

# REUN



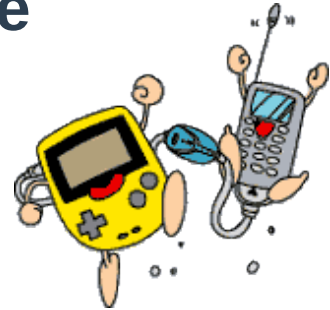
**A Game Boy and his cellphone**



# What is the Mobile Adapter GB?



- **Make and receive calls**
  - Send/receive data over the phone line
- **Call an ISP and connect to the internet**
- **Associated online game services: Mobile System GB**
- **Very early attempt at online connectivity by Nintendo**



# What is the Mobile Adapter GB?



- **A few different versions**
  - PHS never released
- **Service sunset in december 2002**

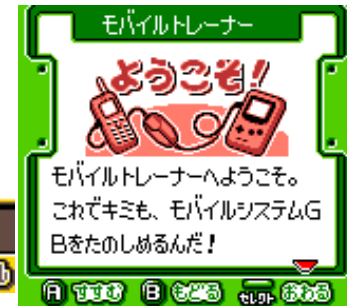


# Games

Because a gameless peripheral is like a breadless sandwich

# Games: Mobile Trainer

- **Bundled**, used to configure the adapter
- **Usage manual**
- **Mail client**
  - SMTP and POP
  - Contact with friends
- **Web browser**
  - HTTP, very basic HTML
  - Read news





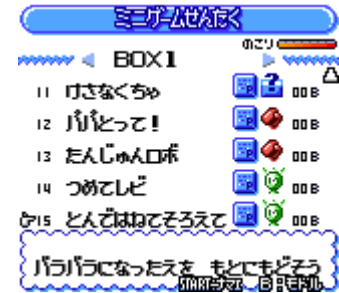
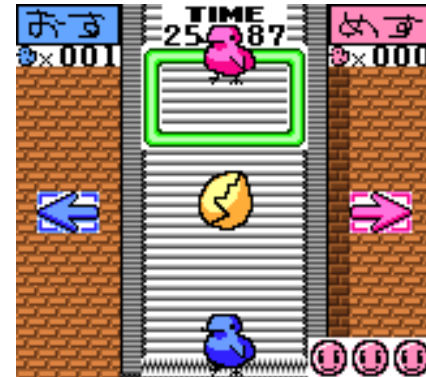
# Games: Pocket Monsters: Crystal Version

- Battling/Trading
- Battle Tower
- Trade Corner
- News Machine
- Events



# Games: Net de Get

- Minigame collection
- Custom mapper
- Downloadable games



# Games: Various



- **Mobile Golf**
  - Bundled with adapter later in its life
- **Starcom: Star Communicator**
- **Game Boy Wars**
- **Mario Kart Advance**





# Storytime!

Anything's better with a good story



- **Thread on Glitch City Labs**
- **Python script**
- **Shonumi articles and Dan Docs**
- **Hardware support**



# REON?



- **Group of enthusiasts, developers and preservationists**
- **Recreating the system faithfully**
  - Emulators
  - Servers
  - Translations

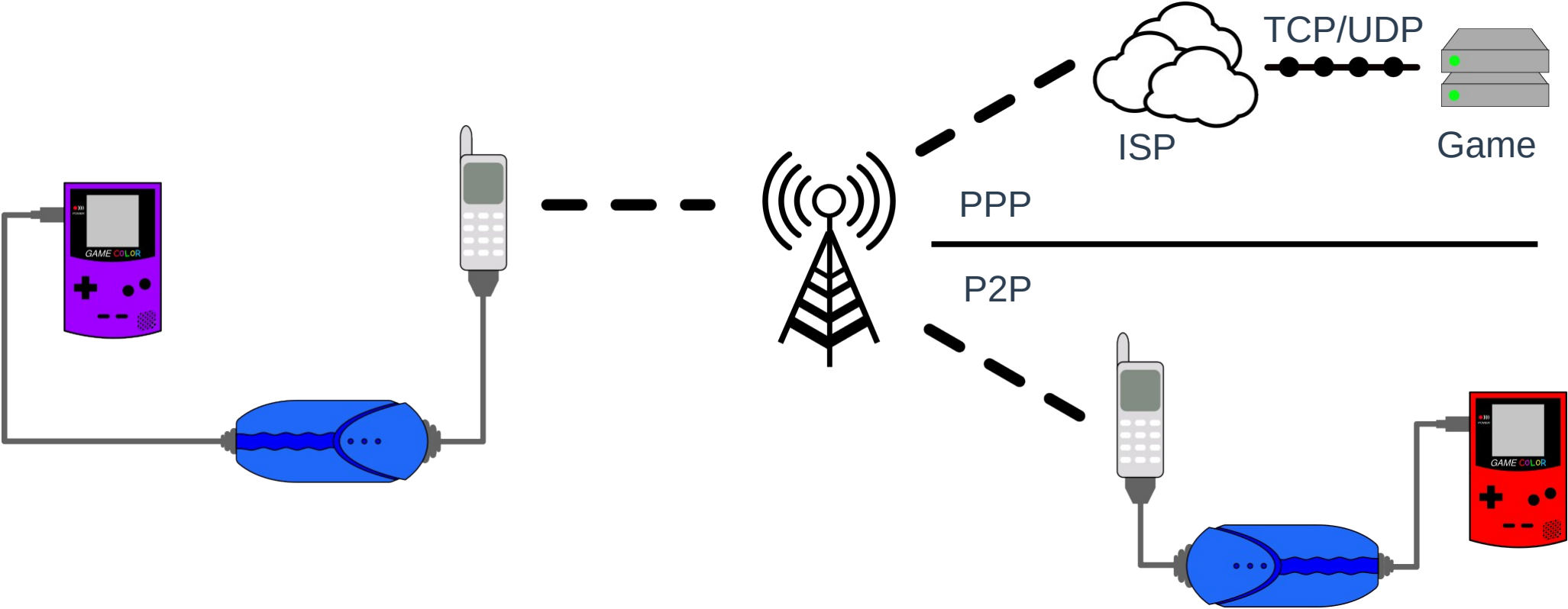


# The system

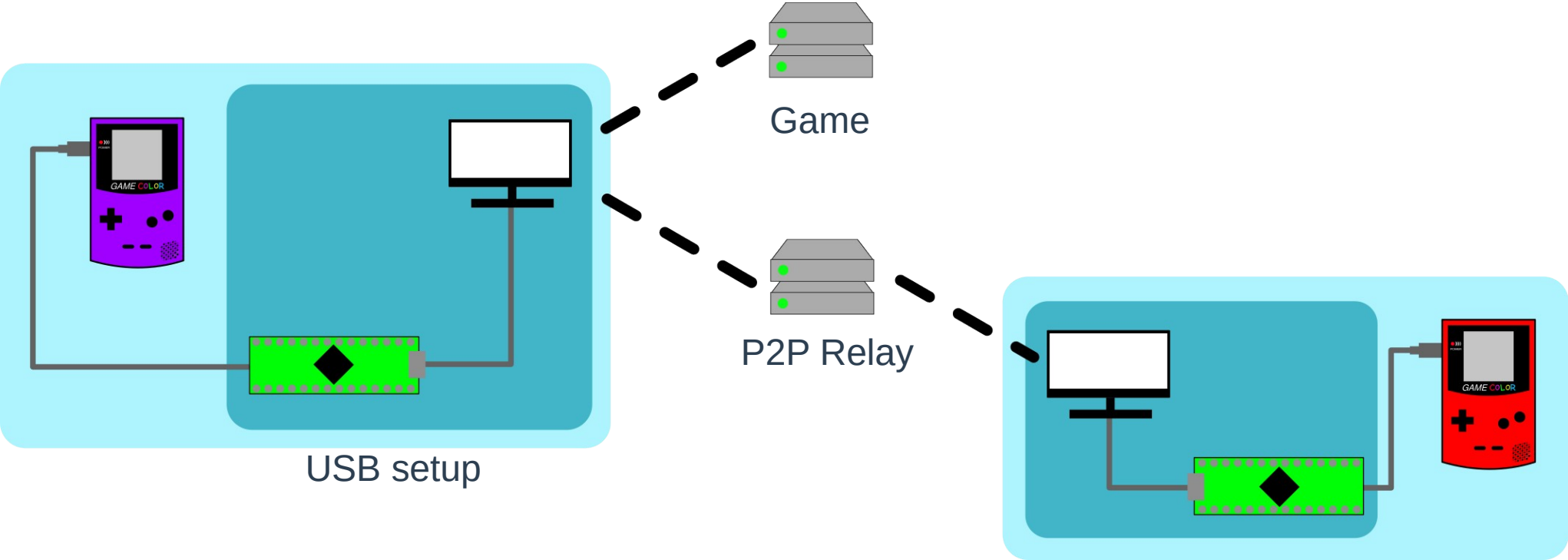
Work it. Make it. Do it. Makes us.



# The system: High-level overview



# The system: Emulated



# Emulation: Peripheral

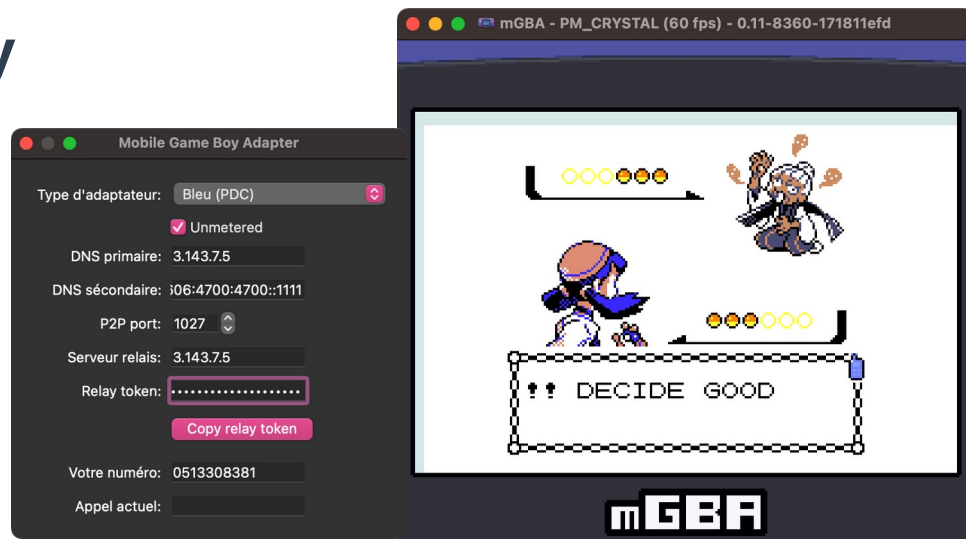


- **libmobile: callback-based library**

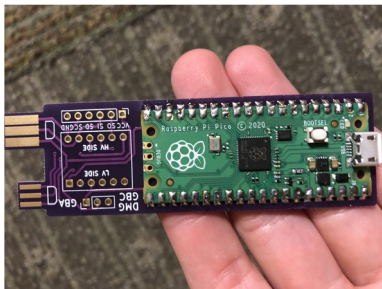
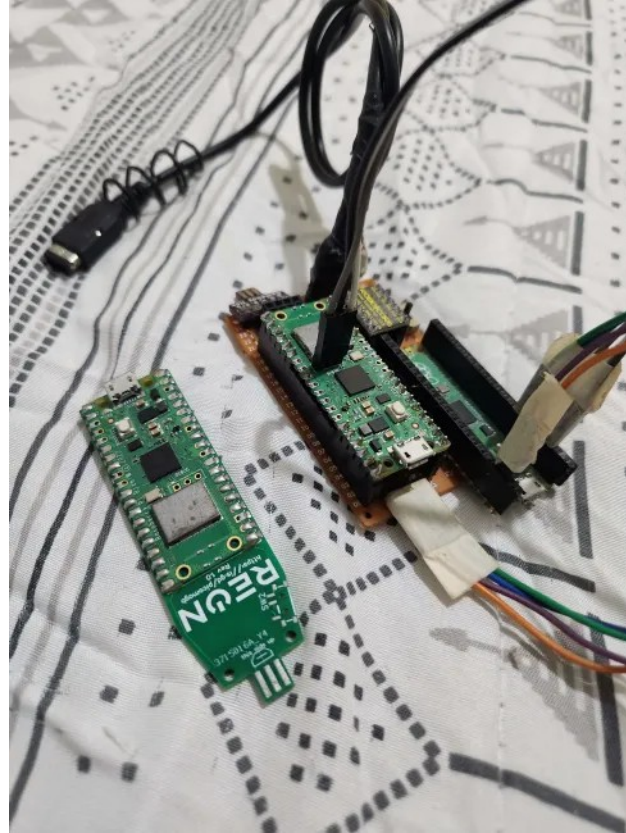
- BGB
- mGBA
- RP2040 (Raspberry Pi Pico)
- ATmega (Arduino Uno)

- **GBE+**

- **Complete documentation in Dan Docs**



# Emulation: Peripheral





# Emulation: Peripheral



# Emulation: Servers



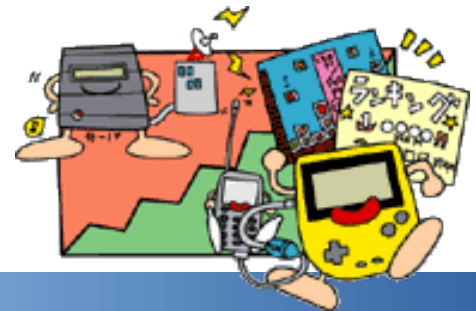
- **P2P: Relay server**
- **Mail server (SMTP, POP)**
- **Game servers**
  - Pokémon Crystal
  - Mario Kart
  - Monopoly EX





- **Game servers**

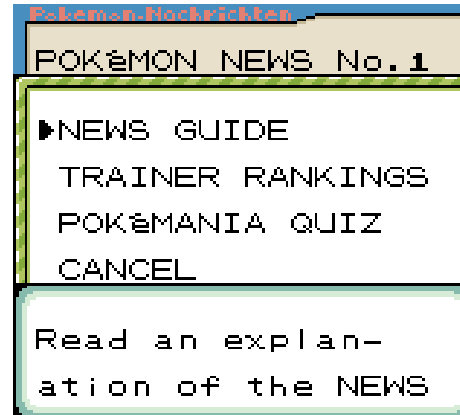
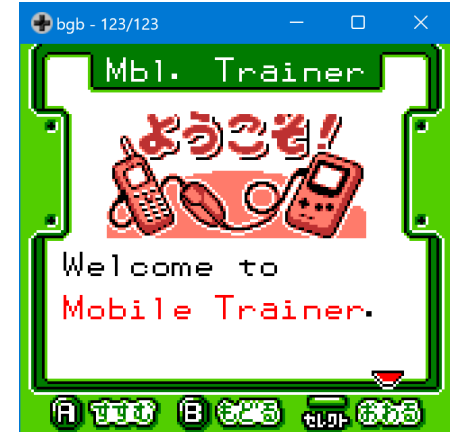
- Net de Get @ 100 (GBE+)
- Game Boy Wars 3 (GBE+)
- All-Japan GT Championship (GBE+)
- Hello Kitty's Happy House (GBE+)



# Translations



- **Pokémon Crystal**
  - All features restored
  - All 5 languages, all features
- **Mobile Golf** - @marc\_max
- **Mobile Trainer** - @TrEpToR







- **Adapter emulation: libmobile**
  - No dependencies, easy to reuse
  - <https://github.com/REONTeam/libmobile>
- **Server emulation: reon repository**
  - Infrastructure reused for most games
  - <https://github.com/REONTeam/reon>
- **Client library: MIA**
  - libma, decompilation of nintendo SDK



# Conclusion

# Links



<https://github.com/REONTeam>



<https://discord.gg/ceaFvwbkSJ>



<https://shonumi.github.io/>



# Diving deeper

Exploring the depths unknown

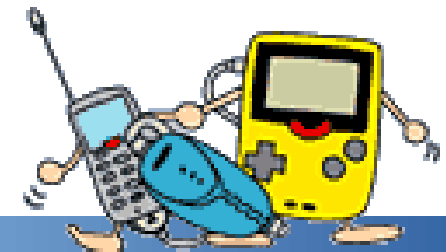
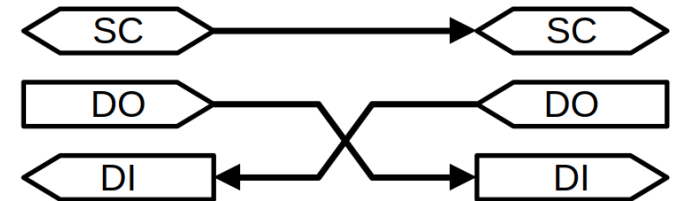
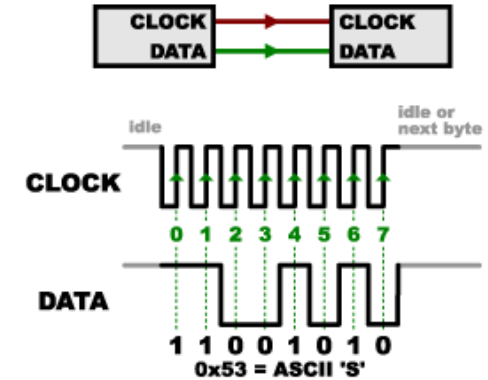


# Protocol: Basics



- Bidirectional serial data
- Request/response protocol

0x99	0x66	CMD	0
LEN		DATA	
DATA			
DATA		SUM	
DEV	ACK		



# Protocol: Command flow



```
>>> 10 Start session: NINTENDO
<<< 10 Start session: NINTENDO
>>> 19 Read EEPROM (offset: 00; size: 60)
<<< 19 Read EEPROM (offset: 00)
[... data ...]
>>> 19 Read EEPROM (offset: 60; size: 60)
<<< 19 Read EEPROM (offset: 60)
[... data ...]
>>> 12 Call (prot 0): #9677
<<< 12 Call
>>> 21 PPP connect (id: g11111111; dns1: 210.196.3.183; dns2: 210.141.112.163)
<<< 21 PPP connect (ip: 127.0.0.1; dns1: 0.0.0.0; dns2: 0.0.0.0)
```

Connect to ISP

```
>>> 28 DNS request: gameboy.datacenter.ne.jp
<<< 28 DNS request: 127.0.0.1
>>> 23 TCP connect: 127.0.0.1:80
<<< 23 TCP connect (conn 0)
>>> 15 Transfer data (conn 0)
GET /01/CGB-B9AJ/index.html HTTP/1.0
User-Agent: CGB-B9AJ-00

<<< 15 Transfer data (conn 0)
>>> 15 Transfer data (conn 0)
<<< 15 Transfer data (conn 0)
HTTP/1.0 200 OK

[ ... data ... ]
>>> 15 Transfer data (conn 0)
<<< 1F Transfer data end (conn 0)
```

HTTP request

```
>>> 22 PPP disconnect
<<< 22 PPP disconnect
>>> 13 Disconnect
<<< 13 Disconnect
>>> 11 End session
<<< 11 End session
```

Cleanup



# Protocol: HTTP endpoints



- **`/cgb/download?name=<path>`**
- **`/cgb/upload?name=<path>`**
- **`/cgb/utility?name=<path>`**
- **`/cgb/ranking?name=<path>`**

# Protocol: HTTP auth



- `crypt(md5(key + password) + userid)`

