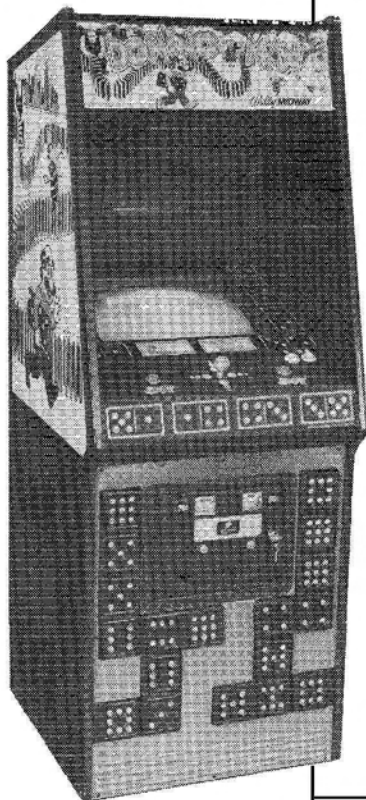
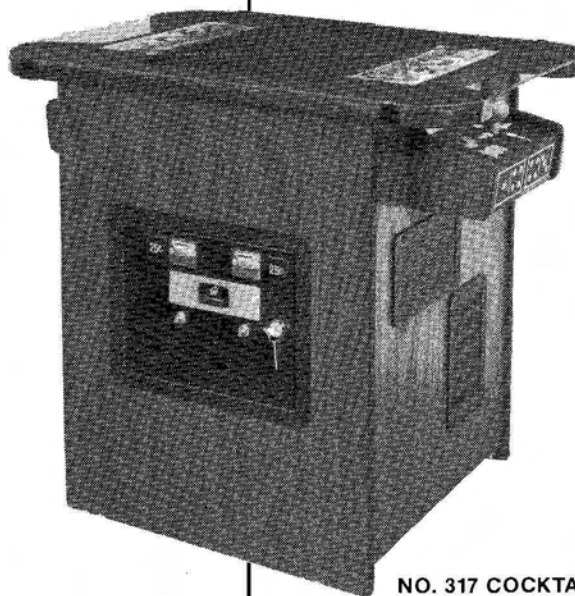




Parts & Operating Manual



NO. 316 UPRIGHT



NO. 317 COCKTAIL

Bally

MIDWAY MFG. CO.

10750 W. Grand Avenue
Franklin Park, Illinois 60131
U.S.A.



Phone: (312) 451-1360

Cable Address: MIDCO

Telex No.: 72-1596

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 used in accordance with the instructions 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.

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Domino Man

IMPORTANT NOTE

DO NOT plug in your new game yet. Before you do anything to your game, we recommend that you read SECTIONS I and II of this manual completely. It will not take more than a few minutes and it may be very helpful.

I. Introduction

DOMINO MAN is a one or a two player game. There are two models: the "UPRIGHT" and "COCKTAIL TABLE". The Upright model has been designed for either **RIGHT** or **LEFT** hand use. When the two player mode is selected on the Upright model, the players take turns at the controls to take their Domino Man through the game course. If you have purchased the Cocktail Table model of this game, the rules of play are the same. The only **difference** is that in the two player mode of the Cocktail Table game, the picture flips to face you when it's your turn.

When playing this game, the Domino Man is under **YOUR** control. **YOU** make him move back and forth or up and down on the screen to place his Dominos, take them out of the Bully's way, and to move the other various people on the screen around to keep them from knocking down his row of Dominos.

The game is presented in phases, and there are 3 racks to a phase. The 3 racks which compose a phase are arranged as follows: the **FIRST RACK** is a **street scene**, the **SECOND RACK** takes place on the **golf course**, and the **THIRD RACK** is in a **construction site**.

All your Domino Man wants to do is set up his Dominos. (This is accomplished by having him step on the **WHITE** dot.) However, all the other people in each of the above three scenes are not very careful

and will wander into his Dominos knocking them over if he does not keep changing their paths of travel for them. This makes his life rather hectic to say the least.

The **ONLY** person on the screen that **CANNOT** be turned aside is the Bully. The only thing you can do to him is have Domino Man jump up and down on his head to speed up his passage. **BE SURE** you have removed any Dominos that were in front of him **FIRST** or he will knock them **ALL** over.

In order to have your Domino Man do anything other than just place Dominos, you must push the "SAVE" button when you want him to do it. For example: he cannot move or change the direction of travel of any of the other people on the screen in any way whatsoever **UNLESS** the SAVE button is depressed when he is trying to do this.

As your skill level increases and you work your way into the higher and higher racks, the patterns in which the Dominos must be placed become more complicated, the other people on the screen appear more often, and they move faster.

Bonus Domino Men are awarded to you periodically throughout the game as you reach or pass certain preselected point values. Each item in the game that can contribute to your score is assigned a point value as shown in Figure 1-1.

Major Features

There are several major features in your DOMINO MAN game: 1) The UPRIGHT model has been designed for ease of play by EITHER **RIGHT-HANDED** or **LEFT-HANDED** players; 2) You can select the level of difficulty at which you want to play (NOVICE or EXPERT); 3) You can vary the speed at which your Domino Man travels through the game course by pressing **AND HOLDING DOWN** the SAVE Button; 4) The game has OWNER/OPERATOR selected variable levels of difficulty so game play can be tailored to player skill level in his area; 5) There is a new and easy to use diagnostic package featuring: a complete ROM/RAM check with bad chip location information readout on the monitor screen; the capability to check each of the game's 15 different sounds **INDIVIDUALLY**; provision for checking each control and switch **SEPARATELY**; a full function Bookkeeping mode; an entire options list that can be

set from the front console with **NO NEED** to crawl inside the back of the cabinet and look for tiny switches located on P.C. boards; a sound system test; and a "PRE-SET" category that can return **ALL** information in the Bookkeeping mode to zero and/or all operator selected options back to factory recommended settings; and 6) The game is equipped with a rechargeable battery so that it won't forget where it was the night before at closing — even if you turn it off. It will "remember" this information for up to two weeks.

Game Objective

The object of the game is to **HAVE FUN** while constantly increasing your skill as you play, running up the highest score possible each time.

DESCRIPTION	POINTS AWARDED
PLACING DOMINO	100
TURNING AN INTRUDER AROUND	50
PER SECOND OF PUSHING AN INTRUDER	30
PUSHING INTRUDER OFF-SCREEN	50
SWATTING A BEE	200
MONEY BAG (RANDOM)	100, 200, 250, 500
NOT LOSING MAN DURING RACK	250 x RACK #
NOT ALLOWING A DOMINO TO FALL DURING RACK	250 x RACK #
IF BOTH OF ABOVE (Maximum 15,000)	1000 x RACK #
BONUS TIMER ADDED TO SCORE AT RACK END	

Figure 1-1 Assigned Point Values

II. Location and Setup

INSPECTION:

1. Remove the game from its shipping crate.
2. Inspect the entire outside of it for any signs of damage.
 - Any scratches?, dents?, cracks?
 - Any broken controls?
 - Any broken glass or plastic?
 - Just look it over closely and make a note of any signs of damage.
3. Remove the shipping cleats from the bottom of the cabinet.
 - UPRIGHT MODELS ONLY:** In order to help prevent easy theft of your game, you may wish to remove the Caster Wheel Assemblies from the bottom of your cabinet at this time.
4. Install the four levelers, one at each corner of the cabinet.
 - Level the cabinet.
5. Open the cabinet and inspect the inside of the game for any signs of damage. See Figure 2-1.
 - Also check to make sure all plug-in connectors on the wire harness are firmly seated.

NOTE: ALL connectors or plugs are keyed so they will only go together when all pins are properly lined up.

 - Replug any connectors found unplugged. DO NOT FORCE PLUGS ONTO CONNECTORS. DO NOT FORCE PLUGS TOGETHER. If it won't go on easily, assuming the keys are lined up, it either does not belong there or is damaged.
 - Make sure all printed circuit boards (P.C.B.'s) are firmly seated in their connectors. See Figure 2-1. These connectors are also keyed. The

P.C.B.'s will only go into them one way without being damaged.

- Note the location of the game's serial number. See Figure 2-1.
- Check all major subassemblies to be sure they are mounted securely. These are called out in Figure 2-1.
 - Power supply.
 - Control panel(s).
 - T.V. monitor.
 - Other P.C.B.'s and/or P.C.B. rack, etc.
 - Power supply filter assembly.
 - Transformer board assembly.
- 6. Make a note of any problems that can't be easily corrected.
- 7. Call your distributor and/or service man about your problem list.

INSTALLATION

1. Location requirements:

- Power:**
 - Domestic 110 V @ 60 Hz
 - Foreign 200 V to 240 V @ 50 Hz
- Temperature:** 32° to 100° F (0° to 38° C)
- Humidity:** Not over 95% relative
- Space required:**
 - Upright 29" x 25" (73cm x 63cm)
 - Cocktail 32" x 22" (81cm x 55cm)
- Game height:**
 - Upright 68" (170cm)
 - Cocktail 29" (73cm)

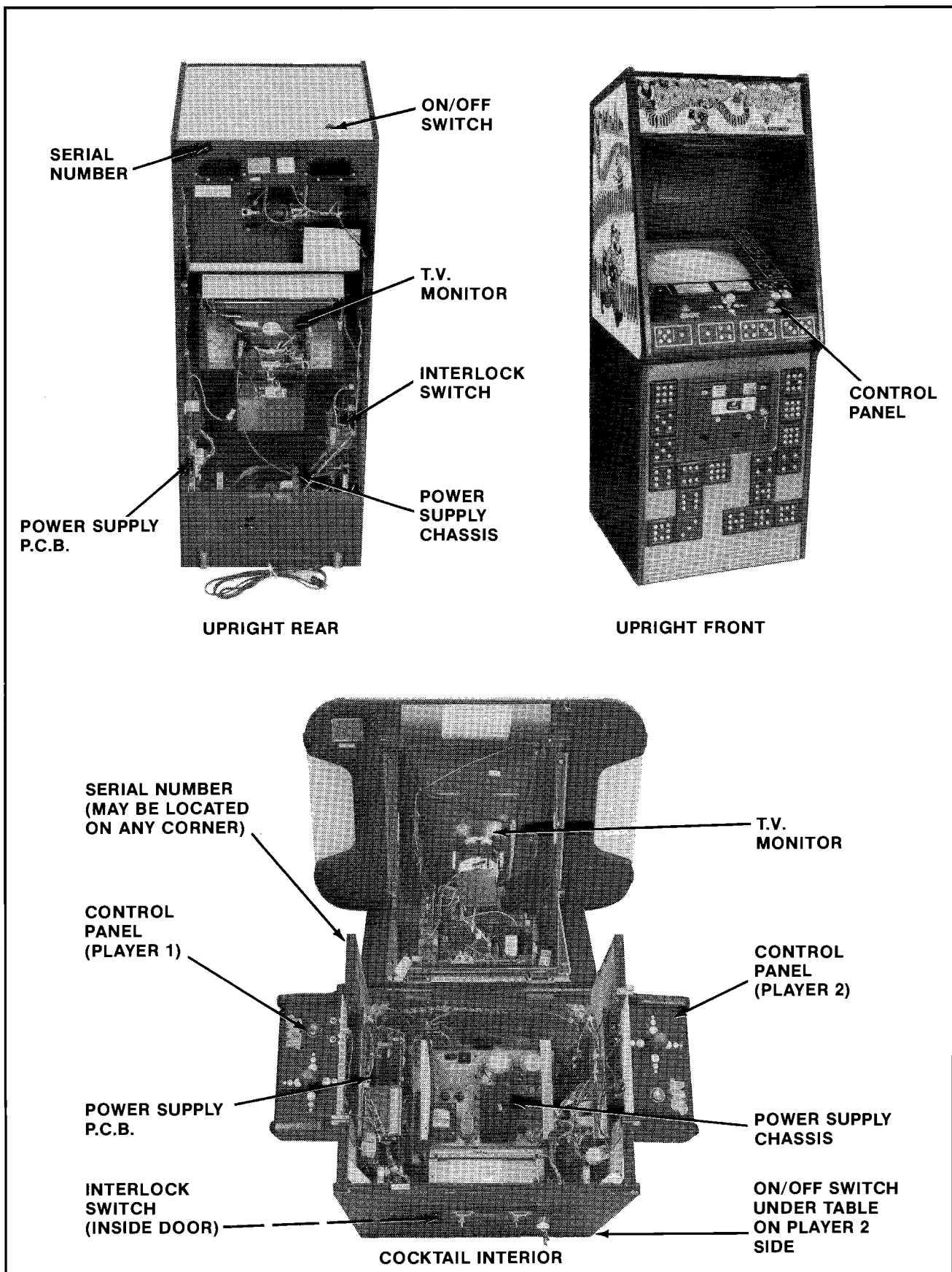


Figure 2-1 Location of Serial No., Interlock Switch, On/Off Switch, & Major Sub-Assemblies

2. Voltage Selection:

Your game is designed to work properly on the line voltage where you are located. Check your line voltage with a meter to determine what its value is. Then check the power input wires to the main power supply transformer on your game to be sure they are connected to taps which correspond to your line voltage value.

If the power input wires to the main power supply transformer are not connected to taps which correspond to your local line voltage, move them to the proper taps.

If the line voltage in your area falls outside the upper or lower limits of the range of inputs covered by the main power supply transformer, **DO NOT PLUG YOUR GAME IN** until you have talked with your distributor and/or service man and obtained a solution to this problem. Otherwise you could damage your game.

3. Interlock and power ON/OFF switches: See Figure 2-1.

- To help prevent the possibility of getting an electric shock while working inside the game cabinet, interlock switches have been installed at each cabinet access door (this **DOES NOT** include the coin door in the Upright model).
- When any access door is opened, the interlock switch installed there turns off all power to the game.
- Check each interlock switch for proper operation.

After checking the line voltage in your area and determining that the input wires to the main power supply transformer of your game are connected properly — or — after obtaining a solution to your over or under voltage problem from your distributor and/or your service man, plug the game into your A.C. wall outlet.

The game ON/OFF switches for both models are located as shown in Figure 2-1. Turn the game on and allow it to warm up a few minutes.

Slowly open each access door to the game (this does not include the coin door on the Upright model).

As the door is opened approximately 1" (2.54cm) the power to the game should go off (the T.V. monitor, all the lights, and all sounds will stop).

If this does not happen, check the interlock switch by this door to see if it has broken loose from its mounting or if it is stuck in the "ON" position.

If the switch is found to be bad, turn the game off, unplug it, and replace the interlock switch. When done, plug the game back into the wall outlet, close the access door, and turn the game back on.

After the game has warmed up, repeat the above interlock switch test.

When the interlock switch is working properly and turns the power to the game off, power may be restored to the game with the access door(s) open. Take hold of the interlock switch plunger and **gently** pull it out to its fully extended position. **THIS IS TO BE USED ONLY FOR SERVICING THE GAME.** See Figure 2-2.

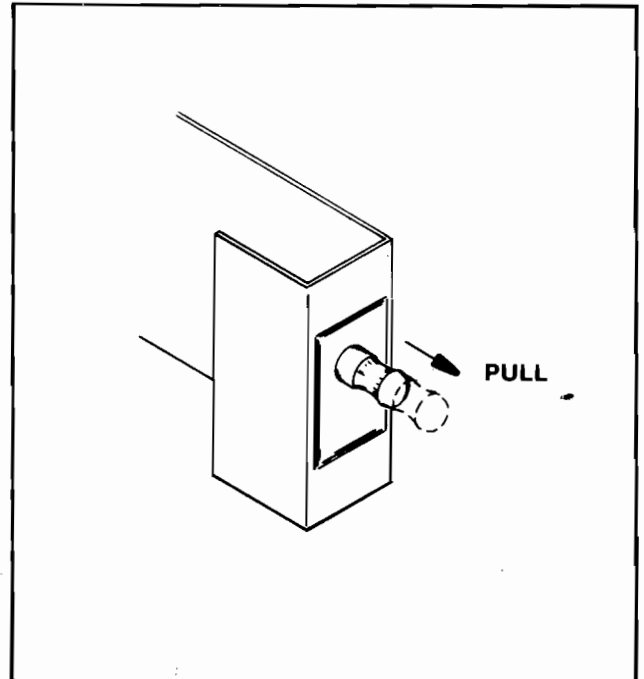


Figure 2-2 Interlock Switch Operation

SELF-TEST

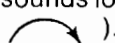
Your new game will Self-Test itself to see if it has any bad parts. The information it receives while testing itself will be shown on the T.V. monitor. Some information can also be heard through the game's speaker system. See the GAME OPERATION section for a more detailed description of this function.

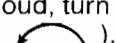
When there is a bad result according to the Self-Test, call your distributor and/or service man to have the trouble fixed unless it is something you can do yourself (such as replace a bad RAM or ROM chip).

GAME VOLUME ADJUSTMENT CONTROL

See Figure 2-3.

The game volume control pot is located just inside the cabinet on the right side of the coin door frame. There is only one pot. For adjustment, it may be reached through the coin door on both models.

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

To make the sounds **less** loud, turn the pot counter-clockwise as you face it ().

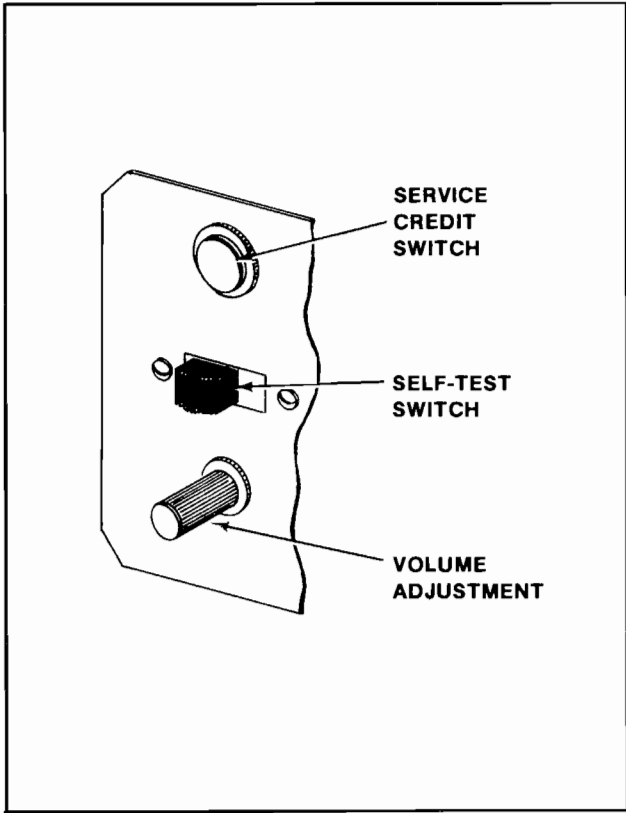


Figure 2-3 Game Volume Adjustment Control

OPTION SETTINGS

To change the most common option settings, you **DO NOT** have to take the game apart or go into the cabinet and hunt for tiny switches on P.C. boards. These most common options can be changed from the main console of the game while it is in the Self-Test mode. The Self-Test switch is located just inside the cabinet on the right side of the coin door frame as you face it.

When changing any options, ALWAYS perform the Self-Test and play the game to be sure the ones selected are working properly. Of course, when you must change one of the switches that is located on one of the game's P.C. boards, it is also recommended that you perform the Self-Test and play the game to be sure the switches have worked properly and that no switches were accidentally moved that were not meant to be. (These switches are small and this can happen.)

The P.C. Board option switch settings, and what they will make the game do are shown in Figure 2-5. These switches are **MAINLY INTENDED** for use by a technician who is checking and/or performing tests on the game. See Figure 2-4 for option switch locations.

NOTE: In order to set the option switches located on the game's P.C. Boards, these Boards need not be removed from their card rack.

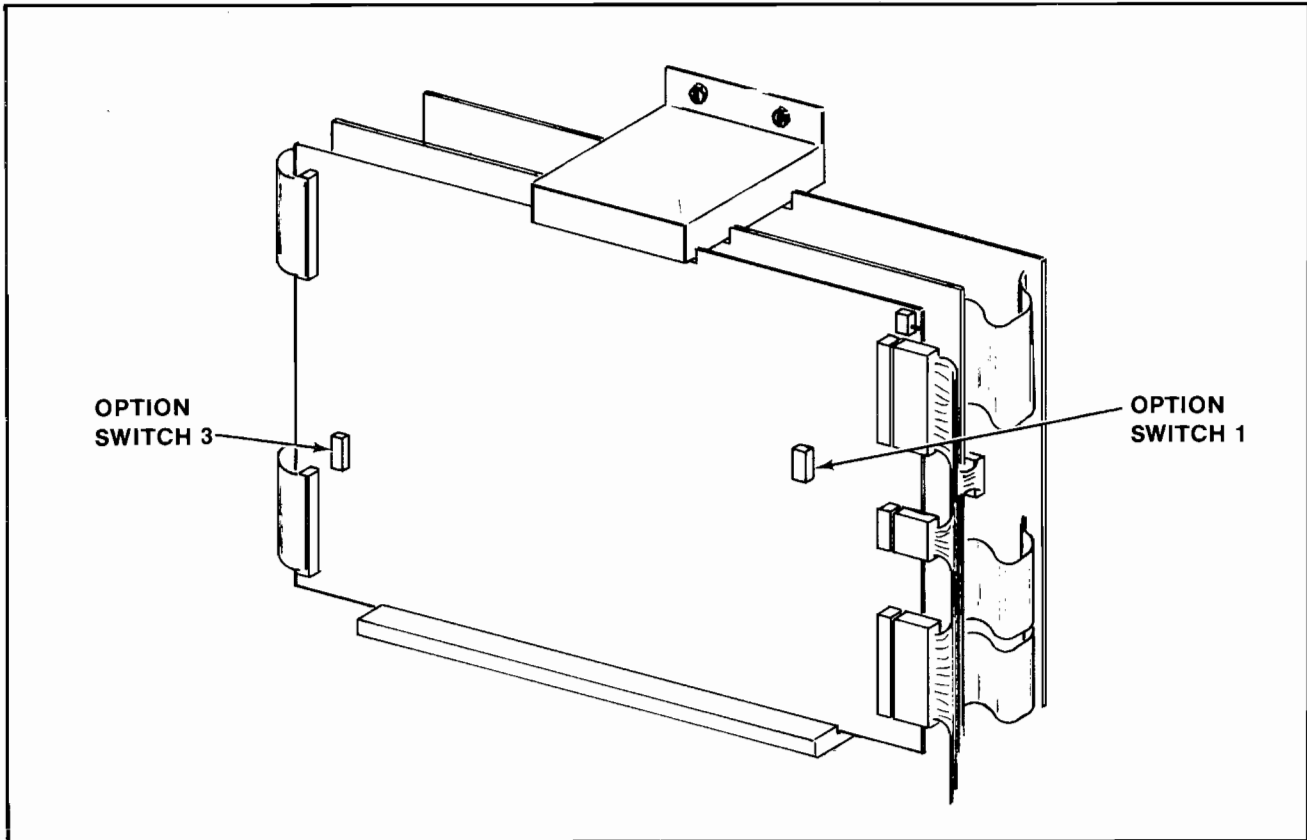


Figure 2-4 Option Switch Locations

DOMINO MAN										
OPTION SWITCH SETTINGS										
SWITCH NO. 1— AT B 3 — LOCATED ON SOUND I/O P.C. BOARD										
DURING GAME PLAY: **PLAY MUSIC DO NOT PLAY MUSIC	SW#1	SW#2	SW#3	SW#4	SW#5	SW#6	SW#7	SW#8	SW#9	SW#10
	ON		NOT USED	NOT USED	NOT USED	NOT USED		NOT USED	NOT USED	
	OFF		USED	USED	USED	USED		USED	USED	
BLACK SCREEN CHARACTERS **CAUCASIAN SCREEN CHARACTERS	ON									
	OFF									
UPRIGHT COCKTAIL TABLE							ON			
							OFF			
FREEZE VIDEO **NORMAL OPERATION										ON
										OFF
SWITCH NO. 3 — AT D 14 — LOCATED ON SOUND I/O P.C. BOARD										
	SW#1	*SW#2	*SW#3	*SW#4						
**NORMAL OPERATION SOUND I/O DIAGNOSTIC MODE	OFF									
	ON									
**NORMAL OPERATION RAM/ROM TEST INDICATES TEST RESULTS VIA YELLOW LED ON SOUND I/O BOARD: FAST FLASH = BAD ROM SLOW FLASH = BAD RAM		OFF								
		ON								
**NORMAL OPERATION OSCILLATOR TEST			OFF							
			ON							
**NORMAL OPERATION FILTER TEST				OFF						
				ON						
*NO EFFECT IF SW#1 OF SWITCH NO. 3 IS IN THE "OFF" POSITION. **FACTORY RECOMMENDED SETTINGS.									PART NO. M051-00303-A011	

The remainder of Domino Man's most common option settings are conducted during the machine setup portion of the Self-Test mode and will be covered in detail in that section of this manual.

Figure 2-5 Option Switch Settings

III. Game Operation

DOMINO MAN is a one or a two player game with a color T.V. monitor. The game gives a display which has all the parts shown in Figure 3-1.

The game has five possible modes of operation: ATTRACT, READY-TO-PLAY, PLAY, HIGH SCORE INITIAL, and SELF-TEST.

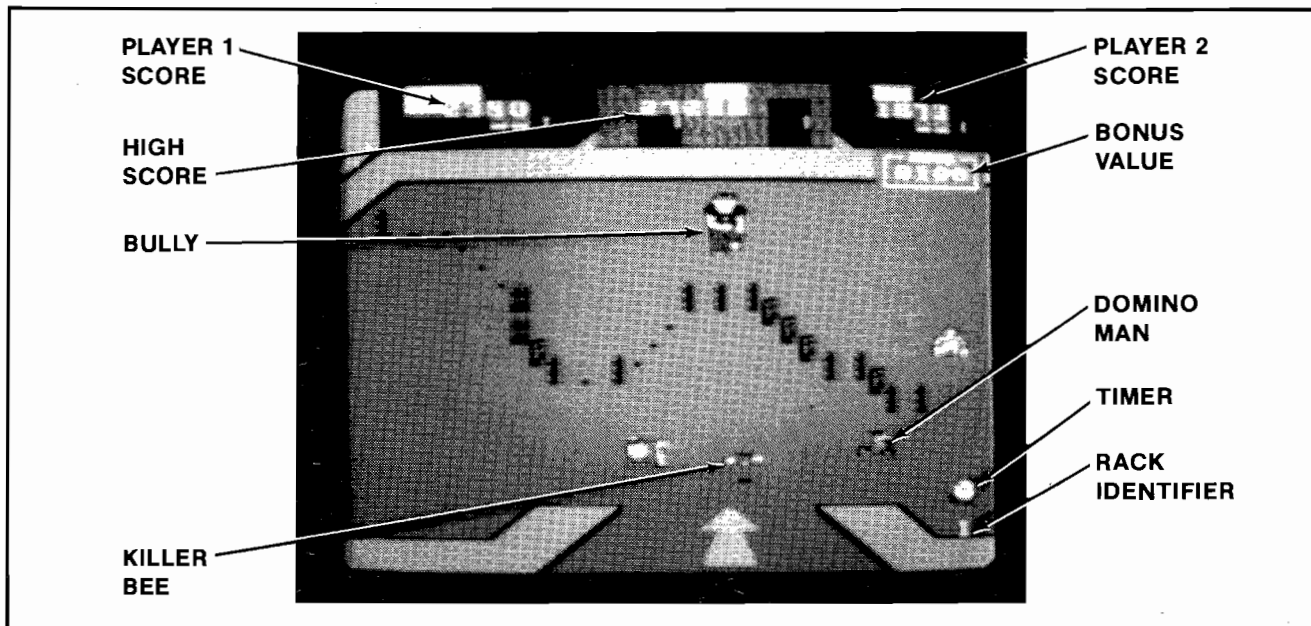


Figure 3-1 Identification of "On Screen" Graphics

SELF-TEST MODE

The Self-Test mode is a special mode for checking game play statistics as well as game switches and computer functions. It is the easiest and best way to check for proper operation of the entire game.

NOTE: Putting the game into Self-Test **WILL NOT** cause the game to erase any CREDITS it has in its memory when the Self-Test mode is entered.

After the power to the game is on, you may begin a Self-Test at **ANY TIME** by sliding the Self-Test switch (switch is located just inside the cabinet on the right side of the coin door frame as you face it) to the "ON" position and then activating the "TILT" switch (located on the back side of the coin door just below the lock mechanism). The game will then **IMMEDIATELY** go into the Self-Test mode.

The Self-Test mode has eight (8) major categories as illustrated by Figure 3-2.

1. It is easy to select what category you want to enter. By pushing the control stick forward or pulling it back, the Cursor at the left of the screen can be moved UP and DOWN, (forward = UP) and (backward = DOWN), until it is in front of the category you want to test. Release the control stick at this time.

2. After the Cursor has been positioned, depress either "RUN/SWAT" Button on the console and the monitor screen will display the test category you have selected.

Once you are **IN** one of the Self-Test mode categories, **FOLLOW THE ON-SCREEN INSTRUCTIONS TO COMPLETE THE TEST.**

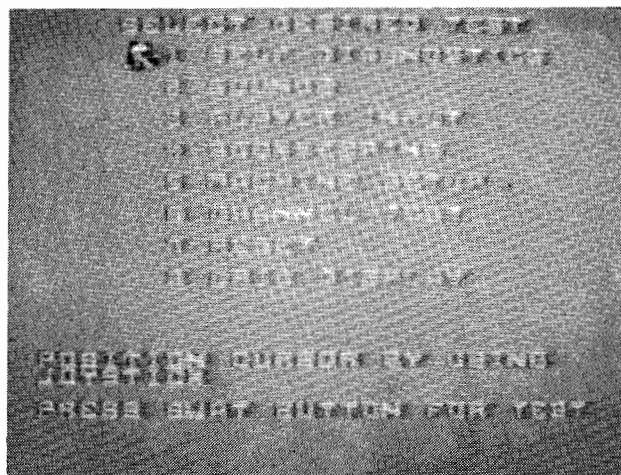


Figure 3-2 Self Test Mode

3. The next group of Figures (3-2a through 3-2g) show the **CORRECT** screen presentation for **EACH** category of the Self-Test mode.

During the SELF DIAGNOSTICS section of the Self-Test mode, you will **first** see a cross hatch pattern on the screen for about 1/2 second. **Second**, you will see a lot of different colored bars shown on the monitor screen. These bars will be **UNpainted** one at a time from left to right. **Third**, you will see the screen painted Red, Blue, and Green in bars from left to right. **Fourth**, all the different colored bars you saw "**Second**" are displayed again. And **fifth**, the different colored bars are replaced by this message: "**PRESS RUN BUTTON TO EXIT**". If the RUN Button is not hit, the test will repeat itself. This feature was designed into the game to enable overnight testing for an intermittent hardware problem.

If the SELF DIAGNOSTICS find one or more bad ROM or RAM chips: instead of going through what is described above, the game will give you a written message as to which parts are bad. This message includes their I.D.'s and their P.C. Board locations.

During the SOUNDS section of the Self-Test mode, the game will give a display which looks like that shown in Figure 3-2a.

- In this category, each of the game's sounds can be checked individually in any order — or — you can tell the game to check them all in order.

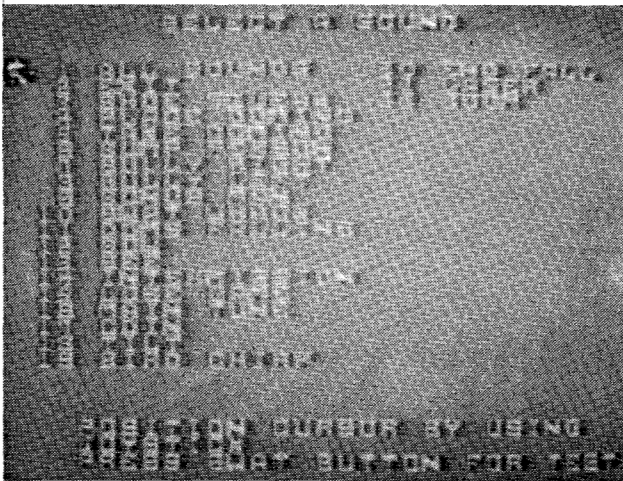


Figure 3-2a Self Test Mode — Sounds

During the PLAYER INPUT section of the Self-Test mode, the game will give a display which looks like that shown in Figure 3-2b. You **MUST** hit the **TILT SWITCH** to **EXIT** this test.

- In this category, each of the game's player operated controls — including the coin switches on the back side of the coin door — may be checked individually. A game sound will be heard as each switch/control is actuated. If no game

sound is heard, that switch/control is either not working, miswired, or disconnected. Check it out thoroughly.

As the Player Input Switches and Devices are activated, the Switch or Device activated is spelled out in the blank space at center of screen.

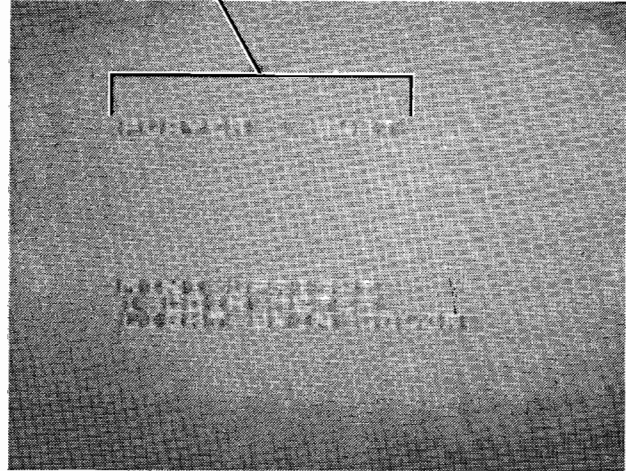


Figure 3-2b Self Test Mode — Player Input

During the BOOKKEEPING section of the Self-Test mode, the game will give a display which looks like that shown in Figure 3-2c.

- In this category a basic bookkeeping function is performed. And with the selection of the "TIME REPORT" and the "SCORE REPORT", detailed breakdowns of the game times and scores may be obtained.

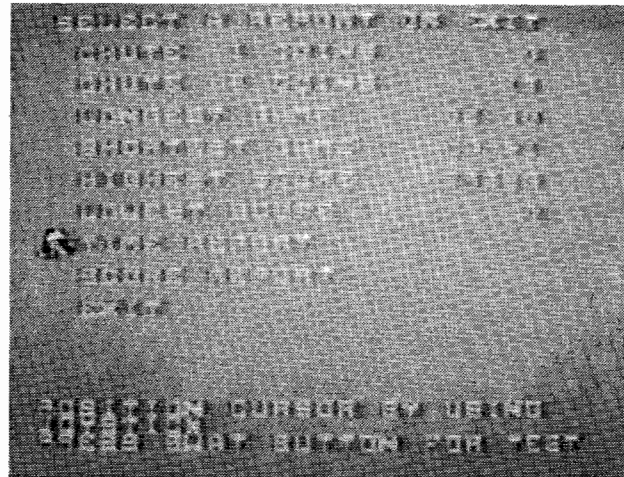


Figure 3-2c Self Test Mode — Bookkeeping

In the TIME REPORT and SCORE REPORT sections of the BOOKKEEPING mode, the game will give displays which look like those shown in Figure 3-2d and 3-2e respectively.

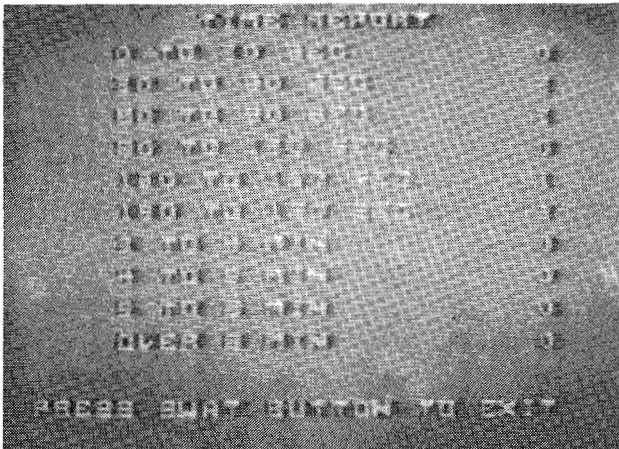


Figure 3-2d Self Test Mode — Time Report

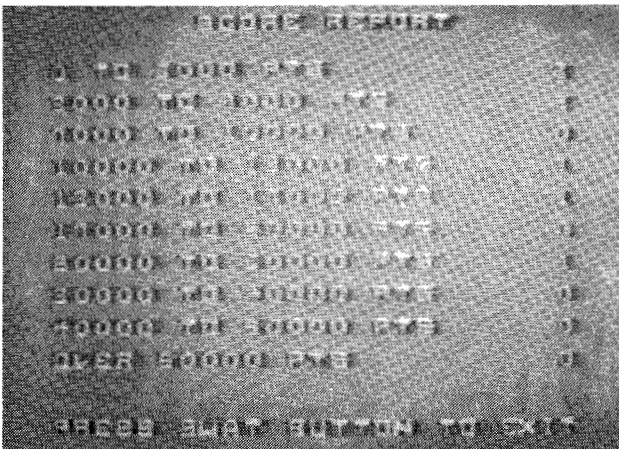
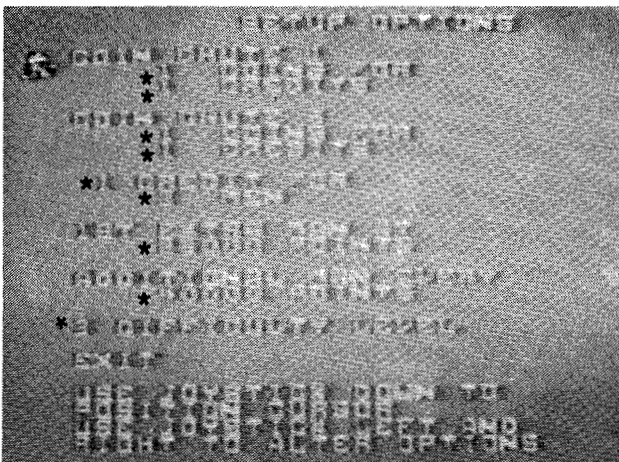


Figure 3-2e Self Test Mode — Score Report

During the SETUP OPTIONS section of the Self-Test mode, the game will give a display which looks like that shown in Figure 3-2f.



* = Factory recommended settings.

NOTE: You MUST hit the RUN BUTTON to EXIT this test.

Figure 3-2f Self Test Mode — Setup Options

- In this category, all common game options may be changed from the control console: coins per credit, credits per base, extra base(s) awarded at difficulty level --, and so on.

DIFFICULTY LEVEL EXPLANATION:

The Difficulty Level setting has a range of 1 to 9 with 1 representing the easiest level of play and 9 representing the most difficult level of play. Three is the factory recommended setting.

AWARD OF BONUS BASES EXPLANATION:

Bonus Bases are awarded to the player when he reaches or passes certain pre-selected point values. These are Owner/Operator selectable. As a starting point, the factory recommendation is 20,000 (first Man) and EVERY ADDITIONAL 20,000 (another additional Man).

During the CHANNEL TEST section of the Self-Test mode, the game will give a display which looks like that shown in Figure 3-2g.

- In this category, the game conducts a test of its SOUND SYSTEM.

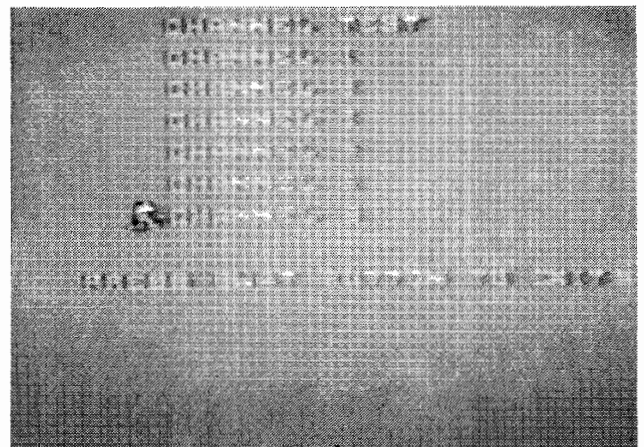


Figure 3-2g Self Test Mode — Channel Test

Once you enter the CHANNEL TEST section of the Self-Test mode, the game automatically tests Channels 1 through 6 giving a tone for each one as it checks it. After the 6th Channel is tested, the game automatically repeats the test until the RUN Button is hit. It then goes back to the Self-Test Mode Menu.

The "PRE-SET" category returns ALL information in the Bookkeeping mode to zero and sets all operator selected options back to factory recommended settings. This is accomplished by positioning the cursor in front of the "PRE-SET" category in the Self-Test Mode Menu and pressing the RUN Button.

During the GRID DISPLAY section of the Self-Test mode, the game shows a white cross hatch pattern on the monitor screen. This is for alignment and/or test purposes. This pattern will remain on the monitor screen until the RUN Button is hit. The game will then go back to the Self-Test Mode Menu.

To leave the Self-Test mode, simply slide the Self-Test switch to the "OFF" position at **ANY** time. The game will then run through the ROM/RAM test display after which normal game functions will return to the monitor screen.

CROSS HATCH PATTERN:

A cross hatch pattern is shown on the screen when power is first turned on to the game, when the TILT Switch is actuated, during the "SELF DIAGNOSTIC" portion of the Self-Test mode, and during the "GRID DISPLAY" portion of the Self-Test mode.

This pattern may be kept on the screen for adjustment purposes as described earlier.

When you are finished using the cross hatch pattern, simply hit the RUN Button to return to the Self-Test Mode Menu.

HARDWARE MASTER RESET SWITCH:

There are two of these little red switches, one on the Sound I/O Board and one on the CPU Board, located as shown in Figure 3-3.

The function of each of these switches — when pressed — is to make the game **THINK** it has **JUST** been turned on. They set up an "initial power-up" condition.

We **DO NOT** recommend that you indiscriminately press **EITHER** of these switches. They should **ONLY**

be used if there is a major problem encountered while testing the P.C. Boards.

ATTRACT MODE

1. The Attract mode starts:

- Just after power has been turned on to the game. (Self-Test switch is in the "OFF" position.)
- After a Self-Test has been completed and there are no more credits left in the game's memory.
- After a play has been finished, the score was not high enough to put the game into the High Score/Initial mode, and there are no more credits left in the game's memory.
- After the High Score/Initial mode when there are no more credits left in its memory.
- In the Attract mode, the game will give the following displays **centered** on the monitor screen:
 - No matter where the game is in the Attract mode sequence, it will immediately add the words "CREDIT 1 PRESS 1 PLAYER" or "CREDIT 2 PRESS 1 OR 2 PLAYER" (depending on how many coins have been inserted) to the bottom of each display of the Attract mode sequence.

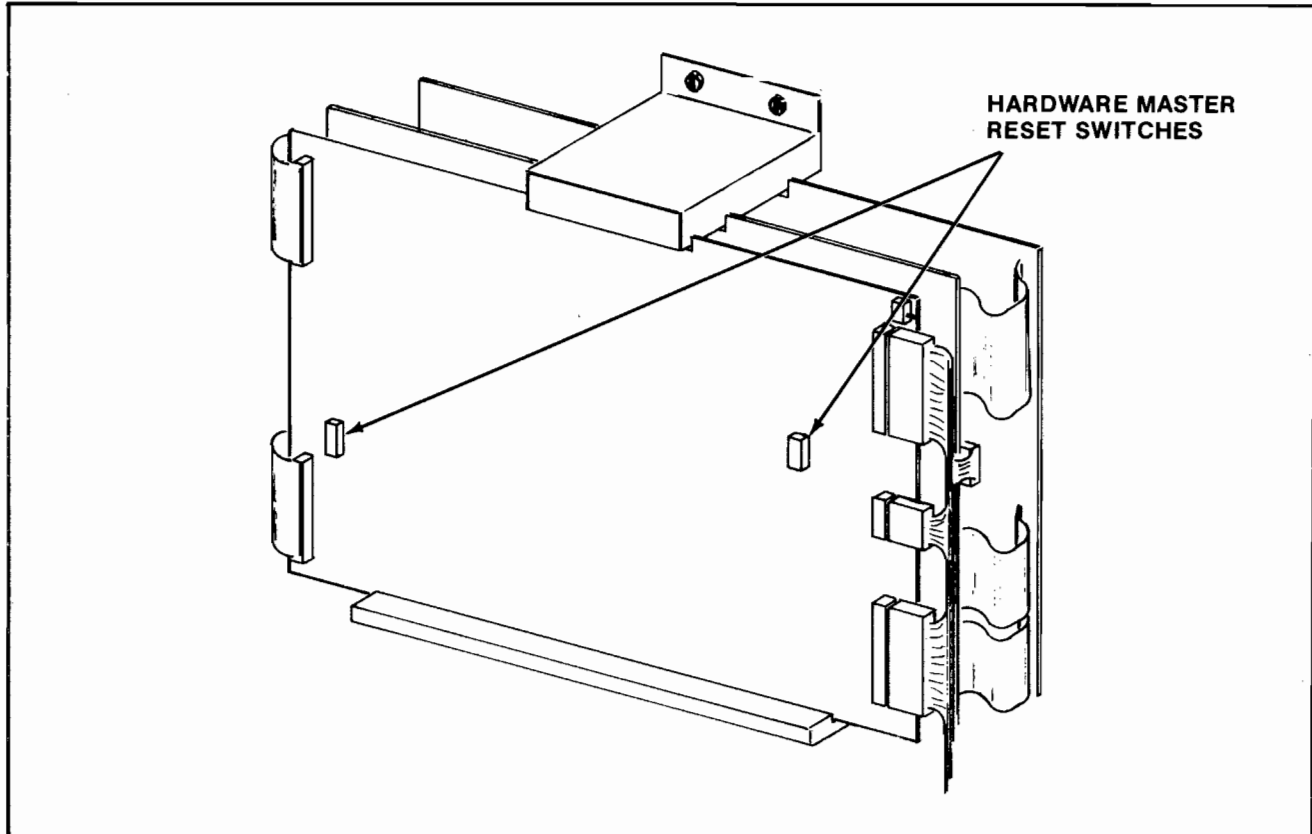
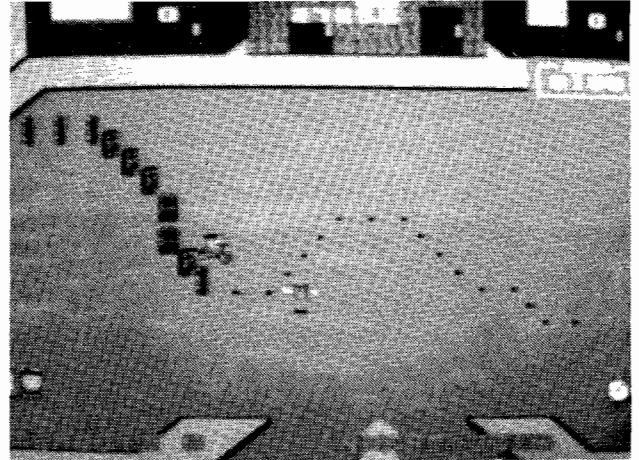


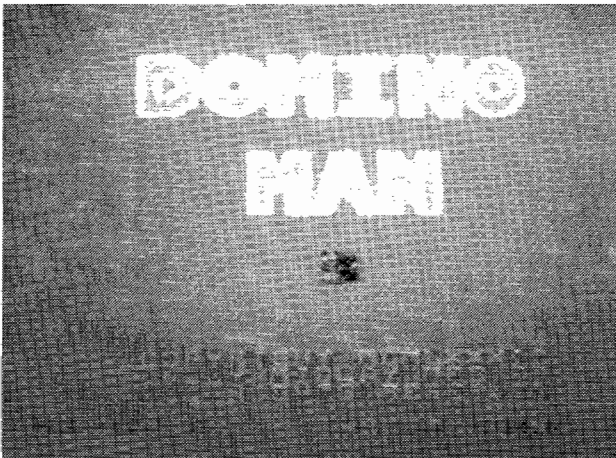
Figure 3-3 Location of Hardware Master Reset Switch



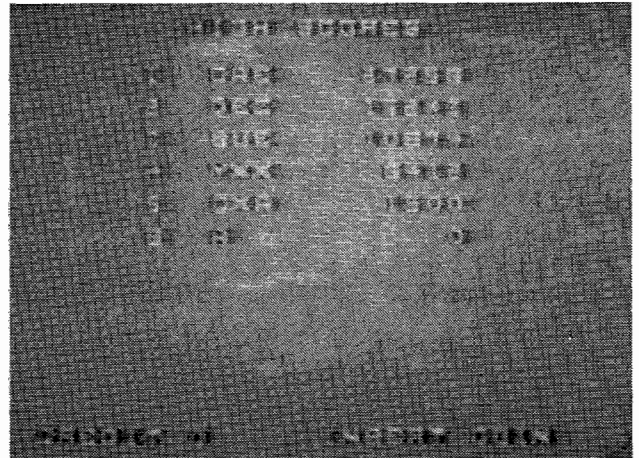
Attract Mode Display 1



Attract Mode Display 3



Attract Mode Display 2



Attract Mode Display 4

READY-TO-PLAY MODE

1. The Ready-To-Play mode starts when enough coins have been accepted for a 1 or a 2 player game. This display ("CREDIT 1 PRESS 1 PLAYER" or "CREDIT 2 PRESS 1 OR 2

PLAYER") will continue to be a part of each Attract mode display sequence until the "1 PLAYER" or "2 PLAYER" Button has been pressed.

2. In the Ready-To-Play mode, the game will give the following displays **centered** on the monitor screen.



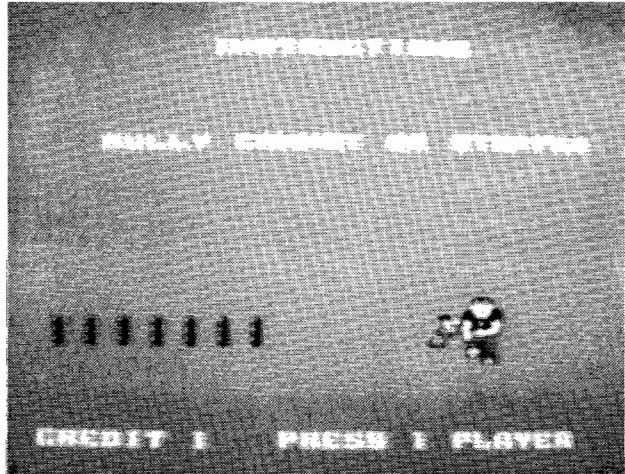
Ready-To-Play Mode Display 1



Ready-To-Play Mode Display 2



Ready-To-Play Mode Display 3



Ready-To-Play Mode Display 6



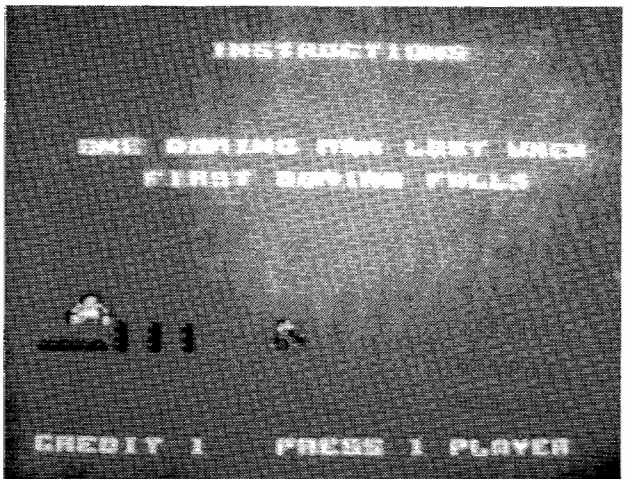
Ready-To-Play Mode Display 4



Ready-To-Play Mode Display 7



Ready-To-Play Mode Display 5



Ready-To-Play Mode Display 8

PLAY MODE

1. The Play mode begins when the 1 or the 2 PLAYER Button is pressed. When this happens, the first game scene is displayed on the monitor screen.
2. The Play mode ends when all the Dominos have been knocked over, the Clock knocks over the first Domino in the line that your DOMINO MAN has been placing, or when your last DOMINO MAN has been stung by the Bee.
3. **ON THE SCREEN:** The game is presented in phases. There are 3 racks to a phase. The 3 racks which compose a phase are arranged as follows: the FIRST RACK is a **street scene**, the SECOND RACK takes place on the **golf course**, and the THIRD RACK is in a **construction site**.

When playing this game, the Domino Man is under **YOUR** control. **YOU** make him move back and forth or up and down on the screen to place his Dominos, take them out of the Bully's way, and to move the other various people on the screen around to keep them from knocking down his row of Dominos.

At the beginning of each rack (in the TWO PLAYER games ONLY), the game tells which player is up **BEFORE** play begins.

The Rack Timer (the Alarm Clock) is also set at the beginning of each rack and after the loss of each DOMINO MAN.

Also indicated in each rack is the rack number you're playing, the number of players (1 or 2), and a running total of the players' score(s).

4. **PLAY BEGINS:** Your DOMINO MAN appears at the top center of the monitor screen.
5. **ALARM CLOCK:** The Alarm Clock (rack timer) appears at the upper right side of the monitor screen and starts its movement down the right side of the screen, across the bottom (to the left), and up the left side of the screen where it will knock over the first Domino in the line if you have not finished setting the last Domino in this rack by the time it gets there. **NOTHING** can affect it in **ANY** way.
6. **RACK BONUS:** This Bonus is linked with the Rack Timer. As the rack begins it is set at some value and counts **BACKWARD** as rack play continues. So, the faster your DOMINO MAN can get all his Dominos set in each rack, the higher will be his RACK BONUS.
7. **DOMINO DOT:** A black dot appears that you have to make DOMINO MAN get close to with his foot in order to place his Dominos. A message telling you to do this in order to place the Dominos also appears briefly on the screen about this time.
8. **MONEY BAG:** Several times during each rack, a Money Bag will appear at a random location on the

screen for a **short** period of time. If you run it over with your DOMINO MAN, you will be awarded the bonus points for this Money Bag. If it should disappear **BEFORE** you have the opportunity to run it over, it **WILL** reappear again **DURING** this particular rack.

The Money Bag bonus point values are displayed on the screen at the time they are run over.

9. **BEE:** The Bee in each rack will try to sting your DOMINO MAN. If it does, you will lose one DOMINO MAN. Whenever you are close to the Bee, DOMINO MAN can make it go away for a short time by pushing the SWAT Button and centering (or letting go of) the joy stick momentarily — which will cause him to swat the Bee with a Domino. The Bee will then go away for a few seconds and reappear again to chase your DOMINO MAN until he swats him again.
10. **BULLY:** He appears at random times and at random places along the top of the screen and walks toward the bottom of the screen. He is the **ONLY** on-screen participant that **CANNOT** be moved to the side. He just walks straight down toward the bottom of the screen. DOMINO MAN must remove any Dominos that are in his way. If he should touch them, he will cause the whole line to start falling. If DOMINO MAN can get ahead of the falling Dominos, he can remove one and thus **SAVE** the remainder from being knocked over.

Once any Dominos have been removed from the BULLY'S path, DOMINO MAN can jump up and down on his head to help him across the area where he would like to place his Dominos.
11. **OTHER ON-SCREEN PARTICIPANTS:** All your Domino Man wants to do is set up his Dominos. (This is accomplished by having him get his feet close to the BLACK dot.) However, all the other **ONSCREEN PARTICIPANTS** in each of the above three scenes are not very careful and will wander into his Dominos knocking them over if he does not keep changing their paths of travel for them. This makes his life rather hectic to say the least.
12. **(SAVE) RUN/SWAT BUTTON:** In order to have your Domino Man do anything other than just place Dominos, you must push the (SAVE) "RUN/SWAT BUTTON" when you want him to do it. For example: he cannot move or change the direction of travel of any of the other **ON-SCREEN PARTICIPANTS** in any way whatsoever **UNLESS** the (SAVE) RUN/SWAT BUTTON is depressed when he is trying to do this.

He must have the (SAVE) RUN/SWAT BUTTON pressed in order to: 1) run, 2) swat the Bee, 3) remove Dominos, and 4) move other On-Screen Participants.

13. **BONUS DOMINO MEN:** These are awarded when the player reaches or passes certain operator selected point values (see the "MACHINE SETUP" section of this manual for the individual point values at which each bonus DOMINO MAN can be awarded).
14. **PLAY ENDS:** The Play mode ends when all the Dominos have been knocked over, the Clock knocks over the first Domino in the line that your DOMINO MAN has been placing, or when your last DOMINO MAN is stung by the Bee.
15. **HIGH SCORE/INITIAL MODE:** If your score was high enough to become one of the ten best scores, the game will go into the High Score/Initial mode immediately after the above display. If your score is not high enough to cause the game to go into the High Score/Initial mode, it will either go to the Attract mode (if there are no more credits left in its memory) or into the Ready-To-Play mode (if there are still credits left in its memory). In the High Score/Initial mode the game gives a display which looks like the following.

By pulling the control stick toward you, you can make the displayed letter cycle through the alphabet: "A", "B", "C", "D", etc. By pushing the control stick away from you, you can make the displayed letter cycle through the alphabet in the other direction: "Z", "Y", "X", "W", etc.

When you reach your initial, release the control stick and push the RUN/SWAT Button. Your initial is frozen in place. If you do not wish to put your initials opposite your score, just press the RUN/SWAT Button three times. Three "A"'s will appear on-screen where your initials would have been entered.

After the High Score/Initial mode, the game will either go to the Attract mode (if there are no more

credits left in its memory) or into the Ready-To-Play mode (if there are still credits left in its memory).

16. Most of the above holds true in the "2 PLAYER" mode also. But there are a few minor differences.

TWO PLAYER OPERATION

The Upright, and Cocktail Table models both have two player operation.

In the two player mode, the rules of play are the same as in the single player mode. There are some additional rules, however.

1. In the Upright model, the players must take turns at the controls.
2. In the Cocktail Table model, each player has his own set of individual controls. The picture will flip to face you when it is your turn. (When it is not your turn, your set of controls will have **NO** effect on the game.)
3. Your turn lasts until your DOMINO MAN is stung by the Bee or until the first Domino in the row he is placing is knocked over. At this point, the game will do one of several things depending on whether or not the lost DOMINO MAN was your last or if you still have others remaining in reserve.

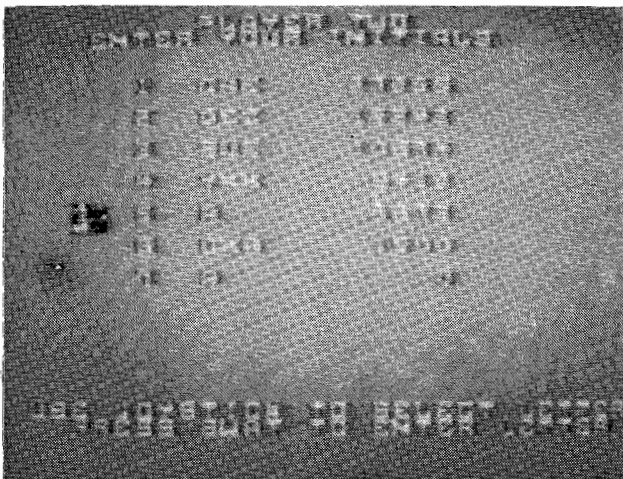
LOST DOMINO MAN — OTHERS REMAINING IN RESERVE

- The game stops and "PLAYER ____" is displayed on the Screen.
- Next, the other player's Scene and Domino pattern appear on the monitor screen and game play begins for the other player.

LOST DOMINO MAN — NO OTHERS REMAINING IN RESERVE

- Game displays: "GAME OVER" "PLAYER ____" on the monitor screen.
After this, "PLAYER ____" is displayed, the other player's Scene and Domino pattern appear on the monitor screen and game play begins for the other player.
- After the last player has finished his game, if either or both of the scores were high enough, it goes to the "HIGH SCORE/INITIAL" mode. The player(s) that attained the high score(s) is indicated by display if "1" (for PLAYER NUMBER ONE) or a "2" (for PLAYER NUMBER TWO) out to the left side of the high score(s) indicated on the screen in this mode.

If your score(s) were **NOT** high enough to cause the game to go into the "HIGH SCORE/INITIAL" mode, the game will either go to the Attract mode (if there are no more credits left in its memory) or into the Ready-To-Play mode (if there are still credits left in its memory).



High Score Initial Mode Display

IV. Maintenance and Repair

Your **NEW** game needs certain types of maintenance to keep it in good working order. **CLEAN**, well **MAINTAINED** games **attract players** and **EARN MORE PROFITS**.

The most important thing for you to remember is to run the Self-Test **EVERY TIME** you collect money from the coin box. **JUST LOOKING** at your game **WILL NOT** tell you if all its controls and inside parts are working correctly. The Self-Test will inform you whether or not your game is working the way it should.

The second most important thing you should remember is to clean the outside of the game and coin acceptor mechanisms on a regular basis.

CLEANING

The outside of the game cabinet plus the metal can be cleaned with any non-abrasive household cleaner. However, the front of the T.V. monitor tube and **both sides** of all other glass and plastic on or in the game **MUST** be cleaned with anti-static cleaner **ONLY**. For cleaning the coin acceptors: hot soapy water may be used on the plastic ones and any household cleanser may be used on the metal ones. If you wish, special coin machine cleaners that leave no residue may be purchased from your distributor.

DO NOT dry-wipe any of the plastic panels. This is because any dust that was on them can scratch their

surfaces. If this has happened, anyone looking through this type of damaged plastic would feel he was looking at the game through a fog. This fogging damage **CANNOT** be repaired or reversed. The **ONLY** solution is to **replace** the damaged piece of plastic.

FUSE REPLACEMENT

This game contains several fuses located as shown in Figure 4-1.

1. UPRIGHT MODEL:

As viewed from the back, facing the cabinet, with the rear access door removed; the fuses are located on the Power Chassis and the Power Supply Board.

2. COCKTAIL TABLE MODEL:

As viewed from the coin door side of the cabinet, with the monitor tilted open to one side; the fuses are located on the Power Chassis and the Power Supply Board.

Replace fuses **ONLY** with the type and size listed in the Illustrated Parts Breakdown Section of this manual.

See the T.V. Monitor Manual (available on request from your distributor or the monitor manufacturer) and/or the T.V. Troubleshooting Section of this manual for information on these fuses.

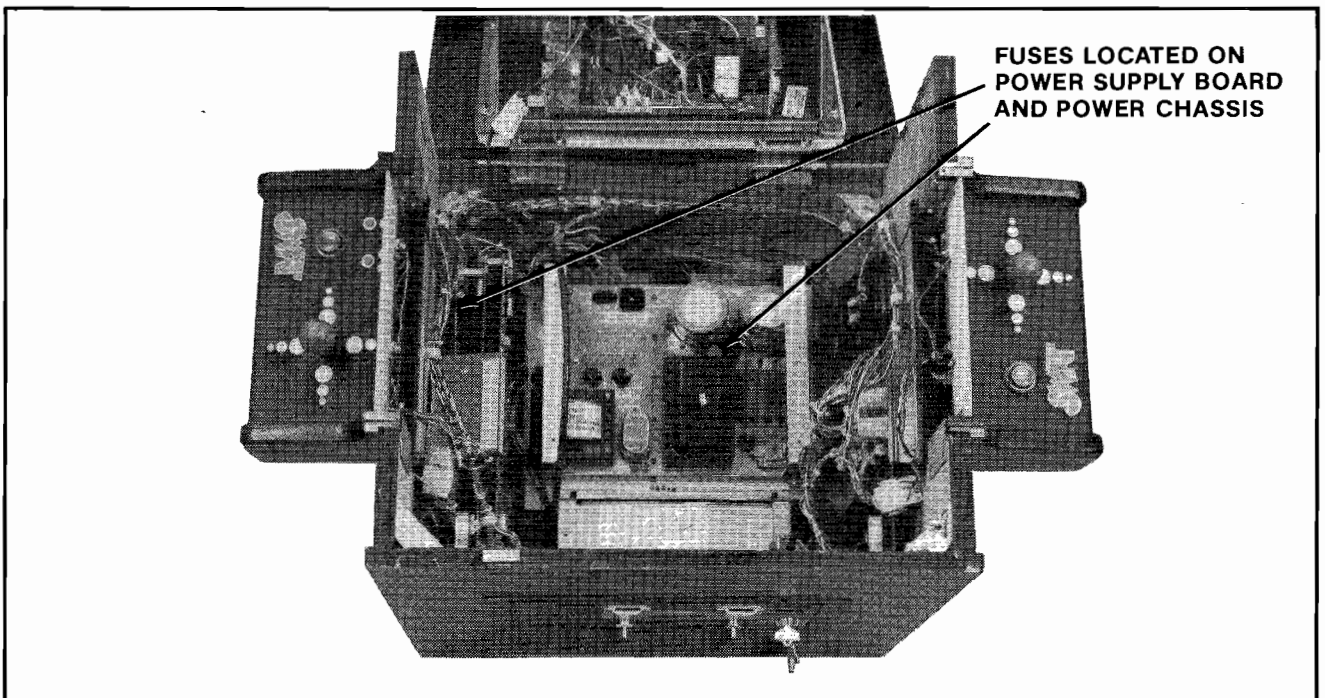


Figure 4-1 Location of Fuses

OPENING THE CONTROL PANEL See Figure 4-2.

1. UPRIGHT MODEL: See Figure 4-2.

- The control panel is held in place by two latches, one on the left side and one on the right side of the cabinet. They are spring loaded to provide constant positive pressure on their latch plates. They can be reached through the coin door **AFTER turning power to the game off.** To release the latches, lift up and toward the front center of the control panel. Once they are released, unhook them from their latch plates.
- 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. The control panel is now free and can be removed.
- To reinstall the control panel, reverse this procedure.

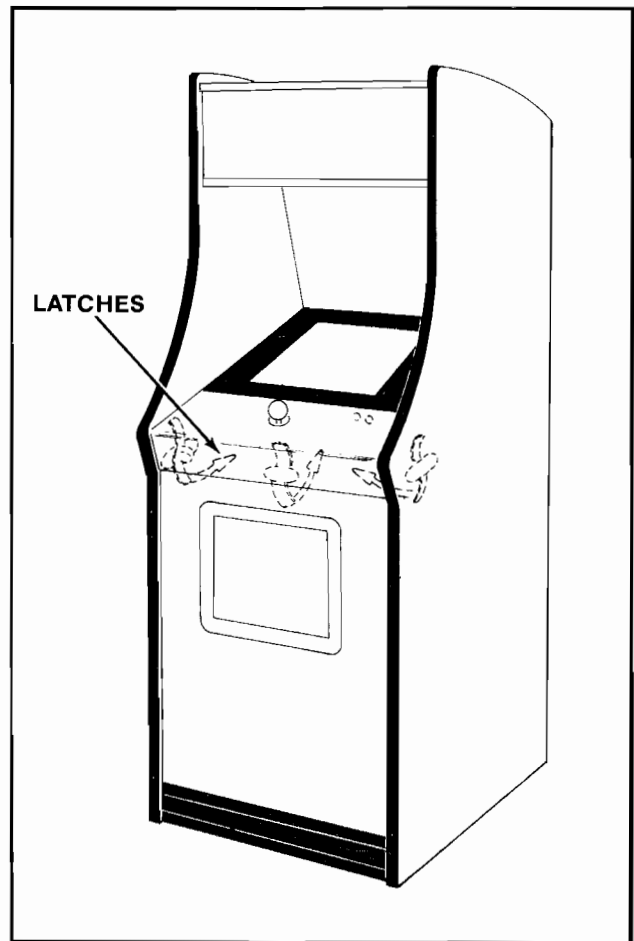


Figure 4-2 Opening the Control Panel — Upright

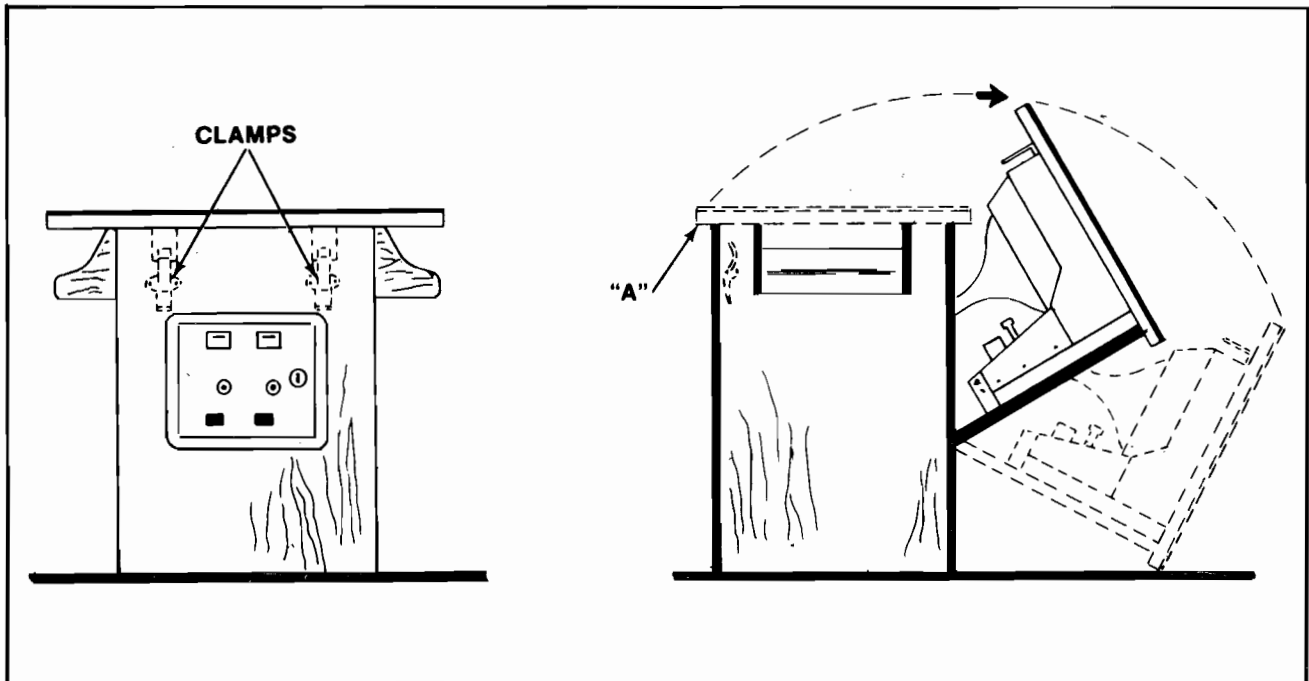


Figure 4-3 Opening the Cocktail Game

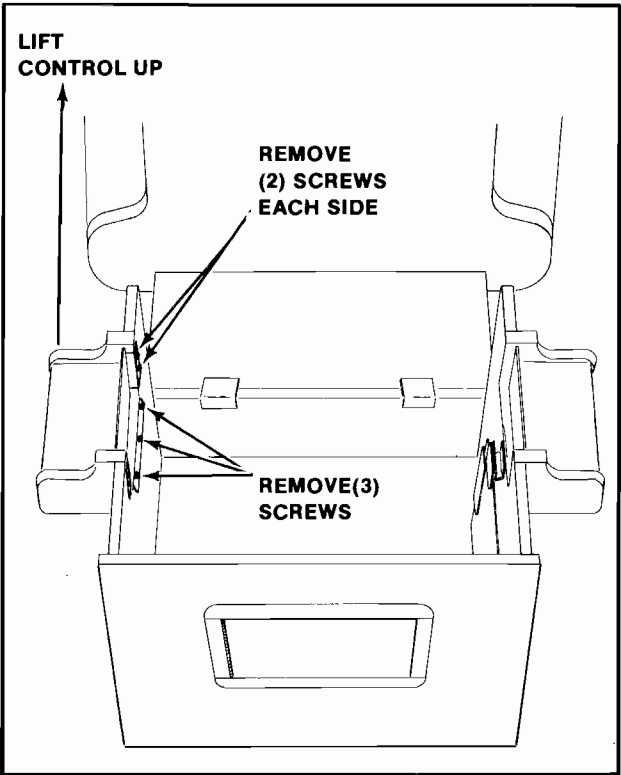


Figure 4-4 Removing the Control Panel — Cocktail

2. COCKTAIL TABLE MODEL: See Figure 4-4.

- Each control panel is held in place by several screws, two on the inside of the cabinet and three along the outside bottom edge of the control panel.

Turn power to the game off.

Open the coin box door and release the two latches indicated in Figure 4-3.

CAUTION: The right hand latch is very close to the HIGH VOLTAGE on the monitor. BE CAREFUL!!

Once they're released, unhook them from their latch plates.

Grasp the table top at "A" and open it as indicated in Figure 4-3.

CAUTION: Due to the weight of the monitor, EXTREME CARE MUST be taken when opening the cabinet.

Remove the screws which secure the control panel in place. See Figure 4-4.

- To remove the control panel(s):
Disconnect it from its cabling.
The control panel is now free and can be removed.
- To reinstall the control panel, reverse this procedure.

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

1. UPRIGHT MODEL: See Figure 4-5.

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 lifted up.
- By putting your finger in the hole in the middle of the main-display-glass support, you can lift it up and out. See Figure 4-5.
- Loosen the screws which secure the T.V. bezel-glass-clamps in place.
Move the clamps to the side and the bezel glass may be removed.
Remove the above mentioned screws and the bezel with four bezel-glass-clamps may be removed.
- To reinstall the T.V. bezel assembly and the main-display-glass, reverse this procedure.

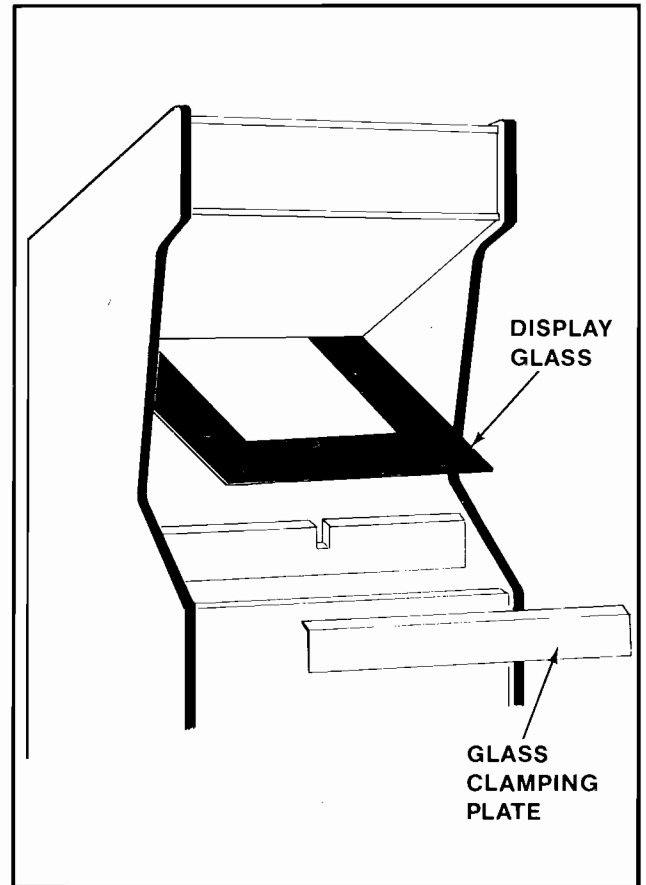


Figure 4-5 Removal of Main Display Glass & T.V. Bezel — Upright

2. COCKTAIL TABLE MODEL: See Figure 4-6.

NOTE: This may be done with the table top in the closed or the open position. If you decide to open the table top, **TURN THE POWER TO THE GAME OFF FIRST.**

- Remove the screws which secure the table top glass clamps in place.
- Remove the table top glass.
- The bezel may now be removed.
- To reinstall the T.V. bezel and the table top glass, simply reverse this procedure.

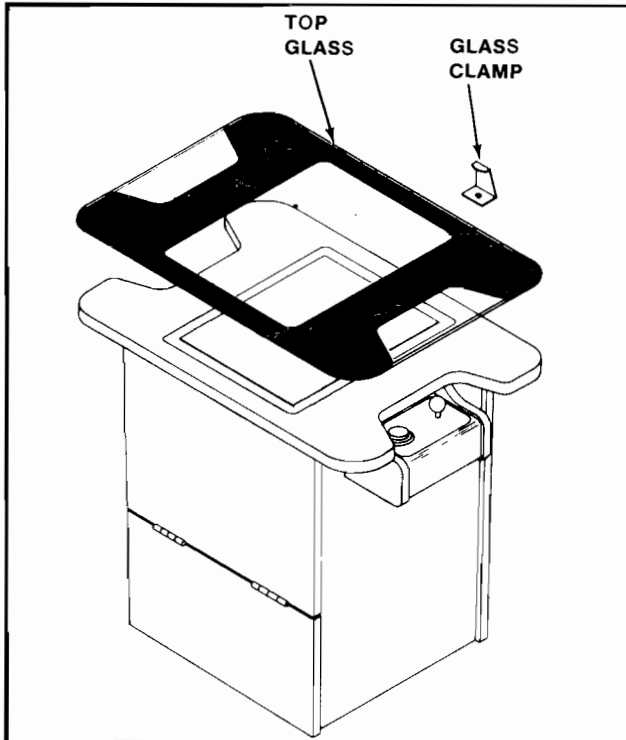


Figure 4-6 Removing Top Glass — Cocktail

T.V. MONITOR REPLACEMENT

CAUTION: High voltages may exist in any television unit, even with the power disconnected. Use **EXTREME CAUTION** and do not touch electrical parts or the T.V. yoke area with your hands or with metal objects held in your hands!

In addition, **BE SURE TO USE HEAVY GLOVES** when handling the monitor. You could cut your hands on the metal T.V. chassis without such protection.

DANGER: The T.V. monitor **DOES NOT** contain an isolation transformer on its chassis (it is mounted instead on the floor of the cabinet). When servicing the monitor on a test bench, **YOU MUST ISOLATE THE MONITOR FROM AC VOLTAGE WITH AN ISOLATION TRANSFORMER.**

1. UPRIGHT MODEL: See Figure 4-7.

- Turn power off to the game.**
- Open the rear access door.
- Completely disconnect the T.V. monitor from all its cabling. **DON'T FORGET THE CHASSIS GROUND WIRE.**
Before removing the T.V. monitor, the main-display-glass **MUST** be removed. See above "Upright Model" procedure.
- With the removal of only four bolts, the T.V. monitor will be loose.

CAUTION: BE SURE to support the T.V. monitor from the rear while removing the four bolts so it will not fall out of the cabinet.

- The monitor mounting channels slide on top of and against two metal guides mounted to the cabinet's right and left sides. The monitor is removed by sliding it out the back of the cabinet.
- To reinstall the T.V. monitor, reverse this procedure.
- After replacing the T.V. monitor, be sure to run the game Self-Test.

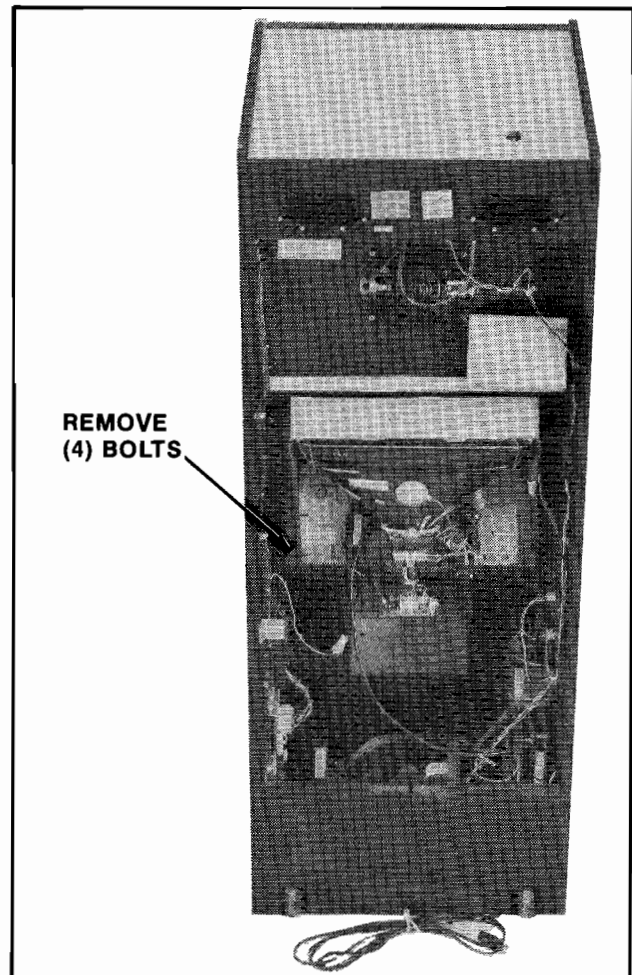


Figure 4-7 Removing Monitor — Upright

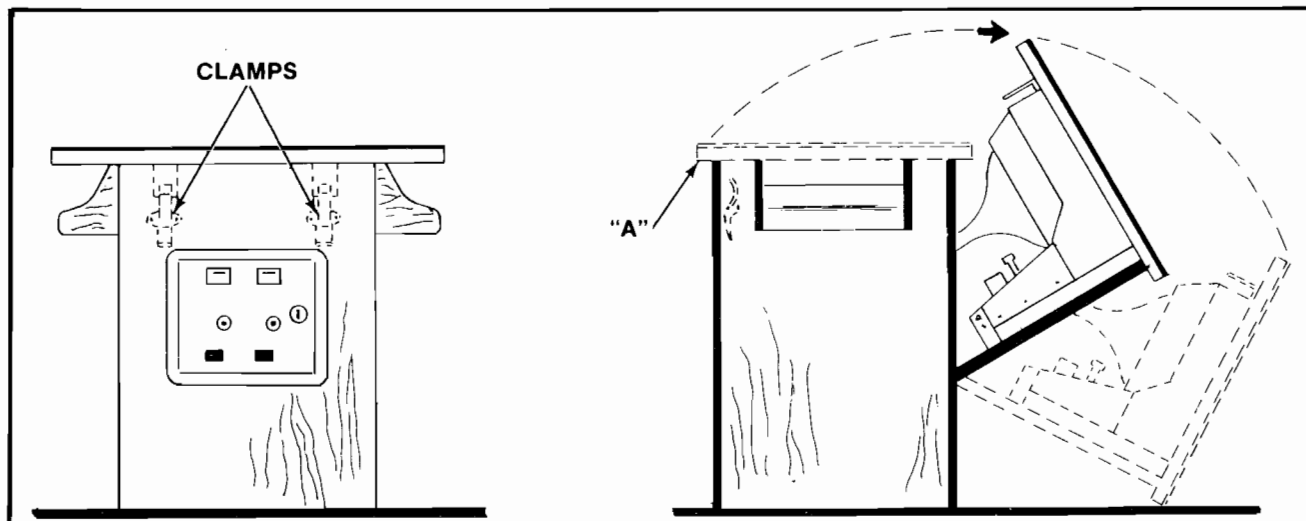


Figure 4-8 Opening the Cocktail Game

2. COCKTAIL TABLE MODEL: See Figure 4-9.

- Turn the power off to the game.
- Open the coin box door and release the two latches indicated in Figure 4-8.

CAUTION: The right hand latch is very close to the HIGH VOLTAGE on the monitor. BE CAREFUL!!

Once the latches are released, unhook them from their latch plates.

- Grasp the table top at "A" and open it as indicated in Figure 4-8.

CAUTION: Due to the weight of the monitor, EXTREME CARE MUST be taken when opening the cabinet.

- Remove the screws which hold the table top glass clamps in place.
- Remove the table top glass.
- Lift out the T.V. bezel assembly.
- Completely disconnect the T.V. monitor from all its cabling. **DON'T FORGET THE CHASSIS GROUND WIRE.**
- Remove the screws holding the T.V. monitor chassis to the "L" brackets by the door hinge(s). See Figure 4-9.
- Close the Cocktail Table and re-latch it.
- Remove the screws which secure the T.V. monitor mounting brackets to the edges of the slot cut in the table top. See Figure 4-9.
- Pry up the end of each monitor mounting bracket with a screwdriver or similar tool until you can grasp them both.

- Lift the T.V. monitor straight up and out of the table top being very careful not to bump the neck of the picture tube.
- To reinstall the T.V. monitor assembly, reverse this procedure.
Be sure to check the clearance of the "L" brackets BEFORE setting the monitor into the table top.
- After replacing the T.V. monitor, be sure to run the game Self-Test.

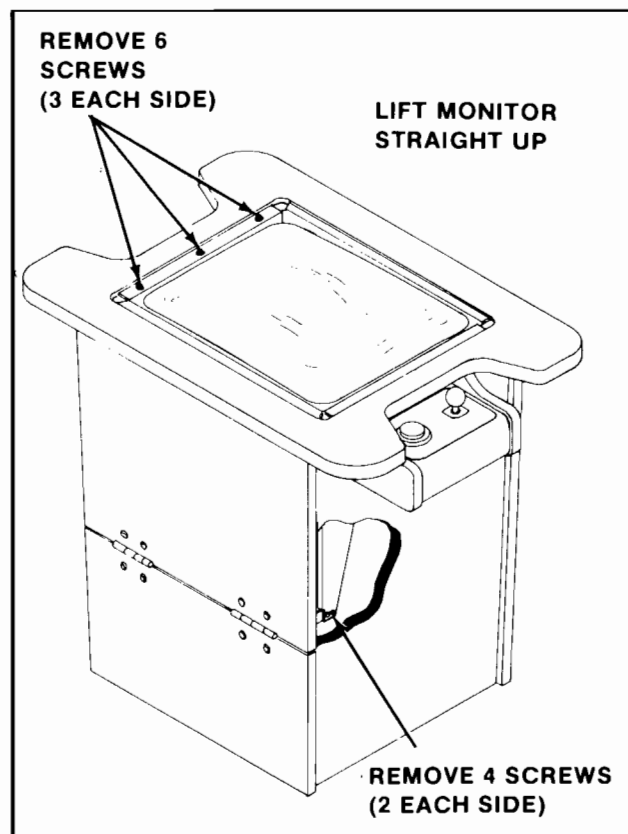


Figure 4-9 Removing Monitor — Cocktail

PRINTED CIRCUIT BOARD (P.C.B.) REPLACEMENT

1. UPRIGHT MODEL: See Figure 4-10.

- Turn the power to the game off.
- Unlock and open the rear access door.
- Disconnect all cabling from the P.C. boards and lift them out of their card rack.
- Disconnect the linear power supply board from all its cabling, remove the P.C.B. supports indicated in Figure 4-10 and slide the linear power supply board out the back of the cabinet.
- To reinstall the above P.C.B.'s, reverse this procedure.

NOTE: P.C.B.'s are all keyed and will **ONLY** fit into their connectors one way without forcing them. The plugs on the cable harness which connect it to the P.C.B.'s are also keyed and will **ONLY** go onto their connectors one way without forcing them.

2. COCKTAIL TABLE MODEL: See Figure 4-11.

- Turn the power off to the game.
- Open the cabinet:
Open the coin box door and release the two latches indicated in Figure 4-8.

CAUTION: The right hand latch is very close to the HIGH VOLTAGE on the monitor. BE CAREFUL!!

Once they're released, unhook them from their latch plates.

- Grasp the table top at "A" and open it as indicated in Figure 4-8.

CAUTION: Due to the weight of the monitor, EXTREME CARE MUST be taken when opening the cabinet.

- Remove the linear power supply board. See Figure 4-11.
Disconnect it from all its cabling.
Remove the two smallest P.C.B. supports.
Once these are removed, the linear power supply can be lifted out the top of the cabinet.
To reinstall the linear power supply board, reverse this procedure.
- To remove the P.C. boards from the card rack. See Figure 4-11.
Disconnect them from ALL their cabling.
The P.C. boards are now free and can be slid from their rack.
To reinstall the P.C. boards, reverse this procedure.

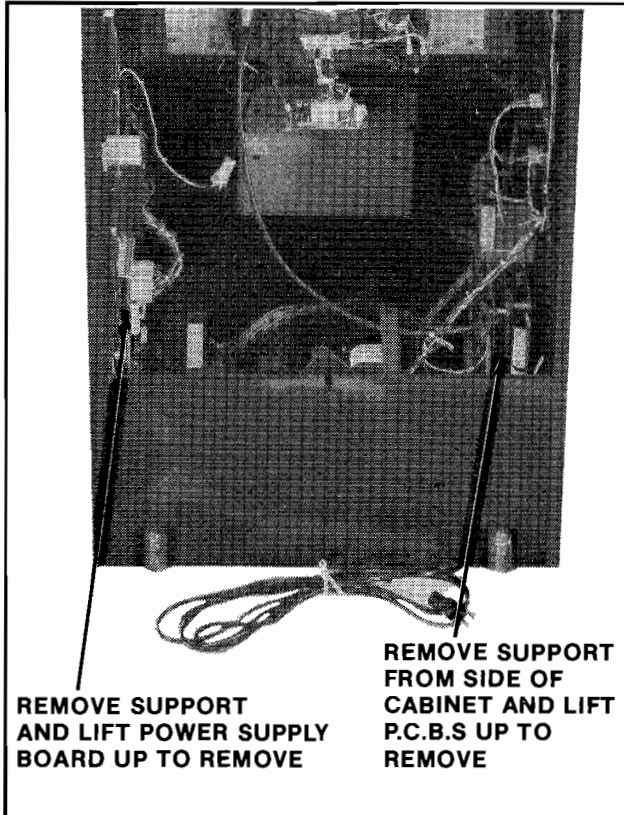


Figure 4-10 Replacing P.C.B.s — Upright

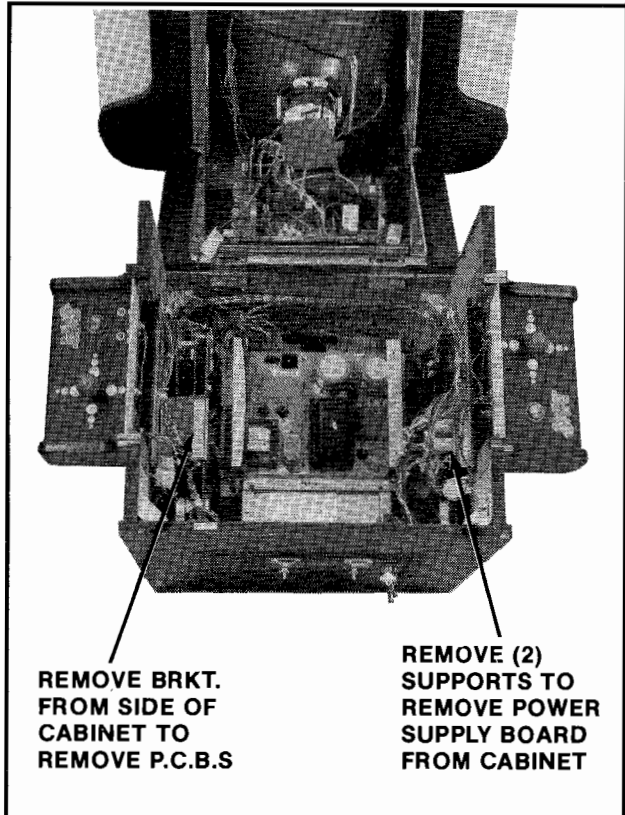


Figure 4-11 Replacing P.C.B.s — Cocktail

OPENING THE ATTRACTION PANEL

1. UPRIGHT MODEL:

- Turn the power to the game off.
- Opening the attraction panel:
Remove the screws which secure the top bracket in place. (They are on its top side.) See Figure 4-12.
Remove the top bracket and slide up the attraction panel. This exposes the speakers, the fluorescent light tube, and its mounting bracket assembly.
To reinstall the attraction panel, reverse this procedure.
- The fluorescent light tube may be replaced at this time. BE CAREFUL NOT TO DROP IT.

WARNING: If you drop a fluorescent tube and it breaks, IT WILL IMplode! Shattered glass can fly six (6) feet or more from the implosion. Use care when replacing any fluorescent tube.

- Replacing the fluorescent tube starter. See Figure 4-13.
Be sure the power to the game has been turned off.
Grasp the starter (it is on the back of the mounting bracket), give it a quarter turn, and remove it from its socket.
To replace the fluorescent light tube starter, reverse this procedure.
- Replacement of the fluorescent tube mounting bracket assembly.
Be sure the power is off to the game.
Disconnect it from its power cable.
Remove the screws at its right and left hand sides which secure it and gently slide it out the front of the cabinet, being careful not to catch its power cable on anything.
To reinstall the fluorescent tube mounting bracket assembly, reverse this procedure.

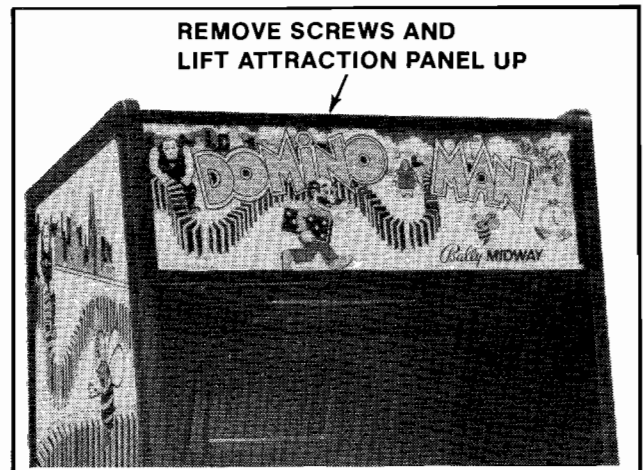


Figure 4-12 Opening the Attraction Panel — Upright

- Replacing the speaker.
Be sure the power is off to the game.
Remove the attraction panel and disconnect the speaker from its cabling.
Remove the nuts and bolts which secure the speaker and speaker grill in place and set them and the speaker grill aside.
Once the bolts which secure the speaker in place are removed, the speaker may be removed through the opening where the attraction panel was.
Reverse this procedure to reinstall the speaker.
- To replace the speaker.
Be sure the power is off to the game.
Disconnect the speaker from its cabling.
Remove the nuts and bolts securing the speaker.
Slide the speaker out through the rear access door.
To reinstall the speaker, simply reverse this procedure.

2. THE COCKTAIL TABLE MODEL HAS NO BACK-LIT ATTRACTION PANEL.

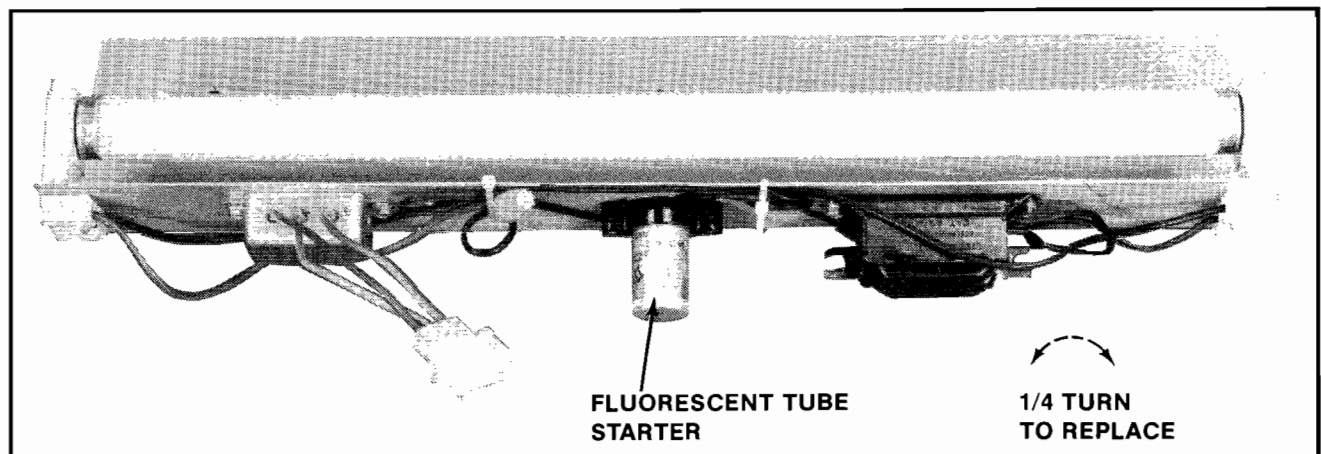
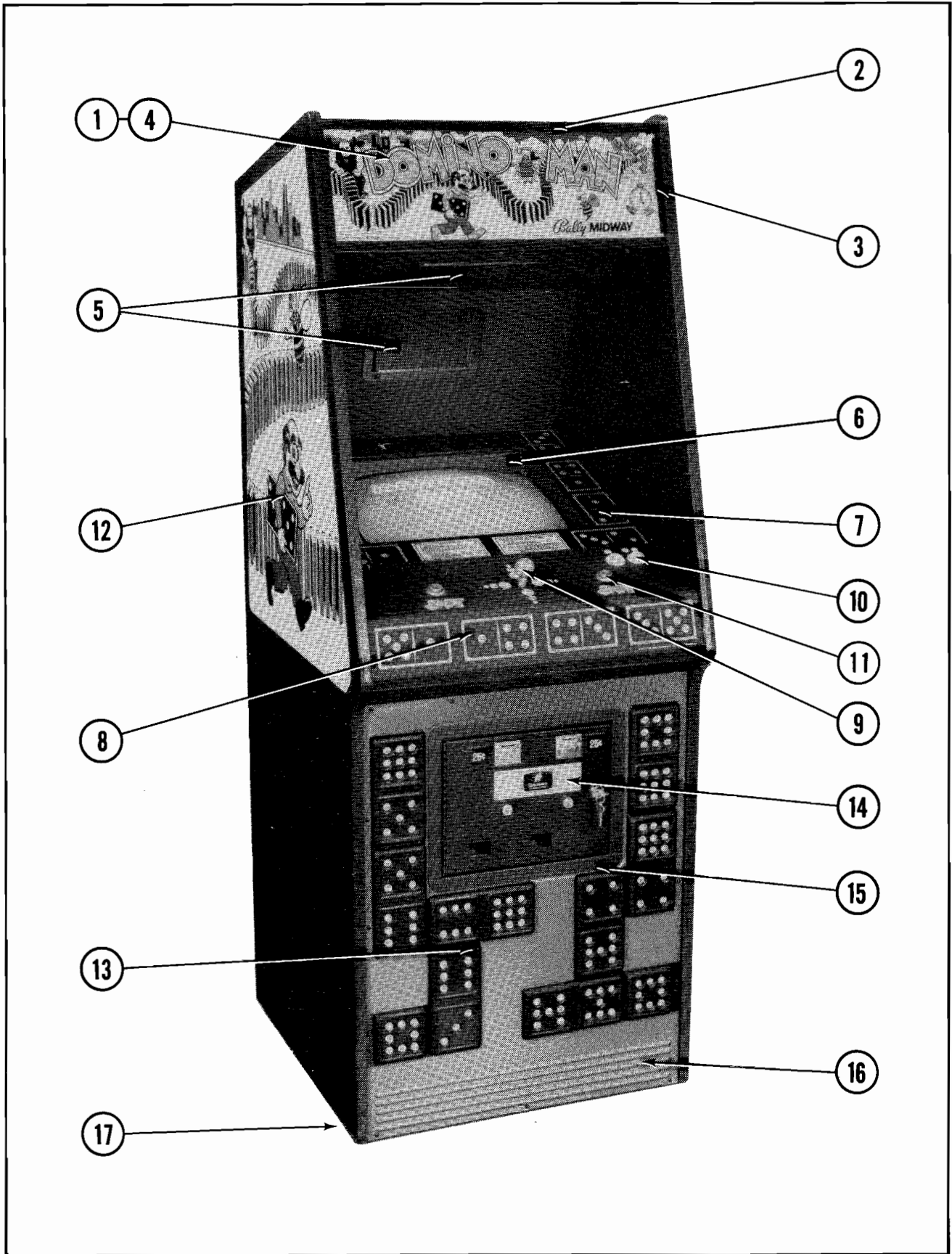


Figure 4-13 Replacing Fluorescent Tube Starter — Upright

V Illustrated Parts Breakdown

NO. 303 — DOMINO MAN — UPRIGHT — FRONT

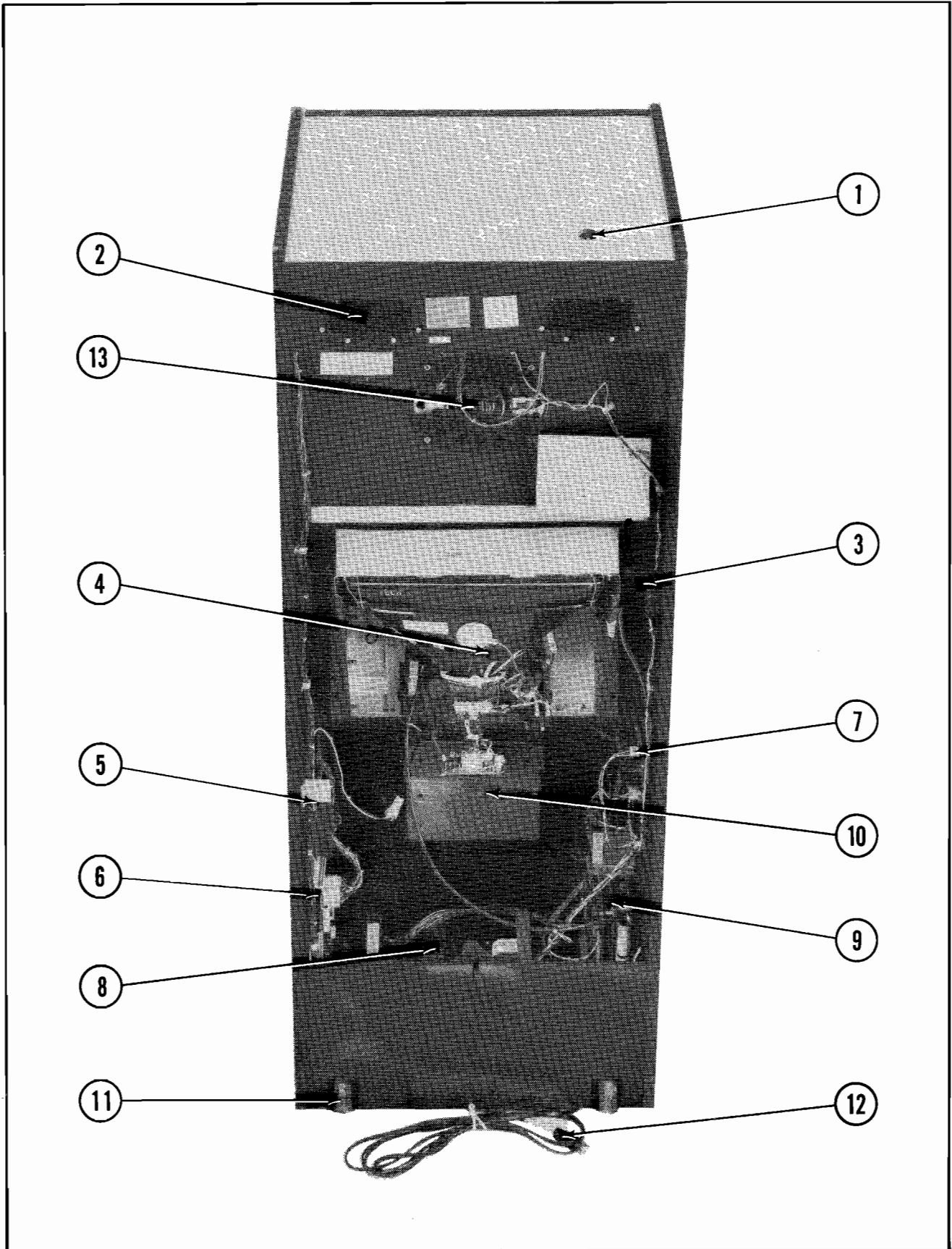


NO. 303 — DOMINO MAN — UPRIGHT — FRONT — PARTS LIST

ORDER BY PART NUMBER ONLY

ITEM	PART NO.	DESCRIPTION
1	0303-00902-00XF	DECORATIVE HEADER PLEXI
2	0574-00903-0100	HEADER BRKT. RETAINER (2 REQ'D.)
	0017-00101-0138	#8 x 5/8 TORX TAMPER RESISTANT SCREW (8 REQ'D)
	0017-00009-0522	LONG ARM KEY T-20 (FOR ABOVE SCREW)
3	0537-00903-0058	GLASS CHANNEL — 6-15/16" LG. (2 REQ'D.)
4	A595-00011-0000	HEADER LIGHT ASSY. — FLUORESCENT
5	0017-00009-0393	BLACK SPEAKER GRILL W/SLOTS (2 REQ'D.)
	0017-00003-0430	6" x 9" SPEAKER — 4 OHM, 10W. (2 REQ'D.)
	0017-00101-0127	#8-32 x 1-1/2 CARRIAGE BOLT (8 REQ'D.)
	0017-00103-0061	#8-32 HEX NUT W/SEMS (8 REQ'D.)
6	0508-00900-0000	19" T.V. BEZEL
	0508-00106-0000	BEZEL MTG. BRKT. (2 REQ'D.)
7	0303-00903-00XF	MAIN VIEWING GLASS
	0508-00108-0000	GLASS STOP BRKT.
	0017-00101-0014	#8 x 1/2 SLT. HEX HD. SCR. (4 REQ'D.)
8	0303-00900-0000	DECORATIVE CONTROL SHELF OVERLAY
	A303-00012-0000	CONTROL SHELF PLATE ASSY. W/STRIKES
	0941-00103-0100	CONTROL SHELF MTG. BRKT. — RIGHT
	0941-00103-0200	CONTROL SHELF MTG. BRKT. — LEFT
	0555-00901-0000	PLASTIC LOCATING PIN (4 REQ'D.)
	0017-00009-0534	LATCH CLAMP (3 REQ'D.)
	0017-00101-0141	#8 x 11/16 UNSLOT. HEX HD. SCR. (6 REQ'D.)
9	A982-00017-0000	CONTROL ASSEMBLY
	A303-00010-0000	CONTROL SHELF CABLE ASSY.
10	0017-00042-0260	PUSH BUTTON ASSY. — WHITE (2 REQ'D.)
11	0017-00042-0261	PUSH BUTTON ASSY. — GREEN (2 REQ'D.)
	0017-00032-0093	PUSH BUTTON SWITCH W/HOLDER (4 REQ'D.)
	0017-00103-0054	5/8-11 PAL NUT (4 REQ'D.)
12	0303-00906-0100	DECAL — LEFT
	0303-00906-0200	DECAL — RIGHT (NOT SEEN)
13	0303-00901-00XF	FORMED OVERLAY
14	A090-00300-11BK	U.S.A. 25¢ DOUBLE COIN DOOR
	A982-00015-0000	COIN DOOR CABLE ASSY.
15	0090-00002-04BK	LARGE COIN DOOR FRAME
	0017-00101-0121	#6-32 x 5/16 PHIL. TRS. HD. SCR. (3 REQ'D.) (MOUNTS COIN DOOR TO FRAME)
16	0935-00906-0100	KICK PLATE — 23" LG. (NOT SHOWN)
17	0017-00102-0048	3/8-16 x 2" LEG LEVELERS (4 REQ'D.)
	0017-00103-0026	3/8-16 LEG LEVELERS HEX NUTS (4 REQ'D.)

NO. 303 — DOMINO MAN — UPRIGHT — REAR ACCESS



NO. 303 — DOMINO MAN — UPRIGHT — REAR ACCESS — PARTS LIST

ORDER BY PART NUMBER ONLY

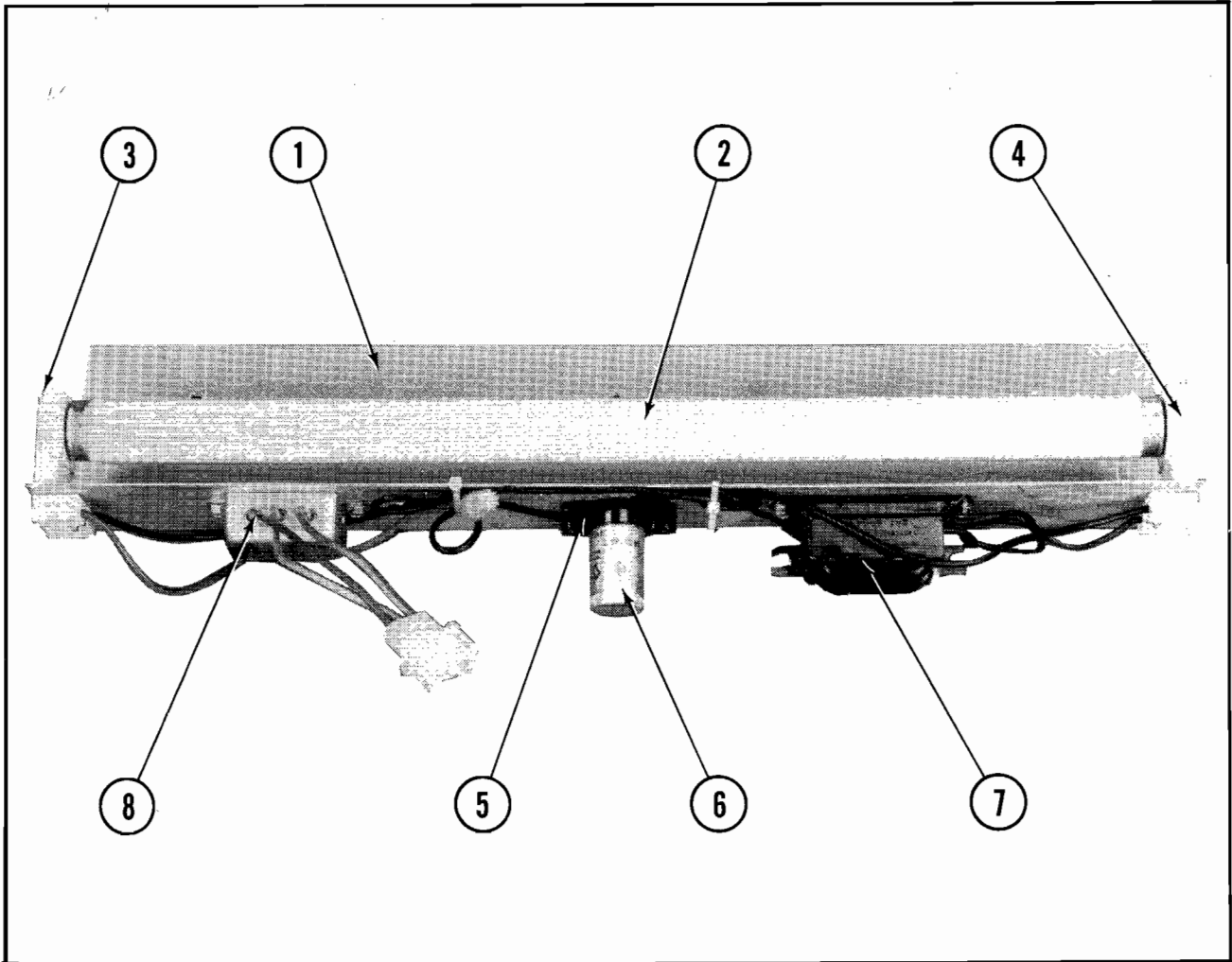
ITEM	PART NO.	DESCRIPTION
1	A088-00013-0000	ON-OFF SWITCH & BRKT. ASSY.
2	0894-00916-0000	PLASTIC PULL & VENT (2 REQ'D.)
	0017-00101-0141	#8 x 11/16 UNSLOT. HEX HD. M.S. (8 REQ'D.)
3	0636-00101-0000	MONITOR RAIL (2 REQ'D.)
	0017-00102-0002	1/4-20 x 1/2 SLT. HEX HD. BOLT (4 REQ'D.)
	0017-00104-0014	7/8" DISH WASHER (4 REQ'D.)
4	0017-00003-0339	ELECTROHOME — 19" COLOR DUAL SYNC. HORIZ. MTG. MONITOR (OR)
4	0017-00003-0439	WELLS-GARDNER — 19" COLOR DUAL SYNC. HORIZ. MTG. MONITOR
5	A088-00016-0000	INTERLOCK SWITCH & SPRING BRKT. ASSY.
6	A082-90412-D000	POWER SUPPLY P.C. BRD. ASSY.
	0624-00902-0200	P.C. SUPPORT BRKT. — 10" LG. (2 REQ'D.)
	0624-00902-0500	P.C. SUPPORT BRKT. — 6-1/2" LG. (2 REQ'D.)
	0017-00101-0141	#8 x 11/16 UNSLOT. HEX HD. SCR. (7 REQ'D.)
	0017-00104-0037	#8 WASHER (7 REQ'D.)
7	A082-90910-E000	DUAL POWER AMP P.C. ASSY.
	0017-00042-0014	1/8" SNAP BUSHING (4 REQ'D.)
	0017-00101-0751	#5-40 x 1/4 PHIL. RND. HD. M.S. (4 REQ'D.)
8	A945-00020-0000	POWER CHASSIS ASSY. — 125VA., 115V.
9	A303-00011-0000	CARD RACK W/BOARDS ASSY.
	A082-90010-F000	C.P.U. P.C. BOARD ASSY.
	A082-90913-F000	SOUND P.C. BOARD ASSY.
	A082-91399-H000	VIDEO GENERATOR P.C. BOARD ASSY.
	0017-00042-0208	1-1/8" P.C.B. SUPPORT (4 REQ'D.)
	0017-00042-0253	DUAL LKG. P.C.B. SPACER (4 REQ'D.)
	0017-00101-0085	#6 x 5/16 SLT. HEX HD. SCR. (4 REQ'D.)
10	A950-00004-0000	COIN BOX ASSY.
	A950-00006-0000	COIN BOX CRADLE ASSY.
	0950-00105-0000	COIN BOX COVER
	0950-00104-0000	COIN BOX HANDLE
	0950-00101-0000	COIN DEFLECTOR (2 REQ'D.)
	0950-00900-0000	LARGE PLASTIC CASH BOX
	0017-00101-0142	1/4-20 x 1-3/8 BLACK RND. HD. BOLT (4 REQ'D.)
	0017-00104-0014	7/8" DISH WASHER (4 REQ'D.)
	0017-00103-0018	1/4-20 HEX NUT (4 REQ'D.)
11	A961-00007-0000	CASTER ASSY. (2 REQ'D.)
	0961-00109-0000	WHEEL BRKT. (2 REQ'D.)
	0017-00042-0255	PLASTIC WHEEL (2 REQ'D.)
	0894-00702-00XF	SHAFT (2 REQ'D.)
	0017-00100-0037	3/8" E-RING (2 REQ'D.)
12	A945-00019-0000	LINE CORD ASSY. — 115V.
13	0017-00003-0430	6" x 9" SPEAKER — 4 OHM, 10W. (2 REQ'D.)

NO. 303 — DOMINO MAN — UPRIGHT — REAR ACCESS — PARTS LIST (Continued)

ORDER BY PART NUMBER ONLY

ITEM	PART NO.	DESCRIPTION
ADDITIONAL PARTS LIST		
	A151-00098-0000	BACK DOOR LOCK ASSY.
	0017-00009-0490	5-5/8" SQR. VENT GRILL (4 REQ'D.)
	A515-00021-0000	MULTIFUNCTION SWITCH & BRKT. ASSY.
	A303-00009-0000	MASTER CABLE W/BRKT. ASSY.
	A303-00007-0000	HIGH VOLTAGE CABLE ASSY.
	A941-00008-0000	LOW VOLTAGE CABLE ASSY.
	A968-00029-0000	VIDEO SIGNAL CABLE ASSY.
	0968-00510-0000	TOP — CARD RACK BLOCK
	0968-00511-0000	BASE — CARD RACK SUPPORT BLOCK

NO. 303 — DOMINO MAN — UPRIGHT — HEADER FLUORESCENT LIGHT ASSY.

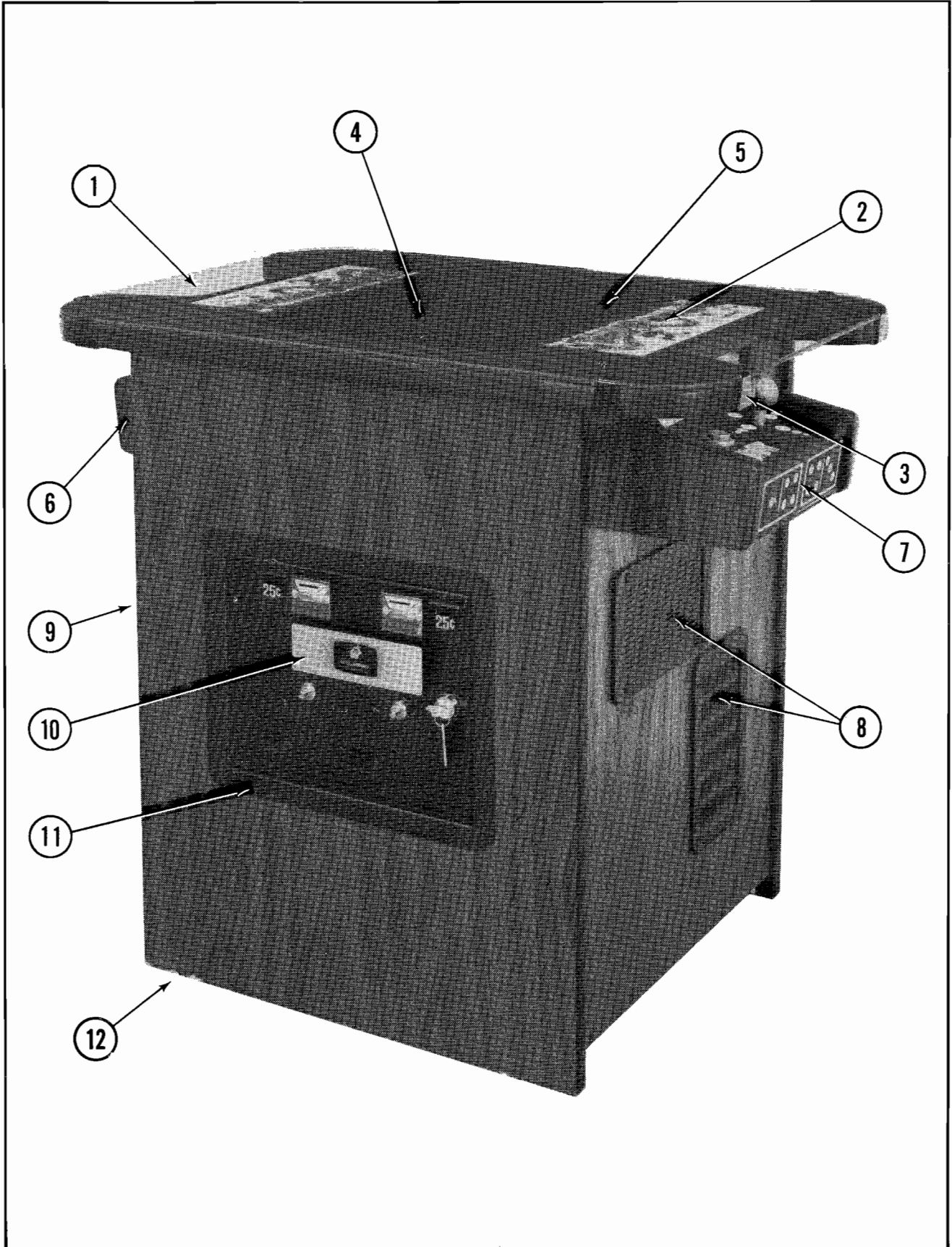


NO. 303 — DOMINO MAN — UPRIGHT — HEADER FLUORESCENT LIGHT ASSY. — PARTS LIST

ORDER BY PART NUMBER ONLY

ITEM	PART NO.	DESCRIPTION
1	0595-00105-0000	FLUORESCENT BRKT.
2	0017-00003-0043	18" COOL WHITE FLUORESCENT LAMP
3	0017-00003-0445	LAMP LOCKS (2 REQ'D.)
4	0017-00031-0036	FLUORESCENT SOCKET (2 REQ'D.)
5	0017-00003-0412	FLUORESCENT STARTER HOLDER W/LEADS
	0017-00101-0573	#6-32 x 1/2 PHIL. RND. HD. M.S. (4 REQ'D.)
	0017-00104-0009	#6 EXT. WASHER (4 REQ'D.)
6	0017-00003-0019	FLUORESCENT STARTER
7	0017-00003-0026	BALLAST
	0017-00101-0598	#8-32 x 5/16 SLT. HEX HD. SCR. (4 REQ'D.)
8	A961-00042-0000	LINE FILTER ASSY.

NO. 314 — DOMINO MAN — COCKTAIL — FRONT

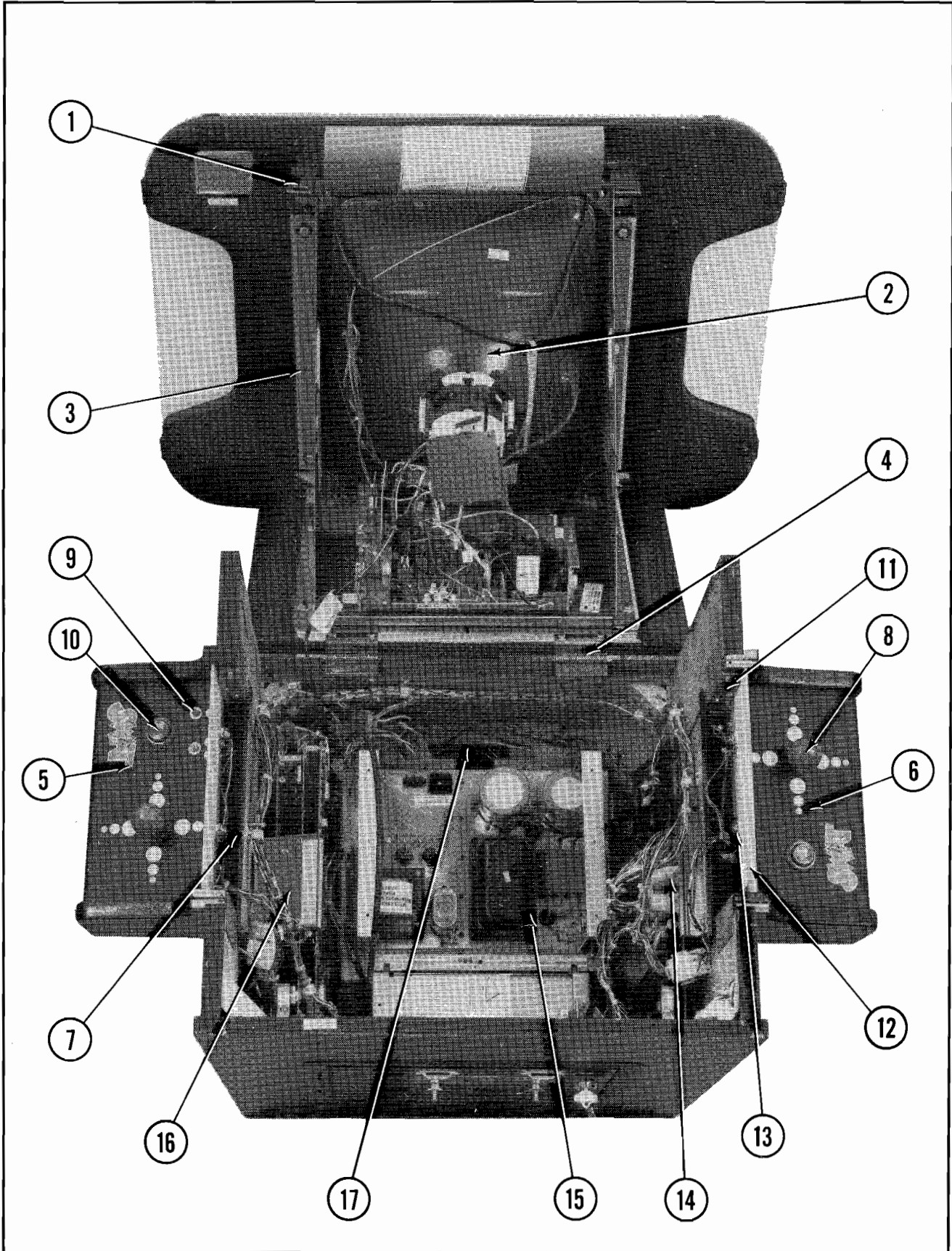


NO. 314 — DOMINO MAN — COCKTAIL — FRONT — PARTS LIST

ORDER BY PART NUMBER ONLY

ITEM	PART NO.	DESCRIPTION
1	0017-00009-0499	COVER GLASS — 32" x 22" x 1/4"
2	0314-00903-0000	ARTWORK UNDERLAY — DECORATIVE
3	0775-00104-00XF	GLASS CLIPS (8 REQ'D.)
	0017-00101-0117	#8 x 5/8 PHIL. TRS. HD. SCR. (16 REQ'D.)
4	0314-00902-0000	PLEXI-GLASS
	0508-00901-0000	PLEXI-GLASS MTG. CLIPS (4 REQ'D.)
	0017-00101-0017	#6 x 1/2" SLT. HEX HD. BLK. SCR. (4 REQ'D.)
5	0557-00900-0000	T.V. BEZEL
6	A314-00005-0100	CONTROL SHELF ASSY. — PLAYER #1
7	A314-00005-0200	CONTROL SHELF ASSY. — PLAYER #2
8	0017-00009-0393	BLACK SPEAKER GRILL W/SLOTS (3 REQ'D.)
9	0017-00009-0482	SMALL SPEAKER GRILL (NOT SHOWN)
	0017-00003-0460	4" SQR. SPEAKER — 4 OHM, 10W.
	0017-00003-0430	6" x 9" SPEAKER — 4 OHM, 10W.
	0017-00101-0136	#8-32 x 1-1/4 CARRIAGE BOLT (16 REQ'D.)
	0017-00103-0061	#8-32 HEX NUT W/SEMS (16 REQ'D.)
10	A090-00300-11BK	COIN DOOR ASSY. — U.S.A. 25¢
	A982-00015-0000	COIN DOOR CABLE ASSY.
11	0090-00002-04BK	LARGE COIN DOOR FRAME
	0017-00101-0121	#6-32 x 5/16 PHIL. TRS. HD. SCREW (3 REQ'D.) (MOUNTS COIN DOOR TO FRAME)
	A927-00019-0000	COIN BOX ASSY.
	A962-00004-0000	COIN BOX COVER ASSY.
	A962-00005-0000	COIN BOX SIDE CHANNEL ASSY. — SHORT
	0962-00101-0000	COIN BOX SIDE CHANNEL — SHORT
	0017-00101-0628	#8-32 x 3/4 CARRIAGE BOLT (4 REQ'D.)
	0017-00104-0022	#8 FLAT WASHER (4 REQ'D.)
	0017-00103-0061	#8-32 HEX NUT W/SEMS (4 REQ'D.)
12	0017-00102-0048	3/8-16 x 2" LEG LEVELERS (4 REQ'D.)
	0017-00103-0026	3/8-16 LEG LEVELER HEX NUTS (4 REQ'D.)

NO. 314 — DOMINO MAN — COCKTAIL — INTERIOR ACCESS



NO. 314 — DOMINO MAN — COCKTAIL — INTERIOR ACCESS — PARTS LIST

ORDER BY PART NUMBER ONLY

ITEM	PART NO.	DESCRIPTION
1	0921-00107-00XF	CATCH (2 REQ'D.)
	0017-00009-0534	BASSICK CLAMP (2 REQ'D.)
	0017-00101-0141	#8 x 11/16 UNSLOT. HEX HD. M.S. (8 REQ'D.)
2	0017-00003-0450	19" COLOR DUAL SYNC. VERT. MTG. MONITOR — (WELLS-GARDNER)
3	0557-00100-0000	MONITOR MTG. BRKT. (2 REQ'D.)
	0017-00101-0642	#8-32 x 1-1/2 CARRIAGE BOLT (4 REQ'D.)
	0017-00104-0031	#8 FLAT WASHER (4 REQ'D.)
	0017-00103-0061	#8-32 HEX NUT W/SEMS (4 REQ'D.)
	0017-00102-0002	1/4-20 x 1/2 SLT. HEX HD. BOLT (4 REQ'D.)
	0017-00102-0052	1/4-20 x 1" UNSLOT. HEX FLAT HD. BOLT (4 REQ'D.)
	0017-00104-0014	7/8" DISH WASHER (8 REQ'D.)
4	0017-00009-0514	2-1/2" HINGE (2 REQ'D.)
	0017-00101-0136	#8-32 x 1-1/4 CARRIAGE BOLT (8 REQ'D.)
	0017-00103-0061	#8-32 HEX NUT W/SEMS (8 REQ'D.)
5	0314-00901-0100	DECORATIVE OVERLAY — PLAYER #1
6	0314-00901-0200	DECORATIVE OVERLAY — PLAYER #2
	A302-00015-0000	CONTROL PANEL WELDMNT ASSY. (2 REQ'D.)
7	0510-00101-00XF	BOTTOM PAN (2 REQ'D.)
	0017-00101-0341	#6 x 1/4 PHIL. TRS. HD. SCR. (6 REQ'D.)
8	A982-00017-0000	CONTROL ASSY. (2 REQ'D.)
	A317-00010-0100	CONTROL SHELF CABLE ASSY. — PLAYER #1
	A317-00010-0200	CONTROL SHELF CABLE ASSY. — PLAYER #2
9	0017-00032-0051	SMALL RED BUTTON SWITCH ASSY. W/HARDWARE (2 REQ'D.)
10	0017-00042-0303	PUSH BUTTON ASSY. — GREEN (2 REQ'D.)
	0017-00032-0093	PUSH BUTTON SWITCH W/HOLDER (2 REQ'D.)
	0017-00103-0054	5/8-11 PAL NUT (2 REQ'D.)
11	0930-00104-0000	CONTROL PANEL LOCATING BRKT. (4 REQ'D.)
	0017-00101-0025	#8 x 1/2 SLT. HEX HD. M.S. (16 REQ'D.)
12	0930-00904-0000	LIGHT SHIELD (2 REQ'D.)
13	0017-00031-0044	WEDGE BASE LAMP SOCKET (4 REQ'D.)
	0017-00003-0219	#194 WEDGE BASE LAMP — 14V., .27A. (4 REQ'D.)
	0017-00101-0555	#6-32 x 5/16 SLT. HEX HD. M.S. (4 REQ'D.)
14	A082-90412-D000	POWER SUPPLY P.C. BRD. ASSY.
	0624-00902-0100	P.C. SUPPORT BRKT. — 12" LG.
	0624-00902-0500	P.C. SUPPORT BRKT. — 6-1/2" LG. (2 REQ'D.)
	0017-00101-0141	#8 x 11/16 UNSLOT. HEX HD. SCR. (7 REQ'D.)
	0017-00104-0037	#8 WASHER (7 REQ'D.)
	A082-90910-E000	DUAL POWER AMP P.C. ASSY.
	0017-00042-0014	1/8" SNAP BUSHING (4 REQ'D.)
	0017-00101-0751	#5-40 x 1/4 PHIL. RND. HD. M.S. (4 REQ'D.)
15	A945-00020-0000	POWER CHASSIS ASSY. — 125VA., 115V.
16	A303-00011-0000	CARD RACK W/BOARDS ASSY.
	A082-90010-F000	C.P.U. P.C. BOARD ASSY.
	A082-90913-F000	SOUND P.C. BOARD ASSY.
	A082-91399-H000	VIDEO GENERATOR P.C. BOARD ASSY.
	0017-00042-0208	1-1/8" P.C.B. SUPPORT (4 REQ'D.)
	0017-00042-0253	DUAL LKG. P.C.B. SUPPORT (4 REQ'D.)
	0017-00101-0085	#6 x 5/16 SLT. HEX HD. SCR. (4 REQ'D.)

NO. 314 — DOMINO MAN — COCKTAIL — INTERIOR ACCESS — PARTS LIST (Continued)

ORDER BY PART NUMBER ONLY

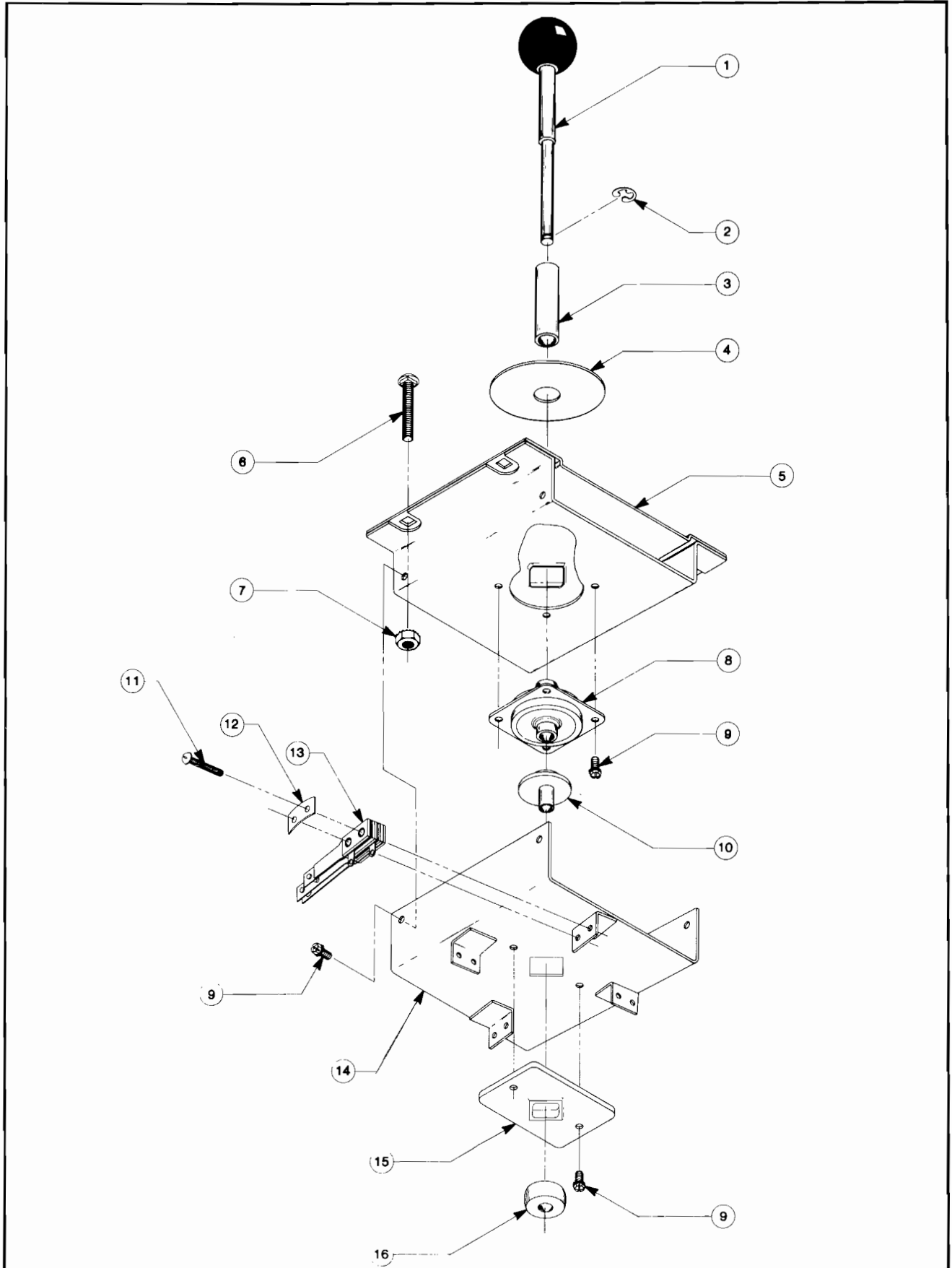
ITEM	PART NO.	DESCRIPTION
17	A775-00013-0000 0151-00081-0000 0775-00110-00XF 0749-00106-00XF 0017-00101-0347 0017-00104-0009 0017-00103-0005 0017-00101-0026	FAN ASSEMBLY 4" FAN FAN PLATE VENT SCREEN #6-32 x 1/2 R.H.M.S. (4 REQ'D.) #6 EXT. WASHER (4 REQ'D.) #6-32 HEX NUT (4 REQ'D.) #8 x 5/8 SLT. HEX HD. M.S. (4 REQ'D.)
	A088-00013-0000 A088-00014-0000 A314-00009-0000 A942-00008-0000 A941-00008-0000 A968-00029-0000 0942-00902-0000 A927-00005-0000 0968-00510-0000 0968-00511-0000	ADDITIONAL PARTS LIST ON-OFF SWITCH & BRKT. ASSY. INTERLOCK SWITCH & BRKT. ASSY. MASTER CABLE W/BRKT. ASSY. HIGH VOLTAGE CABLE ASSY. LOW VOLTAGE CABLE ASSY. VIDEO SIGNAL CABLE ASSY. MONITOR SHIELD HIGH BASE LEG KIT ASSY. — OPTIONAL TOP — CARD RACK BLOCK BASE — CARD RACK SUPPORT BLOCK

DOMINO MAN — CONTROL ASSEMBLY — ALL VERSIONS — PARTS LIST

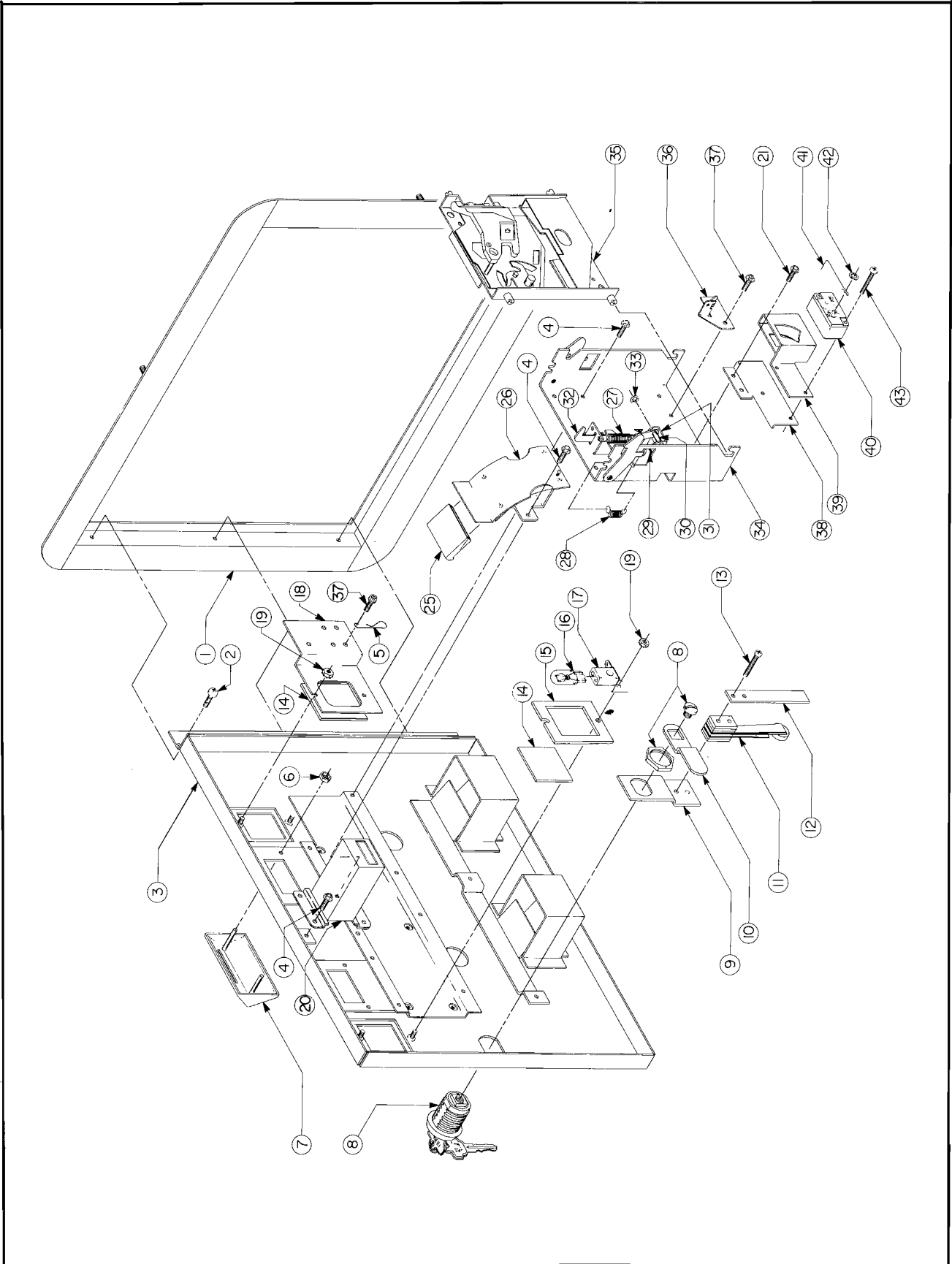
ORDER BY PART NUMBER ONLY

ITEM	PART NO.	DESCRIPTION
1	A932-00022-0000	BALL & SHAFT ASSEMBLY
2	0017-00100-0025	1/4 E-RING
3	0921-00702-0000	STOP SPACER
4	0921-00902-0000	SLIDE PLATE
5	A982-00019-0000	PIVOT PLATE WELD ASSY.
6	0017-00101-0637	#8-32 x 1" CARRIAGE BOLT (4 REQ'D.)
7	0017-00103-0061	#8-32 HEX NUT W/SEMS (4 REQ'D.)
8	0932-00902-0000	GROMMET
9	0017-00101-0598	#8-32 x 5/16 SLT. HEX HD. M.S. (10 REQ'D.)
10	0962-00904-0000	SLEEVE
11	0017-00101-0527	#5-40 x 5/8 SLT. RND. HD. SCR. (8 REQ'D.)
12	0020-00202-0000	SWITCH PLATE (4 REQ'D.)
13	A932-00009-0000	SWITCH ASSEMBLY (4 REQ'D.)
14	A932-00012-00XF	STOP PLATE & SWITCH BRKT. ASSY.
15	0932-00905-0000	WEAR PLATE
16	0921-00700-0000	ACTUATOR

DOMINO MAN — CONTROL ASSEMBLY — ALL VERSIONS



FRONT DOOR ASSEMBLY — U.S.A. 25¢

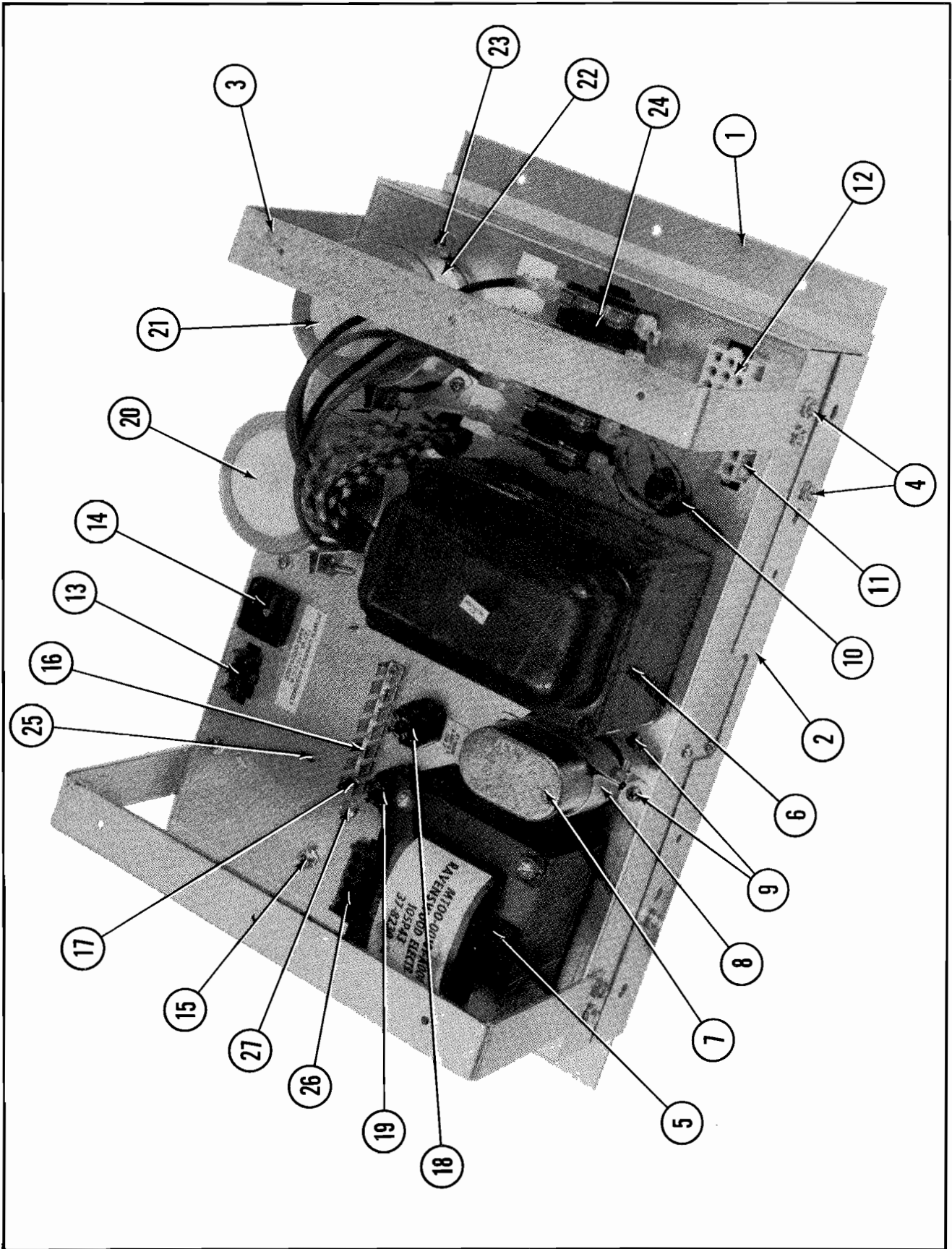


FRONT DOOR ASSEMBLY — U.S.A. 25¢ — PARTS LIST

ORDER BY PART NUMBER ONLY

ITEM	PART NO.	DESCRIPTION
1	0090-00002-04BK	DOUBLE ENTRY COIN DOOR FRAME
2	0017-00101-0121	#6-32 x 5/16 PHIL. TRS. HD. SCR. (3 REQ'D.)
3	A090-00073-02BK	DOUBLE ENTRY COIN DOOR W/DRESS PLATE
4	0017-00101-0123	#8 x 1/4 UNSLOT. HEX HD. SCREW (12 REQ'D.)
5	0017-00007-0019	KEY HOOK
6	0017-00103-0059	PUSH NUT (4 REQ'D.)
7	0090-00912-0000	COIN ENTRY PLATE — 25¢ (2 REQ'D.)
8	A097-00005-0000	DOOR LOCK & KEY W/SCREW & NUT (OR)
8	A097-00006-0000	DOOR LOCK & KEY W/SCREW & NUT
9	0090-00128-00XF	DOOR TILT SWITCH BRKT.
10	0017-00005-0041	DOOR CAM
11	A090-00095-0000	DOOR TILT SWITCH
12	0090-00126-03XF	SWITCH BACK-UP PLATE
13	0017-00101-0525	#5-40 x 9/16" PHIL. HD. M.S. (2 REQ'D.)
	A090-00096-0000	DOOR TILT SWITCH & BRKT. ASSY. (ITEMS 9 & 11 THRU 13)
14	0090-00903-9500	25¢ WINDOW (2 REQ'D.)
15	0090-00143-00XF	COIN PLEX RETAINER
16	0017-00003-0219	12 VOLT LAMP — G.E. #194 (2 REQ'D.)
17	0017-00031-0048	WEDGE SOCKET W/BRKT. (2 REQ'D.)
18	A090-00100-0000	BRKT. ASSY.
19	0017-00103-0084	#6-32 HEX NUT W/SEMS (4 REQ'D.)
20	A090-00089-0000	COIN METER W/DIODE
21	0017-00101-0124	#6 x 1/4 UNSLOT. HEX HD. SCR. (4 REQ'D.)
25	0090-00911-0000	INSULATOR (2 REQ'D.)
26	A090-00112-0000	COIN CHUTE & INSULATOR ASSY. (2 REQ'D.)
27	0010-00134-0000	SPRING
28	0010-00181-0000	SPRING
29	0017-00007-0083	1/8 x 1-5/8 ROLL PIN
30	0090-00129-00XF	PIVOT POST
31	0090-00167-00XF	PIVOT LEVER
32	0090-00182-00XF	REJECT LEVER
33	0017-00100-0018	E-RING
	A090-00088-0000	REJECT LEVER ASSY. (2 REQ'D.) (ITEMS 30 THRU 33)
34	A090-00105-0000	COIN ACCEPTOR FRAME ASSY. (2 REQ'D.)
35	0017-00005-0003	COIN ACCEPTOR W/STRING CUTTER (2 REQ'D.) (OR)
35	0017-00005-0211	COIN ACCEPTOR W/ANTI STRING DEVICE (2 REQ'D.) (OR)
35	0017-00005-0214	COIN ACCEPTOR W/STRING CUTTER (2 REQ'D.)
36	A090-00064-0000	ANTI-PENNY DEVICE
37	0017-00101-0099	#6 x 1/4 SLT. HEX HD. M.S. (2 REQ'D.)
38	0090-00162-00XF	COIN SWITCH MTG. BRKT.
39	0017-00005-0203	COIN SWITCH CHUTE
40	0017-00005-0195	COIN SWITCH
41	0010-00599-0000	COIN SWITCH WIRE
42	0017-00007-0015	PUSH-ON RING
	A090-00059-0400	COIN SWITCH & WIRE ASSY. (ITEMS 40 THRU 42)
43	0017-00101-0147	#4-40 x 3/4 PHIL. PAN. HD. M.S. (2 REQ'D.)
	A090-00077-0000	COIN GUIDE & SWITCH ASSY. (ITEMS 38 THRU 43)

DOMINO MAN — POWER CHASSIS ASSY. — 125VA., 115V. — ALL VERSIONS



DOMINO MAN — POWER CHASSIS ASSY. — 125VA., 115V. — ALL VERSIONS — PARTS LIST

ORDER BY PART NUMBER ONLY

ITEM	PART NO.	DESCRIPTION
1	0945-00104-00XF	CHASSIS
2	A945-00029-0000	MTG. PLATE & BARRIER ASSY.
3	0945-00107-01XF	STRAP (2 REQ'D.)
4	0017-00101-0123	#8 x 1/4 UNSLOT. HEX HD. SCR. (12 REQ'D.)
5	MT00-00101-A000	ISOLATION TRANSFORMER W/O SHIELD ASSY. — 115V., 50/60 HZ.
	0017-00103-0061	#8-32 HEX NUT W/SEMS (4 REQ'D.)
6	MT00-00099-A000	POWER TRANSFORMER ASSY. — 115V., 60 HZ.
	0017-00103-0084	#6-32 HEX NUT W/SEMS (4 REQ'D.)
7	0175-181T4-GXJK	CAPACITOR — 3.5 M.F., 440V.
8	0017-00009-0535	CLAMP
	0017-00101-0565	#6-32 x 7/16 SLT. PAN HD. SCR.
	0017-00103-0084	#6-32 HEX NUT W/SEMS
9	0017-00101-0067	#6 x 3/8 PHIL. PAN HD. SCR. (11 REQ'D.)
	0945-00103-00XF	PARTITION — LOCATED UNDER CHASSIS (NOT SEEN)
10	0945-00902-0000	SNAP BUSHING (3 REQ'D.)
11	0017-00021-0297	2 POSITION CONNECTOR
12	A945-00030-0100	CONNECTOR & CABLE ASSY. #1
13	A945-00030-0200	CONNECTOR & CABLE ASSY. #2
14	A945-00021-0000	CONVENIENCE OUTLET ASSY.
15	0017-00101-0573	#6-32 x 1/2 PHIL. RND. HD. SCR. (2 REQ'D.)
	0017-00103-0084	#6-32 HEX NUT W/SEMS (2 REQ'D.)
	A945-00025-0000	FILTER ASSEMBLY — 125V. — UNDER CHASSIS (NOT SEEN)
16	0017-00021-0510	TERMINAL STRIP
17	0017-00101-0140	#4-40 x 5/16 PHIL. PAN HD. SCR. (2 REQ'D.)
18	0017-00003-0263	SLO-BLO FUSE — 4A., 250V.
19	0017-00003-0005	FUSE — 2A., 250V.
	0017-00003-0444	QUICK CONN. FUSEHOLDER (2 REQ'D.) — FOR ABOVE FUSES
20	0945-00816-1902	CAPACITOR — 100,000 M.F.
21	0945-00816-1901	CAPACITOR — 55,000 M.F.
	0017-00104-0107	#10 FLAT WASHER (4 REQ'D.)
	0017-00103-0081	#10-32 HEX NUT W/SEMS (4 REQ'D.)
22	0017-00009-0422	CLAMP (2 REQ'D.)
	0017-00101-0758	#8-32 x 3/4 PHIL. RND. HD. SCREW (2 REQ'D.)
	0017-00103-0061	#8-32 HEX NUT W/SEMS (2 REQ'D.)
23	0017-00101-0067	#6 x 3/8 PHIL. PAN HD. SCR. (6 REQ'D.)
24	0945-00904-0000	5 POSITION FUSE HOLDER
	0017-00003-0263	SLO-BLO FUSE — 4A., 250V.
	0017-00003-0217	SLO-BLO FUSE — 2.5A., 250V. (2 REQ'D.)
	0017-00003-0007	SLO-BLO FUSE — 3A., 250V. (2 REQ'D.)
	0945-00903-0000	FUSE HOLDER BARRIER
	A945-00022-0000	HEATSINK & DIODE ASSY.
	0017-00101-0067	#6 x 3/8 PHIL. PAN HD. SCR. (2 REQ'D.)
25	0017-00101-0780	#6 x 1/2 PHIL. PAN HD. SCREW (2 REQ'D.)
	0017-00021-0629	5 POSITION TERMINAL STRIP — (UNDER CHASSIS)
	A945-00019-0000	LINE CORD ASSY. — 115V. (NOT SHOWN)
26	A945-00030-0500	CONNECTOR & CABLE ASSY.
27	0017-00101-0660	#10-32 x 3/4 PAN HD. SCREW
	0017-00104-0107	#10 FLAT WASHER
	0017-00103-0081	#10-32 HEX NUT W/SEMS

VI Technical Troubleshooting

Introduction

The most common problems occur in harness components such as the coin acceptor, player controls, interconnecting wiring, etc. The TV monitor and PCB computer cause their share of problems too, but not as much as the harness and its component parts. TV monitor troubleshooting will not be covered here because it is covered in that section of this manual.

As you already know, the PCB computer is a complex device with a number of different circuits. Some circuits remain basically the same among games, but overall there are a great many differences between them. PCB troubleshooting procedures, therefore, can be lengthy and will differ greatly among games. However, some basic Z-80 CPU information is involved in this section.

General Suggestions

The first step in any troubleshooting procedure is correctly identifying the malfunction's symptoms. This includes not only the circuits or features malfunctioning, but also those still operational. A carefully trained eye will pick up other clues 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 the 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, your prospective player inserts his quarter and is not awarded a game. The first item to check is if the quarter is returned. If the quarter is 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 a little by turning the adjusting screw out a bit (see section on coin acceptor for more details).

If the quarter 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 service procedures. If this does not cure the problem, remove the coin acceptor, clean it and perform the 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 so, simply remove the slug 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 in the coin acceptor 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, which is checked by testing 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 operated, the NO and C terminals should close and the NC should be open. If the coin switch checks out, examine the connections to the terminals to make sure there is good contact. If necessary, use the 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 not check out, the problem is in the computer — most likely in the coin and credit circuitry.

If you do get game credit when a coin is deposited, but the game will not start when the start switch is pressed, you may have a problem in the start switch, the interconnecting wiring or in the computer. 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 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 computer.

Transformer and Line Voltage Problems

Your machine must have the correct line voltage to operate properly. If the line voltage drops too low, a circuit in the computer will disable game credit. The point at which the computer will fail to work will vary some from game to game, but no game will work on line voltage that drops below 105 VAC.

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 or dusk, so if your machine's malfunction 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 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.

In any case, the way to check for correct line voltage is with your VOM. Set the VOM to 250 VAC and stick the probes in the wall receptacle. 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 50 VAC 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 TV screen.

HARNESS PROBLEMS

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

The best way to approach this problem is by turning the power off and disconnecting devices that may be causing the problem, such as the TV, transformer, and PCB. Disconnect the devices by pulling off their connectors, but do not allow them to touch. If necessary, insulate them with small pieces of electrical tape. Then, connect your VOM across the terminals of the fuse block (all electrical power shut off), and set it to one of the resistance scales. This will save blowing a fuse each time you want to check the circuit.

If the VOM reveals that disconnecting the devices removed the short, reconnect the devices one by one until the short returns. The last device connected is the one that is at fault. If the VOM reads a short even after the devices are disconnected, the fault must lie in the harness itself, and only patient exploration will reveal its location. First, carefully examine all the wiring, looking for terminals that may be touching, metal objects such as coins shorting connections or burned insulation. If necessary, use the VOM to check each suspected wire.

MALFUNCTIONING CONTROLS

One of the most common problems here is a bad potentiometer. Typically, a bad pot will cause the image to jump as 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 out, 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 it is. In many cases, the input will be +5 VDC. If so, use the VOM to check its presence. Normally, the switch is used to pull a +5 VDC line LOW to GND 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 not, begin exploring the PCB using the logic schematics.

A Glossary of Microprocessor Terms

MICROPROCESSOR — one or several microcircuits that perform the function of a computer's CPU. Sections of the circuit have arithmetic and comparative functions that perform computations and executive instructions.

CPU — central-processing unit. A computing system's "brain", whose arithmetic, control and logic elements direct functions and perform computations. The microprocessor section of a microcomputer is on one chip or several chips.

PROM — programmable read-only memory. User permanently sets binary on-off bits in each cell by selectively fusing or not fusing electrical links. Non-erasable. Used for low-volume applications.

EPROM — erasable, programmable, read-only memory. Can be erased by ultraviolet light bath, then reprogrammed. Frequently used during design and

development to get programs debugged, then replaced by ROM for mass production.

ROM — read-only memory. The program, or binary on-off bit pattern, is set into ROM during manufacture, usually as part of the last metal layer put onto the chip. Nonerasable. Typical ROM's contain up to 16,000 bits of data to serve as the microprocessor's basic instructions.

RAM — random-access memory. Stores binary bits as electrical charges in transistor memory cells. Can be read or modified through the CPU. Stores input instructions and results. Erased when power is turned off.

LSI — large scale integration. Formation of hundreds or thousands of so-called gate circuits on semiconductor chips. Very large scale integration (VLS) involves microcircuits with the greatest component density.

MOS — metal-oxide semiconductor. A layered construction technique for integrated circuits that achieves high component densities. Variations in MOS chip structures create circuits with speed and low-power requirements, or other advantages (static will damage a MOS chip).

Introduction to the Z-80 CPU

The term "microcomputer" has been used to describe virtually every type of small computing device designed within the last few years. This term has been applied to everything from simple "microprogrammed" controllers constructed out of TTL MSI up to low end minicomputers with a portion of the CPU constructed out of TTL LSI "bit slices." However, the major impact of the LSI technology within the last few years has been with MOS LSI. With this technology, it is possible to fabricate complete and very powerful computer systems with only a few MOS LSI components.

The Zilog Z-80 family of components can be configured with any type of standard semiconductor memory to generate computer systems with an extremely wide range of capabilities. For example, as few as two LSI circuits and three standard TTL MSI packages can be combined to form a simple controller. With additional memory and I/O devices a computer can be constructed with capabilities that only a minicomputer could previously deliver.

New products using the MOS LSI microcomputer are being developed at an extraordinary rate. The Zilog Z-80 component set has been designed to fit into this market through the following factors:

1. The Z-80 is fully software compatible with the popular 8080A CPU.
2. Existing designs can be easily converted to include the Z-80.
3. The Z-80 component set is at present superior in both software and hardware capabilities to any other microcomputer system on the market today.
4. For increased throughput the Z80A operating at a 4 MHz clock rate offers the user significant speed advantages.

Microcomputer systems are extremely simple to construct using Z-80 components. Any such system consists of three parts:

1. **CPU (Central Processing Unit)**
2. **Memory**
3. **Interface Circuits to peripheral devices**

The CPU is the heart of the system. Its function is to obtain instructions from the memory and perform the desired operations. The memory is used to contain instructions and in most cases data that is to be processed. For example, a typical instruction sequence may be to read data from a specific peripheral device, store it in a location in memory, check the parity and write it out to another peripheral device. Note that the Zilog component set includes the CPU and various general purpose I/O device controllers, while a wide range of memory devices may be used from any source. Thus, all required components can be connected together in a very simple manner with virtually no other external logic.

General Purpose Registers

There are two matched sets of general purpose registers, each set containing six 8-bit registers that may be used individually as 8-bit registers or as 16-bit register pairs by the programmer. One set is called BC, DE and HL while the complementary set is called BC', DE' and HL'. At any one time the programmer can select either set of registers to work with through a single exchange command for the entire set. In systems where fast interrupt response is required, one set of general purpose registers and an accumulator/flag register may be reserved for handling this very fast routine. Only a simple exchange command need be executed to go between the routines. This greatly reduces interrupt service time by eliminating the requirement for saving and retrieving register contents in the external stack during interrupt or subroutine processing. These general purpose registers are used for a wide range of applications by the programmer. They also simplify programming, especially in ROM based systems where little external read/write memory is available.

Arithmetic & Logic Unit (ALU)

The 8-bit arithmetic and logical instructions of the CPU are executed in the ALU. Internally the ALU communicates with the registers and the external

data bus on the internal data bus. The type of functions performed by the ALU include:

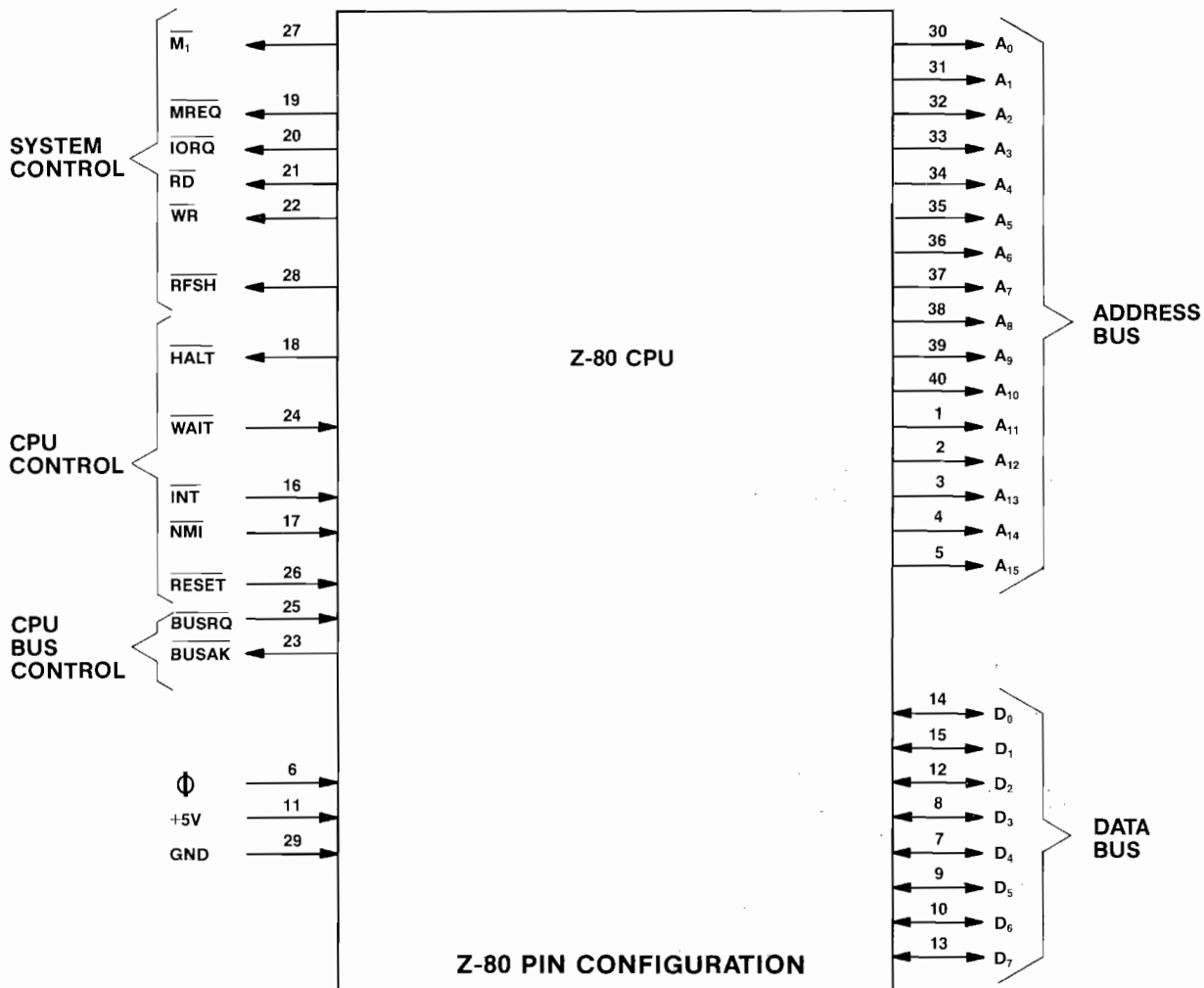
Add	Left or right shifts or rotates (arithmetic and logical)
Subtract	Increment
Logical AND	Decrement
Logical OR	Set bit
Logical Exclusive OR	Reset bit
Compare	Test bit

Instruction Register and CPU Control

As each instruction is fetched from memory, it is placed in the instruction register and decoded. The control sections performs this function and then generates and supplies all of the control signals necessary to read or write data from or to the registers, control the ALU and provide all required external control signals.

Z-80 CPU Pin Description

The Z-80 CPU is packaged in an industry standard 40 pin Dual In-Line Package. The I/O pins are shown in the below figure and the function of each is described.



A₀-A₁₅**(Address Bus)**

Tri-state output, active high. A₀-A₁₅ constitute a 16-bit address bus. The address bus provides the address for memory (up to 64K bytes) data exchanges and for I/O device data exchanges. I/O addressing uses the 8 lower address bits to allow the user to directly select up to 256 input or 256 output ports. A₀ is the least significant address bit. During refresh time, the lower 7 bits contain a valid refresh address.

D₀-D₇**(Data Bus)**

Tri-state input/output, active high. D₀-D₇ constitute an 8-bit bidirectional data bus. The data bus is used for data exchanges with memory and I/O devices.

M₁**(Machine Cycle one)**

Output, active low. M₁ indicates that the current machine cycle is the OP code fetch cycle of an instruction execution. Note that during execution of 2-byte op-codes, $\overline{M1}$ is generated as each op code byte is fetched. These two byte op-codes always begin with CBH, DDH, EDH or FDH. $\overline{M1}$ also occurs with \overline{IORQ} to indicate an interrupt acknowledge cycle.

MREQ**(Memory Request)**

Tri-state output, active low. The memory request signal indicates that the address bus holds a valid address for a memory read or memory write operation.

IORQ**(Input/Output Request)**

Tri-state output, active low. The \overline{IORQ} signal indicates that the lower half of the address bus holds a valid I/O address for a I/O read or write operation. An \overline{IORQ} signal is also generated with an M₁ signal when an interrupt is being acknowledged to indicate that an interrupt response vector can be placed on the data bus. Interrupt Acknowledge operations occur during M₁ time while I/O operations never occur during M₁ time.

RD**(Memory Read)**

Tri-state output, active low. \overline{RD} indicates that the CPU wants to read data from memory or an I/O device. The addressed I/O device or memory should use this signal to gate data onto the CPU data bus.

WR**(Memory Write)**

Tri-state output, active low. \overline{WR} indicates that the CPU data bus holds valid data to be stored in the addressed memory or I/O device.

RFSH**(Refresh)**

Output, active low. \overline{RFSH} indicates that the lower 7 bits of the address bus contain a refresh address for dynamic memories and the current MREQ signal should be used to do a refresh read to all dynamic memories.

HALT**(Halt state)**

Output, active low. \overline{HALT} indicates that the CPU has executed a HALT software instruction and is awaiting either a non maskable or a maskable interrupt (with the mask enabled) before operation can resume. While halted, the CPU executes NOP's to maintain memory refresh activity.

WAIT**(Wait)**

Input, active low. \overline{WAIT} indicates to the Z-80 CPU that the addressed memory or I/O devices are not ready for a data transfer. The CPU continues to enter wait states for as long as this signal is active. This signal allows memory or I/O devices of any speed to be synchronized to the CPU.

INT**(Interrupt Request)**

Input, active low. The Interrupt Request signal is generated by I/O devices. A request will be honored at the end of the current instruction if the internal software controlled interrupt enable flip-flop (IFF) is enabled and if the \overline{BUSRQ} signal is not active. When the CPU accepts the interrupt, an acknowledge signal (\overline{IORQ} during M₁ time) is sent out at the beginning of the next instruction cycle. The CPU can respond to an interrupt in three different modes that are described in detail in section 5.4 (CPU Control Instructions).

NMI**(Non-Maskable Interrupt)**

Input, negative edge triggered. The non maskable interrupt request line has a higher priority than \overline{INT} and is always recognized at the end of the current instruction, independent of the status of the interrupt enable flip-flop. NMI automatically forces the Z-80 CPU to restart to location 0066H. The program counter is automatically saved in the external stack so that the user can return to the program that was interrupted. Note that continuous \overline{WAIT} cycles can prevent the current instruction from ending, and that a \overline{BUSRQ} will override a NMI.

RESET

Input, active low. RESET forces the program counter to zero and initializes the CPU. The CPU initialization includes:

- 1) Disable the interrupt enable flip-flop

- 2) Set Register I = 00H
- 3) Set Register R = 00H
- 4) Set Interrupt Mode 0

During reset time, the address bus and data bus go to a high impedance state and all control output signals go to the inactive state.

BUSRQ

(Bus Request)

Input, active low. The bus request signal is used to request the CPU address bus, data bus and tri-state output control signals to go to a high impedance state so that other devices can control these buses. When BUSRQ is activated, the CPU will set these

buses to a high impedance state as soon as the current CPU machine cycle is terminated.

BUSAK

(Bus Acknowledge)

Output, active low. Bus acknowledge is used to indicate to the requesting device that the CPU address bus, data bus and tri-state control bus signals have been set to their high impedance state and the external device can now control these signals.

CLK

(Clock)

Single phase TTL level clock which requires only a 330 ohm pull-up resistor to +5 volts to meet all clock requirements.

MCR II SYSTEM P.C. BOARD JUMPER OPTIONS

VIDEO GENERATOR P.C. BOARD									
MANUFACTURER	EPROM NO.	JW#1	JW#2	JW#3	JW#4	JW#5	JW#6	JW#7	JW#8
MOTOROLA	68764	#	*	*	#	*	*	*	*
	68766	#	*	*	#	*	*	*	*
INTEL	2764	*	#	#	*	#	*	*	#
T. I.	2564	#	*	*	#	*	#	#	*
SUPER C.P.U. P.C. BOARD									
JUMPER OPTIONS FOR PROGRAM ROMS ONLY									
MANUFACTURER	EPROM NO.	JW#2	JW#4	JW#5	JW#6	JW#7	JW#18	JW#19	
MOTOROLA	68764	#	#	*	#	*	*	#	
	68766	#	#	*	#	*	*	#	
T. I.	2564	#	#	*	#	*	*	#	
INTEL	2764	*	*	#	*	#	#	*	
JUMPER OPTIONS FOR BACKGROUND ROMS ONLY									
MANUFACTURER	EPROM NO.	JW#10	JW#11	JW#12	JW#13	JW#14	JW#15	JW#16	JW#17
MOTOROLA	68764	*	#	*	#	*	#	#	*
	68766	*	#	*	#	*	#	#	*
T. I.	2564	*	#	*	#	*	#	#	*
INTEL	2764	#	*	#	*	#	*	*	#
SOUND I/O P. C. BOARD									
MANUFACTURER	EPROM NO.	JW#1	JW#2						
NUMEROUS MFR'S	2532	*	#						
NUMEROUS MFR'S	2732	#	*						

* = CUT JUMPER WIRES WHERE THIS SYMBOL "*" APPEARS.

= LEAVE JUMPER WIRES IN WHERE THIS SYMBOL "#" APPEARS.

The above table illustrates the fact that the Video Generator P.C. Board used in the MCR II System has 8 jumper wires, the SUPER C.P.U. P.C. Board used in the MCR II System has 19 jumper wires, and the Sound I/O P.C. Board used in the MCR II System has 2 jumper wires.

All of the above Boards can be used with a variety of different **SETS of EPROM chips**. However, these EPROMS are not all made by the same manufacturer

and do have some internal differences. So, in order to make them function properly in their respective P.C. Boards, certain jumper wires on these Boards have to be cut.

The above table tells you which jumpers to cut (depending on which EPROM set you're going to use) by showing a "*" under that jumper wire's number. If there is **NO** "*" under a jumper wire's number, **THAT PARTICULAR JUMPER WIRE IS NOT TO BE CUT.**

VII. Coin Door Maintenance

SPECIAL NOTE: If you have any questions about the coin acceptors in your game(s), please feel free to contact their manufacturers. Each manufacturer's name is **PROMINENTLY** imprinted on every acceptor mechanism.

Metal mechanisms only:
COIN MECHANISMS, INC.
817 Industrial Drive
Elmhurst, IL 60126
Phone (312) 279-9150

Metal and Plastic mechanisms:
COINCO COIN ACCEPTORS, INC.
860 Eagle Drive
Bensenville, IL 60106
Phone (312) 766-6781

COIN DOOR MAINTENANCE

METAL COIN ACCEPTOR MECHANISMS

Periodically, the metal coin acceptor mechanism(s) must be removed from the coin door and cleaned.

1. **Make sure the power to the game is off.**
2. Unlock and open the coin door.

3. Remove the coin acceptor mechanism as shown in Figure 7-1.
 - Push down on the two spring loaded latches.
 - While holding the latches down, pull the top of the coin acceptor mechanism toward you.
 - Release the latches and lift out the coin acceptor mechanism.

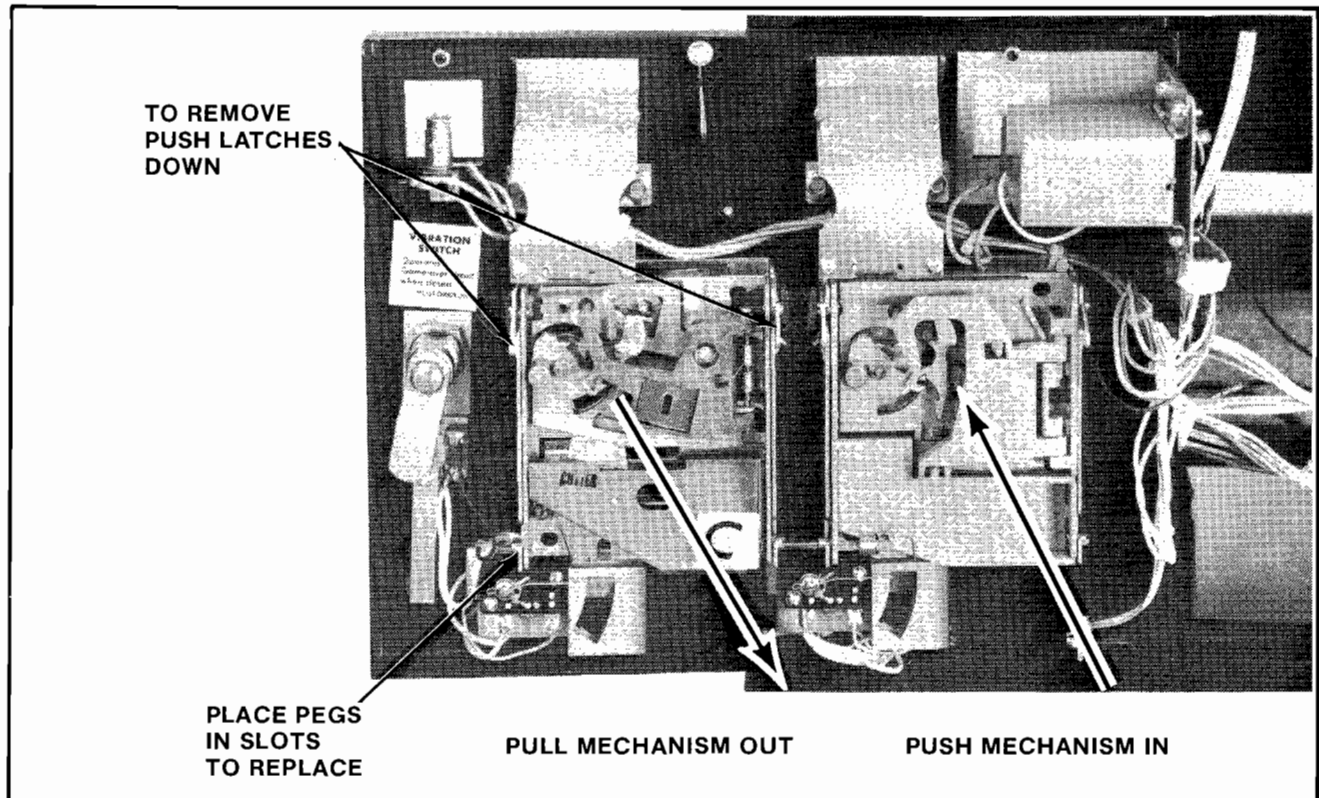


Figure 7-1 Removing and replacing coin acceptor

4. Clean the magnet of all foreign particles. See Figure 7-2.
 - This may be accomplished by swinging the gate open as shown in the above figure.
5. Remove the cradles and undersize levers and clean the bushings. (A pipe cleaner makes a good bushing cleaner.)
 - Also clean the pivot pin.
6. Whenever needed, the coin acceptor should be cleaned with hot water and cleanser in the following manner:
 - Place the coin acceptor in boiling water for about ten minutes.

CAUTION: BE CAREFUL NOT TO BURN YOURSELF.

- Next, use a brush and kitchen cleaner to remove all remaining foreign matter from the unit.
- Rinse the coin acceptor in clean boiling water.
- Dry the coin acceptor thoroughly by using filtered compressed air to blow it dry.

NOTE: The reason we recommend using boiling water is that it evaporates faster than cold water and speeds drying time.

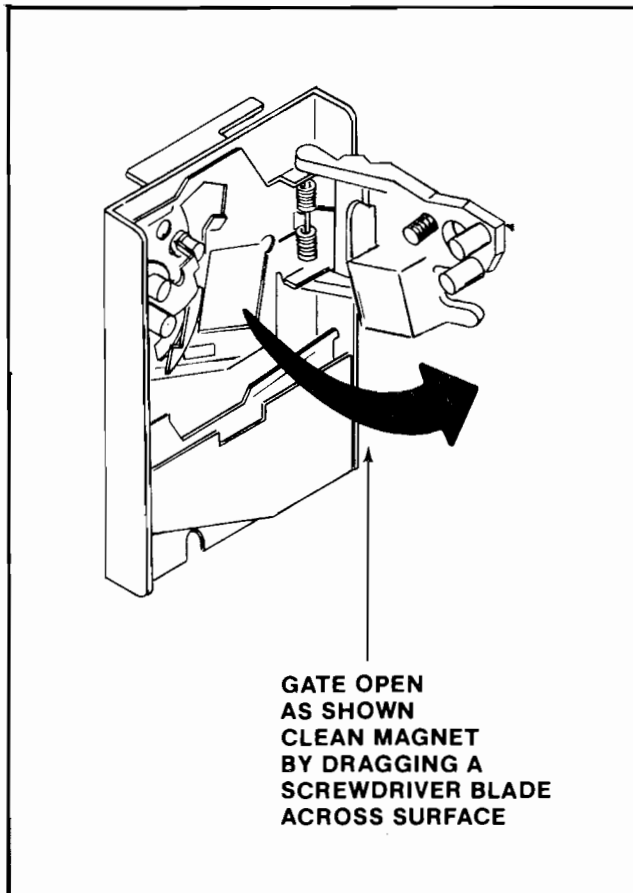


Figure 7-2 Cleaning the metal coin acceptor

7. To lubricate the coin acceptor:
 - Use **ONLY** powdered graphite and put it **ONLY** on the moving parts of the coin acceptor. These parts are called out in Figure 7-3.
 - Be extremely careful to keep the powdered graphite away from paths that are traveled by the coins.

**— WARNING —
DO NOT USE OIL
TO LUBRICATE THE
COIN ACCEPTOR.**

8. Check the coin chute for obstructions such as: paper, gum, etc.
9. Reinstall the coin acceptor to the coin door. See Figure 7-1.
 - Place the two pegs at the coin acceptor's base into their retaining slots.
 - Now push the top of the coin acceptor toward the coin door until it snaps in place and is held there by the two spring loaded latches.
10. Close and lock the coin door.

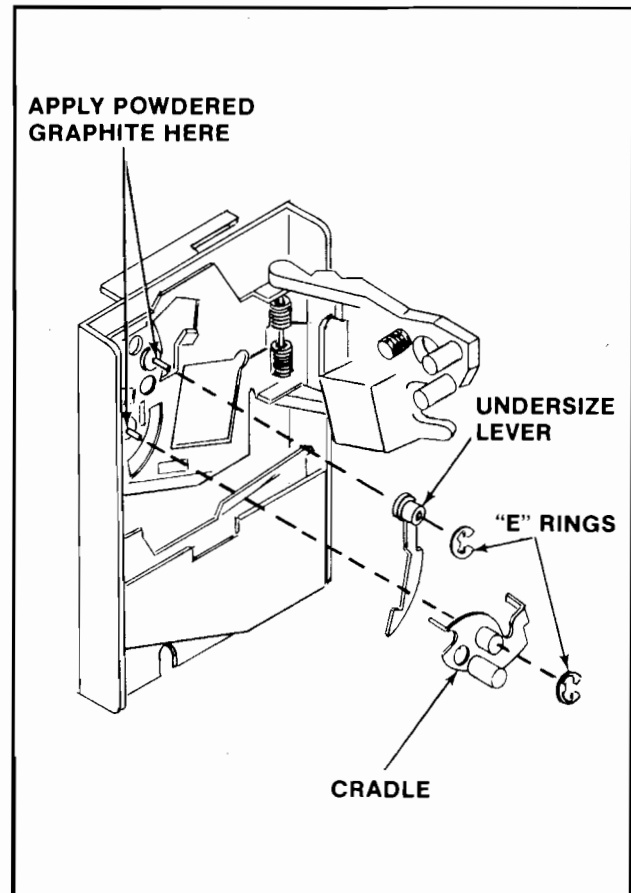


Figure 7-3 Lubricating the metal coin acceptor

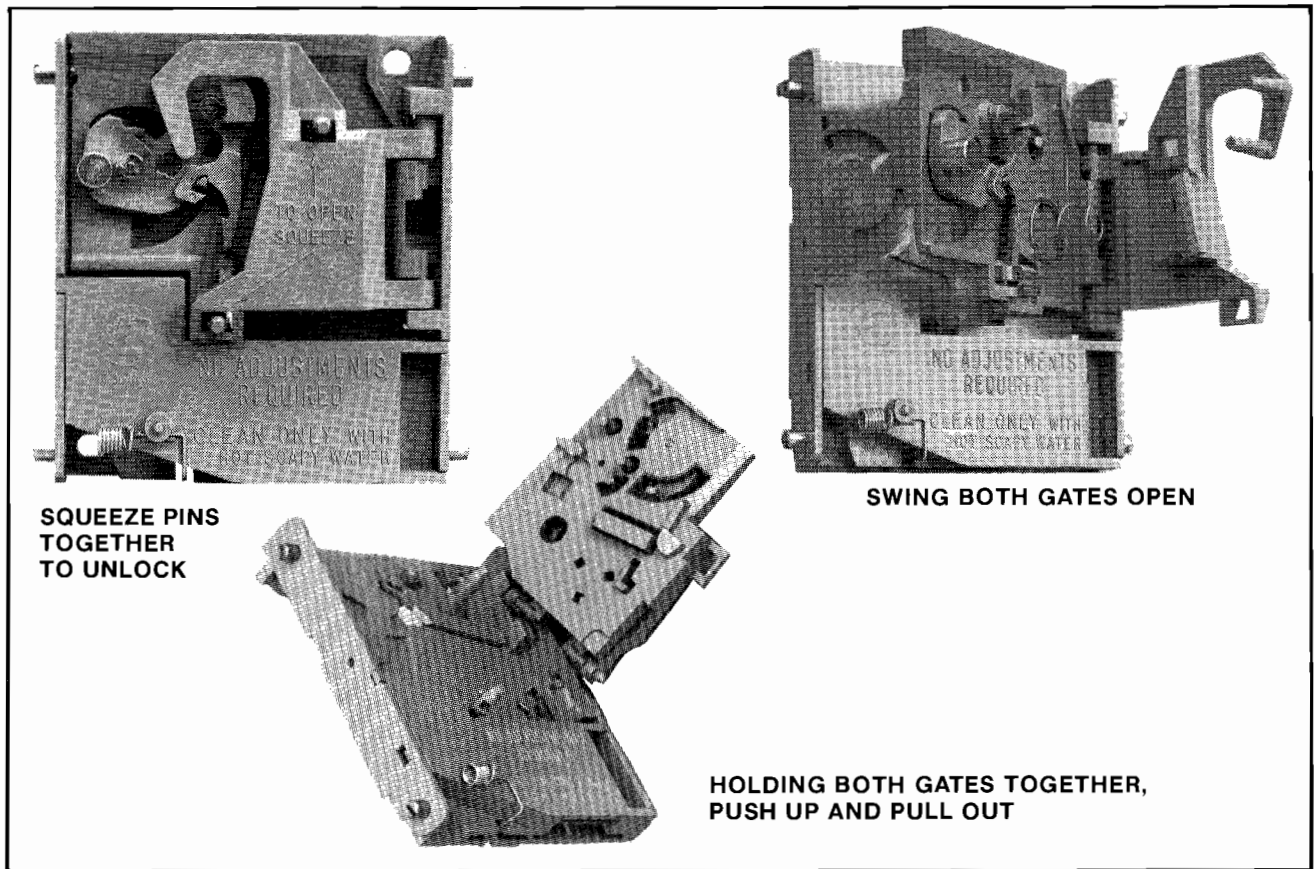


Figure 7-4 Opening the plastic coin acceptor

PLASTIC COIN ACCEPTOR MECHANISMS

The plastic coin acceptor mechanism(s) must be removed periodically from the coin door and cleaned.

1. **Make sure the power to the game is off.**
2. Unlock and open the coin door.
3. Remove the coin acceptor mechanism(s) as shown in Figure 7-1.
 - Push down on the two spring loaded latches.
 - While holding the latches down, pull the top of the acceptor mechanism toward you.
 - Release the latches and lift out the mechanism.
4. Squeeze the two pins indicated in Figure 7-4 together to open the mechanism and break it down into its three basic parts.
 - Clean the mechanism in hot soapy water. It never rusts.
 - Rinse the mechanism in clean hot water and allow it to dry.

Reassemble the mechanism (it never needs lubrication).

5. Check the coin chute for obstructions such as: paper, gum, etc.
6. Reinstall the coin acceptor to the coin door. See Figure 7-5.
 - Place the two pegs at the coin acceptor's base into their retaining slots.
 - Now push the top of the coin acceptor toward the coin door until it snaps in place and is held there by the two spring loaded latches.
7. Close and lock the coin door.

NOTE: See Figure 7-6 for instructions on how to set the plastic coin acceptor mechanisms to either accept or reject Canadian quarters.

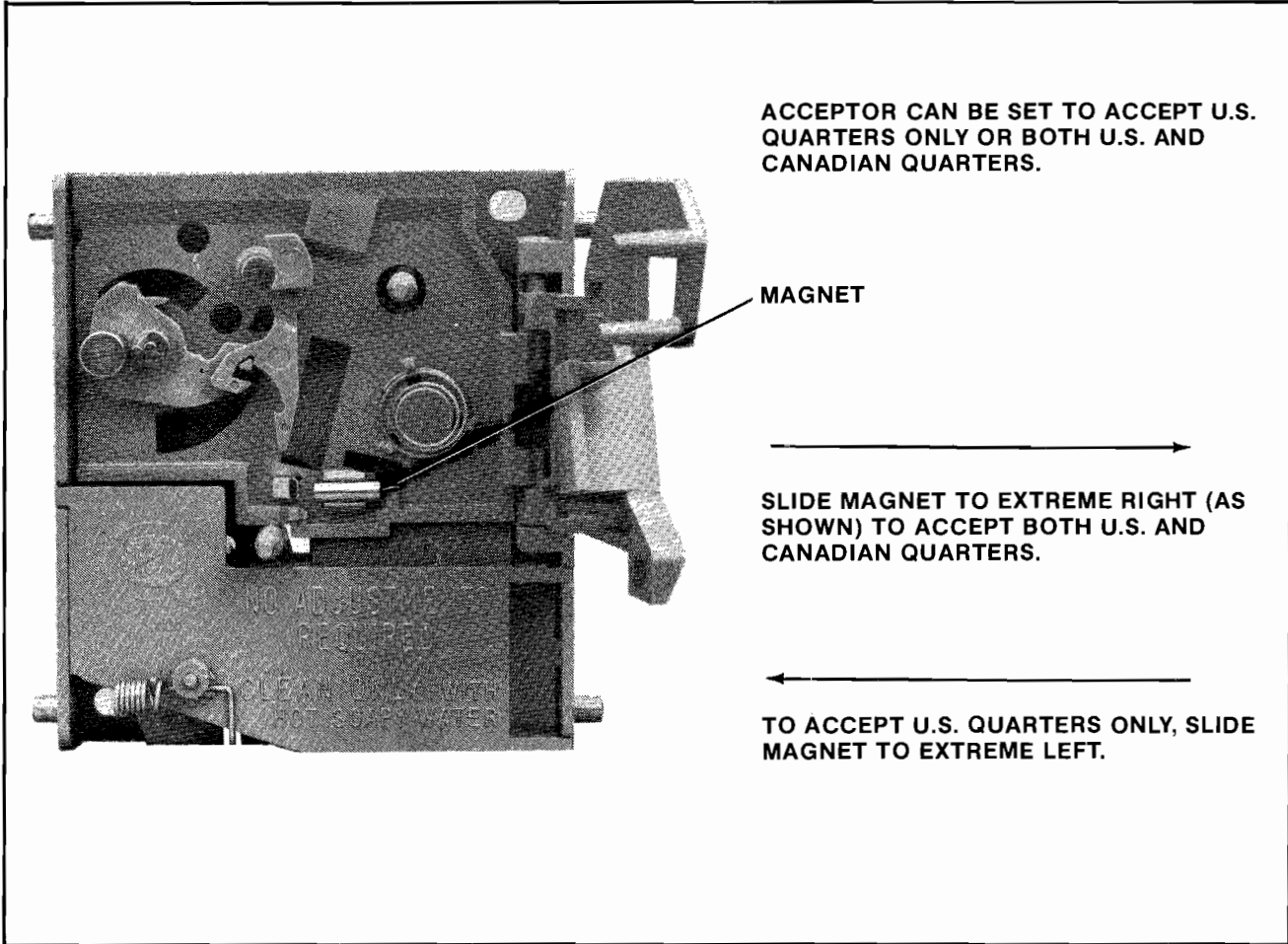


Figure 7-5 Changing the plastic coin acceptor to accept American or Canadian quarters.

PLEASE NOTE:

THE INFORMATION CONTAINED IN THIS SECTION IS TOLD IN AN EASY TO UNDERSTAND MANNER AND IS INTENDED TO AID THOSE WITHOUT AN ELECTRONICS DEGREE IN TROUBLESHOOTING AND REPAIRING THEIR GAMES T.V. MONITOR.

IF YOU READ THROUGH THIS SECTION AND STILL HAVE QUESTIONS, PLEASE CONTACT YOUR DISTRIBUTOR OR MIDWAY MANUFACTURING COMPANY AT THE TOLL FREE NUMBER PROVIDED WITH YOUR GAMES PAPERS.

OUR STAFF AND OUR DISTRIBUTORS STAND READY TO HELP YOU!

THANK YOU

VIII T.V. Monitor Manual

Color T.V. Monitor

Introduction: (How to use this section of your manual.)

This section has been designed to simply familiarize you with one of the more mystical components in your game — the T.V. monitor. If you are an electronics technician who is quite knowledgeable on the subject, you may decide to just go to the schematics and start troubleshooting the defective monitor. But if you are like most people, a monitor is a T.V. set, and that means a complex doo-dad that means big buck repairs. This isn't necessarily so. This section of the manual will acquaint you with the monitor and could just help you repair it if you feel adventurous enough to give it a try. If you have any knowledge of electronics, especially the use of a voltmeter, the repairs you can make are astonishing. Just keep in mind that **ELECTRICITY CAN BE VERY DANGEROUS, SO BE CAREFUL!!**

If you want to understand how a monitor works, just read the "THEORY OF OPERATION" subsection. If you wish, you can follow along with the schematics. The information is presented in a very basic manner but more complete treatment of the subject can be found in the technical sections of bookstores.

If you want to attempt to repair your monitor, it would be a good idea to read this whole section beginning to end before starting. **Pay attention to all warnings**

and take them seriously. The more equipment you have the better, but a low cost Volt-Ohm-Milliameter can often do the trick. Here are the steps to take:

1. Find the symptom that matches the problems your monitor has in the "SYSTEM — DIAGNOSIS" subsection. The diagnosis tells the circuit or area the problem may be in and possibly even the actual component causing it.
2. Once you have the circuit that is causing the trouble, read the "TROUBLESHOOTING" subsection to learn the procedure for finding the bad part.
3. Next, go to the schematic section and find the schematic that matches your monitor. It may be helpful to read the "DIFFERENCES BETWEEN MONITORS" subsection if you are unsure of which monitor you have. Use the schematic to see what parts are in the offending circuit.

That really is all there is to it. Just remember that there are some bizarre or rare symptoms not covered, or that a monitor may have two or more different problems that only a genius, the experienced, or an experienced genius can figure out. But be patient, follow safety precautions, and remember that there is also literature available from the monitor companies through your distributor or from Midway Manufacturing Company on request. (There is a toll free number on the back side of the front cover of this manual.)

Symptom Diagnosis

1. Insufficient width or height:

- A. Horizontal line (due to VERTICAL CIRCUIT DEFECT).
 - Bad yoke.
 - Bad vertical output section.
 - Open fusible resistor in vertical section.
 - Bad height control.
 - Bad flyback.
- B. Vertical line (due to HORIZONTAL CIRCUIT DEFECT).
 - Bad yoke.
 - Open width coil.
 - Open part in horizontal output section.

2. Picture spread out too far or crushed in certain areas:

- A. Horizontal or vertical output transistor.
- B. Bad component in output circuitry.

3. Line too close with black spacing:

- A. Problem in vertical section causing poor linearity.

4. Poor focus and convergence:

- A. Bad high voltage transformer ("flyback") or control.
- B. Focus voltage wire not connected to neck-board terminal.

5. Colors missing; check:

- A. Interface color transistors.
- B. Color output transistors.
- C. Cracked printed circuit board.
- D. Color circuits.
- E. Video input jack.

6. Picture not bright enough:

- A. Weak emission from picture tube. (Turn horizontal sync off frequency and put brightness all the way up for about 15 minutes. Occasionally this cures the problem.)

7. Silvery effect in white areas; check:

- A. Beam current transistors.
- B. Weak picture tube emission.

8. Too much brightness with retrace lines; check:

- A. Beam limiter transistors.
- B. Brightness and/or color blanking control set too high.

9. Increasing brightness causes an increase in size and poor focus.

- A. Weak high voltage rectifier or regulation (high voltage unit).

10. Small picture and/or poor focus:

- A. Low B+ voltage (power supply trouble).

11. Vertical rolling:

- A. Vertical oscillator transistor, IC, or circuit.
- B. No sync from logic board.

12. Horizontal line across center:

- A. Vertical output circuit is dead (see symptom No. 1. A.).
- B. Vertical oscillator is not putting out the right wave form.

13. Picture bends:

- A. Horizontal sync needs adjusting.
- B. Magnetic or electromagnetic interference.

14. Flashing picture, visible retrace lines:

- A. Broken neck board.
- B. Internal short circuit in the picture tube (arcing).

15. Unsymmetrical picture or sides of picture:

- A. Defective yoke.

16. No brightness, power supply operating — No high voltage for the picture tube; check:

- A. Horizontal oscillator.
- B. Horizontal amplifier and output.
- C. Flyback transformer (high voltage unit).

17. No brightness, high voltage present; check:

- A. Heater voltage to the tube at the neck board.
- B. Screen-grid voltage for the tube.
- C. Focus voltage.
- D. Grid to cathode picture tube bias.

18. No high voltage; check:

- A. For AC input to the "flyback".
- B. Horizontal deflection stages.
- C. Flyback transformer.
- D. Yoke.
- E. Power supply.

19. No horizontal and vertical hold; check:

- A. Sync transistors and circuit.
- B. Wires and jack from logic board to the monitor.

20. Wavy picture — (power supply defect); check:

- A. Transistors, diodes, electrolytic capacitors in the power supply.

21. Moving bars in picture:

- A. Ground connector off between monitor and logic boards.
- B. Defect in the power supply (see wavy picture symptom).

22. Washed out picture (see picture not bright enough):

- A. Check video signal at the cathode pins with an oscilloscope. If there is about 80 volts peak to peak, the picture tube has weak emission.

23. Monitor won't turn on:

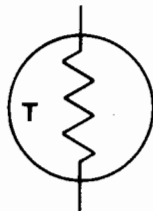
- A. Problem in the power supply: Check fuse, transistors, open fusible resistor.
- B. Shorted horizontal output transistor.

- C. Defective high voltage disabling circuit.
- D. Crack(s) somewhere on main chassis board.

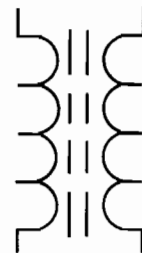
24. Can't adjust purity or convergence:

- A. Use a degausser to demagnetize the picture tube carefully following your degausser's instructions.
- B. Picture tube defective.
- C. Metal foreign material is in picture tube shield.
- D. Nearby equipment is electromagnetically interfering.
- E. The poles of the earth are pulling off the purity.
- F. Poor focus or width of picture.

Guide To Schematic Symbols



THERMISTOR
(POLARITY DOESN'T MATTER)



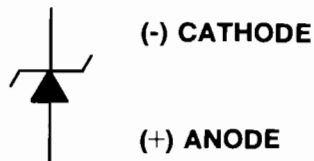
IRON CORE TRANSFORMER
(SUCH AS A FLYBACK)



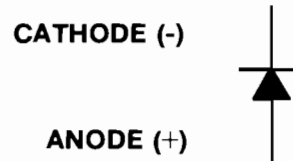
INDUCTOR, COIL, CHOKER
(POLARITY DOESN'T MATTER)



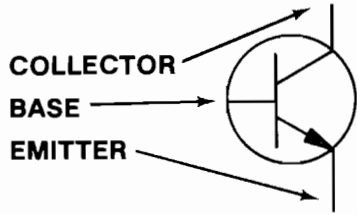
FUSE
(POLARITY DOESN'T MATTER)



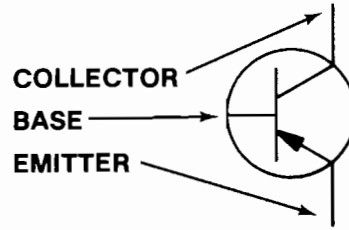
ZENER DIODE



DIODE



NPN TRANSISTOR



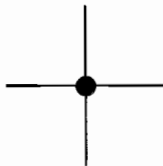
PNP TRANSISTOR



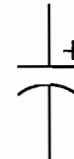
VARIABLE RESISTOR, POT, CONTROL
(POLARITY DOESN'T MATTER)



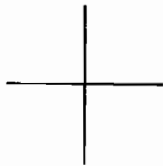
RESISTOR
(POLARITY DOESN'T MATTER)



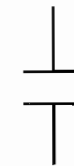
LINES ARE CONNECTED



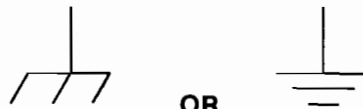
ELECTROLYTIC CAPACITOR



LINES ARE NOT CONNECTED



CAPACITOR
(POLARITY DOESN'T MATTER)



OR
GROUND

Troubleshooting

Troubleshooting monitors requires experience, patience, **and luck**. The first step is to match the symptom the monitor displays to the diagnosis next to it in the "SYMPTOM-DIAGNOSIS" subsection. This will pinpoint the circuit the problem is probably in, and often the parts to check. Next, the circuit should be visually inspected to see if there are any parts broken, burned, or if something is there that shouldn't be, like a loose screw, etc. Some parts go bad before others and should be checked first. In fact, following is the general order in which parts usually go bad:

1. Semiconductors (like transistors, diodes, and integrated circuits).
2. Fusible resistors.
3. Electrolytic capacitors.
4. Resistors.
5. Capacitors and coils.

Always remember that a monitor can bite like a snake. Even when it is turned off, capacitors hold voltage and will discharge it to you should you be touching chassis ground. The picture tube or CRT, itself, is a giant capacitor, so avoid the flyback anode plug hole. With the monitor on, the power supply circuit and/or the flyback, which puts out at least 18,000 volts, **CAN BE KILLERS!!** Avoid handling power transistors (usually output transistors), yoke terminals, and other high power components when the monitor is on.

WARNING: That picture tube is a bomb!

When it breaks, first it implodes, then it explodes. Large pieces of glass have been known to fly in excess of 20 feet in all directions. **DO NOT** carry it by the long, thin neck. Discharge its voltage to ground by shorting the anode hole to ground. Use a plastic handled screwdriver, connect one end of a wire with an alligator clip at each end to chassis ground and the other end to the metal shaft of the screwdriver. Using **ONE HAND ONLY** (put the other in your pocket) and touching **ONLY** the plastic handle of the screwdriver (**DO NOT TOUCH THE METAL SHAFT**) stick the blade of the screwdriver into the anode hole. Be prepared for a fairly loud pop and a flash. The longer the monitor has been turned off, the smaller the pop and dimmer the flash. But **BE CAREFUL**, picture tubes will hold a very

healthy charge for at least a **week** if not longer. Even after you've discharged it once, it may still carry a residual charge. It's better to be too careful than dead, which is why electronic equipment always carries stickers referring servicing to qualified personnel. Handle the side with the viewing screen against your chest when changing it. **ALWAYS** wear safety goggles when handling the picture tube.

To maintain the safety and performance of the monitor, always use exact replacement parts. For instance, the wrong components in the power supply can cause a fire, or the wrong color transistor may give a funny color to the picture. Service your monitor on a nonconductive firm table like wood, **NOT METAL**, and take off all of your jewelry just in case. With all this in mind, you are ready to begin troubleshooting.

Observe the picture carefully. Try to vary the appropriate control that would most likely affect your particular symptom. For example, if there is poor brightness or no picture, try turning up the brightness or contrast control. If the controls have no effect at all, chances are there is trouble with the control itself, the circuit it controls, or a nearby circuit that may be upsetting voltages. Go to the list of symptoms and determine with the schematic where the bad circuit is.

CAUTION:

Keep in mind that capacitors hold a charge as can the picture tube (for at least a week and usually longer), and could shock you.

First, check for obvious visual defects such as broken or frayed wires, solder where it is not supposed to be, missing components, burned components, or cracked printed circuit boards. If everything looks good up to this point, make sure that diodes, electrolytic capacitors, and transistors have their leads connected in the right polarity as shown on the schematic and the circuit board.

Turn on the power and measure the voltages at the leads of the active devices such as tubes, transistors, or integrated circuits. Any voltage that does not come within at least 10% to 15% of the voltage specified on the schematic indicates either a problem with that device or a component connected with it in the circuit. The next step is to use the ohmmeter to narrow down the field of possible offenders.

To test a transistor, one lead of the ohmmeter is placed on the base; and the other lead placed just on the emitter, then on the collector. A normal transistor will read either high resistance (infinite), or little resistance (400 to 900 ohms), depending on the polarity of this type transistor. Then the leads should be switched, one remaining on the base, and the other switched from the emitter to the collector. Now the opposite condition should result: the resistance should be infinite if it was lower when the other lead was on the base. Consistently infinite readings indicate an open, and a short is demonstrated by 0-30 ohms on most of these test readings. Finally, place one lead on the collector, then the other on the emitter. No matter which lead is used, there should be infinite resistance. Any lower reading, such as 50 ohms (which is typical on a bad transistor), indicates a short.

This all sounds pretty confusing, but a little experience on a good transistor will make you an expert in no time. Usually, the lowest ohmmeter setting is used for testing transistors. Once in a great while a transistor may check out good on this test, but may actually be "leaky" or break down only on higher voltages. If in doubt, change it. It is also wise to check the transistor out of the circuit just in case some component in the circuit is affecting the ohmmeter reading.

A diode is tested like a transistor except it only has two leads. Again, there should be high resistance one

way and little resistance the other. If it tests bad, take one lead out of the circuit in case some component is messing up the ohmmeter reading.

NOTE: DO NOT leave soldering equipment on the leads too long since all semiconductors, especially integrated circuits, are easily destroyed by heat.

Without special equipment, integrated circuits are checked by verifying the proper DC voltage on the pins and the correct AC wave form using an oscilloscope. **BE CAREFUL:** Shorting their pins can easily destroy them.

Resistors are checked with an ohmmeter and should usually be within ten percent of the value stated on them and on the schematic. You may have to desolder one lead from the printed circuit board. If you wreck the foil on the board, carefully solder a small wire over the break to reconnect the conductive foil.

Capacitors are tricky. Their resistance goes up when checked with an ohmmeter which shows a charging action. As they suck up current from the meter, the voltage goes up and so does the resistance. If you are sure a particular circuit is giving you a problem and everything else checks out O.K., Electrolytic capacitors are prime suspects. Substitute a new one and keep your fingers crossed.

Theory of Operation

To understand what goes on inside the monitor, large general groups of circuits will be examined instead of laboriously analyzing the branches and small circuits that make up these groups. This will help avoid confusion and aid in a basic, concrete, knowledge of what makes up a monitor.

THE POWER SUPPLY —

The AC going to the monitor from the game transformer is just like the voltage and current from your wall outlet. It jumps up and down going positive and negative sixty times a second. But a monitor needs nice, smooth DC; direct current, not alternating. So diodes chop up the AC and a big electrolytic capacitor filters it out to make it even smoother. Since the monitor is a big piece of electronic equipment, with many circuits demanding a lot of power from the power supply, there are also zener diodes and transistors to help maintain a nice, constant, smooth voltage so that the monitor circuits don't jump around. And this is what happens when you see a wavy picture. There is AC creeping

through the power supply, so it must be malfunctioning. If the voltage from the power supply is too low, the other circuits will be starved for power and you may see a small, wavy picture, or none at all.

Some circuits receive voltages that are higher than what the power supply should put out. But they come from the flyback transformer which will be discussed later.

THE INTERFACE SECTION OF THE CHASSIS —

The interface section of the chassis is fairly easy to identify. It is right by the place where the video jack(s) from the logic board(s) plug into. There are sets of transistors that receive the separate red, green, blue, and sync information from the cables that come from the logic boards. The circuits jack up the voltage and match impedances, or in other words, prepare the logic board outputs for the circuits that will really amplify them for the output devices such as the yoke in the case of the sync, or the picture tube that shows the colors.

An interesting aside is that our sync is composite negative sync. That means two things:

1. The sync is a negative going wave form.
2. There are two pulses going at different speeds over the same wire:
 - a. Vertical wave forms at 60 times per second (or Hertz) and
 - b. Horizontal wave forms at about 15,750 times per second (Hz).

The sync is amplified by a sync amplifier transistor and sent on its way to the oscillators. The sync or timing information will be explained along with the oscillator shortly.

The color information is sent via wires to the neck board where the main amplification occurs. This will also be discussed later.

VERTICAL AND HORIZONTAL DEFLECTION—

After the sync signal is amplified by the sync amp, it goes to two different sections, the vertical and horizontal circuits. Basically, the sync signals are for timing so the picture doesn't mess up since it is assembled like an orderly jigsaw puzzle, but so fast that you can't see the electron beams for each color painting the picture on the screen. This will all become clear soon. For now, we will follow the 60 cycle component of the sync as it goes on its journey to the deflection yoke.

The 60 cycle pulse goes to the vertical oscillator to make sure this circuit goes back and forth (or oscillates) at 60 times a second. Without this pulse keeping the circuit at the correct speed, it may get lazy and oscillate at 58 cycles or lower, or get ambitious and oscillate at 62 cycles or higher. At the wrong speed, the picture will start to roll up or down.

A Wells Gardner 13" (K4806) or 19" (K4906, K4956) color monitor uses an integrated circuit for its sync section. An Electrohome 13" or 19" color monitor uses an integrated circuit IC501 for its sync section. Wells Gardner uses HA11423 and Electrohome uses HA11244. **These ARE NOT interchangeable!** The idea is all the same. The output to the vertical amplifying transistors for all monitors must form a sawtooth wave form, sort of like a bunch of pyramids, racing through the yoke's vertical coils at 60 times a second.

Along the way to the output transistors, the 60 cycle pulse is shaped and amplified to do the job: the yoke magnetically pushes the electron beam to fill the screen out sideways looking at the screen with the greatest length going up and down. Or viewing the screen sitting like a home television set, the amplified vertical output fills the screen up and down. Watching a monitor like this, seeing only a horizontal line means a problem with the vertical coils of the yoke or anything from the vertical output section on back to the oscillator.

The horizontal section is very similar with a few exceptions. The horizontal wave shape is more like a square and has a frequency of 15,750 cycles a second. Both Wells Gardner and Electrohome use the other side of their respective integrated circuits for the horizontal circuitry. If the oscillator isn't going at the correct speed, the picture may move sideways, start to slant, or tear up with slanted thin figures. With both the vertical and horizontal of all monitors, there are variable resistors that change the speed of the oscillators up and down. This way you have controls that can make the correct frequencies to keep the electronic jigsaw puzzle nicely locked in place. If you're driving in a car and next to you someone else is driving their car at exactly the same speed, it will appear that they are not moving. And this is why the sync frequency and the oscillator's frequency must match, so the picture doesn't appear to move.

The correct wave form is shaped and amplified in the circuitry just like in the vertical section. But the horizontal output transistor is a large power transistor and not only serves to give current to the horizontal yoke windings, it also feeds the flyback transformer.

THE FLYBACK TRANSFORMER (OR HIGH VOLTAGE UNIT) —

The picture tube needs high voltage to light up, and the power supply can't meet this demand. The flyback transformer receives current alternating at about 15,750 times per second from the horizontal output transistor. The "flyback" jacks up its input voltage and puts out a higher voltage alternating at the same speed. But, in your "flyback" there are diodes that chop up the alternating voltage to make it a smooth DC output just like in the power supply. This is what goes through that thick red wire to your picture tube. **THIS AREA HAS ABOUT 18,000 VOLTS ON IT AND IT CAN KILL YOU!!**

The "flyback" may be dangerous, but it is also generous. It has extra output windings which give voltage to the heater pins of the picture tube, voltage for the vertical deflection circuits, and picture tube screen-grid voltage. So in a way, the high voltage "flyback" is like a second power supply.

COLOR CIRCUITS —

The color circuits are pretty straight forward. The signals go into the interface section where some amplification and impedance matching occurs. These circuits are pretty sparse and simple. Each color just has two transistors and a diode with some resistors and capacitors. From here, the AC color signal is sent by wires to the neck board.

The color output circuits are on the neck board. The color signals going to the transistors are controlled by two variable resistors called drive controls. There are only two, one for the red and one for the green.

The blue doesn't have one. In the emitter part of each transistor is another variable resistor that is the cut off control. These controls vary the amount of amplified AC signal that goes to the cathodes of the picture tube. The more signal, the more color. The bases of each of these transistors are connected together and are all connected to the blanking and beam limiting transistors which are in the interface section.

The beam limiter helps control the brightness level, and the blanking transistor rapidly turns the picture tube on and off so that retrace lines don't show up on the screen. By turning up the brightness on a good monitor, these four to six retrace lines can be seen slanting diagonally across the picture.

PROTECTION CIRCUIT —

To protect the high voltage section against voltages that are too high coming from the power supply which could cause X-rays to be emitted from the "flyback", a circuit senses the higher power supply voltage, and using a transistor, turns off the horizontal oscillator. Since the horizontal oscillator doesn't work, the horizontal output transistor has nothing to feed the "flyback" which in turn has nothing to feed the picture tube. The monitor will be silent, have no picture, and will appear to be off. **But don't be fooled.** There is still that excessive amount of voltage coming from the power supply. To find out, check at pin two of Wells Gardner's IC501 and emitter of X04 for the Electrohome monitor. Here are the voltages you should receive:

Wells Gardner = 130VDC
Electrohome = 120VDC

The best place to measure this voltage on an Electrohome monitor is at a pin marked B1 on the chassis. This is because a 13 inch color Electrohome monitor,

The G07-FB0 or G07-902, has an integrated circuit and very little else in the power supply. Still, there should be 120VDC at B1.

THE PICTURE TUBE (OR CRT) —

The picture tube or CRT is an output device. In other words, the end result of the circuit's work is displayed by this part. Actually, the output of other circuits is in the neck of the picture tube.

First, there is the heater. The heater boils off electrons from the cathodes so that they (the electrons) shoot up to the screen to excite the phosphors so that the three phosphors emit three colors of light.

The cathodes are next, and again they emit electrons to turn on the tube phosphors, making it glow. The cathode can arc or short to the heater resulting in no picture and a defective picture tube.

Next come the grids. The first grid is grounded. The following grid is the screen grid which receives about 300VDC depending on the brightness setting. The next grid closest to the picture tube screen is the focus grid which gets about one fifth the amount of voltage that is applied to the picture tube anode.

After jetting from the cathode through all these grids, the electrons speed through a mask, a sheet of material with tiny holes, and then excite the tiny dots of phosphor in the inside surface of the picture tube screen. The green electron gun (or cathode and circuitry) spits out electrons which head for the green phosphors only. The same goes for the red and blue guns. The way the phosphor light blends determines the color seen. Should these electron beams become too intense, they may burn the phosphor. With the monitor off, this can be seen as a dark permanent image of the video information on the tube screen.

Differences Between Monitors

The easiest way to identify the brand of monitor you are working with, assuming you can't find the brand name written on it anywhere, is to check the color of the suction cup type insulator that houses that dangerous anode plug on the CRT. Both monitors use a red wire but the Wells Gardner anode cup is BLACK while the Electrohome anode cup is LIGHT GRAY. Unfortunately, "call-out-numbers" for parts, circuit layout, and even circuit design are similar enough to confuse the average observer.

Let's say you have an Electrohome that isn't working. No problem. You can scavenge parts from an old broken up one that you may have around.

Now let's say you have a Wells Gardner that isn't working. **STOP!!** This could be a problem. There are 3

different types of Wells Gardner K4900 **SERIES** monitors in the games. Here are ways to identify them.

K4906 (1st TYPE) — This monitor's identifying tags have **BLACK** ink printed on a white background. There is **NO** Vertical Damping Control. (This Control would be next to the Vertical Hold Control but this area is jumpered with a small wire instead.

K4906 (2nd TYPE) — This monitor's identifying tags have **RED** ink printed on a white background. There **IS** a Vertical Damping Control next to the Vertical Hold Control. The Damping Control provides a few more lines on the top of the monitor screen (monitor viewed as a normal T.V. would be) for any video game that may need these lines to fit the picture on the

screen. Moving the Control may distort the top part of your picture (or the side, depending on the game and how the monitor is mounted) so go ahead and move it if you are having this type of problem. To accommodate this new feature, there are a few circuit changes.

ONE MAJOR DIFFERENCE BETWEEN THESE TWO VERSIONS OF THE K4906 IS THE YOKE. They look the same but notice the part numbers:

K4906 **WITHOUT** the Damper Control: 2021111201

K4906 **WITH** the Damper Control: 2021111258

Since the companies like to change part numbers at the drop of a hat, the best thing to do is to request whatever part number is written on your yoke. If you should get the wrong yoke, the results will be:

Picture distortion.

Excessive brightness.

Too much or too little vertical picture size.

K4956 (3rd TYPE) — This monitor is identical to the K4906 **WITHOUT** the Damper Control **EXCEPT** the picture tube is vertically mounted and there is an additional small P.C. Board mounted on the monitor where the yoke plugs in. This monitor is used on some Cocktail Table games where the picture has to flip for the second player.

Generally speaking, some games flip the picture image via the logic board programming but this monitor is used in games that flip the picture image via generation of a small signal voltage which is sent to the extra P.C. Board on this monitor. This signal voltage causes relays on this extra P.C. Board to flip the picture by reversing the horizontal and vertical signals to the yoke pins.

What kind of problems can this extra P.C. Board cause? If the relays become defective, the picture won't flip. If the P.C. Board gets cracked you may have a horizontal line on the screen, a vertical line on the screen, or maybe just a dot in the center of the screen. Of course, the logic board could be defective and not sending the signal to flip the picture. In any case, some people feel that using relays is cheaper, simpler, and more reliable, so this is an advantage.

CONTROLS YOU MAY NOT TOUCH

Basically, on the Electrohome monitor, you can move any control you want **EXCEPT** for the B1 control. This sets the power supply voltage (ideally at 120 VDC) and is located right behind VERTICAL HOLD. The 13" Electrohome **DOES NOT** have this control. It may also be wise not to move the VERTICAL LINEARITY since this distorts the picture and is hard to reset perfectly. If you do move it, turn on the Cross Hatch Test Pattern of your game and try to get the squares to the point where they are equal in size by readjusting this Linearity Control.

On the Wells Gardner monitor, brightness is adjusted by the "BLACK LEVEL" Control which is right next to the Horizontal Frequency Control. Under the Focus Control is the "SCREEN" Control which you **DO NOT** touch. Yes, this control does adjust the brightness, but it is used to set the CRT bias and is adjusted at the factory. When Wells Gardner sets it, they mark the position with a black mark on the knob. If you move it, be sure to realign the mark and THEN set the BLACK LEVEL Control to the brightness you desire. So, other than the SCREEN control, you may adjust any of the controls.

Parts Interchangeability

Some parts can be interchanged on all of the monitors. Here are the rules:

1. You **CAN** swap any resistor between monitors that has the same resistance, wattage rating, and tolerance.
2. You **CAN** swap any capacitor between monitors that has the same capacitance and voltage rating.
3. You **CAN** swap many of the parts between the 19" and the 13" versions of each manufacturer's monitor. **BUT**, be certain to compare the manufacturers' part numbers to be positive the parts you want to interchange are identical. **BE SURE** you have read the section DIFFERENCES BETWEEN MONITORS which was covered earlier.
4. You **CANNOT** swap any picture tubes between monitors!! In the past you could, but Wells Gardner is now using a new monitor. When

ordering a replacement picture tube, **ALWAYS SPECIFY THE PICTURE TUBE NUMBER!**

5. You **CANNOT** change any part that is a **safety part**, one that is shaded in gray on the schematic; it **MUST** be **IDENTICAL** to the original. **To do otherwise IS DANGEROUS.** For instance, the 13 inch Electrohome (G07-902) monitor "flyback" looks identical to the 19 inch Electrohome (G07-904) monitor "flyback". In fact, there is even a 19 inch Electrohome (G07-905) monitor (which is an obsolete model) with a similar looking "flyback". **NONE OF THESE ARE INTERCHANGEABLE!!**
6. You **CAN** change any of the parts between the G07-904 and G07-907. They're essentially the same monitor except that the G07-907 has a vertically mounted picture tube.

If there is any doubt about what parts can be swapped between each manufacturer's 19 inch and 13 inch models, compare the manufacturer's part number between each one. If they match up, they are the same part.

19" COLOR MONITOR SCHEMATIC DIAGRAM

MODELS 19K4901, 19K4906, 19K4951, 19K4956

Power Supply Voltage and Symbols

Symbol	Voltage	Operating Circuit
	15V	Vert. Osc. Sync Blanking CRT Cut-Off
	130V	Horiz. Osc. Horz. Drive Horz. Output Vert. Output
	175V	Video Output

★

SERVICE TECHNICIAN WARNING
X-RAY RADIATION PRECAUTION:

THIS PRODUCT CONTAINS CRITICAL ELECTRICAL AND MECHANICAL PARTS ESSENTIAL FOR X-RAY RADIATION PROTECTION. FOR REPLACEMENT PURPOSES, USE ONLY TYPE PARTS SHOWN IN THE PARTS LIST.

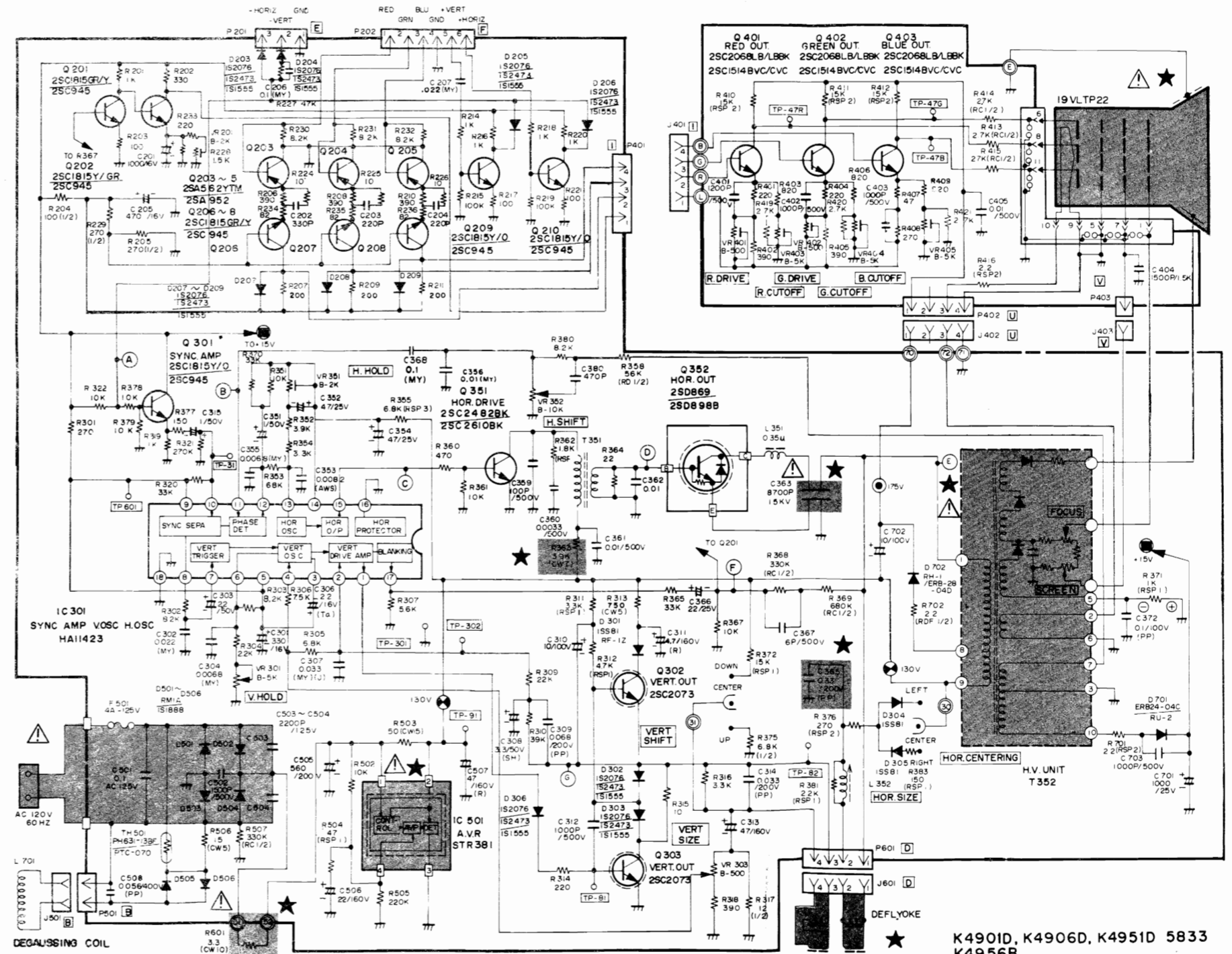
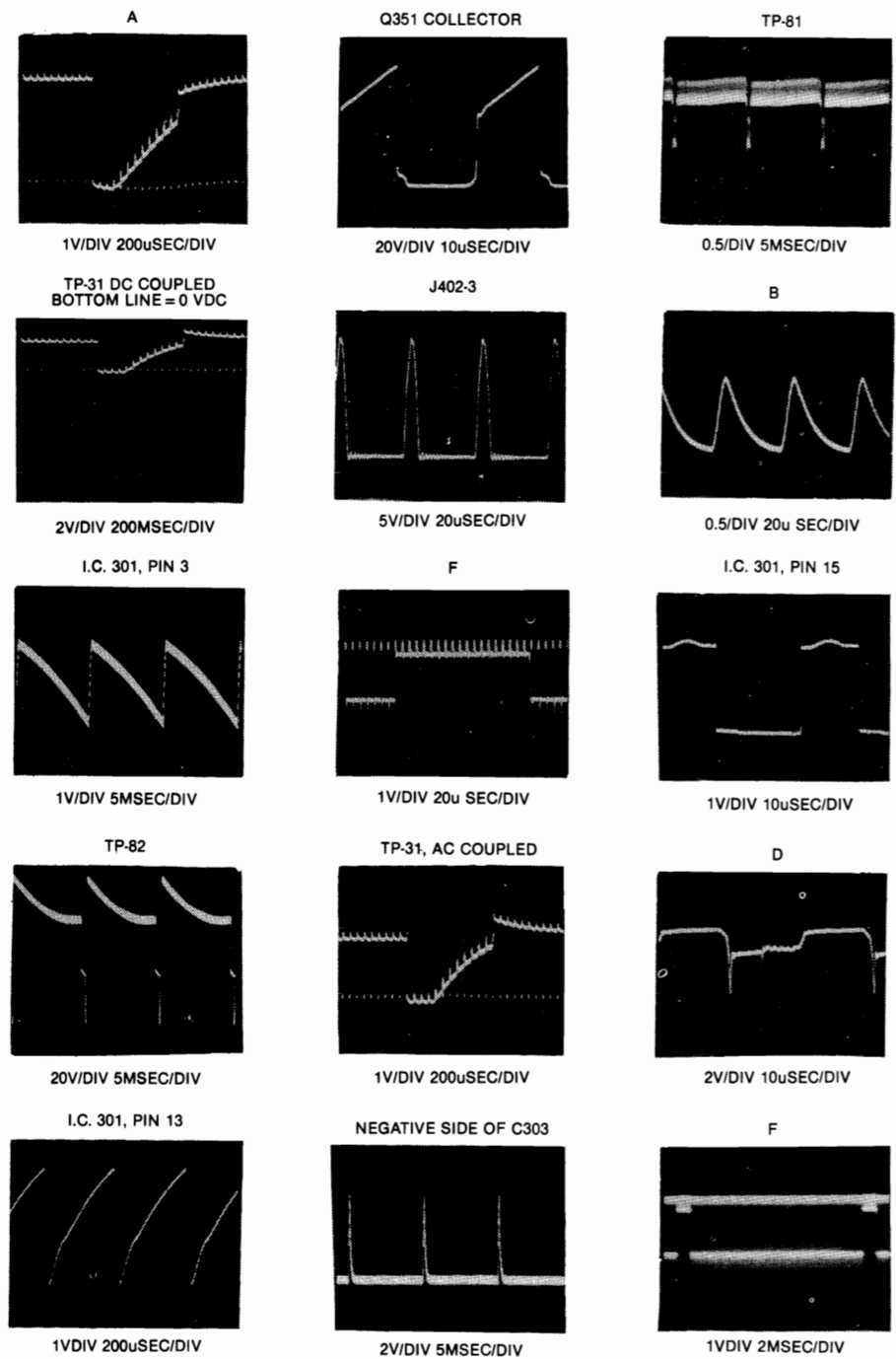
⚠

CAUTION: FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMMENDED PARTS.
AVERTISSEMENT: POUR MAINTENIR LE DEGRE DE SECURITE DE L'APPAREIL NE REMPLACER LES COMPOSANTS DONT LE FONCTIONNEMENT EST CRITIQUE POUR LA SECURITE QUE PAR DES PIECES RECOMMANDEES PAR LE FABRICANT.

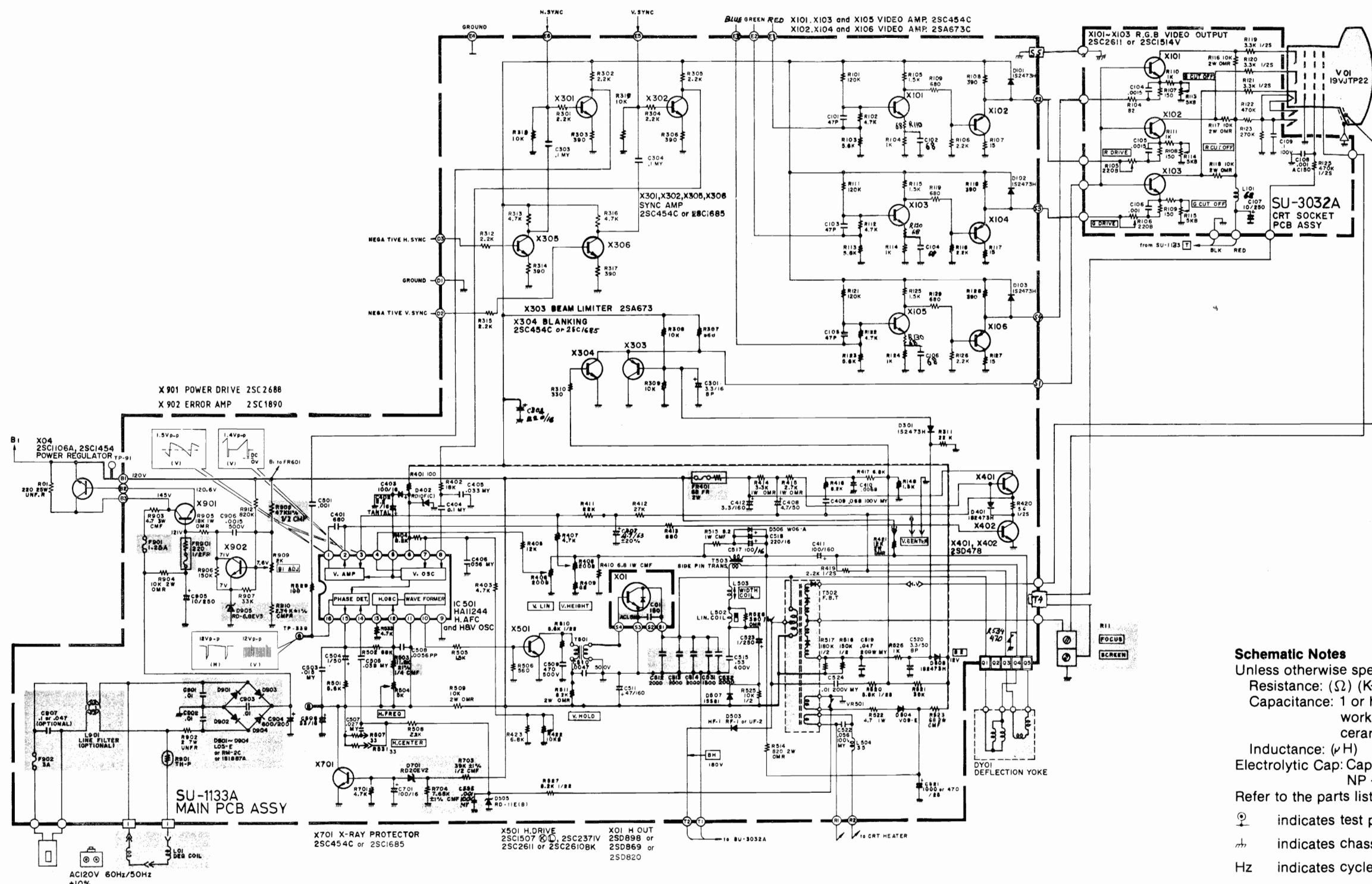
OSCILLOSCOPE WAVEFORM PATTERN

The waveforms shown are as observed on the wide band oscilloscope with the monitor turned to a reasonably strong signal and a normal picture. The voltages shown on each waveform are the approximate peak amplitudes.

If the waveforms are observed on the oscilloscope with a poor high frequency response, the corner of the pulses will tend to be more rounded than those shown and the amplitude of any high frequency pulse will tend to be less.



★ K4901D, K4906D, K4951D 5833
K4956B



Schematic Notes
 Unless otherwise specified
 Resistance: (Ω) (K \rightarrow K Ω , M \rightarrow M Ω), 1/4 (W) carbon resistor
 Capacitance: 1 or higher \rightarrow (pF), less than 1 \rightarrow (μ F)
 working voltage \rightarrow 50 (V)
 ceramic capacitor
 Inductance: (μ H)
 Electrolytic Cap: Capacitance Value (μ F)/working voltage (V),
 NP \rightarrow non-polar (or bipolar) electrolytic cap.
 Refer to the parts list for additional component information.

\odot indicates test point connection
 \perp indicates chassis ground unless otherwise specified
 Hz indicates cycles per second

For **safety** purposes (and continuing reliability)
 \triangle replace all components marked with safety symbol with identical type.
 NOTE: FR \rightarrow fusible resistor

00-4147-04
 G07-CB0

Parts identification on circuit boards:
 e.g. SU1126A (R107 = R1107)
 SU3030A (R113 = R3113)

REPLACEMENT PARTS LIST - ELECTROHOME 19" MONITOR

Components identified by the Δ symbol in the PARTS LIST and on the Schematic have special characteristics important to safety.

DO NOT degrade the safety of the set through improper servicing.

Abbreviations for Resistors and Capacitors

Resistor		Capacitor	
C R	: Carbon Resistor	C Cap.	: Ceramic Capacitor
Comp. R	: Composition Resistor	M Cap.	: Mylar Capacitor
OM R	: Oxide Metal Film Resistor	E Cap.	: Electrolytic Capacitor
V R	: Variable Resistor	BP E Cap.	: Bi-Polar (or Non-Polar) Electrolytic Capacitor
MF R	: Metal Film Resistor	MM Cap.	: Metalized Mylar Capacitor
CMF R	: Coating Metal Film Resistor	PP Cap.	: Polypropylene Capacitor
UNF R	: Nonflammable Resistor	MPP Cap.	: Metalized PP Capacitor
F R	: Fusible Resistor	PS Cap.	: Polystyrol Capacitor
		Tan. Cap.	: Tantal Capacitor

NOTE: When ordering replacement parts please specify the part number as shown in this list including part name, and model number. Complete information will help expedite the order.

Use of substitute replacement parts which do not have the same safety characteristics as specified, may create shock, fire or other hazards. For maximum reliability and performance, all parts should be replaced by those having identical specifications.

SERVICE REPLACEMENT PARTS LIST

Symbol	Description	Part Number
	Main P.C.B. Ass'y	SU-1133A
	CRT Socket P.C.B. Ass'y	SU-3032A
	Purity Shield Ass'y	07-220083-03

Outside of the P.C.B. Ass'y

Symbol	Description	Part Number
Δ	Picture Tube 19"	17-7198-03
Δ	Deflection Yoke	A29779-D = 21-141-01
Δ	PC Magnet	A75034-B = 29-32-01
Δ	Flyback Transf.	A29951-B
Δ	HVR	A46600-A
R05	UNF Resistor 220 Ω ,25W K	QRF258K-221
C04	C Capacitor 150pF, AC1.5KV	QCZ0101-005
X01	Si. Transistor	2SD870
X02	Si. Transistor	2SC1106A
SC	Screw #8- $\frac{3}{8}$	31-610818-06
SC	Screw $\frac{1}{4}$ x $\frac{3}{4}$ Pix Tube Mtg. (4)	31-601418-12
WA	Pyramidal Lock Washer (4)	33-255-01
	Nut Retainer, Pix Tube Mtg. (4)	33-494-01
	Clip — P.C.B. Support	33-629-02
	Standoff	33-670-010R-02
	Wire Terminal (Gnd. Strap)	34-228-03
	Terminal Lug (Gnd.)	34-33-04
	Groundstrap Assy.	34-574-02
	Grounding Spring	35-212-03
	Wire Hook (Gnd. Strap)	35-3053-02
	Purity Shield Holddown Clamp	35-2348-01
	Support Brkt. RH	35-3890-01
	Support Brkt. LH	35-3890-02
	Chassis Base	38-449-02
	Yoke Wedge (3)	39-1233-01

Purity Shield Ass'y. Parts List

Symbol	Description	Part Number
D911, D912	Degaussing Coil	21-1007-30
	Rectifier 1 Amp 600V (2)	28-22-27
	Pin Terminal (2)	34-708-01
	Pin Terminal Housing	34-709-01
	Purity Shield (2 pcs.)	35-3847-01
	Purity Shield (2 pcs.)	35-3847-02
C911	Capacitor 100nF 10% 400V	48-171544-62
R921	Resistor, Wirewound 33 Ω , 4W	42-113301-03
	Fire Retardent Term. Strip 4 Lug	34-492-09

CRT Socket P.C.B. Ass'y (SU-3032A) Parts List

Resistors		Description		Part Number
R3105	V	R	200	QVZ3234-022
R3106	V	R	200	QVZ3234-022
R3113	V	R	5K	QVZ3234-053
R3114	V	R	5K	QVZ3234-053
R3115	V	R	5K	QVZ3234-053
R3116	OM	R	10K Ω 2W J	QRG029J-103
R3117	OM	R	10K Ω 2W J	QRG029J-103
R3118	OM	R	10K Ω 2W J	QRG029J-103
R3119	Comp.	R	3.3K Ω $\frac{1}{2}$ W K	QRZ0039-332
R3120	Comp.	R	3.3K Ω $\frac{1}{2}$ W K	QRZ0039-332
C3121	Comp.	R	3.3K Ω $\frac{1}{2}$ W K	QRZ0039-332

Capacitors

Symbol	Description	Part Number
C3107	E Cap. 10uF 250V A	QEW53EA-106
C3108	C Cap. 1000pF DC1400V P	QCZ9001-102M

Coils

Symbol	Description	Part Number
L3101	Peaking Coil	QQL043K-101

Semiconductors

Symbol	Description	Part Number
X3101	Si. Transistor	2SC1514VC
X3102	Si. Transistor	2SC1514VC
X3103	Si. Transistor	2SC1514VC

Miscellaneous

Symbol	Description	Part Number
△	△CRT Socket	A76068

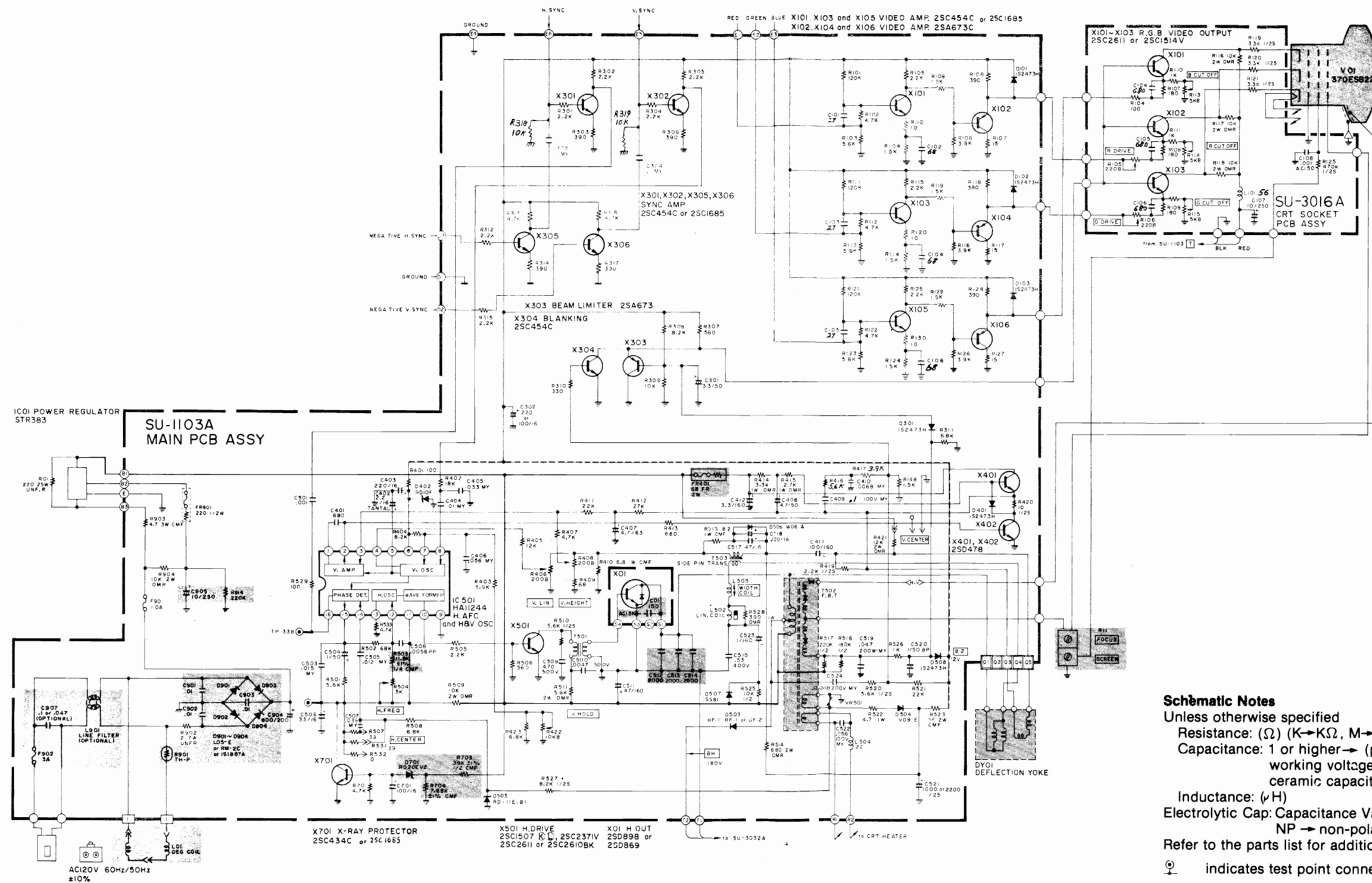
Main PCB Ass'y (SU-1133A) Parts List**Resistors**

Symbol	Description	Part Number
R1406	V R 200Ω	QVZ3230-002
R1408	V R 200Ω	QVZ3230-002
R1410	CMF R 6.8Ω1W J	QRX019J-6R8
R1414	OM R 3.3KΩ1W J	QRG019J-332
R1415	OM R 2.7KΩ1W J	QRG019J-272
R1421	OM R 12KΩ2W J	QRG026J-123Z
R1422	V R 10KΩ	QVZ3230-014
△FR1401	△F R 68Ω2W K	QRH024K-680M
△R1503	△CMF R 11.8KΩ¼W +1%	QRV142F-1182
R1504	V R 5KΩ	QVZ3230-053
R1509	OM R 10KΩ2W J	QRG026J-103Z
R1512	OM R 8.2KΩ2W J	QRG026J-822Z
R1514	OM R 820Ω2W J	QRG026J-821Z
R1515	CMF R 8.2Ω1W J	QRX019J-8R2
R1522	CMF R 4.7Ω1W J	QRX019J-4R7
R1523	OM R 68Ω2W J	QRG026J-680Z
R1528	OM R 390Ω1W J	QRG019J-391
R1534	ZN R	ERZ-C05ZK471
VR1501	ZN R	ERZ-C05DK271
△R1703	△CMF R 39Ω½W +1%	QRV122F-3902
△R1704	△CMF R 7.68KΩ¼W +1%	QRV142F-7681
△R1901	△Posistor	A75414
R1902	UNF R 2Ω7W K	QRF076K-2R0
R1903	CMF R 4.7Ω3W J	QRX039J-4R7
R1904	OM R 10KΩ2W J	QRG026J-103Z
R1905	OM R 18KΩ1W J	QRG019J-183
△Q1908	△CMF R 47Ω½W +1%	QRV122F-470Z
△R1909	V R 2KΩ	QVP5A0B-023E
R1910	△CMF R 2.74KΩ¼W +1%	QRV142F-274I
△FR1901	△F R 220Ω½W K	QRH124K-221M

Capacitors

Symbol	Description	Part Number
C1301	BPE Cap. 3.3uF 50V A	QEN61HA-335Z
C1402	Tan. Cap. 2.2uF 16V K	QEE51CK-225B
C1407	E Cap. 4.7uF 6.3V A	QEW51JA-475
C1411	E Cap. 100uF 160V A	QEW52CA-107
C1412	E Cap. 3.3uF 160V A	QEW52CA-335
C1508	PP Cap. 5600uF 50V J	QFP31HJ-562
△C1512	△PP Cap. 2000pF DC1500V J	QFZ0082-202
△C1513	△PP Cap. 2000pF DC1500V J	QFZ0082-202
△C1514	△PP Cap. 2000pF DC1500V J	QFZ0082-202
C1515	PP Cap. 0.53uF DC1200V J	QFZ0067-534
C1520	BPE Cap. 3.3uF 50V A	QEN61HA-335Z
C1523	E Cap. 1uF 160V A	QEW62CA-105Z
C1524	M Cap. 0.1uF 200V K	QFM720K-104M
△C1531	△PP Cap. 2000pF DC1500V J	QFZ0082-202
△C1532	△PP Cap. 1500pF DC1500V J	QFZ0082-152
C1904	E Cap.	QEY0034-001
C1905	E Cap. 10uF 250V A	QEW52EA-106

Coils	Description	Part Number
Symbol		
L1502	Linearity Coil	A39835
L1503	Width Coil	C30380-A
L1504	Heater Choke	C30445-A
Transformers		
Symbol	Description	Part Number
T1501	Hor. Drive Transf.	A46022-BM
T1503	Side Pin Transf.	C39050-A
Semiconductors		
Symbol	Description	Part Number
IC1501	IC	HA11244
X1101	Si. Transistor	2SC1685(R)
X1102	Si. Transistor	2SA673(C)
X1103	Si. Transistor	2SC1685(R)
X1104	Si. Transistor	2SA673(C)
X1105	Si. Transistor	2SC1685(R)
X1106	Si. Transistor	2SA673(C)
X1301	Si. Transistor	2SC1685(R)
X1302	Si. Transistor	2SC1685(R)
X1303	Si. Transistor	2SA673(C)
X1304	Si. Transistor	2SC1685(R)
X1305	Si. Transistor	2SC1685(R)
X1401	Si. Transistor	2SD478
X1402	Si. Transistor	2SD478
X1501	Si. Transistor	2SC2610BK
X1901	Si. Transistor	2SC2688 (K.L.M.)
X1902	Si. Transistor	2SC1890A (E.F.)
D1101	Si. Diode	W06A
D1102	Si. Diode	W06A
D1103	Si. Diode	W06A
D1301	Si. Diode	1SZ473H
D1401	Si. Diode	1SZ473H
D1402	Zener Diode	RD10F(C)
D1503	Si. Diode	HF-1
D1504	Si. Diode	V09E
D1505	Zener Diode	RD11E(B)
D1506	Si. Diode	W06A
D1507	Si. Diode	1SS81
D1508	Si. Diode	1SZ473H
△D1701	△Zener Diode	RD20EV2
△D1901	△Si. Diode	1S1887A
△D1902	△Si. Diode	1S1887A
△D1903	△Si. Diode	1S1887A
△D1904	△Si. Diode	1S1887A
△D1905	△Zener Diode	RD6.8EV3
Miscellaneous		
Symbol	Description	Part Number
△F1901	△Fuse 1.25A	QMF53U1-1R25S
△F1902	△UL Fuse 3A	QMF66U1-3R0S



Schematic Notes

- Unless otherwise specified
- Resistance: (Ω) (K→KΩ, M→MΩ), 1/4 (W) carbon resistor
- Capacitance: 1 or higher → (pF), less than 1 → (μF)
- working voltage → 50 (V)
- ceramic capacitor
- Inductance: (μH)
- Electrolytic Cap: Capacitance Value (μF)/working voltage (V), NP → non-polar (or bipolar) electrolytic cap.
- Refer to the parts list for additional component information.
- ⊙ indicates test point connection
- ⊕ indicates chassis ground unless otherwise specified
- Hz indicates cycles per second
- For **safety** purposes (and continuing reliability)
- ⚠ replace all components marked with safety symbol with identical type.
- NOTE: FR → fusible resistor (—FR—)

G07-FBO
00-4147-03

Parts identification on circuit boards:
e.g. SU1126A (R107 = R1107)
SU3030A (R113 = R3113)

REPLACEMENT PARTS LIST - ELECTROHOME 13" MONITOR

Components identified by the Δ symbol in the PARTS LIST and on the Schematic have special characteristics important to safety.

DO NOT degrade the safety of the set through improper servicing.

Abbreviations for Resistors and Capacitors

Resistor		Capacitor	
C R	: Carbon Resistor	C Cap.	: Ceramic Capacitor
Comp. R	: Composition Resistor	M Cap	: Mylar Capacitor
OM R	: Oxide Metal Film Resistor	E Cap.	: Electrolytic Capacitor
V R	: Variable Resistor	BP E Cap.	: Bi-Polar (or Non-Polar) Electrolytic Capacitor
MF R	: Metal Film Resistor	MM Cap.	: Metalized Mylar Capacitor
CMF R	: Coating Metal Film Resistor	PP Cap.	: Polypropylene Capacitor
UNF R	: Nonflammable Resistor	MPP Cap.	: Metalized PP Capacitor
F R	: Fusible Resistor	PS Cap	: Polystyrol Capacitor
		Tan. Cap.	: Tantal Capacitor

NOTE: When ordering replacement parts please specify the part number as shown in this list including part name, and model number. Complete information will help expedite the order.

Use of substitute replacement parts which do not have the same safety characteristics as specified, may create shock, fire or other hazards. For maximum reliability and performance, all parts should be replaced by those having identical specifications.

Symbol	Description	Part Number
	Main P.C.B. Ass'y	SU-1103A
	CRT Socket P.C.B. Ass'y	SU-3016A

Outside of the P.C.B. Ass'y

Symbol	Description	Part Number
Δ V01	Δ Picture Tube	370ESB22(E)
Δ DY01	Δ Deflection Yoke	C29123-V
	PC Magnet	A76366-A
	Wedge	C30006
	Δ Flyback Transf.	A19183-A
Δ R11	Δ Focus V R	A46606-A
Δ R05	UNF Resistor 220 Ω , 25W. K	QRF258K-221
Δ C04	Δ C Capacitor 150 pF, AC1.5KV	QCZ0101-005
X01	Si. Transistor	2SD869
IC01	IC Regulator	STR383
L01	Degaussing Coil	21-1007-31
	Degaussing Coil Pin Terminal (2)	34-708-01
	Degaussing Coil Pin Terminal Housing	34-709-01
	Groundstrap Ass'y.	34-697-04
	Groundstrap Wire Terminal	34-228-03
	Groundstrap Spring (2)	35-3560-01
BR	Support Bracket RH	35-3919-01
BR	Support Bracket LH	35-3919-02
SC	SCREW 10- $\frac{1}{2}$ Pix Tube Mtg. (4)	31-631018-08
WA	Pyramidal Lockwasher (4)	33-255-01
	Clip P.C.B. Support (2)	33-629-02
	Ground Lug	34-33-04
CH	Chassis Base	38-452-01

Main P.C.B. Ass'y (SU-1103A) Parts List

Resistors

Symbol	Description	Part Number
R1406	V R 200 Ω	QVZ3230-022
R1408	V R 200 Ω	QVZ3230-022
R1410	CMF R 6.8 Ω 1W J	QRX019J-6R8
R1414	OM R 3.3K Ω 1W J	QRG019J-332
R1415	OM R 2.7K Ω 1W J	QRG019J-272
R1421	OM R 12K Ω 2W J	QRG029J-123
R1422	V R 10K Ω	QVZ3224-014H
Δ FR1401	Δ F R 68 Ω 2W K	QRH024K-680M
Δ R1503	Δ CMF R 11.8K Ω $\frac{1}{4}$ W +1%	QRV142F-1182
R1504	V R 5K Ω	QVZ3230-053
R1509	OM R 10K Ω 2W J	QRG029J-103
R1511	OM R 5.6K Ω 2W J	QRG029J-562
R1514	OM R 680 Ω 2W J	QRG029J-681
R1515	CMF R 8.2 Ω 1W J	QRX019J-8R2
R1522	CMF R 4.7 Ω 1W J	QRX019J-4R7
R1523	OM R 56 Ω 2W J	ORG029J-560
R1528	OM R 390 Ω 1W J	ORG019J-391
R1534	ZN R	ERZ-C05ZK471
VR1501	ZN R	ERZ-C05DK271
Δ R1703	Δ CMF R 39K Ω $\frac{1}{2}$ W +1%	QRV122F-3902
Δ R1704	Δ CMF R 7.68K Ω $\frac{1}{4}$ W +1%	QRV142F-7681
Δ R1901	Δ Posistor	A75414
R1902	UNF R 2 Ω 7W K	QRF076K-2R0
R1903	CMF R 5.6 Ω 3W J	QRX039J-5R6
R1904	OM R 10K Ω 2W J	QRG026J-103Z
Δ FR1901	Δ F R 220 Ω $\frac{1}{2}$ W K	QRH124K-221M

Capacitors

Symbol	Description	Part Number
C1402	Tan. Cap. 2.2uF 16V K	QEE51CK-225B
C1411	E Cap. 100uF 160V A	QEW52CA-107
C1412	E Cap. 3.3uF 160V A	QEW52CA-335
C1508	PP Cap. 5600pF 50V J	QFP31HJ-562
C1511	E Cap. 47uF 160V A	QEW52CA-476S
Δ C1512	Δ PP Cap. 2000pF DC1500V J	QFZ0082-202
Δ C1513	Δ PP Cap. 2000pF DC1500V J	QFZ0082-202
Δ C1514	Δ PP Cap. 2500pF DC1500V J	QFZ0082-252
C1515	PP Cap. 0.53uF DC1200V K	QFZ0067-534
C1520	BPE Cap. 1uF 50V A	QEN61HA-105Z
C1524	M Cap. 0.1uF 200V K	QFM72DK-682M
C1904	E Cap.	QEY0034-001
C1905	E Cap. 10uF 250V A	QEW52EA-106
Δ C1907	Δ MM Cap. 0.1uF AC150V Z	QFZ9008-104

Coils

Symbol	Description	Part Number
L1501	Peaking Coil	A75360-6
L1502	Liniarty Coil	A39934
L1503	Width Coil	C30380-A
L1504	Heater Choke	C30333-A
L1901	Line Filter	A39475-J

Transformers

Symbol	Description	Part Number
T1501	Hor. Drive Transf.	A46022-BM
T1503	Side Pin Transf.	C39050-A

Semiconductors		
Symbol	Description	Part Number
IC1501	I.C.	HA11244
X1101	Si. Transistor	2SC1685(R)
X1102	Si. Transistor	2SA673(C)
X1103	Si. Transistor	2SC1685(R)
X1104	Si. Transistor	2SA673(C)
X1105	Si. Transistor	2SC1685(R)
X1106	Si. Transistor	2SA673(C)
X1301	Si. Transistor	2SC1685(R)
X1302	Si. Transistor	2SC1685(R)
X1303	Si. Transistor	2SA673(C)
X1304	Si. Transistor	2SC1685(R)
X1305	Si. Transistor	2SC1685(R)
X1401	Si. Transistor	2SD478
X1402	Si. Transistor	2SD478
X1501	Si. Transistor	2SC2610BK
X1701	Si. Transistor	2SC1685(P-S)
D1101	Si. Diode	W06A
D1102	Si. Diode	W06A
D1103	Si. Diode	W06A
D1301	Si. Diode	1S2473H
D1401	Si. Diode	1S2473H
D1402	Zener Diode	RD10F(C)
D1503	Si. Diode	HF-1
D1504	Si. Diode	V09E
D1505	Zener Diode	RD11E(B)
D1506	Si. Diode	W06A
D1507	Si. Diode	1SS81
D1508	Si. Diode	1S2473H
△D1701	△Zener Diode	RD20EV2
△D1901	△Si. Diode	1S1887A
△D1902	△Si. Diode	1S1887A
△D1903	△Si. Diode	1S1887A
△D1904	△Si. Diode	1S1887A
Miscellaneous		
Symbol	Description	Part Number
△F1901	△Fuse 1A	QMF53U1-1R0S
△F1902	△UL Fuse 3A	QMF66U1-3R0S

CRT Socket P.C.B. Ass'y (SU-3016A) Parts List

Resistors

Symbol	Description	Part Number
R3105	V R 200 Ω	QVZ3234-022
R3106	V R 200 Ω	QVZ3234-022
R3113	V R 5K Ω	QVZ3234-053
R3114	V R 5K Ω	QVZ3234-053
R3115	V R 5K Ω	QVZ3234-053
R3116	OM R 10K Ω 2W J	QRG029J-103
R3117	OM R 10K Ω 2W J	QRG029J-103
R3118	OM R 10K Ω 2W J	QRG029J-103
R3119	Comp. R 3.3K Ω ½W K	QRZ0039-332
R3120	Comp. R 3.3K Ω ½W K	QRZ0039-332
R3121	Comp. R 3.3K Ω ½W K	QRZ0039-332

Capacitors

Symbol	Description	Part Number
C3107	E Cap. 10uF 250V A	QEW52EA-106
C3108	C Cap. 1000pF DC1400V P	QCZ9001-102M

Coils

Symbol	Description	Part Number
L3101	Peaking coil	QQL043K-101

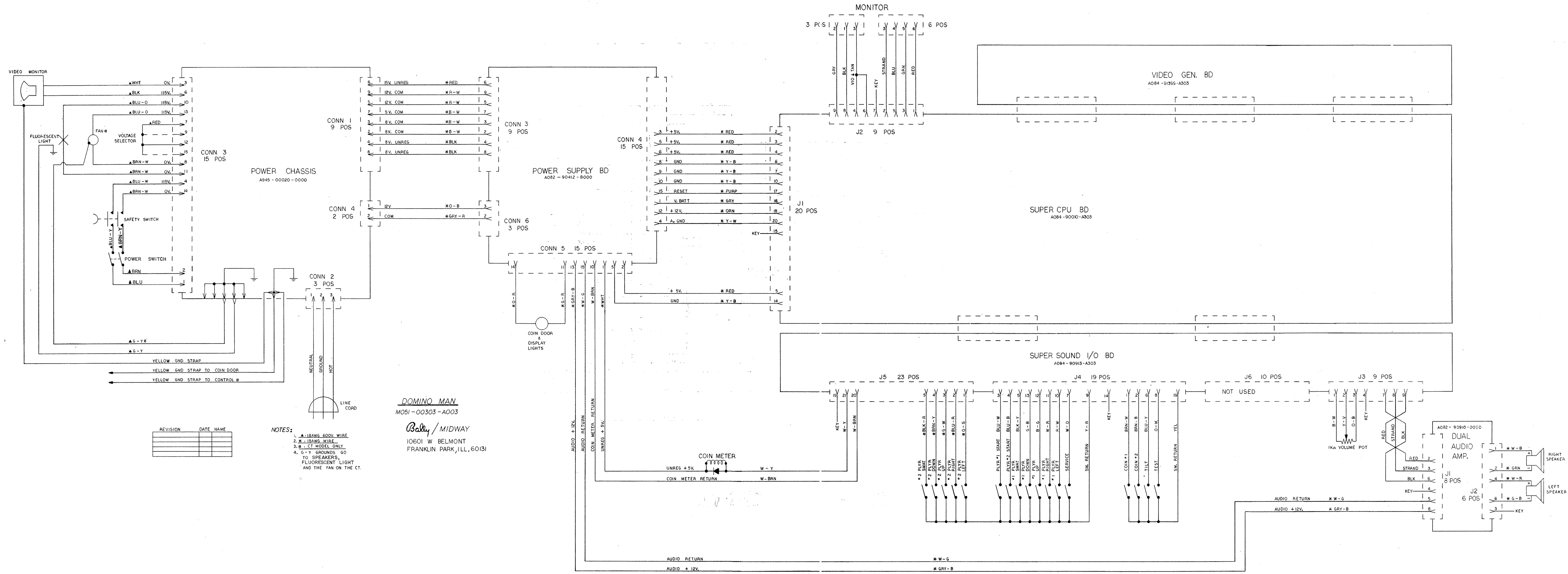
Semiconductors

Symbol	Description	Part Number
X3101	Si. Transistor	2SC2611
X3102	Si. Transistor	2SC2611
X3103	Si. Transistor	2SC2611

Miscellaneous

Symbol	Description	Part Number
△	△ CRT Socket	A75522

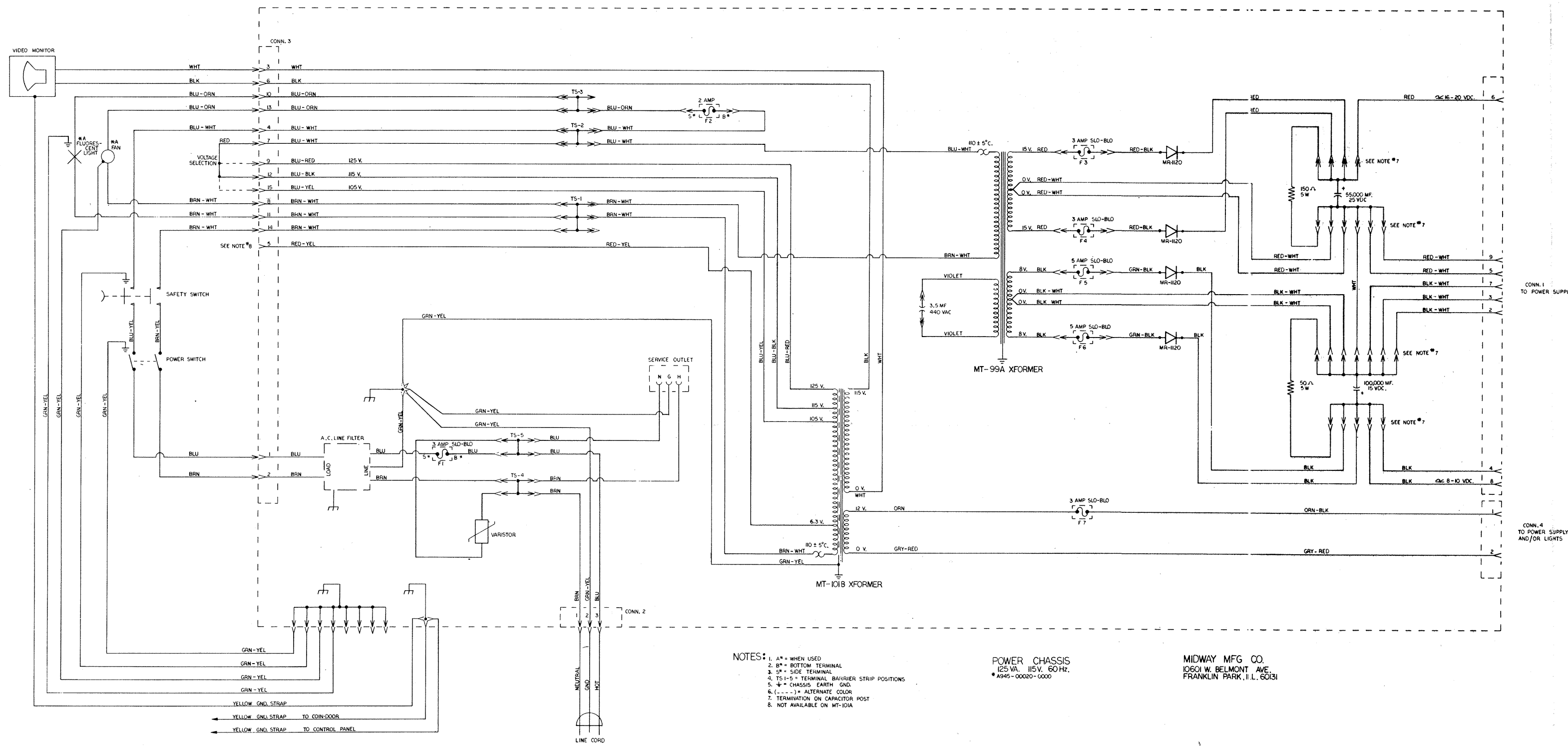
IX Schematics and Wiring Diagrams



REVISION	DATE	NAME

- NOTES:**
- *1 DRAWS BODY WIRE
 - *2 DRAWS WIRE
 - *3 CT MODEL ONLY
 - *4 G-Y GROUNDS GO TO SPEAKERS, FLUORESCENT LIGHT AND THE FAN ON THE CT.

DOMINO MAN
M051-00303-A003
Bally/MIDWAY
10601 W BELMONT
FRANKLIN PARK, ILL, 60131



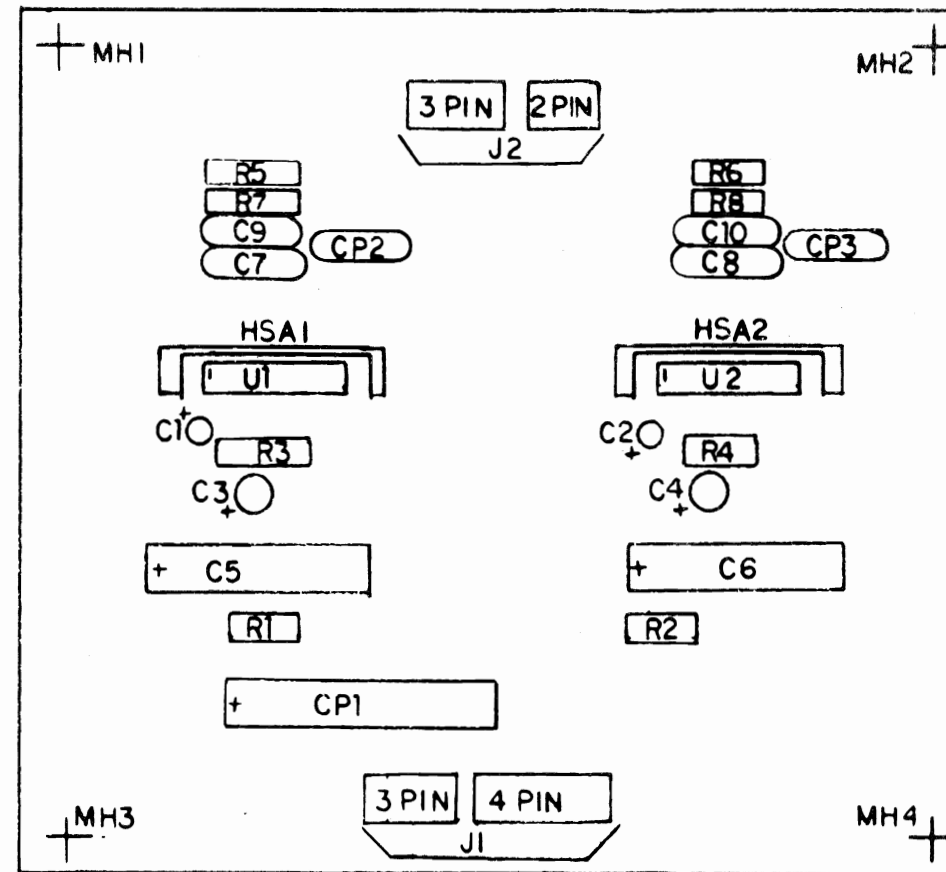
- NOTES:
1. A* WHEN USED
 2. B* BOTTOM TERMINAL
 3. SP* SIDE TERMINAL
 4. TS1-5* TERMINAL BARRIER STRIP POSITIONS
 5. * CHASSIS EARTH GND.
 6. (- - -) * ALTERNATE COLOR
 7. TERMINATION ON CAPACITOR POST
 8. NOT AVAILABLE ON MT-101A

POWER CHASSIS
 125 VA. 105V. 60HZ.
 # 6946-00000-0000

MIDWAY MFG. CO.
 10501 W. BELMONT AVE.
 FRANKLIN PARK, I.L. 60151

DESIGNATION LIST

DESIGNATION	DESCRIPTION
C1,C2	4.7mf 25v rd.tant.
C3,C4	22mf 6v " "
C5,C6	470mf 6v ax.elect.
C7-C10	.1mf 50v ax.cr.
CP1	220mf 25v ax.elect.
CP2,CP3	.1mf 50v ax.cr.
R1,R2	2.7K Ω 1/4w 5% CRBN.
R3,R4	27 Ω " " " "
R5-R8	1 Ω 1/2w " "
U1,U2	MB3730
J1	3 PIN STRT. KK156
J2	2 PIN STRT. KK156
HSA1,2	HEATSINK ASSY.
MHI-MH4	HEYCO BUSHING



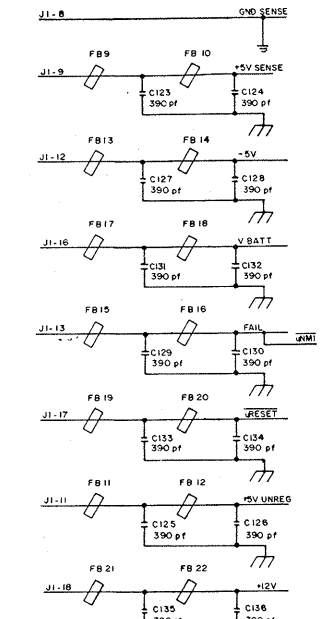
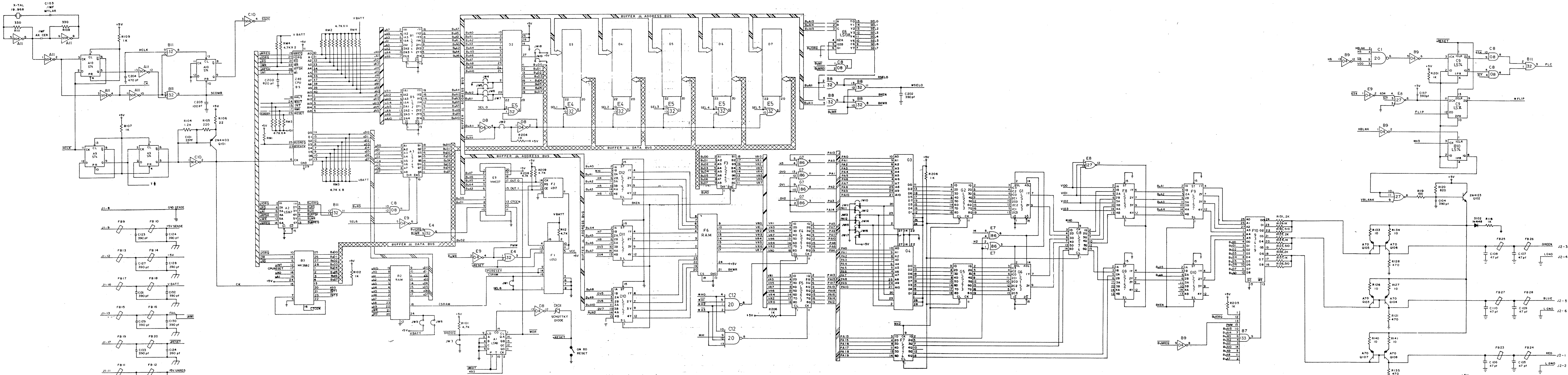
CROSS REFERENCE LIST

DESCRIPTION	QTY	DESIGNATION	PART NO
.1mf 50v ax.cr.	6	C7-C10, CP2,CP3	0986-00800-1100
4.7mf 25v rd.tant.	2	C1,C2	0986-00800-3100
22mf 6v " "	2	C3,C4	0986-00800-1600
220mf 25v ax.elect.	1	CP1	0986-00800-3200
470mf 6v " "	2	C5,C6	0986-00800-1700
1 Ω 1/2w 5%	4	R5-R8	0062-026D3-1XXX
27 Ω 1/4w " "	2	R3,R4	0062-068B3-1XXX
2.7K " "	2	R1,R2	0062-199B3-1XXX
MB3730	2	U1,U2	0066-188xx-xx4x
2 PIN STRT. KK156	1	J2	3000-16367-0200
3 " " " "	2	J1,J2	3000-16367-0300
4 " " " "	1	J1	3000-16367-0400
HEATSINK ASSY.	2	HSA1, HSA2	A986-00010-E000
HEYCO BUSHING	4	MHI-MH4	0017-00042-0014
PC BOARD	1		A080-90910-E000

PROJECT ENG. C. MEDNICK

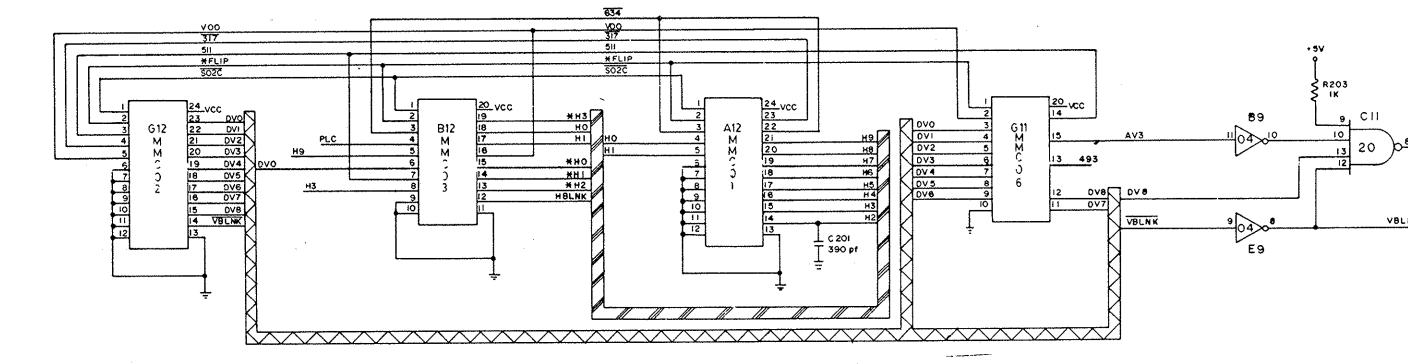
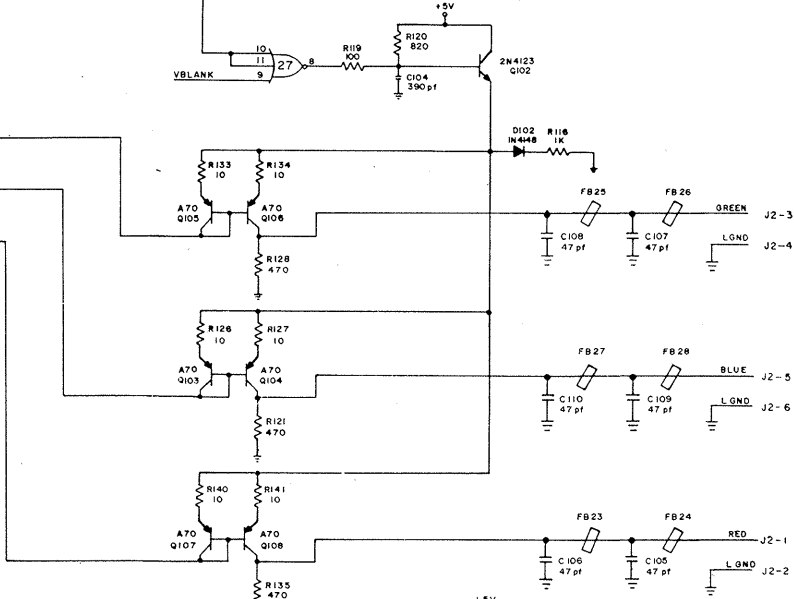
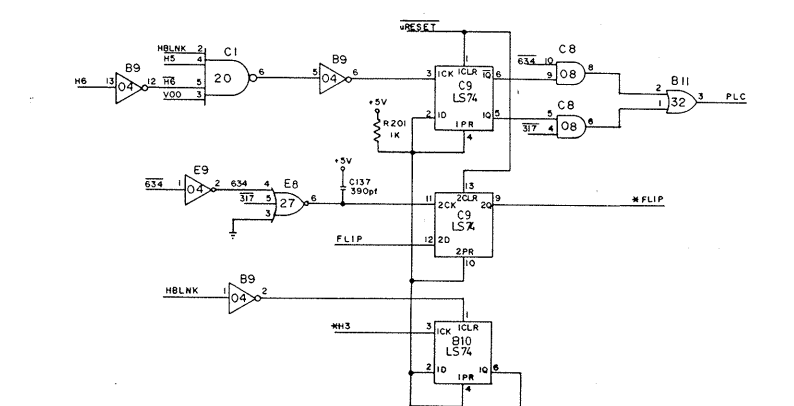
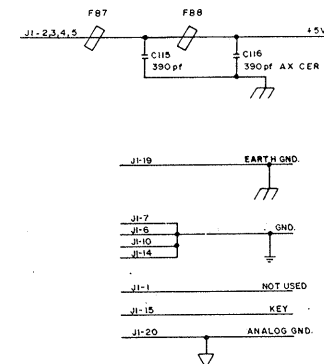
THIS DWG. IS CONFIDENTIAL & PROPERTY OF MIDWAY MFG. CO.

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 TRON	DATE 9-1-82	SCALE FULL	MIDWAY MFG. CO. FRANKLIN PK., IL. 60131 A BALLY CO.	REVISIONS PART NO. M051-00986-E010
	DRN TJK				
	ELEC. CHK. C. M. M.	FINISH	DUAL PWR. AMP. ASSY A080-90910-E000		



72 PIN TEST CONNECTOR		J3		J4		J5		J6		J7		J8	
1	L GND	25	J40	49	J50	1	L GND	2	L GND	1	RED	1	RED
2	+5V	26	J41	50	J51	2	L GND	3	L GND	2	ORNG	2	ORNG
3	L GND	27	J42	51	J52	3	L GND	4	L GND	3	GRN	3	GRN
4	+5V	28	J43	52	J53	4	L GND	5	L GND	4	BLU	4	BLU
5	+5V	29	J44	53	J54	5	+5V	6	+5V	5	WHT	5	WHT
6	+5V	30	J45	54	J55	6	+5V	7	+5V	6	BRN	6	BRN
7	+5V	31	J46	55	J56	7	+5V	8	+5V	7	BLK	7	BLK
8	VBLANK	32	J47	56	J57	8	L GND	9	L GND	8	YEL	8	YEL
9	WDO	33	J48	57	J58	9	L GND	10	L GND	9	WHT	9	WHT
10	WDO	34	J49	58	J59	10	L GND	11	L GND	10	BLU	10	BLU
11	WDO	35	J50	59	J60	11	L GND	12	L GND	11	GRN	11	GRN
12	WDO	36	J51	60	J61	12	L GND	13	L GND	12	ORNG	12	ORNG
13	WDO	37	J52	61	J62	13	L GND	14	L GND	13	BLU	13	BLU
14	WDO	38	J53	62	J63	14	L GND	15	L GND	14	GRN	14	GRN
15	WDO	39	J54	63	J64	15	L GND	16	L GND	15	ORNG	15	ORNG
16	WDO	40	J55	64	J65	16	L GND	17	L GND	16	BLU	16	BLU
17	WDO	41	J56	65	J66	17	L GND	18	L GND	17	GRN	17	GRN
18	WDO	42	J57	66	J67	18	L GND	19	L GND	18	ORNG	18	ORNG
19	WDO	43	J58	67	J68	19	L GND	20	L GND	19	BLU	19	BLU
20	WDO	44	J59	68	J69	20	L GND	21	L GND	20	GRN	20	GRN
21	WDO	45	J60	69	J70	21	L GND	22	L GND	21	ORNG	21	ORNG
22	WDO	46	J61	70	J71	22	L GND	23	L GND	22	BLU	22	BLU
23	WDO	47	J62	71	J72	23	L GND	24	L GND	23	GRN	23	GRN
24	WDO	48	J63	72	J73	24	L GND	25	L GND	24	ORNG	24	ORNG

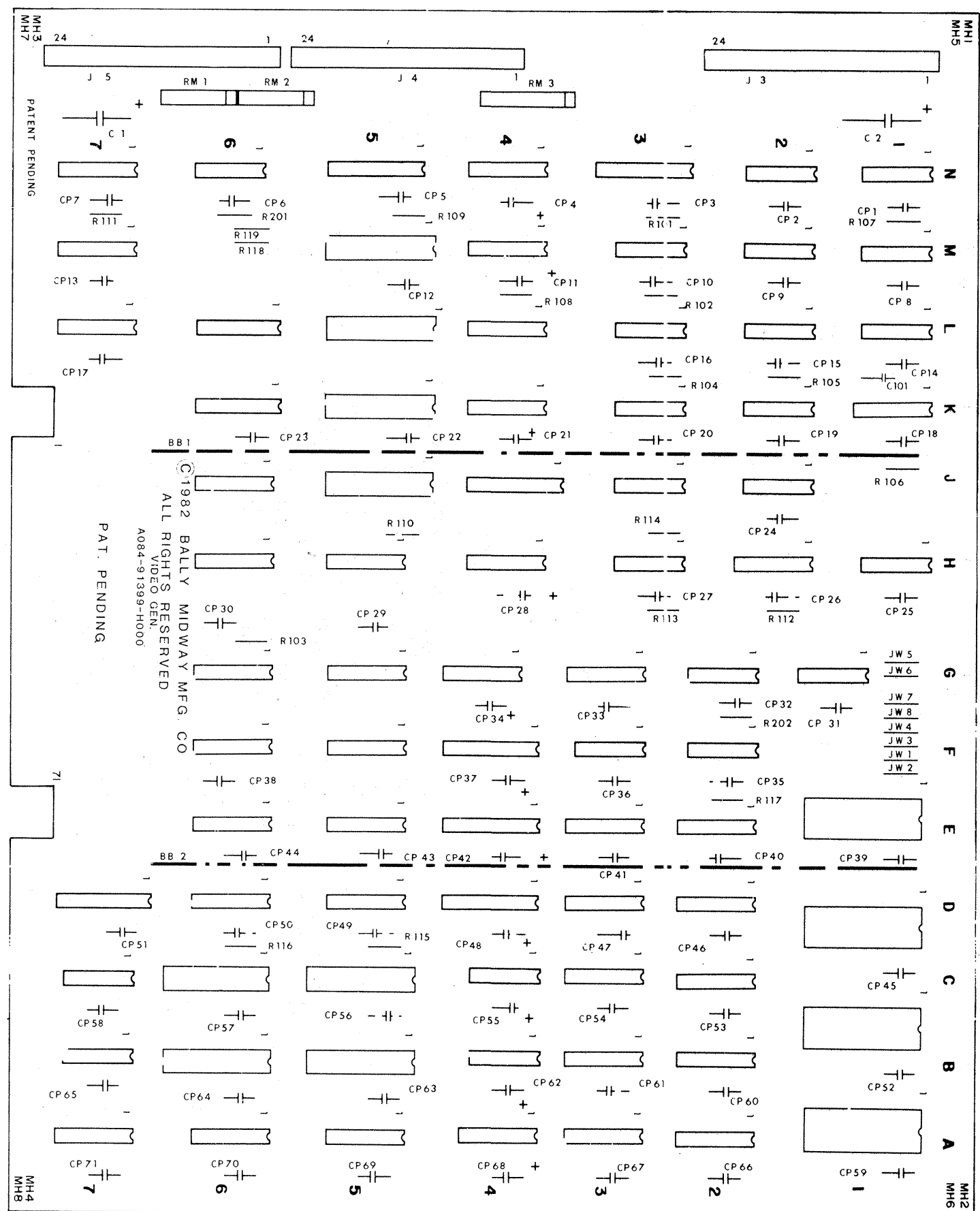
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DESIGNED BY: A. GHOSH	DESIGNED BY: M. S. DOWD	DESIGNED BY: M. S. DOWD
DATE: 11/28/82	DATE: 11/28/82	DATE: 11/28/82
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DESIGNATION LIST

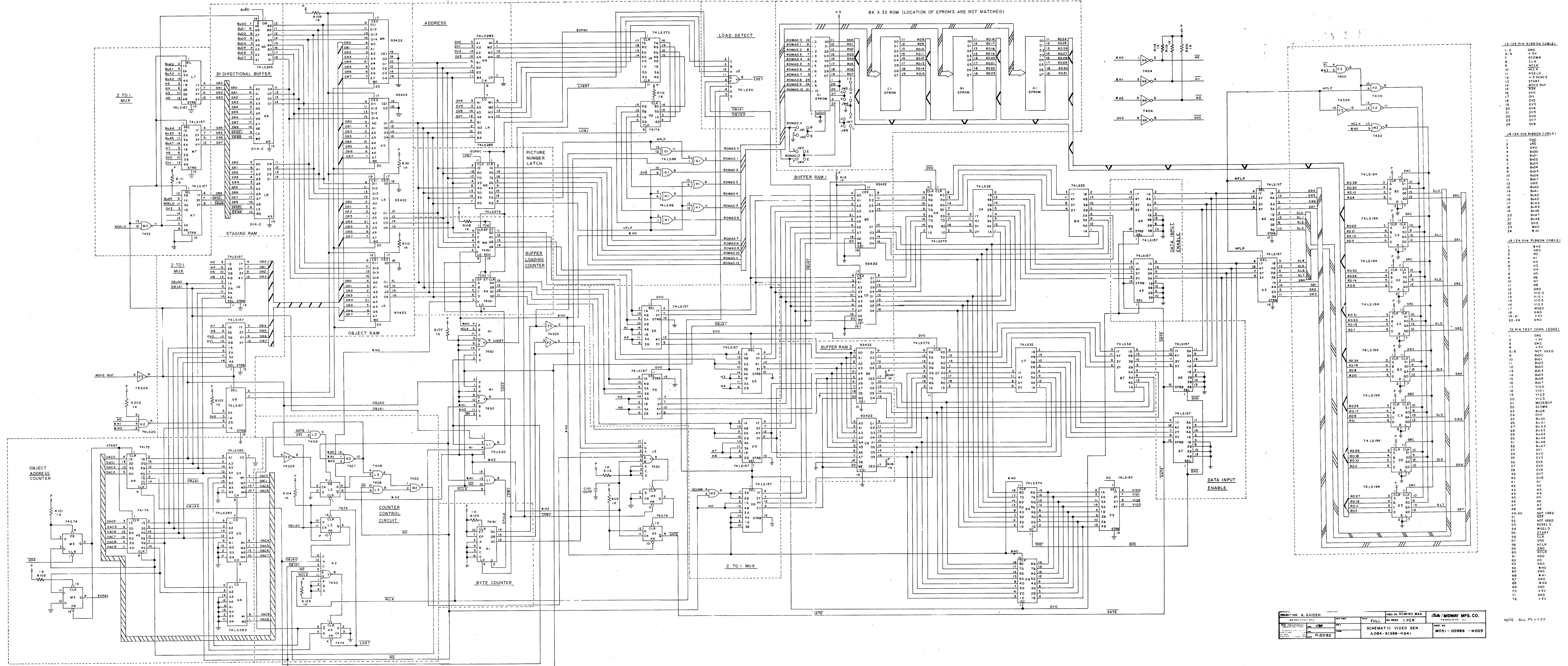
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CI, 2	100 µf AX. ELECT	IC D 1	EPROM	IC L 1	74 LS 20
C101	100 pf AX. CER.	IC D 2	74 LS194	IC L 2	7408
CP1-3, 5-10		IC D 3	74 LS194	IC L 3	7474
CP12-20, 22-27,		IC D 4	74 LS273	IC L 4	74 LS283
CP29-33, 35, 36,		IC D 5	74 LS157	IC L 5	422
CP38-41, 43-47, 01 µf AX. CER.		IC D 6	74 LS157	IC L 6	2114-2
CP49-54, 56-61,		IC D 7	74 LS273	IC L 7	74 LS157
CP63-67, 69-71.		IC E 2	74 LS194	IC M 1	7430
		IC E 3	74 LS194	IC M 2	7432
CP4, 11, 21, 28, 34,		IC E 4	74 LS374	IC M 3	74 S 74
CP37, 42, 48, 55, 10 µf 25V AX. TANT.		IC E 5	74 LS157	IC M 4	74161
CP62, 68.		IC E 6	74 LS157	IC M 5	422
		IC E 6	74 LS157	IC M 7	74 LS157
		IC F 2	7400	IC N 1	7430
RI01-119, 201, 202, 1 K 1/4 W 5%.		IC F 3	74 S04	IC N 2	7427
		IC F 4	74 LS374	IC N 3	74 LS273
		IC F 5	74 LS157	IC N 4	74 LS283
		IC F 6	74 LS157	IC N 5	74 LS245
				IC N 6	7404
				IC N 7	74 LS157
RM1, 2	8 PIN 1 K SIP	IC G 1	74 LS 86	ICS A1, B1, C1, D1.	28 PIN IC SOCKET
RM 3	10 PIN 1 K SIP	IC G 2	74 LS 20	ICS B5, 6, C5, 6,	22 PIN IC SOCKET
		IC G 3	74 LS 283	J5, K5, L5, M5.	
		IC G 4	74 LS 283	ICS K6, L6.	18 PIN IC SOCKET
		IC G 5	74 LS 283	J3, 4, 5	24 PIN SOCKET
		IC G 6	74 LS157	JW1-JW8	JUMPER WIRE
IC A 1	EPROM	IC H 1	74 LS 86	BBI, 2	BUSS BAR
IC A 2	74 LS157	IC H 2	74174	PCMH1-4	PC BD SPACER
IC A 3	74 LS157	IC H 3	74 S 74	PCMH5-8	PC MTG SCREW
IC A 4	74 LS157	IC H 4	74175	A080-91399-H000	VID. GEN. PC
IC A 5	74 LS157	IC H 5	74174		
IC A 6	74 LS157	IC H 6	74 LS157		
IC A 7	74 LS157				
IC B 1	EPROM	IC J 2	74 LS 30		
IC B 2	74 LS194	IC J 3	7430		
IC B 3	74 LS194	IC J 4	74 LS273		
IC B 4	74 LS32	IC J 5	422		
IC B 5	422	IC J 6	74 LS157		
IC B 6	422				
IC B 7	74 LS32				
IC C 1	EPROM	IC K 1	74161		
IC C 2	74 LS194	IC K 2	7430		
IC C 3	74 LS194	IC K 3	7474		
IC C 4	74 LS32	IC K 4	74161		
IC C 5	422	IC K 5	422		
IC C 6	422	IC K 6	2114-2		
IC C 7	74 LS32				



CROSS REFERENCE LIST

Q'TY	DESCRIPTION	DESIGNATION	PART NO.
60	100 Pf 50V AX. CER.	C101	0986-00800-1000
	01 µf 50V AX. CER.	CP1-3, CP5-10,	0986-00800-2500
		CP12-20, CP22-27,	
		CP29-33, CP35, 36,	
		CP38-41, CP43-47,	
		CP49-54, CP56-61,	
		CP63-67, CP69-71.	
11	10 µf 25 V AX. TANT.	CP4, 11, 21, 28, 34, 37,	0986-00800-2400
		CP42, 48, 55, 62, 68.	
2	100 µf 25 V AX. ELECT.	CI, 2.	0986-00800-1800
21	1 K 1/4 W CRBN. FLM.	RI01-119, 201, 202.	0062-17983-1XXX
2	1 K 8 PIN SIP	RM1, 2.	0986-00804-1100
1	1 K 10 PIN SIP	RM 3	0986-00804-1000
2	2114-2	K6, L6.	0986-00803-2300
1	7400	F 2	0986-00803-2800
1	7404	N 6	0986-00803-8300
1	74 S04	F 3	0986-00803-3100
1	7408	L 2	0986-00803-3200
2	74LS20	G2, L1	0986-00803-3400
1	7427	N 2	0986-00803-3500
4	7430	J3, K2, M1, N1	0986-00803-3600
1	74LS30	J 2	0986-00803-4300
1	7432	M 2	0986-00803-4400
4	74LS32	B 4, 7, C 4, 7,	0986-00803-3700
2	7474	K 3, L 3	0986-00803-4500
2	74S74	H 3, M 3	0986-00803-4100
2	74LS86	G 1, H 1	0986-00803-4200
18	74LS157	A 2, 3, 4, 5, 6, 7, D5, 6,	0986-00803-2400
		E 5, 6, F 5, 6, G 6, H 6,	
		J 6, L 7, M 7, N 7.	
3	74161	K 1, K 4, M 4.	0986-00803-2500
2	74174	H 2, 5	0986-00803-2600
1	74175	H 4	0986-00803-2700
8	74LS194	B 2, 3, C 2, 3, D 2, 3, E 2, 3.	0986-00803-2900
1	74LS245	N 5	0986-00803-3000
4	74LS273	D 4, 7, J 4, N 3	0986-00803-3800
5	74LS283	G 3, 4, 5, L 4, N 4,	0986-00803-3900
2	74LS374	E 4, F 4	0986-00803-4000
8	93422	B 5, 6, C 5, 6, J 5, K 5, L 5, M 5	0986-00804-0800
1	EPROM	A 1 (VG A)	ROM/EPROM OPTIONS KIT 0303-00803-0003
1	EPROM	B 1 (VG B)	
1	EPROM	C 1 (VG C)	
1	EPROM	D 1 (VG D)	
8	JUMPER WIRE	JW1-8	0986-00805-0200
2	BUSS BAR	BBI, 2	0986-00804-0900
1	P.C. BOARD		A080-91399-E000
3	24 PIN SOCKET	J 3, 4, 5	0986-00804-4700
4	28 PIN SOCKET	ICS A1, B1, C1, D1	0986-00804-0300
8	22 PIN SOCKET	ICS B5, 6, C5, 6, J5, K5, L5, M5	0986-00804-0700
2	18 PIN SOCKET	ICS K6 L6	0986-00804-0600
4	PC BD SPACER	PCMH1-PCMH4	0986-00701-00X
4	PC MTG SCREW	PCMH5-PCMH8	0017-00101-0339

PROJECT ENG: A. GOSH	USED ON DOMINO MAN	REVISIONS
DO NOT SCALE DRAWING	SCALE: FULL	NO. REQ'D: ONE PER
DIM. TOLERANCES: DRP	MAT'L:	FRANKLIN P. ILL.
DATE: 12/3/82	FINISH:	PART NO: M051-00303-A008
VIDEO GENERATOR P.C. ASSY DWG		
A082-91399-H000		

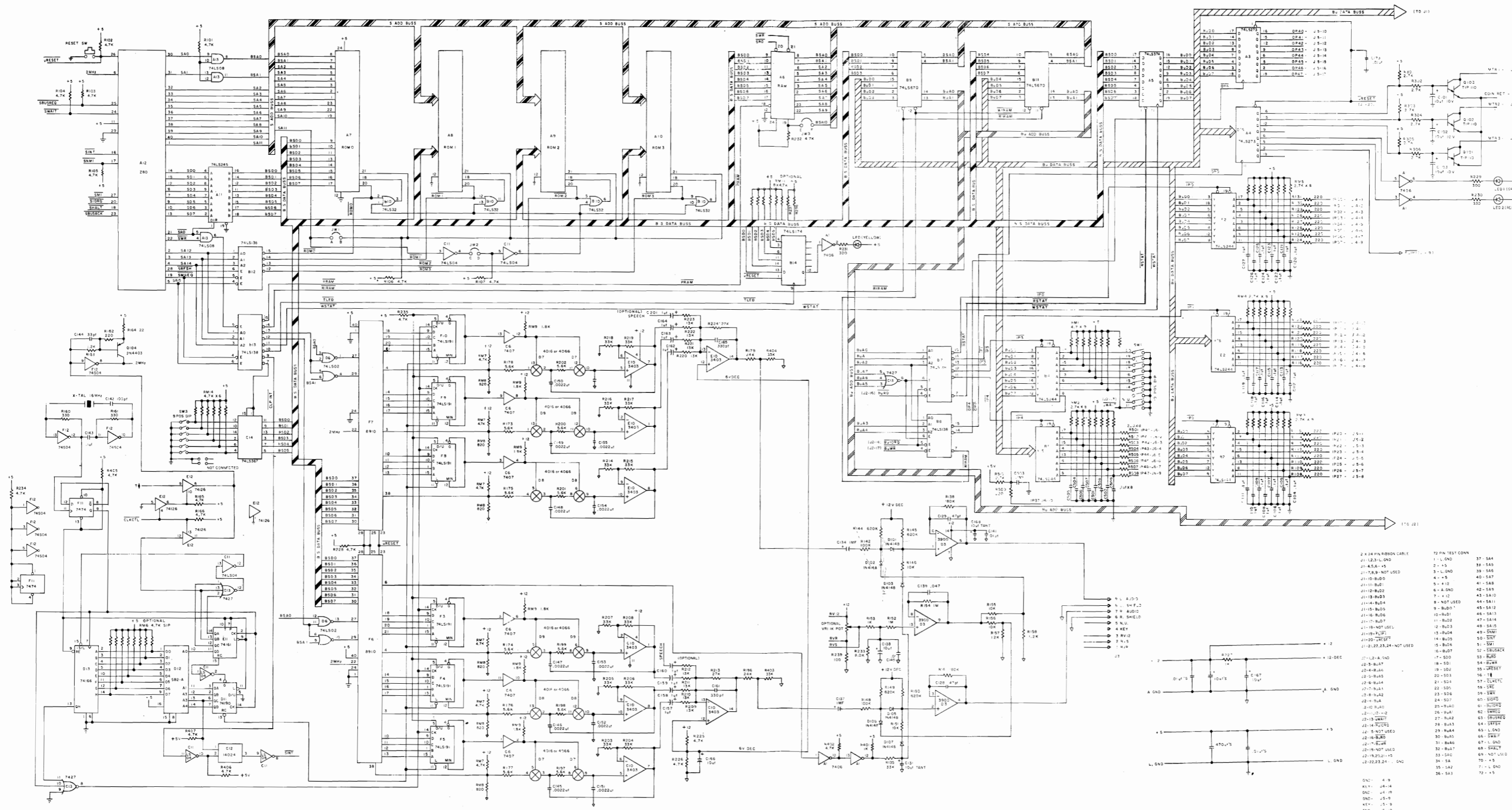


- 13 (24 PIN RIBBON CABLE)
- 1 +5V
 - 2 GND
 - 3 SCWB
 - 4 CLK
 - 5 TCLK
 - 6 +5SENCE
 - 7 +5SENCE
 - 8 MOVE BUF
 - 9 DVO
 - 10 DVO
 - 11 DVO
 - 12 DVO
 - 13 DVO
 - 14 DVO
 - 15 DVO
 - 16 DVO
 - 17 GND
 - 18 GND
 - 19 GND
 - 20 GND
 - 21 GND
 - 22 GND
 - 23 GND
 - 24 GND
- 14 (24 PIN RIBBON CABLE)
- 1 GND
 - 2 GND
 - 3 GND
 - 4 BU0
 - 5 BU0
 - 6 BU0
 - 7 BU0
 - 8 BU0
 - 9 BU0
 - 10 BU0
 - 11 BU0
 - 12 GND
 - 13 GND
 - 14 BU1
 - 15 BU1
 - 16 BU1
 - 17 BU1
 - 18 BU1
 - 19 BU1
 - 20 BU1
 - 21 GND
 - 22 GND
 - 23 GND
 - 24 GND
- 15 (24 PIN RIBBON CABLE)
- 1 BU2
 - 2 BU2
 - 3 BU2
 - 4 BU2
 - 5 BU2
 - 6 BU2
 - 7 BU2
 - 8 BU2
 - 9 BU2
 - 10 BU2
 - 11 BU2
 - 12 GND
 - 13 GND
 - 14 BU3
 - 15 BU3
 - 16 BU3
 - 17 BU3
 - 18 BU3
 - 19 BU3
 - 20 BU3
 - 21 GND
 - 22 GND
 - 23 GND
 - 24 GND
- 22 PIN TEST CORN (EDGE)
- 1 GND
 - 2 +5V
 - 3 GND
 - 4 +5V
 - 5 GND
 - 6 NOT USED
 - 7 BU0
 - 8 BU0
 - 9 BU0
 - 10 BU0
 - 11 BU0
 - 12 BU0
 - 13 BU0
 - 14 BU0
 - 15 BU0
 - 16 BU0
 - 17 VIO 0
 - 18 VIO 2
 - 19 VIO 2
 - 20 VIO 3
 - 21 SCWB
 - 22 SCWB
 - 23 BU0
 - 24 DVO
 - 25 BU0
 - 26 BU1
 - 27 BU1
 - 28 BU1
 - 29 BU1
 - 30 BU1
 - 31 BU1
 - 32 BU1
 - 33 BU1
 - 34 BU1
 - 35 DVA
 - 36 DVA
 - 37 DVA
 - 38 DVA
 - 39 DVA
 - 40 DVA
 - 41 BU1
 - 42 H2
 - 43 H2
 - 44 H2
 - 45 H2
 - 46 H2
 - 47 H2
 - 48 H2
 - 49 H2
 - 50 H2
 - 51 H2
 - 52 H2
 - 53 H2
 - 54 H2
 - 55 H2
 - 56 H2
 - 57 H2
 - 58 H2
 - 59 H2
 - 60 H2
 - 61 GND
 - 62 GND
 - 63 GND
 - 64 GND
 - 65 GND
 - 66 GND
 - 67 GND
 - 68 GND
 - 69 GND
 - 70 GND
 - 71 GND
 - 72 +5V

DESIGNED BY: DR. A. GHOSH
 DRAWN BY: DR. S. GHOSH
 CHECKED BY: DR. S. GHOSH
 DATE: 10/20/82

FULL NAME: DR. S. GHOSH
 SCHEMATIC VIDEO GEN.
 A084-91399-H941

MIDWAY MFG. CO.
 PART NO: M051-00986 - H005

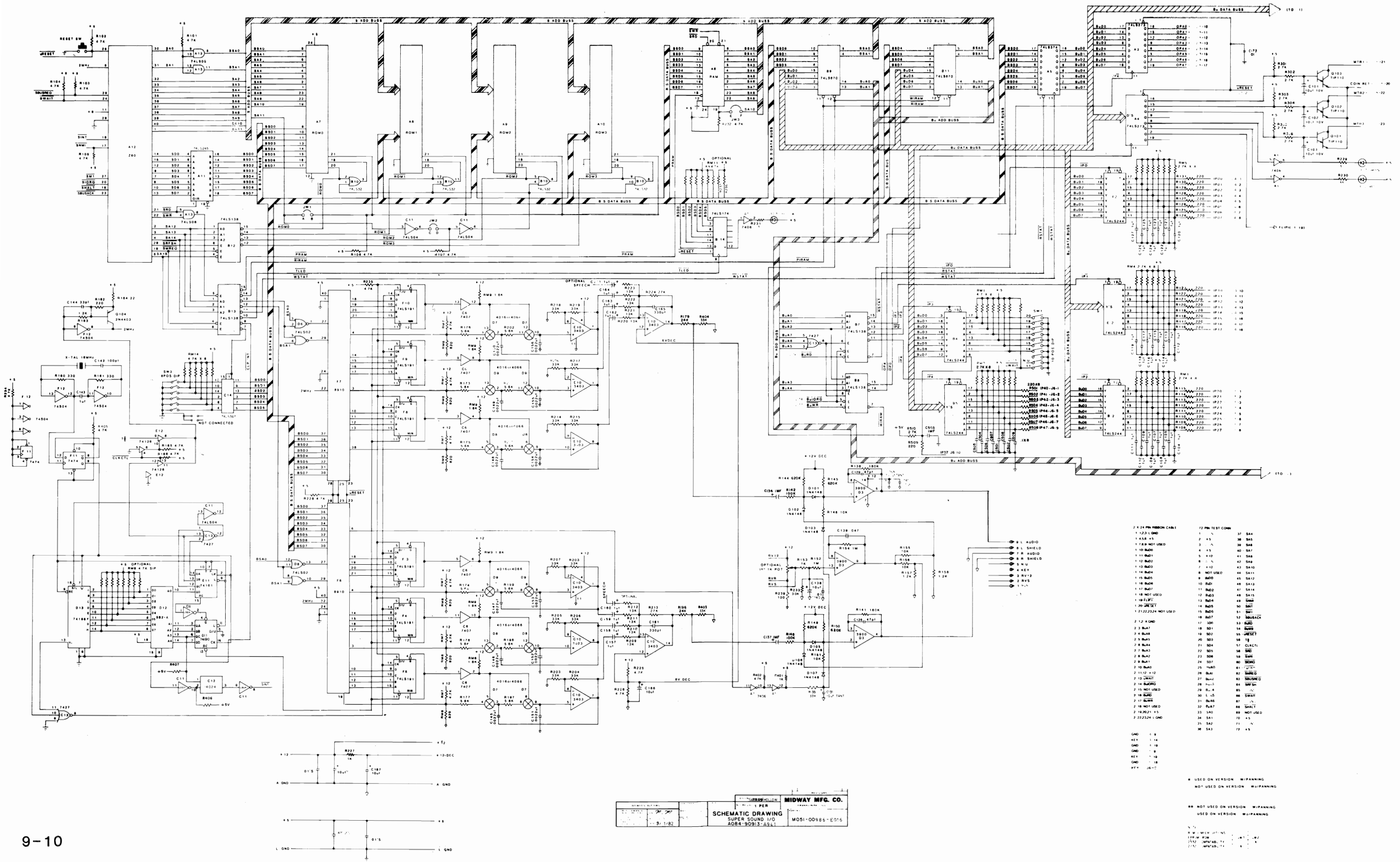


- 24 PIN RIBBON CABLE
- J1-12,3-L GND
 - J1-4,5-B +5
 - J1-7,8-B NOT USED
 - J1-10-B D0
 - J1-11-B D1
 - J1-12-B D2
 - J1-13-B D3
 - J1-14-B D4
 - J1-15-B D5
 - J1-16-B D6
 - J1-17-B D7
 - J1-18-NOT USED
 - J1-19-RP1
 - J1-20-RP2
 - J1-21,22,23,24-NOT USED
- 72 PIN TEST CONN
- 1-L GND
 - 2-L GND
 - 3-L GND
 - 4-L GND
 - 5-L GND
 - 6-L GND
 - 7-L GND
 - 8-NOT USED
 - 9-B D0
 - 10-B D1
 - 11-B D2
 - 12-B D3
 - 13-B D4
 - 14-B D5
 - 15-B D6
 - 16-B D7
 - 17-S00
 - 18-S01
 - 19-S02
 - 20-S03
 - 21-S04
 - 22-S05
 - 23-S06
 - 24-S07
 - 25-R40
 - 26-R41
 - 27-R42
 - 28-R43
 - 29-R44
 - 30-R45
 - 31-R46
 - 32-R47
 - 33-SAC
 - 34-SA
 - 35-SAC
 - 36-SA3
 - 37-SA1
 - 38-SA5
 - 39-SA6
 - 40-SAT
 - 41-SAB
 - 42-SAB
 - 43-SA10
 - 44-SA11
 - 45-SA12
 - 46-SA13
 - 47-SA14
 - 48-SA15
 - 49-SW1
 - 50-SW2
 - 51-SW1
 - 52-SW2
 - 53-R48
 - 54-SW3
 - 55-SW4
 - 56-R49
 - 57-CLKCT
 - 58-SW5
 - 59-SW6
 - 60-SW7
 - 61-R49
 - 62-SW8
 - 63-SW9
 - 64-SW10
 - 65-L GND
 - 66-SW11
 - 67-L GND
 - 68-SW12
 - 69-NOT USED
 - 70-L GND
 - 71-L GND
 - 72-L GND
- GND - 4-9
 KEY - 24-14
 GND - 44-49
 GND - 45-9
 KEY - 45-9
 GND - 45-9
 KEY - 48-9

DESIGNED BY J. JARON
 USED ON DOWNSIDE MAN
 NO REVISIONS
 SCHEMATIC DRAWING
 SUPER SOUND 1/0
 4086-8093-FOOD

REVISIONS
 MIDDAY MFG CO.
 PART NO
 MOSI-00988-FOIB

NOT USED ON VERSION #/PANNING
 NOT USED ON VERSION #/PANNING
 NOT USED ON VERSION #/PANNING



72 PIN TEST CONN

1	123 GND	37	SA4
2	155 +5	38	SA5
3	158 NOT USED	39	SA6
4	159	40	SA7
5	160	41	SA8
6	161	42	SA9
7	162	43	SA10
8	163	44	SA11
9	164	45	SA12
10	165	46	SA13
11	166	47	SA14
12	167	48	SA15
13	168	49	SA16
14	169	50	SA17
15	170	51	SA18
16	171	52	SA19
17	172	53	SA20
18	173	54	SA21
19	174	55	SA22
20	175	56	SA23
21	176	57	SA24
22	177	58	SA25
23	178	59	SA26
24	179	60	SA27
25	180	61	SA28
26	181	62	SA29
27	182	63	SA30
28	183	64	SW1
29	184	65	SW2
30	185	66	SW3
31	186	67	SW4
32	187	68	SW5
33	188	69	SW6
34	189	70	SW7
35	190	71	SW8
36	191	72	SW9

72 PIN TEST CONN

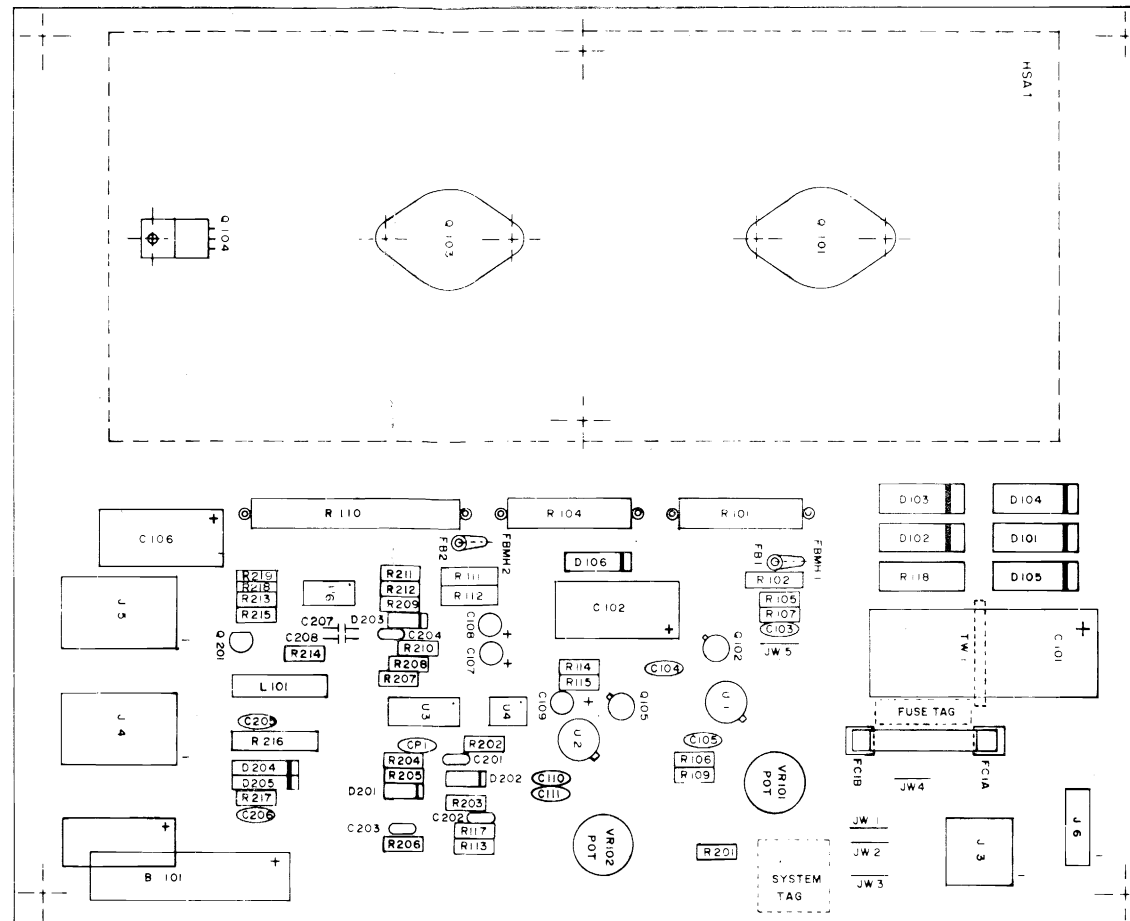
1	123 GND	37	SA4
2	155 +5	38	SA5
3	158 NOT USED	39	SA6
4	159	40	SA7
5	160	41	SA8
6	161	42	SA9
7	162	43	SA10
8	163	44	SA11
9	164	45	SA12
10	165	46	SA13
11	166	47	SA14
12	167	48	SA15
13	168	49	SA16
14	169	50	SA17
15	170	51	SA18
16	171	52	SA19
17	172	53	SA20
18	173	54	SA21
19	174	55	SA22
20	175	56	SA23
21	176	57	SA24
22	177	58	SA25
23	178	59	SA26
24	179	60	SA27
25	180	61	SA28
26	181	62	SA29
27	182	63	SA30
28	183	64	SW1
29	184	65	SW2
30	185	66	SW3
31	186	67	SW4
32	187	68	SW5
33	188	69	SW6
34	189	70	SW7
35	190	71	SW8
36	191	72	SW9

MIDWAY MFG. CO.
 SUPER SOUND I/O
 MOSI-00985-E016
 9/1/82

CROSS REFERENCE LIST

DESIGNATION LIST

DESIGNATION *	DESCRIPTION	DESIGNATION *	DESCRIPTION
C101	4700uf AX. ELECT.	R117	560ohm 1/4W 5%
C102	470uf AX. ELECT.	R118	150ohm 2W
C103	.1uf AX. CER.	R201	270ohm 1/4W 5%
C104	.1uf AX. CER.	R202	1.2K 1/4W 5%
C105	47pf AX. CER.	R203	1.1M 1/4W 5%
C106	470uf AX. ELECT.	R204	3.3M 1/4W 5%
C107	105uf RD. TANT.	R205	10M 1/4W 5%
C108	1uf RD. TANT.	R206	100K 1/4W 5%
C109	4.7uf RD. TANT.	R207	33K 1/4W 5%
C110	.1uf AX. CER.	R208	2M 1/4W 5%
C111	.1uf AX. CER.	R209	1M 1/4W 5%
C201	.01uf MYLAR	R210	1.2M 1/4W 5%
C202	.033uf MYLAR	R211	75K 1/4W 5%
C203	.01uf MYLAR	R212	75K 1/4W 5%
C204	.047uf MYLAR	R213	220K 1/4W 5%
C205	820pf AX. CER.	R214	3.9K 1/4W 5%
C206	.01uf AX. CER.	R215	1.2K 1/4W 5%
C207	0.082uf MYLAR	R216	82ohm 1W 10%
		R217	270ohm 1/4W 5%
		R218	110K 1/4W 5%
		R219	68ohm 1/2W 5%
		VR101,102	100ohm POT
CP1	.1uf AX. CER.	D101	A15F
		D102	A15F
		D103	A15F
		D104	A15F
		D105	A15F
		D106	1N4001
		D201	1N4148
		D202	1N4148
		D203	1N4148
		D204	1N4001
		D205	1N4001
R109	1K 1/4W 5%	Q102	2N2905
R110	.16ohm 15W W/RES. SPACER	Q105	2N2905
R111	6.8ohm 1/2W 5%	Q201	2N4401
R112	68ohm 1/2W 5%	U1	LM305 REG.
R113	1.2K 1/4W 5%	U2	LM305 REG.
R114	47ohm 1/4W 5%	U3	LM3900
R115	160ohm 1/4W 5%	U4	4N28
		U6	555
		L101	.22uH INDUCTOR
		B101	BATTERY 3.6VDC 60DEG C
		F1	3 8A S-BLO FUSE
		FC1A,1B	FUSE CLIP
		FB1,2	FERRITE BEAD
		TW1	TIE WRAP
		J3	9PIN P.C. MOUNT CONN (MALE)
		J4	15PIN P.C. MOUNT CONN (FEMALE)
		J5	15PIN P.C. MOUNT CONN (MALE)
		J6	3PIN P.C. MOUNT CONN (MALE)
		LB1	FUSE TAG
		LB2	SYSTEM TAG
		HSA1	HEAT SINK ASS'Y 1
		MHSA1	MOUNTING HARD WARE (HEAT SINK) 2 SCREW 4 WASHER 2 HEXNUT
		JW1-5	JUMPER WIRE
		FBMH1,2	FERRITE BEAD MOUNTING HARD



DESCRIPTION	Q'ty	DESIGNATION *	PART #
47pf AX. CER	1	C105	0945-00811-0100
820pf AX. CER	1	C205	0945-00816-0400
.01uf AX. CER	2	C206,208	0945-00816-0100
.01uf MYLAR	2	C201,203	0945-00816-0200
.033uf MYLAR	1	C202	0945-00816-0500
.047uf MYLAR	1	C204	0945-00816-0300
0.082uf AX. CER	1	C207	0945-00816-1900
.1uf AX. CER	5	C103,104,110,111, CP1	0945-00811-0200
1uf RAD. TANT	1	C108	0945-00811-0300
4.7uf RAD. TANT	1	C109	0945-00811-0400
100uf RAD. TANT	1	C107	0945-00811-0500
470uf AX. ELECT.	2	C102,106	0945-00816-0600
470uf AX. ELECT.	1	C101	0945-00811-0700
.16ohm 15W 5%	1	R110	0945-00815-0100
.18ohm 5W 5%	1	R101	0945-00815-0200
6.8ohm 1/2W 5%	1	R111	0662-04703-1XXX
10ohm 5W 5%	1	R104	0945-00812-0100
27ohm 1/4W 5%	1	R105	0662-088B3-1XXX
47ohm 1/4W 5%	1	R114	0662-086B3-1XXX
68ohm 1/2W 5%	3	R102,112,219	0662-098D3-1XXX
82ohm 1W 10%	1	R216	0662-104F5-1XXX
150ohm 2W 5%	1	R118	0945-00812-0200
160ohm 1/4W 5%	1	R115	0662-124B3-1XXX
270ohm 1/4W 5%	3	R106,201,217	0662-138B3-1XXX
560ohm 1/4W 5%	1	R117	0662-162B3-1XXX
1K 1/4W 5%	1	R109	0662-179B2-1XXX
1.2K 1/4W 5%	3	R113,202,215	0662-183B3-1XXX
3.9K 1/4W 5%	1	R214	0662-207B3-1XXX
6.2K 1/4W 5%	1	R107	0662-217B3-1XXX
33K 1/4W 5%	1	R207	0662-251B3-1XXX
75K 1/4W 5%	2	R211,212	0662-269B3-1XXX
100K 1/4W 5%	1	R206	0662-275B3-1XXX
110K 1/4W 5%	1	R218	0662-277B3-1XXX
220K 1/4W 5%	1	R213	0662-291B3-1XXX
1M 1/4W 5%	1	R209	0662-323B3-1XXX
1.1M 1/4W 5%	1	R203	0662-325B3-1XXX
1.2M 1/4W 5%	1	R210	0662-327B3-1XXX
2M 1/4W 5%	1	R208	0662-337B3-1XXX
3.3M 1/4W 5%	1	R204	0662-347B3-1XXX
10M 1/4W 5%	1	R205	0662-371B3-1XXX
100ohm POT	2	VR101,102	0945-00814-0000
LM305 REG.	2	U1,2	0945-00813-0100
555	1	U6	0929-00810-4500
LM3900	1	U3	0945-00813-0200
4N28	1	U4	0945-00813-0300
A15F RECTIFIER	5	D101-105	0945-00804-0200
1N4001	3	D106,204,205	0945-00804-0300
1N4148	3	D201-203	0945-00804-0500
2N2905	2	Q102,105	0945-00808-0300
2N4401	1	Q201	0945-00804-0400
BATTERY 3.6VDC 60DEG-C	1	B101	0017-00003-0377
FUSE 3/8A S-BLO	1	F1	0945-00808-0400
FUSE CLIP	2	FC1A,1B	0017-00003-0214
TIE WRAP	1	TW1	0945-00814-0300
FERRITE BEAD	2	FB1,2	0017-00009-0225
FERRITE MOUNTING HDW.	2	FBMH1,2	0017-00033-0139
.22uH INDUCTOR	1	L101	0945-00814-0200
FUSE TAG	1	LB1	M051-00945-A004
SYSTEM TAG	1	LB2	M051-00945-A009
P.C.B.	1		A080-90412-U000
HEAT SINK ASS'Y	1	HSA 1	A945-00008-0000
(SEE HS ASS'Y DRAWING "NOTE")			
4-40 X 10 SLT RND	2	MH HSA 1A, 2A	0017-00101-00727
4-40 HEX NUT	2	MH HSA 1E, 2E	0017-00103-0002
WSH 4-120-.250-018	4	MH HSA 1B, 1D	0017-00104-0071
MH HSA 2B, 2D			
3PIN P.C. MOUNT CONN (MALE)	1	J6	0017-00021-0443
9PIN P.C. MOUNT CONN (MALE)	1	J3	0017-00021-0425
15PIN P.C. MOUNT CONN (FEMALE)	1	J4	0017-00021-0441
15PIN P.C. MOUNT CONN (MALE)	1	J5	0017-00021-0440
22 AWG T & R BARE 2.5"	5	JW1-5	0151-00087-0000

PROJ. ENG: L. DEKKER

DATE OF: SATANS HOLLOW

MIDWAY MFG. CO.

FRANKLIN, PA. U.S.A.

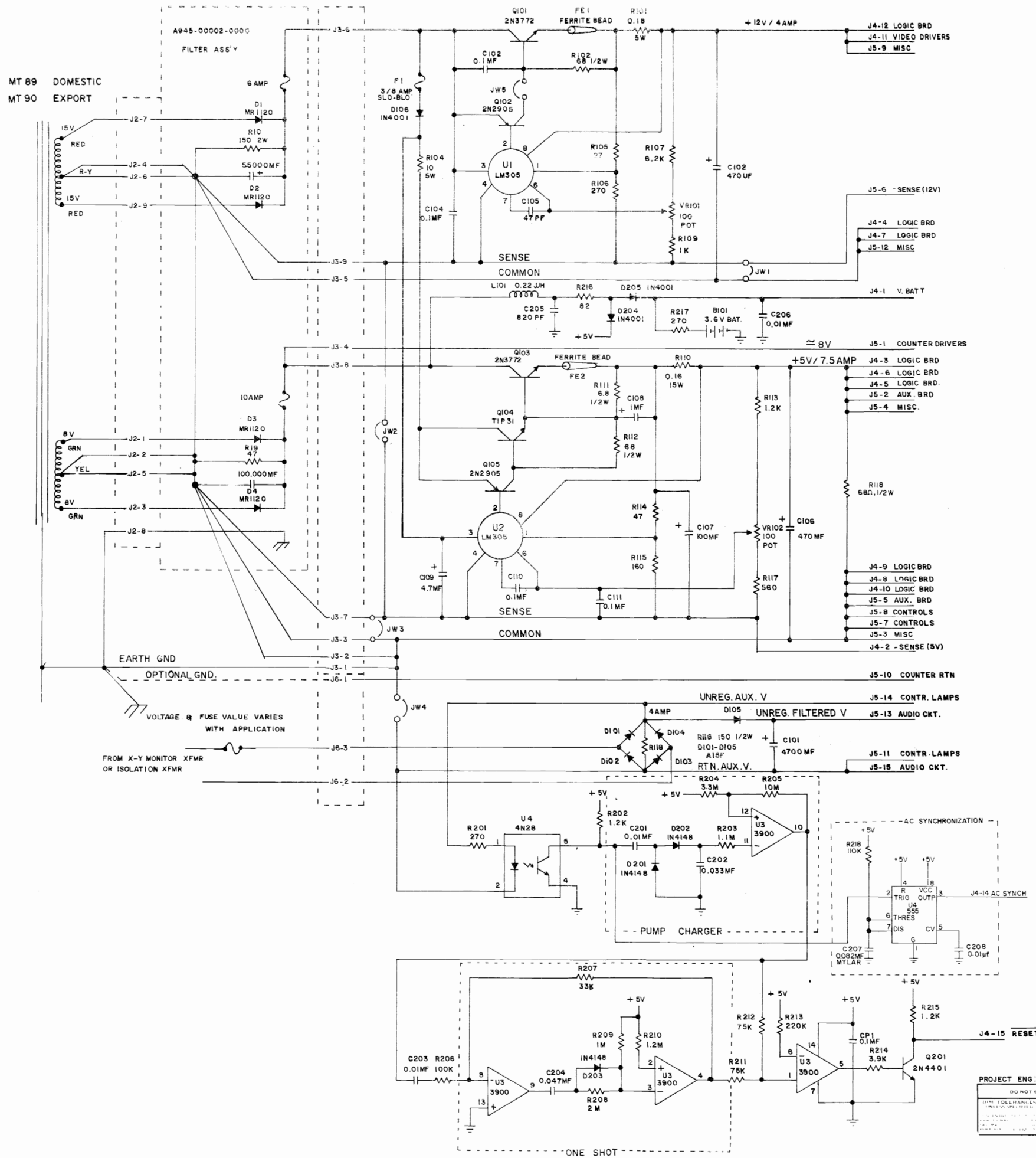
NO. 1000 I.P.E.R.

ASSEMBLY DRAWING 125VA PWRSPY

A082-90412-0000

M051-00945-B006

5/14/82



ONE SHOT

PROJECT ENG: L. DEKKER		SIGNED BY: SATAN#POLLOW		MIDWAY MFG. CO.	
DO NOT SCALE DWG		NO REVISIONS PER.		FRANKLIN, PA. U.S.A.	
DATE: 5/3/82		PART: FULL		POWER SUPPLY 125VA W/CKT SUPPORT A082-90412-0000	
DRAWN BY: M.M.		CHECKED BY:		PART NO: M051-00945-D007	