CP/M 3.1 for the NABU PC

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General Notes

This release of CP/M 3.1 supports the following on the NABU PC:

- SSDD 40 TRK 48 TPI 5.25”, DSDD 80 TRK 48 TPI 5.25”, and DSDD 160 TRK 96 TPI 3.5" disks
- Dynamic BIOS reconfiguration when swapping SSDD and DSDD disks on 5.25" drives
- Serial option board
- Parallel port
- Input/Output device re-assignment
- Virtual and true 80 column modes
- ADM-3A terminal emulation

Commands

You will find the standard CP/M 3.1 transient commands on the disk images, including:

- DIR
- ERASE
- SHOW
- SETDEF
- GET
- PIP
- SAVE
- RENAME
- HELP
- SID
- PATCH
- TYPE
- DEVICE
- COPYSYS
- ED
- SUBMIT
- DUMP
- DATE
- PUT
- SET
- HEXCOM
- INITDIR

This release also includes the following utilities specifically written for the NABU PC:

- FORMAT3 : multi-format floppy disk formatter
- XMRECV : xmodem receive tool to allow transfer of files to the NABU over the serial port
- XMSEND : xmodem send tool to allow transfer of files from the NABU over the serial port (xmsend supports both Checksum and CRC transfers)
- KERMIT : NABU port of KERMIT-80
- SETCOLOR : changes the text and background color of the display

In addition, the disk images include the following original CP/M 3 NABU utilities and programs:

- NABUSHOW
- CHECK
- MS BASIC
- CLEAN

***Note**: Not all commands are available on the single-sided disk image due to space constraints.*

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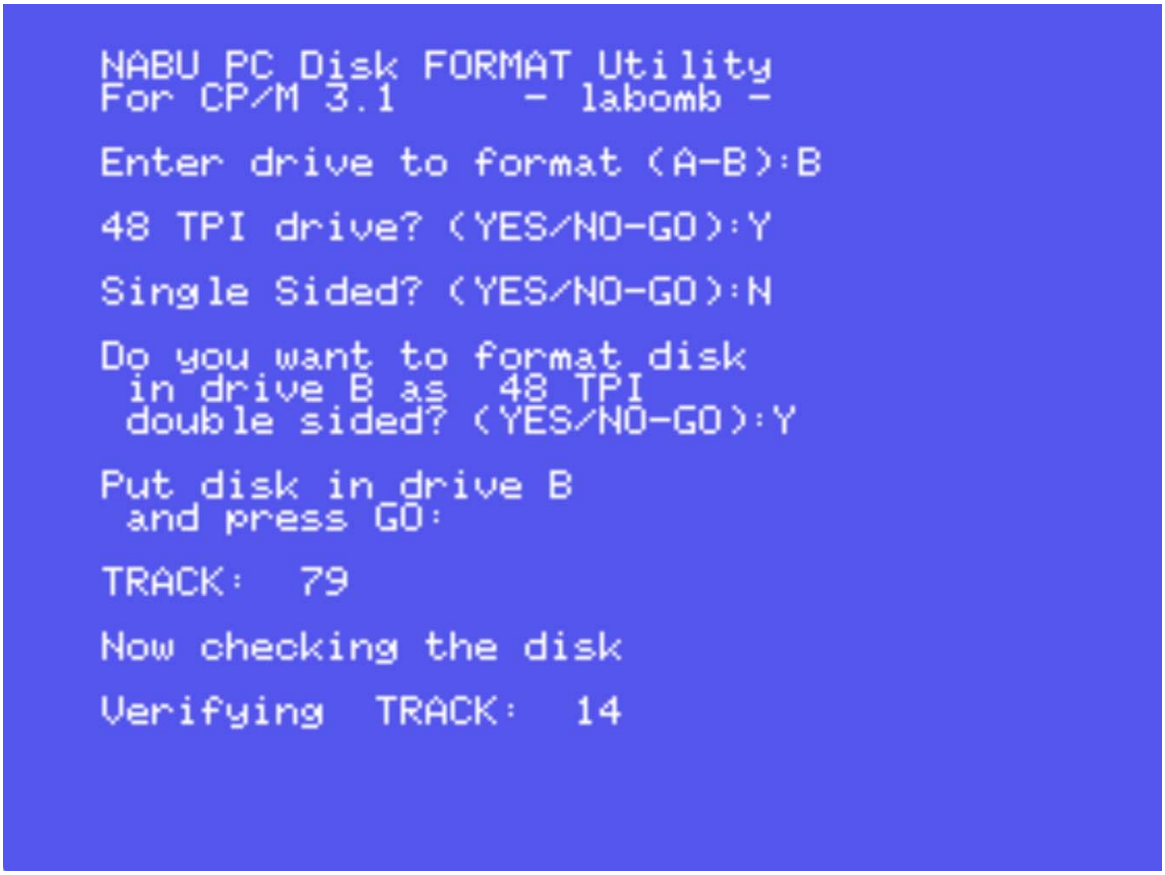
NABU Specific Command Notes

format

The floppy disk format utility is based on the original utility bundled with the CP/M 3 release. It supports all of the disk formats supported by this release of CP/M. The utility will print several prompts, and based on responses to those prompts it will proceed to format and verify the selected disk. Only the first letter of the requested responses needs to be entered.



copysys

For those of you who may be familiar with the DOS operating system, when you wished to create a bootable disk, you could add the '/s' parameter to the format command when formatting a disk, which would simply copy two hidden system files and the ubiquitous 'command.com' file to the target disk after the format operation was complete. Another option was to use the DOS 'sys' command, which effectively did the same thing as the '/s' option when used with the format command.

The **copysys** utility is one means to do a similar thing in CP/M. It copies the contents of the system tracks, and optionally the CP/M 3 system file, from a bootable disk to a formatted but non-bootable disk so that it too, may be bootable.

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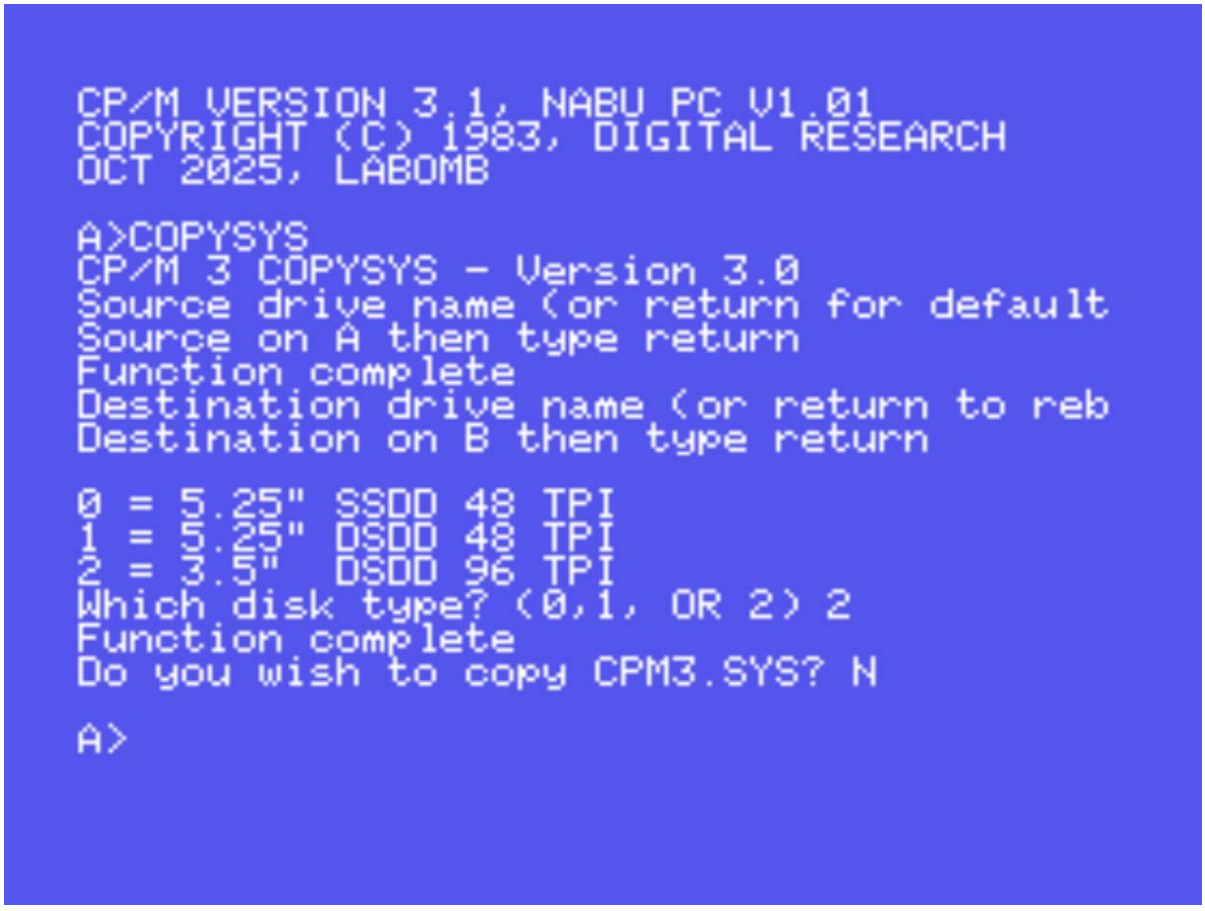
With most earlier CP/M releases, the entire CP/M operating system was stored on the system tracks. This later changed with the release of CP/M version 3… the operating system was moved to files residing on the disk file system. With version 3, the system tracks contain the cold boot loader and the CP/M loader, with the latter having the task of loading the CP/M system file (cpm3.sys) into memory.

While the **copysys** source code was provided by Digital Research, it needed to be modified to suit the specific CP/M 3 implementation it was used on. The version provided with this distribution was modified accordingly.

Note that while **copysys** offers the option to copy the cpm3.sys file to the target disk after copying the system tracks, it does not offer to copy the ccp.com file as well. Both cpm3.sys *and* ccp.com are required to successfully boot CP/M 3. Thus, you will need to use pip or some other means to copy ccp.com over to the target disk after running **copysys**.



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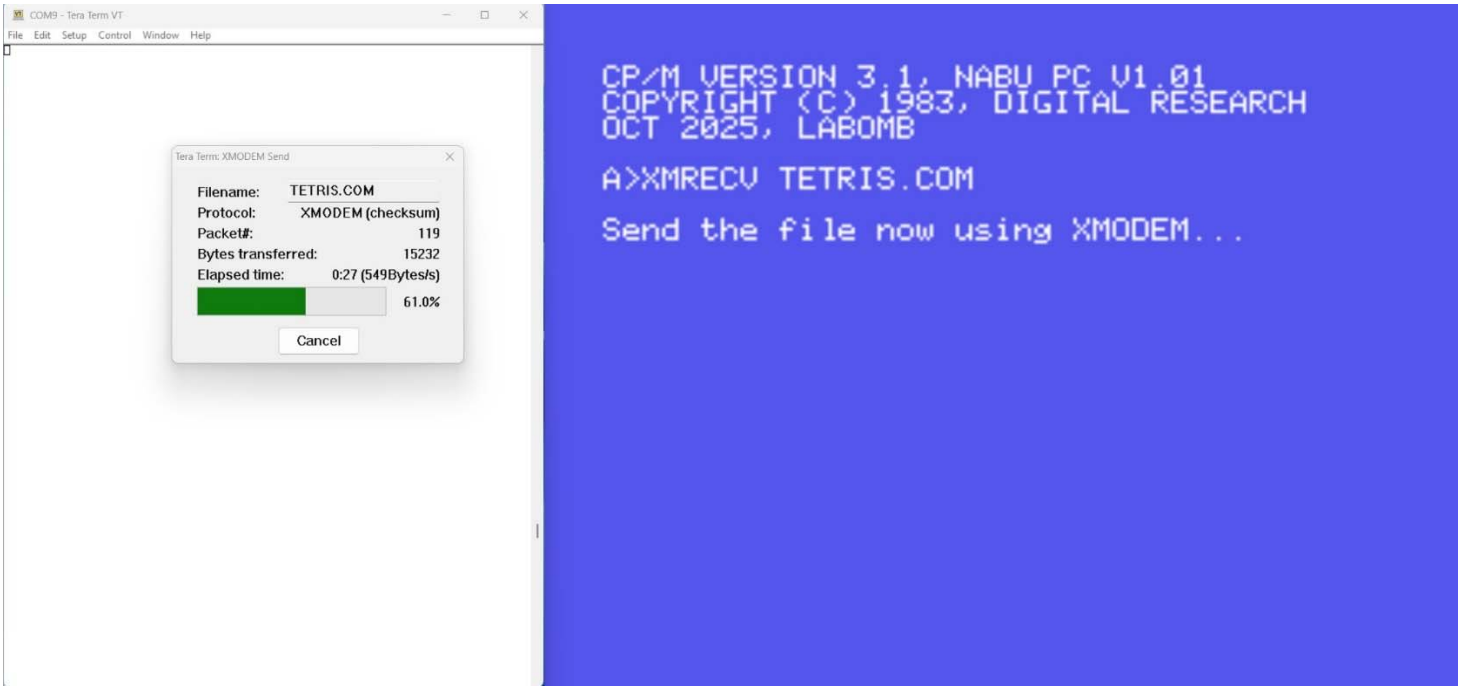
xmrecv and xmsend

The **xmrecv** and **xmsend** utilities provide a simple way to transfer files from and receive files to your NABU PC using the widely supported XMODEM file transfer protocol. The XMODEM protocol typically works over a serial connection, and as such a serial option board is required (or if using the mame, you will need to configure a serial port when starting the NABU emulation).

To use either utility, you will need to connect a laptop or other computer that can run terminal emulation software that supports the XMODEM transfer protocol (most all emulation software apps that I am aware of do) to the serial port on your NABU PC. On Windows, I typically use TeraTerm.

This release of CP/M 3.1 configures the serial port for 9600 BAUD by default, and an 8-bit word length, with no parity, and 1 stop bit (often shortened to 8/N/1). You can use the DEVICE command to change the BAUD rate if you wish. Your terminal emulator will need to be configured similarly.

Once connected, you simply enter the appropriate command followed by the filename to send or receive files:



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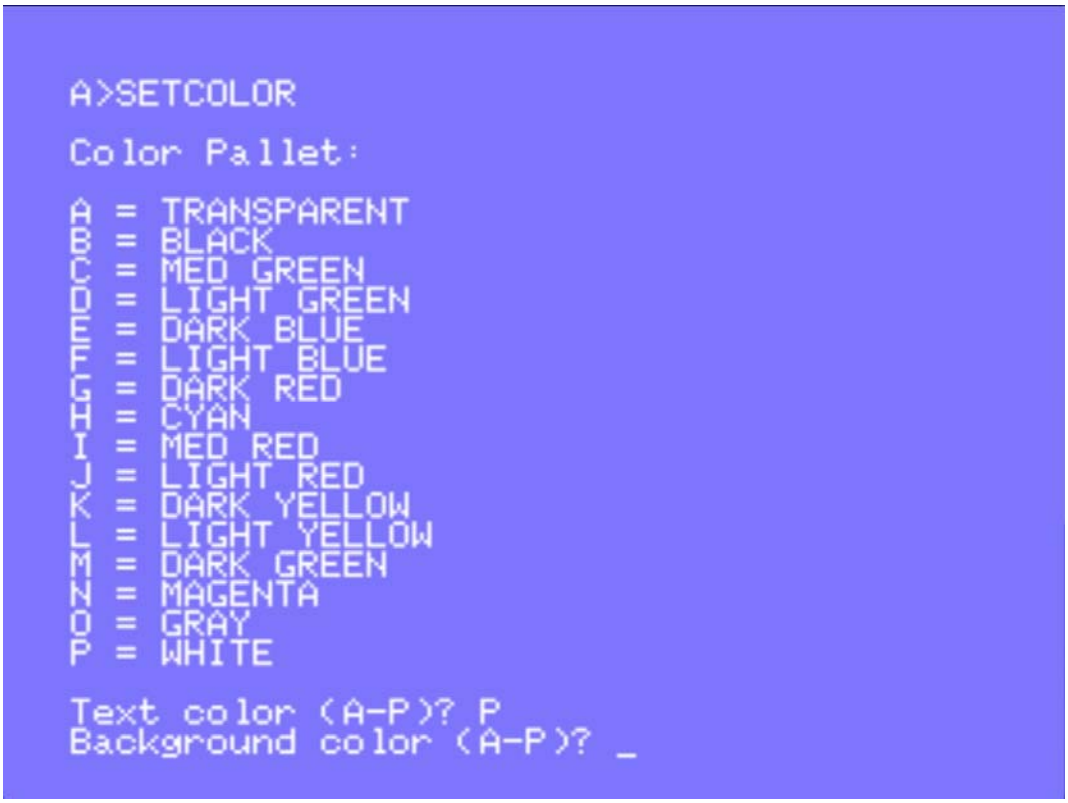
setcolor

This is a simple utility that can customize the screen text and background colors. It can be run interactively, or your desired color choices can be provided on the command line when executing the command.



kermit

This is Kermit-80 specifically ported to run with this NABU PC CP/M 3.1 implementation. Kermit-80 was one of the original Kermit programs, first written in 1981 for the Intertec Superbrain computer and then made portable to many other CP/M systems. It provides a consistent approach to file transfer, terminal emulation, script programming, and character set conversion across many different computer hardware and operating system platforms.

This port supports the SPEED command, in addition to many other native Kermit commands. While Kermit will use the default 9600 BAUD rate for CP/M (or any BAUD rate set by the DEVICE utility), you can set the preferred rate from within Kermit once started by using the SET SPEED command at the Kermit prompt. Kermit will automatically use the serial board that is configured when CP/M boots up.

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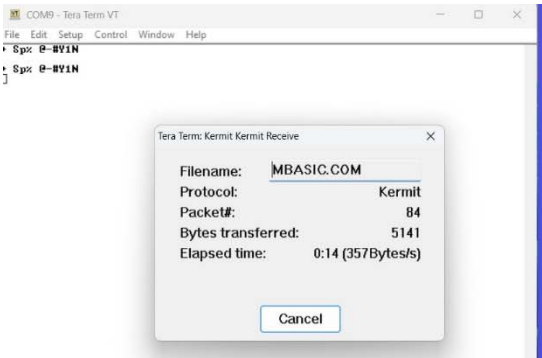
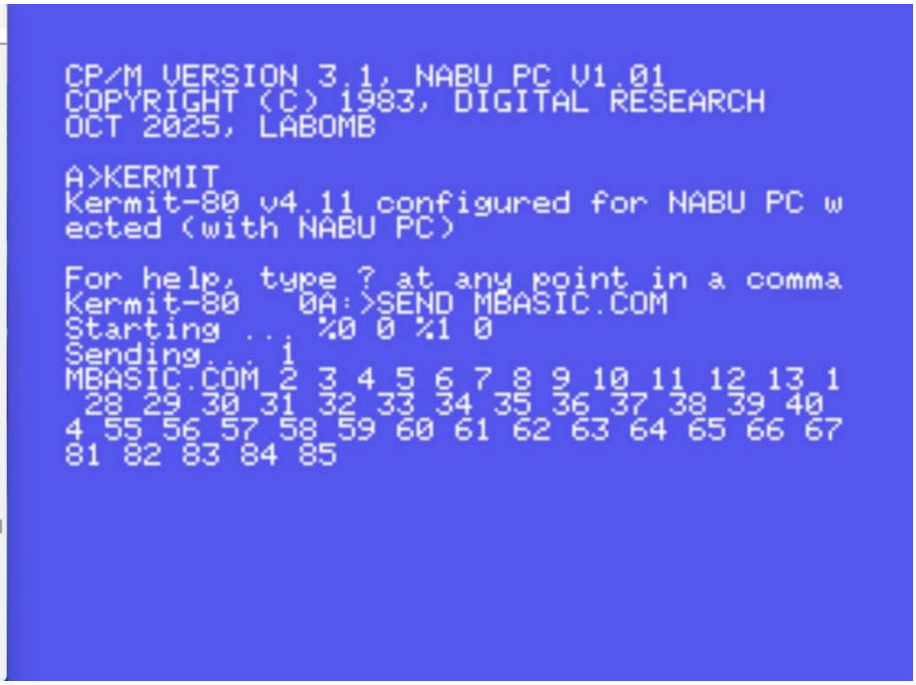
This port also supports the NABU printer port (should you happen to have one attached to your NABU!) and as such will provide the ability to print a hardcopy of your online session.

Note that while Kermit really shines (and enables more features) when connected to another system that is also running the Kermit program, it can also be used as a terminal emulator to communicate with and transfer files with other systems running a variety of terminal emulation software packages.

While it is obviously beyond the scope of this document to provide a detailed overview of the Kermit program, you will find the original user guide for it in the 'extras' folder of this CP/M distribution.





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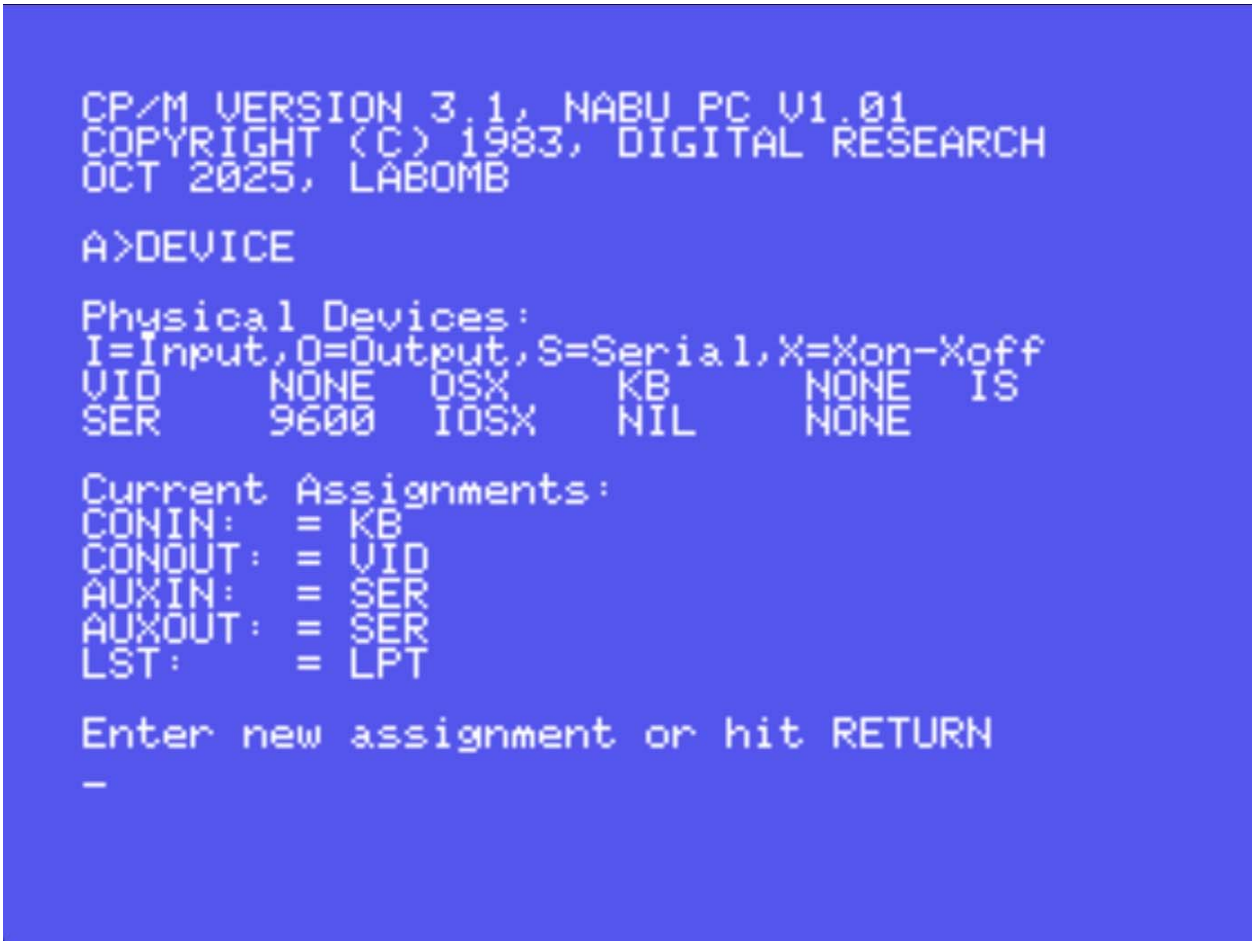
device

While the **device** command in of itself isn't unique to the NABU PC implementation of CP/M 3.1, the device assignments that **device** can set/modify are. The configuration of the physical devices and current assignments can be displayed by simply entering the **device** command:



There are three assignment options that are available for the console (CONOUT:) device:

- VID : the console output is assigned to the NABU monitor (default)
- SER : the console output is assigned to the terminal/emu attached to the serial port
- LPT : output is displayed on the NABU printer

There are two assignment options that are available for the console (CONIN:) device:

- KB : the console input is assigned to the NABU keyboard (default)
- SER : the console input is assigned to the terminal/emu attached to the serial port

Device reassignments are straightforward. For example, if you wish to use the serial port for console output, you can just enter:

DEVICE CONOUT:=SER

To display output on both the NABU monitor and the serial attached device, just use:

DEVICE CONOUT:=VID,SER

Likewise, you can use the serial port for input instead of the keyboard:

DEVICE CONIN:=SER

Or you can accept input from either the NABU keyboard or the serial port:

DEVICE CONIN:=KB,SER

The device command can be also used to alter the serial port configuration. For example, to change the BAUD rate of the serial board to 2400 BAUD enter:

DEVICE SER[2400]

The AUXIN and AUXOUT devices are assigned to the serial port if the option is installed and found during boot, otherwise they are assigned to the KB and VID devices respectively. The LST device is always assigned to the NABU parallel port, regardless of the assignment. The parallel port is fully supported, but note that it's up to the individual CP/M applications to support specific printer models.

Changing disk formats

Many 5.25" disk drives can support both single-sided and double-sided floppy disks. This release of CP/M supports either format dynamically. Specifically, you can swap between both formats without the need to reboot the NABU.

The BIOS will initially configure itself to support whatever format is first used in any given 5.25" drive. Should you wish to later change formats, simply enter control-c (press the ctrl key and the c key at the same time) after inserting the new disk into the drive. With CP/M, a ctrl-c initiates a warm boot, and it is during this quick process that the BIOS will examine the current disks and reconfigure itself to support the format of the disks currently in each of the drives.

Some early implementations of CP/M required that you enter the ctrl-c sequence whenever a disk was inserted, regardless of format. That is not required with this implementation, it is only required when changing disk formats. If you never change disk formats, there is no need to initiate a warm boot.

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CPMTOOLS

Included with the CP/M 3.1 distribution is a 'diskdefs' file that can be used with the CPMTOOLS application (either the original Unix version, or my Windows platform port). The diskdefs file contains the definitions that can be used to transfer files to, transfer files from, delete files on, etc… the included 3.1 disk images. To use these definitions, simply copy the contents of the included diskdefs file into your existing CPMTOOLS diskdef file. If you don't have an existing diskdefs file, just copy the included file to your CPMTOOLS directory.

There is a definition for each of the supported disk formats:

nabu3s4	: for single-sided, 40 track, 48 TPI, 5.25" disk images
nabu3d8	: for double-sided, 80 track, 48 TPI, 5.25" disk images
nabu3d16	: for double-sided, 160 track, 96 TPI, 3.5" disk images

examples

These examples assume that you have copied the 3.1 disk images to your CPMTOOLS directory, have additionally copied the included diskdefs file contents to the CPMTOOLS diskdef file, and have copied any files that you wish to add to your disk images to the CPMTOOLS directory as well.

To copy mbasic.com to user area 0 of a double-sided 5.25" disk image named cpm3_boot.d8.img:

cpmcp -f nabu3d8 cpm3_boot.d8.img mbasic.com 0:

To copy tetris.com to user area 1 of a double-sided 3.5" disk image named cpm3_boot.d16.img, but name it cooltet.com:

cpmcp -f nabu3d16 cpm3_boot.d16.img tetris.com 1:cooltet.com

To copy file device.com from a single-sided disk 5.25" image named cpm3_boot.s4.img to the CPMTOOLS directory:

cpmcp -f nabu3s4 cpm3_boot.s4.img 0:device.com device.com

To delete file test.com from double-sided 5.25" disk image cpm3_boot.d8.img:

cpmrm -f nabu3d8 cpm3_boot.d8.img 0:test.com

To list the files on a double-sided 5.25" disk image cpm3_boot.d8.img:

cpmls -f nabu3d8 cpm3_boot.d8.img

The CPMTOOLS package is available from numerous online resources, with binaries available for Windows and Unix, as well as in source format.

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GoTEK drives

Simply place the provided img.cfg file and the disk images on the GoTEK USB drive, and select the image you wish to use as per usual. The provided image files can be renamed, but you do need to maintain the s4.img, d8.img, and d16.img file extensions, as these are the extensions that are defined in the img.cfg file.

As you have probably noted with the previous CPMTOOLS examples, the files extensions used will determine the disk format type that the GoTEK will use:

.s4.img	:	for single-sided, 40 track, 48 TPI, 5.25” disk images
.d8.img	:	for double-sided, 80 track, 48 TPI, 5.25” disk images
.d16.img	:	for double-sided, 160 track, 96 TPI, 3.5” disk images

Virtual 80 column support

The terminal uses a ‘virtual’ 80 column implementation. The NABU PC, like several other popular computers of the day, utilized a video graphics chip that supports a text display in a 40-column x 24-line format. However, CP/M and its associated utilities and applications generally expect an 80-column display.

To accommodate the 80-column requirement, a ‘virtual’ 80-coumn mode is used that enables scrolling both left and right to view all 80 columns.

To scroll left, press this key: 

To scroll right, press this key: 

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