INSTALLATION GUIDE -- 10 EASY STEPS

Step 0: Make sure your Millipede game is fully working

Before installing this kit, make sure your Millipede game is fully functional. Make sure there are no beeps when the game powers up, and make sure that you can enter and exit test mode, and that test mode does not report any errors. This kit can only work in a fully functional game.

Step 1: Turn off power to the game

While it may be possible to install this kit without removing your board from its cabinet, you may find it easier to install the kit if you do remove the board. In that case, pay careful attention (or label), any wire connections as you disconnect your board so that you can correctly reconnect the game PCB afterwards. Take note of which side of the PCB edge connectors are facing the parts side of the board and which sides face the solder side. These connectors are typically not keyed and can be inadvertently plugged in backwards - ouch! It is recommended that you label the connectors face with something like "parts side" or "solder side".

Step 2: Remove the game PCB from the cabinet

For Millipede upright, the game PCB is usually attached to the right side of the cabinet (as viewed from the back). It is commonly enclosed in a large metal cage. The board may also have screws attaching the board to cabinet or cage, which will need to be removed so that the board can be removed for easy access. Refer to your game manual for additional information about locating and removing the game PCB.
Step 3: On the PCB, locate and remove the 6502 CPU chip
Locate and remove the 6502 CPU chip on the board. Use the images below to assist in locating it. See [6502 Chip Identification](#) for additional information. The 6502 CPU chip is a 40 pin (large) chip, located in Row 2 There are three 40 pin chips in a cluster near the corner of the board. Remove only the 6502 CPU. Use the photos as a guide to help locate the chip. Remove the chip gently by using a flat head screwdriver to pry it out of its socket from each end. Some of the Atari boards have open frame sockets which do not protect the PCB traces. **Be careful not to scratch any of the PCB traces underneath the socket.** Also be careful not to bend any of the pins. If any pins do get inadvertently bent, you will need to straighten them out before the next step. Needle nose pliers work best for this.

Step 4: Insert the 6502 CPU into the larger daughter card
Insert the just removed 6502 CPU chip into the empty 40 pin socket on the larger daughter card in the Multipede Kit. Make sure pin-1 is correctly oriented. Pin-1 is usually indicated on the 6502 CPU chip by some type of indentation or circle molded into the plastic. Pin-1 on the daughter card is marked by a large "1" on the PCB, as well the with the text "6502". **If the 6502 chip is installed backwards it will cause permanent damage to the 6502 chip.**

Pin-1 Identification
Multipede kit

Step 5: Insert the daughter card into the board

Insert the daughter card back into the 6502 CPU socket on the board where the 6502 CPU chip was originally removed from. Again, make sure pin-1 of the 6502/daughter card is oriented to correctly match pin-1 on the board. Use the photos as a guide. The kit fits very close to the test points that stick up out of the PCB. Make sure the test point tabs remain on the outside of the daughter card and that they do not short against the underneath side of the daughter card. You may need to slightly bend the closest test point. The gold machined pins on the daughter can bend very easily, make sure they are all straight and that each pin is inserted in the Millipede socket.
Step 6: Locate and remove the character set eproms 5P and 5R

On the game board, locate the two character set eproms. They are located at locations 5P and 5R, and are usually labelled with "106" and "107" on the stickers. Use the photos as a guide.

Remove these two eproms following similar steps and precautions as in step 3, again, being careful not to scratch the Millipede PCB traces. These chips will not be reused. If you chose to keep them, it is suggested that they be stored in the anti-static bag provided with the kit.
Step 7: Insert the smaller daughter card into sockets 5P and 5R

With chip sockets 5P and 5R now empty, insert the smaller daughter card into those sockets. Pay attention that the pins are aligned with the socket. This is sort of tricky, as the daughter card has a two 28 pin eproms on the top side, but only two sets of 24 pins on the bottom side. (Actually 23 pins per device, as it is normal for one of the pins to be clipped on each device). The wires coming from the daughter card should be on the side closest to the main CPU daughter card inserted in step 4. The Wire-Wrap sockets used on the smaller daughter card may have tall pins which may have become misaligned. Make sure the pins are straight and that all pins get inserted into the millipede socket. You may have to provide a little bit of force to get a snug fit.
Step 8: Double check your work

Review the previous steps double checking that 6502 CPU is properly installed into the daughter card with no bent pins and that it is correctly oriented for pin-1. And that the daughter card is also installed snug into the 6052 CPU socket at Row 2 with pin-1 matched up. Apply the same checks to the character rom daughter card installed at 5P & 5R as part of steps 6 and 7. REPEAT: If any of these devices are installed backwards it may cause permanent damage to the kit and your board!
Step 9: Reinstall game PCB into cabinet and Powerup

Reinstall your Millipede board into the cabinet, hookup the two edge connectors with the original orientation. Then powerup your game.

If the game does not come up, turn power off immediately, double check your work, and read over the trouble shooting section.

Step 10: Verify Multipede functionality

The game should have powered up in Millipede mode. Press both p1-start and p2-start and verify the game toggles to Centipede. Repeat and verify it toggles back to Millipede.

Now is a good time to verify your game settings via the setup menu. Put the game in test mode by sliding the test switch on. You should see a
screen similar to the original millipede test mode screen. Follow the on-screen instructions in test mode to press and hold P1-start and P2-start at the same time. The game will transition to setup mode.

Once in setup mode, verify the settings displayed are the ones desired. To change a setting, use the trackball to move up and down to select the setting to be changed. The selected setting is indicated by a shooter icon on the left. Once selected, use the fire button to toggle through the available combinations. When done making changes to settings, be sure to select "SAVE AND EXIT". At this time the game will return to the multipede test mode screen. Turn the test mode switch off to return to game play mode. The new settings should now be active.

As a side note, if you want, you can also remove the old code eproms. These are located at the edge of the board near the 6502 CPU location. See code eprom pic1. You can also remove the EAROM if desired. See earom pic1 and earom pic2. Once the Multipede kit is installed, the EAROM and existing CPU ROMs are no longer accessed.

SETUP

The Multipede on-screen setup menu allows you to configure your game options without crawling into the cabinet to set dip switches and allows separate configuration of Centipede and Millipede options.

To enter setup mode, place the game in self-test mode. The self-test switch is located inside the cabinet, usually above the coin box.

Once in self-test mode, press both the P1-START button and P2-START button at the same time. The game should now be in setup mode.
Once in the setup mode, use the trackball to move up and down within the menu. The current selected item is indicated by a shooter icon character on the left side of the screen. To make changes to the current selected item, use the FIRE button. For each button press, the current selected field will toggle to the next option.

To save the settings and return to self-test mode, scroll down to the bottom item "save and exit", and press the fire button. At this point the currently displayed configuration will be saved and the game will return to self-test mode. It is at this point that high scores are erased if you selected that option.
If for some reason you wish to cancel your changes without saving them, simply take the game out of self-test **without executing the "save and exit" option**!

To return to game play mode, take the game out of self-test mode. The new settings will now have taken affect.

TROUBLE SHOOTING GUIDE

So far the only issues seen with multipede have been either incorrect installation or general Millipede board problems. **Multipede kit can only work in a fully functional Atari Millipede board.**

General information on various Millipede board problem can be found further down this page.

If the smaller Multipede character eprom daughter card is not installed properly or is making bad contact, you may see screen images like these:
General Millipede trouble shooting guide

Game is in cocktail mode, how do I change this?

Centipede and Millipede do not have a cocktail DIP switch like some games do. Instead, Atari used a pin on the harness to determine upright versus cocktail mode. For millipede, this is pin 16. Millipede pin 16 should be left open (high) for upright, or grounded (low) for cocktail. This is backwards from how centipede does it. So if you are using some sort of centipede to millipede adapter or have rewired your harness, check that pin 16 is properly setup.

To assist, the multipede testmode will display the text "UPRIGHT" or "COCKTAIL" to show you what the current mode of the game is.

Multipede does not change how upright versus cocktail is selected, it continues to be determined the same way the millipede hardware determines it.

If you are using a centi/milli adapter, please make note that for upright move you need to remove the cocktail/upright jumper on the adapter.

Sounds are wrong (or missing)
Millipede produces sounds using the 2 pokey chips (40 pin IC at chip locations D4 and B4). The pokey chip usually has the text "CO-12294" on it. The pokey chip is a custom chip made by Atari.

If the sounds are incorrect or missing, most likely one or both of the pokey chips are faulty.

The standard Atari Millipede selftest will perform a simple pokey diagnostic and report the result. A failed pokey is indicated on the upper left side of the screen with the text "P0" or "P1" or both. The diagnostic only tests the random number generator function of the pokey, but it does provide some indication if the pokey is bad. The diagnostic does not test the sounds. "P0" means pokey chip at D4 failed. "P1" means pokey chip at B4 failed.

Millipede requires that the millipede board is fully working, any bad pokeys should be replaced before installing the kit.

Pokey chips are used on many classic Atari gameboards including centipede, millipede, asteroids deluxe, missile command, crystal castles, and many many more.

Replacement pokey chips are available from HERE

Millipede test mode screen showing faulty Pokey0 (P0) and Pokey1 (P1)

Mushrooms are in straight line or spider movement is not random
This is also a symptom of a bad pokey chip. See above.
Game is dead except a series of beeps

The Millipede gamecode at bootup always performs a quick memory test. The memory test diagnoses the CPU ram and Video RAM. If it encounters a failure, it beeps to indicate which memory chip has failed, and repeats.

This is slightly different than Centipede which only performs the memory test when in selftest mode.

If millipede detects any RAM failure, it will not allow the game to be played, it will continually loop repeating the RAM test and beeping.

Replace the faulty chip, and re-test. It should be noted that the test only indicates the first RAM chip to fail, there could be more than one failure, but the first faulty chip needs to be fixed before the test can continue.

<table>
<thead>
<tr>
<th>Beeps</th>
<th>Suspect BAD ram chip</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>F2 (2114)</td>
</tr>
<tr>
<td>2</td>
<td>E2 (2114)</td>
</tr>
<tr>
<td>3</td>
<td>M2 (2101)</td>
</tr>
<tr>
<td>4</td>
<td>N4 (2101)</td>
</tr>
<tr>
<td>5</td>
<td>L2 (2101)</td>
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<tr>
<td>6</td>
<td>M4 (2101)</td>
</tr>
<tr>
<td>7</td>
<td>K2 (2101)</td>
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<tr>
<td>8</td>
<td>L4 (2101)</td>
</tr>
<tr>
<td>9</td>
<td>J2 (2101)</td>
</tr>
<tr>
<td>10</td>
<td>K4 (2101)</td>
</tr>
</tbody>
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Millipede ROM failure codes
As displayed in test mode

<table>
<thead>
<tr>
<th>Code</th>
<th>Suspect BAD rom chip</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1</td>
<td>M/N1</td>
</tr>
<tr>
<td>R2</td>
<td>L1</td>
</tr>
<tr>
<td>R3</td>
<td>J/K1</td>
</tr>
<tr>
<td>R4</td>
<td>H1</td>
</tr>
<tr>
<td>EA</td>
<td>P2 (EAROM)</td>
</tr>
<tr>
<td>P0</td>
<td>D4 (pokey)</td>
</tr>
<tr>
<td>P1</td>
<td>B4 (pokey)</td>
</tr>
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Millipede bad character EPROM screen shots
5P and 5R swapped

5P and 5R swapped
5P and 5R swapped

Bad 5P
Bad 5P

Bad 5P