

Title: *Installation and set-up of Multi-Pac*

Version: 2.52

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Disclaimer:

USE THIS INFORMATION AT YOUR OWN RISK. WE ARE NOT RESPONSIBLE FOR ANY DAMAGE THAT MAY OCCUR TO YOUR PERSON OR PROPERTY. LETHAL VOLTAGES ARE PRESENT IN ARCADE GAMES AND GENERALLY ACCEPTED INDUSTRY PRECAUTIONS SHOULD BE TAKEN. YOU SHOULD BE FAMILIAR WITH ELECTRO STATIC DISCHARGE AND GENERAL CIRCUIT BOARD TERMS, REFERENCES, AND PROCEDURES. IF YOU HAVE ANY DOUBT, SEEK PROFESSIONAL ASSISTANCE WITH THE INSTALLATION.

Overview:

This is a board that replaces the daughterboard on a Ms Pacman PCB, and can be added to a Pacman PCB by the addition of a ribbon cable. It adds both high score support and a top ten list to the attract mode. All dip switch settings are moved to nvRAM and are accessed through a set of configuration menus. Added features include 2 new difficulty levels, cheat mode, speedup mode, screensaver and start on any level. Multiple mazes are included as well as additional games. The board also has connection points for future expansion and is continually supported via freely distributed code updates.

Installation Instructions:

Unpacking: Your Multi Pac is shipped with the 5E sub-board inserted into one of the 40-pin sockets to protect its legs. Carefully unplug it from the socket, and unwind the sub-ribbon cable to begin installation. You should start with a working Midway Pacman PCB (or Ms Pac), however since none of the original ROMs or their sockets are used, on occasion this Multi board will revive an otherwise non-working board that has issues with row 6 ROMs, or 5F. It's worked a couple of times for me, but your mileage may vary.

Decide which board you have: The Multi-Pac supports a variety of boards which are covered on page 8 of the manual. For Ms Pac and Pac begin at **Step 1**, for others refer to page 8 titled: **Multi-Pac Manual Addendum: Installation on boards besides Midway**

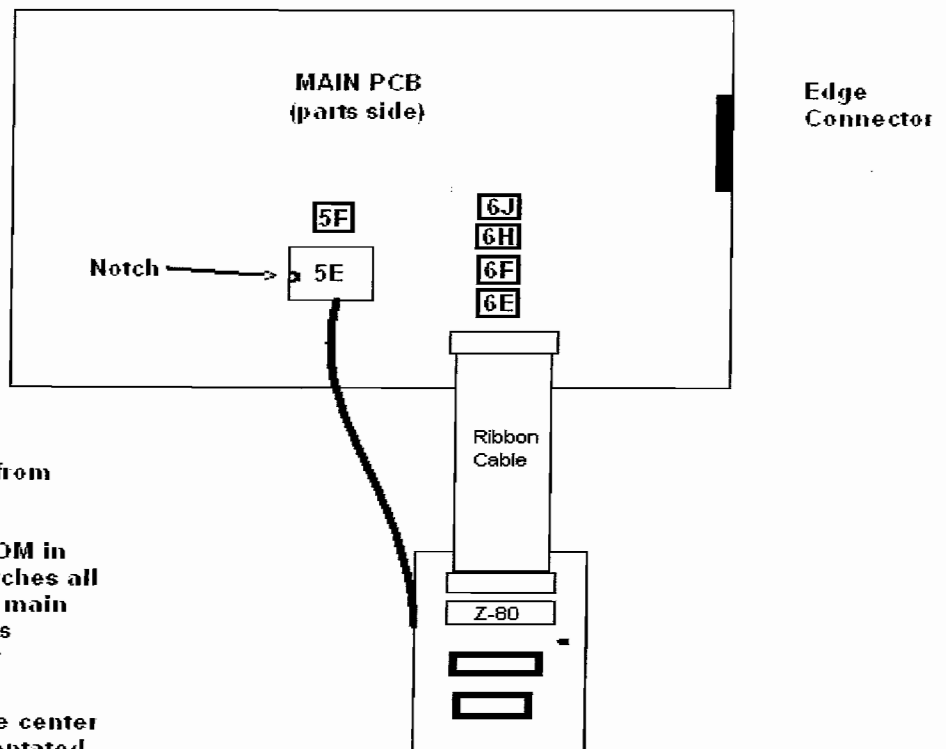
Step 1. Remove the four EPROM's in row 6. If you have to remove the Synbus card to get to 6E, make sure you plug it back in the same way.

Step 2. If you're converting a Ms Pac board, remove the Z-80 from the Ms Pac auxiliary board and place it in the Multi board in the 40-pin socket near the center, with the notch in the same direction as the other chips on the Multi board. Then plug the ribbon cable in the 40-pin socket closest to the edge of the Multi board, orient the cable per the diagram on page 2.

Step 2. If you're converting a Pac board, move the Z-80 from the 40-pin socket on the main PCB to the center socket of the Multi board with it's notch in the same orientation as the other chips on the Multi board. Connect a ribbon cable to the socket on the main PCB, and connect it to the Multi board with the orientation per the diagram below.

Step 3. Carefully remove your 5E and 5F ROMs. The small graphics board is plugged into 5E with the notch in the same direction as the other chips on the main PCB.

Step 4. Review your work to be sure that the Z-80 chip has its notch in the right orientation (it should match the other 3 small chips near the top of the Multi board). Check the sub-board at 5E to ensure its notch is oriented the same as the other chips on the main PCB. Check for any bent pins.



1. Remove all EPROMs from rows 5 and 6.

2. The notch in the EPROM in the new 5E sub-card matches all the other notches on the main PCB. It is critical that it is installed with the correct orientation.

3. The Z-80 plugs into the center socket with it's notch orientated in the direction of the other chips on the Multi board.

4. The ribbon cable plugs into the 40 pin socket nearest the edge of the Multi Board.

Configuration:

Once installed, the Multi-Pac is ready to configure to your favorite settings. The non-volatile RAM will save all settings and high scores even when the unit is unplugged. To do this:

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1. Set all DIP-switches 1-8 to OFF.
2. Set DIP #6 to ON, this brings up the administrator menus when a game is selected.
3. Power up game.
4. Select Ms Pacman with the Player 1 button.
5. You should now see a MENU that reads something like this although settings may not match exactly:

```

MS PACMAN
* Next Maze
  Cheat OFF
  Speed Normal
  1 Coin 1 Credit
  Bonus 20K
  Ms Pac-Men 1
  Upright
  ScrnSvr OFF
  Difficulty NORM
  Starting LVL 1
  Locked
  Clear
  Exit

```

There should be a RED power pellet to the left of 'Next Maze'. Move this red power pellet using the joystick up/down and change the selection by moving the joystick LEFT/RIGHT. (RIGHT is choose, LEFT is to go back in the choice menu). Pressing Player 1 Start will cause the LEFT/RIGHT choice to jump by 8 or 10 increments instead of 1, (i.e. a fast forward button.).

Move down to CLEAR & move joystick LEFT. This clears the NVRAM for this game only, now you may set up the game, as you like. Once you've set-up the first game, continue setting each title for the number of lives, cheats, ect. When you've completed setting up all the games, shut the game off and move dipswitch #6 back to "OFF". The settings for the Pac series mazes are global in nature, so your selection for the Chevrolet series for example, will be the same for Impala, Chevelle, ect.

Features and Functions in detail:

NEXT GAME - this allows you to chose from the various installed mazes, Ms Pac, Ms Pac Plus, Ms Pac No Exit, etc. This will be your default game upon power up.

CHEAT - ON/OFF - this turns on the cheat mode. Press Player 1 Start to become invincible. Pressing Player 2 Start will be change your speed to Fast if you are in normal mode or to slow if you are playing a fast mode game.

SPEED - NORMAL/FAST - this sets the default speed of the game to normal or fast.

1 COIN 1 CREDIT - allows you to alter coins per credit or choose FREE PLAY.
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Freeplay now has an attract mode. There is no on/off setting, if you are in freeplay mode; it works exactly like 1 coin/1 credit. Pengo and Alien Armada (Space Invaders) do not have Freeplay settings; you'll need to click credits in for these games.

BONUS 20K - allows you to set the number of points required to earn an extra Pac-Man. Note: a hidden feature is enabled by setting bonus to 28K, 2 Player simultaneous Pac-Man (cocktail only), 2nd player is able to control the RED Ghost (Speedy), or the computer will control it if no one plays the 2nd Joystick, see *NOTE 1 below for more info on how this works.

MS PAC-MEN - 1 to 256 allows you to set the number of Pac-Man given per credit to start a game.

UPRIGHT - UPRIGHT/COCKTAIL allows you to set the mode of the cabinet.

SCRN SVR - ON/OFF is a screen saver feature that prevents a static screen burn in on your monitor. Screensaver runs a special entirely black screen with a ghost moving across it every few seconds. The setting for screensaver is the number of attract mode cycles before it activates. OFF or 1 to 255. Any stick movement, coin drop or button press will take it out of screensaver and return it to attract mode, or start screen in the case of a coin drop.

DIFFICULTY - NORM/HARD/XDIF/MAX - sets the game difficulty level that controls the attack patterns and time of ghost. NORM is the normal setting; HARD is the original hard setting. XDIF is extra difficult & becomes much harder faster than on factory available settings. MAX is maximum difficulty, the first level is as hard as it gets.

STARTING LVL - 1 to 256 - set the starting level of the game if you like. NOTE: For Ms Pacman, the split screen "feature at the last level" and all the other kill screens have been "fixed" and is playable as any normal screen, the game will also roll over to screen 1 again. However the difficulty remains at maximum. It was necessary to fix the kill screen because the memory trashing bug at level 134 also trashes the high score table.

LOCKED - LOCKED/HOME allows you to choose between commercial use and HOME use. HOME use allows you to access the setup menu using Joystick LEFT and Player 1 Start & Player 2 Start simultaneously. If freeplay is on, be sure to move left before you push the buttons. (Note: this is a global setting that applies to all games, you cannot configure some games for Home and some for Locked).

CLEAR - YES is to ERASE *ONLY* the high score saves in the NVRAM for the particular game you are in, it will not effect the other games settings or HIGH scores.

EXIT - will return you to game over mode but only if DIPSWITCH #6 is OFF, otherwise you will just see this menu again.

Dip Switches and feature controls:

The test button works like dip 6, but only during the top ten list. At all other times, the test button works like normal and resets your machine. If you don't want to use dip 6 during the initial configuration, you can start the game and wait for the attract mode to run through and the top ten list to start.

Dip 8 is still video freeze.

Dip 7 is still the rack test.

Dip 6 allows access to the menu.

Dip 5 'on' activates "Auto Menu" (on code versions v2.52 and above) In this mode the player will be returned to the menu at the completion of their game.

Dip 4 'on' puts the game in Tournament mode. In this mode, only specific settings will count towards the high score (3 lives, cheat off, etc.). If the word Tourn is in red then your settings are not "typical" and no scores will count.

Dip 3 'on' allows fast games to count towards high scores.

Dip 2 'on' (you're actually reading all this stuff? I'm impressed) Dip 2 does nothing!

Dip 1 'on' enables "Simple Menu" (on code versions v2.52 and above) which will display a single page of the top titles and hide the maze variations.

With the release of v2.2 (now updated to v2.52 on 3/28/05) the Multi-Pac now scans for button & joystick combinations to recall menus and enable special features:

1. To pause the game use "joystick right + player 1 + player 2 at the same time.
2. Now select "joystick up" to recall the game menu –or–
3. Select "joystick left" to disable pause and you'll come right back to the same point you left off at in your game.
4. "Joystick right" during pause will add credits to Pengo and Alien Armada.

To minimize screen burn the pause feature also blanks the majority of the screen and scrolls colors on the text "paws". You'll notice variations between games on the display of this feature which is normal behavior (display of static garbage).

Game Notes:

Mr. TNT, Eyes, Alien Armada, Pengo, and Mr. & Mrs. Pacman have the "generic" menu. The dials are numbered and not labeled. Mr. TNT has an option to test the nvRAM. It will go through the entire chip writing 1's and 0's and counting the number of read errors. This is non-destructive. Eyes has an option to erase the entire nvRAM this will set every byte to 0. In order to do this, all dials have to be set to "0N".

Cheat mode for Mr. TNT is: PLAYER 2 for slow motion. Note Mr. TNT has a RAM test if you turn go into the menu and turn dip 7 on.

Cheat mode for Eyes is: PLAYER 2 for invincible, and PLAYER 1 becomes "auto-fire".

PLAYER 1 or "joystick up" is "fire" in Alien Armada.

PLAYER 1 is “jump” in Pac Rabbit 3D.

PLAYER 1 is “Super” in Super Pacman.

Note #1 (also see **Note #2** for info on a similar topic)

Ms Pac 2 Player Simultaneous (Easter Egg)

No it's not what you think, there's still only 1 Ms Pacman. The second player controls the red ghost, Blinky. To prevent "goaltending" the last dot, control of Blinky is returned to the computer when you have less than ~20 dots left. In order to make this also a 1-player game, if you don't move around, Blinky will go on autopilot. For the first ~6 seconds Blinky follows a random pattern just like in the original, this will hopefully keep things interesting since you don't know where you're going to start at. He doesn't check for input as often as Ms Pacman so you have to lead it just a little. Another interesting feature is that when Blinky turns blue he reverts to computer control making him easier to catch, which should tip the scales back to Ms Pacman's side a little. Obviously you can't play this on a standard Pac cabinet. Primarily it is for cocktail tables but if you have a Jamma adapter you could play it in a 2-player Jamma cab. Also something I bet you didn't know, there are 3 "slides" on the Ms Pacman board. Once you get on a slide you can't change direction until you come out the other side. These are similar to the ones on Make Trax.

Note #2

“The Marriage of Mr. and Mrs. Pacman” For the first time in arcade history, Pac and Ms Pac are finally together in one maze. It's fitting that the first release of Mr. & Mrs. Pacman on the Multi-Pac would occur around Valentine's Day (2004). It's also likely that Mr. & Mrs. Pacman will end up being the run-away favorite game on Multi-Pac. Two player, collaborative play is now possible with 2 Pac's in the maze working together (one is Ms Pac so you can tell them apart).

Mr. & Mrs. Pacman is included as a bonus game in Multi-Pac. To get the game to work at all, concessions had to be made in the graphical handling of the Pac's and Ghost. You'll notice a slight flickering in the Pac's and Ghost, which is normal, and is due the way the hardware and code handle the extra demands. There isn't a “speed up” setting for this game, (you've got to give the Ghost at least a fighting chance). One bug showed up in emulation (but not on actual Midway hardware yet) in about 1 in 20 games: Pac would pass through a wall. We have not been able to reproduce this, and believe it's related to a rare timing/position issue. For this reason, the game is included as a bonus at the same price as earlier releases of Multi-Pac without Mr. & Mrs. Pacman.

The global settings for the Pac series games pertaining to cocktail and upright will affect Mr. & Mrs. Pac. If you're using the Multi-Pac on a cocktail, you should already have configured all the games to “cocktail” settings. For Mr. & Mrs. Pacman, the “cocktail” setting affects the joystick orientation for Player 2, since the screen never flips.

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If the Player 2 joystick is reversed, then your Pac series games haven't been set to "cocktail" yet. Go back to **Configuration** on page 2 in this manual to change settings to "cocktail".

If you've got an upright, your choices are 1) enjoy the other 500 or so variations, 2) run your Multi Pac on a Midway board with a JAMMA adaptor in a 2 player upright cabinet, 3) or get your hands on a "Jump Shot" control panel. Jump Shot was a conversion game for Midway Pac cabinets that has 2 joysticks. I have yet to experiment with this set-up for 2 player Mr. and Mrs. Pacman with regards to wiring and control inputs, but it would be a good head start towards having 2 joysticks mounted on a control panel already designed for your cabinet.

Note #3

Tip: Modifying Midway Coin Doors: You can easily convert the coin return button on a Midway coin door to act as a credit button. First remove the coin mech, then press the coin return button almost all the way in, and note the movement of the linkage. You'll notice if the button is pressed too far, it will jam. You'll also notice there is a small vertical metal strip that limits the overall travel of the return button. Bent this strip 90 degrees, about 1/2 an inch from its end to shorten the travel of the coin return button to prevent it's jamming from over-travel. It's also a good idea to clean and lightly lubricate the coin return button so it works smoothly. Now, using a short piece of wire fabricate a linkage from the coin return linkage to the coin drop switch. You'll have to play with the angles and adjust it so when the coin return button is pressed, the linkage will in turn activate the coin drop switch. This way your coin door will remain original, and everything can be reversed if you decide to in the future.

Note #4

Troubleshooting: The Multi-Pac is very reliable with a conservative electrical design and power down voltage spike protection, but it won't tolerate being plugged in backwards or interface with a bad socket on the original game board. If you experience any problem in operation, verify continuity between the Multi-Pac and your original game board's 40 pin socket on the solder side of both boards. A bad ribbon cable or more likely a bad socket will cause problems.

Note #5

A lot of time has gone into development and construction of every Multi-Pac. Each unit is tested and ships in a static safe bag. Since the board is used on other projects, you will notice unused traces, connections or additional jumpers. These are all designed to keep the cost down and allow future expansion and flexibility. You'll find the design is very reliable and consumes less power than the original ROM chips it replaces.

We hope you enjoy, what we feel is the ultimate Multi-Pac experience and appreciate your feedback.

Multi-Pac Manual Addendum: Installation on boards besides Midway

Revision date: 11/29/04

The Multi-Pac supports a variety of boards besides the regular Midway Pac and Ms Pac (which is really a Pac board with a daughtercard and different character proms at 5E & 5F). The 5E sub board is set up to support 2532's in the original configuration. To change it to support 2732's, cut the trace on the underside of the board labeled "25" and add a jumper between the two holes labeled "27" where required in the instructions below.

PAC1/PAC2:

Most likely the easiest of the bunch to convert since it's usually just "plug and play" by connecting to 5E and the Z80 socket using a 40 pin ribbon cable.

FALCON or PAC3:

There are several versions of these boards (maybe bootlegs of bootlegs?) I think it will run on all of them, just change the jumper on the 5E graphics board to match the EPROM that was in 5E of your bootleg board (i.e. 2532 or 2732).

Make Trax:

Change the jumper on the 5E graphics board to match the original EPROM that was in 5E of the Make Trax board (usually a 2732) by cutting the trace labeled "25" and adding a jumper for the two plated thru-holes labeled "27". If you get unusual behavior, try pulling the 24 pin security chip in row 6. You will also need to change the 4A color PROM for a Pac man version to have completely accurate colors.

Eyes:

Change the jumper on the 5E graphics board to match the EPROM that was in 5E of your board (i.e. 2532 to 2732) + you need the encrypted 5E ROM. You will also need to change the 4A color PROM for a Pac man version to have completely accurate colors.

Piranha:

You'll need the encrypted ROM at 5E (code available via email or specify on your order) there are no changes in jumper settings on the graphics board (5E board). You will also need to change the 4A color PROM for a Pac man version to have completely accurate colors.

Crush Roller:

Change the jumper on the 5E graphics board to match the EPROM that was in 5E of your board (i.e. 2532 to 2732) + you need the encrypted 5E ROM. You will also need to change the 4A color PROM for a Pac man version to have completely accurate colors.

Some boards use **Eyes Encryption** so we have an encrypted 5E EPROM (or code via email) available if needed.

Version 2.52 Manual addendum covering new software features:

This kit contains the latest software release v2.52 created on 3/28/05. Additional features were added at the request of collectors and operators which are covered below:

1. Auto-Menu: this feature will return a player to the menu screen automatically when enabled after they complete their game and/or enter their initials in the high score menu. The feature is enabled by switching dip #5 to "on" in the dip switch bank on the main game PCB.
2. Simple-Menu: this feature creates a basic one page menu with speed selectable versions of Pac and Ms Pac along with the other main popular titles. The pages of maze and theme variations are not displayed with this feature enabled. This feature is enabled by switching dip #1 to "on" in the dip switch bank on the main game PCB.

Game notes:

1. Super Pac runs at reduced size due to the maximum graphic handling capability of the Pac based hardware and it's limitations on moving object handling.
2. The player 1 button is used to "jump" in Pac Rabbit.