

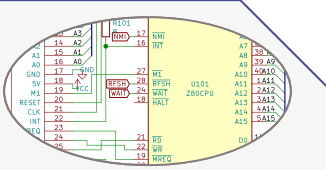
### Introduction

The Mini II is a Z80 based SBC retro computer kit. It consists of a Z80 CPU, 32k RAM, 16k banked ROM, serial I/O and a 7.3728MHz clock all on a single PCB. Once assembled it can run BASIC, FORTH or Z80 Assembly Code through a terminal emulator.

The RC2014 Mini II is an evolution of the original RC2014 Mini, featuring improvements such as power-on reset, better electrical design, easier assembly, pageable ROM and an RC2014 Enhanced Bus expansion socket that can connect it to Standard Bus or Enhanced Bus modules.



Full schematic available at  
<https://rc2014.co.uk>  
or last page if viewing  
this doc digitally



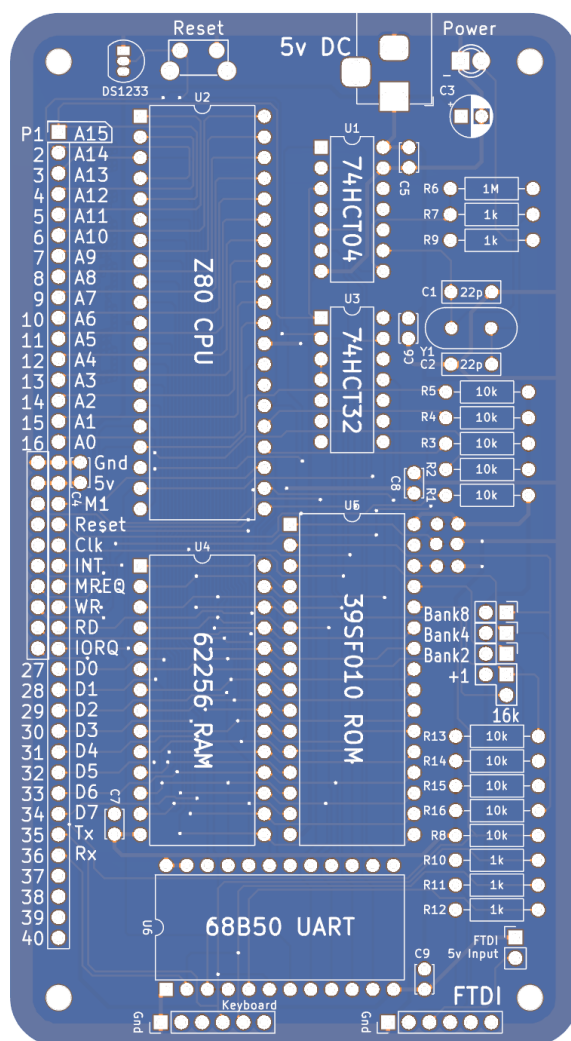
### Kit's content

The contents of the kit are supplied in several packages grouped into similar components

1 x RC2014 Mini II PCB	1 x RA tactile switch
1 x 40 pin wide DIL socket	1 x 7.3728 MHz Xtal
1 x 32 pin wide DIL socket	1 x DS1233-5+
1 x 28 pin wide DIL socket	2 x 22pf ceramic cap
1 x 24 pin wide DIL socket	6 x 100nf
2 x 14 pin narrow DIL socket	5 x 1k resistor
1 x 40 Way SIL socket	10 x 10k resistor
1 x 10 Way SIL socket	1 x 1M resistor
1 x 6 Way SIL socket	1 x 74HCT04
1 x 6 pin RA header	1 x 74HCT32
1 x 2 pin RA header	1 x Z80 CPU
1 x 5x2 RA header	1 x ST39SF010
4 x jumper	1 x 62256 RAM
1 x 2.1mm power jack	1 x MC68B50
1 x 3mm green led	1 x USB barrel lead

Optionally if your kit was ordered with a laser cut enclosure, it will also include

1 x lasercut top plate	4 x 6mm M3 screws
1 x laser cut lower bumper	4 x 12mm M3 screws
4 x 10mm M3 threaded spacers	



Resistors, crystals, and ceramic capacitors have no 'polarity'. That is, they can be soldered in any direction. Pay attention to polarity for LEDs, diodes, and electrolytic capacitors that normally have an indication on the soldering direction





You do not need to fit the expansion bus headers at this stage unless you have modules to plug in or the CP/M Upgrade Kit to fit.

Leaving them off now gives you the option of fitting right-angle headers sockets or pins that might work out better for backplane options.

Fit the 40 pin socket for the RC2014 Standard Bus and the 10 pin socket for the RC2014 Enhanced Bus. The 10 pin socket needs to be sat flush with the 40 pin socket.



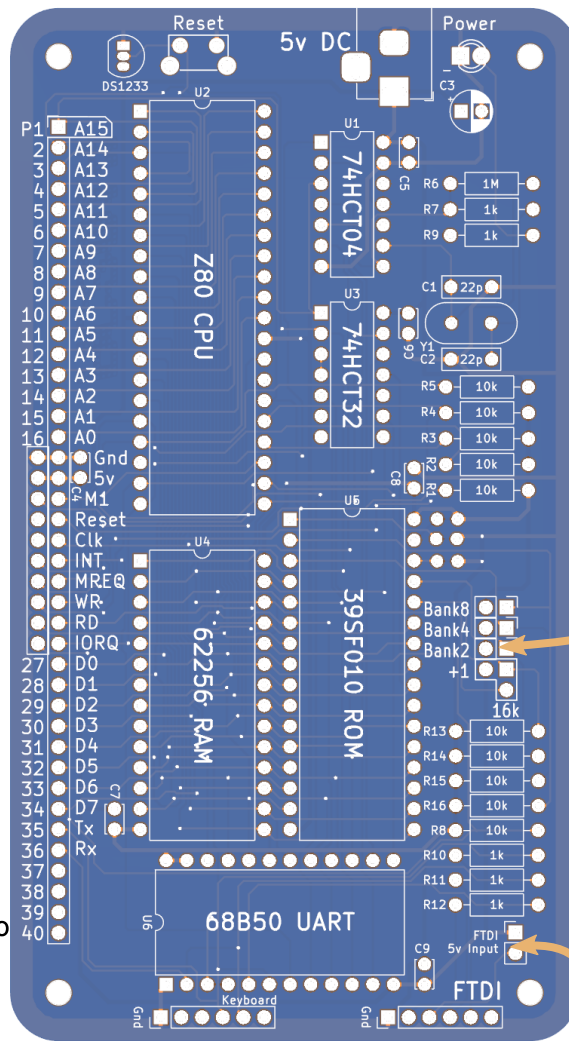
The 6 pin keyboard socket is optional and only required if you will be using the corresponding keyboard

Inspect your work carefully, ensuring there are no shorts, missed or bad solder joints and that the component leads are trimmed.

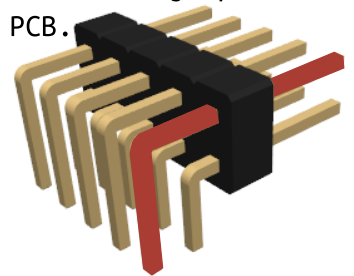
To insert the ICs you will need to bend the legs in slightly. Hold the ends of the chip body firmly in one hand and roll it slightly on a hard surface so that the legs bent up at right angles to the body. Push them in to their corresponding sockets ensuring the correct chip goes into the correct socket and the orientation is correct.



When placing the ICs in the sockets, make sure that the notch on one of the narrow sides matches the notch on the component's silkscreen outline



To prepare the 5x2 right angle header, remove the top right pin when looking at it from the angle side. Use a pair of pliers to pull it straight back whilst holding the plastic part. This should now line up exactly with the ROM Selection jumpers on the PCB.

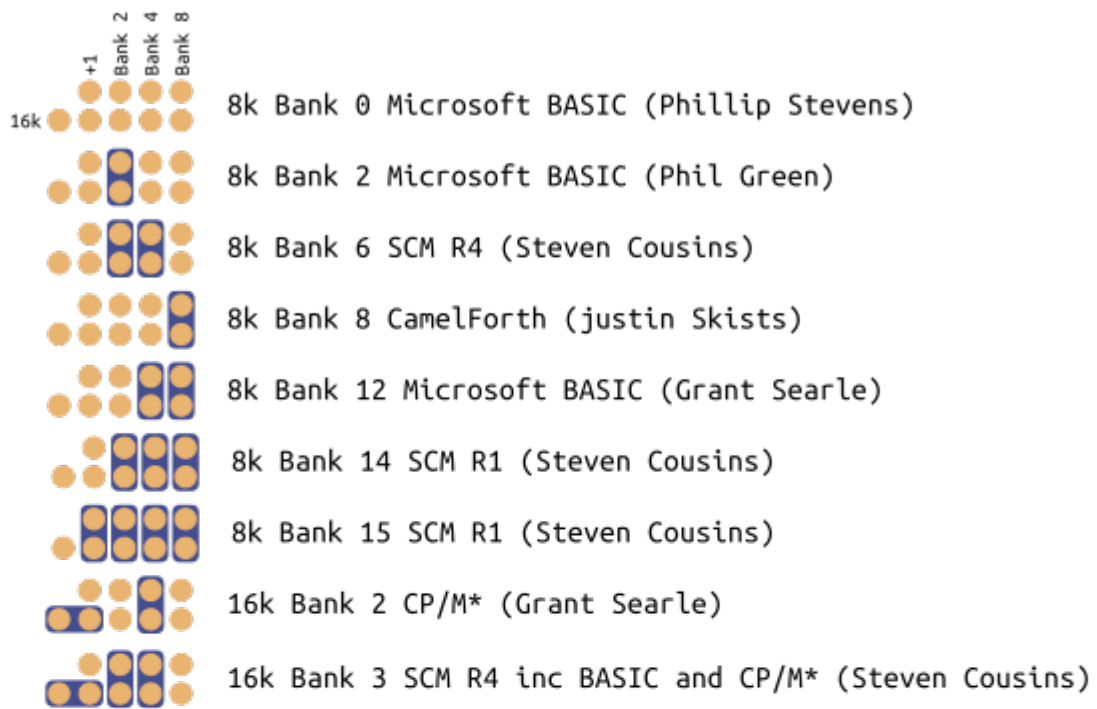


Fit the 2 pin right angle header for the FTDI 5v Input with the pins pointing to the outside of the board. Fitting a jumper to this before soldering will help keep it level.


Fit the 6 pin right angle header for the FTDI with the pins pointing to the outside of the board.

# ROM Selection

The RC2014 Mini II has a 128k ROM which is logically divided into 8k and 16k banks with the option to select which bank via jumpers. The right 3 jumpers select which 16k bank is used and the left hand jumper can be omitted (lower 8k bank), vertical (upper 8k bank) or horizontal (full 16k bank).




\* CP/M Requires additional hardware



Tl;DR Leave all the jumpers off and you'll boot in to BASIC

Fit all jumpers vertically and you'll boot in to SCM




The ROM has a sticker on it indicating what firmware was loaded onto it. Decoding information is here:

<https://rc2014.co.uk/1515/decoding-rom-labels>


## First power-up!

For power either use the jack with 5V or use the FTDI cable by putting a jumper on the 2-pin FTDI Power header of the RC2014 Mini II. When power is applied the green LED on the Mini PCB will turn on. Now connect the FTDI cable, matching the black cable to the Gnd pin on the FTDI header.

Connect the FTDI cable to a computer and launch your favourite terminal emulator (putty, minicom, tera term etc). Set the appropriate port to 115200bps and 8-N-1. Press the reset button and you should get a welcome screen.



Never power the RC2014 Mini II from both the power jack and the FTDI cable!



Official FTDI colours are

- \* Black GND
- \* Brown CTS
- \* Red VCC
- \* Orange TXD
- \* Yellow RXD
- \* Green CTS

You may need to match the signals if you have different colours

## 8k Bank 0 - Microsoft BASIC

This is an enhanced version of Microsoft BASIC that was originally written for the Nascom 2. For links to the manual and to the enhancements see the rc2014 website.

```
RC2014 - MS Basic Loader
z88dk - feilipu
Cold | Warm start (C|W) ? C
```

Press C

Press ENTER

Start typing BASIC :)

```
Memory top?
Z80 BASIC Ver 4.7c
Copyright (C) 1978 by Microsoft
31948 Bytes free
Ok
10 for a=1 to 5
20 print "RC2014 is cool"
30 next a
run
```

## 16k Bank 3 - SCM R4

Type ?  
for list  
of options

Small Computer Monitor - RC2014

\*?

Small Computer Monitor by Stephen C Cousins (www.scc.me.uk)  
Version 1.0.0 configuration R4 for Z80 based RC2014 systems

Monitor commands:

A [<address>]	= Assemble	D [<address>]	= Disassemble
M [<address>]	= Memory display	E [<address>]	= Edit memory
R [<name>]	= Registers/edit	F [<name>]	= Flags/edit
B [<address>]	= Breakpoint	S [<address>]	= Single step
I <port>	= Input from port	O <port> <data>	= Output to port
G [<address>]	= Go to program		
BAUD <device> <rate>		CONSOLE <device>	
FILL <start> <end> <byte>		API <function> [<A>] [<DE>]	
DEVICES, DIR, HELP, RESET			

BASIC Grant Searle's adaptation of Microsoft BASIC

WBASIC Warm start BASIC (retains BASIC program)

CPM Load CP/M from Compact Flash (requires prepared CF card)

\*cpm

Z80 CP/M BIOS 1.0 by G. Searle 2007-13

RC2014 port by Mitch Lalovic 2017

CP/M 2.2 Copyright 1979 (c) by Digital Research

A>

Note that  
BASIC,  
WBASIC  
and CPM  
are all  
available  
options

Note that CP/M  
is only  
available if the  
optional CP/M  
Upgrade Kit is  
fitted.  
Alternatively  
you can boot  
BASIC, use the  
Z80 monitor or  
upload an intel  
hex file

## 8k Bank 8 - CamelForth

```
RC2014 - CamelForth BootROM - v20230819
Ported to RC2014 ROM by Justin Skits
Z80 CamelForth v1.02 25 Jan 1995
```

Press return

```
OK
: HELLO ( -- ) CR ." RC2014 is cool!" ;
OK
HELLO
RC2014 is cool!
OK
```

Type code

Type HELLO

# 8k Bank 14 - SCM R1

Type ?  
for list  
of options

Start coding  
in Z80, or  
upload an  
Intel .ihx  
hex file

Small Computer Monitor - RC2014  
\*?  
Small Computer Monitor by Stephen C Cousins (www.scc.me.uk)  
Version 1.0.0 configuration R1 for Z80 based RC2014 systems

Monitor commands:  
A [<address>] = Assemble  
M [<address>] = Memory display  
R [<name>] = Registers/edit  
B [<address>] = Breakpoint  
I [<port>] = Input from port  
G [<address>] = Go to program  
BAUD <device> <rate>  
FILL <start> <end> <byte>  
DEVICES, DIR, HELP, RESET  
\*

D [<address>] = Disassemble  
E [<address>] = Edit memory  
F [<name>] = Flags/edit  
S [<address>] = Single step  
O [<port> <data>] = Output to port  
CONSOLE <device>  
API <function> [<A>] [<DE>]

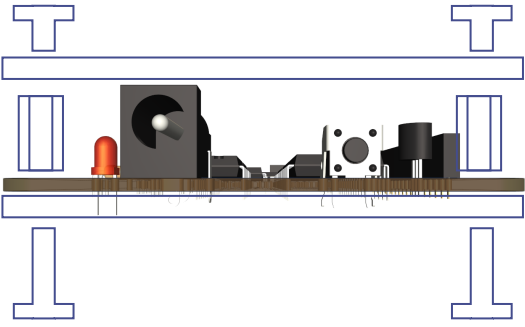
SCM R1 is similar to SCM R4, however, it does not allow booting to BASIC or CP/M

## Laser Cut Enclosure

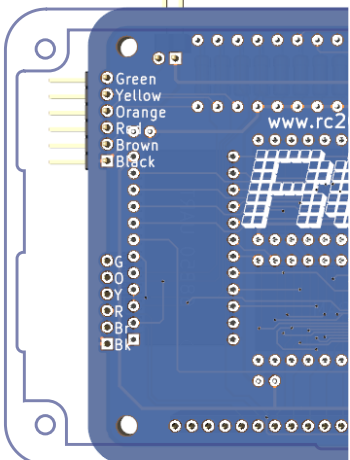
If you ordered your kit with the laser cut enclosure, start by peeling off the protective plastic from both sides.

Use the longer screws to go through the lower piece and the PCB and fixing in place with the hex-spacer.

Use the shorter screws to secure the top piece.



The lasercut enclosure for the Mini II and CP/M Upgrade kits fit in a similar fashion. See the assembly guide that comes with the Upgrade kit for details



Ensure the profiled indentions on lower piece line up with the pins poking through the PCB

## Troubleshooting

Check if power is applied correctly (5V and LED is on). Check that the correct ICs are plugged into their respective sockets and that they are in the correct orientation. Check the orientation of the FTDI cable and port settings. Try pressing the pushbutton again; does anything appear on the screen? Additional help is at [rc2014.co.uk/troubleshooting/](http://rc2014.co.uk/troubleshooting/)

