INTRODUCTION

HOW TO OPERATE NIBBLER

Nibbler is an exciting maze game.

The object of the game is to nibble all the bonus objects in the maze without nibbling the Nibbler.

The mazes and bonus objects are varied so that 32 waves must be completed to see all patterns.

Each wave is faster and more difficult than the preceding wave.

The game continues at maximum difficulty after the 32nd wave.
RECEIVING AND INSTALLATION
(VIDEO GAMES)

RECEIVING INSPECTION

Your game was shipped in ready-to-play condition. However, after removal of the shipping carton, a brief visual examination is suggested.

Naturally, you'll want to make note of any physical damage to the game cabinet and its external components for freight claim purposes. Considering the quality of the shipping carton, any damage to the exterior would indicate possible interior damage as well.

The interior of the game should also undergo a brief examination for: loose mounting hardware (check to be sure that the major components are still securely mounted); disconnected or loose wires, cables or harnesses; electronic devices loose in their sockets; etc.

At this time the game serial number should be logged. Please remember that the game serial number will be required if you need service from your distributor.

ELECTRICAL REQUIREMENTS

A good earth ground is essential for the proper operation of this game or for that matter any electronic device. Problems with instability and erratic operation of computer-type devices can usually be traced to an ineffective ground system. Therefore, plug the game into a properly wired 3 prong outlet. If a 3 prong to 2 prong AC adaptor must be used, an alternate method of grounding the third prong must be used.

INITIAL ADJUSTMENTS

When the game is connected to AC power, one of the game sounds may be heard. This is normal.

The audio level (volume) can be easily adjusted. This is achieved by rotation of the volume control located on the coin door. The audio level should compete with other machines "on the floor" to maximize play time.

OPERATOR OPTIONS

The option switches allow you to select how many credits per coin, how many chances to play per game & bonus scoring. If your machine DOES NOT have multiple pricing capability, refer to page 2-2. If it DOES have multiple pricing capability, skip 2-2 and refer to page 2-3.

CREDIT BUTTON. When you push this button you can increase credits without affecting the counter. It's the red button on the coin door.

WARNING

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. As temporarily permitted by regulation it has not been tested for compliance pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.
"NIBBLER" OPTION SWITCHES  
(LOCATED ON GAME BOARD)  

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>SW1</th>
<th>SW2</th>
<th>SW3</th>
<th>SW4</th>
<th>SW5</th>
<th>SW6</th>
<th>SW7</th>
<th>SW8</th>
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<td>DIAGNOSTICS OFF</td>
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<tr>
<td>1 COIN / 1 PLAY</td>
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<td>OFF</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>4 COINS / 3 PLAYS</td>
<td>ON</td>
<td>ON</td>
<td></td>
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</tbody>
</table>

NORMAL SETTING: 3 NIBBLERS PER PLAYER  
1 COIN / 1 PLAY

NORMAL SWITCH SETTINGS: ALL SWITCHES OFF

TURN OFF POWER TO GAME BEFORE CHANGING SWITCH POSITIONS  
NEW SWITCH POSITIONS BECOME EFFECTIVE ON POWER UP
NIBBLER DIAGNOSTICS

On power-up, the diagnostic program (which is inside the game software) first checks that it can read and write to the RAM, and calculates sumchecks for the PROMs which are compared against values stored in software. The diagnostics are run regardless of the setting of the diagnostic dip switch (switch 5); the use of the switch will be described later.

If RAM IC13 is bad, the program may not be able to run at all, in which case a low oscillating sound is made (until the power is turned off).

If IC13 is OK, the program then checks the rest of the RAMs and PROMs and displays the results. If any of the RAM is bad (status = FAIL), the display will be messed up, but may still be readable.

If the diagnostic program won't work, then either PROM IC10 or IC14 is bad. If the diagnostic program works but indicates that any IC has failed, the game may work (but probably won't work well). Note that IC14 does not get a sumcheck, but if the diagnostic program works, and the letters and numbers on the CRT look OK (and IC67 and 68 are OK), then IC14 is OK.

After displaying the status of the RAMs and PROMs, the screen is then filled with a grid pattern for aligning the CRT. Now, if the diagnostic dip switch is OFF, the program goes immediately to the game. There are no further diagnostics.

If the diagnostic dip switch is ON, the grid pattern stays on the screen until one of the following buttons is pushed:

1 player start: the program goes immediately to the game; there are no further diagnostics, and the dip switch will have no affect until the power is turned off and back on again.

2 player start: the diagnostics are re-run from the beginning; by keeping this button pushed, it is possible to continuously repeat the diagnostics.

Further Note: If the dip switch is ON, it is possible to retain the screen which gives the results of the diagnostics by pushing the joystick down before the grid is written (on a cocktail table, use the player 1 joystick). Otherwise the information is only visible for about 2 seconds. If the dip switch is OFF, it is NOT possible to retain this information; the game will enter the attract mode regardless of the buttons (until credits are entered).
G-208 NIBBLER
Cabinet Parts
### COIN DOOR - COMPLETE

**#G-6115-A**

<table>
<thead>
<tr>
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<th>PART NO.</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>1</td>
<td>G-6102</td>
<td>Coin Return Button (with Coin Slot)</td>
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<tr>
<td>2</td>
<td>G-6088</td>
<td>Coin Return Button (Red)</td>
</tr>
<tr>
<td>3</td>
<td>G-6089</td>
<td>25¢ Price Decal</td>
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<tr>
<td>4</td>
<td>G-6103</td>
<td>Token Decal</td>
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<td>5</td>
<td>G-6104</td>
<td>Coin Return Button Cover (Red)</td>
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<td>6</td>
<td>G-6111</td>
<td>Coin Button Housing</td>
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<td>7</td>
<td>G-6088</td>
<td>Coin Return Button (Orange)</td>
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<td>8</td>
<td>G-6089</td>
<td>25¢ Price Decal</td>
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<tr>
<td>9</td>
<td>G-6112</td>
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<td>G-6113</td>
<td>Coin Return Button Cover (Orange)</td>
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<td>G-6241</td>
<td>Coin Door (includes Hinge) - 2 Coin</td>
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<tr>
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<td>G-6242</td>
<td>Door Frame (Die Cast)</td>
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<td>G-6243</td>
<td>Switch</td>
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<tr>
<td>14</td>
<td>G-6246</td>
<td>25¢ Acceptor (5301-10)</td>
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<td>G-6247</td>
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<td>G-6248</td>
<td>Locking Arm (2)</td>
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<td>G-6249</td>
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<td>18</td>
<td>G-6239</td>
<td>Coin Return Lever (New Style)</td>
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**COMMON PARTS**

**SPECIAL PARTS (Service Original Doors)**
# CREDIT COUNTER P.C. BOARD ASSEMBLY

**G-6105-A**

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<td>19</td>
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<td>Key Switch - Single Contact - Red</td>
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<td>22</td>
<td>G-0940</td>
<td>Capacitor, Ceramic Disc 50V</td>
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GENERAL INFORMATION
AND PERIODIC MAINTENANCE

Your video game contains the same basic building blocks as any other video game.

THE POWER SUPPLY provides all the necessary voltages for the CPU, audio section, monitor and fluorescent light. Always unplug the game before replacing a fuse.

THE CENTRAL PROCESSING UNIT (CPU) is the "brain" of the game. It senses when a coin is dropped in the coin meter, and gives credit. It then reads what is happening at the operator controls, interprets and computes to make the game play according to what buttons the player pushes. It tells the monitor what to draw on the screen. And it tells the audio section when to make appropriate sound effects.

THE AUDIO SECTION generates all the sound effects for the game and powers the loudspeaker.

THE COLOR MONITOR is the picture tube. It draws pictures on the tube screen according to the instructions it receives from the CPU.

THE MAIN WIRING HARNESS carries power from the power supply to the CPU, audio section and monitor. It connects to each section through the Molex plugs. NEVER CONNECT OR DISCONNECT THE MOLEX POWER PLUGS UNLESS THE GAME IS UNPLUGGED.

PERIODIC MAINTENANCE - The only Periodic Maintenance required is an occasional cleaning. The very high voltage used on the picture tube attracts dust that gradually degrades picture quality. To clean: unplug game and let sit for at least 5 minutes to let voltages "bleed-off".

To clean the face of the picture tube and associated plastic parts, remove the control panel by loosening clamps on each side of panel on inside of cabinet. These clamps are accessible thru coin door. Remove the plexiglas window being careful not to scratch clear or painted areas. Window, gray filter and picture tube may now be cleaned with a mild solution of dish detergent. Dry all parts and reassemble.
REPLACEMENT PARTS LIST FOR WELLS-GARDNER COLOR MONITOR

These are Wells-Gardner parts with Wells-Gardner part numbers. Please order these parts from them.

2701 N. Kildare Ave., Chicago, Il. 60639

★ SAFETY CRITICAL PARTS LIST

This receiver contains circuits and components included specifically for safety purposes. For continued protection no changes should be made to the original design and components shown in shaded areas of schematics, or any parts listed should be replaced with exact factory replacement parts. The use of substitute parts may create a shock, fire, x-radiation or other hazard. Service should be performed by qualified personnel only.

MAIN BOARD (MQ-29)

<table>
<thead>
<tr>
<th>Ref. No.</th>
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<th>Description</th>
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<tr>
<td>RESISTORS</td>
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<td>1k Ohm, +5%, 1W M.O.</td>
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<tr>
<td>R606</td>
<td>20X1425-021</td>
<td>470 Ohm, +10%, 5W W.W.</td>
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<td>R607</td>
<td>20X1450-508</td>
<td>2.7k Ohm, +10%, 5W W.W.</td>
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<td>R608</td>
<td>20X9014-603</td>
<td>1.2k Ohm, +5%, 1W M.O.</td>
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<tr>
<td>R610</td>
<td>20X6500-240</td>
<td>22 Ohm, +5%, 1/8W Carbon</td>
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<tr>
<td>R612</td>
<td>20X6500-552</td>
<td>1k Ohm, +5%, 1/2W Carbon</td>
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<td>R613</td>
<td>20X3471-944</td>
<td>470 Ohm, +5%, 1/2W Comp.</td>
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<td>270k Ohm, +5%, 1/2W Comp.</td>
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<td>20X6500-741</td>
<td>2.7k Ohm, +5%, 1/8W Carbon</td>
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<td>R617</td>
<td>20X6500-108</td>
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<td>R620</td>
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<td>R631</td>
<td>20X9015-087</td>
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<td>340X8111-731</td>
<td>110 Ohm, +5%, 5W Carbon</td>
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<td>340X8121-731</td>
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<td>R634</td>
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<td>R640</td>
<td>20X6500-762</td>
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<td>3.9M Ohm, +5%, 1/2W Comp.</td>
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<td>R646</td>
<td>20X6500-468</td>
<td>180 Ohm, +5%, 1/8W Carbon</td>
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<td>R647</td>
<td>340X5150-041</td>
<td>15 Ohm, +10%, 2W Carbon</td>
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<td>340X2225-934</td>
<td>2.2M Ohm, +5%, 1/4W Carbon</td>
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*For Model K4803 Only

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<tr>
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<th>Description</th>
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<tr>
<td>TR601</td>
<td>Rectifier, (Si) RM-24V 600V</td>
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<tr>
<td>TR602</td>
<td>Diode (HS) SB-2CG 1200V min.</td>
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<tr>
<td>TR603</td>
<td>Diode (Si) IS2473 172</td>
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<tr>
<td>TR604</td>
<td>Diode (HS) RC-2V 0.6 US</td>
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<tr>
<td>TR605</td>
<td>Diode (HS) RU-2V</td>
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<td>TR606</td>
<td>Diode (HS) RU-2V</td>
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MISCELLANEOUS

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<td>204X9600-380</td>
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<td>Plug, 3 Pin (NM)</td>
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<td>Plug, 2 Pin (GT)</td>
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<td>Plug, 2 Pin (NM)</td>
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<td>201X1013-007</td>
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TRANSFORMERS & COILS

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<tr>
<td>L601</td>
<td>201X6000-112</td>
<td>Coil, Line Filter R-3</td>
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<td>L602</td>
<td>201X6000-042</td>
<td>Coil, Filter, 10uH</td>
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<td>L603</td>
<td>201X4100-024</td>
<td>Coil, Peaking, 22uH</td>
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<td>L607</td>
<td>201X7110-134</td>
<td>Coil, R.F. Choke</td>
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<td>T601</td>
<td>201X9500-337</td>
<td>Transformer, Audio Output</td>
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<td>T602</td>
<td>201X1200-080</td>
<td>Transformer, Hor. Drive</td>
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<td>T603</td>
<td>201X1210-191</td>
<td>Transformer, Side PC</td>
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<tr>
<td>L702</td>
<td>9A2795-001</td>
<td>Horiz. Size</td>
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### RESISTORS

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<th>Description</th>
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<tbody>
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<td>R301</td>
<td>203X6500-628</td>
<td>820 Ohm, ± 5%, 1/8W Carbon</td>
</tr>
<tr>
<td>R302</td>
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<td>12k Ohm, ± 5%, 1/8W Carbon</td>
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<td>203X6500-927</td>
<td>15k Ohm, ± 5%, 1/8W Carbon</td>
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<td>R304</td>
<td>203X6500-886</td>
<td>10k Ohm, ± 5%, 1/8W Carbon</td>
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<td>203X6501-241</td>
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<td>1k Ohm, ± 5%, 1/8W Carbon</td>
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<td>203X6500-689</td>
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<td>R308</td>
<td>203X6500-724</td>
<td>2.2k Ohm, ± 5%, 1/8W Carbon</td>
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<td>R309</td>
<td>203X6501-285</td>
<td>470k Ohm, ± 5%, 1/8W Carbon</td>
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<td>203X6500-850</td>
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<td>47k Ohm, ± 5%, 1/8W Carbon</td>
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<td>R315</td>
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<td>R319</td>
<td>203X6700-509</td>
<td>560 Ohm, ± 5%, 1/2W Carbon</td>
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<td>203X9100-121</td>
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<td>203X8500-869</td>
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<td>R323</td>
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<td>R325</td>
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<td>R332</td>
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<td>12k Ohm, ± 5%, 1/8W Carbon</td>
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<td>R333</td>
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<td>R334</td>
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<td>2.2k Ohm, ± 5%, 1/8W Carbon</td>
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<td>R335</td>
<td>203X6500-666</td>
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<td>R336</td>
<td>203X9014-988</td>
<td>47k Ohm, ± 5%, 1W M.O.</td>
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<td>203X7000-969</td>
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<td>R338</td>
<td>203X6001-145</td>
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<td>R343</td>
<td>203X6104-751</td>
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<td>VR301</td>
<td>204X2122-093</td>
<td>Varistor, 250k Ohm, Vert. Hold</td>
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<td>VR302</td>
<td>204X2114-085</td>
<td>Varistor, 20k Ohm, Vert. Size</td>
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<td>VR303</td>
<td>204X2114-099</td>
<td>Varistor, 50k Ohm, Hor. Hold</td>
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### CAPACITORS

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<tbody>
<tr>
<td>C301</td>
<td>203X1100-928</td>
<td>0.15 µF, 50V, ± 10% Mylar</td>
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<td>C302</td>
<td>203X1100-573</td>
<td>0.022 µF, 50V, ± 10% Mylar</td>
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<td>C304</td>
<td>203X1100-858</td>
<td>0.1 µF, 50V, ± 10% Mylar</td>
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<tr>
<td>C306</td>
<td>203X0025-026</td>
<td>2.2 µF, 50V, electrolytic</td>
</tr>
<tr>
<td>C307</td>
<td>203X1100-928</td>
<td>0.15 µF, 50V, ± 10% Mylar</td>
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<tr>
<td>C309</td>
<td>203X1100-958</td>
<td>0.1 µF, 50V, ± 10% Mylar</td>
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<td>C310</td>
<td>203X0010-011</td>
<td>22 µF, 16V Electrolytic</td>
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<td>C311</td>
<td>203X0020-099</td>
<td>1000 µF, 35V Electrolytic</td>
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<td>C312</td>
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<td>0.0082 µF, 50V, ± 10% Ceramic</td>
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### RESISTORS

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<td>180 Ohm, ± 10%, 15W WW</td>
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<td>203X6000-608</td>
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<td>R503</td>
<td>203X6000-960</td>
<td>1k Ohm, ± 5%, 1/8W Carbon</td>
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<td>R504</td>
<td>203X6000-579</td>
<td>56k Ohm, ± 5%, 1/8W Carbon</td>
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<td>R505</td>
<td>203X9014-965</td>
<td>39k Ohm, ± 5%, 1W M.O.</td>
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<td>R506</td>
<td>203X6500-842</td>
<td>6.8k Ohm, ± 5%, 1/8W Carbon</td>
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<td>R507</td>
<td>203X6500-420</td>
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<td>VR501</td>
<td>204X2050-001</td>
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### TRANSFORMERS & COILS

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<td>Varistor Vert. Adj.</td>
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### POWER BOARD (MV)

#### RESISTORS

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<td>203X0010-011</td>
<td>22 µF, 16V Electrolytic</td>
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<td>C504</td>
<td>203X0005-046</td>
<td>220 µF, 10V Electrolytic</td>
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### SEMICONDUCTORS

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**Page 4-2**
# NECK BOARD (MS/QG)

WELLS-GARDNER PARTS...ORDER FROM THEM...SEE PAGE 6-9

## RESISTORS

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<td>R401</td>
<td>203X6500-709</td>
<td>1.8k Ohm ± 5% 1/8W Carbon</td>
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<tr>
<td>R402</td>
<td>203X6500-709</td>
<td>1.8k Ohm ± 5% 1/8W Carbon</td>
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<tr>
<td>R403</td>
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<tr>
<td>R404</td>
<td>203X6500-447</td>
<td>150 Ohm ± 5% 1/8W Carbon</td>
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<td>R405</td>
<td>203X6500-481</td>
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<td>R406</td>
<td>203X6500-447</td>
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<td>R408</td>
<td>203X6500-508</td>
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<td>R409</td>
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<td>R410</td>
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<td>R411</td>
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<td>R412</td>
<td>203X9104-809</td>
<td>12k Ohm ± 5% 2.0W Metal Oxide</td>
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<td>R413</td>
<td>203X9104-809</td>
<td>12k Ohm ± 5% 2.0W Metal Oxide</td>
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<td>R414</td>
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<td>R415</td>
<td>203X5601-313</td>
<td>2.7k Ohm ± 10% 1/2W Comp.</td>
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<td>R416</td>
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<td>203X5602-254</td>
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<td>203X5602-165</td>
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<tr>
<td>R422</td>
<td>203X9105-117</td>
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<td>R423</td>
<td>203X5102-155</td>
<td>270k Ohm ± 5% 1/4W Carbon</td>
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<tr>
<td>VR401</td>
<td>204X2115-014</td>
<td>500 Ohm Varistor R Drive</td>
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<td>VR402</td>
<td>204X2115-014</td>
<td>500 Ohm Varistor B Drive</td>
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<td>VR403</td>
<td>204X2115-006</td>
<td>5k Ohm Varistor R Cutoff</td>
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<td>5k Ohm Varistor G Cutoff</td>
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<tr>
<td>VR406</td>
<td>204X2000-025</td>
<td>1M Ohm Varistor Screen</td>
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## CAPACITORS

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<th>Description</th>
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<tbody>
<tr>
<td>C401</td>
<td>202X7000-247</td>
<td>1000 pF, 50V, 10% Ceramic</td>
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<tr>
<td>C402</td>
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## SEMICONDUCTORS

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<th>Part No.</th>
<th>Description</th>
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<td>Transistor, 2SC2068, 2SC1514</td>
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<tr>
<td>TR402</td>
<td>200X3206-800</td>
<td>Transistor, 2SC2068, 2SC1514</td>
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<td>TR403</td>
<td>200X3206-800</td>
<td>Transistor, 2SC2068, 2SC1514</td>
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<tr>
<td>VR401</td>
<td>204X2115-014</td>
<td>500 Ohm Varistor R Drive</td>
</tr>
<tr>
<td>VR402</td>
<td>204X2115-014</td>
<td>500 Ohm Varistor B Drive</td>
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<td>VR403</td>
<td>204X2115-006</td>
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<td>1M Ohm Varistor Screen</td>
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## MISCELLANEOUS

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<td>200X5003-963</td>
<td>Socket, 3 Pin</td>
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<td>P401</td>
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<td>P402</td>
<td>204X9000-254</td>
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### \[297X2000-072\] HIGH VOLTAGE ASSEMBLY (T701)

#### \[\Delta \star\] 701

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<td>3.3 Ohm, ± 10% 10W WW Resistor</td>
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<tr>
<td>X701</td>
<td>204X9001-125</td>
<td>Focus Control Diode (SI HV)</td>
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<tr>
<td>X702</td>
<td>204X9001-125</td>
<td>Focus Control Diode (SI HV)</td>
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<tr>
<td>X703</td>
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### \[\Delta \star\] 207X1110-810

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<td>3.3 Ohm, ± 10% 10W WW Resistor</td>
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<td>X701</td>
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<td>Focus Control Diode (SI HV)</td>
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<td>X702</td>
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<td>Focus Control Diode (SI HV)</td>
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<td>X703</td>
<td>204X9001-125</td>
<td>Focus Control Diode (SI HV)</td>
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### \[\Delta \star\] 297X2000-072

<table>
<thead>
<tr>
<th>Ref. No.</th>
<th>Part No.</th>
<th>Description</th>
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<tbody>
<tr>
<td>VR701</td>
<td>204X1625-058</td>
<td>3.3 Ohm, ± 10% 10W WW Resistor</td>
</tr>
<tr>
<td>X701</td>
<td>204X9001-125</td>
<td>Focus Control Diode (SI HV)</td>
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<td>X702</td>
<td>204X9001-125</td>
<td>Focus Control Diode (SI HV)</td>
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<tr>
<td>X703</td>
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### FINAL ASSEMBLY PARTS

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<td>3.3 Ohm, ± 10% 10W WW Resistor</td>
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<td>Focus Control Diode (SI HV)</td>
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### 19V/JP22 Pix Tube

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<tr>
<td>38A5554-000</td>
<td>205X9000-256</td>
<td>Ass'y. Purity Shd/Degaussing</td>
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<tr>
<td>207X2000-072</td>
<td>6A0397</td>
<td>Lateral/Purity Assembly</td>
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<tr>
<td>208X2000-946</td>
<td>92753-003</td>
<td>Yoke, Deflection</td>
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<tr>
<td>297X2000-072</td>
<td>92753-003</td>
<td>CRT Socket</td>
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<tr>
<td>297X2000-072</td>
<td>92753-003</td>
<td>HV Unit (T701)</td>
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<td>297X2000-072</td>
<td>92753-003</td>
<td>Plug, Line Cord</td>
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<td>92753-003</td>
<td>Degaussing Coil (L701)</td>
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<tbody>
<tr>
<td>R201</td>
<td>340X3910-934</td>
<td>1/2W 5% 91 Ohm</td>
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<td>45x0524-038</td>
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<td>R202</td>
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<td>1/4W 5% 22K Ohm</td>
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<td>R203</td>
<td>340X3102-934</td>
<td>1/2W 5% 1K Ohm</td>
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<td>R204</td>
<td>340x2101-934</td>
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<tr>
<td>R206</td>
<td>340x3331-944</td>
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<td>340x2222-934</td>
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<td>340x2151-934</td>
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<td>66x0046-001</td>
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<td>204x9300-958</td>
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<td>6A393-003</td>
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<td>340x2522-934</td>
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<td>R226</td>
<td>340x2822-934</td>
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<td>204x9300-958</td>
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<td>R227</td>
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<td>1/2W 5% 8.2K Ohm</td>
<td>J203</td>
<td>206x5019-207</td>
<td>Socket, 4 Pin</td>
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**RESISTORS**

**CAPACITORS**

**SEMI-CONDUCTORS**

**MISCELLANEOUS**
## POWER SUPPLY ASSEMBLY

### G-6060-A

<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>PART NO.</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>1</td>
<td>G-6063-A</td>
<td>Power Supply Chassis Weld Assembly</td>
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<tr>
<td>2</td>
<td>49250</td>
<td>Shock Safe Fuseholder</td>
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<td>3</td>
<td>G-5403-A</td>
<td>Fuseholder Assembly - Canada only</td>
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<td>4</td>
<td>44935</td>
<td>Snap-in Steel Clip - Canada only</td>
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<td>5</td>
<td>ST-9843</td>
<td>Tapered Caplug #5 - Red</td>
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<td>6</td>
<td>ST-3090</td>
<td>3 Amp 250V Slo-Blo Fuse</td>
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<td>6A</td>
<td>44930</td>
<td>Fuseltron GMQ 3.2A Fuse (F1) Canada only</td>
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<td>ST-9631</td>
<td>5 Amp 250V Slo-Blo Fuse</td>
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<td>ST-4332</td>
<td>1 Amp 250V Slo-Blo Fuse</td>
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<td>ST-4323</td>
<td>0.8 Amp 250V Slo-Blo Fuse</td>
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<td>0.5 Amp 250V Slo-Blo Fuse</td>
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<td>ST-10589</td>
<td>3 Circuit Universal Socket Housing</td>
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<td>ST-10588</td>
<td>4 Circuit Universal Socket Housing</td>
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<td>ST-10570</td>
<td>9 Circuit Universal Socket Housing</td>
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<td>ST-10500</td>
<td>15 Circuit Universal Socket Housing</td>
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<td>G-6059-CA</td>
<td>Power Transformer Assembly Canada only</td>
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<td>ST-8722</td>
<td>10-32 Hex Flg Whiz-Lock Nut</td>
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<td>ST-10062</td>
<td>8-36 X 5/16 M.S. Brass - Green Iridite</td>
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<td>19</td>
<td>49007</td>
<td>Input Terminal Insulator</td>
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<td>3 Pole Input Terminal</td>
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<td>ST-4518</td>
<td>6-32 X 1/2 Mach. Screw</td>
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<td>ST-8715</td>
<td>6-32 Nut, Hex Flange - Serrated</td>
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<td>3 Conductor Cord &amp; Plug - Domestic, Canada</td>
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<td>6062-A</td>
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<td>ST-8267</td>
<td>8-32 X 1/4 Tapping Screw</td>
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*Diagram of assembly showing item numbers 1 to 25.*
### NIBBLER

#### PARTS LIST

**G-208**

#### OVERALL ASSEMBLY

<table>
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<td>G-6479-A</td>
<td>Control Panel Assembly</td>
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<td>3</td>
<td>G-6100-A</td>
<td>Monitor Assembly - Complete</td>
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<td>4</td>
<td>G-6480-A</td>
<td>Game P.C. Board Assembly</td>
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<td>G-6080-A</td>
<td>Power Supply - Complete - Domestic</td>
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#### CABINET ASSEMBLY - NIBBLER

**G-6455-A**

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<td>G-24182-A</td>
<td>Cabinet - Wood</td>
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<td>G-6329</td>
<td>Rock-Ola Decal - Blue</td>
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<td>Rock-Ola Decal - Green</td>
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<td>3</td>
<td>G-6115-A</td>
<td>Coin Door - Complete - Canada &amp; Domestic</td>
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<td>G-6115-AA</td>
<td>Coin Door - Complete - Australia</td>
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<td>G-6115-BA</td>
<td>Coin Door - Complete - Belgium</td>
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<td>G-6115-FS</td>
<td>Coin Door - Complete - France</td>
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<td>G-6115-GA</td>
<td>Coin Door - Complete - Germany</td>
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<td>G-6115-JA</td>
<td>Coin Door - Complete - Japan</td>
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<td>G-6108-A</td>
<td>Counter #1 - Complete (Single Price)</td>
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<td>G-6109-A</td>
<td>Counter #1 &amp; #2 - Complete (Multi-Price)</td>
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<td>G-5419-A</td>
<td>Counter Assembly Only</td>
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<td>7</td>
<td>G-6072-A</td>
<td>Coin Switch Cable</td>
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<td>G-5092-A</td>
<td>Braided Shield - Short</td>
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<td>G-5693</td>
<td>Bracket - Volume Control</td>
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<td>Potentiometer (Small) - Standard</td>
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<td>.203 I.D. X 1/2 O.D. X .032 Fl. Washer - Z.P.</td>
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<td>10-24 Hex Flg Whiz Lock Nut - Blk Ox</td>
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<td>G-5022</td>
<td>Speaker - 6 X 9</td>
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<td>ST-301</td>
<td>1/4 Int. Lock Washer</td>
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<td>ST-1376</td>
<td>1/4-20 Wingnut</td>
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<td>Tongue Brkt - C.B.</td>
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<td>G-5048-A</td>
<td>Coin Box &amp; Handle Assy</td>
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<td>ST-9741</td>
<td>8 X 1/2 Hex Flg (Type A) Z.P.</td>
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<td>30</td>
<td>G-6100-A</td>
<td>Monitor - 19&quot; Raster - Complete (w/Guard &amp; Cable)</td>
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<td>G-6101-A</td>
<td>Monitor - 19&quot; Raster (Monitor only)</td>
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<td>G-5428-A</td>
<td>Monitor Power Cable Assy</td>
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<td>G-5638</td>
<td>Guard - CRT</td>
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<th>DESCRIPTION</th>
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<td>G-24073</td>
<td>Monitor Platform Rail (Wood)</td>
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<td>G-5441</td>
<td>End Mounting Bracket</td>
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<td>ST-10904</td>
<td>10-32 X 1 Hex Flg Swageform - Z.P.</td>
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<td>10-24 Hex Flg Whiz Lock Nut - Blk Ox</td>
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<td>42</td>
<td>G-0831</td>
<td>Bezel - CRT (Blk)</td>
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<td>G-5436</td>
<td>CRT Filter - Gray</td>
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<td>G-5413-A</td>
<td>Light Assembly - 120V</td>
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<td>G-5414-A</td>
<td>Light Assembly - 220/240V</td>
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<td>8-32 X 1 Carriage Bolt - Blk Ox</td>
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<td>49557</td>
<td>Ballast Plate</td>
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GAME P.C. BOARD ASSEMBLY
G-6480-A

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SK-7 P.C. BOARD ASSEMBLY
G-6486-A

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### SK-7 P.C. BOARD ASSEMBLY

**G-6486-A**

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SECTION 5

BASIC TROUBLESHOOTING

GENERAL

Be careful - certain components of monitor utilize high voltage

Solid-State Control Panel

Turn off power before changing components

Do not use VOM on P.C. Board as use may damage P.C. Board components

When attaching connectors, be sure to observe polarity

K4600 COLOR MONITOR SAFETY INFORMATION

WARNING:

An isolation transformer must be used between the AC supply and the AC plug of the monitor before servicing or testing is performed since the chassis and the heat sink are directly connected to one side of the AC line, which could present a shock hazard. The chassis of the monitor should NEVER be connected to ground. Before servicing is performed, read all the precautions labeled on the CRT and chassis.

WARNING:

Parts which influence x-ray radiation in horizontal deflection, high voltage circuits and picture tube etc. are indicated by * in the parts list for replacement purposes. Use only the type shown in the parts list.

WARNING:

For continued safety replace safety critical components only with manufacturer recommended parts. These parts are identified by shading and by △ on the schematic diagram.

For replacement purposes, use the same type or specified type of wire and cable, ensuring that the positioning of the wires is followed (especially for high voltage and power supply circuits). Use of alternative wiring or positioning could result in damage to the monitor or in a shock or fire hazard.

The picture tube used employs integral implosion protection and should be replaced with a tube of the same type number for continued safety.

IMPORTANT: In the event that game exhibits erratic behavior, i.e. resetting in the middle of a game, or failure to power op, CHECK THE FUSES!
When handling the CRT, shatterproof goggles should be worn after completely discharging the high voltage circuit. DO NOT lift the picture tube by the neck.

PERFORMANCE AND OPERATING DATA

Apply a suitable power source to the monitor through an isolation transformer.
Apply a suitable signal source to the monitor PCB by means of P205.
Set up controls.
All controls are preset at the factory, but may be adjusted to suit program material.

1. SUPPLY

Voltage 108 VAC - 132 VAC

Frequency 50 Hz - 60 Hz

Note: Apply supply voltage through an isolation transformer with 1 Amp. capability.

2. HIGH VOLTAGE (EHT)

For 19"V models 25.5 ± 0.8 K.V. at 0 Beam

Note: Condition for above 1(beam) = 0
      A.C. = 120V

3. SERVICE SET-UP CONTROLS

A. V. Adjustment VR501 set for 127V DC
B. Vertical Size Cont = VR302
C. Vertical Hold Cont = VR301
D. Horizontal Hold Cont = VR351
E. Horizontal Width Cont = L702
F. Focus Control = VR702
G. Screen Control = VR406
H. Video Drive Controls - Red Drive = VR401
   Green Drive = VR402
I. CRT Cut Off Controls - Red Cutoff = VR403
   Green Cutoff = VR404
   Blue Cutoff = VR405

5-2
COLOR MONITOR SERVICE INSTRUCTIONS

FOCUS

Adjust the Focus control (VR702), located on the HV unit (T701), for maximum over-all definition and fine picture detail.

+127V ADJUSTMENT (See Fig. 1)

The +127V adj. control (VR501) is adjusted at the factory. However, if readjustment should be required, proceed as follows.

1. Operate monitor for at least 15 minutes at 120V AC line.
2. Connect Positive lead of V.T.V.M. to blue lead of TR502 negative lead to chassis ground.
3. Adjust VR501 to obtain +127V reading.
4. After adjustment VR501 must be locked with a sealing varnish.

CIRCUIT PROTECTION

A 3.0A pigtail fuse, mounted on the Main Board has been provided to protect the Power Output Circuit.

HORIZONTAL OSC. ALIGNMENT
(See Fig. 2)

A warm-up period of at least five minutes should be allowed before alignment is carried out. Set VR351 to center position. Adjust L351 after grounding R328 plug (TP32 of Vert/Horiz. P.C. Board) through a 1uF/50V capacitor. Adjust L351 to obtain normal picture. After adjustment, remove 1uF/50V capacitor.
SECTION 5

BASIC TROUBLESHOOTING (CONT'D)

COLOR MONITOR SERVICE INSTRUCTIONS

BLACK LEVEL CONTROL ADJUSTMENT

This control has been set at the factory and should not need further attention. If however when the game is connected a slight adjustment of VR201 may be necessary to obtain the proper black level (the black portion of the picture just extinguished).

VERTICAL SIZE (HEIGHT)

The vertical height control is a screw-driver adjustment. Location of this control is shown in Fig. 3. This control must be adjusted slowly, if necessary, until the picture or test pattern attains the correct vertical proportions.

COLOR PURITY AND VERTICAL CENTERING ADJUSTMENT

For best results, it is recommended that the purity adjustment be made in the final monitor location. If the monitor will be moved, perform this adjustment with it facing west or east. The monitor must have been operating 15 minutes prior to this procedure and the faceplate of the CRT must be at room temperature. The monitor is equipped with an automatic degaussing circuit. However, if the CRT shadow mask has become excessively magnetized, it may be necessary to degauss it with manual coil. Do not switch the coil OFF while the raster shows any effect from the coil.
SECTION 5

BASIC TROUBLESHOOTING (CONT'D)

INSTALLATION AND SERVICE INSTRUCTIONS

COLOR PURITY AND VERTICAL CENTERING ADJUSTMENT (CONT'D)

Purity Magnets are used for Color Purity and V Centering Adjustment.

Purity Adjustment procedure is as follows.

1. Remove R-G-B signal from monitor.
2. Turn Green Cut off Control (VR404) on the Neck Board fully CCW.
   Turn Red and Blue Cut off Control (VR405) fully CW.
3. Pull the Deflection Yoke backward so that the Magenta belt will appear. (See Fig. 4)
4. Move the two Purity Magnets and bring the Magenta belt to the mechanical center of the screen (See Fig. 5) The vertical center position should be set VRS to -5/64" (-2 MM) as shown in Fig. 6.
   Insert service tip "N" on Neck circuit board to "G" on Vert./Horiz. circuit board (See Fig. 13). To check, use the Green raster at low intensity. Be sure to return the service tips to their original positions for the next check.
5. Push the Deflection Yoke forward gradually and fix it at the place where the Magenta screen becomes uniform throughout.
6. Turn Cut off Control, and Drive Control and confirm that each color is uniform.
7. If the color is not uniform, re-adjust it moving Purity Magnets slightly.
8. Move a pair of Purity Magnets at the same time (do not change the angle of the pair), and adjust the vert. center to center of screen.
9. Obtain the three colors and confirm whether white uniformity is balanced.
10. Insert the temporary wedge as shown in Fig. 5 and adjust the angle of Deflection Yoke.

STATIC CONVERGENCE ADJUSTMENT

A recently developed Deflection Yoke and Electron Guns construction has been used on this equipment in combination with In-Line Guns and Black Stripe Screen to make a barrel-type magnetic-field distribution for vertical deflection and a pin-cushion-type magnetic field for horizontal deflection with which a self-converging system can be obtained. This type is different from conventional unity-magnetic field distribution type deflection yoke. 4-Pole Magnets and 6-Pole magnets are employed for static convergence instead of a Convergence Yoke.
STATIC CONVERGENCE ADJUSTMENT (CONT'D)

1. A cross hatch signal should be connected to the monitor.
2. A pair of 4-Pole Convergence Magnets are provided and adjusted to converge the blue and red beams. When the Pole opens to the left and right 45° symmetrically, the magnetic field maximizes. Red and blue beams move to the left and right oppositely (See Fig. 7-a and 7-b). Variation of the angle between the tabs adjusts the convergence of red and blue vertical lines.
When the both 4-Pole Convergence Magnet Tabs are rotated as a pair, the convergence of the red and blue horizontal lines is adjusted.
3. A pair of 6-Pole Convergence Magnets are also provided and adjusted to converge the magenta (red + blue) to green beams.
When the Pole opens to the left and right 30° symmetrically, the magnetic field is maximized. Red and blue beams both move to the left and right (See Fig. 8-c and 8-d). Variation of the opening angle adjusts the convergence of magenta to green vertical lines. When both 6-Pole Convergence Magnet Tabs are rotated as a pair the convergence of magenta to green horizontal lines is adjusted.

PRECISE ADJUSTMENT OF DYNAMIC CONVERGENCE (See Fig. 10 and 11)

1. Feed a cross hatch signal to the monitor.
2. Insert the temporary wedge and fix Deflection Yoke so as to obtain the best circumference convergence (See Fig. 10 and 11).
   NOTE: The temporary wedges may need to be moved during adjustments.
4. Insert three rubber wedges to the position as shown in Fig. 9 to obtain the best circumference convergence.
   NOTE: Tilting the angle of the yoke up and down adjusts the crossover of both vertical and horizontal red and blue lines. (See Fig. 10 (a) and (b).
   2) Tilting the angle of the yoke sideways adjusts the parallel convergence of both horizontal and vertical lines at the edges of the screen. See Fig. 11-a and b.
   3) Use three rubber wedges (thick and thin rubber wedges are used for a purpose).
   4) The angle of each rubber wedges are shown in Fig. 9.
   5) After three rubber wedges have been inserted, pull out the temporary wedge.
   6) Fix the rubber wedges with chloroprene rubber adhesive.

5-6
BLACK AND WHITE TRACKING
(With R/G/B. inputs grounded)

1. Set Black Level Control (VR201) to mid point.
2. Set Red and Blue Drive Controls (VR401 & VR402) to
   their mechanical center.
3. Set the G2 Screen Control (VR406) and the 3 Cut-off
   Controls (VR403, VR404, & VR405) to minimum
   (CCW).
4. Slowly turn up G2 screen control until the first
   faint color appears.
5. Slowly turn up the other two color cut-off controls
   in turn to match the first.
6. Remove ground from R/G/B/ inputs. Adjust Red and
   Blue Drive Controls (VR401 & VR402) for white screen.

FIGURE 4

FIGURE 5

FIGURE 6

4-Pole Magnets and the Movement of Beams

FIGURE 7

6-Pole Magnets and the Movement of Beams

FIGURE 8
INSTALLATION AND SERVICE INSTRUCTIONS

FIGURE 9

FIGURE 10

FIGURE 11

FIGURE 12

FIGURE 13.
PICTURE TUBE NECK COMPONENTS LOCATION
Power Supply Voltage and Symbols

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<td>Vert. – Drive stage</td>
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<td>ABL – Bias</td>
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<td>30V</td>
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**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 DEGRÉ DE SECURITÉ DE L’APPAREIL NE REMPLACER LES COMPOSANTS DONT LE FONCTIONNEMENT EST CRITIQUE POUR LA SECURITÉ QUE PAR DES PIÈCES RECOMMANDÉES 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. The frequency accompanying each waveform indicates the repetition rate of waveform not the sweep rate of the oscilloscope.

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.
FIGURE 14: MAIN P.C. BOARD

A-1
P.C. BOARD LAYOUT

FIGURE 17. HORIZ/VERT P.C. BOARD MT/GJ
Switches have been adjusted at the factory to allow contact at vertical and horizontal positions only.

If necessary to readjust in the field, the following procedure should be followed:

Fig. 1. Adjust each individual switch as follows:

1.1 Normal rest position - Top blade should be 1/4" from edge of plastic cam or total of 1" between blades. Bend top blades to this position.

1.2 Check lower blade for air gap between contacts. Switches must not make contact.

Fig. 2. After adjusting all four switches, move lever against top, bottom and sides as shown in Fig. 2 and check switch action.

Fig. 3. Upper blades should make contact and deflect 1/16" as shown.

Fig. 4. Rotate lever at 45° angle (4 ways) and check. No two switches should make at the same time as this will interfere with the direction "Nibbler" travels. Readjust as required.