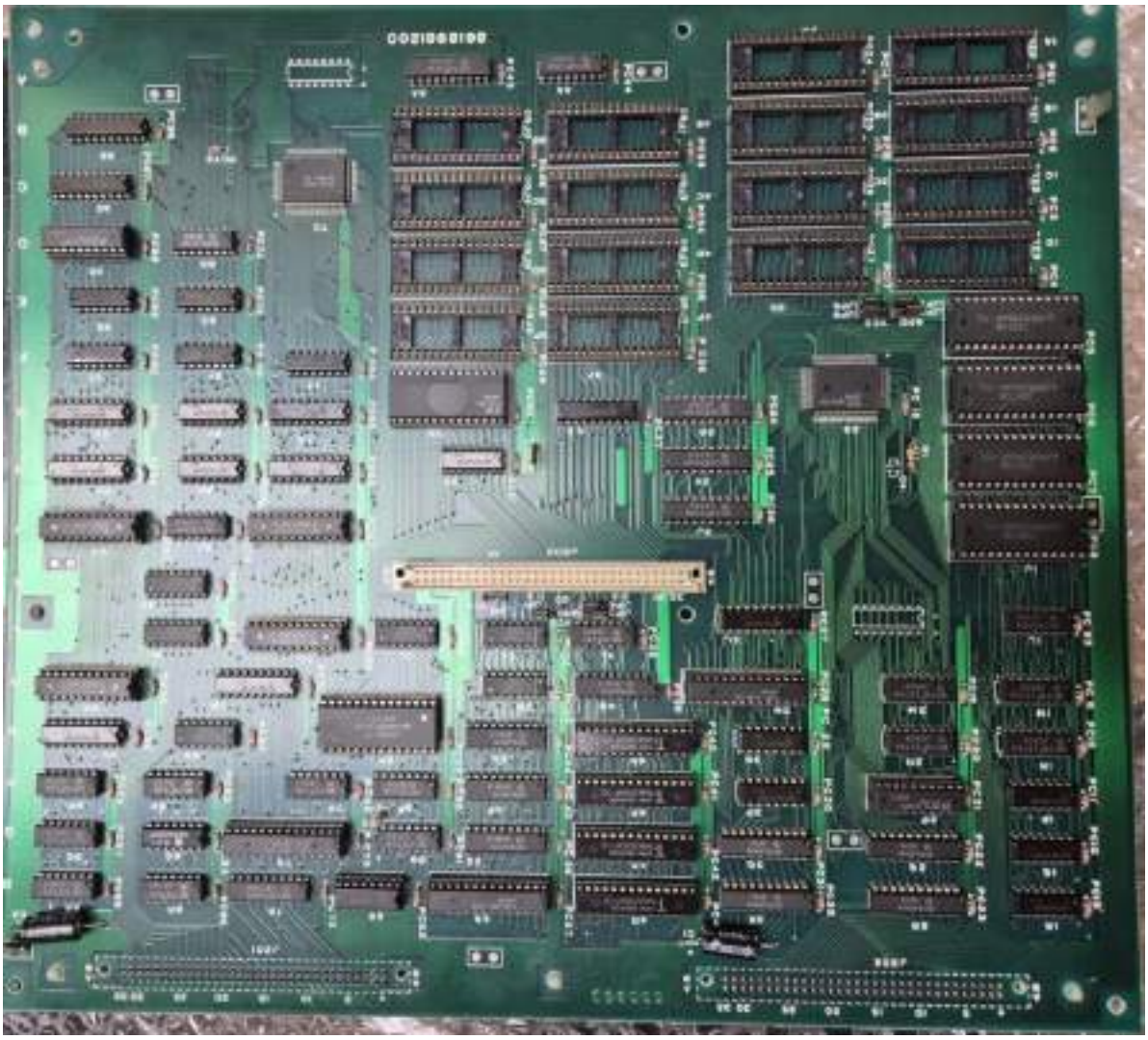
DARKSOFT SYSTEM 2 MULTI INSTALLATION GUIDE v2.2

Development on this long-awaited project has come to an end and System 2 fans will be able to play all the games available on this system using a single setup!

It's been months of work and testing so I really hope you enjoy it as much as I did building it!

In order to make this work, you only need to have a System 2 motherboard and a working arcade cabinet or a supergun.

NOTE: There are several revisions of System 2 PCBs and only those that have the Video Board pictured below will work with this Multi.

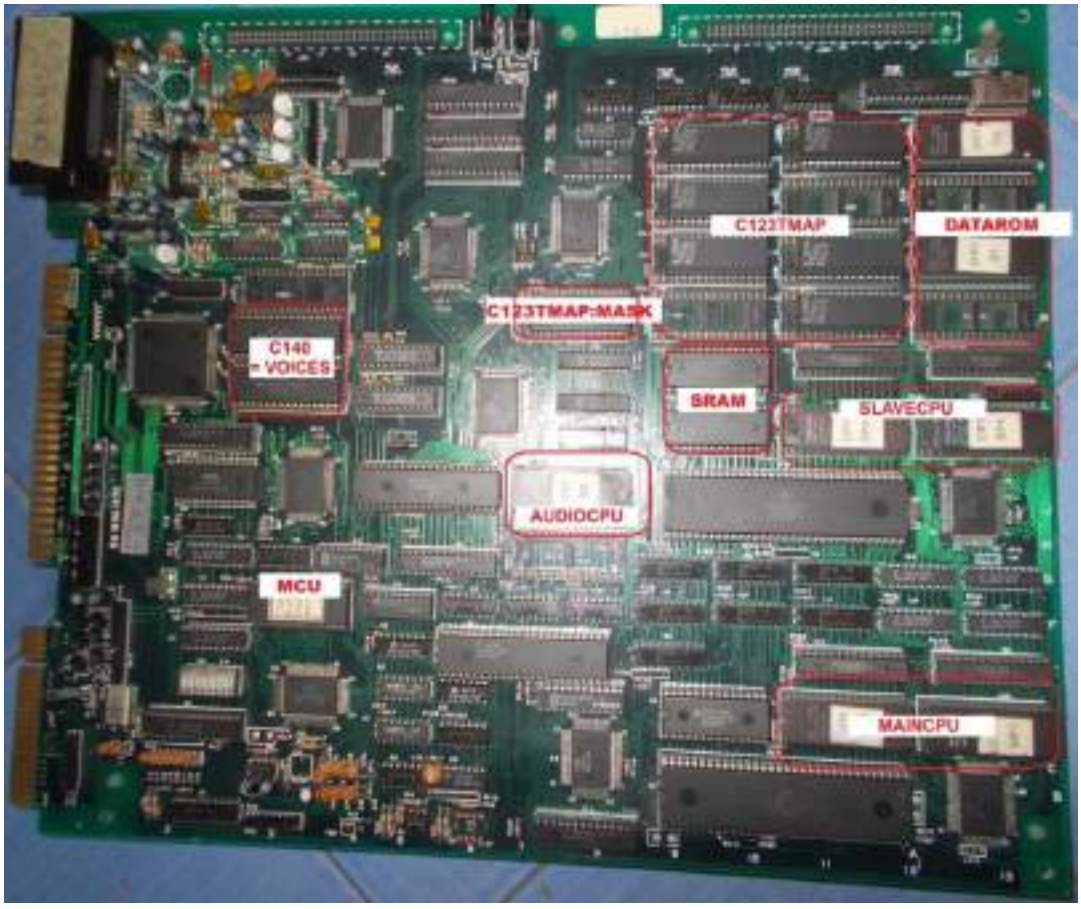


The following games should come standard with that Video PCB:

Assault	Marvel Land
Assault Plus	Mirai Ninja
Bubble Trouble	Ordyne
Burning Force	Phelios
Cosmo Gang The Video	Rolling Thunder 2
Dirt Fox	Super World Stadium
Dragon Saber	Super World Stadium '92
Finest Hour	Super World Stadium '93
Golly Ghost	Valkyrie No Densetsu
Kyuukai Douchuuki	

STEP 1. PREPARING THE MAIN PCB

The first thing that you need to do is to remove all the Mask ROMs and EPROMs from your System 2 PCB. The image below shows each area of the Main PCB and their functions.



REMOVE all the chips in the following sections: **MAINCPU, SLAVE CPU, AUDIOCPU, C140=VOICES, C123TMAP:MASK, C123TMAP** and **DATAROM**.

DO NOT REMOVE the chips marked as **SRAM** or **MCU**.

STEP 2. SETTING JUMPERS (MAIN PCB)

The next step is to set the jumpers on the main PCB. They should be set as follows:

JP15 • —o
JP60 • o—
JP66 • —o
JP67 • —o
JP68 • —o
JP80 • o—
JP86 • —o
JP87 • —o
JP88 • —o

There are three pins for each jumper and a shunt to place on two of the pins.
You simply need to place the shunt on the "—" section with the "o" pin left open/unpopulated.
Pay attention to the • on the silkscreen of the PCB and list above to ensure proper placement.

The photos below show the jumper locations, as well as their expected settings.


156
JAPAN
8835 Z09
PC33
JP67
SHAPE
23C401
JP60
JP66
JP68
PC44
PC45
PC46
123 8830 215
JAPAN
CHR5
CHR6

STEP 3. REMOVING / BENDING GROUND PLATES (MAIN PCB)

Most System 2 Main PCBs have metal ground plates that are vertically mounted on the PCB. If you do not remove or bend these, they will scrape the underside of your Multi PCBs and most likely destroy them before you have a chance to enjoy it ☹!

The plates can be scattered all over your donor PCB but they are commonly found near the 68000 Processor and they look like this:

You need to remove these using a desoldering gun, bend them with your hands gently or use pliers (VERY GENTLY!).

BE EXTREMELY CAREFUL and do not stress your donor PCB.

In some rare cases, your donor PCB may not have these plates installed, and if that's the case you can proceed to the next step safely.

IMPORTANT! Let's repeat again, YOU MUST carefully check these Ground plates before proceeding. If you leave them and they collide with the Multi PCB, you will break your kit, which is of course easy to notice and not covered by any warranty. YOU HAVE BEEN WARNED!

STEP 4. SET ALL DIP SWITCHES TO OFF (MAIN PCB)

The next thing that you need to do is to set all DIP switches on the Main PCB to OFF. You can set these individually to another position on a per-game basis, however if you don't set them all to OFF initially, some games will not boot or have a weird behaviour. They are easy to locate and should look like this:

STEP 5. PREPARING THE VIDEO PCB

The image below shows each area of the Video PCB and their functions.

REMOVE all the chips in the following two sections only: **S2ROZ** and **SPRITES**.

DO NOT REMOVE the chips marked as **PROTECTION (KEYCUS), SRAM** or **USER2**.

STEP 6. SETTING JUMPERS (VIDEO PCB)

Next step, is to set the jumpers on the Video PCB. Follow the instructions and method outlined in STEP 2. They should be set as follows:

JP1 • o—

JP2 • —o

JP3 • —o

JP4 • o—

JP5 • o—

JP6 • o—

JP7 • o—

JP8 • —o

Photos below show the jumper locations, as well as their expected settings.

STEP 7. RE-CHECK & CONFIRM YOUR WORK

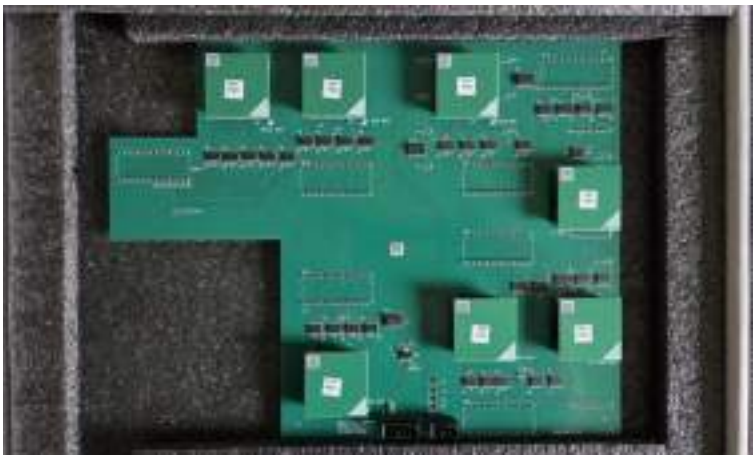
a) Ensure that you have removed/bent the GROUND plates on the MAIN PCB.
b) Ensure that you have adjusted the jumpers on both the VIDEO and MAIN PCB.
c) Ensure that you have removed all specified Mask ROMs on both the Video and Main PCBs.

STEP 8. MULTI KIT CONTENTS OVERVIEW

The kit is made up of two PCBs: one connects to the Video PCB and the other to the Main PCB.

Your kit also contains a small cable to link both Multi PCBs, an adapter to program the memory modules and another cable that connects to the rotary switch PCB which connects to the larger Multi PCB.

The PCB to be installed onto your donor's Main PCB is the larger 'T' shaped PCB that has 7 memory modules. It also features a connector for the rotary switch and another connector that links with the smaller Multi PCB.



The smaller PCB pictured below connects to the Video PCB. It has only 3 modules.

STEP 9. MULTI INSTALLATION

NOTE: There are pins on the bottom of both of the Multi PCBs pressed INTO pink antistatic foam. You must LIFT the PCB off the foam attached to the underside to avoid any damage. Do not move the PCBs left and right, pull out diagonally, or only lift from the corners when removing it from the box; doing so will greatly risk damaging the PCBs and bending their pins.

The ONLY way to install this multi is by separating the 2 PCBs of your original System 2 donor and installing each PCB of the multi separately. If you try to install the PCBs without disassembling them you may apply too much pressure, bend your PCB and break a lot of things.

Firstly, place the pins on the Multi PCBs onto the corners of the EPROM sockets on your donor PCBs. Once everything is sitting where it belongs, you can start to press gently on the left, right and corners of the kit until all pins are securely pushed down.

IMPORTANT! When installing the Multi, please take extra care, making sure first that everything is properly aligned and then start pushing gently until all the pins go in and everything fits properly before finally giving it a firm (but not hard) push to secure the multi in place.

This is how your Video PCB should look with the small PCB from the Multi kit installed:

This is how your Main PCB should look with the larger PCB from the Multi kit installed:

After installing the two multi PCBs to your donor, re-assemble your System 2 stack, and connect the cable between the Video and Main Multi PCBs and also the selector cable to the Main PCB.

NOTE: Each memory module has a white triangle on the lower right-hand corner. Make sure that you align these with the triangles on both Multi PCBs after programming.

STEP 10. MEMORY MODULE PREPERATION

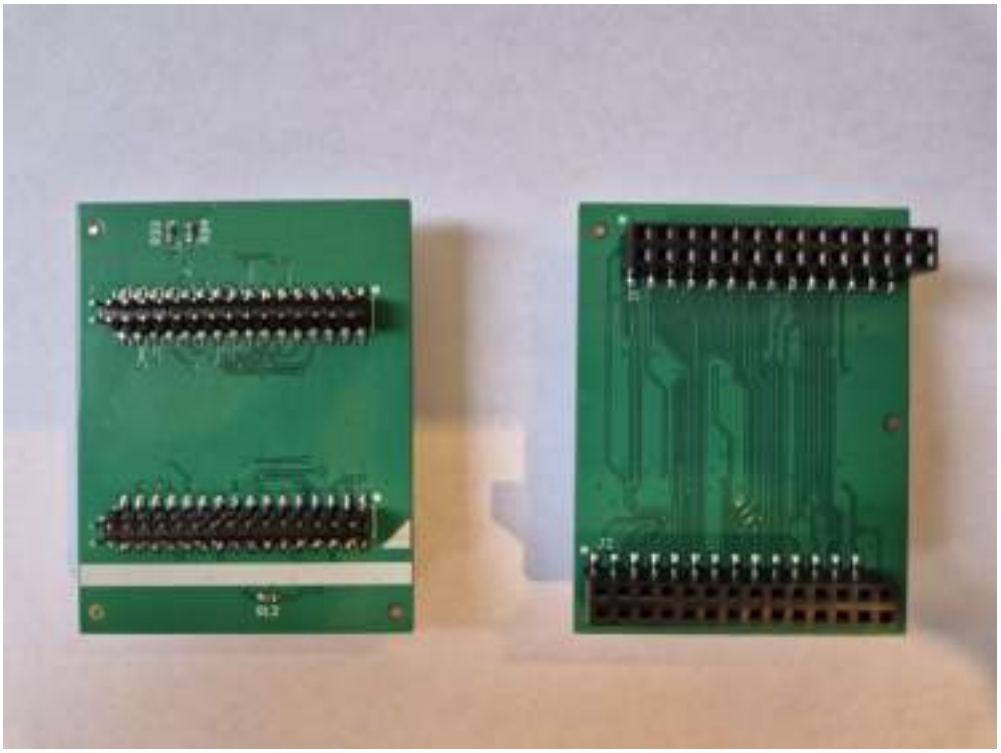
All the modules on the kit have different capacity ranging from 128Mbits to 512Mbits.

You need to program 7 modules for the Main PCB and 3 modules for the Video PCB, one by one, by placing them in your programmer using the adapter included.

In order to program the memory modules, you need to use the PROMAN (aka TL86_PLUS) programmer. This programmer costs around $125 USD and is easily available through online vendors such as AliExpress or eBay. It looks like this:

The multi kit comes with an adapter. In order to program the 10 memory modules, you simply place each of the memory modules, into the adapter and then plug them into your programmer to write your files.

This is how the adapter included in your kit should look:



Once you have plugged the memory module onto the adapter and then placed it onto the PROMAN, it should look like this (please refer to the two white markings on the adapter board that indicate correct orientation):

STEP 11. MEMORY MODULE SIZES

The modules on your Multi kit are three sizes: 128Mbit, 256Mbit, 512Mbit.

The DETECT function in the programming software only works automatically for 256Mbit and 512Mbit modules.

You need to manually define the size for each of the 128Mbit (16MB) modules. Here is a chart showing each areas module size and which ones are 128Mbit.

Filename	Module size	File Size
VOICE_merged.bin	256Mbit = 32MB	32,768 KB
SPR_merged.bin	128Mbit = 16MB	4,096 KB
SND_merged.bin	128Mbit = 16MB	4,096 KB
SHAPE_merged.bin	128Mbit = 16MB	8,192 KB
ROZ_merged.bin	512Mbit = 64MB	65,536 KB
OBJ2_merged.bin	256Mbit = 32MB	32,768 KB
OBJ1_merged.bin	256Mbit = 32MB	32,768 KB
MPR_merged.bin	128Mbit = 16MB	4,096 KB
DATA_merged.bin	256Mbit = 32MB	32,768 KB
CHR_merged.bin	512Mbit = 64MB	65,536 KB

NOTE: 128Mbit modules are also used on the multi for files that are 32Mbit or 64Mbit due to their increased speed. They will program fine using the provided 128Mbit/16MB module.

STEP 12. MEMORY MODULE PROGRAMMING

Load the software for your programmer to program NOR flashes (NOTE: There is another .EXE for NAND flashes, do not use this!).

Press **SCAN** in the <Select Programmer> section, then **DETECT** in <Part Number and Parameters> for 256Mbit or 512Mbit modules, or **MANUALLY** set the size in the <User Defined> section to 8MB for the 128Mbit modules, then choose the **FILE TO PROGRAM** to the module in <Erase and Program> then press the **SMART KEY** button which automates the erase/write/verify functions.

The software should look like this:

If you are manually selecting the module size, the drop-down looks like the photo below: simply select option t. 16MB for all the 128Mbit modules as outlined in the size chart shown above.

There is a script available that you can run in your MAME folder and it will create all the files needed for each of the 10 memory modules for you.

Once you have those files prepare, program the 10 modules one-by-one using your programmer and place the modules onto the system where they were originally located. Be sure not to mix them up!

As a final step, make sure that everything is in place and is properly inserted. If everything looks good, set the rotary switch to the game that you want to play and power it on.

NOTE: Remember that DIP Switches in Main PCB should be all set to OFF

One possible configuration of games is shown below:

0 ASSAULT	→ Assault (Rev B)
1 ASSAULTP	→ Assault Plus (Japan)
2 BURNFORC	→ Burning Force (Japan, new version (Rev C))
3 COSMOGNG	→ Cosmo Gang the Video (US)
4 DIRTFOXJ	→ Dirt Fox (Japan)
5 DSABER	→ Dragon Saber (World, DO2)
6 DSABERJ	→ Dragon Saber (Japan, Rev B)
7 FINEHOUR	→ Finest Hour (Japan)
8 MARVLAND	→ Marvel Land (Japan)
9 MARVLANDUP	→ Marvel Land (US, prototype)
A MIRNINJA	→ Mirai Ninja (Japan, set 1)
B ORDYNE	→ Ordyne (World)
C PHELIOS	→ Phelios
D RTHUN2	→ Rolling Thunder 2
E RTHUN2J	→ Rolling Thunder 2 (Japan)
F VALKYRIE	→ Valkyrie no Densetsu (Japan)

I trust this kit will give you hours and hours of fun, so enjoy! DARKSOFT

APPENDIX A: DIODE REPLACEMENT FOR MISSING KEYCUS

In the photo of the Video PCB below, you will see an area called PROTECTION, this is the Keycus. You need any valid Keycus to use the Multi, however if you board is missing a Keycus, or it becomes corrupted, you can simply install a Diode in its place.

See the below pictures for correct orientation and installation guidance. You can install the diode either on the underside of the PCB or directly into the socket pins.

NOTE: There is a black line on the Pin 26 side to indicate diodes polarity.