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***Corsham Technologies, LLC***

*www.corshamtech.com*

*617 Stokes Road, Suite 4-299*

*Medford, NJ 08055*

**SS-50 Motherboard**

# Introduction

Thank you for buying our SWTPC 6800 compatible motherboard!

Is this board vintage? Well, it was designed in 2014, so technically it is not. However, it uses a design very similar to the original SWTPC motherboard using parts available at that time.

# Features

The motherboard is very similar to the SWTPC MP-B2 motherboard but is smaller and has fewer slots. Given the high density of modern memory chips, not as many memory boards are required to “max out” a system.

Features include:

* Two SS-50 slots fully compatible with the MP-B2 motherboard.
* Two SS-30 I/O slots fully compatible with the MP-B2. The slots may be set to any slot address from 0 to 7.
* I/O decode logic that decodes four I/O addresses per slot.
* Tighter decoding: only 1K is allocated for I/O ($8000-$83FF) leaving more memory space for other uses.
* Power good indicator LEDs.
* Connections via screw terminals or plugs so no soldering is required.
* On-board RESET switch and a connector for an external switch.
* Expansion connectors for addition of more SS-30 and SS-50 slots.

Circuit boards are priced based on the number of square inches, thickness of the board, number of holes and other factors. This board is large and thick, so it’s fairly expensive to produce in small quantities.

# Hooking It Up

## Power

You will need an external +8 volt power supply, and possibly external +12 and -12 supplies if any of your boards need those voltages. None of the Corsham Technologies boards need anything other than +8. How much current? That depends on what you install, but with one of our serial boards, a 6800 CPU and 64K, the total current consumption is still under 750 ma.

There are three “power good” indicator LEDs on the motherboard, along with a jumper to remove +8 from the on-board 5 volt regulator. Please follow these steps to connect the power supplies:

1. Turn off the power supplies!
2. Connect the common rails from all supplies to the GND screw terminals on the motherboard. All of the terminals with the same names are connected together so it doesn’t matter which you use.
3. Remove the jumper labeled ENABLE 8V located near the voltage regulator in the middle of the board.
4. Turn on the power supplies.
5. The LED for each connected supply should come on; if not, check your connections.
6. Once all three LEDs are on, turn off the power supplies.
7. Put the ENABLE 8V back on.

## I/O Connectors

The next step is to properly jumper your SS-30 connectors for the desired slot. The original SWTPC motherboard had all eight slots but ours has two, so you need to select which two they are.

The console adaptor is normally installed in slot 1, so set one of the jumpers to the “1” position and install your MP-S or MP-C board there. It doesn’t matter what position the jumper for the other slot is set to.

## Reset

There is a reset button on the motherboard to the left of the power connectors. There is also a connector for use with a front-panel reset switch. Simply shorting those two pins forces a reset of the system.

# Expansion Connectors

While two SS-30 I/O slots and two SS-50 slots are enough to build a working system, it is highly likely users of the motherboard will want to eventually have more slots. This is especially true if you are using genuine SWTPC memory boards which had 8K each, so filling the lower 32K with RAM requires four boards.

To allow users to expand their systems we have included expansion connectors for both the SS-30 and SS-50 buses so plug-in expanders can be added. As of this writing, those boards are not available but they have been in the planning stages since the motherboard was originally thought out.

SS-30 Expansion Pins

A single 40 pin plug labeled EXP I/O handles the SS-30 bus.

|  |  |  |
| --- | --- | --- |
| Pin | SS-30 Pin | Definition |
| 1 | 1 | UD-3 |
| 2 | 2 | UD-4 |
| 3 | 3 | -12V power |
| 4 | 4 | +12V power |
| 5-8 | 5-6 | Ground |
| 9 | 7 | Index – not actually connected |
| 10 | 8 | /NMI |
| 11 | 9 | /IRQ |
| 12 | 10 | RS0 |
| 13 | 11 | RS1 |
| 14 | 12 | D0 |
| 15 | 13 | D1 |
| 16 | 14 | D2 |
| 17 | 15 | D3 |
| 18 | 16 | D4 |
| 19 | 17 | D5 |
| 20 | 18 | D6 |
| 21 | 19 | D7 |
| 22 | 20 | /Phase 2 |
| 23 | 21 | R/W |
| 24 |  | unused |
| 25-28 | 22-23 | +8V power |
| 29 | 25 | 600 Baud |
| 30 | 24 | 1200 Baud |
| 31 | 27 | 150 Baud |
| 32 | 26 | 300 Baud |
| 33 | 29 | /RESET |
| 34 | 28 | 110 Baud |
| 35 | 30 | /SELECT\_2 |
| 36 | 30 | /SELECT\_3 |
| 37 | 30 | /SELECT\_4 |
| 38 | 30 | /SELECT\_5 |
| 39 | 30 | /SELECT\_6 |
| 40 | 30 | /SELECT\_7 |

You will notice that there are six /SELECT signals. Since there are two SS-30 connectors on the motherboard, those are meant to be slots 0 and 1 while the other six slots are on the expansion board.

SS-50 Expansion Pins

The main SS-50 bus is handled by a pair of 30 pin connectors.

Connector EXP A:

|  |  |  |
| --- | --- | --- |
| Pin | SS-50 Pin | Definition |
| 1-2 | 28-30 | +8 V |
| 3-6 | 25-27 | Ground |
| 7 | 23 | A1 |
| 8 | 24 | A0 |
| 9 | 21 | A3 |
| 10 | 22 | A2 |
| 11 | 19 | A5 |
| 12 | 20 | A4 |
| 13 | 17 | A7 |
| 14 | 18 | A6 |
| 15 | 15 | A9 |
| 16 | 16 | A8 |
| 17 | 13 | A11 |
| 18 | 14 | A10 |
| 19 | 11 | A13 |
| 20 | 12 | A12 |
| 21 | 9 | A15 |
| 22 | 10 | A14 |
| 23 | 8 | /D7 |
| 24 | 7 | /D6 |
| 25 | 6 | /D5 |
| 26 | 5 | /D4 |
| 27 | 4 | /D3 |
| 28 | 3 | /D2 |
| 29 | 2 | /D1 |
| 30 | 1 | /D0 |

Connector EXP B:

|  |  |  |
| --- | --- | --- |
| Pin | SS-50 Pin | Definition |
| 1-6 |  | Unassigned |
| 7 | 50 | 1200 Baud |
| 8 | 49 | 600 Baud |
| 9 | 48 | 300 Baud |
| 10 | 47 | 150 Baud |
| 11 | 46 | 110 Baud |
| 12 | 45 | /HALT |
| 13 | 44 | /PHASE 1 |
| 14 | 43 | BA |
| 15 | 42 | /RESET |
| 16 | 41 | R/W |
| 17 | 40 | /VMA |
| 18 | 39 | /PHASE 2 |
| 19 | 38 | UD 2 |
| 20 | 37 | UD 1 |
| 21 | 36 | /IRQ |
| 22 | 35 | /NMI |
| 23 | 34 | /M.RESET |
| 24 |  | Unassigned |
| 25-26 | 32 | +12 V |
| 27-28 | 31 | -12 V |
| 29-30 | 28-30 | +8 V |

# Go Spurs!

All of our circuit boards have something unusual on them, and since SWTPC was in San Antonio, it seemed the city would make for some interesting additions. Fortunately, I have a friend who is a native of San Antonio, so I asked Suzanne for some ideas or else I’d resort to Googling for something appropriate. A short email with *Go Spurs!* provided all I needed.

# Why This?

Back when SWTPC was around, I was a teenager without much money to spare. I got their catalogs and was intrigued by their inexpensive kits and simple designs that could be assembled by average people. The entry point for a working system was a bit beyond my means, so I ended up with a KIM-1 instead.

Years later, I have my own company that has been making Apple/Franklin and KIM-1 expansion boards and one night I decided it was within my abilities to make a clone of the original SWTPC machine. By using some parts available now, the design can be simplified.

*Bob Applegate*

*May 2014*

# Revision History

|  |  |
| --- | --- |
| Version | Changes |
| A | Initial Beta. |
| B |  |
| C |  |
| D |  |

# Errata