

# SARGE U.R.

## Parts and Operating Manual

*Bally*

MIDWAY MFG. CO.

10601 W Belmont Avenue  
Franklin Park, Illinois 60131  
U.S.A.



Phone (312) 451-9200 Cable Address MIDCO Telex No. 72-1596

0B88-00300-0000

**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 Instructions Manual, may cause interference to Radio Communications. As temporarily permitted by Regulation it has not been tested for compliance to Subpart J or Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference. Operation of this equipment in a Residential Area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

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

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

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

**Bally/MIDWAY**  
T.M.

*Invites You To Use*

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

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

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

**Bally/MIDWAY**  
T.M.

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Printed in U.S.A.

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## GENERAL INSTRUCTIONS

### FOR

### SARGE U. R.

#### INSTALLATION

1. Remove keys from the taped coin return slot and unlock to open the coin box door.
2. Remove four (4) "CABINET LEVELING LEGS" from inside the coin box.
3. Tip the cabinet to the side and remove the shipping cleats from its bottom.
  - Locate the threaded holes - one in each corner - and install the "CABINET LEVELING LEGS" in them.
  - Level the cabinet.
  - When finished, the cabinet should be stable in the upright position.
4. • Unlock and remove the rear access door to gain access to the 3-pronged line cord. Reinstall the rear access door.
5. Connect the 3-pronged line cord to a 3-slot A.C. wall outlet **to insure proper grounding.**
6. The power ON/OFF switch is located:  
UPRIGHT MODEL:        On top at the center of the cabinet.

#### TO SERVICE THE CONTROL PANEL

1. UPRIGHT MODEL:
  - The control panel is held in place by three (3) spring clamps which provide constant pressure on the strikes.
  - **AFTER turning power to the game off,** they can be reached through the coin door.
  - To release the clamps, lift up and toward the center of the control panel.
  - Once they are released, unhook them from their strikes. The third clamp is located near the center of the control panel.
  - To remove the control panel: Raise it up and tilt it toward you until you can see the cable behind it.
  - Cradling the control panel between yourself and the cabinet, disconnect it from its cabling and any miscellaneous hardware.
  - The control panel is now loose and may be serviced.
  - To reinstall the control panel, reverse this procedure.

## REMOVAL OF THE MAIN-DISPLAY-GLASS AND/OR THE T.V. BEZEL

### 1. UPRIGHT MODEL:

**NOTE:** In order to do this, the control panel **MUST** be removed first. See the "UPRIGHT MODEL" procedure.

- Turn the power to the game off and remove the control panel. This frees the main-display-glass so it can be removed.
- By putting your finger in the hole in the middle of the main-display-glass support, you can lift it up and out.
- Remove the bezel securing screws and the bezel may be removed.
- To reinstall the T.V. bezel and the main-display-glass, reverse this procedure.

### VOLUME CONTROL POT / OPTION SWITCH LOCATIONS

The volume control pot is located, along with the credit switch and the self-test switch, just inside the cabinet on the right side of the coin door frame. The option switch is located as shown in the attached P.C. Board reference drawing. For adjustment, it can be reached through the games rear access door.

To make the sounds louder, turn the volume pot clockwise as you face it.

To make the sounds **less** loud, turn the volume pot counterclockwise as you face it.

### SELF-TEST MODE

The Self-Test mode is a special mode for checking the game switches and computer functions. It is the most complete way of checking for proper game operation and is quite easy to use.

The Self-Test mode may be entered at any time and from any mode of operation. Simply locate the black slide switch inside the Coin Box compartment and slide it to the Self-Test position. With this switch in the Self-Test position, activate the slam switch located on the Coin Door. The game will enter the Self-Test mode immediately and display the following test menu....

1. SELF DIAGNOSTICS
2. SOUNDS
3. PLAYER INPUT
4. GRID DISPLAY

MOVE CURSOR DOWN BY MOVING GRIP CONTROL HANDLE DOWN.  
MOVE CURSOR UP BY MOVING GRIP CONTROL HANDLE UP  
HIT START BUTTON FOR TEST

1. SELF DIAGNOSTICS: This test is designed to effectively locate and identify any malfunction of the on-board computer. When selected, the game enters this mode immediately and begins scanning the memory stored in rom and ram. If a defective component is found during the scan, that component and its location will be displayed on screen. It will take about 15 seconds to perform the entire test.
2. SOUNDS: When selected, this test will display a menu of sounds. The first two selections on the menu are ALL and EXIT. If you move the cursor to select ALL the game will automatically perform a test of all the sounds on the menu. If you move the cursor to select EXIT, the game will exit the sound test and return to the main menu page. While in the sound test, any selection on the sound menu may be tested individually by positioning the cursor next to that sound and pressing the SELECT button.
3. PLAYER INPUT: This test is designed to confirm the operation of all player inputs and devices in the game. For example, when you wish to test the coin switches on the coin door, you would enter this test and activate the coin switches. If the switches are operating properly, the screen will display the words COIN CHUTE 1 or COIN CHUTE 2 depending on which coin switch has been activated. All inputs, pin controls, service switches, etc. may be tested in the same manner. To exit this test, activate the coin door slam switch.
4. GRID DISPLAY: This test was designed to display a crosshatch pattern used in adjusting the color monitor. This pattern may be used to adjust convergence, color balance, vertical linearity, and vertical/horizontal size. To exit this test, activate the coin door slam switch.

**IMPORTANT NOTE:** There is **NO** battery back up provided for this game. All logic & memory functions will be retained thru dip switch settings.



SARGE U. R.

OPTION SWITCH SETTINGS

////////////////////SWITCH NO. 2 - AT A 13 - LOCATED ON MONOBOARD////////////////////////////////////

DURING GAME PLAY:	<u>SW#1</u> NOT USED	<u>SW#2</u> NOT USED	<u>SW#3</u> NOT USED	<u>SW#4</u>	<u>SW#5</u>	<u>SW#6</u>	<u>SW#7</u> NOT USED	<u>SW#8</u> NOT USED	<u>SW#9</u> NOT USED	<u>SW#10</u>
** NO FREE PLAY FREE PLAY	OFF ON									
** 1 COIN / 1 CREDIT 2 COINS/ 1 CREDIT 1 COIN / 2 CREDITS	OFF OFF ON OFF OFF ON									
** NORMAL OPERATION FREEZE VIDEO	OFF ON									
										PART NO. M051-00B88-A007

THE REMAINDER OF YOUR NEW GAME'S MOST COMMON OPTION SETTINGS  
ARE CONDUCTED DURING YOUR GAME'S SELF-TEST MODE

SARGE U. R.

OPTION SWITCH SETTINGS

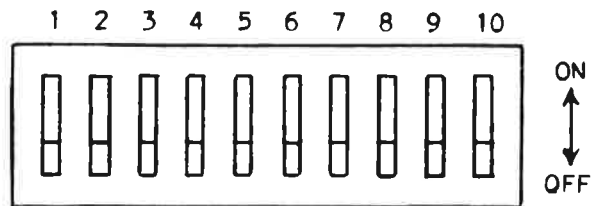
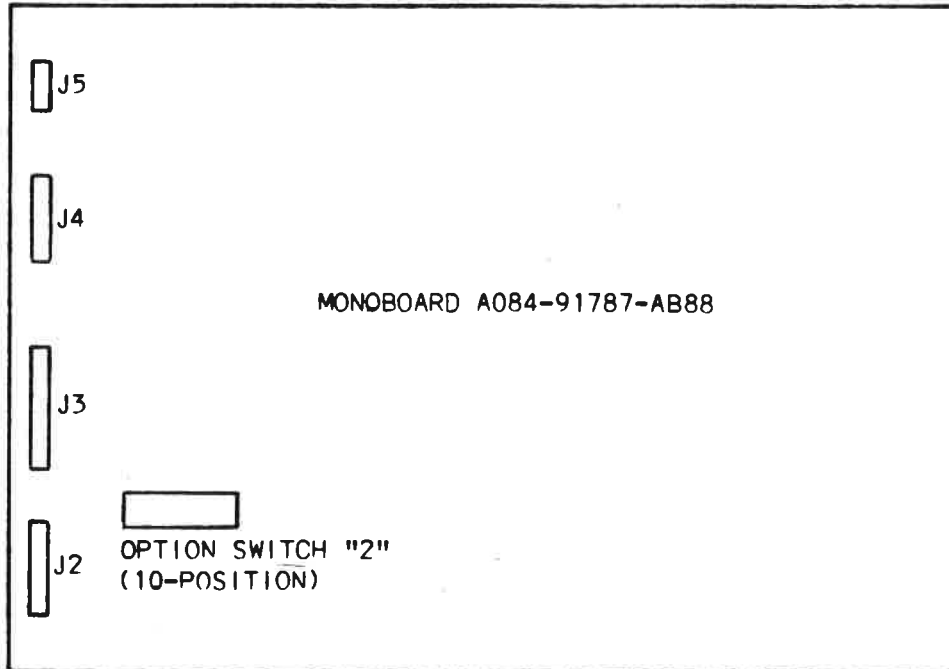
//////////////////////////////////SWITCH NO. 2 - AT A 13 - LOCATED ON MONOBOARD//////////////////////////////////

DURING GAME PLAY:	<u>SW#1</u> NOT USED	<u>SW#2</u> NOT USED	<u>SW#3</u> NOT USED	<u>SW#4</u>	<u>SW#5</u>	<u>SW#6</u>	<u>SW#7</u> NOT USED	<u>SW#8</u> NOT USED	<u>SW#9</u> NOT USED	<u>SW#10</u>	
** NO FREE PLAY FREE PLAY				OFF ON							
** 1 COIN / 1 CREDIT 2 COINS/ 1 CREDIT 1 COIN / 2 CREDITS					OFF ON OFF	OFF OFF ON					
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THE REMAINDER OF YOUR NEW GAME'S MOST COMMON OPTION SETTINGS  
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P.C. BOARD REFERENCE DRAWING

FOR MONOBOARD SYSTEM



## INTRODUCTION

This manual offers generalized troubleshooting procedures for common types of malfunctions which can be applied to most video games. We will not attempt to give you specific instructions for troubleshooting particular games because this would involve hundreds of pages of more repetitive instructions, differing only in the specific details of each game.

The most common problems occur in harness components such as the coin acceptor, player controls, interconnecting wiring, etc. These areas are covered in moderate detail.

The TV Monitor and Game Logic Printed Circuit Boards (PCB's) provide their fair share of problems too, but not to the extent of the harness and its component parts.

As you already know, the Game Logic PC Boards are complex devices. Each contains a great number of different interrelated circuits. The major changes which give each game its own particular individuality are accomplished in the EPROMS and other integrated circuit devices that are installed on each of these PC Boards.

## GENERAL TROUBLE SHOOTING SUGGESTIONS

The first step in troubleshooting is to correctly identify the malfunctions symptoms. This includes not only the circuits or features malfunctioning, but also those still operational. A carefully trained eye will pick up other clues to what's wrong as well. For instance, a game in which the computer functions fail completely just after money was collected may have a quarter shorting the PCB traces. Often an experienced troubleshooter will be able to spot the cause of a problem even before opening the cabinet.

After all the clues are carefully considered, the possible malfunctioning areas can be narrowed down to one or two good suspects. Those areas can be examined by a process of elimination until the cause of the malfunction is discovered.

## HARNESS COMPONENT TROUBLESHOOTING

Typical problems falling in this category are coin and credit problems, power problems, and failure of individual features.

**NO GAME CREDIT** - - For example, a prospective game player inserts a quarter or token and is not awarded a game. The first thing to check is whether or not the quarter or token is returned. If it was returned, the malfunction most certainly lies in the coin acceptor itself. First, use a set of test coins (both old and new) to ascertain that the player's coin is not undersize or underweight. If your test coins are also returned, coin acceptor servicing is indicated. Generally, the cause of this particular problem is a maladjusted magnet gate. Normally, this will mean slightly closing the magnet gate by turning the adjusting screw out a bit.

If the quarter or token is not returned and there is no game credit, the cause of the malfunction may be in one of several areas. First, try operating the coin return button; if the coin is returned, the problem is most likely in the magnet gate. Enlarge the gap according to the coin acceptor manufacturer's service procedures. If this does not cure the problem, remove the coin acceptor, clean it, and perform the manufacturer's suggested major adjustment procedure.

If the trapped coin is not returned when the wiper lever is actuated, you may have an acceptor jammed by a slug, gummed up with beer, a jammed coin chute, or mechanical failure of the acceptor mechanism. In this case, first check for the slug that will generally be trapped against the magnet. If a slug is found, simply remove it and test the acceptor. If the chute is blocked, remove the acceptor and remove the jammed coins. If there is actual failure of the acceptor, remove the unit and repair as indicated by the acceptor manufacturer's service procedures.

If the coin is making its way through the acceptor (that is, falling into the coin box), yet there is still no game credit, you either have a mechanical failure of the coin switch or electrical failure of the coin and credit circuits. The first place to begin is by checking the coin switch. Most of these switches are the make/break variety of micro switch. They are checked for continuity between the "NO", "NC", and "C" terminals. When **not** actuated, the "NC" and "C" terminals should be continuous and the "NO" terminal open. When actuated, the "NO" and "C" terminals should be continuous and the "NC" terminal open. If the coin switch checks good, inspect the solder connections to the coin switch terminals to be sure there is good contact at this point. If necessary, use a continuity tester and check from the terminal lug on the switch to the associated PCB trace. This will tell you if there is a continuous line all the way to the credit circuit.

If the coin switch wires do check good, the problem is in one of the game logic boards - most likely in the coin and credit circuitry.

If you do get a game credit when a coin is deposited, but the game will not start when the one or two player start button is pressed, there may be a problem in the start switch, the interconnecting wiring, or the game logic boards. First, check the switch. If the switch is OK, proceed to check the wiring. Again, make sure you go from the terminal lug on the switch to the PCB trace. This way, you will check the terminal contact as well as the PCB edge connector contact. If the wiring is continuous, proceed to check the PCB credit circuit. If not, check each section of the wiring, until the discontinuity is located. If the wiring is OK, the problem must lie in the game's logic boards.

#### TRANSFORMER AND LINE VOLTAGE PROBLEMS

Your game **MUST** have the correct line voltage to operate properly. If the line voltage drops too low, one of the game's logic circuits will disable the credit acceptance circuit. The point at which the game's logic circuits will fail to function is approximately 105 volts AC.

Low line voltage may have many causes. Line voltage normally fluctuates a certain amount during the day as the total usage varies. Peak usage times occur mainly at dawn and/or dusk. So if your game's problem seems to be related to the time of day, this may be a factor. A large load connected to the same line as the game (such as a large air conditioner or other device with an exceptionally large electric motor) may drop the line voltage significantly when starting up. This drop can result in an intermittent credit problem. In addition, poor connections in the location wiring, plug, or line cord may also cause a significant drop in power. Cold solder joints in the game's harness, especially in areas like the transformer connections, interlock switch, or fuse block, may also produce the same results, although probably on a more permanent basis.

Sometimes location owners (especially in bars) replace light switches with dimmer rheostats, and the game is sometimes on the same line. Obviously, the voltage available to the game is going to drop dramatically when the dimmer is turned down.

In any case, the way to check for proper line voltage is with your VOM. Set the VOM to the 250 VAC scale and stick the probes into the wall outlet the game was connected to. If it's OK here, check the transformer primary connections. If you do not get 117 VAC, examine the solder joints on the transformer, fuse block, and interlock switch. If you do get 117 VAC, the problem must be either in the transformer, harness connections, or in the PCB power supply.

If you suspect the transformer, check its secondaries with the VOM set to the 50 VAC scale and correlate the readings with the legend on the side of the transformer. The transformer must also be correctly grounded, so check the ground potential as well, especially if there is a hum bar rolling up or down the Monitor screen.

**NO POWER, NO PICTURE** - - If the Monitor screen is completely dark, first look in back of the Monitor to see if the CRT filament is glowing. If it is, try adjusting the brightness control. If no luck here, put your ear near the Monitor and listen for the high-pitched B+ hum produced by the flyback transformer. If you get the hum but no picture, and you have tried adjusting the brightness, major Monitor servicing is indicated.

If the monitor seems completely dead, check the rest of the game to see if it has power. If it doesn't, go directly to the wall outlet and check there. If OK there, check the game fuse(s), interlock switch, and interconnecting wire lengths.

Sometimes it is difficult to tell if a slow-blow fuse has blown. If in doubt, check it using any of the VOM "R" scales.

**HARNESS PROBLEMS** - - Other harness problems include blowing fuses and malfunctioning controls. The repeating blown-fuse problem can sometimes be quite exasperating to solve. Short circuits have the tendency to occur in areas almost impossible to find. First, try inserting a new fuse as old fuses age and sometimes blow without cause. If the new fuse also blows, you definitely have a short.

The best way to approach this problem is by disconnecting devices that may be causing the problem, such as the TV Monitor, the various PCB's one at a time, and the isolation transformer. Disconnect the devices by FIRST turning the game off, disconnecting it from its wall outlet. Remove the blown fuse and connect your VOM across the terminals of the fuse block (this will save blowing a fuse each time you want to check the circuit). Set your VOM to one of its resistance scales. You should be reading a short. If not you probably have a part that only shorts out after it is heated up - we'll cover this in a minute. So, assuming you are reading a short on your VOM, disconnect the components from their cabling one at a time, checking the VOM after each one is disconnected. When the short disappears, you have just disconnected the bad component. If all components are disconnected and the short still remains, the problem is in the harness and only patient exploration will reveal its location. Carefully examine all the wiring, looking for terminals that may be touching, metal objects such as coins shorting the connections, or burned insulation. If necessary, use the VOM to check each suspected wire.

OK, now lets assume that you connected your VOM across the fuse block terminals as stated above and you did not read a short. This most likely means that you have a component somewhere in that game that **ONLY** goes bad **AFTER** it heats up. It checks good when its cold. In this case, turn the game off and disconnect **ALL** of its components. Install a known good fuse in the fuse block. And turn the game on. If the fuse does not blow after a few minutes, you know that it is not anything to do with the wire harness. (In this instance, it shouldn't be, actually. But it never hurts to check.) Next, turn the game off again and reconnect **ONE** component. Turn the game back on and wait a few minutes to see if the fuse blows. If it does not, turn the game off again and reconnect another single component.

Turn the game back on and wait a few minutes to see if the fuse blows. Repeat this procedure until the fuse blows. When it does blow, the last component you connected has the part on it that is going bad after it warms up and is shorting out.

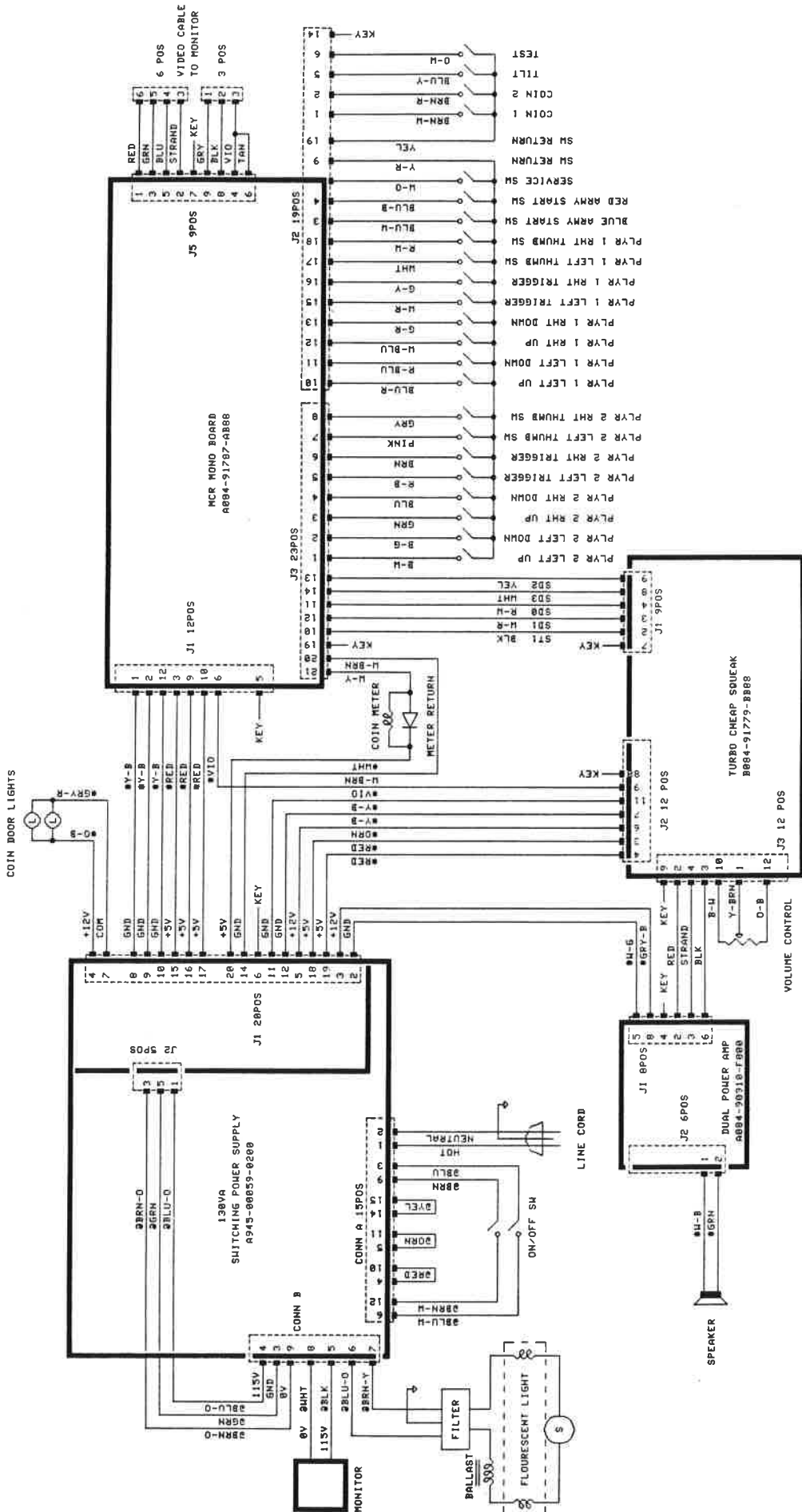
**MALFUNCTIONING CONTROLS** - - The most common problem here is the bad potentiometer (pot). Typically, a bad pot will cause the image on the screen to jump when it reaches a certain point. The only cure for this one is to install a new pot.

If a feature that is operated by a switch (for example, joysticks, foot pedals, control panel buttons) does not operate at all, check the switch with a VOM or continuity tester to verify its operation. If the switch does not check good, replace it. If the switch is OK, you should suspect the input to the switch from the PCB. In this case, get out the harness and logic schematics and check to see what kind of input is supposed to be at this switch. In many cases, the input will be +5 volts DC. If so, use the VOM to check its presence with the game turned on. Normally, the switch is used to pull a +5 volt DC line LOW to GROUND or to pull a LOW line HIGH. If the PCB output is missing, check the wire length from the PCB. If you find the signal at the PCB trace, the wire length or connection is at fault. If there is no signal at the PCB trace, begin exploring the PCB using the logic schematics and game manual.

**SECTION 2**  
**Illustrated Parts Breakdown**



**SECTION 3**  
**Component Layouts,**  
**Schematics & Wiring Diagrams**



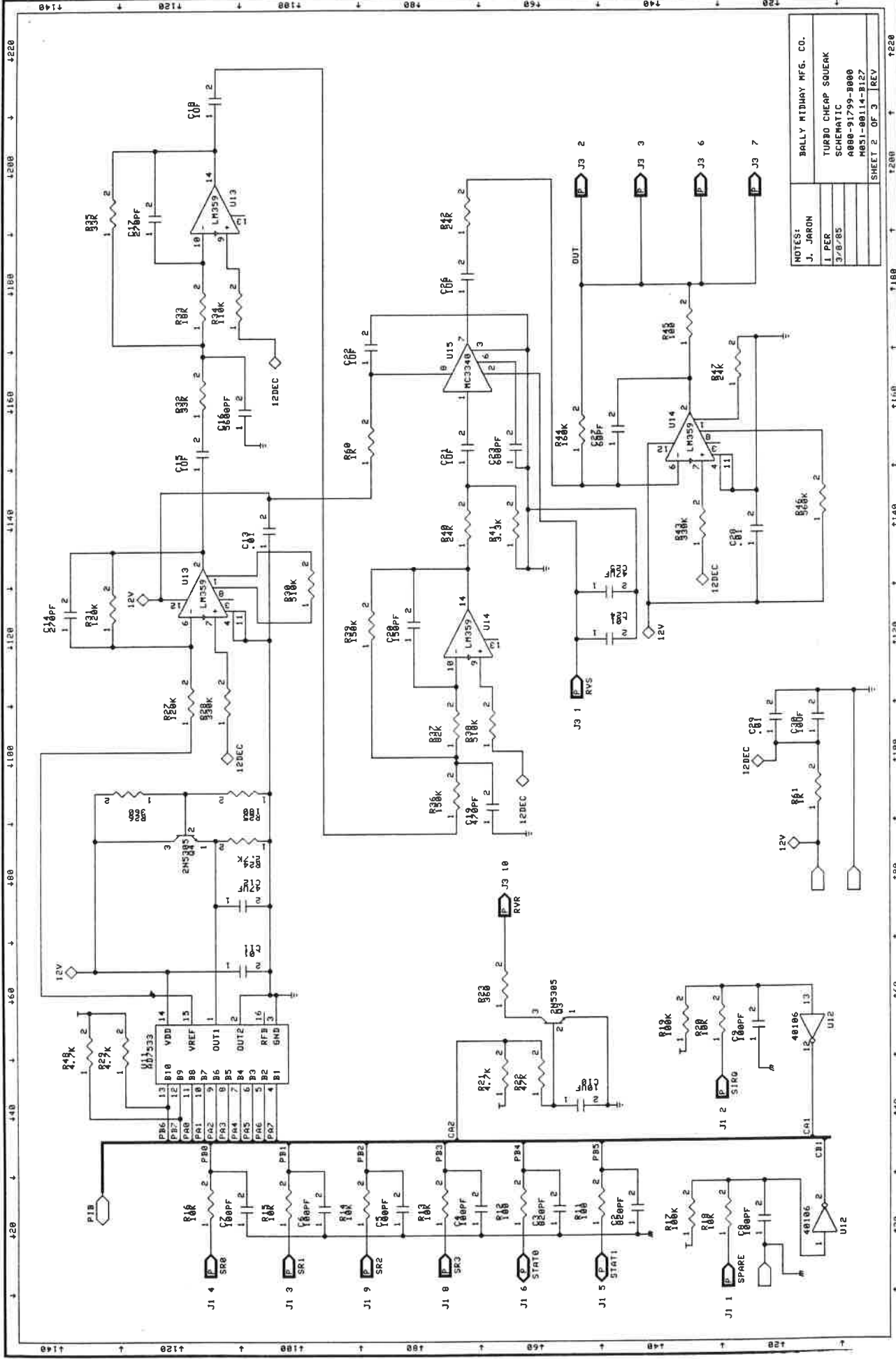
NOTES:

V CARPBUSSO	BALLY MIDWAY MFG. CO.
	SARGE WIRING
	M051-00888-0003
	SHEET 1 OF 1 REV B

NOTES:

- #=18 AWG WIPE
- #=18 AWG 600V WIRE





NOTES:

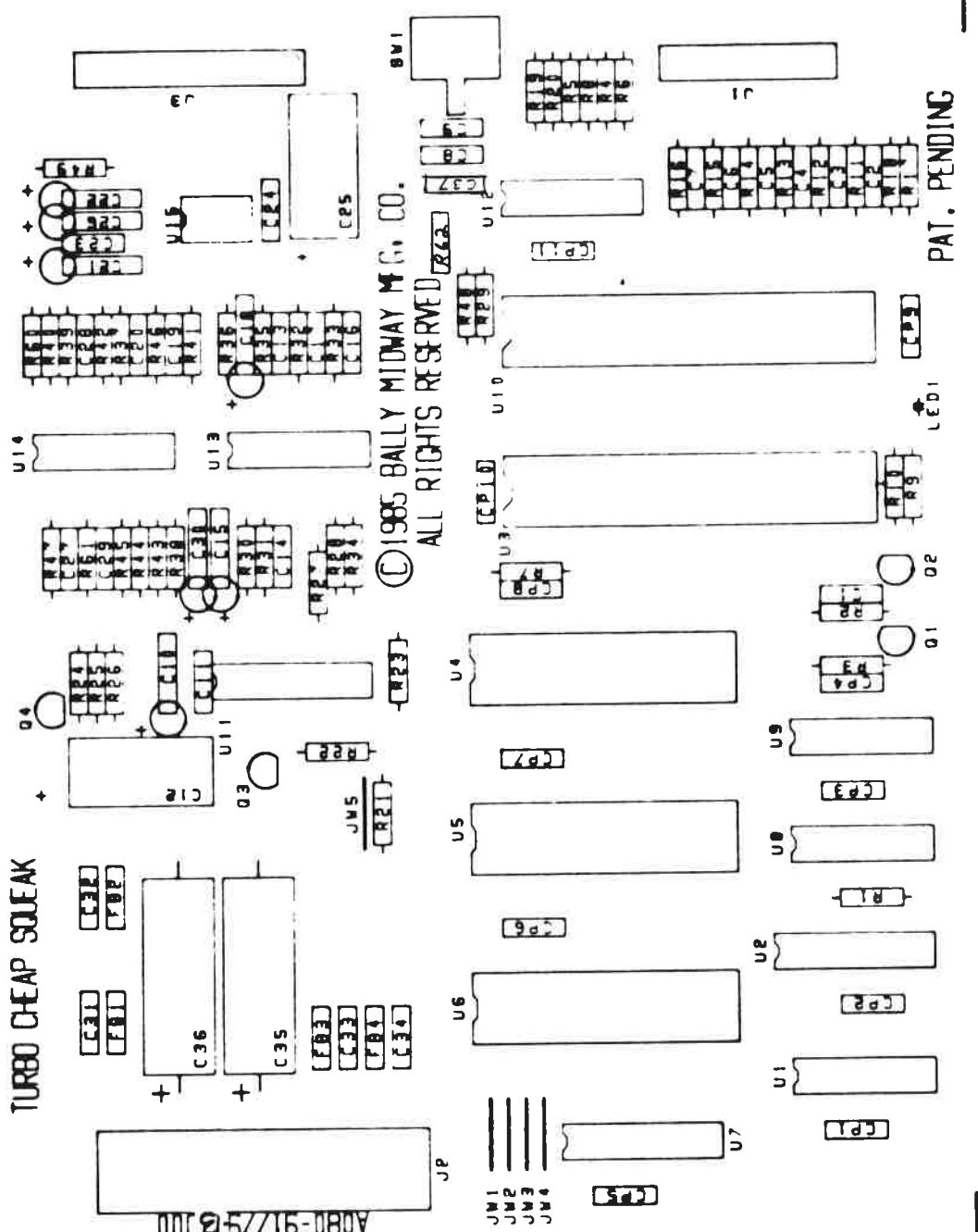
J. JARON
TURBO CHEAP SOULEAK
SCHEMATIC
8080-31799-3000
M651-80114-31C7
SHEET 2 OF 3
REV

420 440 460 480 500 520 540 560 580 600 620 640 660 680 700 720 740 760 780 800 820 840 860 880 900 920 940 960 980 1000

1120 1140 1160 1180 1200 1220



TURBO CHEAP SQUEAK



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PAT. PENDING

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

**TURBO CHEAP SQUEAK**  
A084-91779-B000

FIRST USED ON	DATE	SCALE
DRN C-1	10/21/85	
MECH CHR	MAT 1	
ELEC CHR	FINISH	

**DIM. TOLERANCES**  
UNLESS OTHERWISE SPEC  
FRACTIONAL ± 1/64  
DECIMAL ± .005  
HOLE DIA + .002 - .000  
ANGLE ± 1/2°  
**DO NOT SCALE DWG.**

Revised C37 R62 for plate  
REV. 10/21/85  
REVISIONS

PART NO  
M051-00114-0126  
SHEET 1 of 5

4114-F

**M051-00114-B126  
TURBO CHEAP SQUEAK  
A084-91779-B000**

DESIGNATION LIST

<u>DESIGNATION</u>	<u>DESCRIPTION</u>	<u>DESIGNATION</u>	<u>DESCRIPTION</u>
CP1-CP11	.01MF AX. CR.	R32	33K OHM 1/4W 5%
C1	18PF AX. CR.	R33	18K OHM 1/4W 5%
C2-C3	820PF AX. CR.	R34	110K OHM 1/4W 5%
C4-C9,C37	100PF AX. CR.	R35	33K OHM 1/4W 5%
C10	10MF RD TANT	R36	150K OHM 1/4W 5%
C11	.01MF AX. CR.	R37	82K OHM 1/4W 5%
C12	47MF AX. ELECT.	R38	510K OHM 1/4W 5%
C13	.01MF AX. CR.	R39	150K OHM 1/4W 5%
C14	270PF AX. CR.	R40	24K OHM 1/4W 5%
C15	1MF RD TANT	R41	3.3K OHM 1/4W 5%
C16	.0056MF AX. CR.	R42	24K OHM 1/4W 5%
C17	270PF AX. CR.	R43	330K OHM 1/4W 5%
C18	1MF RD TANT	R44	160K OHM 1/4W 5%
C19	470PF AX. CR.	R45	100 OHM 1/4W 5%
C20	150PF AX. CR.	R46	560K OHM 1/4W 5%
C21-C22	1MF RD TANT	R47	24K OHM 1/4W 5%
C23	680PF AX. CR.	R48	4.7K OHM 1/4W 5%
C24	.01MF AX. CR.	R49	2.7K OHM 1/4W 5%
C25	47MF AX. ELECT.	R60	1K OHM 1/4W 5%
C26	1MF RD TANT	R61	1K OHM 1/4W 5%
C27	68PF AX. CR.		
C28-C29	.01MF AX. CR.	01	MPS3646
C30	10MF RD TANT	02-04	2N5305
C31-C34	390PF AX. CR.		
C35-C36	470MF AX. ELECT.		
R1	4.7K OHM 1/4W 5%	U1	C1K OSC
R2	3.3K OHM 1/4W 5%	U2	74LS76
R3	150 OHM 1/4W 5%	U3	68B09E
R4-R8	4.7K OHM 1/4W 5%	U4	EPROM/ROM
R9	100 OHM 1/4W 5%	U5	EPROM/ROM
R10	47K OHM 1/4W 5%	U6	2K X 8 RAM
R11-R12	100 OHM 1/4W 5%	U7	74LS139
R13-R16,R62	10K OHM 1/4W 5%	U8	74LS02
R17	100K OHM 1/4W 5%	U9	74LS00
R18	10K OHM 1/4W 5%	U10	68B21
R19	100K OHM 1/4W 5%	U11	AD7533
R20	10K OHM 1/4W 5%	U12	40106
R21	4.7K OHM 1/4W 5%	U13	LM359
R22	47K OHM 1/4W 5%	U14	LM359
R23	360 OHM 1/4W 5%	U15	3340
R24	2.7K OHM 1/4W 5%	ICS U3	40 PIN IC SOCKET
R25	180 OHM 1/4W 5%	ICS U4-U6	28 PIN IC SOCKET
R26	360 OHM 1/4W 5%	ICS U10	40 PIN IC SOCKET
R27	120K OHM 1/4W 5%	ICS U11	16 PIN IC SOCKET
R28	330K OHM 1/4W 5%		
R29	4.7K OHM 1/4W 5%	FB1-FB4	FERRITE BEAD
R30	510K OHM 1/4W 5%	JW1-JW5	JUMPER WIRE
R31	120K OHM 1/4W 5%	SW1	PCB SWITCH

M051-00114-B126  
TURBO CHEAP SQUEAK  
A084-91779-B000

DESIGNATION LIST

<u>DESIGNATION</u>	<u>DESCRIPTION</u>
LED 1	GREEN LED
U1	CLOCK OSCILLATOR 8MHZ
J1	9 PIN KK100 R/A
J2	12 PIN KK156 R/A
J3	12 PIN KK100 R/A
MTHW 1-4	SPACERS
PCB	TURBO CHEAP SQUEAK



11/1/85 - A  
 J.J.

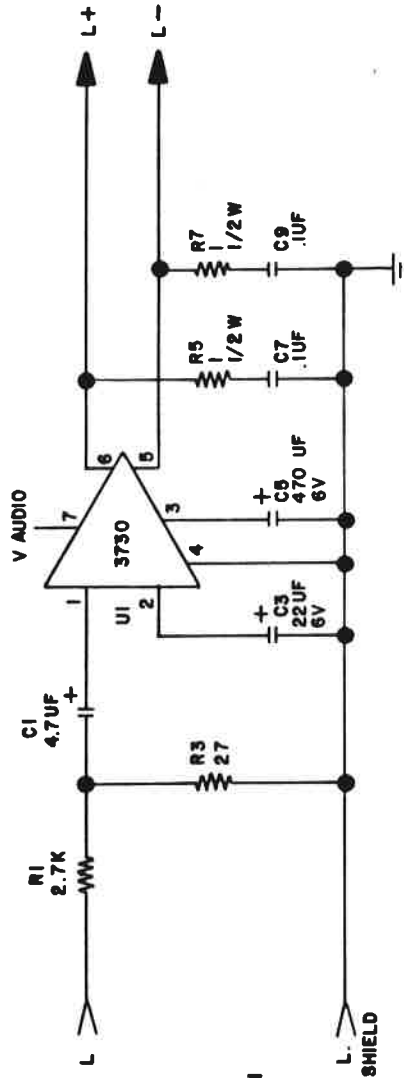
CROSS REFERENCE

	<u>DESCRIPTION</u>	<u>QTY</u>	<u>DESIGNATION NO.</u>	<u>PART NUMBER</u>
	18PF AX. CR.	1	C1	0C48-00800-0001
	68PF AX. CR.	1	C27	0307-00800-0011
	100PF AX. CR.	7	C4,C5,C6,C7,C8,C9,C37	0304-00800-0001
	150PF AX. CR.	1	C20	0307-00800-0010
	270PF AX. CR.	2	C14,C17	0307-00800-0009
	390PF AX. CR.	4	C31,C32,C33,C34	0986-00800-3000
	470PF AX. CR.	1	C19	0307-00800-0008
	680PF AX. CR.	1	C23	0358-00800-0002
	820PF AX. CR.	2	C2,C3	0304-00800-0002
	.0056MF AX. CR.	1	C16	0307-00800-0007
A	.01MF AX. CR.	15	CP1-CP11,C13,C24, C28,C29	0986-00800-2200
	1MF RAD TANT	5	C15,C18,C21,C22,C26	0307-00800-0004
	10MF RAD TANT	2	C10,C30,	0307-00800-0005
	47MF AX. ELECT	2	C12,C25	0307-00800-0003
	470MF AX. ELECT	2	C35,C36	0A15-00800-0005
	100 OHM 1/4WATT 5%	4	R9,R11,R12,R45	100E-00005-0033
	150 OHM 1/4WATT 5%	1	R3	100E-00005-0037
	180 OHM 1/4WATT 5%	1	R25	100E-00005-0039
	360 OHM 1/4WATT 5%	2	R23,R26	100E-00005-0048
	1K OHM 1/4WATT 5%	2	R60,R61	100E-00005-0061
	2.7K OHM 1/4WATT 5%	2	R24,R49	100E-00005-0071
	3.3K OHM 1/4WATT 5%	2	R2,R41	100E-00005-0074
	4.7K OHM 1/4WATT 5%	9	R1,R4,R5,R6,R7,R8 R21,R29,R48	100E-00005-0079
A	10K OHM 1/4WATT 5%	7	R13,R14,R15,R16,R18 R20,R62	100E-00005-0088
	18K OHM 1/4WATT 5%	1	R33	100E-00005-0093
	24K OHM 1/4WATT 5%	3	R40,R42,R47	100E-00005-0097
	33K OHM 1/4WATT 5%	2	R32,R35	100E-00005-0100
	47K OHM 1/4WATT 5%	2	R10,R22	100E-00005-0104
	82K OHM 1/4WATT 5%	1	R37	100E-00005-0112
	100K OHM 1/4WATT 5%	2	R17,R19	100E-00005-0115
	110K OHM 1/4WATT 5%	1	R34	100E-00005-0117
	120K OHM 1/4WATT 5%	2	R27,R31	100E-00005-0118
	150K OHM 1/4WATT 5%	2	R36,R39	100E-00005-0120
	160K OHM 1/4WATT 5%	1	R44	100E-00005-0121
	330K OHM 1/4WATT 5%	2	R28,R43	100E-00005-0128
	510K OHM 1/4WATT 5%	2	R30,R38	100E-00005-0133
	560K OHM 1/4WATT 5%	1	R46	100E-00005-0134
	MPS3646	1	01	104E-00001-0019
	2N5305	3	02-04	104E-00007-0003
	IC 40106	1	IC U12	0304-00803-0056
	IC 74LS00	1	IC U9	0A15-00803-0046
	IC 74LS02	1	IC U8	0986-00803-7400
	IC 74LS76	1	IC U2	0A15-00803-0072
	IC 74LS139	1	IC U7	0A15-00803-0051

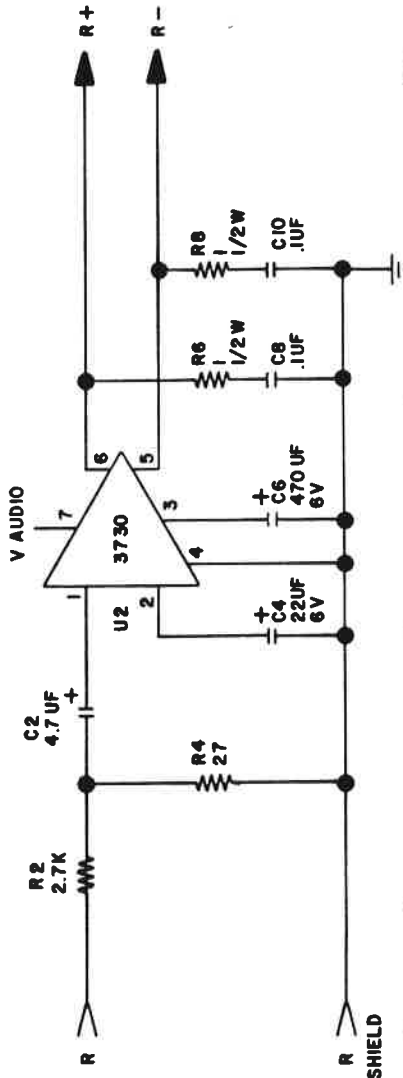
M051-00114-B126  
 TURBO CHEAP SQUEAK  
 A084-91779-B000

CROSS REFERENCE

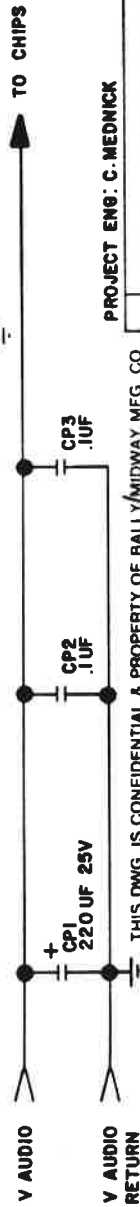
<u>DESCRIPTION</u>	<u>QTY</u>	<u>DESIGNATION NO.</u>	<u>PART NUMBER</u>
IC AD7533	1	IC U11	0304-00803-0055
IC LM359	2	IC U13-U14	0304-00803-0053
IC 3340	1	IC U15	0358-00803-0002
IC 68B09E	1	IC U3	0C48-00803-0001
IC 68B21	1	IC U10	0A15-00803-0074
IC 2K X 8 RAM	1	IC U6	0304-00803-0057
IC EPROM/ROM	2	IC U4-U5	SEE EPROM/ROM CHART
16 PIN IC SOCKET	1	ICS U11	110E-00001-0003
28 PIN IC SOCKET	3	ICS U4-U6	110E-00001-0010
40 PIN IC SOCKET	2	ICS U3,U10	110E-00001-0011
FERRITE BEAD	4	FB1,FB2,FB3,FB4	0316-00804-0002
JUMPER WIRE	5	JW1, JW2, JW3, JW4, JW5	117E-00001-0003
PCB SWITCH	1	SW1	0986-00804-3100
LED GREEN	1	LED 1	119E-00001-0001
CLOCK OSCILLATOR 8MHZ	1	U1	109E-00002-0009
9 PIN KK100 RT ANGLE	1	J1	0017-00021-1269
12 PIN KK156 RT ANGLE	1	J2	0017-00021-1286
12 PIN KK100 RT ANGLE	1	J3	0017-00021-1288
SPACERS	4	MTHW 1-4	0017-00042-0328
TURBO CHEAP SQUEAK	1	PCB	A080-91779-A000



- J1
- PIN 1 - N.C.
  - 2 - L AUDIO
  - 3 - L SHIELD
  - 4 - KEY
  - 5 - VAUDIO RETURN
  - 6 - R AUDIO
  - 7 - R SHIELD
  - 8 - VAUDIO



- J2
- PIN 1 - R +
  - 2 - R -
  - 3 - KEY
  - 4 - L +
  - 5 - N.C.
  - 6 - L -



PROJECT ENG: C. MEDNICK

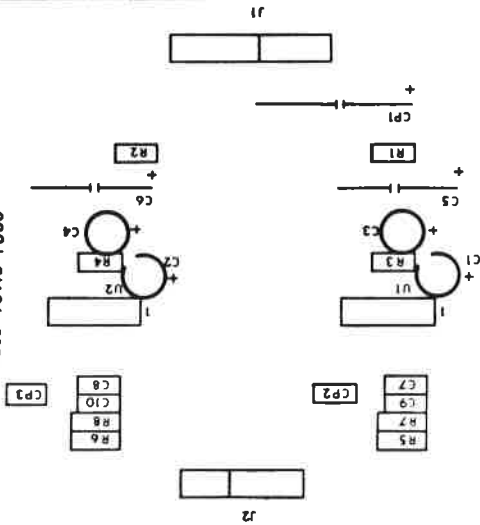
THIS DWG IS CONFIDENTIAL & PROPERTY OF BALLY/MIDWAY MFG CO

DIM. TOLERANCES UNLESS OTHERWISE SPEC		FIRST USED ON TRON	
FRACTIONAL	± 1/64	DATE	6/14/84
DECIMAL	± .005	SCALE	1:1
HOLE DIA	+ .002 - .000	MAT'L	
ANGLE	± 1/2°	FINISH	
DO NOT SCALE DWG.			
Bally/MIDWAY MFG. CO. FRANKLIN PARK, IL 90131		REVISIONS	
DUAL POWER AMP SCHEMATIC A080-90910-F000		PART NO M051-00986-F011	

**DESIGNATION LIST**

DESIGNATION NO.	DESCRIPTION
C1,C2	4.7 MF 25V RD TANT
C3,C4	22 MF 6V RD TANT
C5,C6	470 MF 6V AX ELEC
C7-C10	.1 MF 50V AX CER
CP1	220 MF 25V AX ELEC
CP2,CP3	.1 MF 50V AX CER
R1,R2	2.7K OHM 1/4W 5%
R3,R4	CRBN
R5-R8	27 OHM 1/4W 5%
CRBN	CRBN
U1,U2	1 OHM 1/2W 5%
J1	MB3750
J2	7 PIN
MSA1,2	5 PIN
MM1-MM4	HEATSINK ASSY
	1/4" SPACER

MCR/2  
DUAL POWER AMP. PC.  
A082-90910-F000



**CROSS REFERENCE LIST**

DESCRIPTION	QTY	DESIGNATION NO.	PART NUMBER
.1 MF 50V AX CER	6	C7-C10, CP2, CP3	U986-008U0-1100
4.7 MF 25V RD TANT	2	C1, C2	U986-008U0-3100
22 MF 6V RD TANT	2	C3, C4	U986-008U0-1600
220 MF 25V AX ELEC	1	CP1	U986-008U0-3200
470 MF 6V AX ELEC	2	C5, C6	U986-008U0-1700
1 OHM 1/2W 5%	4	R5-R8	0062-02603-1XXX
27 OHM 1/4W 5%	2	R3, R4	0062-06803-1XXX
2.7K OHM 1/4W 5%	2	R1, R2	0062-19983-1XXX
MB3750	2	U1, U2	0066-188xx-xx4x
TIN .045 SQ PINS	12	J1, J2	0017-00055-0480
HEATSINK ASSY	2	MSA1, 2	A986-00110-0000
1/4" SPACER	4	MM1-MM4	0017-00042-0320
PC BOARD	1		A080-90910-F000

PROJECT ENG. C. MEDNICK THIS DWG IS CONFIDENTIAL & PROPERTY OF BALLY/MIDWAY MFG CO

DIM TOLERANCES UNLESS OTHERWISE SPEC CONCENTRICITY 1 TH .002 POSITIONAL .005 HOLE DIA .002 ± .000 ANGLE ± .12° DO NOT SCALE DWG.	DATE 6/14/84 SCALE TRON 791 FILE LHM FINISH	REVISIONS PART NO M051-00986-F010
Bally/MIDWAY MFG. CO. FRANKLIN PARK, IL 60131		DUAL PWR AMP ASSEMBLY DRWG A084-90910-F000



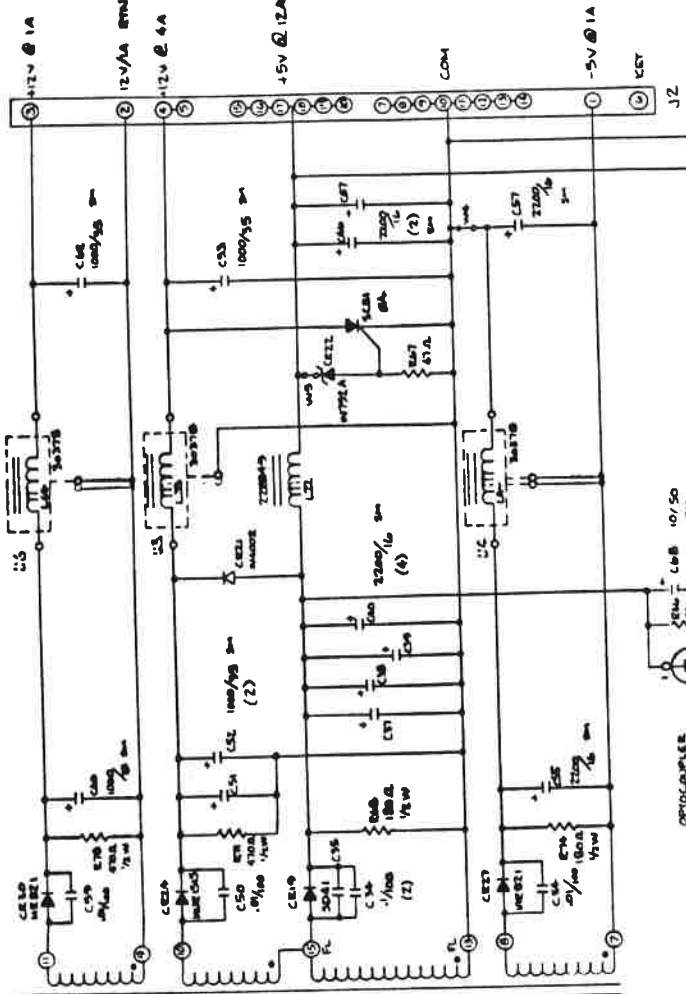
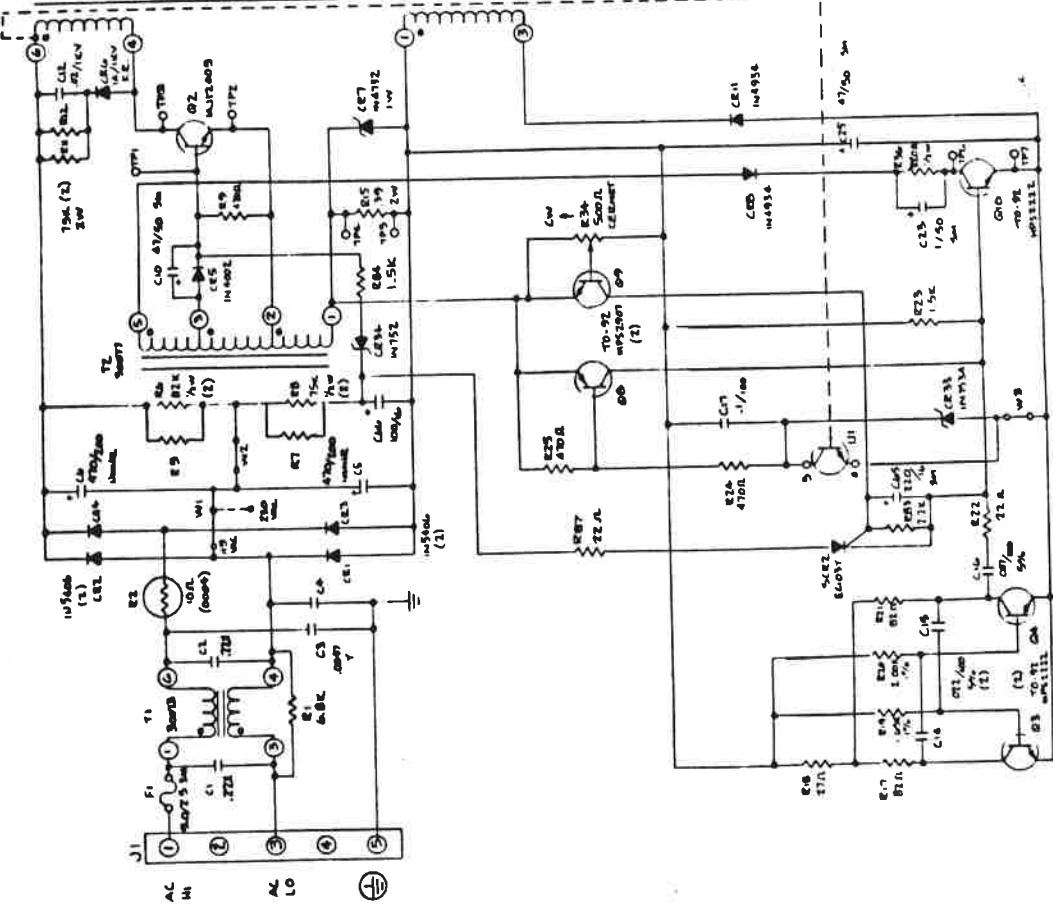
**M051-00114-A130  
OPTICAL ENCODER DELUXE  
A084-91794-A000**

**DESIGNATION LIST**

<u>DESIGNATION</u>	<u>DESCRIPTION</u>	<u>DESIGNATION</u>	<u>DESCRIPTION</u>
C101	4.7UF RAD. TANT	R109-R110	200K OHM 1/4W 5%
CP1	.01UF AX. CR.	R111	4.7K OHM 1/4W 5%
CP2	10UF AX. ELECT.	R112	6.2K OHM 1/4W 5%
CP3-CP4	.01UF AX. CR.	R113	3K OHM 1/4W 5%
CP5	10UF AX. ELECT.	OPT 1	OPTO SWITCH DUAL
CP6	.01UF AX. CR.	U1	74LS491
R101-R102	4.7K OHM 1/4W 5%	U2	LM339
R103-R104	200K OHM 1/4W 5%	J1	15 .045 SQ. PIN
R105	6.2K OHM 1/4W 5%		
R106	82 OHM 1/4W 5%	JW1	JUMPER WIRE
R107	30K OHM 1/4W 5%	PCB	OPTICAL ENCODER DELUXE
R108	91K OHM 1/4W 5%		

**CROSS REFERENCE**

<u>DESCRIPTION</u>	<u>QTY.</u>	<u>DESIGNATION</u>	<u>PART NUMBER</u>
.01UF AX. CR.	4	CP1, CP3-CP4, CP6	0628-00800-0100
4.7UF RAD. TANT	1	C101	0628-00800-0200
10UF AX. ELECT.	2	CP2, CP5	0628-00800-0300
82 OHM 1/4W 5%	1	R106	100E-00005-0031
3K OHM 1/4W 5%	1	R113	100E-00005-0073
4.7K OHM 1/4W 5%	3	R101, R102, R111	100E-00005-0079
6.2K OHM 1/4W 5%	2	R105, R112	100E-00005-0083
30K OHM 1/4W 5%	1	R107	100E-00005-0099
91K OHM 1/4W 5%	1	R108	100E-00005-0113
200K OHM 1/4W 5%	4	R103, R104, R109, R110	100E-00005-0123
74LS491	1	U1	0628-00803-2700
LM339	1	U2	0628-00803-2900
OPTO SWITCH DUAL	1	OPT 1	120E-00001-0010
JUMPER WIRE	1	JW1	117E-00001-0003
15 .045 SQ. PIN	15	J1	0304-00804-0010
OPTICAL ENCODER DELUXE	1	PCB	A080-91794-A000



0017-00003-0543

0017-00003-0543

M051-00845-A087

SCHEMATIC

SP1016

DO NOT SCALE DIMENSIONS

FOR ADDITIONAL ELECTRICAL INFORMATION,  
REFER TO MECH. DWG. NO. 0017-00003-0543.

2 COMPONENT VALUES IN MICROGRAMS / VOLTS.  
1 RESISTOR VALUES ARE IN OHMS 1/2 W, 5%, C.F.

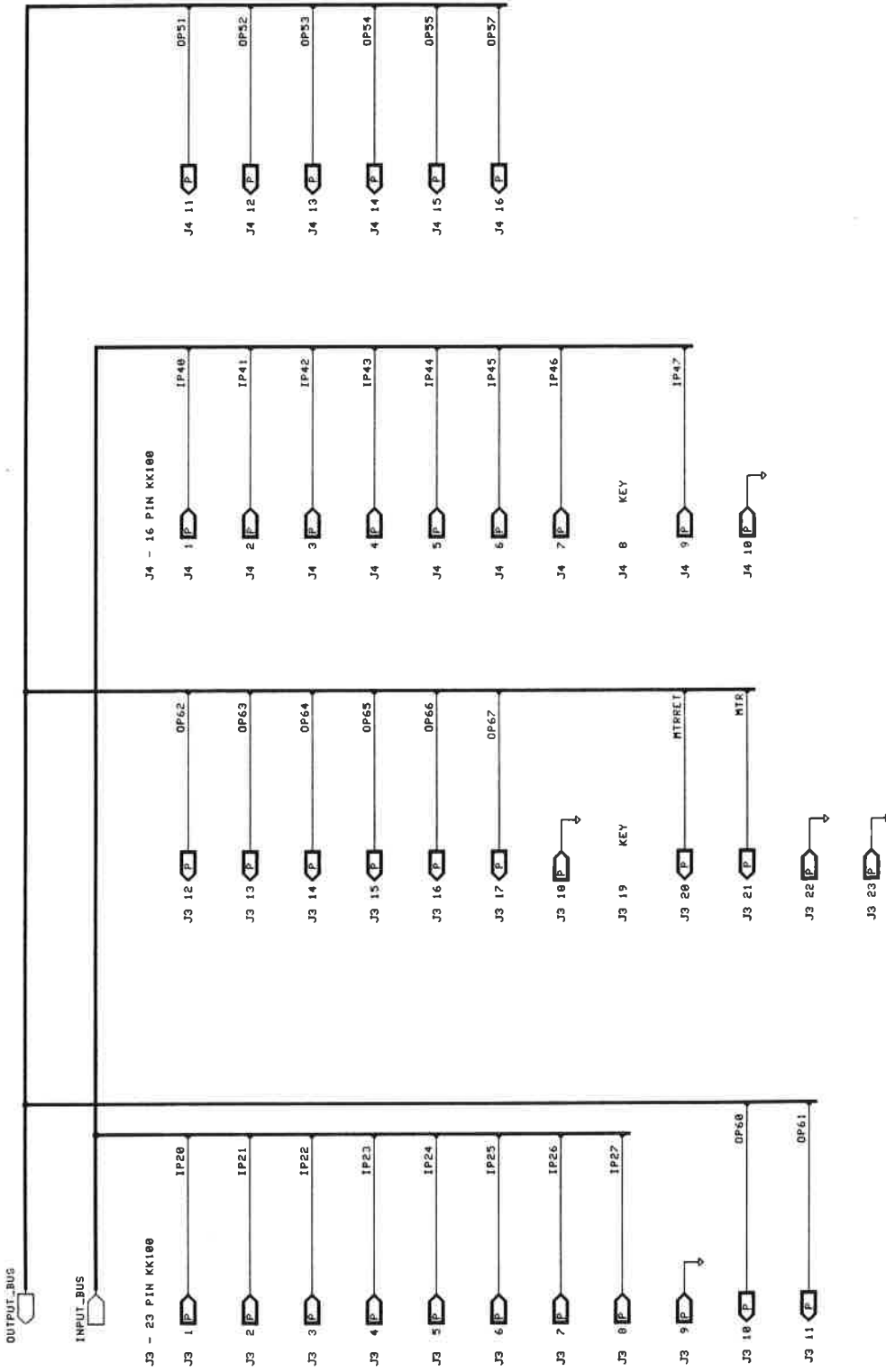
NOTES: UNLESS OTHERWISE SPECIFIED.



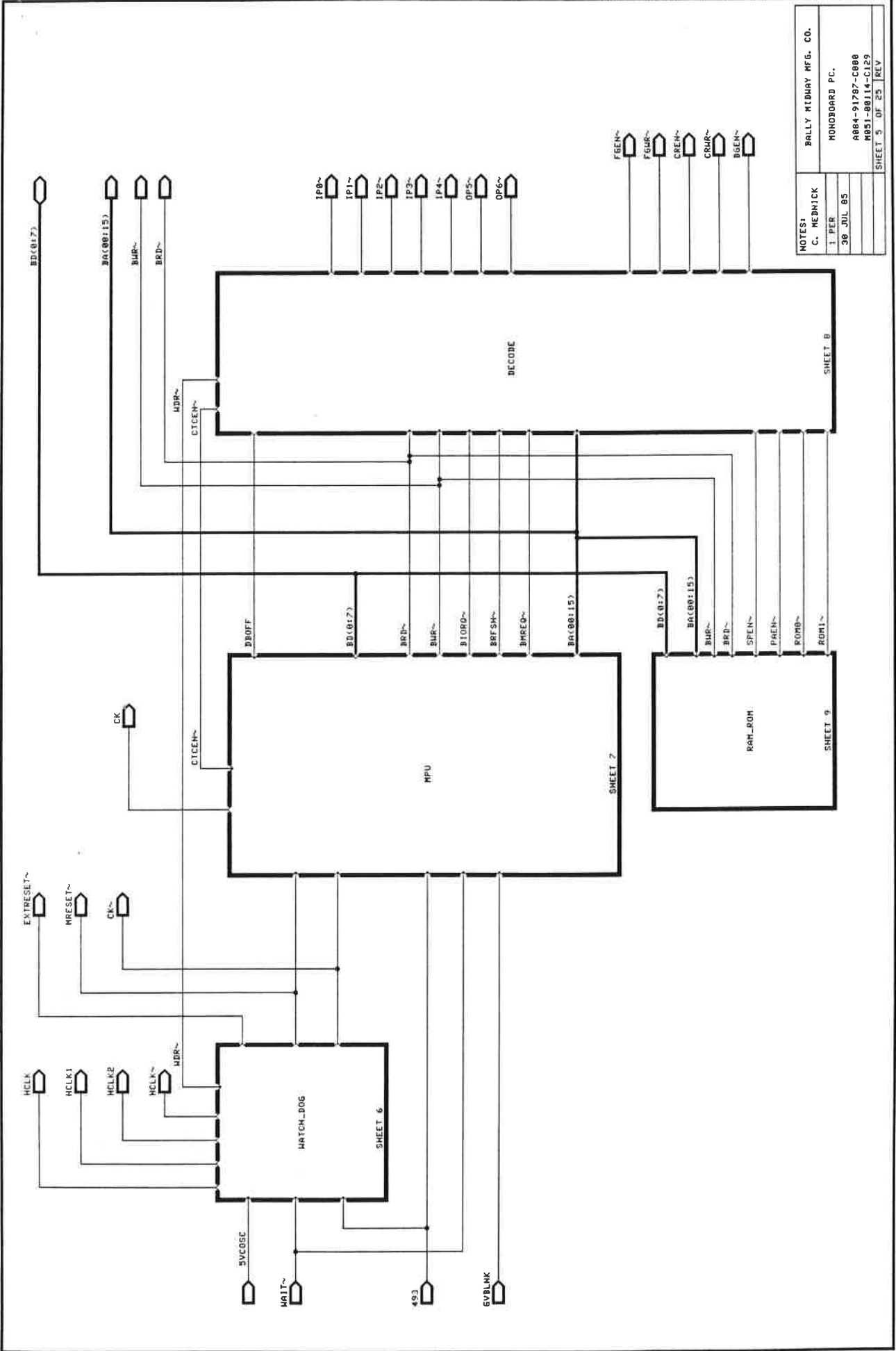






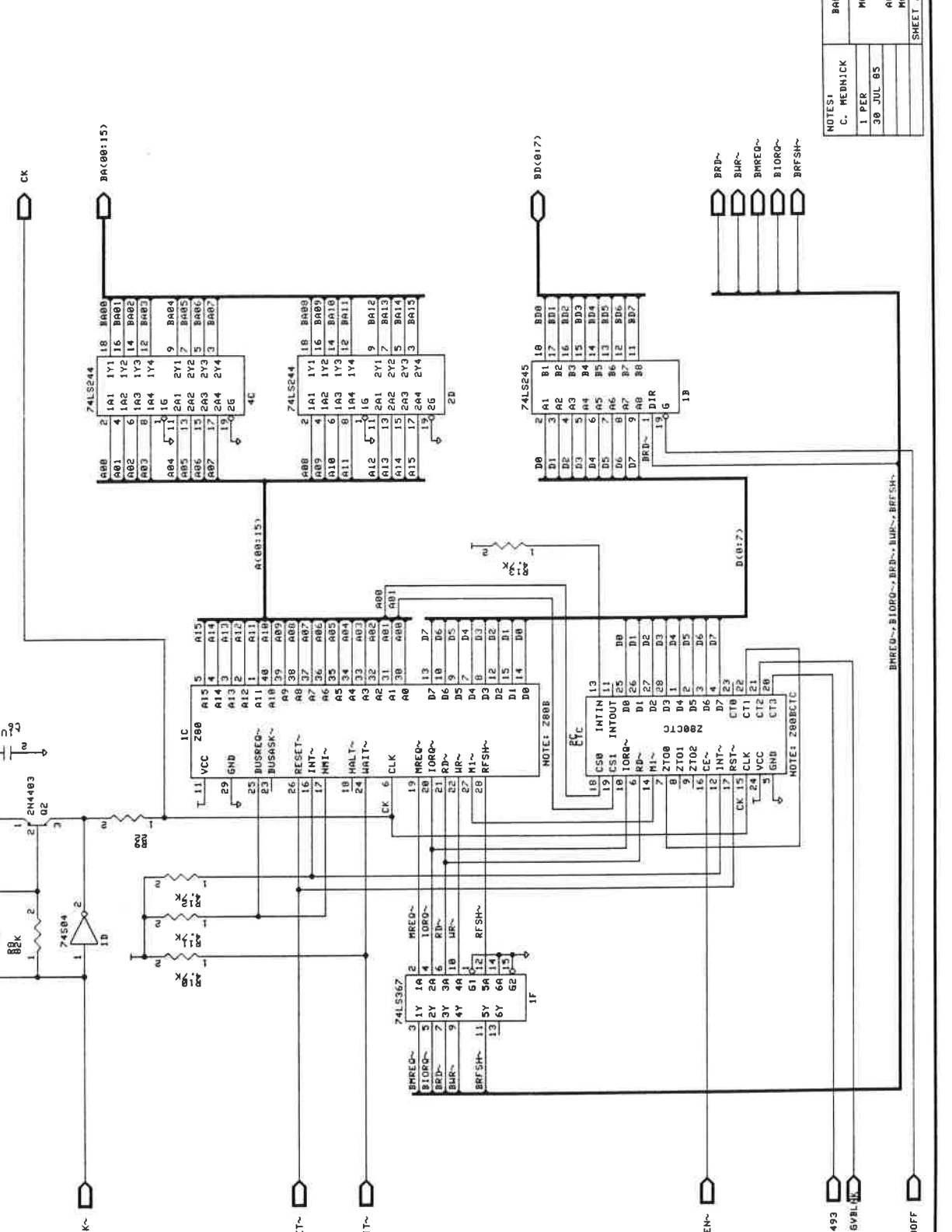


NOTES:	BALLY MIDWAY MFG. CO.
C. MEDTICK	MONOBOARD PC.
1 PER	30 JUL 85
	ABB4-51787-C000
	MBS1-00114-C129
	SHEET 3 OF 25 REV



NOTES:	BALLY MIDWAY MFG. CO.
C. REDNICK	MONOBOARD PC.
1 PER	AB84-91787-C000
30 JUL 85	M851-00114-C129
	SHEET 5 OF 25 REV





NOTES:	BALLY MIDWAY MFG. CO.
C. MEDNICK	MONOBOARD P.C.
I PER	AB84-91787-C088
30 JUL 85	M851-00114-C159
	SHEET 7 OF 25 REV

BMREQ~ B10RQ~ B2D~ BUR~ BRF5H~

493  
6VBL  
DB0FF

CTEEN~

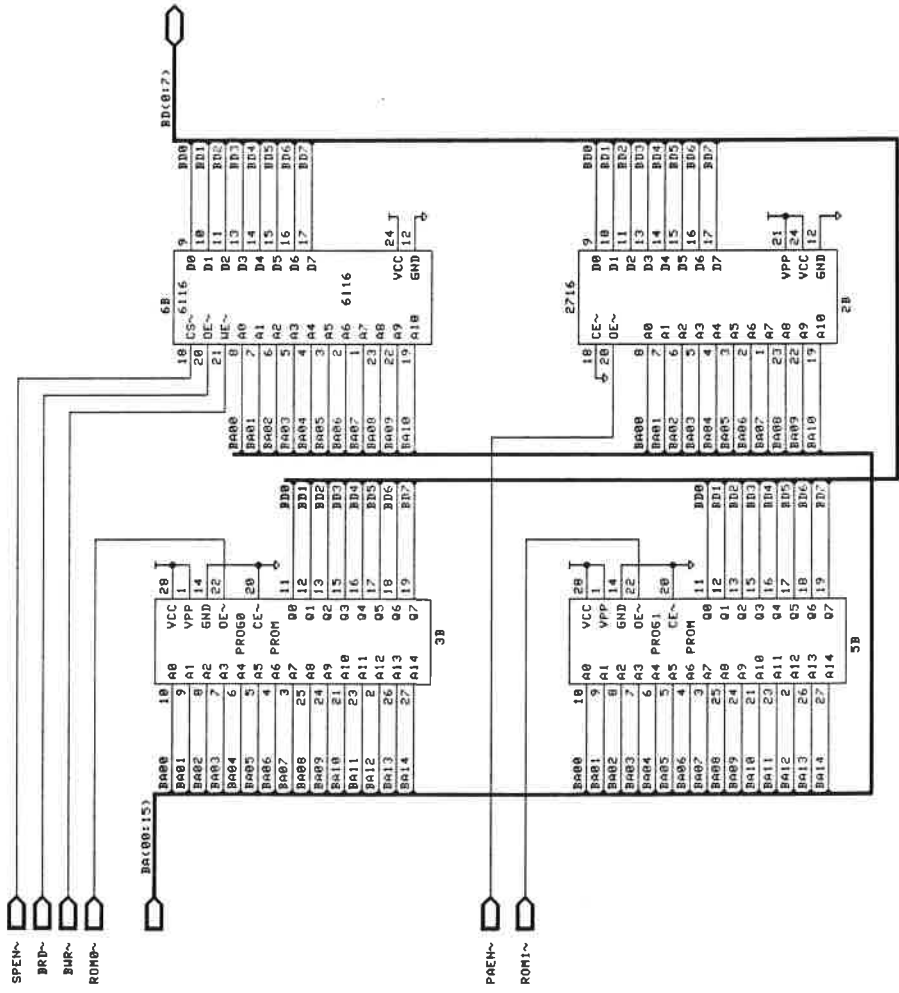
MRESET~  
WAIT~

CK~

CK

NOTES:

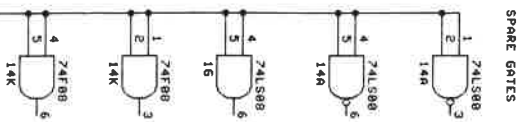
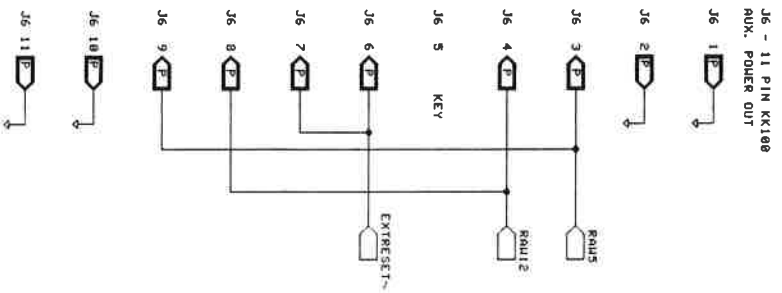
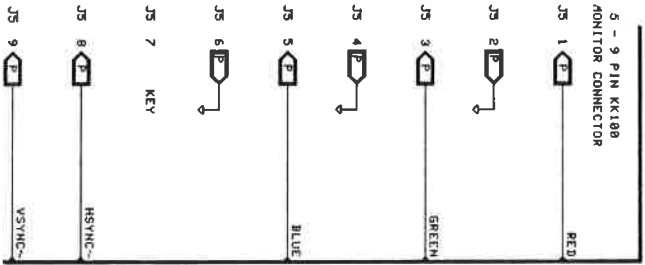
BALLY HIBURY MFG. CO.
MONBOARD P.C.
4884-91787-C000
M851-00114-C129
3P JUL 85
I PER
SHEET 8 OF 25 REV











LAST USED: C36, CP140 D2 J6 F99 Q10 R87 RM9 SH2  
NOT USED: C40, RS1, R80

NOTES:	
C. MEDNICK	BALLY HIGHWAY MFG. CO.
1 PER	MONITORBOARD P.C.
30 JUL 85	AR04-91707-C080
	M051-00114-C129
	SHEET 4 OF 25 REV

MONOBOARD  
A084-91787-C000  
M051-00114-C128

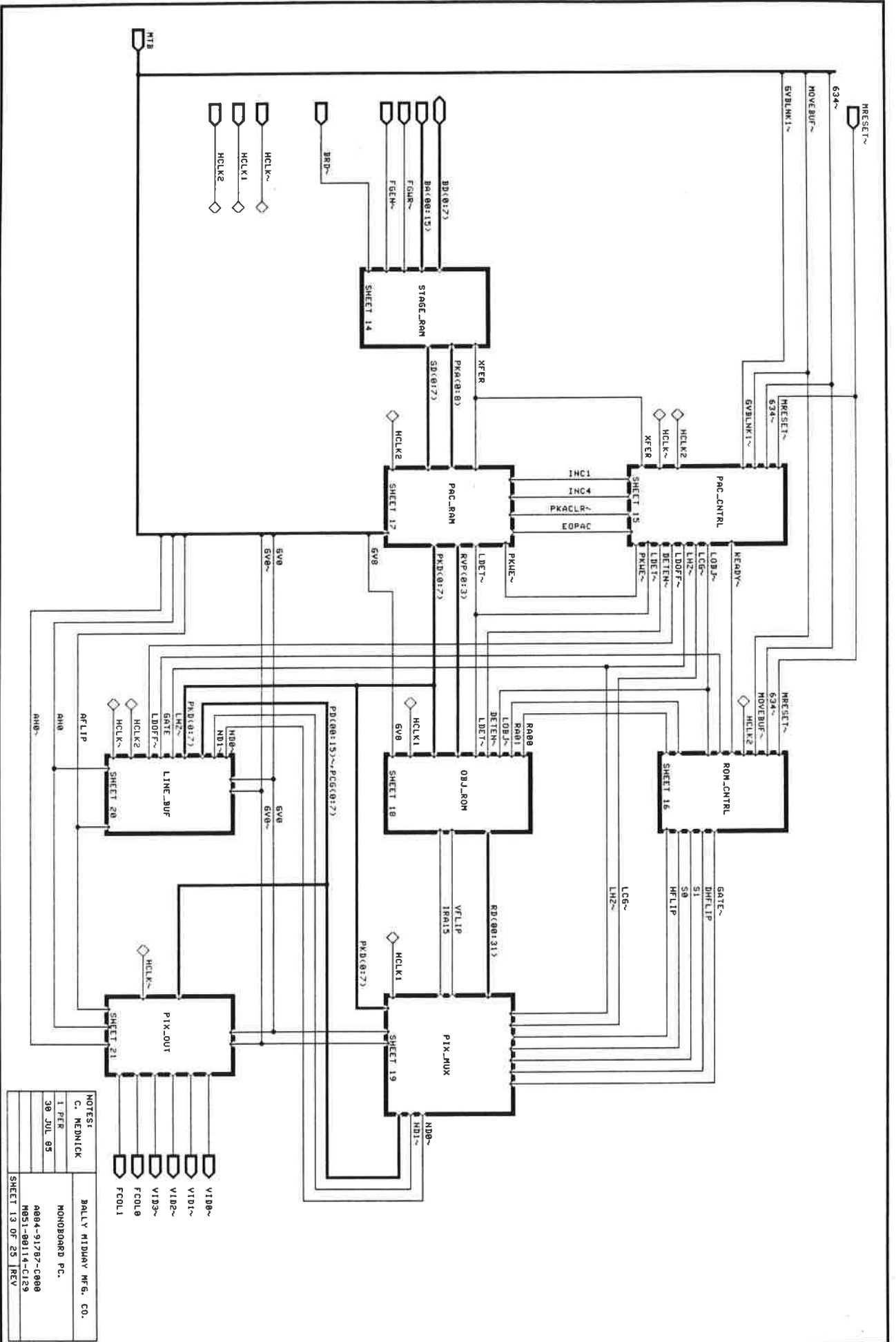
DESIGNATION LIST: Page 4 of 4 (Rev. 04 Sep 85)

<u>DESCRIPTION</u>	<u>DESIGNATION NO.</u>
IC 14J	74LS161
IC 1K	74LS04
IC 2K	7406
IC 3K	74LS74
IC 4K	74LS32
IC 5K,6K	74LS74
IC 7K	74LS169
IC 8K	74LS173
IC 9K	74LS169
IC 10K	2018 2Kx8 RAM 45NS
IC 11K	74LS173
IC 12K	74LS298
IC 13K	74LS174
IC 14K	74F08
IC 15K	74LS74
ICS 4A,15A,3B,5B	28 PIN IC SOCKET (.600)
ICS 6B,9B,11B	24 PIN IC SOCKET (.600)
ICS 14B	28 PIN IC SOCKET (.600)
ICS 1C	40 PIN IC SOCKET (.600)
ICS 2C	28 PIN IC SOCKET (.600)
ICS 10C	24 PIN IC SOCKET (.300)
ICS 3E	16 PIN IC SOCKET (.300)
ICS 4E-6E,8E	28 PIN IC SOCKET (.600)
ICS 4G	24 PIN IC SOCKET (.300)
ICS 5G	20 PIN IC SOCKET (.300)
ICS 11G	24 PIN IC SOCKET (.300)
ICS 5H	20 PIN IC SOCKET (.300)
ICS 6H	24 PIN IC SOCKET (.300)
ICS 2J,3J	20 PIN IC SOCKET (.300)
ICS 9J,11J	24 PIN IC SOCKET (.300)
ICS 13J	20 PIN IC SOCKET (.300)
ICS 10K	24 PIN IC SOCKET (.300)
FB1-FB13	FERRITE BEAD
SW1	SWITCH PC. MTG.
SW2	10 POS. DIP SWITCH
JW1-JW4	JUMPER
J1	AUTO INSERT PINS TIN .045 SQ. PIN
J2-J6	AUTO INSERT PINS TIN .025 SQ. PIN
MHQ3	SNAP
PC BOARD	A080-91787-C000

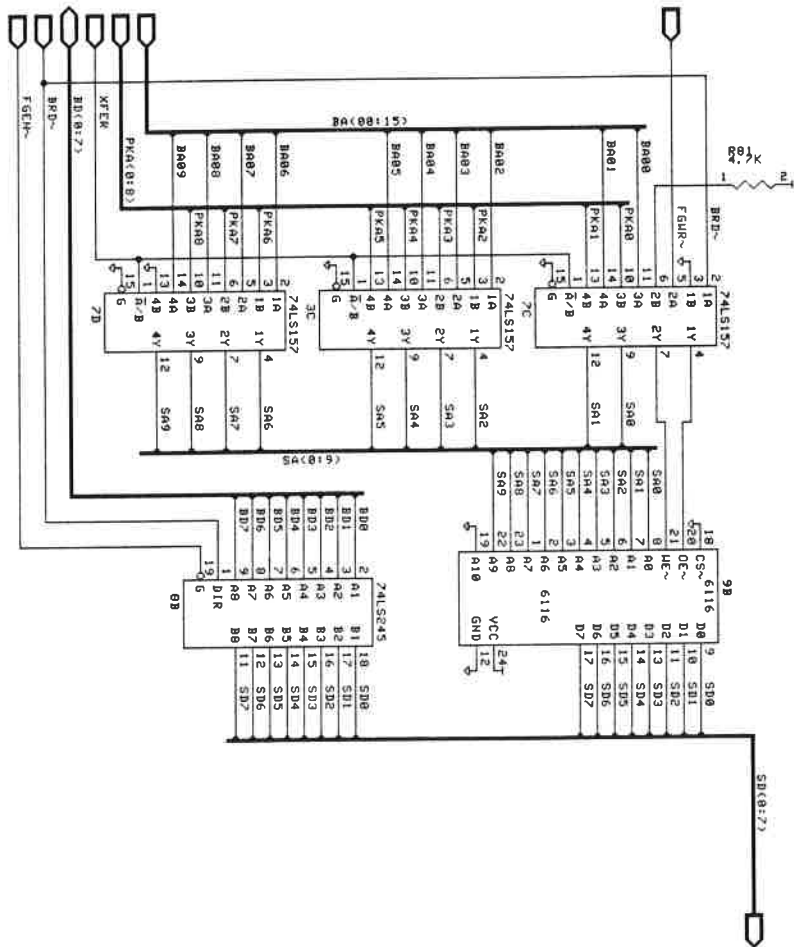
Released 6 Aug 85 CMM  
Changed 22 Aug 85 - added ICS 3E CMM  
Changed 04 Sep 85 - Corrected J2-J6 to .025  
Sq. Pin CMM



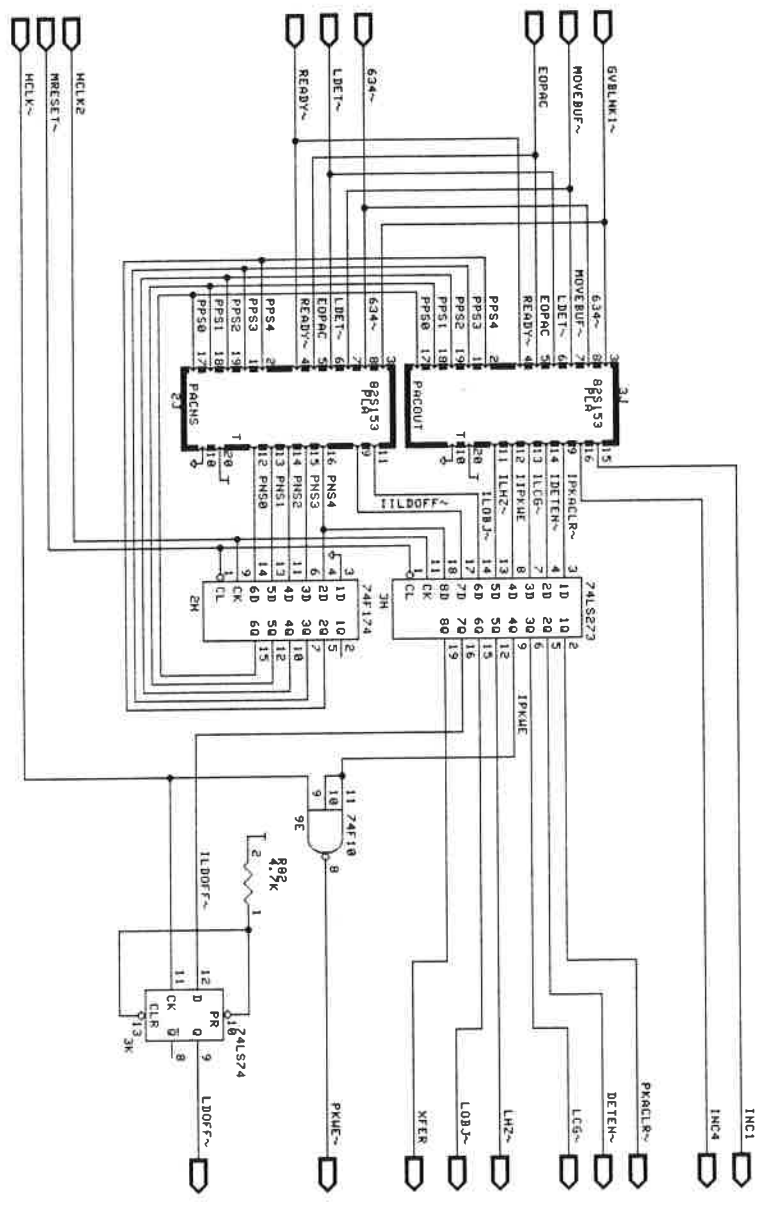




NOTES:  
 C. MEDNICK  
 1 PER  
 30 JUL 85  
 MONOBOARD P.C.  
 8884-91787-C008  
 8851-88114-C129  
 SHEET 13 OF 25 REV

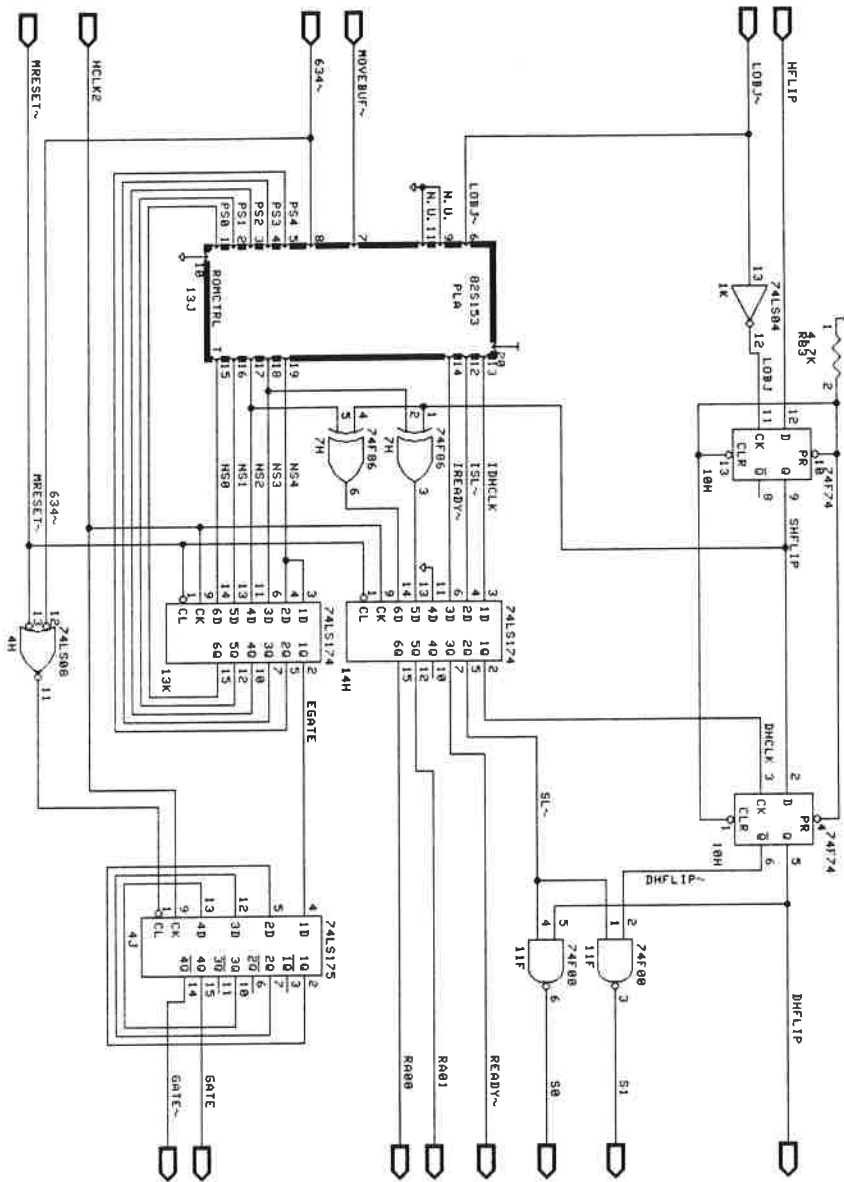


NOTES:	BALLY MIDWAY MFG. CO.
C. HEDNICK	MONOBORD PC.
1 PER	R084-91707-C080
30 JUL 85	R081-00114-C129
	SHEET 14 OF 25 REV



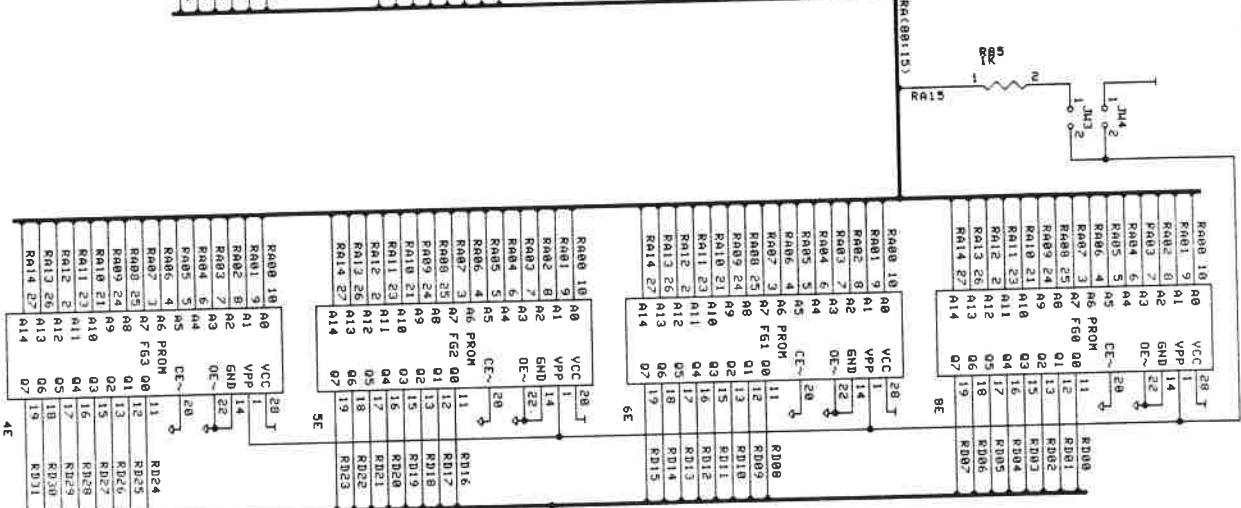
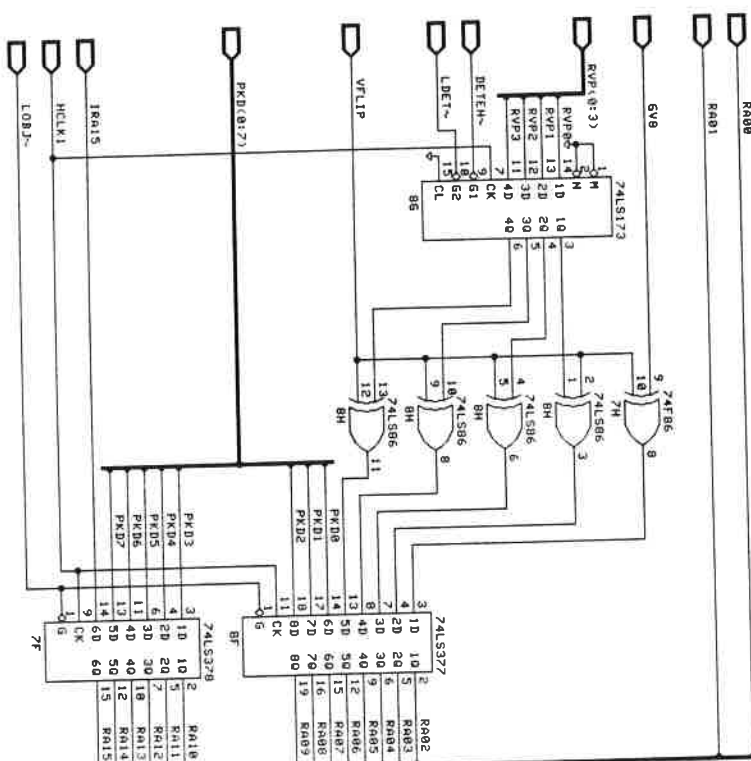
NOTES:  
 C. MEDNICK  
 1 PER  
 30 JUL 85  
 BALLY MIDWAY MFG. CO.  
 MONRODARD P.C.  
 A884-91787-C088  
 M851-08114-C129  
 SHEET 15 OF 25 REV



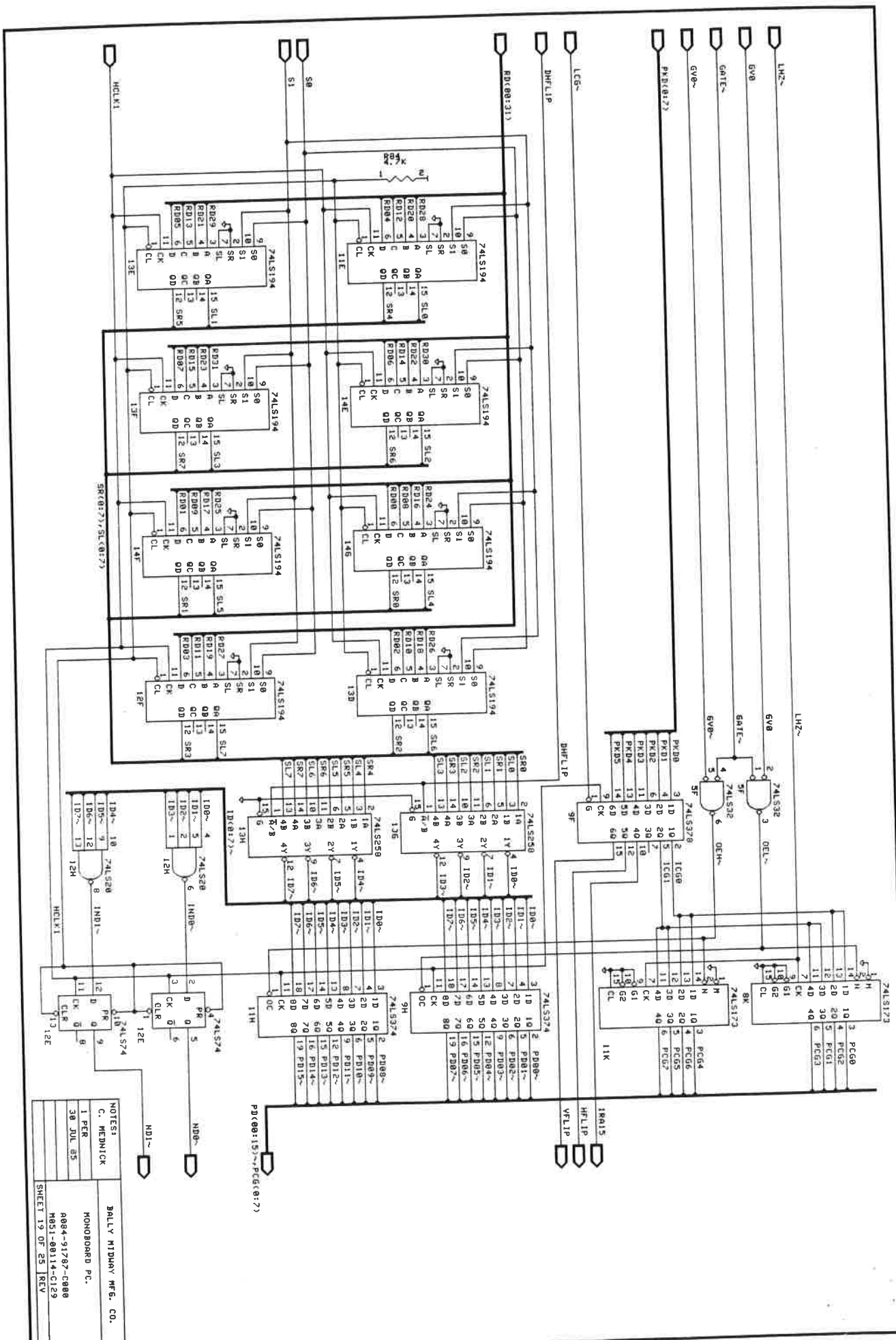


NOTES:	BALLY MIDWAY MFG. CO.
C. WENDICK	
1 PER	
30 JUL 85	
	9084-91787-C000
	M051-00114-C129
	SHEET 16 OF 25   REV





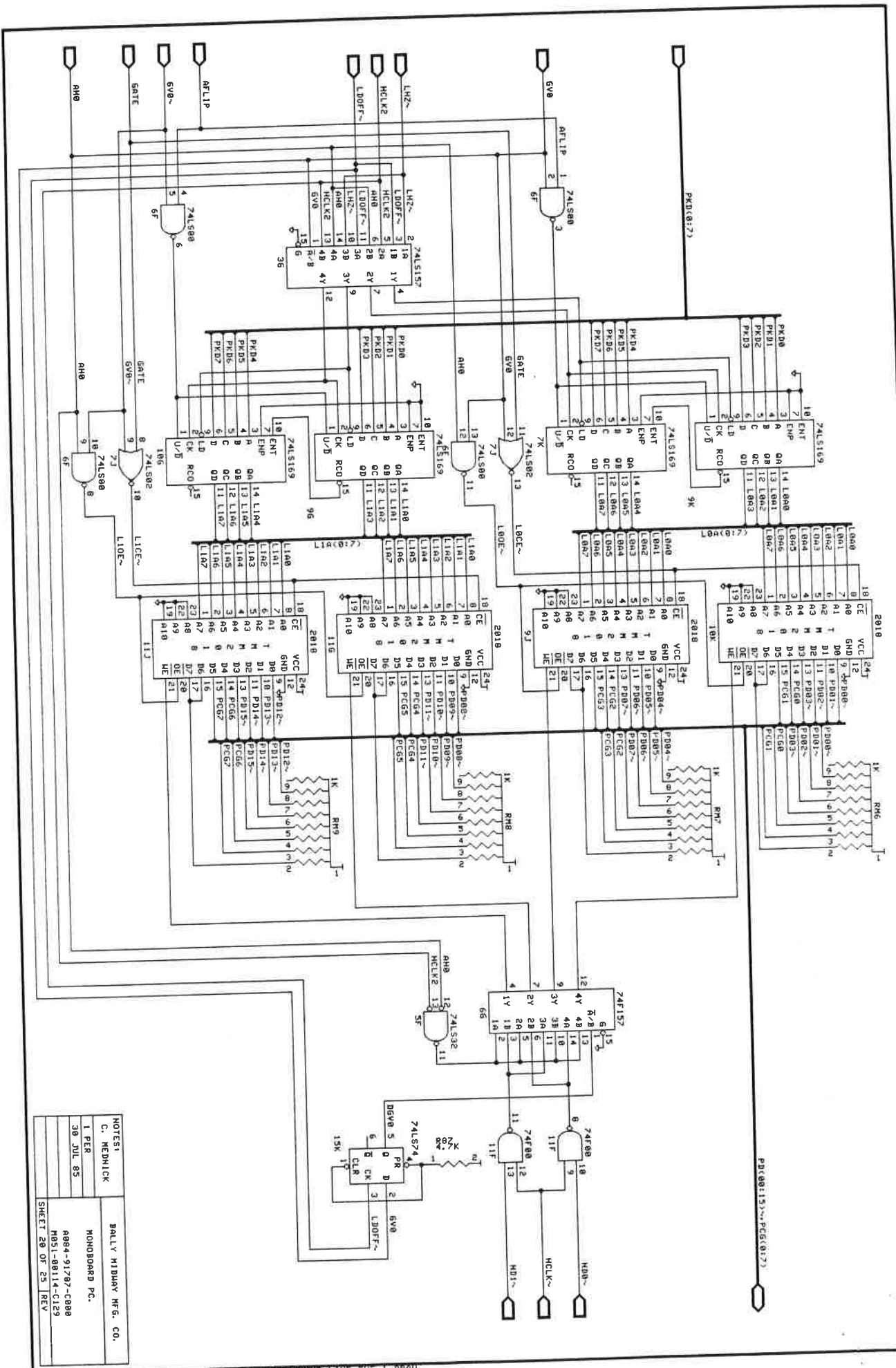
NOTES:  
 C. MEMNICK  
 BALLY HIBWAY MFG. CO.  
 HONOLULU, HI  
 30 JUL 85  
 8884-91787-C080  
 8851-08114-C129  
 SHEET 18 OF 25 REV



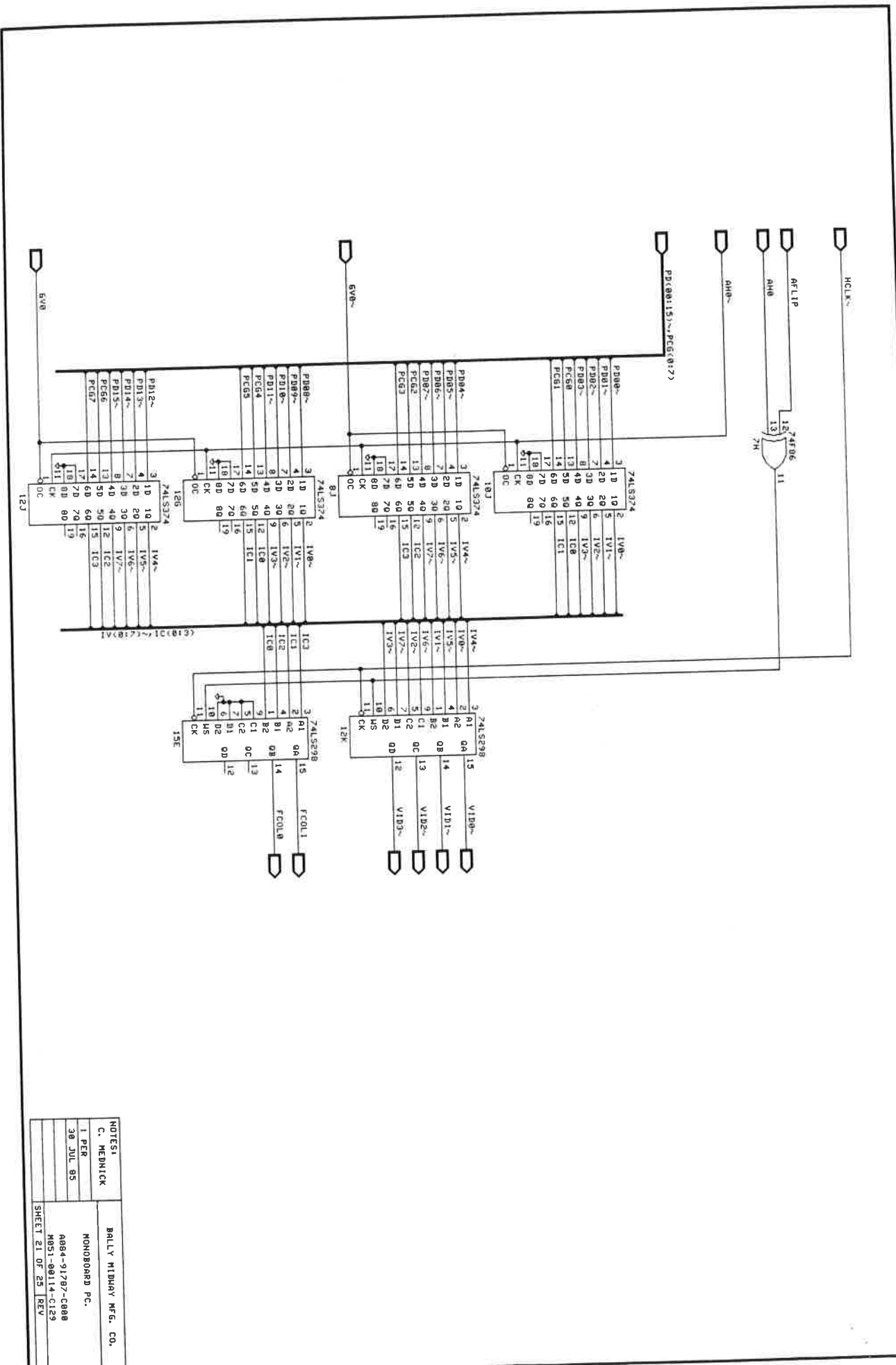
NOTES:  
 C. MEDNICK  
 1 PER  
 30 JUL 85

BALLY MIDWAY MFG. CO.  
 HONOLULU, HI  
 8084-91787-C086  
 M051-08114-C129

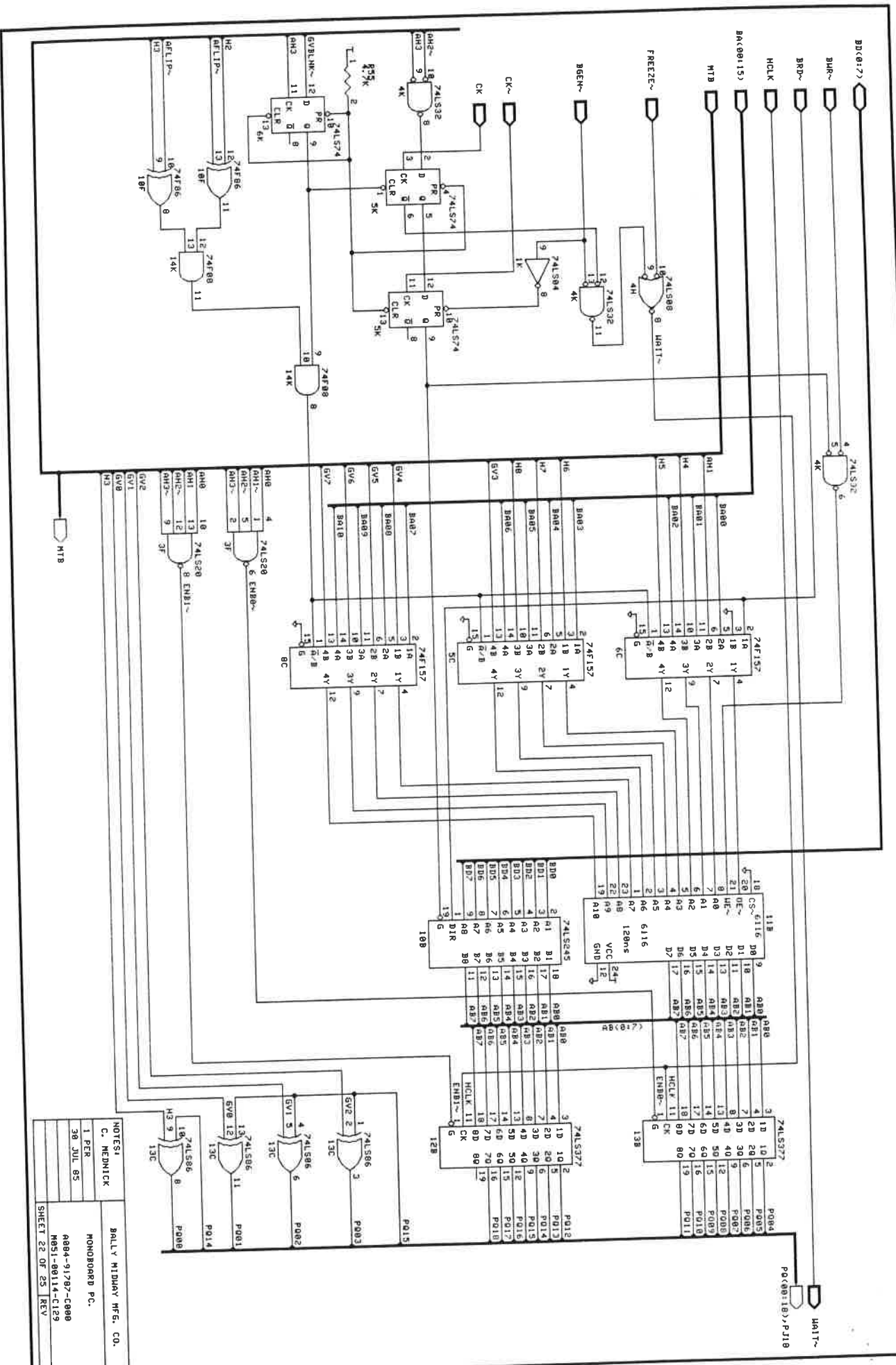
SHEET 19 OF 25 REV



NOTES:	BALLY MIDWAY MFG. CO.
C. MEDNICK	HONOLULU PC.
1 PER	A884-91787-C888
38 JUL 85	M851-80114-C129
	SHEET 20 OF 25 REV



NOTES:	BALLY MIDWAY MFG. CO.
C. REDNICK	NONOBOARD PC.
1 PER	8684-91787-C000
30 JUL 85	M051-00114-C129
	SHEET 21 OF 25 REV

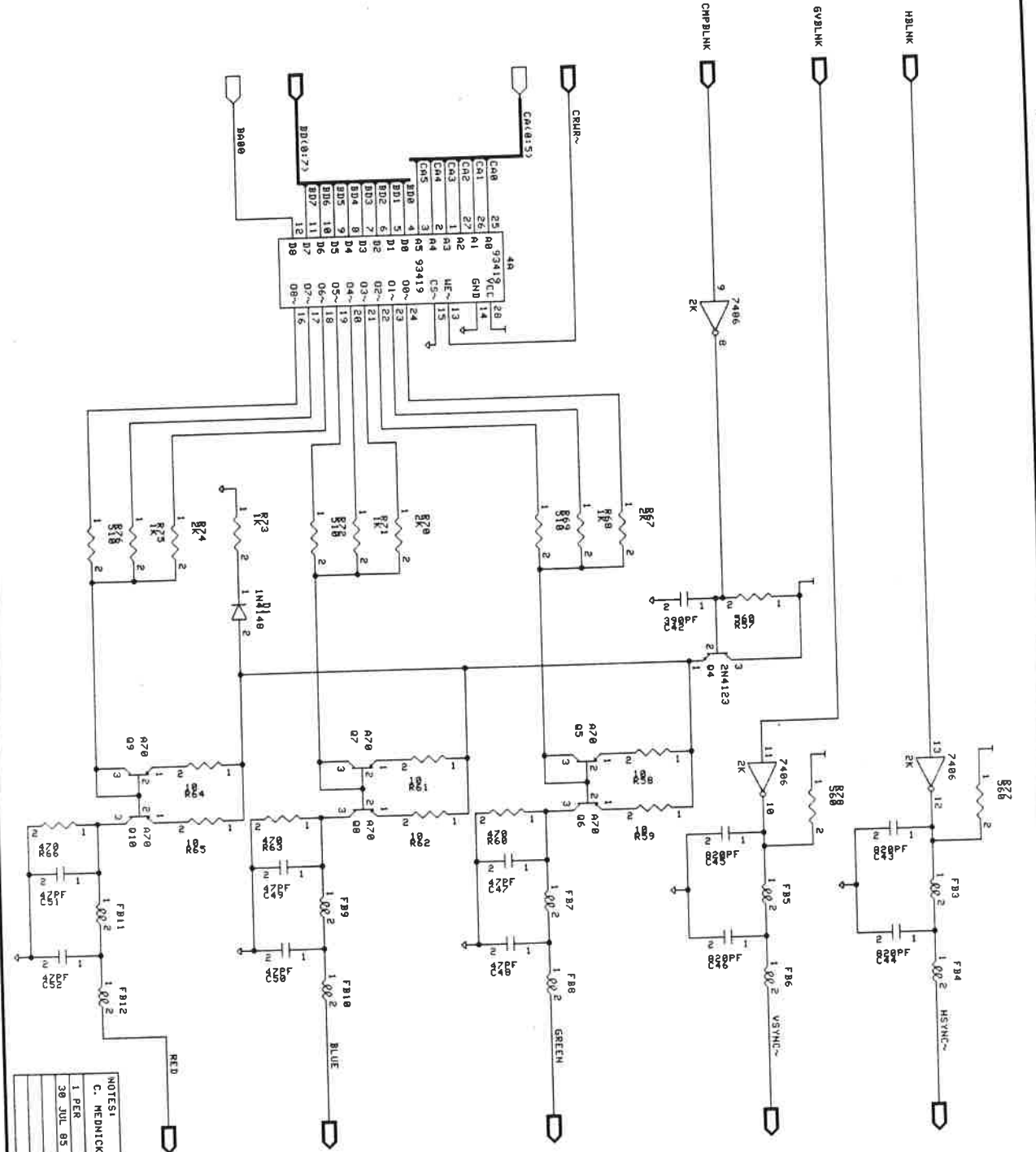


NOTES:  
 C. MEDNICK  
 1 PER  
 30 JUL 85  
 8884-91787-C000  
 8851-00114-C129  
 SHEET 22 OF 25 REV









NOTES:  
 C. MEDNICK  
 30 JUL 85  
 BALLY MIDWAY MFG. CO.  
 MONDODARD PC.  
 4884-91767-C888  
 N051-00114-C129  
 SHEET 25 OF 25 REV

MONOBOARD  
A084-91787-C000  
M051-00114-C128

DESIGNATION LIST: Page 1 of 4 (Rev. 04 Sep 85)

<u>DESCRIPTION</u>	<u>DESIGNATION NO.</u>
CP1-CP140	.01 UF AX. CER.
C1,C2	390 PF AX. CER.
C3	470 UF 16V AX. ELEC.
C4	10 UF 25V AX. TANT.
C5	33 PF AX. CER.
C6-C38	.1 UF AX. CER.
C39	10 UF 25V AX. TANT.
C40	NOT USED (LEAVE OPEN)
C41,C42	390 PF AX. CER.
C43-C46	820 PF AX. CER.
C47-C52	47 PF AX. CER.
C53,C54	470 UF 16V AX. ELEC.
C55	390 PF AX. CER.
C56	10 UF 25V AX. TANT.
R1,R2	4.7K OHM 1/4W 5% CRBN.
R3,R4	10K OHM 1/4W 5% CRBN.
R5-R7	4.7K OHM 1/4W 5% CRBN.
R8	82K OHM 1/4W 5% CRBN.
R9	22 OHM 1/4W 5% CRBN.
R10-R13	4.7K OHM 1/4W 5% CRBN.
R14-R45	220 OHM 1/4W 5% CRBN.
R46,R47	2.7K OHM 1/4W 5% CRBN.
R48-R50,R52-R56	4.7K OHM 1/4W 5% CRBN.
R57	560 OHM 1/4W 5% CRBN.
R58,R59	10 OHM 1/4W 5% CRBN.
R60	470 OHM 1/4W 5% CRBN.
R61,R62	10 OHM 1/4W 5% CRBN.
R63	470 OHM 1/4W 5% CRBN.
R64,R65	10 OHM 1/4W 5% CRBN.
R66	470 OHM 1/4W 5% CRBN.
R67	2K OHM 1/4W 5% CRBN.
R68	1K OHM 1/4W 5% CRBN.
R69	510 OHM 1/4W 5% CRBN.
R70	2K OHM 1/4W 5% CRBN.
R71	1K OHM 1/4W 5% CRBN.
R72	510 OHM 1/4W 5% CRBN.
R73	1K OHM 1/4W 5% CRBN.
R74	2K OHM 1/4W 5% CRBN.
R75	1K OHM 1/4W 5% CRBN.
R76	510 OHM 1/4W 5% CRBN.
R77,R78	560 OHM 1/4W 5% CRBN.
R79,R81-R84	4.7K OHM 1/4W 5% CRBN.
R85	1K OHM 1/4W 5% CRBN.
R86	1K OHM 1/4W 5% CRBN.
R87	4.7K OHM 1/4W 5% CRBN.
RM1-RM4	2.7K OHM 10 PIN SIP
RM5	4.7K OHM 10 PIN SIP
RM6-RM9	1K OHM 9 PIN SIP
D1,D2	1N4148 DIODE
Q1	2N4123 XSTR.
Q2	2N4403 XSTR.
Q3	TIP110 XSTR.

MONOBOARD  
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M051-00114-C128

DESIGNATION LIST: Page 2 of 4 (Rev. 04 Sep 85)

<u>DESCRIPTION</u>	<u>DESIGNATION NO.</u>
Q4	2N4123 XSTR.
Q5-Q10	MPSA70 XSTR.
IC 4A	93419 64x9 RAM
IC 5A	74LS157
IC 6A,7A	74LS273
IC 8A-12A	74LS244
IC 14A	74LS00
IC 15A	BG0 64K ROM/EPROM
IC 1B	74LS245
IC 3B,5B	PROG0,PROG1 256K ROM/EPROM
IC 6B	6116 2Kx8 RAM 150 NS.
IC 8B	74LS245
IC 9B	6116 2Kx8 RAM 150 NS.
IC 10B	74LS245
IC 11B	6116 2Kx8 RAM 120 NS.
IC 12B,13B	74LS377
IC 14B	BG1 64K ROM/EPROM
IC 15B	74LS273
IC 1C	Z80B CPU
IC 2C	Z80B CTC
IC 3C	74LS157
IC 4C	74LS244
IC 5C,6C	74F157
IC 7C	74LS157
IC 8C	74F157
IC 10C	2018 2Kx8 RAM 55NS
IC 11C	74LS244
IC 13C	74LS86
IC 14C	74LS153
IC 15C	74LS273
IC 1D	74S04
IC 2D	74LS244
IC 3D-5D	74LS163
IC 6D	74ALS20
IC 7D	74LS157
IC 8D	74LS174
IC 9D	74LS158
IC 10D	74LS174
IC 11D	74LS157
IC 12D	74LS174
IC 13D	74LS194
IC 14D	74LS158
IC 15D	74LS153
IC 1E	20 MHZ COSC.
IC 2E	74F74
IC 3E	74LS368
IC 4E-6E,8E	FG3,FG2,FG1,FG0 256K ROM/EPROM
IC 9E	74F10
IC 10E	74LS138
IC 11E	74LS194
IC 12E	74LS74
IC 13E,14E	74LS194

MONOBOARD  
A084-91787-C000  
M051-00114-C128

DESIGNATION LIST: Page 3 of 4 (Rev. 04 Sep 85)

<u>DESCRIPTION</u>	<u>DESIGNATION NO.</u>
IC 15E	74LS298
IC 1F	74LS367
IC 2F,3F	74LS20
IC 4F	74S04
IC 5F	74LS32
IC 6F	74LS00
IC 7F	74LS378
IC 8F	74LS377
IC 9F	74LS378
IC 10F	74F86
IC 11F	74F00
IC 12F-14F	74LS194
IC 15F	74LS74
IC 1G	74LS08
IC 2G	74LS138
IC 3G	74LS157
IC 4G	MMCO1A HAL
IC 5G	MMCO3B HAL
IC 6G	74F157
IC 7G	74LS283
IC 8G	74LS173
IC 9G,10G	74LS169
IC 11G	2018 2Kx8 RAM 45NS
IC 12G	74LS374
IC 13G	74LS258
IC 14G	74LS194
IC 1H	74LS32
IC 2H	74F174
IC 3H	74LS273
IC 4H	74LS08
IC 5H	MMCO6 HAL
IC 6H	MMCO2B HAL
IC 7H	74F86
IC 8H	74LS86
IC 9H	74LS374
IC 10H	74F74
IC 11H	74LS374
IC 12H	74LS20
IC 13H	74LS258
IC 14H	74LS174
IC 1J	74LS55
IC 2J	PACNS REV 1.0 PLA
IC 3J	PACOUT REV 1.0 PLA
IC 4J	74LS175
IC 6J	74LS283
IC 7J	74LS02
IC 8J	74LS374
IC 9J	2018 2Kx8 RAM 45NS
IC 10J	74LS374
IC 11J	2018 2Kx8 RAM 45NS
IC 12J	74LS374
IC 13J	ROMCNTRL REV 1.0 PLA

MONOBOARD  
A084-91787-C000  
M051-00114-C128

CROSS REFERENCE LIST: Page 1 of 3 (Rev. 22 Aug 85)

<u>DESCRIPTION</u>	<u>QTY</u>	<u>DESIGNATION NO.</u>	<u>PART NO.</u>
33 PF AX. CER.	1	C5	0986-00800-0300
47 PF AX. CER.	6	C47-C52	0986-00800-2800
390 PF AX. CER.	5	C1,C2,C41,C42,C55	0986-00800-3000
820 PF AX. CER.	4	C43-C46	0945-00816-0400
.01 UF AX. CER.	140	CP1-CP140	0986-00800-2000
.1 UF AX. CER.	33	C6-C38	0986-00800-1100
10 UF 25V AX. TANT.	3	C4,C39,C56	0986-00800-0700
470 UF 16V AX. ELEC.	3	C3,C53,C54	0986-00800-2700
10 OHM 1/4W 5% CRBN.	6	R58,R59,R61,R62,R64, R65	100E-00005-0011
22 OHM 1/4W 5% CRBN.	1	R9	100E-00005-0016
220 OHM 1/4W 5% CRBN.	32	R14-R45	100E-00005-0041
470 OHM 1/4W 5% CRBN.	3	R60,R63,R66	100E-00005-0051
510 OHM 1/4W 5% CRBN.	3	R69,R72,R76	100E-00005-0053
560 OHM 1/4W 5% CRBN.	3	R57,R77,R78	100E-00005-0054
1K OHM 1/4W 5% CRBN.	6	R68,R71,R73,R75,R85, R86	100E-00005-0061
2K OHM 1/4W 5% CRBN.	3	R67,R70,R74	100E-00005-0068
2.7K OHM 1/4W 5% CRBN.	2	R46,R47	100E-00005-0071
4.7K OHM 1/4W 5% CRBN.	23	R1,R2,R5-R7,R10-R13, R48-R50,R52-R56,R79, R81-84,R87	100E-00005-0079
10K OHM 1/4W 5% CRBN.	2	R3,R4	100E-00005-0088
82K OHM 1/4W 5% CRBN.	1	R8	100E-00005-0112
1K OHM 9 PIN SIP	4	RM6-RM9	102E-00004-0011
2.7K OHM 10 PIN SIP	4	RM1-RM4	102E-00004-0020
4.7K OHM 10 PIN SIP	1	RM5	102E-00004-0026
1N4148 DIODE	2	D1,D2	103E-00002-0005
2N4123 NPN XSTR.	2	Q1,Q4	104E-00001-0007
2N4403 PNP XSTR.	1	Q2	104E-00002-0006
MPSA70 PNP XSTR	6	Q5-Q10	104E-00002-0012
TIP110 NPN XSTR.	1	Q3	104E-00009-0001
20 MHZ COSC.	1	IC 1E	0304-00804-0007
7406	1	IC 2K	0986-00803-7600
74ALS20	1	IC 6D	0A59-00803-0015
74F00	1	IC 11F	0A59-00803-0001
74F08	1	IC 14K	0A59-00803-0030
74F10	1	IC 9E	0A59-00803-0002
74F74	2	IC 2E,10H	0A59-00803-0003
74F86	2	IC 10F,7H	0A59-00803-0031
74F157	4	IC 5C,6C,8C,6G	0A59-00803-0004
74F174	1	IC 2H	0A59-00803-0005
74LS00	2	IC 14A,6F	0304-00803-0010
74LS02	1	IC 7J	0986-00803-7400

**MONOBOARD**  
**A084-91787-C000**  
**M051-00114-C128**

**CROSS REFERENCE LIST: Page 2 of 3 (Rev. 22 Aug 85)**

<u>DESCRIPTION</u>	<u>QTY</u>	<u>DESIGNATION NO.</u>	<u>PART NO.</u>
74LS04	1	IC 1K	0986-00803-6900
74LS08	2	IC 1G, 4H	0986-00803-7300
74LS20	3	IC 2F, 3F, 12H	0986-00803-1004
74LS32	3	IC 5F, 1H, 4K	0986-00803-6100
74LS55	1	IC 1J	0A59-00803-0026
74LS74	6	IC 12E, 15F, 3K, 5K, 6K, 15K	0986-00803-1005
74LS86	2	IC 13C, 8H	0986-00803-9900
74LS138	2	IC 10E, 2G	0986-00803-6500
74LS153	2	IC 14C, 15D	0A59-00803-0006
74LS157	6	IC 5A, 3C, 7C, 7D, 11D, 3G	0304-00803-0021
74LS158	2	IC 9D, 14D	0A59-00803-0007
74LS161	1	IC 14J	0986-00803-1003
74LS163	3	IC 3D-5D	0A59-00803-0008
74LS169	4	IC 9G, 10G, 7K, 9K	0304-00803-0023
74LS173	3	IC 8G, 8K, 11K	0A59-00803-0009
74LS174	5	IC 8D, 10D, 12D, 14H, 13K	0304-00803-0024
74LS175	1	IC 4J	0304-00803-0025
74LS194	8	IC 13D, 11E, 13E, 14E, 12F-14F, 14G	0304-00803-0026
74LS244	8	IC 8A-12A, 4C, 11C, 2D	0986-00803-4800
74LS245	3	IC 1B, 8B, 10B	0986-00803-6400
74LS258	2	IC 13G, 13H	0304-00803-0028
74LS273	5	IC 6A, 7A, 15B, 15C, 3H	0986-00803-4700
74LS283	2	IC 7G, 6J	0304-00803-0030
74LS298	2	IC 15E, 12K	0A59-00803-0010
74LS367	1	IC 1F	0986-00803-7000
74LS368	1	IC 3E	0A59-00803-0011
74LS374	6	IC 12G, 9H, 11H, 8J, 10J, 12J	0986-00803-4600
74LS377	3	IC 8F, 12B, 13B	0A59-00803-0012
74LS378	2	IC 7F, 9F	0A59-00803-0013
74S04	2	IC 1D, 4F	0986-00803-6600
MMC01A HAL	1	IC 4G	0986-00803-8900
MMC02B HAL	1	IC 6H	0986-00803-9000
MMC03B HAL	1	IC 5G	0986-00803-9100
MMC06 HAL	1	IC 5H	0986-00803-9200
PACNS REV 1.0 PLA	1	IC 2J	A59A-26AAJ-BXHD
PACOUT REV 1.0 PLA	1	IC 3J	A59A-26AAJ-AXHD
ROMCTRL REV 1.0 PLA	1	IC 13J	A59A-26AAJ-CXHD
2018 2Kx8 RAM 45NS	4	IC 11G, 10K, 9J, 11J	0A59-00803-0028
2018 2Kx8 RAM 55NS	1	IC 10C	0A59-00803-0029
6116 2Kx8 RAM 120NS	1	IC 11B	0A59-00803-0027
6116 2Kx8 RAM 150NS	2	IC 6B, 9B	0A59-00803-0014
93419 64x9 RAM	1	IC 4A	0986-00803-9600
Z80B	1	IC 1C	0304-00803-0041
Z80B CTC	1	IC 2C	0304-00803-0040
BGO 64K ROM/EPROM	1	IC 15A	ROM/EPROM CHART

**MONOBOARD**  
**A084-91787-C000**  
**M051-00114-C128**

**CROSS REFERENCE LIST: Page 3 of 3 (Rev. 22 Aug 85)**

<u>DESCRIPTION</u>	<u>QTY</u>	<u>DESIGNATION NO.</u>	<u>PART NO.</u>
BG1 64K ROM/EPROM	1	IC 14B	ROM/EPROM CHART
FG0 256K ROM/EPROM	1	IC 8E	ROM/EPROM CHART
FG1 256K ROM/EPROM	1	IC 6E	ROM/EPROM CHART
FG2 256K ROM/EPROM	1	IC 5E	ROM/EPROM CHART
FG3 256K ROM/EPROM	1	IC 4E	ROM/EPROM CHART
PROGO 256K ROM/EPROM	1	IC 3B	ROM/EPROM CHART
PROG1 256K ROM/EPROM	1	IC 5B	ROM/EPROM CHART
16 PIN IC SOCKET(.300)	1	ICS 3E	110E-00001-0003
20 PIN IC SOCKET(.300)	5	ICS 5G, 5H, 2J, 3J, 13J	110E-00001-0005
24 PIN IC SOCKET(.300)	7	ICS 10C, 4G, 11G, 6H, 9J 11J, 10K	110E-00001-0009
24 PIN IC SOCKET(.600)	3	ICS 6B, 9B, 11B	110E-00001-0007
28 PIN IC SOCKET(.600)	10	ICS 4A, 15A, 3B, 5B, 14B, 2C, 4E-6E, 8E	110E-00001-0010
40 PIN IC SOCKET(.600)	1	ICS 1C	110E-00001-0011
AUTO INSERT PIN TIN .025 SQ	18	J2	0304-00804-0009
AUTO INSERT PIN TIN .025 SQ	22	J3	0304-00804-0009
AUTO INSERT PIN TIN .025 SQ	15	J4	0304-00804-0009
AUTO INSERT PIN TIN .025 SQ	8	J5	0304-00804-0009
AUTO INSERT PIN TIN .025 SQ	10	J6	0304-00804-0009
AUTO INSERT PIN TIN .045 SQ	11	J1	0304-00804-0010
FERRITE BEAD	13	FB1-FB13	0316-00804-0002
JUMPER	4	JW1-JW4	117E-00001-0003
SWITCH PC. MTG. 10 POS. DIP SWITCH	1	SW1	0986-00804-3100
	1	SW2	113E-00001-0004
SNAP	1	MHQ3	0017-00007-0134
PC BOARD	1		A080-91787-C000

Released 6 Aug 85 CMM

Changed 22 Aug 85 - Added ICS 3E CMM



**BALLY/MIDWAY'S SARGE U.R. (MONOBOARD SYSTEM)**

**U.R. #0B88**

**ROM/EPROM PART NUMBERS**

**UNPROGRAMMED MONOBOARD A084-91787-C000**  
**PROGRAMMED MONOBOARD A084-91787-AB88**

POS.	MIDWAY PART NUMBER
15A	B88A-22AAE-AXRD
14B	B88A-22AAE-BXRD
8E	B88A-47AAE-CABD
6E	B88A-47AAE-DABD
5E	B88A-47AAE-EABD
4E	B88A-47AAE-FABD
3B	B88A-47AAE-AABD
5B	B88A-47AAE-BABD

JUMPERS	IN	OUT
JW1	**	
JW2	**	
JW3	**	
JW4		**

**UNPROGRAMMED TURBO CHEAP SQUEAK A084-91779-A000**  
**PROGRAMMED TURBO CHEAP SQUEAK A084-91779-AB88**

POS.	MIDWAY PART NUMBER
U4	B88A-22AAE-CXRD
U5	B88A-22AAE-DXRD

JUMPERS	IN	OUT
JW1	**	
JW2		**
JW3		**
JW4	**	
JW5	**	

**UNPROGRAMMED OPTICAL ENCODER DELUXE A084-91794-A000**

JUMPER	IN	OUT
JW1		**

**REVISIONS**

10/6/85		RELEASE FOR PRODUCTION

**M051-00B88-A008**



# Thayer's Quest™

“**THAYER'S QUEST**” is like no Arcade Game you have ever played.

You will notice many differences as you get to know the System and “Thayer's Quest.” Here's how you get started:

1. **TYPE** in your **NAME**. Put a **SPACE** between your first and LAST.
2. Press the **ENTER** key.

## THE ADVENTURE BEGINS

“Thayer's Quest” creates a realm of fantasy and adventure. Survival and Success depend more on your decisions than your reflexes.

1. Press a number key (1-4) to select an action for Thayer.
2. **NOTE:** Something different can happen even when you make the same choice.

## ITEMS

FOR THE FIRST TIME IN **ARCADE HISTORY** YOU CAN **GET AND USE** TREASURES, WEAPONS AND ARTIFACTS. WE CALL THEM “**ITEMS.**”

1. The first way to get an item is: **PRESS** the key with the **PICTURE** of that item. Thayer will try to take the item in the scene.
2. Another way to acquire an item is to use an item you already have.

**EXAMPLE:** To use the **ORB OF QUOID** to get the **PENTACLE COINS**...**PRESS** the key with the picture of the **ORB OF QUOID**.

3. If you want to review the items you have, **PRESS** the **ITEMS** key.

**IMPORTANT:** The options to get or use an item will **not** be listed on the screen. You must hear the clues in order to see and recognize the opportunities to get or use items when they occur!

A lost item can be recovered, **IF** you can find it again.

## ENEMIES AND OBSTACLES

You can use items to overcome enemies and obstacles. To use an item against an obstacle or enemy, **PRESS** the **PICTURE** key of the item you want to **use**.

If Thayer is **WOUNDED**, **HEALING** locations restore him to full strength.

WHEN PAID TIME RUNS OUT, THE SYSTEM AUTOMATICALLY SAVES YOUR GAME! The System has enough room to save up to ten games.

**Your score is important. Unless your score is high enough, there are situations where your magic or magical items will turn on you, and you cannot win the game.**