Ethernet experiment with ESP32 development board電子工作

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From the beginning, I had high hopes for the ESP32's Ethernet (wired internet connection), so I bought a LAN8720 PHY module on AliExpress and tried it out, but it didn't work out.
The reason is that to use the ESP32 Ethernet module, it is necessary to input a 50MHz PHY clock to GPIO0. As you know, GPIO0 is used to switch between normal startup mode and firmware rewrite mode by setting it High or Low at startup. This means that a function to stop the 50MHz clock at startup is required. In fact, this is how it is done in the circuit of the Olimex ESP32-GATEWAY board .

At that time, I gave up on using the LAN8720 PHY module and conducted experiments with the ESP-GATEWAY board, confirming that lwIP worked.

This time, I wanted to make a board that can use Ethernet with ESP32, and after doing some research, I found a sample program called ETH_LAN8720_internal_clock for ESP32 arduino. It seems that it can output 50MHz for PHY from GPIO17. I thought that I might be able to experiment by modifying the LAN8720 PHY module, so I tried it and it worked, so I'm reporting it here.

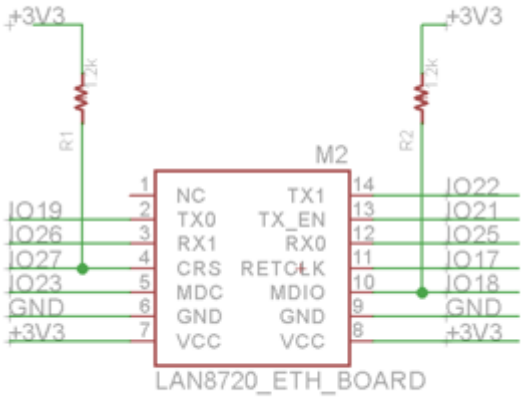
First, I need to stop the clock of the LAN8720 module. I thought I could do it by cutting the pattern, but I can't see the pattern. I should be able to figure it out by looking at the circuit diagram and tracing it from R12 and R14, but the part names are not written, so I don't know which are R12 and 14.

I gave up and decided to remove the oscillator. I thought I would need two soldering irons, but for some reason I only had one. I had no choice but to pull out the SMD Rework Station and remove it. I stopped using the soldering iron in the Rework Station because I bought the FX-888, but I often use the Hot Air. It's very convenient.



Call the example sketch "ETH_LAN8720_internal_clock" and compile it. For some reason, the definition of ETH_CLK_MODE overlaps with ETH.h, which causes a compilation error, so specify it directly as an argument to `setup()`the call `.ETH.beginETH_CLOCK_GPIO17_OUT`

After some trial and error, I modified the circuit and was able to successfully retrieve data from the Internet via Ethernet. The final circuit, or rather the connection between the LAN8720 PHY module and the ESP32, was as follows:



The IO connected to MDC and MDIO can be changed, but the others cannot be changed. It's a shame that DAC cannot be used because IO25 and IO26 are used.

You can buy the LAN8720 on Aliexpress for about $2. I think it's not bad to be able to experiment with the ESP32's Ethernet just by removing the oscillator, but what do you think?

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