

REWRITABLE STORAGE DEVICE FOR GAMEBOY

Grzegorz Romanowski

Secondary School Degree, Zespół Szkół Elektrycznych im. T.Kościuszki w Opolu

E-mail: greygor@o2.pl

Supervised by: Michał Podpora

E-mail: ravyr@klub.chip.pl

ABSTRACT

In this paper author describes cartridge for portable console GameBoy, in which data can be written (using a computer) and erased. He describes how to create it, use it, and possibilities that it gives.

1. INTRODUCTION

Portable consoles are very popular nowadays. Small, handheld device, usually powered by batteries, together with technical progress gets smaller and smaller and becomes more and more advanced. The first GameBoy had a monochrome display and a big casing. It was heavy because of the necessary power from many batteries. Consoles produced nowadays have color LCD displays, so they are handy and lightweight.

I was very interested, how does the console work. The most interesting was the reason why some of the games remember the result after turning the power off, and some of them don't.

Putting cartridge with a game in GameBoy's cartridge slot, in fact, we put in a memory chip, from which GameBoy reads the game. Memory in an original cartridge is read only (so after cutting the power off all results are lost, and after turning it on again, the game starts from the beginning). Construction of a cartridge is very simple and very often inside it the memory is implemented as an integrated circuit. Making the games more useful, inside such a cartridge there are two kinds of memories. One of them is a read-only memory, containing the code of a game, the second one – memory keeping the results. The second memory is held up by use of a small battery (embedded in the cartridge). Thanks to such a solution, it is possible to turn the console off, and later to continue the game on the same level as before.

2. THE PURPOSE

The purpose of the practical implementation was replacing the original memory with another one (which you can program and erase). The intention was to make such a cartridge, in which (with the use of a computer) your own game or application can be programmed to the memory. This enables the possibility of using a GameBoy to control another equipment.

3. CREATING THE CARTRIDGE

After preliminary analysis of literature, I found the basic information about construction of simple cartridges and some applications that can be written down to a cartridge. As well as using it in a GameBoy emulator.

I decided to use PCB from an original cartridge, because of small dimensions and high precision of copper tracks.

3.1. TOOLS AND PARTS

For making the practical implementation you need: an original GameBoy cartridge (working or damaged one), memory chip - EPROM 27C256, DIP socket for integrated circuit, about 100 cm of thin wire, solder, soldering iron, pinsetter, hot melt glue stick, hot melt glue gun, set of precise screwdrivers.

3.2. MODDING THE CARTRIDGE

After opening the cartridge, I soldered out the original memory. Then, I begun fitting up connector for the writable memory. Users ought to have free access to this memory. For these reason, memory has to be installed outside. In the original casing, I made oblong holes for the DIP socket pins. I attached this socket to the casing by hot melt glue, which made the joint aesthetic and very durable. Next, I soldered the socket's pins to the prepared PCB's connector (Figure 1). It is difficult not to make a short-circuit between tracks. After screwing off the casing, I tested the connections with a wire tester.

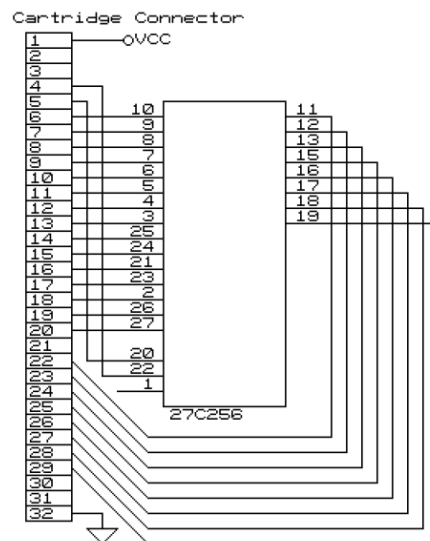


Figure 1: Connecting the 27C256 EPROM memory to the GameBoy's cartridge slot.

4. TEST AND RUN

For practical test, I had to program the EPROM memory. At first, I stucked the EPROM's glass window by a tape, and then, (using a "Picolo" programmer), I programmed an example game to the memory. After installing EPROM memory in the cartridge and putting it into the GameBoy, the memory was working - it was possible to play.

5. EVERYDAY USE

For using the cartridge you need:

- A PC computer,
- EPROM memory programmer,
- EPROM memory eraser (UV)

To program a game or an application to the cartridge's memory you must remove the EPROM chip and put it in programmer. Next, you must check if it is empty. If it is not empty, you must erase the data by sticking out the tape from the glass window and putting the memory into the EPROM eraser. After about 5 minutes check the content again. If memory is empty, you should stick the glass windows again. Now you can start the programming process. When the memory is programmed, all you have to do is to put it into the DIP socket of the cartridge. The application is ready for using.

6. CONCLUSIONS AND FUTURE WORK

I made a cartridge for portable console GameBoy, which enables the possibility to program and erase the data. It makes possible creation of my own games and applications.

But now it is still not enough for me. I plan to make a cartridge with bigger memory for my own applications.

In the future, I would like to make a special application, which could use GameBoy as a computer's CD-ROM drive - working as an audio CD player.