

# Setting Up CP/NET on the MinZ-U

April 10, 2021

This document is located in a github repository and the most-recent version may be obtained at <https://github.com/durgadas311/minimalCPM/blob/master/doc/MinZ-U-CPNET.pdf>.

## Table of Contents

Introduction.....	1
Downloads Required.....	1
MinZ-U Setup.....	2
CP/NET Server Setup.....	2
Windows Server.....	3
Windows/CYGWIN Server.....	3
Linux Server.....	3
Starting CP/NET.....	4
Sample Session.....	5
Setting Up A Printer.....	6
Building CP/NET 1.2 for the MinZ-U.....	6

## Introduction

The following refers to MinZ-U with ROM v2.6 or later. Other models or ROM versions may differ slightly.

The base model MinZ-U is a (approx.) 2"x2" PCB with a Z180 MCU, 512K SRAM, and 512K EEPROM. The Z180 includes two UARTs, which are connected to a dual serial-to-USB chip which provides access to the serial ports over a single USB cable to a host PC.

The MinZ-U powers-up (auto boots) into CP/M, using the rest of the SRAM as a ramdisk (B:) and the rest of the EEPROM as a romdisk (P:).

One of the serial ports is the system console. The other is available to be used for other purposes. This document describes how to use the second serial port as a CP/NET link to a host PC, where a CP/NET server provides extended disk services to the MinZ-U.

## Downloads Required

**cpnet12-minz.tgz:** may be downloaded from <http://sebh.c.durgadas.com/cpnet12-minz.tgz> or may be created from the github repository <https://github.com/durgadas311/cpnet-z80> as described in section "Building CP/NET 1.2 for the MinZ-U".

**CpnetSerialServer.jar:** The only known-working server currently available is <https://github.com/durgadas311/cpnet-z80/blob/master/contrib/CpnetSerialServer.jar> with documentation located at <https://github.com/durgadas311/cpnet-z80/blob/master/doc/CpnetSerialServer.pdf>.

**jSerialComm-2.6.2.jar**: This provides access to serial ports to **CpnetSerialServer.jar**. It is available at <https://fazecast.github.io/jSerialComm/>.

**dri-cpnet.pdf** (optional): The original Digital Research CP/NET documentation, updated for CP/M 3 support, is available at <https://github.com/durgadas311/cpnet-z80/blob/master/doc/dri-cpnet.pdf>. There is a lot of good information there, but it is a long document.

## MinZ-U Setup

Connect the USB cable to the MinZ-U and to the host computer. The MinZ-U will power-up and boot, but without a console connected no messages will be visible (LED will be green). Two sequentially-numbered serial (COM) ports will appear on the PC. On Linux, they are typically /dev/ttyUSB*N*, where *N* are numbers like “0” and “1”. On the host PC, start a terminal program (such as PuTTY or minicom) on the first serial port, setup for 115200 baud (or 230800 for the 36MHz model) and 8N1 (LED should turn red). Pressing the Enter key (known as “Return” on legacy systems) should cause the “B>” prompt to appear, or you can press the RESET button on the MinZ-U and see the whole startup/boot sequence. If your MinZ-U has the newest ROM (romdisk image), then it contains the program CPNBOOT.COM in the romdisk, which is required to boot CP/NET. Otherwise, follow the MinZ instructions for writing this file to the romdisk. This file is located in the “cpnet12-minz.tgz” archive.

## CP/NET Server Setup

In order to run CP/NET, you need to have a CP/NET server attached to the second serial port. This server needs to support network booting.

A compatible server is available from <https://github.com/durgadas311/cpnet-z80> in contrib/CpnetSerialServer.jar. Documentation on this server is in doc/CpnetSerialServer.pdf. The server requires that JAVA be installed on the host computer, which is usually already installed. The server is configured using a file that is plain text and contains properties and values. Here is a typical configuration file for the MinZ-U:

```
# CpnetSerialServer for use with real serial port
cpnet_tty = /dev/ttyUSB1 115200
cpnet_cid = f1
cpnet_server00 = HostFileBdos /home/you/MinCPM
cpnet_protocol = dri
dri_ack_timeout = 100
dri_char_timeout = 100
cpnet_flow_control = rts/cts
netboot_dir = /home/you/MinCPM
netboot_default = cpnos.sys
netboot_org0 = none
```

The properties that require modification for your system are:

**cpnet\_tty**: the tty name needs to match the second serial port name on your system. This example is for Linux, and Windows device names are different (e.g. “COM1:”). If you have the 36MHz model, set the baud to 230800.

**cpnet\_server00**: the path needs to match the location you have chosen for your CP/NET drives. This directory needs to have 16 subdirectories named “a” through “p”. This defines server node ID “00”, which is the default. Other servers may be defined for other node IDs, but each must use a different directory path (each with subdirectories “a” through “p”). Servers may also be defined to use a TCP/IP socket connection for access to remote machines.

**netboot\_dir**: the path needs to match the location you have chosen for your CP/NET boot files. This may be the same as the path for **cpnet\_server00** or it may be a different directory.

Other properties that you probably want to customize are:

**cpnet\_cid**: the client node ID used by CP/NET to identify this MinZ-U. It should be unique, however if this server does not connect to other servers on the internet, uniqueness does not matter beyond the defined servers.

Set up the server as follows:

1. Create the directories specified by the **cpnet\_server00** and **netboot\_dir** properties.
2. Create subdirectories named “a” through “p” below the **cpnet\_server00** directory.
3. From the “cpnet12-minz.tgz” archive, copy the files from the “cpnet12” subdirectory into the “a” subdirectory of the **cpnet\_server00** path. Not all files are needed, but they may all be copied without causing any problems.
4. From a standard CP/M 2.2 distribution, copy the desired utilities to the “a” subdirectory. [TODO: suggest a URL to download these files] Add any other CP/M programs or utilities.
5. Copy the “snios.spr” and “ndos.spr” files to the **netboot\_dir** directory. These files do not need to remain in the “a” subdirectory (i.e. they may be moved).
6. Place the configuration file created above, and the two JAR files, in a convenient directory for running the server. Start the server from this directory.

There is a Linux shell script that may be used to start the server, however it must be customized for the locations of the JAR files, and the use of semi-colon if used under CYGWIN. This script is at <https://github.com/durgadas311/cpnet-z80/blob/master/contrib/serialserver>.

The server will print informative messages to the terminal, as well as errors – if encountered. That output may be directed to a log file if desired. See the server documentation for more information.

## Windows Server

Windows also requires an additional property (no value is required) in the configuration file:

**cpnet\_nosys**: this disables use of the CP/M “SYS” file attribute, which is not available on Window filesystems. Without this setting, none of the CP/NET shared files will appear on “DIR” listings.

Start the server with this command (run from the directory chosen in step 6):

```
java -cp CpnetSerialServer.jar;jSerialComm-2.6.2.jar CpnetSerialServer conf=config-file
```

## Windows/CYGWIN Server

CYGWIN on windows also requires that the **cpnet\_nosys** property be set, and uses the same JAVA command to start the server.

## Linux Server

Start the server using the command (run from the directory chosen in step 6):

```
java -cp CpnetSerialServer.jar:jSerialComm-2.6.2.jar CpnetSerialServer conf=config-file
```

## Starting CP/NET

Once the server is running on the second serial port, CP/NET may be started on the MinZ-U with the CPNBOOT.COM program. The general syntax of the command is:

```
CPNBOOT [sid [tag]]
```

Where *sid* and *tag* are optional. *sid* is the server node ID to boot from, and defaults to “00”. *tag* is an optional suffix to add to the boot files, and is only valid when there are multiple different copies of boot files provided in the **netboot\_dir** directory. For the setup described here, the command “cpnboot” is sufficient.

Note that CPNBOOT will normally reside on the romdisk, which is drive P:.

By default, MinZ-U drive A: will be mapped to server 00 drive A:, which contains all the files and commands required by CP/NET. Note, the MinZ-U starts up with the default drive as B:, which will still be the case after starting CP/NET. You may want to set the default to A: (type “A:(return)”).

In addition, the CP/M LST: device will be mapped to server 00 LST 0. Since this device is currently not defined in the server configuration file, no LST: device is available.

## Sample Session

```
B>dir
NO FILE
B>p:cpnboot
ser-dri:minz Network Loader
```

```
BIOS      F600 0A00
BDOS      E800 0E00
SNIOS     SPR E500 0300
NDOS      SPR D900 0C00
```

54K TPA

```
B>a:
A>dir
A: DDT      COM : NETSTAT  COM : CPNETSTS COM : TPA      COM
A: MAIL     COM : RMAC     COM : DUMP     COM : Z80     LIB
A: LINK     COM : SRVSTAT  COM : DSKRESET COM : LOGOFF  COM
A: XSUBNET  COM : XREF     COM : SID      COM : Z180   LIB
A: CCP      SPR : STAT    COM : XEDIT   COM : TR      COM
A: NETDOWN  COM : ENDLIST  COM : LOGIN    COM : NETWORK COM
A: ZSID     COM : PIP      COM : LOCAL    COM : MAC     COM
A: RDATE    COM : ASM      COM : LOAD     COM
A>netstat
```

CP/NET Status

=====

Requester ID = C8H

Network Status Byte = 10H

Device status:

Drive A: = Drive A: on Network Server ID = 00H

List Device = List #0 on Network Server ID = 00H

A>rdate

Remote Time is: Wed 03/10/21 18:01:03

A>netdown

Ready for RESET/power-off

(press any key to resume CP/NET)

Z8S180 @ 33.333MHz 512KB RAM (0ws) 512KB Flash "ROM" (1ws)

A: RAMdisk 428 KB

P: ROMdisk 496 KB

CP/M 2.2 63K (56K TPA) - BIOS V2.3 SAT SEP 1/18 0:00:00

B>

## Setting Up A Printer

There are two basic types of printer that may be setup on the server. One is a simple capture file, where all raw output is stored in the file, without separation by job (ENDLIST.COM). The other uses a Diablo 630 emulation to produce post-script files, separated by job and potentially automatically printed.

Refer to CpnetsSerialServer, and CpnetsSocketServer, documentation for more details. The basic premise is to use the property:

**cpnetserver\_lstX**: where *X* is a hexadecimal digit representing the desire List Device Number, 0-15. Values like “> *file*” will direct raw output to *file*. The more complicated “**Diablo630Stream** *args...*” is for the Diablo 630 emulation. *args...* may reference the same configuration file being used for CpnetsSerialServer, allowing Diablo630 properties to be inline with general server properties. Note that, by default, diablo630 will spawn a GUI for controlling the printer. This may be undesirable for certain server contexts. Consult the server documentation for full details.

## Building CP/NET 1.2 for the MinZ-U

The repository <https://github.com/durgadas311/cpnet-z80> contains all the source code used to build the MinZ-U CP/NET files. This build is setup for Linux systems.

1. Clone this repository as usual.
2. Instructions for setting up the build environment are in the BUILD.md file. This file is best viewed from the repository web interface, but may also be viewed directly as plain text.
3. The build command is:

```
make NIC=ser-dri HBA=minz
```

This will build the files in a “bld” subdirectory. The build may be set to a different location by adding a “BUILD=...” argument, for example:

```
make NIC=ser-dri HBA=minz BUILD=~/.cpnet-bld
```

4. The contents of “cpnet12-minz.tgz” was taken from the “ser-dri/minz/bin/cpnet12” subdirectory of the build output.