

28C64/256 to 2364/32 adapter

instruction manual

Features:

- Replaces old 2364 and 2632 mask ROMs
- Accepts 28C64 and 28C256 EEPROMs, that are still being produced today
- A13 and A14 address lines available on a header, can be used for ROM switches
- Through hole components for easy soldering
- EEPROM in PLCC socket: Limits the height of the adapter, while the EEPROM can still be easily removed and reprogrammed in any programmer

Applications:

- Sinclair ZX80/ZX81
- Commodore VIC-20
- Commodore 64/128
- Commodore 1541
- Atari 800XL
- Atari 1050

EEPROM choices

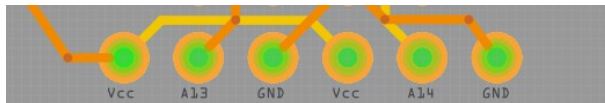
You can use either an 28C64 or 28C256 EEPROM with this adapter. In the latter case, you can attach switches to the adapter and install 4 different ROM images. A possible application for this adapter could for example be a Commodore 64 KERNAL switcher.

Using an 28C64 EEPROM

The adapter is out-of-the-box compatible with 28C64 EEPROMs, such as the AT28C64B from Microchip. Just insert the EEPROM into the PLCC socket and it will work.

Using an 28C256 EEPROM

If you would like to use an 28C256 ROM, such as the AT28C256 from Microchip, you will need to look at the 6 pin header connection on the adapter. Seen from the underside of the adapter it looks like this:



This header makes the A13 and A14 address lines of the EEPROM available. Next to these address lines are GND and 5V lines. If you install a standard jumper header, you can connect these address lines to either GND or 5V with a jumper. However, you can also connect these lines to SPDT or DPDT switches, in which case you can select between ROM images with external switches.

Using the adapter as a replacement for a 2364 mask ROM

The adapter is ready to use to replace a 2364 mask ROM. No modifications are necessary.

Using the adapter as a replacement for a 2332 mask ROM

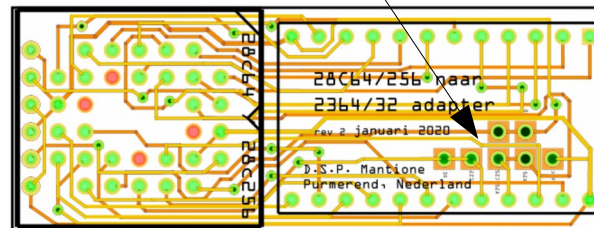
If you would like the adapter to act as a 2332 ROM, things become a bit more complex, because the 2332 mask ROM has two chip select lines. The second chip select line, CS2, uses the pin that is used for address line A12 (21) of the 2364 ROM.

This means that by default, CS2 is connected to line A12 of the EEPROM. In many computer implementations, CS2 is not actually used and connected to 5V. In such case A12 of the EEPROM will always be high and thus the upper 4KB of a 28C64 EEPROM will be used. This is for example the case in the Commodore 64, where the adapter can be used as is to replace the character ROM.

In case of a computer where both chip select lines are actually used, some modifications are required. 28Cxxx EEPROMs have two enable lines: CE and OE, which are comparable, but not exactly the same as chip select lines. The difference is that when the CE line is high, the chip enters a low power state, from which it will recover more slowly than when the OE line is high. Because this adapter will be used in old computers, where speeds are low, it should be acceptable to use OE as CS1 and CE as CS2.

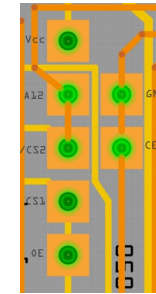
This adapter is not useful for situations where full performance of the EEPROM is desired in order to replace a 2332. In such case an AND gate would be required in order to AND CS1 and CS2. Because 2332 ROMs are used in slow old computers, it is not expected that you will encounter such a situation.

There is an area on the adapter with connection pads, that are connected by default with PCB traces:



This adapter connects CE by default to GND and OE to CS1. This means that the EEPROM is never in power save mode. Its power consumption is already way lower than old mask ROMs, after all.

This connection is made between the two pads on the right side:



You can cut this trace in order to break the connection between CE and GND. Note that the trace is on the top side of the adapter. You will also want to break the connection between A12 and CS2. This connection is made in the two pads left of this. (The connections are on the underside of the adapter.)

You can reconnect line A12 of the EEPROM to either GND or 5V, depending on whether you want to use the lower or upper 4KB. Pads that carry both have been placed nearby.

A pad that connects to CE of the EEPROM has been placed close to a pad carrying CS2, so both can be easily connected to each other.

Schematic of the adapter:

