

RC2014 Pro – Homebrew Z80 Computer Kit Assembly Tips

Having received my RC2014 Pro Kit in the mail I noticed a lack of information included in the kit. Specifically, assembly instructions. However, since this kit was meant for electronics enthusiasts that have some knowledge of working with electronics it made sense not to have to include any instructions. It just makes the process more enjoyable to “figure out” things as you go.

Plus, there is information online for most every module to assist in the assembly. HOWEVER, there were things I wish I knew prior to assembly that would have made my troubleshooting much easier. And this article is a culmination of my searches (after the fact,) that would have made things much easier.

Modules

As you know you get six modules with the RC2014 Pro. They are:

1. [z80 2.1 CPU Module](#)
2. [Pageable ROM Module](#)
3. [64k RAM Module](#)
4. [Dual Serial SIO/2 Module](#)
5. [Compact Flash Storage Module](#)
6. [Dual Clock Module](#)

But you only get FIVE double row Right Angle headers (or Enhanced Bus Connectors.) The sixth is a single row header. The single row header is used for the Compact Flash (CF) Storage Module. It looks confusing when you look at the schematics because they all show the enhanced bus. But the CF Module does not use this bus and therefore only needs the single row header.

Additionally, there is a great article on preparing the Enhanced Bus Connectors that I could have used before I broke one of my double row connectors. You can find a link to “[Preparing Enhanced Bus Connectors](#)” (just CTRL-CLICK, to follow the link.)

The Dual Clock Module you have two rows of headers to select the clock speed at the top of the module. After soldering (I think,) a couple hundred connections, I found it easier to just solder the 7.3728 header in as I was not planning on using any of the other clock speeds initially.

The Pageable ROM module you will notice that there are no values on the silkscreen to denote what resistor values to use. In fact, the schematic does not list the values either. I only found out after assembling the other modules and having five 10k ohm resistors left for this board.

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Jumper settings

Since the ROM module I received had the label of “24006000”, it was unclear at first what type of ROM I had. Then peeling back the label I found it was an AMTEL AT27C512R-45PU which is a 512K (64K x 8) EEPROM. Organized into 64K x 8 bits, or in other words having available 8 each 8K banks.

Then I discovered the [Decoding ROM Labels](#) page but it was still a bit confusing. I was looking at the Address, A15, A14, A13, ROM Label; table and it wasn't making sense. Then after Spencer and I exchanged emails, it finally made sense. Looking below the table he mentions each DIGIT (on the ROM label,) represents what is in that particular 8k bank. So, 24006000, means:

2 – Microsoft BASIC, for 32k RAM, SIO/2, with origin 0x0000

4 – Microsoft BASIC, for 56k RAM, SIO/2, with origin 0x0000

0 – Empty bank, available for user to program

0 – Empty bank, available for user to program

6 – CP/M Monitor, for pageable ROM, 64k RAM, SIO/2, CF Module at 0x10, with origin at 0x0000

0 – Empty bank, available for user to program

0 – Empty bank, available for user to program

0 – Empty bank, available for user to program

Therefore, the jumpers for the **ROM module** would be set up as:

A10 – No Connection/Jumper

A11 – No Connection/Jumper

A12 – No Connection/Jumper

A13 – LOW

A14 – LOW

A15 – HIGH

With the PAGE size set to 8K (looking at the jumpers from left to right, they would be:

LOW, LOW, HIGH, HIGH, HIGH

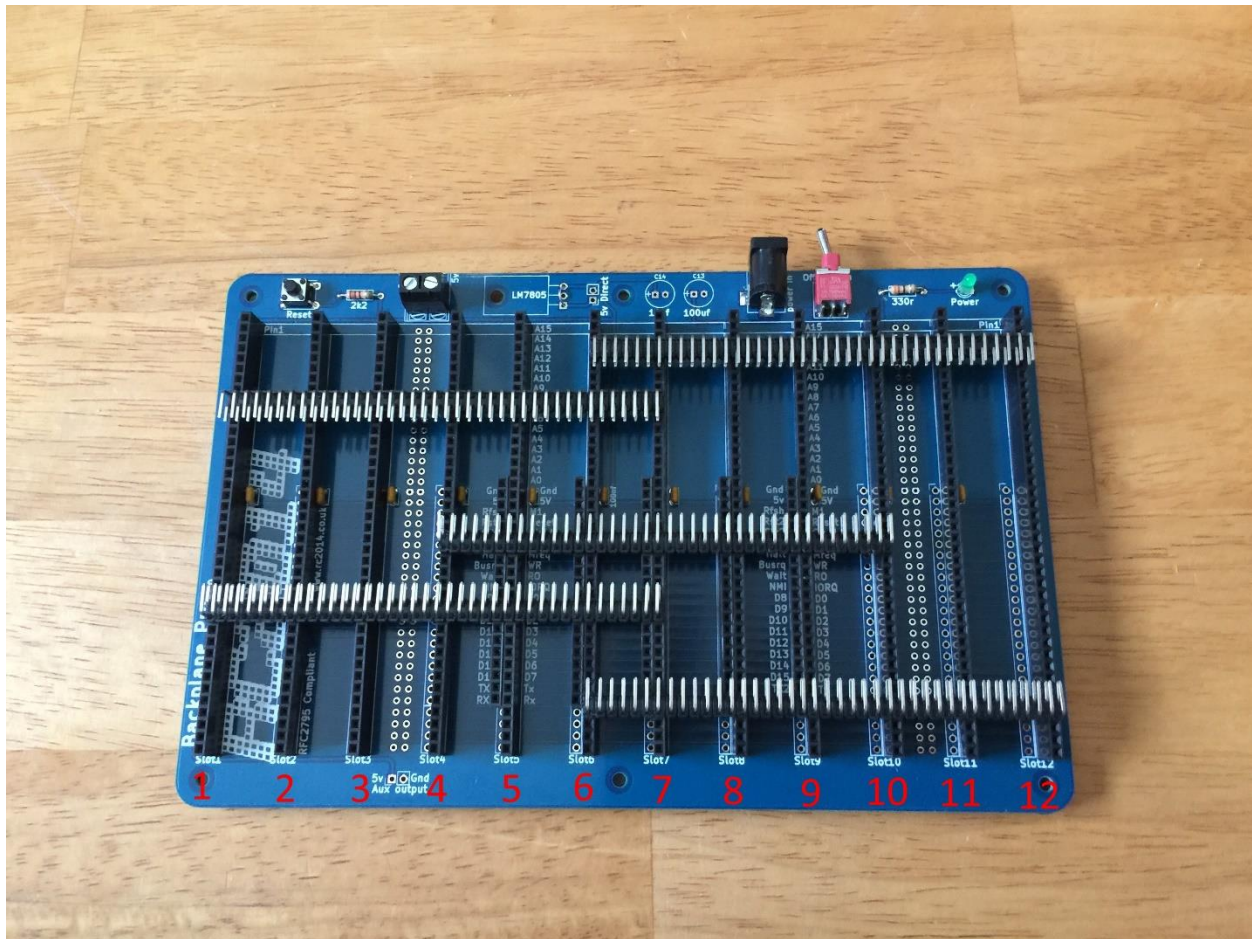
For the **RAM Module** set all jumpers to the RIGHT using the starting address 0000.

The above settings are to enable you to use the CP/M system and CF Card.

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Backplane Pro

The header sockets for this board can be a pain to ensure that they are straight and aligned on the board properly for soldering. Trying to place the socket on the board and then flip it over for soldering was the most difficult part of the whole assembly process. During my attempt, the sockets would rock from side to side and I found a couple of them were at a slight angle. I found a post on the RC2014 Google Group from [AstroBob](#) that has the following picture:



He plugged the headers in as shown above to hold them in place for soldering. This also had the advantage to keep the extended headers flushed up against the primary header sockets. Keep in mind that you don't have to plug the headers all the way into the sockets. Just enough to hold things in place will do.

Keep in mind that the expanded header sockets are in slots 5 through 9. In one other post on the forums it was suggested to have the modules located as follows:

SLOT	Module
4	Compact Flash Module
5	Z80 2.1 CPU Module
6	64k RAM Module
7	Pageable ROM Module
8	Dual Serial SIO/2 Module
9	Dual Clock Module

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Solder used

Being that this was my first major soldering project I was trying to figure out what would be the better solder to use. I had a couple of various tubes of solder from Radio Shack®. One being a Lead Free tube (99.3% Sn [Tin], 0.0008% Ag [Silver], 0.7% Cu [Copper]), and another being Silver Bearing (96% Tin, 4% Silver) solder. **But I settled on** 0.032" Diameter SN63 PB37 (63% Tin, 37% Lead) No Clean Flux Solder. Also, the solder tip temperatures are most commonly between 315-343° Celsius for this type of solder. I used about 325° C for my purposes. One thing to also consider is to make sure to keep your tip clean after every five to ten solder points. And make sure to heat each pad connection properly to allow the solder to flow into the pad. I had a few that had minimal solder and had to go back to retouch them up.

Lastly, when I was soldering the rows of pins, oriented the board flipped to mirror the above picture from AstroBoy. I tended to place my solder tip on the top side of the pad (as I was facing the board,) and bring my solder in from the bottom or to one side of the pad. This allowed me to start at the pad closest to me and work my way AWAY from me. This helped prevent bridging solder between the pads as I soldered, since my soldering iron would be away from the pad I previously soldered.

Terminal

I have many terminal programs (PuTTY, MobaXterm, YAT to name a few,) but I was referred to one called [Tera Term](#) that works like a charm. After starting the program, you can go to "Setup->Serial Port" and set the Port, Baud (115200), and Flow control (hardware). If you are planning on pasting in the HEX files that use the DOWNLOAD.COM program, you can set the "Transmit Delay" to 1 msec/char and proceed with your downloads. Then go to "Setup->Save Setup" to save your settings.

Conclusion

That's it for my suggestions. I am sure there will be more but hopefully, these will help make your assembly more enjoyable, and trouble free