

SRBP-PRO-Z80 Theory of Operation v1.0

The SRBP-PRO-Z80 is a simple solution intended to replace a series of smaller EPROMS with a single 27512 EPROM on a Z80 based system. It is designed to plug directly in the systems Z80 CPU socket. A 27512 can store enough data to cover the entire address space of a Z80 CPU.

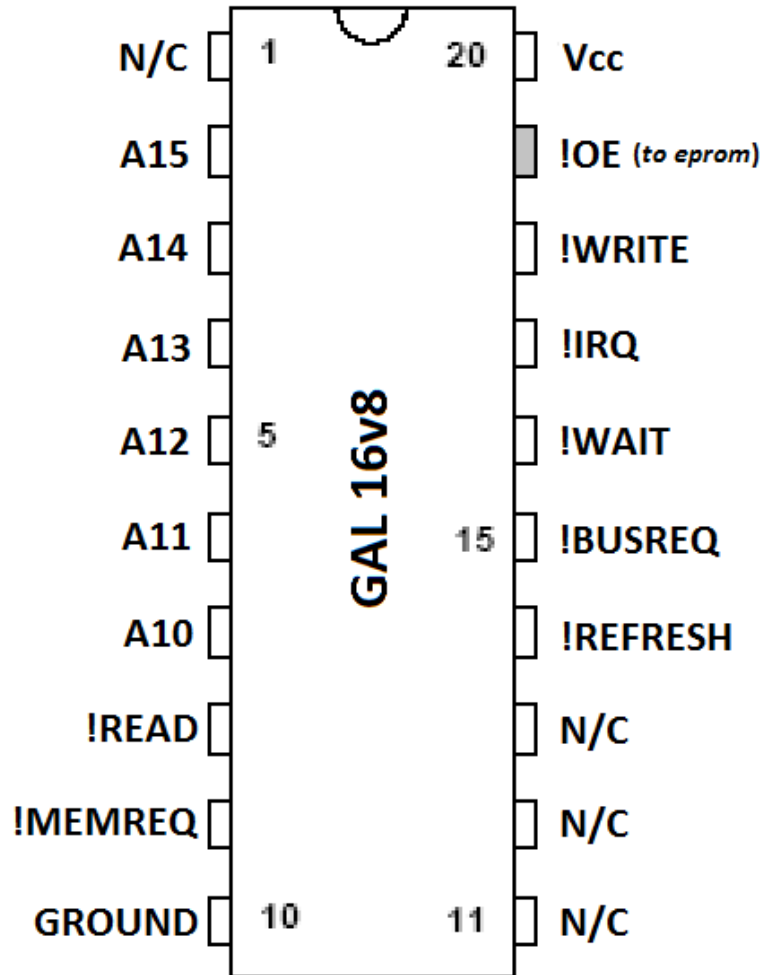
To allow for replacing the original ROMs. The SRBP-PRO contains a socket for a 27512 EPROM and a socket for a GAL16V8. The theory of operation is that the original systems ROMs should be removed, and the original EPROM data should be copied from the original ROMS and burned into a 27512 at the addresses* that they are expected in the memory map of the original system. The 16 address lines from the CPU are wired DIRECTLY to the 27512 EPROM. So the EPROM can provide data at any requested address from 0x0000 – 0xFFFF.

The purpose of the GAL16V8 is to provide the chip select logic to tell when the 27512 to output a response to memory requests. Basically, the GAL16V8 receives as input address lines A10 – A15 as well as some of the CPU control lines. Based on the address lines and the CPU control lines the system implementer programs the GAL to provide the /OE output signal on pin 19 that is run to the 27512. As the system implementer your main job is to create the logic for the GAL to output GROUND on pin 19 whenever a ROM provided address is requested AND ONLY when a ROM provided address is requested. At all other times pin 19 should be HIGH to put the EPROM in high impedance mode. If the GAL logic is not correct and pin 19 is set low for ranges that are NOT ROM ranges, then the system will not work correctly.

** Some systems “mirror” EPROMs at multiple memory addresses, for example EPROM A might exist at 0x0000 – 0x1FFF AND 0x4000 – 0x4FFF. When that is the case the EPROM data should be copied into both memory regions on the 27512.*

The following picture indicates which address lines and CPU control lines are run to the GAL16V8. All pins are inputs EXCEPT pin 19 (!OE) which is an output that goes DIRECTLY to pin 22 on the 27512. Pin 20 on the 27512 is permanently wired to ground so the chip is always “powered” on, but only outputs when pin 22 on the 27512 (or pin 19 on the GAL16V8) goes low.

SRPB-PRO-Z80



Installation instructions

- Assemble the SRBP-PRO-Z80
- Remove the Z80 CPU from the original system CPU socket
- Insert the Z80 CPU into the SRBP-PRO-Z80's CPU socket
- Remove all the EPROMs that you wish to replace from the original PCB
- Copy the EPROM contents and burn it onto the 27512 at the expected memory ranges, duplicating if the original system "mirrors" any of the ROM ranges
- Insert the programmed 27512 into the 27512 socket of the SRBP-PRO-Z80
- Create the output enable logic, and program a GAL16V8
- Insert the GAL16V8 into the 20 pin socket on the SRBP-PRO-Z80
- Insert the completely assembled and populated SRPB-PRO-Z80 into the system CPU socket

Below is example logic for using a SRPB-PRO-Z80 to replace the ROMS on a Midway pacman.

```
Name  pacman ;
PartNo 00 ;
Date   3/3/2017 ;
Revision 01 ;
Designer Brian Brzezicki ;
Company Paladin Group, LLC ;
Assembly None ;
Location ;
Device  virtual ;

/* ***** INPUT PINS ***** */
PIN 9  = not_memreq;
PIN 8  = not_read;
PIN 2  = a15;
PIN 3  = a14;

/* ***** OUTPUT PINS ***** */
PIN 19 = not_oe;

not_oe = ! OE;
OE = !a15 & !a14 & MEM_READ;
MEM_READ = (! not_read) & (! not_memreq);
```