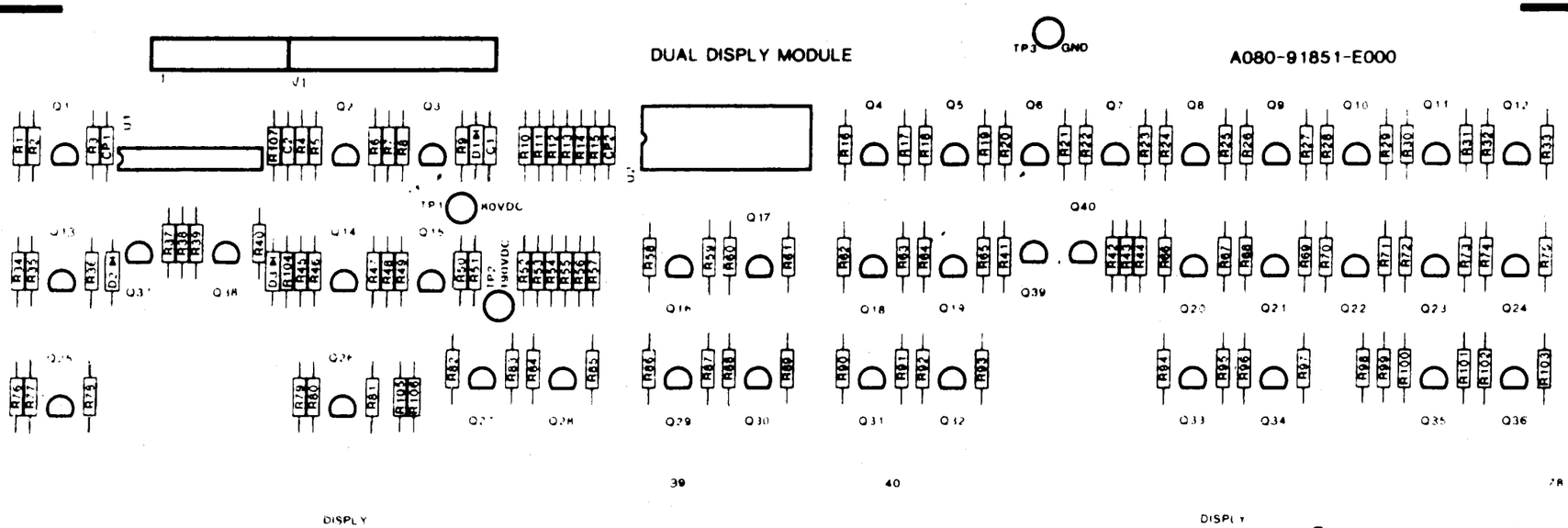
DESCRIPTION	QTY.	DESIGNATION NO.	PART NOS.
1K OHM POT	1	VR1	0360-00804-0003
10 UH INDUCTOR	2	L1,L2	0360-00804-0031
1N958B DIODE	1	D4	103E-00001-0002
1N4004 DIODE	2	D2,D3	103E-00003-0005
1N4606 DIODE	3	D5-D7	103E-00002-0006
VR330 DIODE	1	D1	0360-00801-0007
LED, GREEN	1	LED1	119E-00001-0001
2N3904	2	Q1,Q3	104E-00001-0006
2N4403	2	Q2,Q4	104E-00002-0006
2N5305	2	Q6,Q8	0360-00802-0012
MPS3646	1	Q7	104E-00001-0019
COSC, 8 MHZ	1	OSC1	119E-00002-0009
6116 2KX8 RAM 200NS.	1	IC U6	0304-00803-0057
74LS00	1	IC U2	0A15-00803-0046
74LS02	1	IC U3	0986-00803-7400
74LS76	1	IC U1	0A15-00803-0072
74LS139	1	IC U4	0A15-00803-0051
AD7533	1	IC U9	0304-00803-0055
LM3900	1	IC U10	0360-00803-0002
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

DESCRIPTION	QTY.	DESIGNATION NO.	PART NOS.
JUMPER (0 OHM RESISTOR)	9	JW1-JW8,R27	117E-00001-0003
AUTO INSERT PINS TIN .045 SQ. PIN	14	J1	0304-00804-0010
AUTO INSERT PINS TIN .045 SQ. PIN	5	J2	0304-00804-0010
TEST POINTS	2	TP1 TP2	0017-00007-0131
P.C. BOARD			A080-91855-C000


SPARE GATES
MC6809E
PROM
SRAM
MC68B21
74LS139
TO SHEET 2
NOTES:
C. MEDNICK
04 APR 86
BALLY MIDWAY MFG. CO.
PINBALL TURBO CHEAP SQUEAK
M051-00114-C147
A084-91855-C000
SHEET 1 OF 3
REV


AD7533
CA1,PA(0:7),PB(0:3),PB(6:7)
FROM SHEET 1
R27 IS A JUMPER WIRE
SPARE AMP
4/22/86 Reversed numbering of J2
NOTES:
C. MEDNICK
04 APR 86
BALLY MIDWAY MFG. CO.
PINBALL TURBO CHEAP SQUEAK
M051-00114-C147
A084-91855-C000
SHEET 2 OF 3
REV


14VDC
TO SHEET 2
J1 10 14_UNREG
J1 13 EARTH GND
J1 15 UNREG_RET
J1 6 LOGIC_GND
J1 14 LOGIC_GND
J1 5 N.U.
J1 7 N.U.
J1 9 N.U.
J1 12 N.U.
RST~
TO SHEET 1
LAST USED: C43,CP10,D7,FB5,J2,JW8,L2,LED1,OSC1,Q9,R64,SW1,TP2,U14,VR1
NOT INSERTED: C1,C9,C18-C22,C40-C43,FB3-FB5,Q5,Q9,R16-R18,R23,R25,R62-R64,U11,U14
NOT USED: R58,R59
NOTES:
C. MEDNICK
04 APR 86
BALLY MIDWAY MFG. CO.
PINBALL TURBO CHEAP SQUEAK
M051-00114-C147
A084-91855-C000
SHEET 3 OF 3
REV



PAT. PENDING

© 1985 BALLY MIDWAY MFG. CO
ALL RIGHTS RESERVED

THIS DWG IS CONFIDENTIAL & PROPERTY OF BALLY/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

Bally/MIDWAY MFG. CO.
FRANKLIN PARK, IL 60131

ASSY DRAWING
DUAL DISPLAY MODULE
A084-91851-E000

REVISIONS

PART NO.
M-0-5-1 - 0-0-3-6-5 - E-0-3-3

DUAL DISPLAY MODULE
A084-91851-E000
M051-00365-E033

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

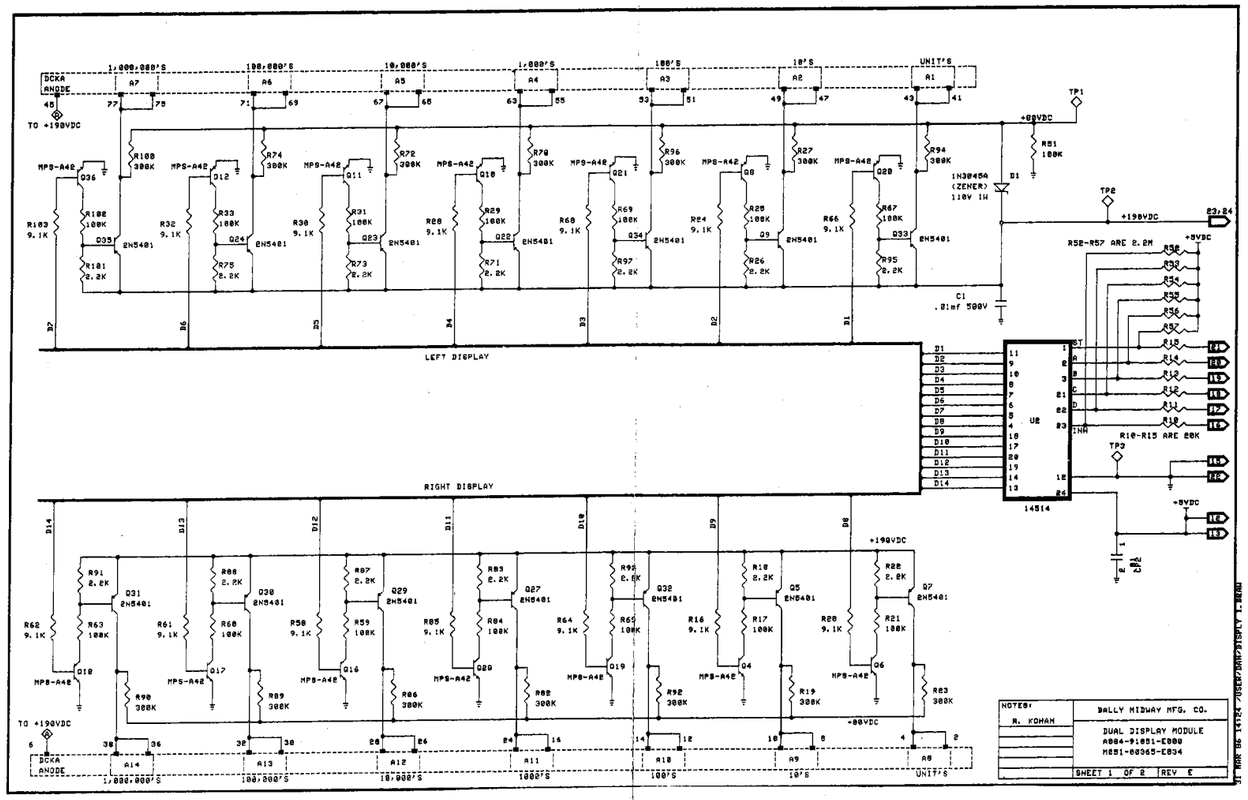
DESIGNATION NO.	DESCRIPTION
R59	100K 1/4W 5% METAL FILM
R60	100K 1/4W 5% METAL FILM
R61	9.1K 1/4W 5% CARBON
R62	9.1K 1/4W 5% CARBON
R63	100K 1/4W 5% METAL FILM
R64	9.1K 1/4W 5% CARBON
R65	100K 1/4W 5% METAL FILM
R66	9.1K 1/4W 5% CARBON
R67	100K 1/4W 5% METAL FILM
R68	9.1K 1/4W 5% CARBON
R69	100K 1/4W 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

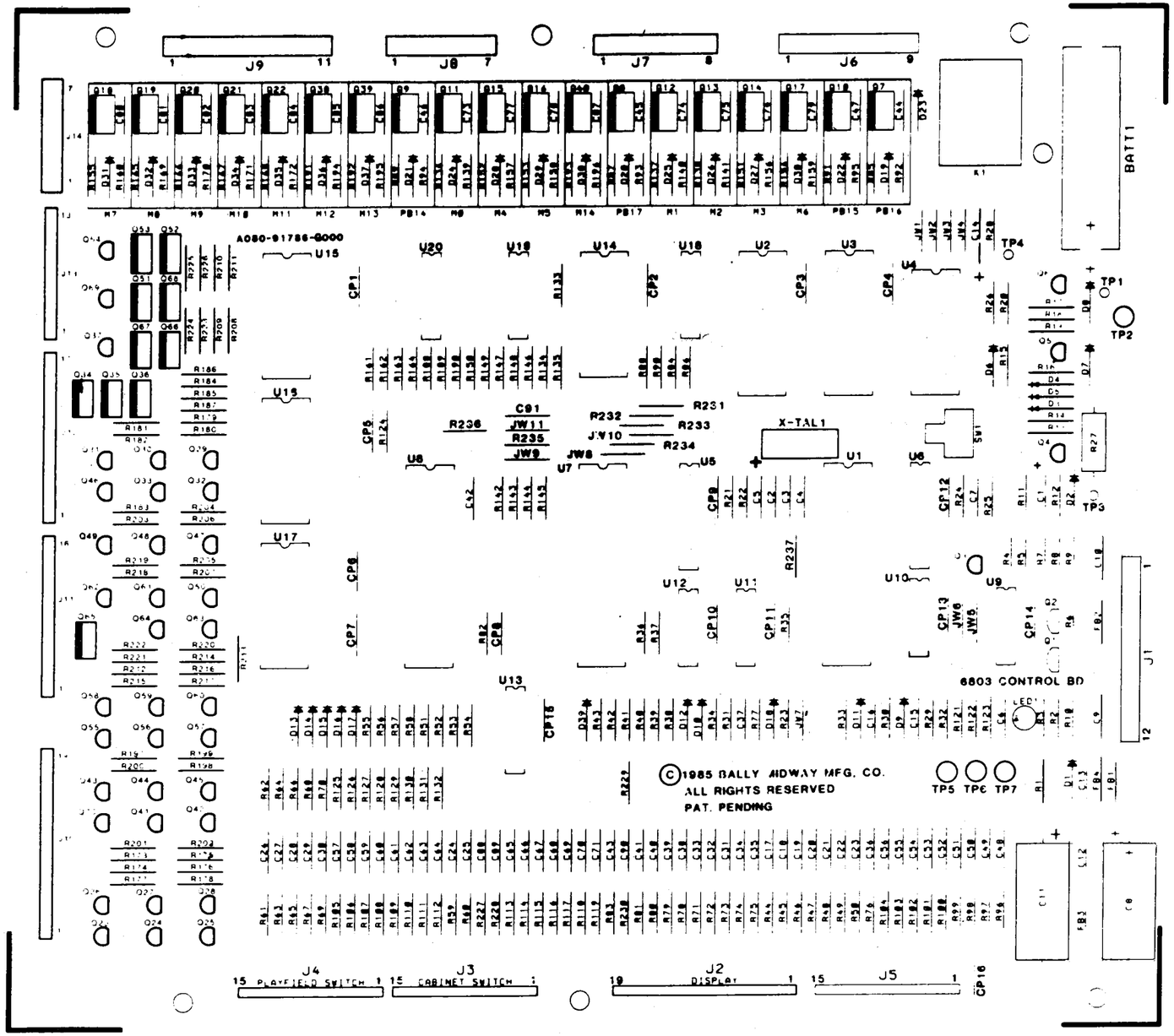
DESIGNATION LIST

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
A080-91851-E000	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	3		0017-00081-0288
BUMPER	1		0017-00041-0598
DUAL DISPLAY MODULE PCB	1		A080-91851-E000


1,000,000'S
100,000'S
10,000'S
1,000'S
100'S
10'S
UNIT'S
DCKA ANODE
TO +190VDC
MPS-A42
2N5401
LEFT DISPLAY
RIGHT DISPLAY
+190VDC
+88VDC
+88V
+5VDC
TP1
TP2
TP3
1N3045A (ZENER) 110V 1W
D1
C1 .01mf 500V
C2 1mf
R51 100K
R52-R57 ARC 2.2M
R10-R15 ARC 20K
14514
U8
74HC373
U1
9 SEGMENT 14 DIGIT DISPLAY
FRONT SIDE PIN OUT
78 67 . . . 64 63 . . . 55 54 . . . 41 40 . . . 39 30 . . . 25 24 . . . 16 15 . . . 2 1
NOTES:
R. KOHAN
BALLY MIDWAY MFG. CO.
DUAL DISPLAY MODULE
A804-91851-E800
A851-00365-E804
SHEET 1 OF 2 REV E
SHEET 2 OF 2 REV E



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 M-0-5-1-0-0-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, P35, 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

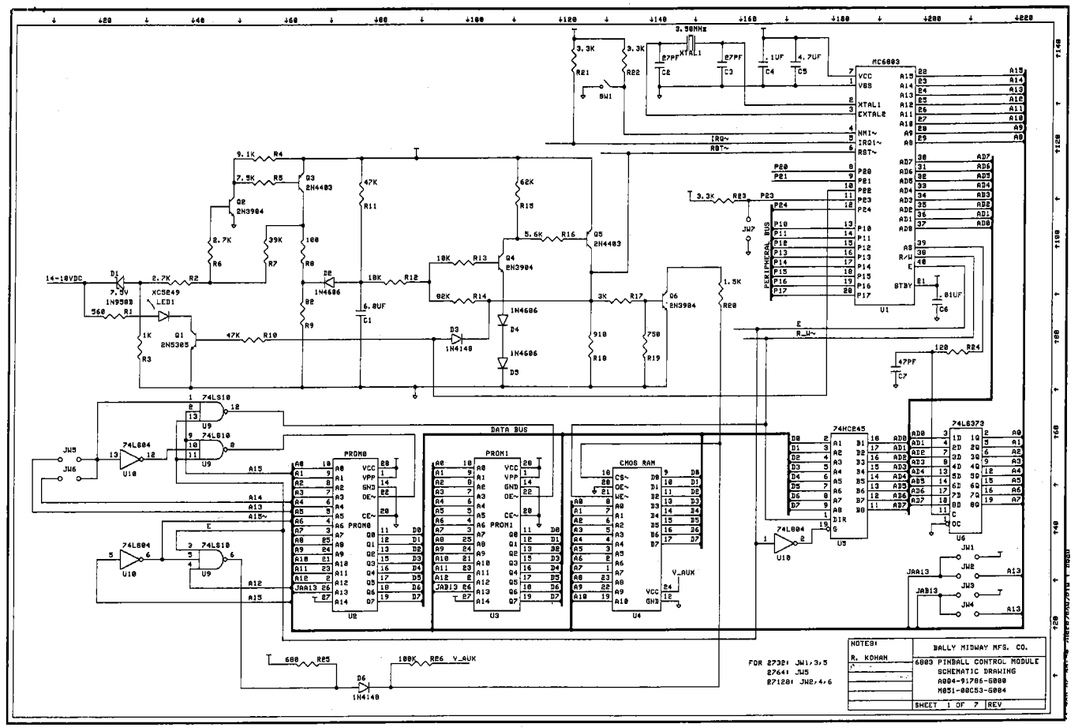
DESIGNATION	DESCRIPTION
C1	6.8UF 25V TANT.
C2,C3	27PF 50V CER.
C4	.1UF 50V CER.
C5	4.7UF 25V TANT.
C6	.01UF 50V CER.
C7	47PF 50V CER.
C8	470UF 16V ELEC.
C9,C10	.01UF 50V CER.
C11	470UF 25V ELEC.
C12,C13	.01UF 50V CER.
C14	4.7UF 25V TANT.
C15,C16	.01UF 50V CER.
C17 - C23	470PF 1KV CER.
C24 - C30	390PF 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

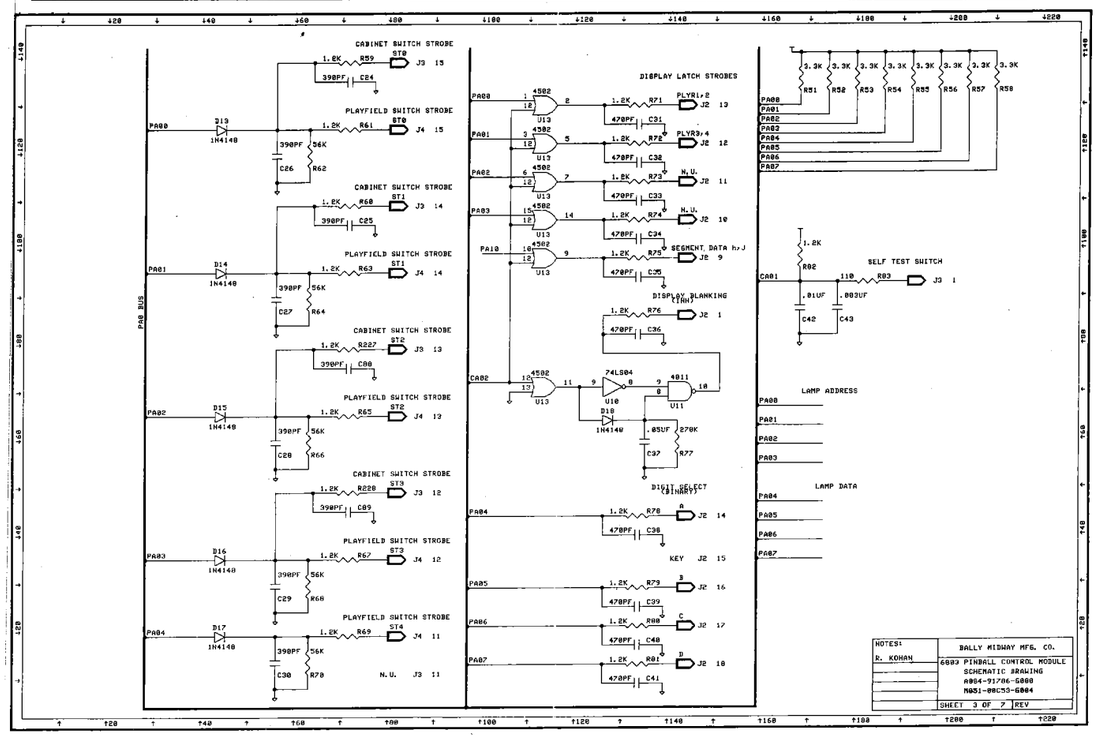
6803 CONTROL BOARD
A084-91786-G000
M051-000C53-G003

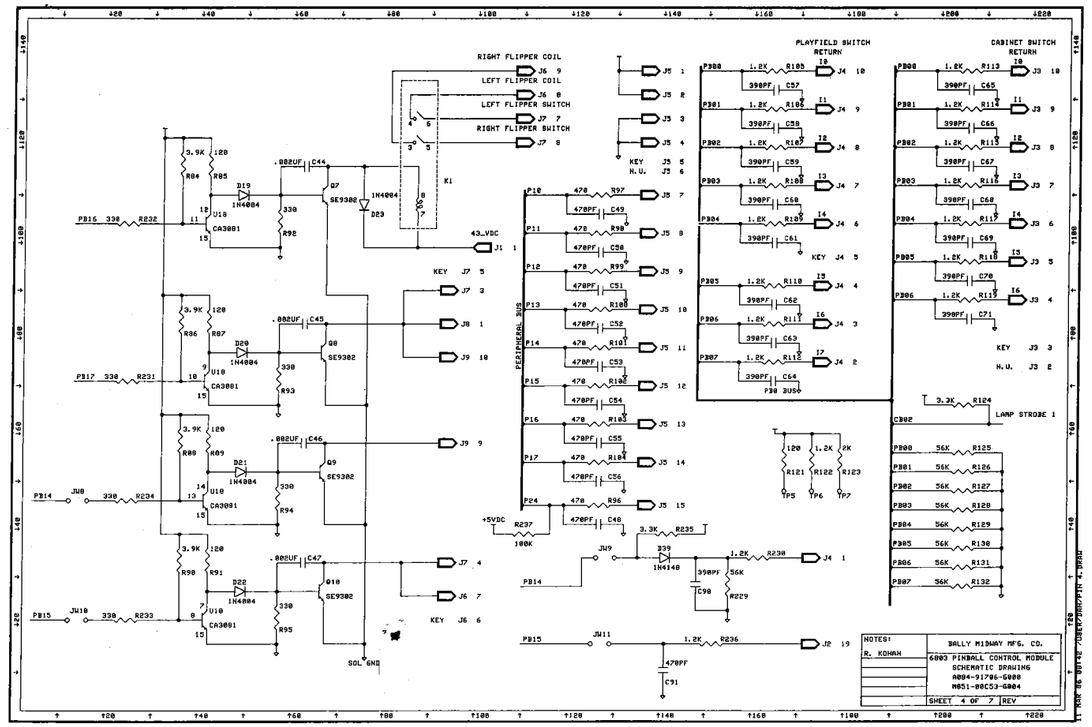
CROSS REFERENCE LIST

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.


2.56MHz
MC6803
PROM0
PROM1
CMOS RAM
DATA BUS
74HC245
74LS373
74LS04
74LS10
PERIPHERAL BUS
14-18VDC
5V
5V RETURN
UNREGULATED_5V
KEY
PHASE_A
PHASE_B
R_W~
E
RST~
IRQ~
V_AUX
3.6V NICAD BATT1
PIA1
MC6821
PIA0
MOMENTARY SOL DATA
CONTINOUS SOL DATA
SOL BANK SELECT
ADDRESS BUS
DATA BUS
6-30-86 CORRECTED PIA ADDRESSING (AGAIN). CMM
6-27-86 A6,A5 CORRECTED TO PIA0. CMM
BALLY MIDWAY MFG. CO.
6803 PINBALL CONTROL MODULE
SCHEMATIC DRAWING
A804-91786-G800
M851-80C53-G804
SHEET 2 OF 7 REV
FOR 2732: JW1,3,5
2764: JW5
27128: JW2,4,6
SHEET 1 OF 7 REV


CABINET SWITCH STROBE
PLAYFIELD SWITCH STROBE
DISPLAY LATCH STROBES
DISPLAY BLANKING
DIGIT SELECT
SEGMENT DATA
SELF TEST SWITCH
LAMP ADDRESS
LAMP DATA
KEY
N.U.
PA00 BUS
BALLY MIDWAY MFG. CO.
6803 PINBALL CONTROL MODULE
SCHEMATIC DRAWING
A804-91786-G800
M851-80C53-G804
SHEET 3 OF 7 REV


RIGHT FLIPPER COIL
LEFT FLIPPER COIL
LEFT FLIPPER SWITCH
RIGHT FLIPPER SWITCH
PLAYFIELD SWITCH RETURN
CABINET SWITCH RETURN
43_VDC
SOL_GND
KEY
N.U.
PERIPHERAL BUS
P30 BUS
LAMP STROBE 1
BALLY MIDWAY MFG. CO.
6803 PINBALL CONTROL MODULE
SCHEMATIC DRAWING
A804-91786-G800
M851-80C53-G804
SHEET 4 OF 7 REV

BLACK BELT LAMP DRIVER LOCATIONS

DRIVER	CONNECTOR	PIN	PHASE	WIRE CODE	DESCRIPTION
Q35	J13	2	B	83	2X
Q52	J13	13	B	97	3X
Q67	J13	5	B	86	4X
Q36	J13	3	B	84	5X
Q66	J13	6	B	87	BLACK BELT
Q51	J13	8	B	93	BLUE BELT
Q46	J11	16	A	78	BODY SHOT
Q45	J10	10	B	28	BONUS 1,000
Q60	J10	13	B	36	BONUS 2,000
Q29	J11	8	B	64	BONUS 3,000
Q46	J11	16	B	78	BONUS 4,000
Q61	J11	6	B	62	BONUS 5,000
Q30	J11	12	B	72	BONUS 6,000
Q47	J11	11	B	71	BONUS 7,000
Q62	J11	4	B	61	BONUS 8,000
Q31	J11	13	B	73	BONUS 9,000
Q48	J11	10	B	68	BONUS 10,000
Q63	J11	3	B	59	BONUS 20,000
Q32	J11	14	B	74	BONUS 30,000
Q49	J11	9	B	67	BONUS 40,000
Q64	J11	2	B	58	BONUS 50,000
Q59	J10	14	B	37	CENTER X-BALL
Q54	J13	11	B	95	COLLECT BONUS
Q57	J10	18	B	43	FLASH 1
Q26	J10	4	B	15	FLASH 2
Q43	J10	11	B	31	FLASH 3
Q58	J10	19	B	45	FLASH 4
Q27	J10	5	B	18	FLASH 5
Q44	J10	12	B	32	FLASH 6
Q34	J13	1	B	81	GREEN BELT
Q37	J13	4	B	85	HOLD BONUS (LOWER)
Q50	J11	7	A	63	HOLD BONUS (UPPER)
Q34	J13	1	A	81	KARATE "A"
Q66	J13	6	A	87	KARATE "A"
Q52	J13	13	A	97	KARATE "E"
Q65	J11	1	A	48	KARATE "K"
Q51	J13	8	A	93	KARATE "R"
Q35	J13	2	A	83	KARATE "T"
Q64	J11	2	A	58	LEFT 10,000
Q49	J11	9	A	67	LEFT ARROW
Q42	J10	9	B	26	LEFT CALF
Q25	J10	3	B	14	LEFT KNEE
Q50	J11	7	B	63	LEFT OPEN GATE
Q70	J10	7	B	24	LEFT OUTLANE
Q36	J13	3	A	84	LEFT RETURN LANE
Q33	J11	15	A	75	LEFT SIDE
Q56	J10	17	B	41	LEFT THIGH
Q70	J10	7	A	24	METER 4,000
Q55	J10	16	A	38	METER 6,000
Q41	J10	8	A	25	METER 10,000
Q56	J10	17	A	41	METER 25,000
Q25	J10	3	A	14	METER 50,000
Q23	J10	1	A	12	METER 200,000
Q24	J10	2	A	13	METER 800,000
Q42	J10	9	A	26	METER SPECIAL
Q68	J13	10	B	94	READY
Q53	J13	12	B	96	READY ARROW
Q37	J13	4	A	85	REGULAR BODY
Q53	J13	12	A	96	REGULAR LEFT LEG
Q68	J13	10	A	94	REGULAR LEFT SIDE
Q69	J13	7	A	91	REGULAR RIGHT LEG
Q54	J13	11	A	95	REGULAR RIGHT SIDE
Q48	J11	10	A	68	RIGHT 10,000
Q31	J11	13	A	73	RIGHT ARROW
Q55	J10	16	B	38	RIGHT CALF
Q32	J11	14	A	74	RIGHT EXTRA BALL
Q24	J10	2	B	13	RIGHT KNEE
Q33	J11	15	B	75	RIGHT OPEN GATE
Q23	J10	1	B	12	RIGHT OUTLANE
Q67	J13	5	A	86	RIGHT RETURN LANE
Q69	J13	7	B	91	RIGHT SAUCER ARROW
Q63	J11	3	A	59	RIGHT SIDE
Q41	J10	8	B	25	RIGHT THIGH
Q28	J10	6	B	21	SOLENOID EXPANDER
Q28	J10	6	A	21	SOLENOID EXPANDER
Q45	J10	10	A	28	SPSA
Q57	J10	18	A	43	TOP "A"
Q26	J10	4	A	15	TOP "B"
Q43	J10	11	A	31	TOP "C"
Q58	J10	19	A	45	TOP "D"
Q27	J10	5	A	18	TOP "E"
Q44	J10	12	A	32	TOP "F"
Q59	J10	14	A	37	TOP "G"
Q65	J11	1	B	48	YELLOW BELT

BLACK BELT SOLENOID DRIVER LOCATIONS

TRANSISTOR	CONNECTOR PIN	DESCRIPTION	WIRE CODE
Q21	J9-4	BRIGHT BACK LEFT	54
Q22	J9-6	BRIGHT BACK RIGHT	56
Q16	J7-1	BRIGHT MAN/LEFT SINGLE DROP TARGET	27
Q18	J9-1	BRIGHT RIGHT/MIDDLE SAUCER	51
Q15	J8-6	BRIGHT SUN/RIGHT SINGLE DROP/TARGET	25
Q19	J9-2	BRIGHT TOP LEFT/ RIGHT KICKER	52
Q20	J9-3	BRIGHT TOP RIGHT	53
Q9	J9-9	EXTRA SWITCH	511
Q40	J9-11	KNOCKER	59
Q7	J6-9	*LEFT FLIPPER	95
Q10	J6-7	LEFT GATE	311
Q17	J6-5	LEFT SAUCER	36
Q13	J6-3	LEFT SLINGSHOT	34
Q11	J6-1	LEFT THUMPER BUMPER	31
Q39	J9-8	OUTHOLE	58
Q38	J9-7	RESERVED FOR GERMAN USE	57
Q7	J6-8	*RIGHT FLIPPER	90
Q8	J7-3	RIGHT GATE	24
Q14	J6-4	RIGHT SLINGSHOT	35
Q12	J6-2	RIGHT THUMPER BUMPER	32

* FLIPPERS CONNECTED THROUGH K1, THE FLIPPER RELAY.

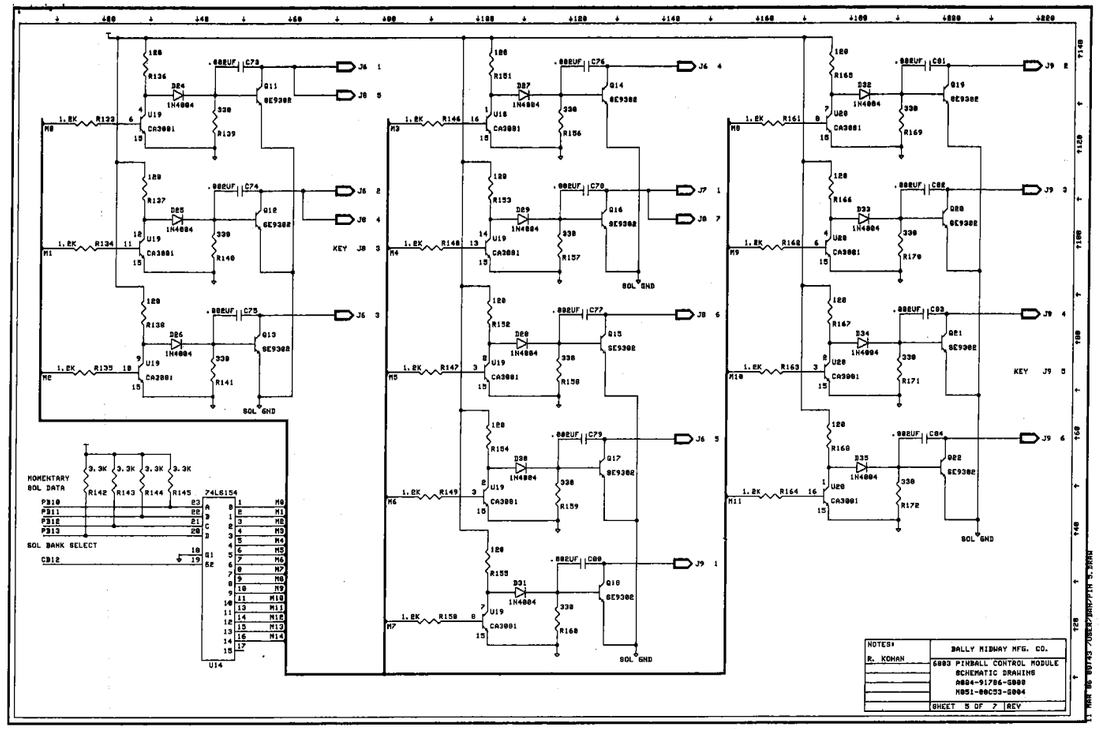
3/2-267-2240 Williams - BALLY

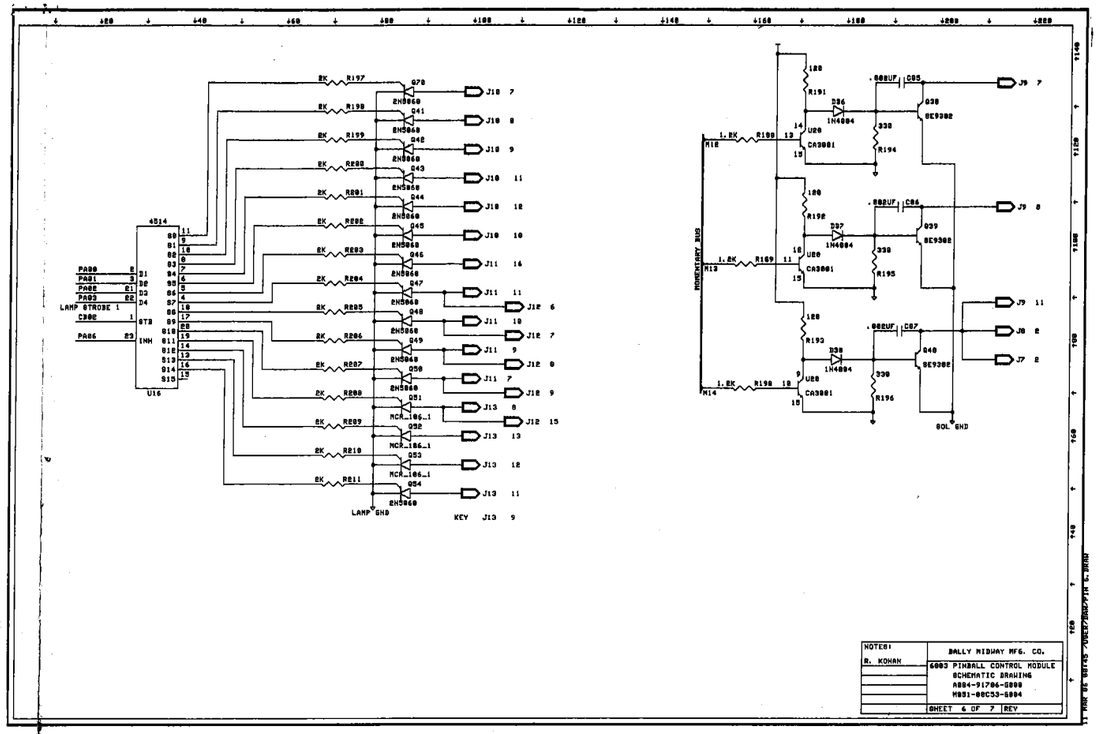
WIRE COLOR CODE

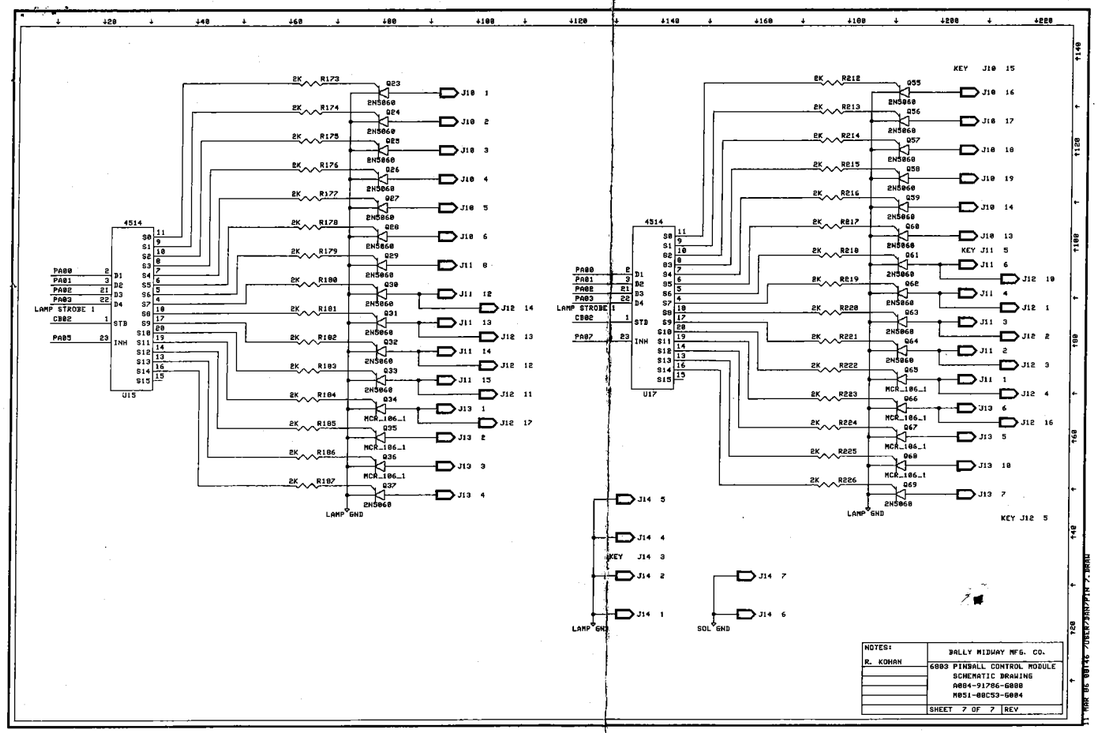
1-RED -R-
2-BLUE -BLU-
3-YELLOW -Y-
4-GREEN
5-WHITE -W-
J-JUMPER
1-FIRST NUMBER-BODY COLOR
2-SECOND NUMBER-TRACER COLOR

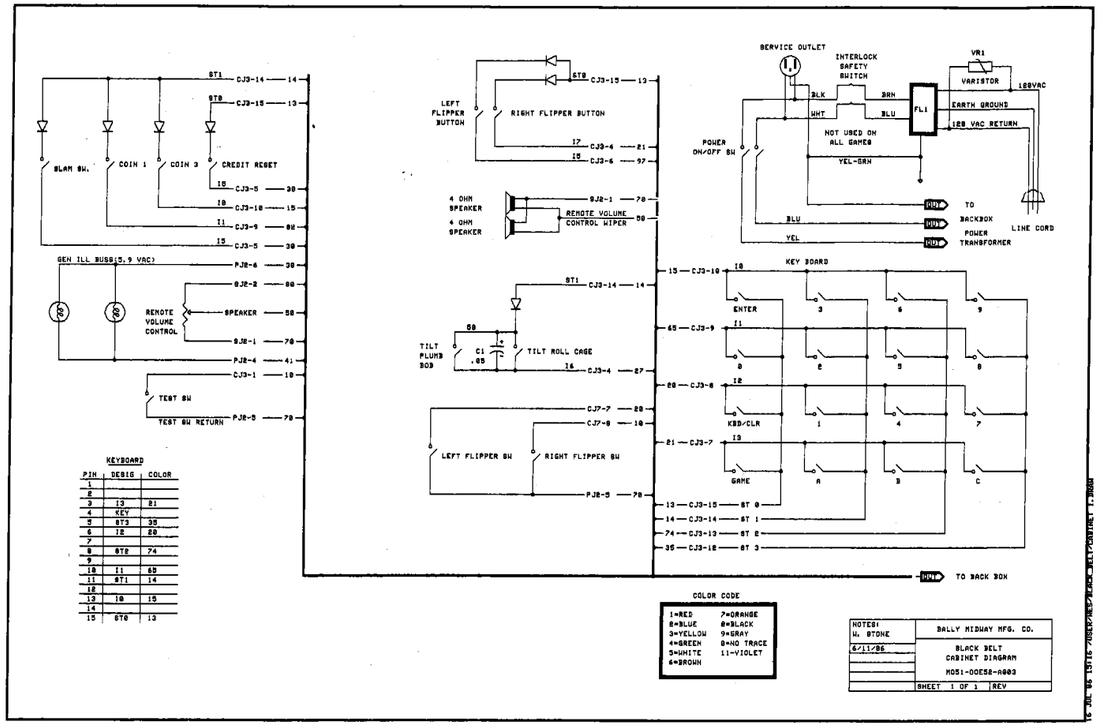
EXAMPLE: 50 -WHITE
51 -WHITE-RED

6-BROWN -BR-
7-ORANGE -O-
8-BLACK -B-
9-GRAY
0-NO TRACER
11-VIOLET


MOMENTARY SOL DATA
SOL BANK SELECT
SOL GND
KEY J8 3
KEY J9 5
NOTES:
R. KOHAN
BALLY MIDWAY MFG. CO.
6803 PINBALL CONTROL MODULE
SCHEMATIC DRAWING
A804-91786-6808
M851-88C53-6804
SHEET 5 OF 7 REV


LAMP STROBE 1
LAMP GND
KEY J13 9
MOMENTARY BUS
SOL GND
NOTES:
R. KOHAN
BALLY MIDWAY MFG. CO.
6803 PINBALL CONTROL MODULE
SCHEMATIC DRAWING
A804-91786-6808
M851-88C53-6804
SHEET 6 OF 7 REV


LAMP STROBE 1
LAMP GND
KEY J10 15
KEY J11 5
KEY J12 5
KEY J14 3
SOL GND
NOTES:
R. KOHAN
BALLY MIDWAY MFG. CO.
6803 PINBALL CONTROL MODULE
SCHEMATIC DRAWING
A804-91786-6808
M851-88C53-6804
SHEET 7 OF 7 REV



KEYBOARD

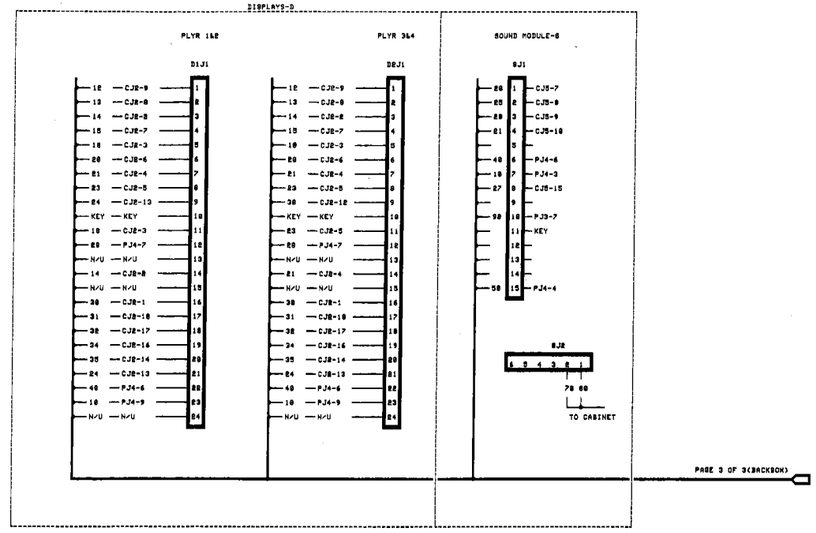
PIN	DESIG	COLOR
1		
2		
3	I2	21
4	KEY	
5	BT3	35
6	I2	20
7		
8	BT2	74
9		
10	I1	69
11	BT1	14
12		
13	I0	15
14		
15	BT0	13

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	

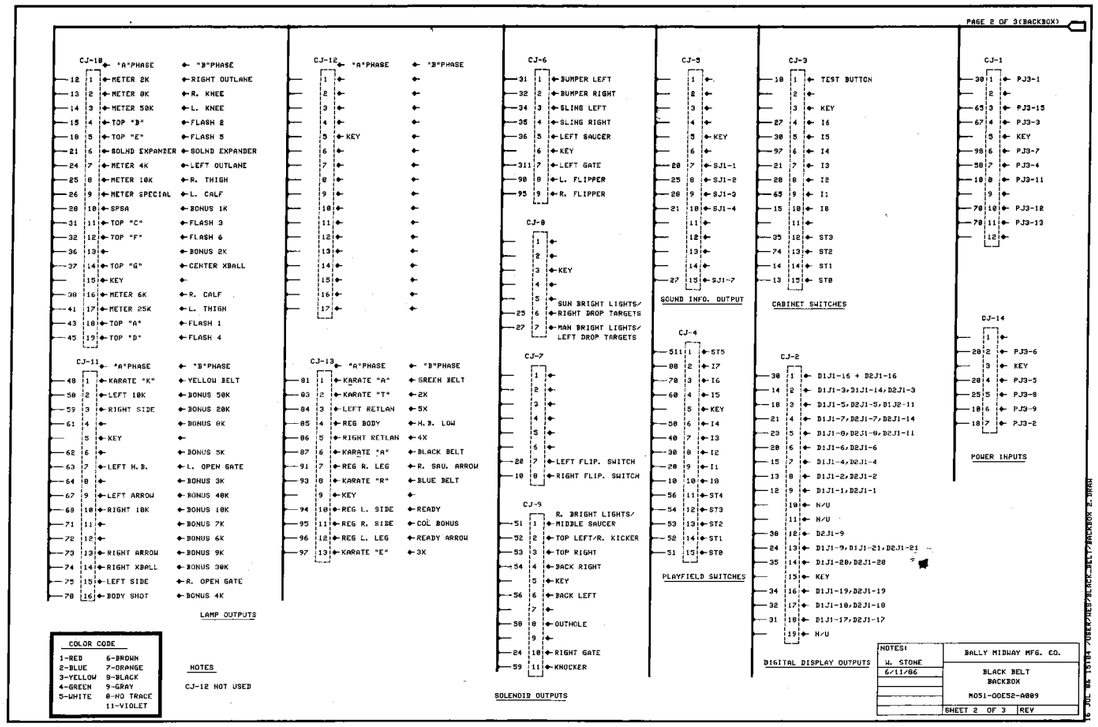
NOTES:	BALLY MIDWAY MFG. CO.
W. STONE	BLACK BELT CABINET DIAGRAM
6/11/86	MOS1-00ES2-A003
	SHEET 1 OF 1 REV

16 JUL 86 15:16 /USER/WEPA/BLACK_BELT/POSITRACK 1.DRAW



NOTES:	BALLY MIDWAY MFG. CO.
W. STONE	BLACK BELT BACKBOX
6/11/86	MOS1-00ES2-A003
	SHEET 3 OF 3 REV

16 JUL 86 15:16 /USER/WEPA/BLACK_BELT/BACKBOX 3.DRAW



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

NOTES:	BALLY MIDWAY MFG. CO.
W. STONE	BLACK BELT BACKBOX
6/11/86	MOS1-00ES2-A003
	SHEET 2 OF 3 REV

16 JUL 86 15:16 /USER/WEPA/BLACK_BELT/BACKBOX 2.DRAW

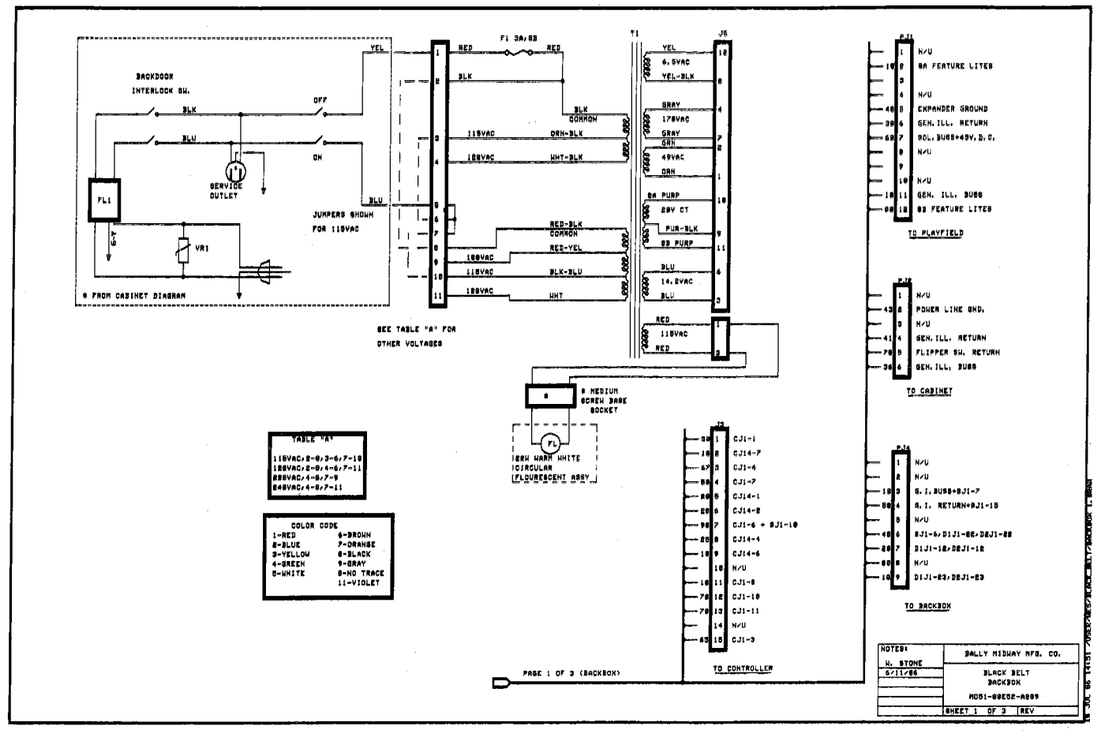


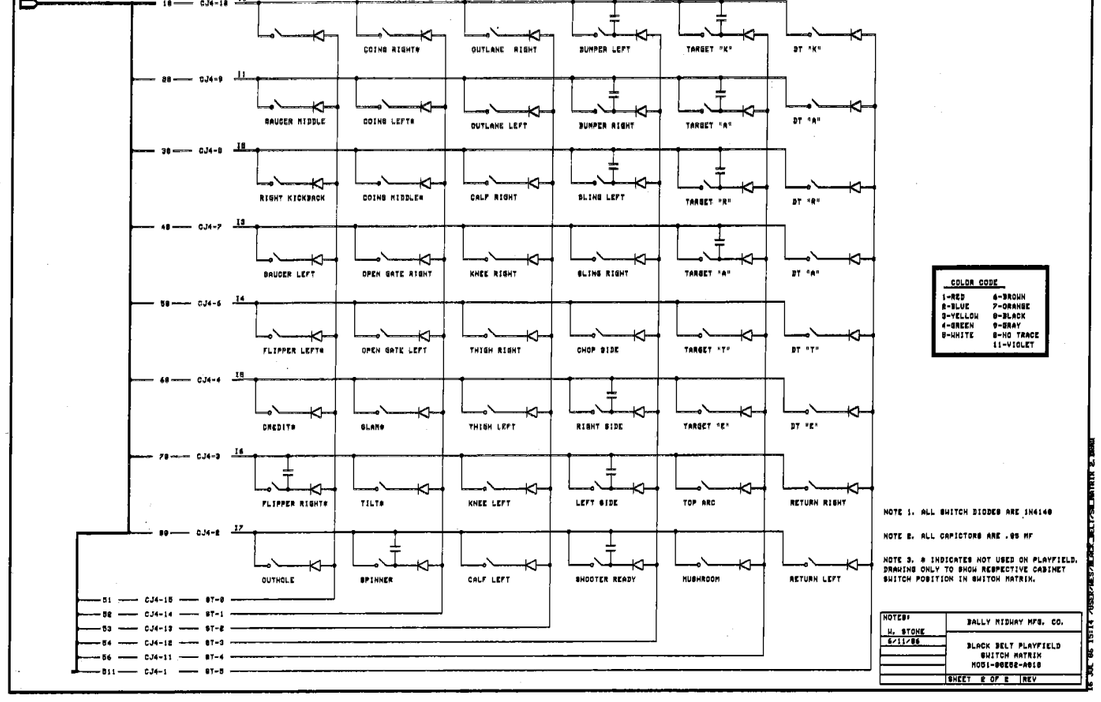
TABLE "A"

110VAC:2-8/3-6/7-10
180VAC: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:	BALLY MIDWAY MFG. CO.
W. STONE 6/11/86	BLACK BELT BACKBOX M051-00E02-A089
	SHEET 1 OF 3 REV



COLOR CODE

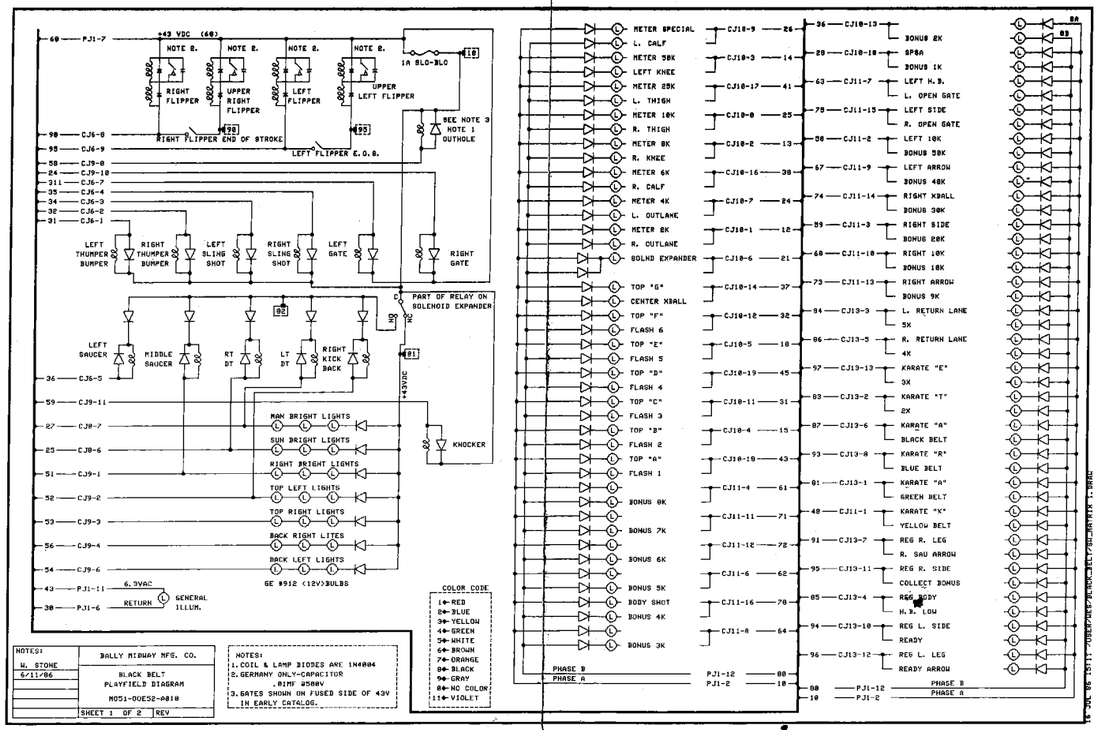
1-RED	6-BROWN
2-BLUE	7-ORANGE
3-YELLOW	8-BLACK
4-GREEN	9-GRAY
5-WHITE	0-NO TRACE
	11-VIOLET

NOTE 1. ALL SWITCH DIODES ARE 1N4148

NOTE 2. ALL CAPICTORS ARE .05 MF

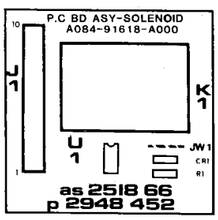
NOTE 3. 0 INDICATES NOT USED ON PLAYFIELD. DRAWING ONLY TO SHOW RESPECTIVE CABINET SWITCH POSITION IN SWITCH MATRIX.

NOTES:	BALLY MIDWAY MFG. CO.
W. STONE 6/11/86	BLACK BELT PLAYFIELD SWITCH MATRIX M051-00E02-A010
	SHEET 2 OF 2 REV



NOTES:	BALLY MIDWAY MFG. CO.
W. STONE 6/11/86	BLACK BELT PLAYFIELD DIAGRAM M051-00E02-A010
	SHEET 1 OF 2 REV

NOTES:
1. COIL & LAMP DIODES ARE 1N4004
2. GERMANY ONLY-CAPACITOR .01MF 250AV
3. GATES SHOWN ON FUSED SIDE OF 43V IN EARLY CATALOG.

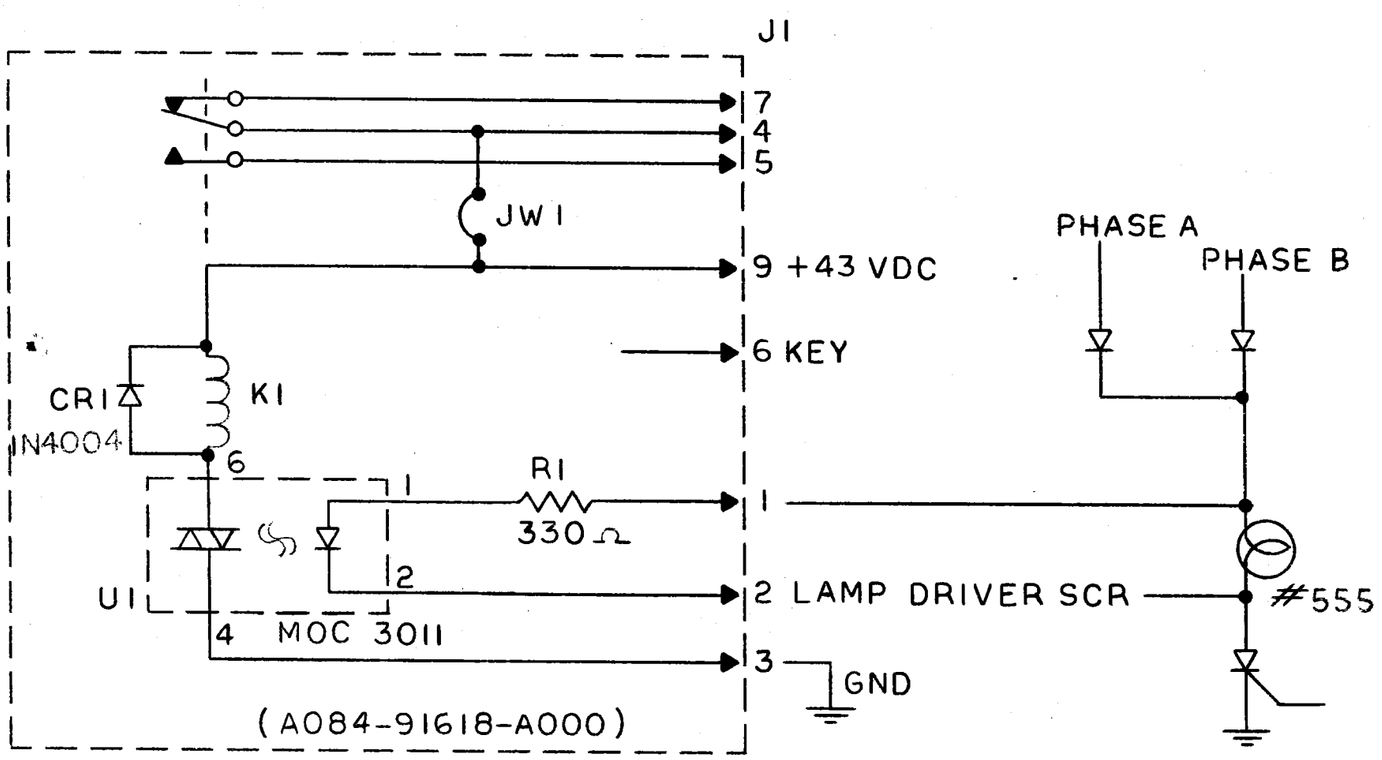


CROSS REFERENCE LIST

DESCRIPTION	QTY.	DESIGNATION	PART NUMBER
IN4004 DIODE	1	CR1	103E-00003-0005
10 PIN KK156 CONN.	1	J1	0017-00021-0388
ZERO OHM RESISTOR	1	JW1	117E-00001-0003
48 VOLT RELAY	1	K1	114E-00001-0011
330 OHM 1/4 W. CRBN.	1	R1	100E-00005-0047
MOC 3011 OPTO COUPLER	1	U1	120E-00002-0001
P.C. BOARD	1		A080-91618-A000

PROJECT ENG: CARY MEDNICK		USED ON	Bally / MIDWAY MFG. CO. FRANKLIN PK. ILL.
DO NOT SCALE DWG.	HEAT TREAT	SCALE FULL	NO. REQ'D
DIM. TOLERANCES UNLESS SPECIFIED: CONCENTRICITY T.I.R. .002, FRACTIONAL ±1/64, DECIMAL ±.005, HOLE DIA. +.002 -.000	DRN. DBC 6/19/86	SHT'L.	SOLENOID EXPANDER ASSY. DWG. A084-91618-A000
	CHK. CMM	FINISH	PART NO. M051-00114-A058
	DATE 6/19/86		

REVISIONS



THIS DWG. IS CONFIDENTIAL & PROPERTY OF BALLY/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	Bally/MIDWAY MFG. CO. FRANKLIN PARK, IL 60131	6-20-86 REVISIONS
	DRN DBC DATE 6/19/86 SCALE		
	MECH CHK MAT'L	SOLENOID EXPANDER (SCHEMATIC)	PART NO. M051-00114-A059
	ELEC. CHK. FINISH		

BALLY/MIDWAY'S BLACK BELT
#E52
ROM/EPROM PART NUMBERS

UNPROGRAMMED CONTROL BOARD A084-91786-G000
PROGRAMMED CONTROL BOARD A084-91786-AE52

POS.	MIDWAY PART NUMBER
U2	0E52-00803-0001
U3	0E52-00803-0002

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

UNPROGRAMMED TURBO CHEAP SQUEAK FOR PINBALL A084-91855-C000
PROGRAMMED TURBO CHEAP SQUEAK FOR PINBALL A084-91855-AE52

POS.	MIDWAY PART NUMBER
U7	0E52-00803-0003

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

M051-00E52-A008	REVISIONS
06-26-86	RELEASE FOR PRODUCTION