



Version 2
(October 2021)

**How to add games on Nintendo Game and Watch 2020.
No Soldering Raspberry pie only Guide.
For original 1MB flash (and 16/64MB)
(based on Mickey`s guide)**



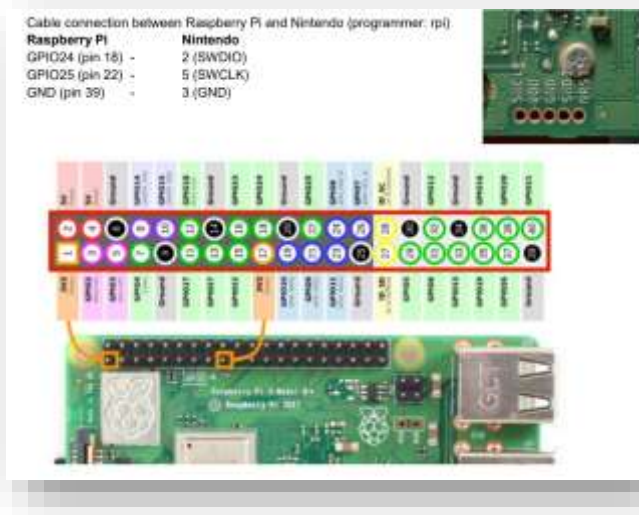
Disclaimer: this guide is for those who don't have the right equipment, experience and time on hand. There are better and more professional guides on the internet.

Prerequisites.

1. Raspberry pi
2. Dupont cables.

Step1: Open and Prepare your Game and Watch for flashing

1. Find suitable screw driver (does not have to be triangle)
2. Connect dupont cables using scheme



Step2 : Prepare your Raspberry.

1. Use Raspberry pi imaging tool to install Raspbian Lite on your SD.
2. Activate SSH on your Raspberry using Raspy-Config -> Connection.
 - a. Use SSH on your PC to access Raspberry to be able to copy paste commands from this guide.

Step 3: Hack and Unlock your Game and Watch

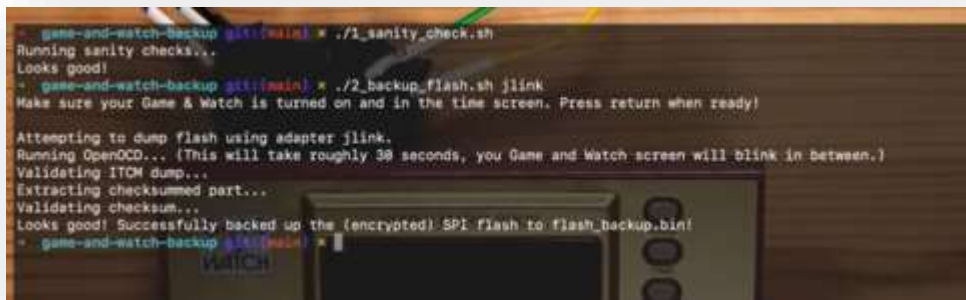
1. `sudo apt update`
2. `sudo apt upgrade`
3. `wget https://github.com/xpack-dev-tools/arm-none-eabi-gcc-xpack/releases/download/v10.2.1-1.1/xpack-arm-none-eabi-gcc-10.2.1-1.1-linux-arm.tar.gz`
4. `mkdir -p ~/opt`
5. `cd ~/opt`
6. `tar xvf ../xpack-arm-none-eabi-gcc-10.2.1-1.1-linux-arm.tar.gz xpack-arm-none-eabi-gcc-10.2.1-1.1`
7. `export PATH=$PATH:/home/pi/opt/xpack-arm-none-eabi-gcc-10.2.1-1.1/bin/`
8. `git clone https://github.com/ghidraninja/game-and-watch-backup.git`
9. `sudo apt install npm`
10. `npm install --global xpm@latest`
11. `xpm install --global @xpack-dev-tools/openocd@latest`
12. `export OPENOCD="/home/pi/.local/xPacks/@xpack-dev-tools/openocd/0.11.0-`

ls -la - you should see directories as on below picture:

```
pi@raspberrypi: ~/opt
pi@raspberrypi:~/opt $ pwd
/home/pi/opt
pi@raspberrypi:~/opt $ ls -la
total 20
drwxr-xr-x  5 pi pi 4096 Jan 20 13:15 .
drwxr-xr-x  3 pi pi 4096 Jan 20 13:15 ..
drwxr-xr-x 12 pi pi 4096 Jan 20 12:57 game-and-watch-backup
drwxr-xr-x  9 pi pi 4096 Dec 19 15:54 xpack-arm-none-eabi-gcc-10.2.1-1.1
```

1.1/.content/bin/openocd"

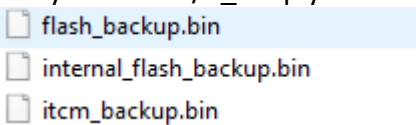
13. `sudo apt-get install binutils-arm-none-eabi python3 libftdi1`
14. `cd game-and-watch-backup`
15. `./ 1_sanitary_check.sh` (if you get error try pushing and holding dupont cables to make sure you have connection (or solder them)



```
game-and-watch-backup giti@main:~$ ./1_sanitary_check.sh
Running sanity checks...
Looks good!
game-and-watch-backup giti@main:~$ ./2_backup_flash.sh jlink
Make sure your Game & Watch is turned on and in the time screen. Press return when ready!

Attempting to dump flash using adapter jlink.
Running OpenOCD... (This will take roughly 30 seconds, you Game and Watch screen will blink in between.)
Validating ITCM dump...
Extracting checksummed part...
Validating checksum...
Looks good! Successfully backed up the (encrypted) SPI flash to flash_backup.bin!
game-and-watch-backup giti@main:~$
```

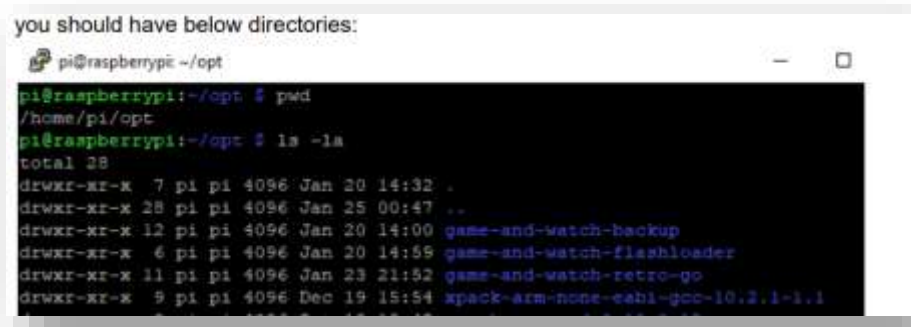
16. `./ 2_backup_flash.sh rpi`
17. `./3_ ... rpi`
18. Follow this video from minute 2:48 -> https://www.youtube.com/watch?v=-MzmoEFs0bQ&ab_channel=stacksmashing
19. Once you reach `./5_` step you should have 3 files in backup filed within folder game-and-watch-backup



```
flash_backup.bin
internal_flash_backup.bin
itcm_backup.bin
```
20. Backup those files if not the whole folder game-and-watch-backup, you can use FileZilla on your Windows PC to access Raspberry pi and copy files from RPI to your PC. You can later use FileZilla to copy ROMS on RPI.
21. If something goes wrong later on you can come back to this folder and run `5_restore.sh` script and restore original FW.

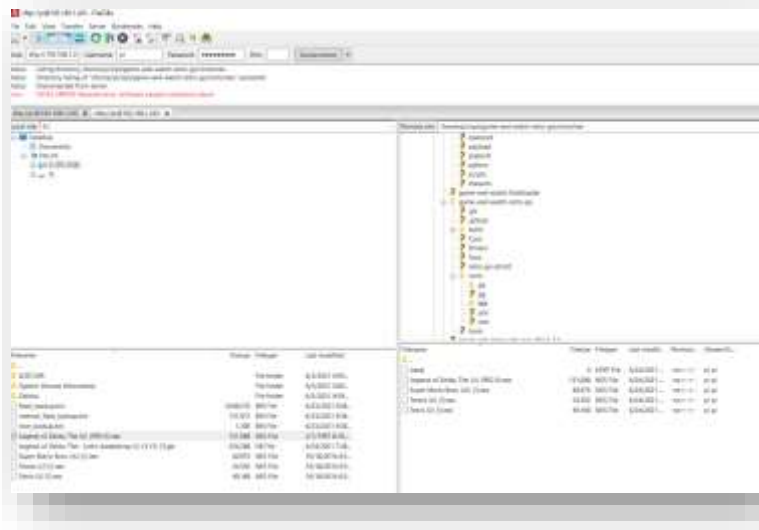
Step 4: Install Retro-Go

1. if you use 1MB original Flash chip this will replace original FW but you can always use `./5_restore.sh` script to bring it back.
2. `cd ..`
3. `cd opt`
4. `git clone https://github.com/ghidraninja/game-and-watch-flashloader.git`
5. `cd game-and-watch-flashloader`
6. `make GCC_PATH=/home/pi/opt/xpack-arm-none-eabi-gcc-10.2.1-1.1/bin/`
7. `cd ..`
8. `cd opt`
9. `git clone --recurse-submodules https://github.com/kbeckmann/game-and-watch-retro-go`



```
you should have below directories:
pi@raspberrypi: ~/opt
pi@raspberrypi:~/opt $ pwd
/home/pi/opt
pi@raspberrypi:~/opt $ ls -la
total 28
drwxr-xr-x  7 pi pi 4096 Jan 20 14:32 .
drwxr-xr-x 28 pi pi 4096 Jan 25 00:47 ..
drwxr-xr-x 12 pi pi 4096 Jan 20 14:00 game-and-watch-backup
drwxr-xr-x  6 pi pi 4096 Jan 20 14:59 game-and-watch-flashloader
drwxr-xr-x 11 pi pi 4096 Jan 23 21:52 game-and-watch-retro-go
drwxr-xr-x  9 pi pi 4096 Dec 19 15:54 xpack-arm-none-eabi-gcc-10.2.1-1.1
```

11. Use FileZilla on your PC to copy rom into dedicated folder e.g. /home/pi/opt/game-and-watch-retro-go/roms/nes



- 12.
13. `cd game-and-watch-retro-go`
14. `export ADAPTER=rpi`
15. `export OPENOCD="/home/pi/.local/xPacks/@xpack-dev-tools/openocd/0.11.0-1.1/.content/bin/openocd"`
16. `make GCC_PATH=/home/pi/opt/xpack-arm-none-eabi-gcc-10.2.1-1.1/bin/ flash_all`
17. Once compilation ends , HOLD power button if the flash process fails.
18. If you get failure, navigate to the folder game-and-watch-backup and run `./5_retrore.sh rpi` to flash back original FW, or alternatively run command 17 above make `GCC_PATH=...` again.

How many games you can add?



The retro-go before flashing will show statistics and extflash line will tell you how much space you have left see below.

```
[ LD ] gw_retro_go.elf
text      data      bss      dec      hex filename
934622    3624    1057204    1995450    1e72ba build/gw_retro_go.elf
itcram    632 / 65536      (64904 bytes free (0.062 MB))
dtcram    104304 / 131072 (26768 bytes free)
ram_uc    307200 / 307200 (0 bytes free (0.000 MB))
ram        65280 / 69632 (4352 bytes free (0.004 MB))
ram_emu_nes    103244 / 671744 (568500 bytes free (0.542 MB))
ram_emu_gb     431256 / 671744 (240488 bytes free (0.229 MB))
ram_emu_sms      0 / 671744 (671744 bytes free (0.641 MB))
ram_emu_pce      0 / 671744 (671744 bytes free (0.641 MB))
ahbram    5760 / 131072 (125312 bytes free (0.120 MB))
flash     65652 / 131072 (65420 bytes free (0.062 MB))
extflash   868350 / 917504 (49154 bytes free (0.047 MB))
saveflash   126976 / 126976 (0 bytes free (0.000 MB))
[ BIN ] gw_retro_go_intflash.bin
/home/pi/.local/xPacks/@xpack-dev-tools/openocd/0.11.0-1.1/.content
-f ../game-and-watch-flashloader/interface rpi.cfg -c "program build
```

How to get NEWUI or user interface with Cover Artwork?



Put Cover art pictures into the same folder as roms. Pictures will be compressed during compilation step #9. Supported pictures are BMP, PNG, JPEG.

 Alex Kidd - The Lost Stars (UE) [!].png	2,918 PNG File
 Alex Kidd - The Lost Stars (UE) [!].sms	262,144 SMS File

1. `cd game-and-watch-retro-go`
2. `git remote add olderzeus https://github.com/olderzeus/game-and-watch-retro-go.git`
3. `git fetch olderzeus`
4. `git checkout NewUI`
5. `git submodule update`
6. `make clean`
7. `git pull`
8. `chmod a+x scripts/*.sh`
9. `make GCC_PATH=/home/pi/opt/xbpack-arm-none-eabi-gcc-10.2.1-1.1/bin/ COVERFLOW=1 COMPRESS=lzma flash_all`

If you have installed 16 or 64MB chip use this

10. `make GCC_PATH=/home/pi/opt/xbpack-arm-none-eabi-gcc-10.2.1-1.1/bin/ COVERFLOW=1 COMPRESS=lzma EXTFLASH_SIZE_MB=64 or 16 flash_all`