

## 1. CF Card

From the release zip folder copy the cromix-root-cpm-cf.iso image to a CF Card minimum size 256MB. If using Linux the following dd command can be used:

```
dd if=cromix-root-cpm-cf.iso of=/dev/sda bs=512
```

Where /dev/sda is the device associated with your CF Card (double check).

For Windows, a tool such as [balena Etcher](#) can be used.

This CF card can be in either Drive A or Drive B of the IDE Card. I will be using Drive A in these instruction.

Note: Not all CF cards are the same, if you have issues try a different card.

## 2. Consoles

The first part of the Cromix boot will use the same console as the 68030 Boot Monitor, either the Propeller board or the USB port on the Serial IO Board.

For the second part of the Cromix boot. Port 1 of Serial IO Board is used as the console.

Before booting connect a terminal to Serial Port 1: 9600 baud, no parity, 8 bits, 1 stop bit.

## 3. Boot Cromix Plus

Boot the 68030 Boot Monitor.

```
S100 68030 Boot Monitor V0.3.0.R6
Damian Wildie, 11/05/2021

A: TOSHIBA THNCF256MDG
  Sectors: 0007A400
  Partition  Start      End      Sectors  Id   Type
  [0]*       00000800  0004B7FF 0004B000 5F   Cromix
  [1]       0004B800  0006B800 00020001 52   CP/M
B: CF 256MB
  Sectors: 0007D600
  Partition  Start      End      Sectors  Id   Type
  [0]*       00000800  0007D5FF 0007CE00 5F   Cromix
```

The MBR partition table for the CF Card in Drive A will be displayed showing the Cromix and CP/M partitions.

The contents of the current partition can be displayed using the *dir* or *ls* commands.

```
A:0$ dir
Drive geometry:
  cylinders:    1225
  sectors/track: 20
  surfaces:     11
  bytes/sector: 512
  start cylinder: 1
  first fs block: 0x8dc

  48 D   11:50:30  9/10/1987  etc
 103 D   11:46:47  9/10/1987  bin
  19 D   11:49:01  9/10/1987  cmd
 132 D   11:49:10  9/10/1987  dev
   8 D   11:50:23  9/10/1987  equ
91544 F   17:07:11 14/04/2021  cromix.sys
  12 D   11:51:55  9/10/1987  usr
  16 D   11:51:11  9/10/1987  gen
   0 D   04:05:49 21/11/1997  tmp
   0 F   15:26:07 16/05/2020  floppy
   0 F   07:02:45 22/12/2020  ide
```

Cromix is booted using the *cromix* command.

```
A:0$ cromix
Loading file: cromix.sys, 91544 bytes to address 0x0
Loaded 91544 bytes

Booting cromix ...
Address: Memory test by 16K blocks
000000h: ++++++
100000h: ++++++
200000h: ++++++
300000h: ++++++
idecf init(12,1)

IDE/CF Drives:
Drive A  Start      Size      Type
[12,0]  0x00000800  0x0004b000  Cromix (ST)
[12,1]  0x0004b800  0x00020001  CP/M
Drive B  Start      Size      Type
[12,4]  0x00000800  0x0007ce00  Cromix (ST)

tim_init(4)
stty init(16,2)
stty init minor 0, port 0xa0
stty init minor 1, port 0xa1
siospeed 0xa1, 13, hi 0x00, lo 0x0e
siospeed 0xa0, 13, hi 0x00, lo 0x0e

Floppy = 1, STDC = 6, ESDC = 11
Enter major root device number: 12
Enter minor root device number: 0
idecf open(0xc00,0x1)
cylinders:    1225
sectors/track: 20
surfaces:     11
bytes/sector: 512
start cylinder: 1

68010 XPU 162  Cromix-Plus Operating System
S100computers Cromix-Plus - Damian Wildie, 2020

stty open(0x1001)
siospeed 0xa1 126, no change
```

Cromix like UNIX and Linux uses major and minor numbers to specify devices. For the IDE/CF driver the major number is 12 and the minor numbers are:

- 0 First partition of drive A
- 1 Second partition of drive A
- 2 Third partition of drive A

3	Fourth partition of drive A
4	First partition of drive B
5	Second partition of drive B
6	Third partition of drive B
7	Fourth partition of drive B

The major and minor numbers are shown on the console, just after the memory test, for the available partitions.

When prompted to “Enter major root device number”, enter 12.

When prompted to “Enter minor root device number”, enter 0 the CF card is in Drive A or 4 if using Drive B.

Once the stty open and siospeed messages appear on the console, Cromix switches to using serial port 1 as the console.

```
System initialization complete
      Friday, May 14, 2021          16:40:16
DATE (mm/dd/yy): 05/14/121
TIME (hh:mm:ss): 17:15
      Friday, May 14, 2021          17:15:00
Hello world

If you have reset the computer, immediately execute "check -s".

XPU Cromix-Plus release 162
The message from /etc/welcome: Welcome to the Cromix-Plus Operating System
Login: █
```

When entering the date, specify the year as an offset from 1900, ie. 121 for 2021.

Login as “system” (equivalent to the UNIX root user), no password is required.

#### 4. Using Cromix Plus

Some notes:

- 1 Useful Cromix – UNIX command equivalents  
Use d instead of cd  
Use type instead of cat  
Use copy instead of cp  
Use makdir instead of mkdir
- 2 There is a help command.
- 3 The Cromix screen editor, ce, is functional. I have created a termcap, Z100, which seems to work with a VT100 terminal emulator.
- 4 Cromix periodically “syncs” the disks but the *shutdown* command should be used to shutdown the system.
- 5 Read the Cromix-Plus User’s Reference Manual Revision F.

#### 5. Adding a second terminal

A second terminal connected to the second serial port (9600N81) on the Serial IO Board can be used. To enable the terminal edit the /etc/ttys file and change the first character on the

second line from a 0 to 1, save the file. The terminal will be automatically enabled on reboot or enter the following command to enable immediately:

```
kill -1 1
```

## 6. Limitations

The “raw” I/O functions have not yet been implemented in the IDE/CF driver, therefore, it is not possible to initialise and format new disks images.

## 7. Driver library

The source for the ported drivers is located in the `/home/drivers` directory. It can be built using the `mk` command.

Generating a new `cromix.sys`:

The files required to regenerate `cromix.sys` are located in the `/gen` directory. The `sysdef` file defines the system configuration and contains a lot of helpful information. You can:

- Change the amount of available memory, currently 4 Megabytes.
- Change the logon message
- Set a default root device so that it does not have to be specified at every boot.

Use the `gen` command to generate a new `cromix.sys` in the `/gen` directory. This can be booted with the following Cromix command:

```
boot /gen/cromix.sys
```

Once tested, the new `cromix.sys` can be made the default using the following Cromix command:

```
copy -f /gen/cromix.sys /cromix.sys
```

## 8. Booting CP/M-68K

The second partition on the supplied CF image is a bootable CP/M-68K system. To boot, issue the following commands:

*part 1*                      Select partition 1  
*boot*                        Boot CP/M-68

The booted system has 10 (A – J) 4MB disks.

```
S100 68030 Boot Monitor V0.3.0.R6
Damian Wildie, 11/05/2021

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  Partition  Start      End      Sectors  Id   Type
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  [1]        0004B800  0006B800  00020001  52   CP/M

B: CF 256MB
  Sectors: 0007D600
  Partition  Start      End      Sectors  Id   Type
  [0]*       00000800  0007D5FF  0007CE00  5F   Cromix

A:0$ part 1
A:1$ boot

CP/M-68K S100 Boot Loader V0.1.1.R3

CP/M-68K(tm) Version 1.3  08/05/85
Copyright (c) 1985 Digital Research, Inc.

CP/M-68K S100 BIOS V0.1.1.R3 [CPM]

A>
```