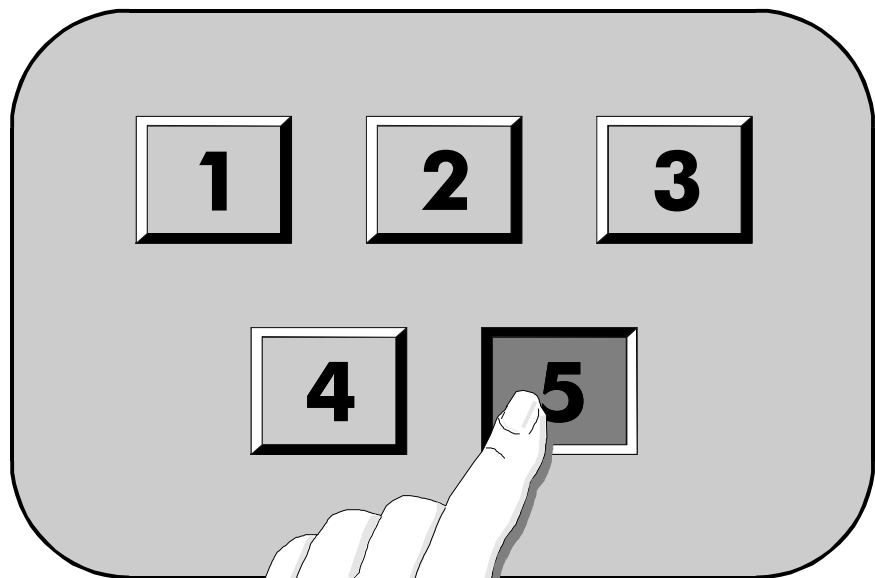


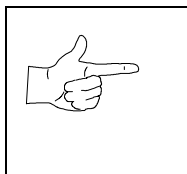
TOUCHMASTER[®]

CONVERSION

CHAPTER



Troubleshooting



NOTICE : The conversion kit interchangeable with the Board Assembly. The different part numbers. The touchscreen calibration errors.

CPU Board Assembly is not standard Touchmaster[®] CPU assemblies look very similar but have incorrect assembly will cause sync and

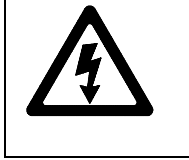
This Video Game Machine (VGM) uses complex electronic components that are **sensitive** to static electricity. The following precautions must be observed and followed prior to handling VGM electronics.

1. Turn off AC power to the VGM and ensure the cord is unplugged prior to servicing the VGM.
2. Discharge any static electricity build up in your body by touching any unpainted metal on the VGM, such as the chain lug. This is to be done **before** touching or handling the assemblies.
3. Handle the electronic assemblies by their edges and store them in an anti-static area when not in active use. Anti-static bags are to be used to store or transport the CPU Board Assembly.
4. **Do not** install, remove, or connect any electronic assemblies when the cabinet AC power is ON. Doing so will damage the electronic assemblies and void the warranty.
5. Always replace ground wires, shields, safety covers, etc. when maintenance or service is completed. Ensure that all ground and mounting screws are installed and tightened firmly.

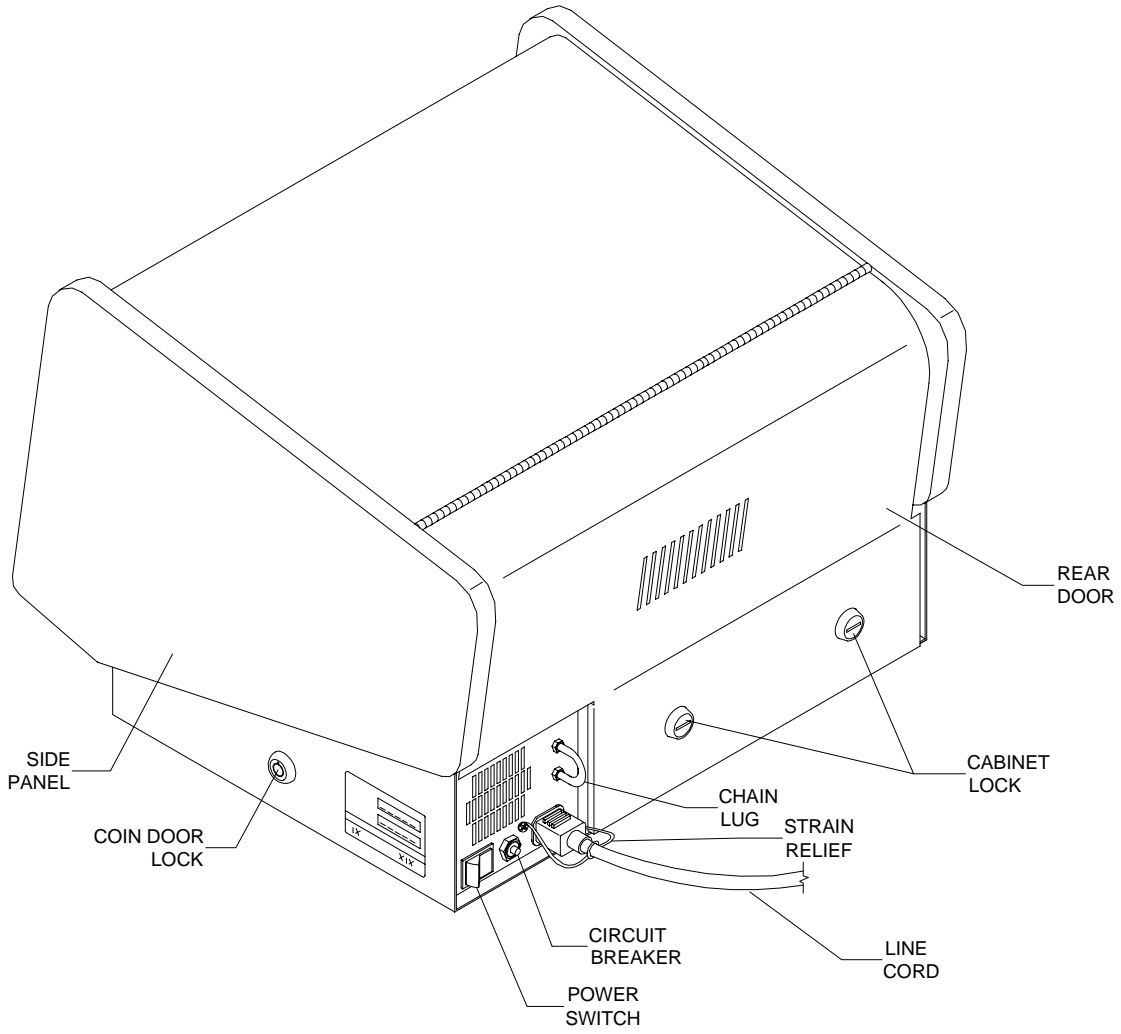
VGM Does Not Start

Symptom	Problem	Suggested Solution
<ul style="list-style-type: none"> VGM appears non-functional. No audio No fan No video display. 	Lack of electricity	Check that the Power Switch is set to ON and VGM is plugged in.
<ul style="list-style-type: none"> VGM appears non-functional Fan works. 	Poor AC connection	<ol style="list-style-type: none"> Check the air flow out of the cabinet by the fan. (This does not mean that voltages or signals are as they should be, but it does indicate that there is DC power available from the Power Supply.) Turn off power. Remove line cord cable clamp. Test line cord, power plug and I.E.C. connector for breaks or damage. Verify the continuity of each wire in cord. Fully seat I.E.C. connector into the mating cabinet receptacle. Replace cable clamp and all of its screws. Ensure that cabinet wiring harness connectors are fully seated in the corresponding AC Power Wiring Harness connectors. Verify the AC wire connections at the Power Supply terminals.
	Tripped circuit	<ol style="list-style-type: none"> Examine the AC Circuit Breaker on the cabinet. If the circuit has been broken, the reset button will be protruding from the Circuit Breaker. Press the button in until it latches to restore power.
	Faulty AC line filter	<ol style="list-style-type: none"> Examine the AC line filter on the cabinet. If the filter is faulty, replace it with an identical filter of the proper voltage and current rating. Connect the line cord and verify operation. Fully seat the AC plug in the outlet. Verify that AC line voltage is present. Turn VGM power ON. Check the DC wiring harness and connectors if the breaker opens the circuit again.
<ul style="list-style-type: none"> VGM appears non-functional Fan operates. 	Poor DC connections	<ol style="list-style-type: none"> Unlock and open the cabinet rear cover while AC power is on. Inspect the CPU Board Assembly under low light level conditions. You should see a glow from the LEDs if there is voltage in the processor circuits. (This does not mean that voltages or signals are as they should be, but it does indicate that the CPU Board is

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| | | <p>receiving some DC power from the Power Supply.)</p> <ol style="list-style-type: none"> 4. Turn OFF VGM power. 5. Unplug the AC line cord. 6. Inspect the CPU Board Assembly. 7. Ensure that the DC Power connector is attached and fully seated onto the mating board connector. 8. Check the other wiring harness connectors in the same way. |
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WARNING: DISCONNECT POWER. Do not remove or install any connector when power is turned on. Doing so will damage the CPU board assembly and void the warranty.



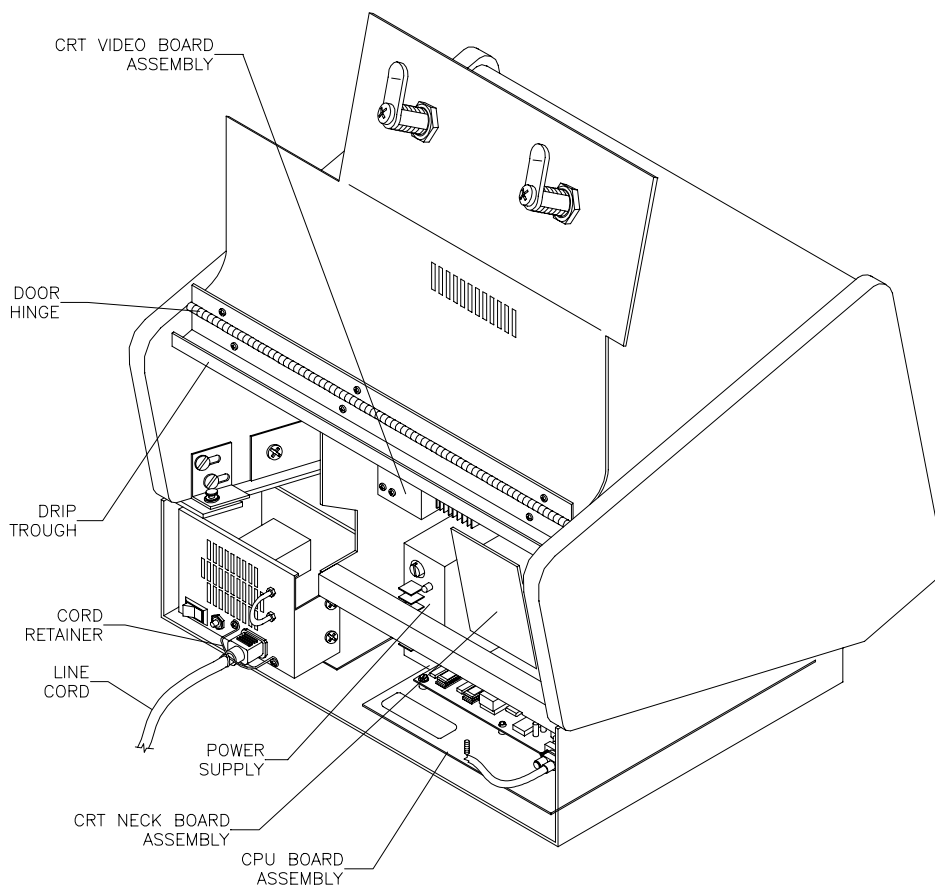
REAR VIEW OF CABINET

	Faulty video fuse	<ol style="list-style-type: none"> 1. Examine AC line fuse on Video Monitor Board. 2. If fuse is faulty, replace with identical fuse of proper voltage and current rating. 3. Connect line cord and verify operation.
	Poor voltage	<p>Plug in VGM and turn ON power.</p> <p>Using the 20 Volt DC range on a digital voltmeter, measure DC voltages at the CPU Power connector pins.</p> <p>Refer to the Typical Cabinet Wiring Diagram for specific wiring information and voltage limits.</p> <p>Adjust the +5V source if it is variable.</p> <p>Using the 2 Volt AC range on a digital voltmeter, measure the same DC voltages as above. Any reading here indicates that the supply voltages are unstable and may contain ripple or noise.</p>
		<p>Verify that the VGM runs and completes the power-up self-test sequence without any errors.</p> <p>Note errors and/or failures found during these tests.</p>
		<p>Remove cash door.</p> <p>Enter Menu System by pressing the SETUP button inside the coin vault. From SYSTEM SETUP menu, choose the VIDEO TESTS (refer to Section One for additional details). Use these tests to check the operation of screens used in the VGM.</p>

VGM Can Not Be Played

Symptom	Problem	Suggested Solution
<ul style="list-style-type: none"> • VGM will not accept currency or tokens. • VGM does not start. • Audio functional. • Video functional. 	Cash door blockage	Unlock and remove cash door. Empty the cash box. Inspect for counterfeit currency. Check vault and remove items that block the path from the coin mechanism.
		Check each coin mechanism or currency acceptor by hand to ensure proper mounting. Remove the mechanism or acceptor and clear the currency path. Reinstall the mechanism and latch it.
	Unlevel cash door	<ol style="list-style-type: none"> 1. Verify that the mechanism is level when the cabinet is in its normal position. 2. Ensure that the connector is attached and fully seated. 3. Repair or replace a bent or damaged mechanism.
	Poor connection	Ensure that cables and wiring are connected to the currency acceptor or coin mechanism. An electronic currency acceptor may require some programming to recognize currency.
<ul style="list-style-type: none"> • VGM accepts currency or tokens. • VGM does not start. • Audio functional. • Video functional. 	Poor switch	<ol style="list-style-type: none"> 1. Unlock and remove cash door. 2. Check each mechanism by hand to ensure proper mounting. 3. Verify that each release latch is closed and locked. 4. Test both good and bad coins to see if the mechanism or acceptor accepts and rejects the currency correctly. 5. Enter the VGM Menu System by pressing the SETUP button. 6. From the SYSTEM SETUP menu, go to DIAGNOSTICS and choose SWITCH TEST. Use these tests to confirm the operation of each switch used in the VGM.
	Poor connection	<ol style="list-style-type: none"> 1. Inspect internal cash door wiring connections. 2. Check connectors and cables for wiring continuity from CPU Board Assembly connector to coin mechanism or currency acceptor. 3. Examine the acceptor for programmable features. Some devices require operator adjustment for each specific type of currency recognized. 4. Refer to the manufacturer's literature for assistance in setting the acceptor features to the required values. 5. Turn OFF VGM power. 6. Ensure that no parts or wires are caught in hinges or switch contacts. 7. Check for continuity in each of the suspect switch connections (Common to Normally Open or

		<p>Common to Normally Closed).</p> <ol style="list-style-type: none"> Replace faulty switches (bent levers, broken actuators, etc.). Verify that each mechanism is operating properly by placing it in a known functional unit.
<ul style="list-style-type: none"> VGM accepts currency or tokens. Number of credits per coin or bill is incorrect. 	Faulty switch	<ol style="list-style-type: none"> Unlock and remove the cash door. Enter the VGM Menu System by pressing the SETUP button. From the SYSTEM SETUP menu, go to DIAGNOSTICS and choose SWITCH TEST. Use tests to confirm operation of each switch used in the VGM. Set the pulse width adjustment to long pulses if the bills do not register when inserted into the acceptor. Verify that each acceptor is operating properly by placing it in a known functional unit.

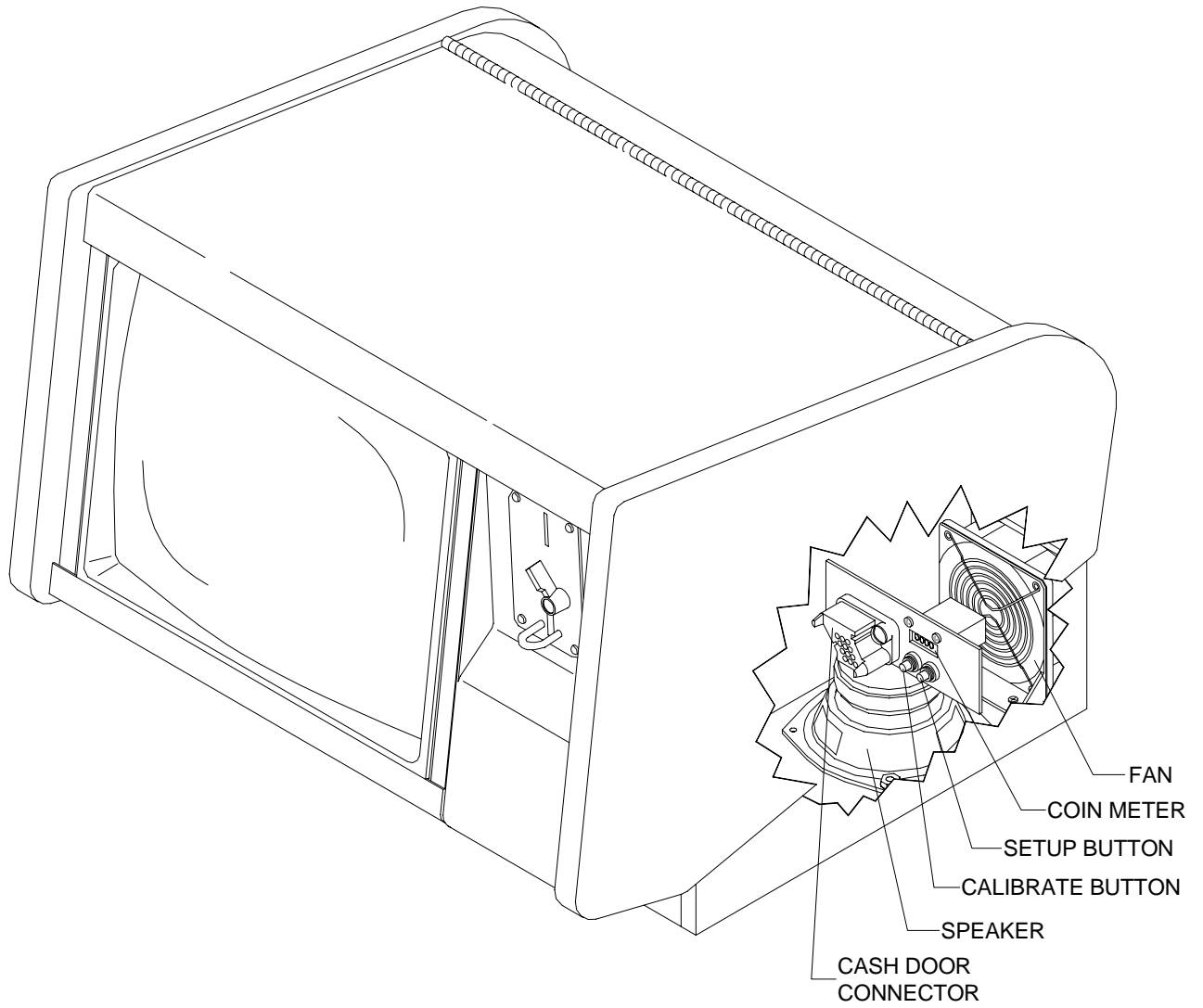


REAR VIEW OF CABINET WITH DOOR OPEN

Touchscreen Malfunctions

Symptom	Problem	Suggested Solution
<ul style="list-style-type: none"> Touchscreen is not accurate for two or more players. 	Dirty screen	Clean the entire cabinet frequently, especially the video screen glass and the touchscreen area. It is not necessary to switch off power to the VGM to clean the unit. Apply an isopropyl alcohol or warm water to a clean cloth or sponge, then use this to wipe the surface. Do not apply the cleaner directly on the unit. Liquids can drip into circuits and cause erratic VGM operation.
	Overzealous touching	Warn players to use only one finger at a time. Simultaneous touches confuse the touch controller.
	Poor player grounding	Some players may find that touchscreen response improves when they touch the surface of the metal cabinet with one hand as they operate the touchscreen with the other hand.
<ul style="list-style-type: none"> Touchscreen chooses incorrect items or does not respond when certain areas are touched. 	Poor calibration	Unlock and remove cash door. Enter Menu System by pressing the SETUP switch inside the coin vault. From the SYSTEM SETUP menu, go to DIAGNOSTICS and choose the CALIBRATE TEST (refer to Operation for additional details). Use these tests to confirm that the touchscreen is detecting and properly tracking finger position in all areas of the screen.
		From the DIAGNOSTIC menu, choose CALIBRATE to adjust the touchscreen accuracy. Follow the on screen instructions to optimize the touchscreen for sensitivity and linearity.
	Dirty screen	<ol style="list-style-type: none"> Turn OFF the VGM. Unlock and open the rear door. Remove the top cover and bezel (refer to Servicing instructions). Clean the touchscreen, especially areas normally hidden by the bezel.
	Faulty controller	Ensure that the Touchscreen Controller is operating properly by placing it in a known functional unit.
<ul style="list-style-type: none"> Touchscreen reacts in opposite corner from where touched 	Improper signal	<ol style="list-style-type: none"> Turn OFF the VGM and remove AC line cord. Open rear door. Verify that pin 3 of connector P6 is electrically grounded. Temporarily disconnect the blue/white wire at pin 3 of connector P6. Tape or insulate end of blue/white wire and secure to wiring harness. Plug in and turn ON the VGM. Recalibrate touchscreen.
<ul style="list-style-type: none"> Player touch controls are intermittent or completely non-functional. 	Poor connection	<ol style="list-style-type: none"> Unlock and remove the cash door. Enter the VGM Menu System by pressing the SETUP button.

<ul style="list-style-type: none"> VGM starts normally. 		<ol style="list-style-type: none"> From the SYSTEM SETUP menu, go to DIAGNOSTICS and choose the SWITCH TEST. Use these tests to confirm the operation of each switch used in the VGM.
	Poor calibration	From the DIAGNOSTIC menu, choose CALIBRATE (refer to Operation for additional details). Follow the on-screen instructions to optimize the Touchscreen for sensitivity and linearity.
	Poor power	<ol style="list-style-type: none"> Unlock and remove the top cover. Observe the CPU Board Assembly as you touch the screen. If the CPU senses your touch, you will see a glow from a red LED. A glow will be seen from a green LED on the end of the Touchscreen Controller if there is voltage in the Touchscreen circuits. Refer to LED Indicator Status Chart. Turn OFF VGM power. Inspect the Controller and, if necessary, lift the device up just enough to expose the Touchscreen connector. Check that the cable is fully seated in the connector. Ensure that the Touchscreen Controller is operating properly by placing in a known functional unit.
	Wrong board assembly	Verify that any replacement CPU Board Assembly is for use in the conversion kit. The CPU Board Assembly for standard production Touchmaster® units will cause calibration errors in this kit.
<ul style="list-style-type: none"> "Touch Controller Not Found" error message 	Poor connection	<ol style="list-style-type: none"> Turn OFF the VGM power. Unlock the snap latch plunger handles and lift up the rear edge of the CPU Board Assembly. Release the cable ties and lift the controller up just enough to expose the Touchscreen connector. Check that the cable is fully seated in the connector. Ensure that the Touchscreen Controller is operating properly by placing in a known good unit.



CUTAWAY OF COMPONENTS BEHIND CASH DOOR

Audio Malfunctions

Symptom	Problem	Suggested Solution
<ul style="list-style-type: none"> • Audio is non-functional. • Video is functional • VGM appears to operate normally. 	Volume set to zero in software.	<ol style="list-style-type: none"> 1. Unlock and remove the cash door. 2. Open the rear cover. 3. Enter the VGM Menu System by pressing the SETUP button. 4. From the SYSTEM SETUP menu, go to DIAGNOSTICS and choose SOUND TEST. 5. Verify that volume has not been set at zero. 6. Change the level to maximum to make the VGM audible.
	Volume set to zero on CPU Board Assembly	<ol style="list-style-type: none"> 1. Select an endlessly repeating sound track. 2. With the screen audio level at maximum, turn the master volume control on the CPU Board Assembly full up. Do not come into contact with the high voltage leads. 3. Now reduce the master volume until the sound is as loud as possible without distortion. 4. Use the screen adjustments to set a comfortable playing level.
		While in the SOUND TEST menu, select PLAY and use the NEXT box to advance through all the game sounds. Use sounds to confirm operation of the audio amplifier and speaker. Note if any game sounds are unintelligible, voice messages, strange noises, missing.
	Poor connection	<ol style="list-style-type: none"> 1. Turn OFF VGM power. 2. Verify correct cabinet wiring for this VGM. 3. Ensure that the speaker is properly connected to the audio output wires from the Audio connector. 4. Verify speaker continuity. 5. Refer to Typical Cabinet Wiring Diagram for specific wiring information.
	Poor power continuity	<ol style="list-style-type: none"> 1. Turn ON VGM power. 2. Using the 20 Volt DC range on a digital voltmeter, measure DC voltages present at the Power connector pins. 3. Verify the +5V, -5V and +12V sources. 4. Refer to the Typical Cabinet Wiring Diagram for specific wiring information and voltage limits. 5. Using the 2 Volt AC range on a digital voltmeter, measure the same DC voltages as above. 6. Any reading here indicates that the supply voltages are unstable and may contain ripple or noise. 7. Verify proper operation of CPU Board Assembly by placing it in a known functional unit.

<ul style="list-style-type: none"> • Audio is distorted or muffled. • A constant low hum may be present. • Sounds may be missing. 		<ol style="list-style-type: none"> 1. Unlock and remove the cash door. 2. Enter the VGM Menu System by pressing the SETUP button. 3. From the SYSTEM SETUP menu, go to DIAGNOSTICS and choose SOUND TESTS. These tests will verify some of the functions of the audio circuits in this VGM.
	Bad speaker	<ol style="list-style-type: none"> 1. Turn OFF the VGM. 2. Unlock and remove the cabinet cover. 3. Locate the speaker. 4. Ensure that it is FULL RANGE (100 to 10,000 Hz response) and rated for at least 15 WATTS continuous power.
	Poor connection	<ol style="list-style-type: none"> 1. Inspect the speaker and its wires. 2. Ensure that no loose parts or wires are caught in speaker cone, terminals, mounting screws, or stuck to the magnet.
	Bad board assembly	<ol style="list-style-type: none"> 1. Verify that the sound ROM is correct for this VGM. There is only one sound ROM in this VGM set. The ROM circuit is labeled with the assembly number and the software version. 2. Check that the cabinet wiring is correct for this VGM. 3. Ensure that all cabinet ground wires are connected. 4. Refer to the Typical Cabinet Wiring Diagram for specific wiring information.
	Poor voltage	<ol style="list-style-type: none"> 1. Using the 2 Volt AC range on a digital voltmeter, measure voltages at the speaker terminals. Any reading here indicates that the supply voltages are unstable and may contain ripple or noise. 2. Verify that the speaker is operating properly by placing in a known functional unit.

Video Malfunctions

Symptom	Problem	Suggested Solution
<ul style="list-style-type: none"> • Monitor appears non-functional. • Audio is functional. • Controls operate normally. 	Lack of electricity	<ol style="list-style-type: none"> 1. Unlock and remove cabinet cover. 2. Verify that AC Power is connected to the Video Monitor. 3. Inspect the neck of the CRT under low light level conditions. 4. You will see a glow near the CRT base if voltage is in the filament circuits. (This does not mean that other voltages or signals are as they should be, but it indicates that some monitor circuits are receiving power.)
	Poor connection	<ol style="list-style-type: none"> 1. Turn OFF VGM power. 2. Verify that the Video Signal and the Remote Adjustment Board connectors are fully seated on the Video Monitor Board Assembly. 3. Ensure that the video connector was installed onto the board with the pins in the same orientation as the original connector. 4. Check the other monitor connectors in the same way. Important: Do not operate a monitor without a Remote Adjustment Board.
	Faulty fuse	Examine the AC line fuse on the Video Monitor Board Assembly. If the fuse is faulty, replace it with an identical fuse of the proper voltage and current rating.
	Loose parts	Ensure that no loose parts or wires are caught or pinched by chassis or the mounting brackets. Reposition the thick, red CRT high voltage wire away from other components under the CPU shelf.
	Incorrect adjustments	<ol style="list-style-type: none"> 1. Check that the brightness (intensity) and contrast have not been set to their minimum levels. 2. Verify that the Video Monitor is operating correctly by placing it in a known functional unit.
<ul style="list-style-type: none"> • The power-up self-test is functional. • Game does not appear. • Audio is not functional. 	Error message	<ol style="list-style-type: none"> 1. Note and record any error messages that occur during self-test. 2. Turn OFF VGM power. 3. Restore power after one minute. 4. Note and record any new messages that appear on the screen. 5. Unlock and remove the cash door. 6. Enter the VGM Menu System by pressing the SETUP button. 7. From the SYSTEM SETUP menu, go to DIAGNOSTICS and choose VIDEO TEST. These tests will verify some functions of the video circuits.
	Wrong board assembly	<ol style="list-style-type: none"> 1. Turn OFF VGM power.

<ul style="list-style-type: none"> • Monitor does not lock onto signal and provide a stable picture. • Colors are missing, etc. 		<ol style="list-style-type: none"> 2. Verify that the CPU Board Assembly is correct for this VGM. Each CPU Board is marked with the manufacturer name, assembly number and the hardware version.
	Wrong ROM	<ol style="list-style-type: none"> 1. Verify that the ROM instruction set is correct for this VGM. There is more than one ROM in a VGM set. Each ROM circuit is labeled with the assembly number and the software version. 2. Turn ON VGM power. 3. Using the 20 Volt DC range on a digital voltmeter, measure DC voltages at Power connector pins. 4. Refer to Typical Cabinet Wiring Diagram for specific wiring information and voltage limits. 5. Adjust the +5V source if it is variable. 6. Using the 2 Volt AC range on a digital voltmeter, measure the same DC voltages as above. Any reading indicates that the supply voltages are unstable and may contain ripple or noise. 7. Compare CPU Board Light Emitting Diode states with the LED Indicator Status Chart.
	Poor connection	Check connectors and cables for wiring continuity from the CPU Board Assembly to the Video Monitor.
	Wrong board assembly	<ol style="list-style-type: none"> 1. Ensure that the CPU Board Assembly is correct for this VGM. Monitors for some VGMS require different sync polarity than Midway production units. Units with incorrect polarity or unusual sync connections will result in what appears to be horizontal tearing or complete loss of sync. 2. Verify that the Video Monitor is operating correctly by placing it in a known functional unit
<ul style="list-style-type: none"> • VGM operates normally. • Video wavers or rolls, has dark bars, uneven colors, etc. 	Poor connection	<ol style="list-style-type: none"> 1. Check connectors and cables for wiring continuity from the CPU Board to the Video Monitor. 2. Ensure that all the cabinet ground wires are connected, especially at the Video Monitor Chassis.
	Interference	<ol style="list-style-type: none"> 1. Move the cabinet away from machines, appliances, other VGMS, etc. Some equipment normally emits very strong electrical or magnetic fields. 2. Verify that the Video Monitor is operating correctly by placing it in a known functional unit.

Miscellaneous Malfunctions

Symptom	Problem	Suggested Solution
<ul style="list-style-type: none"> VGM operates normally. Cabinet gets very warm after several hours of use. 	Poor air flow	<ol style="list-style-type: none"> Check bottom and rear of cabinet for blocked air flow. Move VGM away from sources of heat. Turn OFF VGM power. Apply a high power vacuum cleaner to fan vent holes to remove dust.
	Poor cooling system	Unlock and open the rear door. Ensure that all fans are connected and operating at full speed.
<ul style="list-style-type: none"> Touchscreen requires excessive recalibration to maintain VGM accuracy. 	Touchscreen abuse	<ol style="list-style-type: none"> Clean the entire cabinet frequently, especially the video screen glass and the touchscreen area. It is not necessary to switch off power to the VGM to clean the unit. Apply an isopropyl alcohol or warm water to a clean cloth or sponge and use it to wipe the surface. Do not apply cleaner directly on the unit. Liquids could drip into circuits and cause erratic VGM operation. Warn players to use only one finger at a time. Multiple, simultaneous touches confuse the controller.
	Infrequent calibration	Repeat the Calibrate and Calibrate Test sequence each time the VGM is relocated.
<ul style="list-style-type: none"> Error messages appear on the screen. VGM is not functional. Audio is not functional. 	Defined by message	<ol style="list-style-type: none"> Check the assembly (RAM, ROM, battery, touchscreen, etc.) identified in the error message. If errors seem to occur at random, try to determine what conditions occur with the appearance of the message (i.e., time of day, when other equipment is turned off or on, when room temperature is elevated, when certain players are at the VGM, periods of low or high humidity, etc.). Call your authorized distributor for help with unresolved screen messages.
<ul style="list-style-type: none"> "Security Key Error" message 	Security failure	<ol style="list-style-type: none"> Check to see if security key is missing or incorrectly installed on CPU Board Assembly. Confirm that security key version matches software version.