DARKSOFT: CPS-1 / CPS-1.5 MULTI
INSTALLATION GUIDE v1.4

Thank you for your purchase of the CPS-1 / CPS-1.5 Multigame Kit from Darksoft. We'd like to thank you kindly for your patience and hope you enjoy this kit as much as we had fun putting it together for you!

KIT CONTENTS:

The Darksoft CPS-1 Multi kit comes with the following items:

- CPS-1 Multi PCB
- Sound Board
- Filter Board
- JAMMA Finger
- LCD Selector
- 30cm Cable for LCD Selector
- 2 x Female DuPont Jumper Wires
- 2 x Spacers
- Replacement PAL Chip

Please note that the box containing the multi is dual tiered with two layers of components arranged on the anti-static foam. You will need to remove the main multi PCB to reveal components underneath. The empty space on the lower level is for the spinner PCB and sound modules if required or orderable from your point of sale.

If any items listed / shown above are missing in your kit, please contact your place of purchase for immediate assistance.

NOTE: We **DO NOT** provide any game software of any kind with our kits. You are on your own to provide the game files required.

REQUIRED HARDWARE:

Aside from your CPS-1 Multi Kit, you you will need the following items to get up and running:

- Compatible CPS-1 “A” Board with the Sound Section Populated
- Compatible CPS-1 “C” Board
- Compatible MicroSD Card

HARDWARE COMPATIBILITY / RECOMMENDATIONS:

Most “A” Boards are supported by the kit.

The following boards are NOT compatible with the multi:

- Any boards without the sound section populated (such as those found in CPS-1.5 games)
- Long “A” boards (Model Number: 88617A-7B).

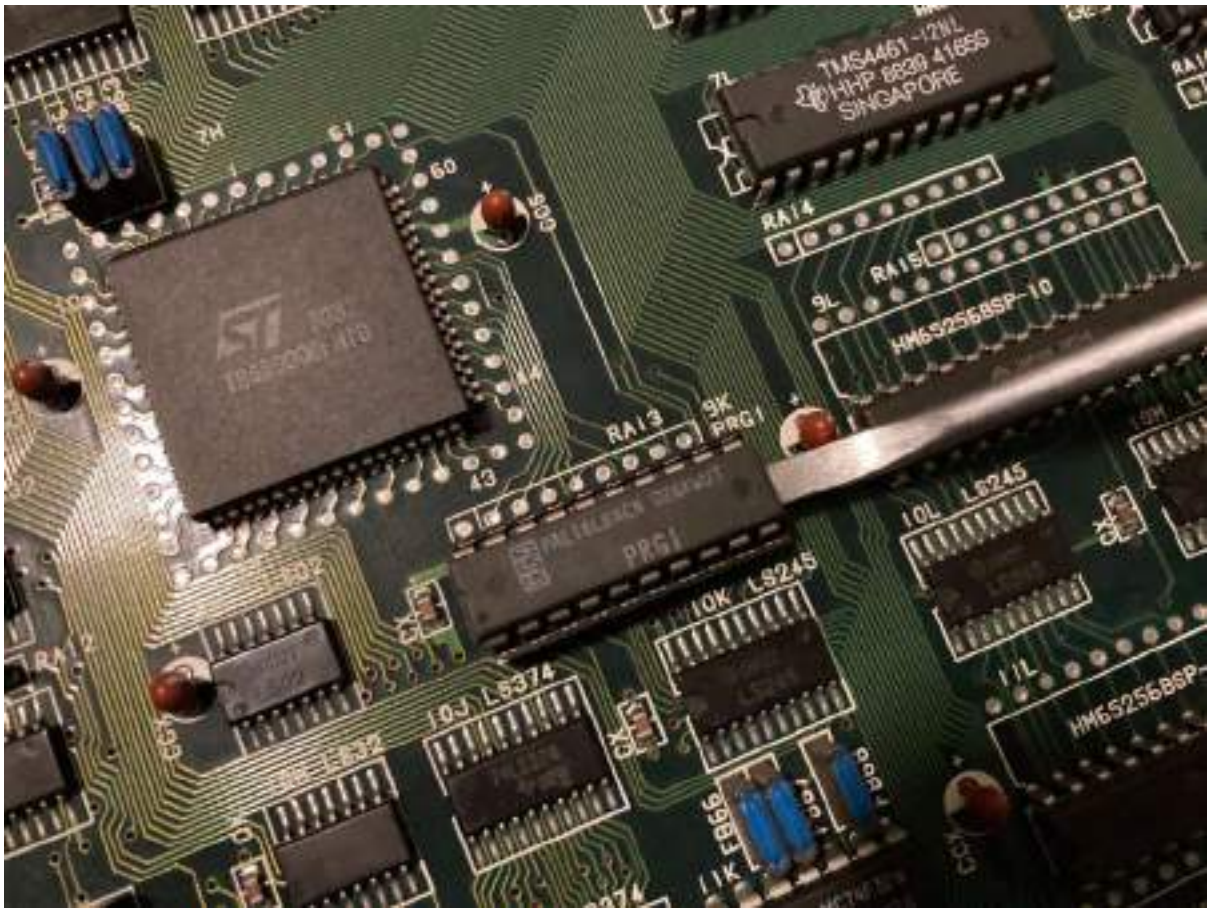
For absolute 100% accuracy, please match your game sets with a suitable board. Most 10MHz games can be played on a 12MHz Dash Board with very minor (almost un-noticeable) speed differences and vice versa on 10MHz boards. There are a few anomalies to this rule however and we will document them in future versions of the guide and on the Arcade-Projects forum as users report them.

Only “C” Boards with a B-21 chip that also originally had battery support are compatible. The 3 model numbers for these are boards are: 90630C-4, 90631C-5 and 92641C-1. If your board still has a battery, you will need to remove it so that the multi can program keys on the fly.

NOTE: There are modified C-Boards around that need their modification wires undone. This kit only supports original C-Boards and it is your sole responsibility to ensure that you have a working C-Board BEFORE using it with the multi. Unfortunately, we can not accept any warranty claims due to damage from using poorly modified, repurposed or molested C-Boards.

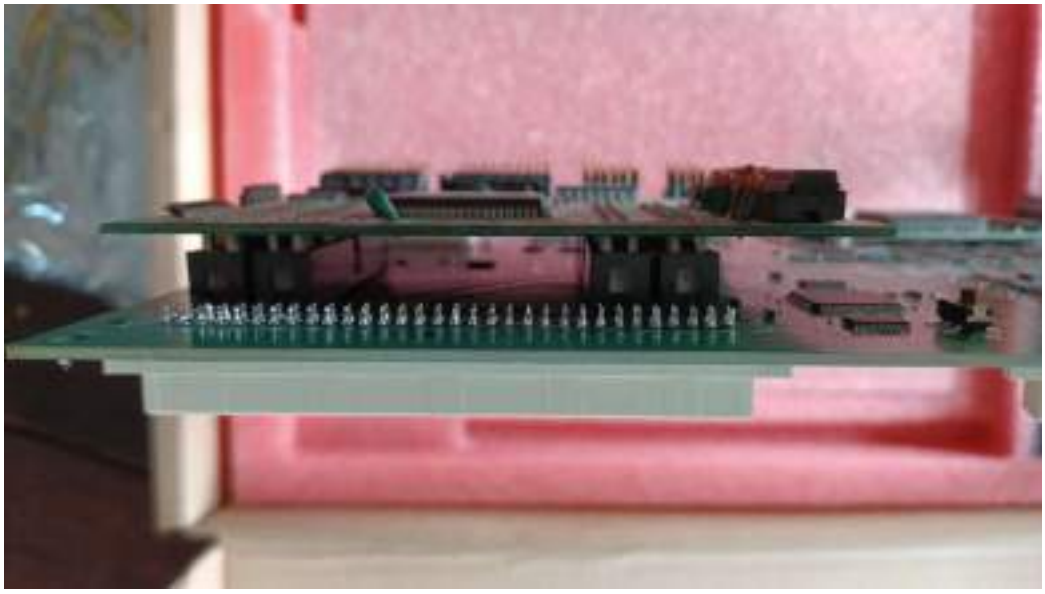
INSTALLATION INSTRUCTIONS:

1. **PAL CHIP SWAP:** Remove your old PAL chip and insert the one included in the kit at position PRG1 (9K) on your A-Board. The existing PAL chip should be socketed so it should be easy to replace. As always, exercise care and caution when removing chips by being gentle and using either a chip removal tool or a small flat head screwdriver.



2. **C-BOARD INSTALLATION:** Install your compatible C-Board onto the Multi in the correct orientation. It is important to install the C-Board **BEFORE** installing the multi onto your A-Board as doing it afterwards will flex your multi stack too much and potentially cause damage.

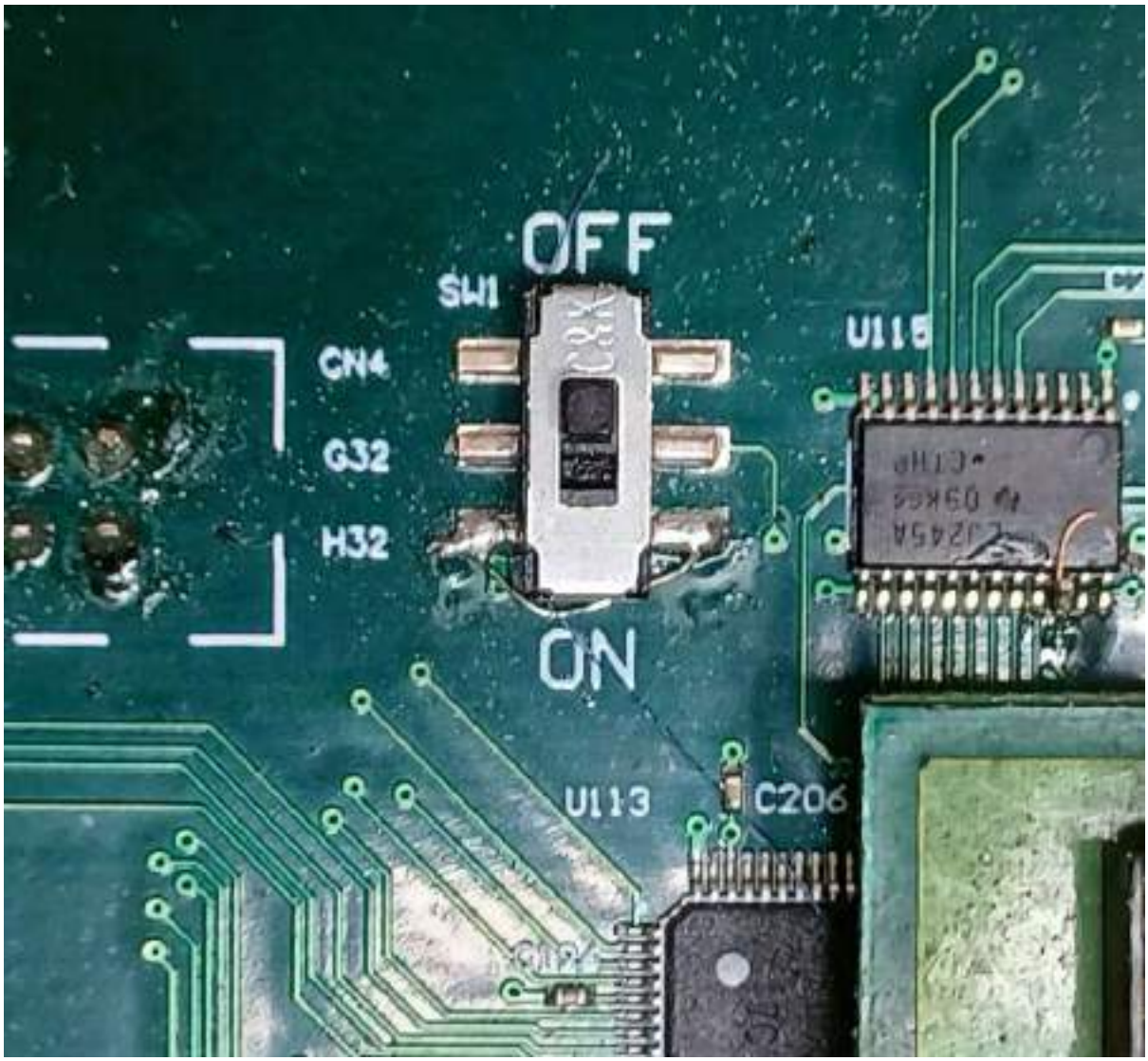
Make sure to support the multi board firmly from underneath while applying firm but gentle pressure to make sure your C-Board is flush and firmly down and connected.



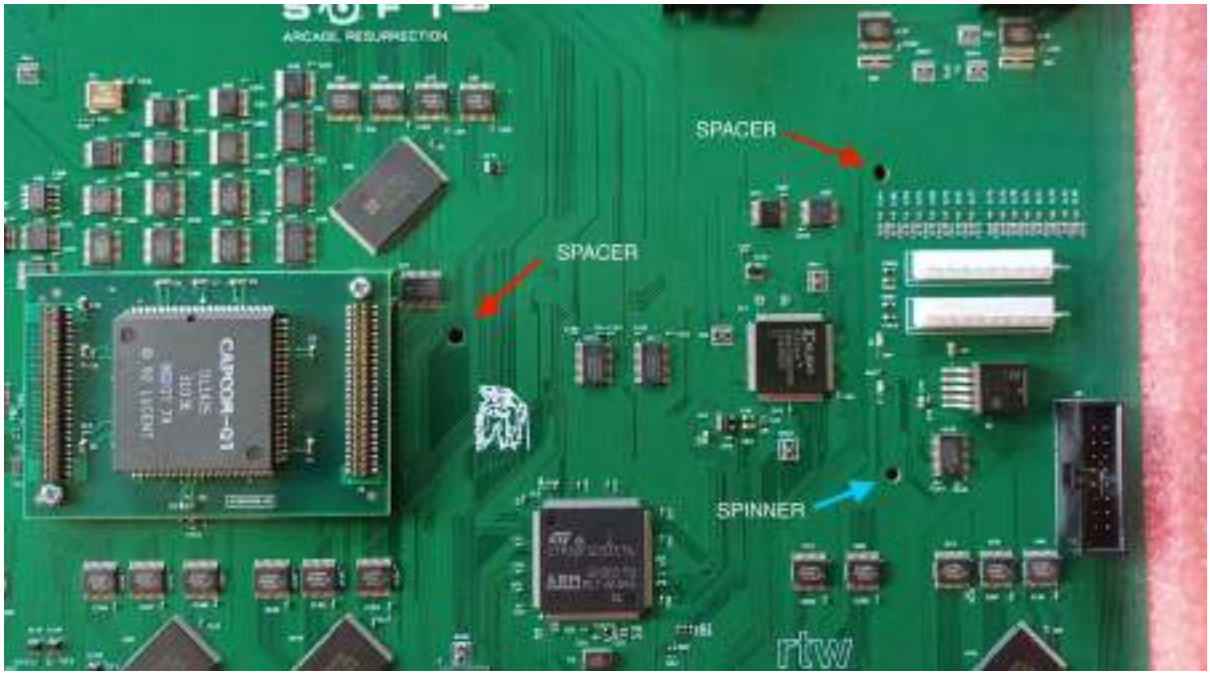
3. **SET C-BOARD SWITCH:** If you are using a C-Board that has just one PAL chip (92641C-1 or 90630C-4) or if it doesn't have the JST connectors for controls, then you need to activate the switch at the top of the Multi PCB to the **"ON"** position.

If your C-Board model number is 90631C-5 and has two PAL chips, you must leave this switch in the "**OFF**" position as shown below.

Thanks to this switch, even if your C-Board has no kick connectors (CNI01 & CNI02), you can now have access to use the ones built into the Multi PCB.



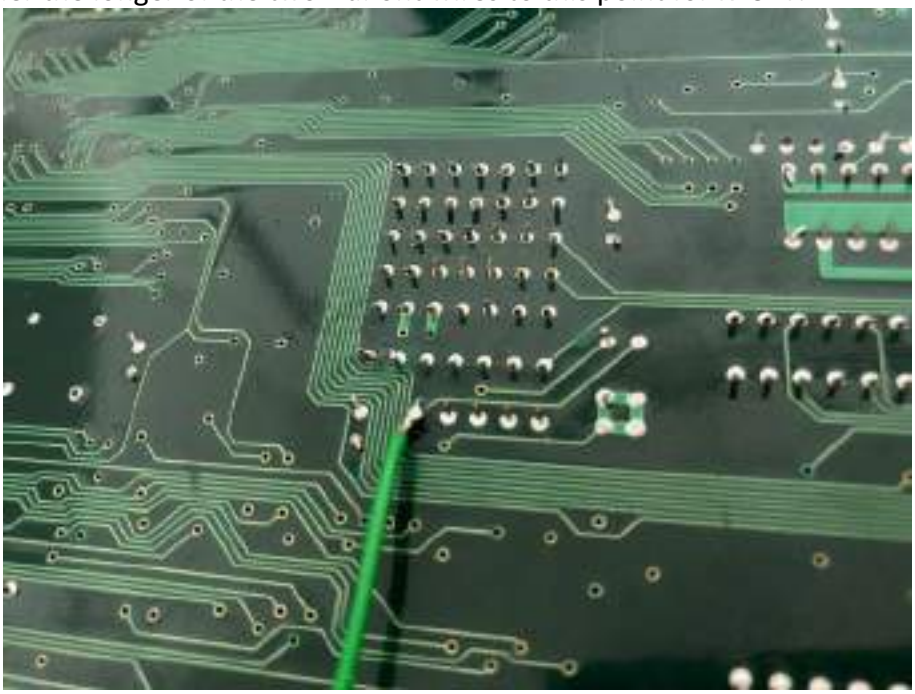
4. **PLASTIC SPACER INSTALLATION:** Install the two included little white spacers onto your “Multi” PCB by pushing them in from underneath. Their locations are shown below with the red arrows. Please note also the location reserved to install the optional add-on Spinner PCB, this hole is smaller and will not accept the spacers included with the kit.



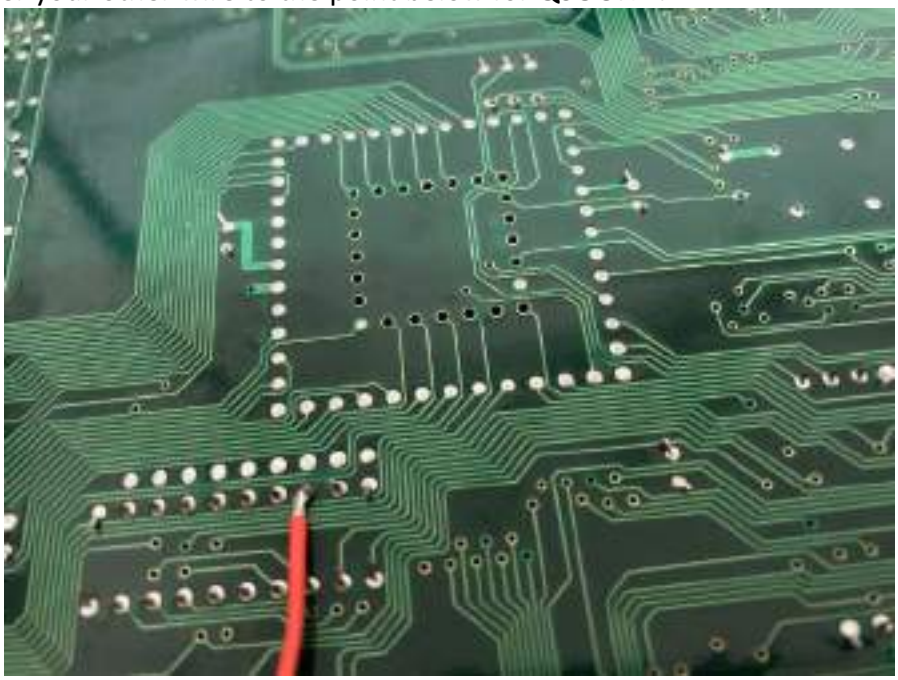
5. **RESET / QSOUND WIRE INSTALL:** The two DuPont wire cables included in the kit are pre-cut, stripped and ready for installation. Before installing to the points of your CPS-1 motherboard, it's recommend you pre-tin both wires and add a tiny amount of solder to the points of your motherboard for an easy flow.

One end of each cable will be soldered to your CPS-1 "A" Board and the other ends with the DuPont connector will connect to your multi at the headers outlined in Section 7 below.

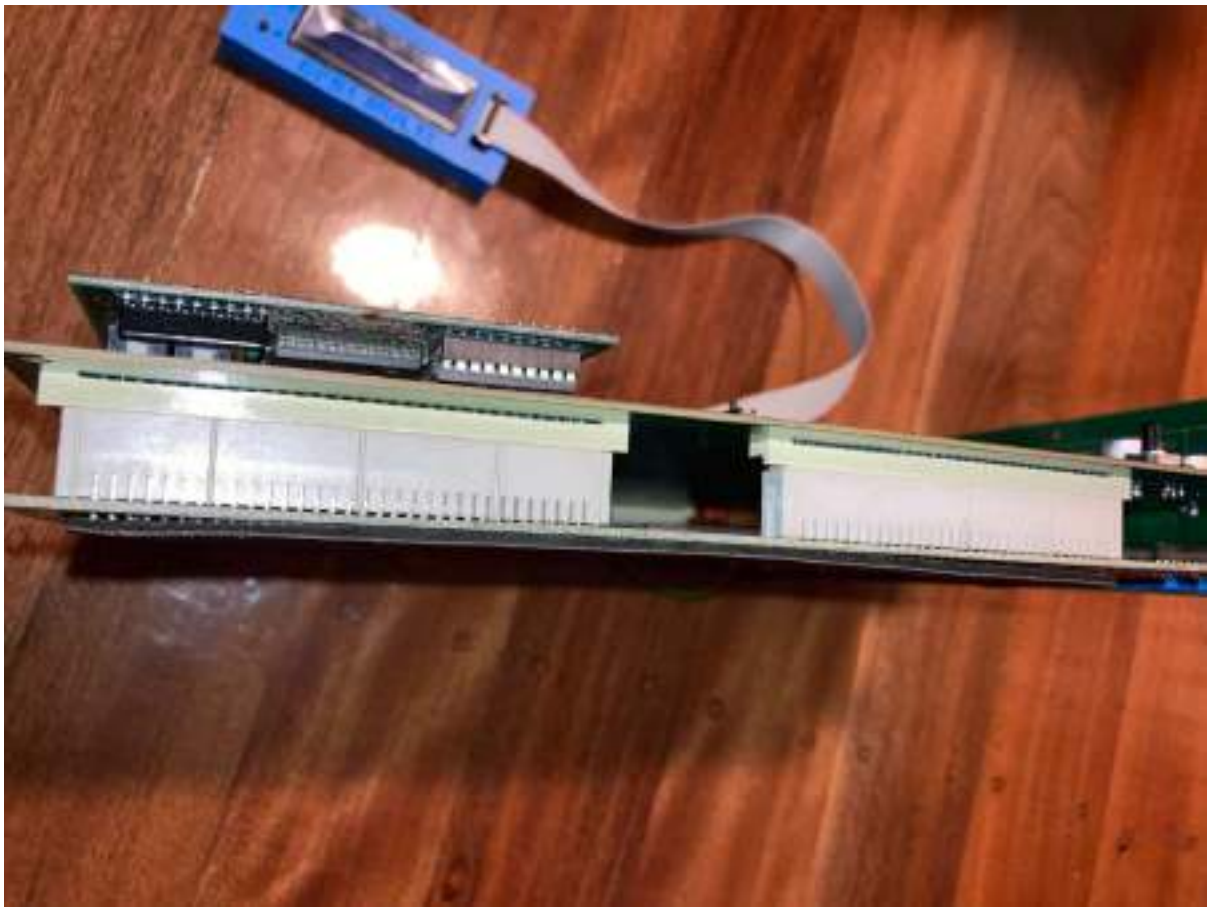
A. Solder the longer of the two DuPont wires to this point for **RESET**.



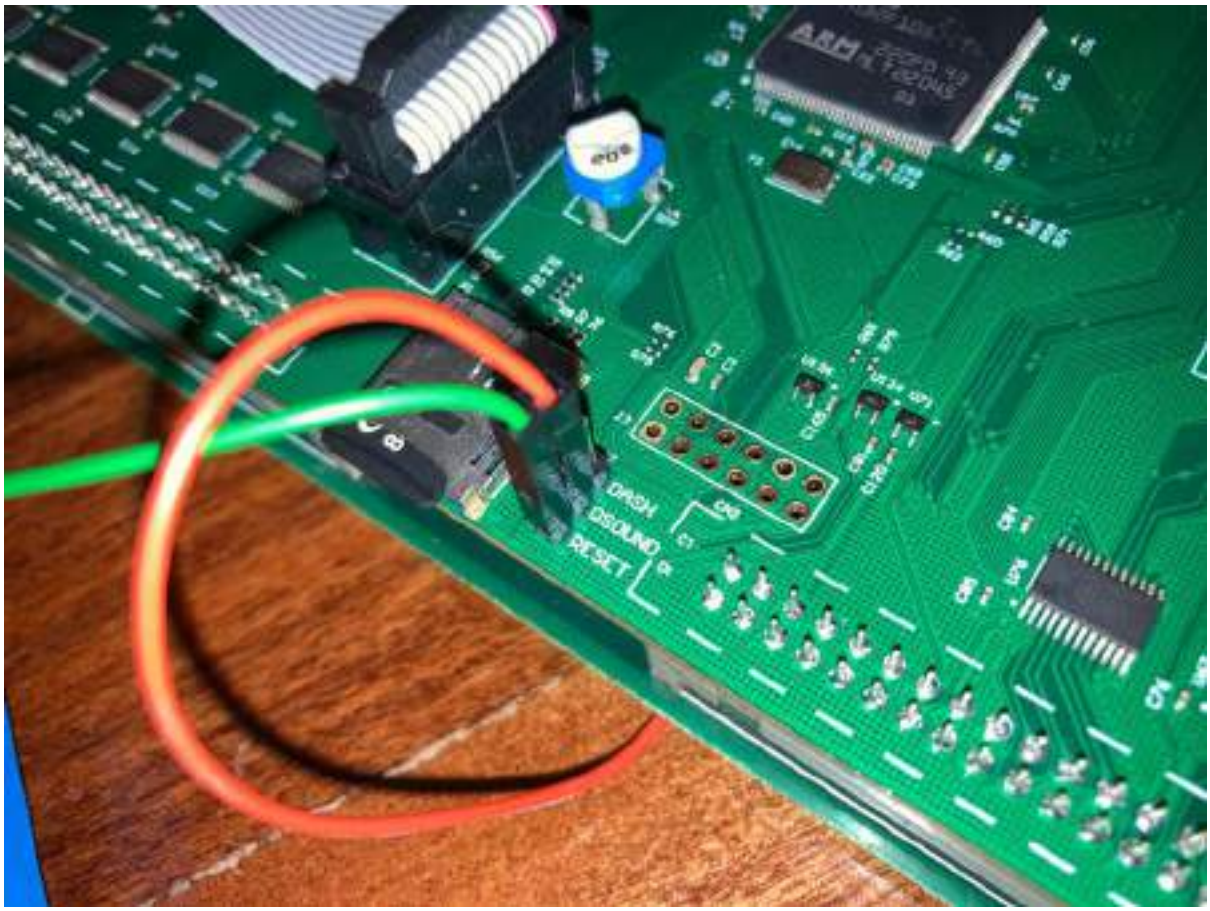
B. Solder your other wire to the point below for **QSOUND**.



6. **MULTI BOARD INSTALLATION**: Now it’s time to connect the Multi PCB to your A-Board. Ensure that each the four connectors on the multi are firmly in place and fully down at all points on your A-Board.



7. **RESET/QSOUND WIRE INSTALLATION:**
Plug the RESET cable soldered in step 5.A (green) to the RESET pin on the multi PCB.
Plug the QSOUND cable soldered in step 5.B (red) to the QSOUND pin on the multi PCB.



NOTE: There is an unused pin in this step labelled “DASH”. This pin indicates if the game is 10Mhz or 12Mhz mode. This can be used with future crystal/clock speed add-ons for the multi to denote the native speed of the game.

8. **JAMMA FINGER / FILTER BOARD CONNECTION:** Insert the JAMMA finger into the connector on the Filter Board so it faces outward of your Multi stack. The edge with the keyed notch should be sticking outwards and will be what you connect to your Arcade Cabinet or Supergun.

Next, connect the Filter Board so that it joins your “A” Board and the “Multi” PCB together. Be careful when doing this and use as little force as possible. Ensure that both connectors are flush, snug, tight and completely inserted.

When properly installed, it will look like this:

9. **LCD / RIBBON CABLE INSTALL:** Connect the LCD Ribbon Cable to the Multi board in the orientation shown below. Connect the other end to the LCD selector.

If the contrast is too high or low, there is an adjustment pot on the main Multi PCB (labelled 202, as seen in the photo above) for fine tuning. It's normal for the brightness on the LCD to fluctuate when your voltages are different between machines/superguns.

10. **FINAL STEP:** You're Done! Now, simply insert your MicroSD card into the multi board loaded with your games that you want to play, plug your kit into your Arcade Cabinet or Supergun, choose a title using the LCD and enjoy!

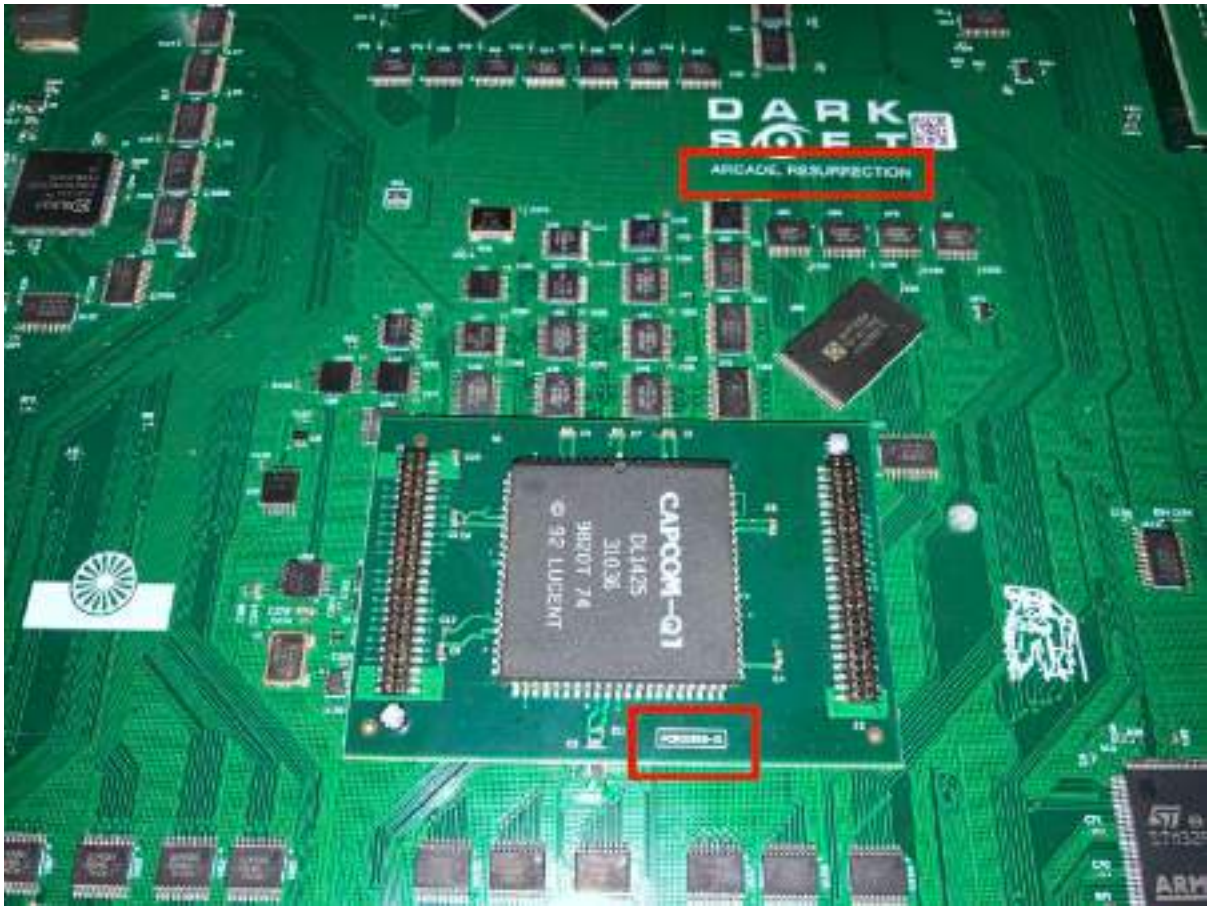
SOUND BOARD INSTALLATION & IMPORTANT INFORMATION:

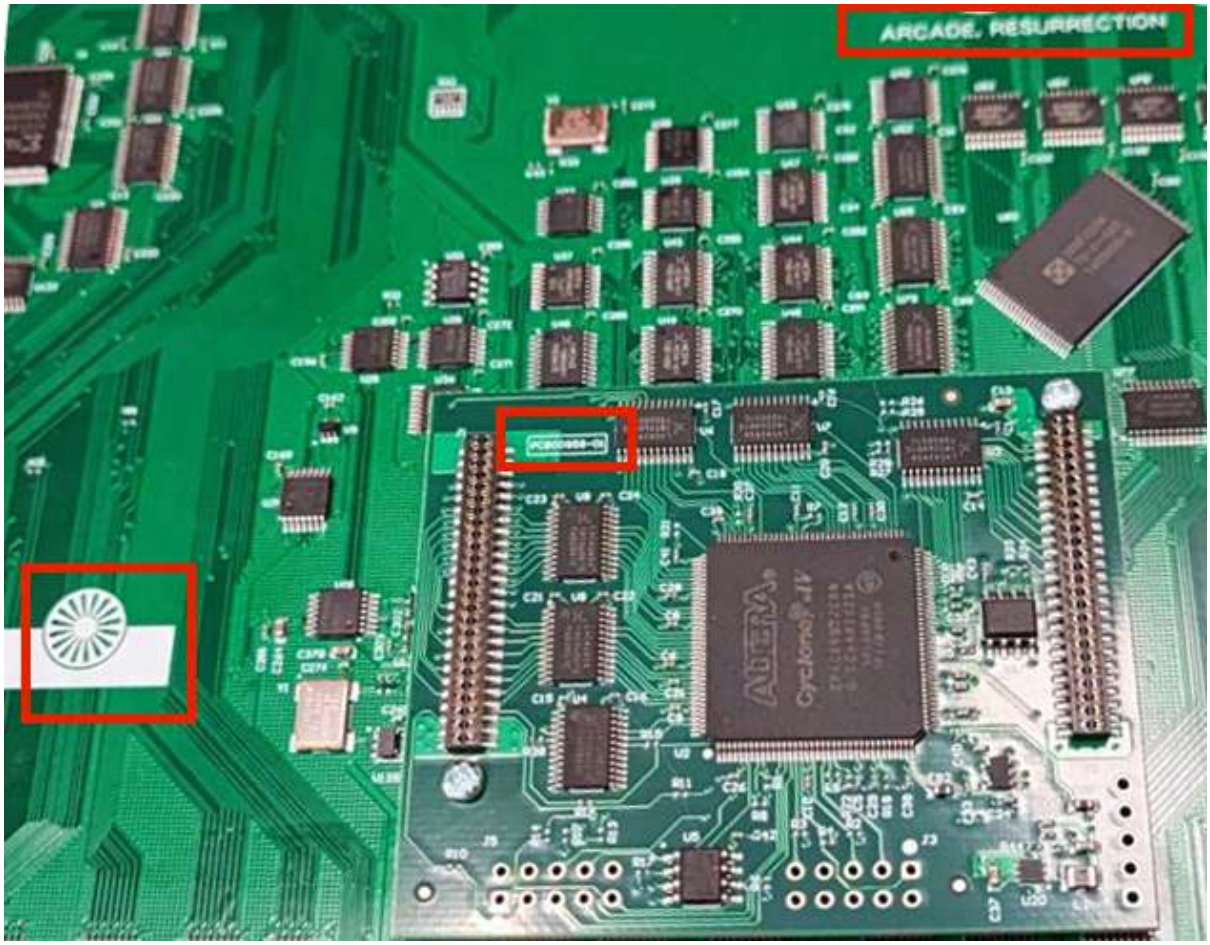
If your kit doesn't come with a Sound Board installed, it will be on the lower floor of the multi box. In that case, you need to connect the Sound Board to the main Multi PCB. Be very careful when doing so and ensure the connector is lined up and apply gentle pressure to ease it down evenly onto the pins. When secure and in place, screw it down with the two supplied screws.

If your kit comes with a FPGA Sound Board, please refer to the "**FPGA Programming**" section later in this document before turning on your multi.

SOUND BOARD ORIENTATION WARNING: Both QSound and FPGA Sound Board PCBs can be inserted backwards and doing that will fry the audio PCB and possibly even the multi. Inserting the chip backwards voids any warranty claim, so please take care.

In order to be sure that the PCB is properly inserted, you need to make sure that the text "PCB000258-01"on the FPGA board and "PCB00959-01" on the Original QSound board is oriented in the same way as the rest of silkscreen text on the Multi PCB. See the pictures below for visual points of reference.

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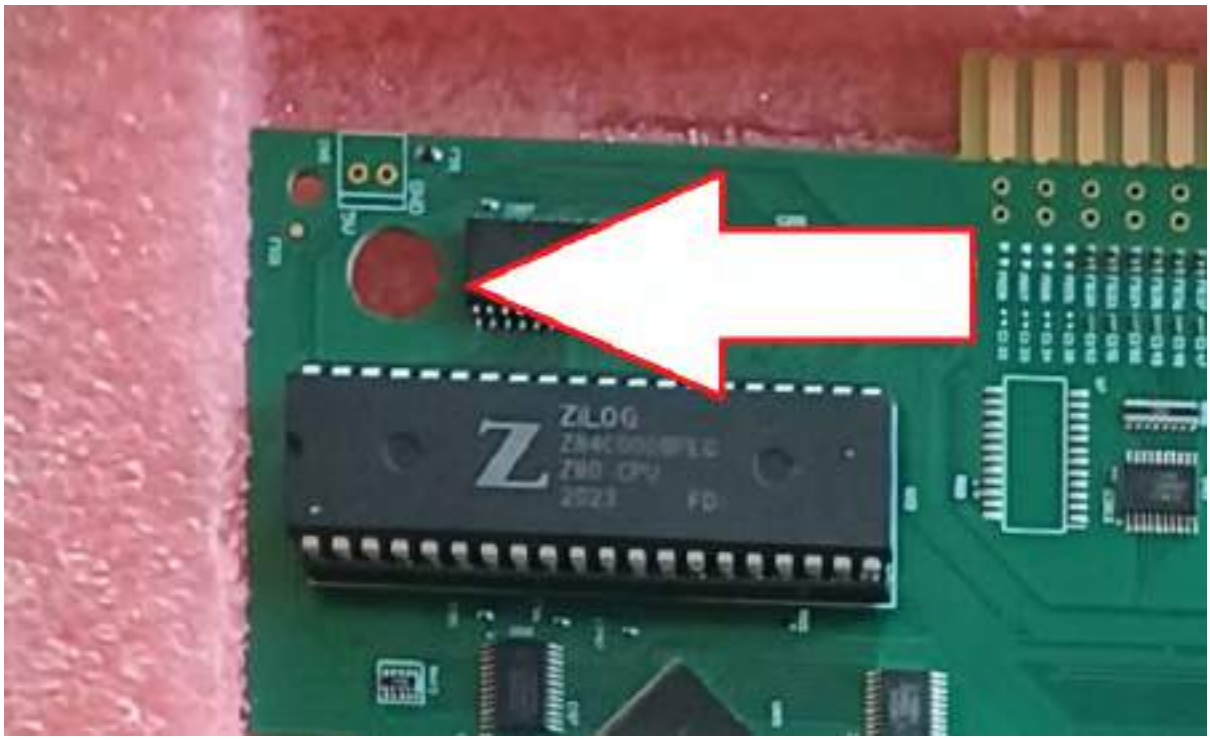
OPERATIONAL NOTES / ADDITIONAL INFO:

When the PCB is in reset mode, you may see some graphic artifacts / glitching on your screen. This is 100% normal and can't be avoided when the multi is in a state of reset and programming a game.

Whilst FLASH is being erased or a game is loading, the LCD will display asterisks to indicate progress. You can also tell this process is occurring when 2 LEDs are active on the multi instead of just one in the middle right part of the Multi PCB.

You can skip forward 10 games at a time by pressing and holding the "up" or "down" button on the LCD selector. This is to help navigating if you have a large number / revisions of games on your SD card.

Volume for CPS-1 games are controlled by adjusting the standard volume knob on your A-Board. An opening has been created on the multi, near the Z80, to allow ease of access to the original volume knob, even with the multi installed!



CPS-1.5 games do not use this volume knob, instead there is a potentiometer on the multi PCB to adjust sound output level over JAMMA, but this is ONLY used for games on the CPS-1.5 platform.

NOTE: We **DO NOT** provide any game software of any kind with our kits. You are on your own to provide the game files required.

FPGA PROGRAMMING:

If your kit is the FPGA version, in order to work you need to have a file called qsound.bin on the MicroSD. This file will be copied to the FPGA PCB and deleted from the MicroSD after

installation.

UPDATING MULTI FIRMWARE:

To update the firmware on the multi place the "flash.img" file in the root of your SD card. To update the cpld, place the file "cpld" (note this file has no extension) in the root of the SD card and turn the multi on.

The screen will "glitch" similar to loading a game, this is normal and lets you know that the process is working. Once finished the last game you had loaded will launch and your firmware/cpld will be updated.

TECHNICAL INFORMATION:

Each game folder supports numerous configurable files:
“name” stores the name of the game displayed on the LCD
"dash" indicates that the PCB runs on a dash board at 12Mhz
"config" has a value from 0 to 32 and indicates the Graphic PAL that will be used
"enckey" indicates which B chip in the B-21 we want to use, just like the Infinikey does. Possible values are: B01, B02, B03, B04, B05, B11, B12, B13, B14, B15, B16, B17, B18, B21, CDx, Q5x, CCx, KDx, KRx, MBx, MBDx, PSx, QDx, MBx, RTx, VAx, TK2x.
"qsound" if a game uses Qsound then this file will be present with 0 bytes (this file can be any size, the multi only checks for its existence)

For example:

If the game supports QSound, the following files need to be present:

- *.01 -> GFX
- *.02 -> GFX
- *.03 -> ProgramROM
- *.07 -> QSound
- *.08 -> Z80

NOTE: We don’t load the usual audio files but instead (z80.08 and qsound.07). These 2 files are rearranged using a script, so existing ROM sets from MAME, will not work!

If the game is CPS-1, the following files need to be present:

- *.01 -> GFX
- *.02 -> GFX
- *.03 -> ProgramROM
- *.05 -> OKI
- *.06 -> AudioCPU

NOTE: .06 and .08 are both for Z80 but we don’t mix them and have a separate FLASH available for each type of file.

OPTIONAL ADDONS:

We strongly recommend using a shell or case in order to keep all the PCBs in place, especially the Filter Board that connects the Multi and “A” board together. These cases will be available from a number of creators/vendors soon-after the release of the Multi.

There are currently 3 optional add-ons available for the CPS-1 Multi Kit:

A “Forgotten Worlds Spinner PCB” which is an extra board that allows you to play with original or repro spinners.

A “3P/4P Kit” which is a set of 2 cables that allow you to take the 3P and 4P connectors to the front of the multi (on the Vertical Filter Board) so that you have a universal setup for all games, including CPS-1.5

A remote DIP bank that gives you the ability to control DIP switch settings for games. This is due to the original DIPs being obstructed by the Multi kit.

These add-ons can be purchased from @Mitsurugi-w on the Arcade-Projects.com forum.

TROUBLESHOOTING:

This section is to be completed in further revisions of the guide after the multi has reached end users and if we come across any issues.

In the meantime, if there are any issues whatsoever with your multi or something is not working properly for you, please visit the arcade-projects.com forums and contribute to the official “CPS-1 Multi Troubleshooting” thread for assistance.

ENJOY!

Installation Guide written and compiled by @djsheep. Last Edited 27th May 2022.