

## Release Notes

ATON CP/M 2.25B

February 15, 1984

These notes describe the new features of the 2.25 release and provide additional information on operating procedures and installation of popular CP/M application packages.

### Making a Two Sided Working Copy

#### Making Backup Copies of the Master Diskette on a Single Drive System

On a system with two or more floppy drives, the copy program makes an image copy quite efficiently.

The most efficient way to make a copy of the system disk on a single drive system or to make a two sided working copy is to use the following three steps:

1. Use the COPY program to format a single sided or two sided double density diskette in drive B:. When CP/M asks you to mount a diskette in drive B:, type the letter A. This single keystroke informs the system that drive B is not present and CP/M will go into a mode where it asks the operator to mount diskettes for the various drives into drive A: (drive 0) as it needs to access them. Follow the disk swap instructions on the upper right part of the screen as they are presented.
2. Use the COPYSYS program to copy the system tracks from drive A to drive B. The CP/M system will tell you when to swap diskettes.
3. Use the FILEX program to copy all files from drive A to drive B. The command is FILEX B: = A:\*. The system will tell you when to swap diskettes. When the A> prompt reappears, the copy operation is complete and you have a bootable diskette.

### System Setup for Model II

Select BEL code response described below.

Select drive motor startup pause length of zero, as described below.

### System Setup for Model 12/16A/16B

Select BEL code response described below.

### Don't Mix Release 2.23 or 2.24 Utilities with the Release 2.25 Operating System

To do so will cause system crashes! Note that the SYSGEN program has been replaced with COPYSYS.

## **BEL Code Response**

The CP/M system and many application programs output the BEL code (07) to the console when an error occurs. There are three possible ways the operator can be signalled by the BEL code. The screen may be flashed if SYSDEF is used to turn on this option. Use SYSDEF main menu option 1, then submenu option 0, then finally option B to turn on the screen flash. Secondly, the Model 12 or 16B beeper is used for a time length selected by main menu option 1, then submenu option 3. This time length controls both the screen flash and Model 12/16B beep length. If it is set to zero, no Model 12/16B beep or screen flash will occur. Finally, if the P&T clock, calendar, beep card (CCB) is installed with the default port address of BE/BF, it will beep on the BEL code. There is no way to disable this, short of removing the card or using a different port address.

## **Model 12/16B Key Click**

The length of the click when a key is depressed can be adjusted using SYSDEF, main menu option 1, submenu option 4. Don't make the click more than 8 or 9 milliseconds long or you may start to lose time in the time of day clock. Set this value to zero to eliminate the click.

## **Drive Motor Startup Length**

This parameter can be adjusted by using SYSDEF main menu option 1, submenu option 6. This parameter may be set to zero for a Model II with full size drives. It must be set for one second or longer (10 units) for Model 12/16/16B. Depending on your machine and the type of diskettes you use, this may have to be increased to 2 or 3 seconds.

## **Printer Busy Timeout Length**

A message will be issued if the parallel printer is busy for longer than this timeout length. If you use a hardware spooler or a printer with an unusually large buffer, you should increase this timeout. If you set it to zero, no time out error message will ever be issued.

## **Other System Options**

The CTRL-P console list toggle can be retained through a warm boot by using main menu option 1, submenu option 0, then option H. Normally if the CTRL-P toggle (copy console to printer) is used, it will automatically be turned off at warm boot time. By using option H, the only way to turn off this console list toggle is to hit CTRL-P again or use the break key for abort during a system error message. Option H is a convenient way to have all console output listed on the printer during a SUBMIT run.

System option G can be used to cause the system date and time to be automatically read from the P&T CCB card at cold boot time if the CCB is installed with the default port address of BE/BF. The ATON CP/M system will then keep time accurate to within the tolerance of the crystal on the Z-80 CPU board. Unlike the P&T or TRSDOS systems, the ATON system doesn't automatically lose several seconds per hour.

## **New Line Printer Support**

The user program can cause the printer driver to set its internal line counter to zero by passing a DC-4 (CTRL-T, hex 14, decimal 20) code to the printer driver. This has

the same effect as the operator pushing top of the form key (CTRL-. or CTRL-, or CTRL-/ key). The recognition of DC-4 can be suppressed by SYSDEF printer option commands

Your program can automatically synchronize the paper with the line counter by issuing this DC-4 code after the operator sets the paper up in the printer. If the printer does not emulate form feeds with line feeds, then your program needs to issue a form feed (CTRL-L, hex 0C, decimal 12) code before the DC-4 code.

The line printer drivers, both parallel and serial, now support the early Radio Shack printers (LP-III and others) by using an LF instead of CR when the print line has no printable characters.

SYSDEF may be used to select a mode whereby ESC LF is recognized as a reverse line feed for page length including counting purposes. ESC LF is used as a reverse line feed by many Radio Shack printers.

When printing long texts, it is desirable that the printing not occur on the page perforation of continuous forms. This is usually accomplished one of three ways. Some printers, such as the TI-810 will automatically skip over the page perforation unless a switch is set to suppress it. ATON CP/M will do the automatic skip if "lines per page" is not equal to "page length". The "lines per page" and "page length" parameters can be modified with the SYSDEF utility program. Lastly, some application programs such as WordStar and MultiPlan assume that neither CP/M nor the printer will do the automatic skip so these application programs will output extra line feeds or form feeds to perform the page skip. If your application program is doing the automatic perforation skip, then you need to suppress the skip in CP/M by setting "lines per page" to "page length" using SYSDEF and also setting the switch on the line printer to suppress the automatic perforation skip.

The auto line feed can be suppressed on later production DW-II printers by outputting an ESC CTRL-U (in hex: 1B, 15 or in decimal: 27, 21) to it once after power on. If you have an earlier production DW-II, it can be updated with a new ROM for a nominal fee by Radio Shack.

There are many parameters associated with various printers and ATON CP/M can be adjusted (using the SYSDEF program) to properly drive just about any printer on the market. If your printing is erratic, experiment with SYSDEF printer options to correct the problem. For instance if the printer is double spacing when it should be single spacing, then the printer option "A" (Auto Line Feed) may be selected when the printer switches are set for no "Auto Line Feed." Unlike previous releases, the 2.25 system is shipped with both page length and line length set to 66, which suppresses the page overflow check. Also, the line width is set to zero which suppresses line width checking.

### **Keyboard Mapping Table**

The keyboard mapping table is a convenient way to lock out the BREAK or CTRL-C key by mapping it (code 03) to some other key such as back space (08). Some other key such as CTRL ' (A2) can then be mapped to generate the BREAK or CTRL-C code (03).

The keyboard mapping table has been adjusted so that the CTRL— key outputs a RUBOUT (07FH) and the CTRL= key outputs the ' code (060H). The number of spare keyboard mapping entries has been increased from 4 to 10. SYSDEF main menu option

6 can be used to remap the HOLD key into CTRL S, BACKSPACE key into CTRL H, etc. It can also be used to remove any or all mapping by using a "-" for the mapped code as described on the SYSDEF menu.

### **Model 12/Model 16B Keyboard**

The Model 12 and Model 16B have additional function keys. These can be used to advantage in programs like Multiplan to control additional functions:

<u>Function Key</u>	<u>Hex Code</u>	<u>CTRL Key</u>
F1	01	A
F2	02	B
F3	04	D
F4	0C	L
F5	15	U
F6	10	P
F7	0E	N
F8	13	S

### **Garbled Characters from Keyboard**

Some keyboards will generate garbled characters if the REPEAT key and another key are pressed simultaneously. This is a hardware characteristic.

### **New CRT Control Codes**

Four new CRT control codes have been added:

ESC v	Turn on cursor (lower case v)
ESC w	Turn off cursor (lower case w)
ESC \$	Turn on graphics mode
ESC %	Turn off graphics mode

The graphics mode means that all following alpha characters are masked with 09FH until graphics mode is turned off. This means that @ is graphics 0, A or a is graphics 1, B or b is graphics 2, etc. The graphics mode may be easier to use than the high order bit set mode which is still available.

### **CBASIC Random Access Files**

There are two versions of the run time program CRUN.COM for CBASIC. One of these is for CP/M 1.4 and can handle random access files up to 512K bytes long. The other version, CRUN23.COM or CRUN23x.COM is for CP/M 2.2 and will process random access files as large as 8 megabytes. If you notice your program doing strange things when your files get large, check to be sure you have the correct version of CRUN.COM.

### **Serial I/O**

There are many programs on the market and in the public domain for transferring files from computer to computer over the telephone line via serial communications. These programs usually will allow the operating system to set up the bit rate, parity and number of stop bits, but will perform the actual data transfers on the I/O ports themselves.

In order to install one of these programs you need certain hardware specific information about the serial I/O ports (Zilog SIO/DART):

Data port (Channel A)	0F4H
Status and command port (Channel A)	0F6H
Data port (Channel B)	0F5H
Status and command port (Channel B)	0F7H
Transmit buffer empty mask	004H
Receiver buffer full mask	001H
Status bit is true when 1	
Initialization done by operating system	

Use SYSDEF to set up the operating parameters such as bit rate, parity, stop bits, etc. The SYSDEF transmit protocol selections have a different meaning because the CP/M I/O drivers are not used by these file transfer programs. The "No Protocol" selection turns off "Auto enables" so that CTS and DCD signals are not required for data transfer to occur. Any of the other protocol selections (it doesn't matter which one you pick) will turn on "Auto enables" so that CTS must be present for a transmission to occur and DCD must be present for receive to occur. These signals are normally generated by modems.

The printer parameters are ignored by the file transfer program. On later production Model IIs and all Model 12s and 16s, the transmit bit rate parameter on port A can not be set differently from the receive bit rate and the receive bit rate will determine the actual bit rate.

### **EIOS Function Calls**

Contrary to page 23 of the ATON CP/M manual, the IX and IY registers may be modified by EIOS processing.

### **Direct BIOS Disk I/O**

In previous releases, direct disk I/O (BIOS entries SELDSK, SETTRK, SETSEC, READ, WRITE, etc.) did not function as expected in Level I. This has been rectified so that programs such as DU.COM, CP/M-68K and REFORMATTER will operate correctly.

### **Programmable Density Select**

Your program can force a density reselection by using a call to the BIOS SELDSK entry with bit 0 of register E set to zero, as well as using the floppy disk EIOS function 0D0H described on page 24 of the ATON CP/M manual.

### **Standard Graphics and Hi-Res Graphics Board**

Both the standard graphics (codes 00-1F) and the hi-res graphics board (26-4104) screen outputs will be altered in 25 line screen mode. If you find this objectionable, use the 24 line mode, selectable by SYSDEF main menu option 2. The hi-res graphics board can be accessed under CP/M by using the graphics BASIC package supplied with the board under BASIC

Surrogate, which is a separately priced software utility package available from ATON.

### **Tri-Soft CP/M 68K**

This package functions with the ATON CP/M 64K (Level I) and 80K systems. It is not currently functioning with ATON 96K (Level II), although Tri-Soft has been given the information necessary for them to make it function with Level II. The files associated with LDM68 and M68 must be located on drive A: for correct operation.

### **Interrupt Processing**

ATON CP/M relies on clock and other interrupts for its functioning. Two stack locations (4 bytes) must be available whenever interrupts are enabled for interrupt processing.

### **Sharing Data Between Job Steps**

You can gain some space at the top of memory by using MOVCPM to move the system down in increments of 256 bytes. This space can be used for I/O drivers or for communicating data between program links.

### **SUBMIT Files**

The SUBMIT/XSUB facility provided by Digital Research with CP/M is very useful, but also is fragile, so watch out for the following:

- a) No blank lines are allowed in the SUBMIT files. These will cause bizarre problems.
- b) If your SUBMIT file includes parameters (\$1, \$2, etc.) and you forget to put them on the SUBMIT file name command line, again the results are unpredictable.
- c) The XSUB facility modifies locations 1 and 2. These locations are used by many programs to locate the BIOS jump table, so those programs can't be used with XSUB unless they are modified. Under XSUB, the normal contents of locations 1 and 2 are saved at a location 2 bytes below the location pointed to by locations 1 and 2. If XSUB is active, location 1 will not be 3.

### **Modifying System Parameters by User Programs**

Study the program SETLPP.MAC for information on how to modify system parameters from user programs.

### **Aborting Programs from CP/M Messages**

Using the BREAK key or CTRL-C when a message is shown in reverse video in the upper right part of the screen will force the default drive to be drive A: and the user number to be zero. Use of the BREAK key at other times will not affect the default drive or user number unless the default drive is set to a non-existent drive.

## **Hardware Considerations**

A potential problem is static electricity generated by carpeting or room air ionizers. If you pick up a static charge from the carpet or air ionizer, then walk over to the computer, you can disable the computer until it is reset. The Models II and 16A are more sensitive to this than the Models 12 or 16B.

Turning the power on or off on the parallel port line printer can generate enough electrical noise to cause problems in the computer as well. Disconnecting pins 25 and 28 on the printer cable will help this some, although disconnecting pin 28 will also disable the printer offline check in CP/M.

Opening the diskette drive door in the middle of a disk read or write can cause a subsequent boot operation to report DISK ERROR RS. Hitting the reset switch again will clear that. Sometimes the DMA will hang up, making the RESET switch useless. The only way out of this is to power down the computer, wait 15-20 seconds, and turn it back on. Both of these problems stem from the lack of a master reset input to the DMA chip.

Opening the diskette drive door during a disk write can easily cause BDOS errors later on by corrupting the track format on one or more tracks.

## **Z-80 Wait State Jumpers and Memory Board Pull Ups**

Reliable operation on Model IIs and 16As may require that the wait state jumpers be properly set on the Z-80 CPU board. The jumper between U13 and U14 on the CPU board should be vertical (parallel with the long edge of U13). The jumper between U21 and U22 should be horizontal.

Also, jumpers should be installed between pins 1 and 2 as well as 5 and 6 on all the 64K memory boards installed in the system. Similar jumpers are located between pins A and B as well as W and V on the hard disk interface board.

## **Single Density Incompatibility**

Early single density disk controllers set a certain byte in the track format to a value different from what is now used as the standard. Single density diskettes using this old format cannot be read reliably by the WD-179X series of disk controllers which are used in the Models II and 16A. The old format doesn't seem to cause a problem with the WD-279X series of disk controllers used in the Models 12 and 16B. The old format is generated by computers using the WD-177X series of disk controllers and by the Intel MDS systems under the ISIS-II FORMAT command. However, the Intel MDS system using the ISIS-II IDISK command will generate a compatible disk.

## **Low Memory Locations**

The first 256 bytes of memory are used as a communication region by the operating systems and the hardware and user programs, and its use must be carefully coordinated. Usage of low memory is described on pages 18 and 19 of the ATON CP/M reference manual. Locations 50H through 5AH are available for user programs in all ATON CP/M systems. Under the 64K (Level I) and 80K systems, locations 28H through 37H are also available. Locations 28-37H are not available under the ATON 96K (Level II) systems. Location 5B is modified by DDT, SID and ZSID when using the R command.

Some programs use the RST op-code instead of the CALL op-code as a way to save space. BDS "C" uses RST 6 in some cases and Pascal. MT+ uses RST 3 for some library routines. These conflict with ATON CP/M but there are compiler and linker options available with these languages to change or suppress RST usage. RST 1 and RST 7 are available for use by languages under ATON CP/M. Pascal MT+ allows you to specify the RST number to be used by the command (\*\$Cn\*) at the beginning of the source code. See the Pascal MT+ User Guide for further information.

### **Recovering Floppies with Bad Sectors**

If you discover that one of your floppies with critical data on it has a bad sector, a partial recovery can sometimes be obtained using the COPY program. The COPY program will make extensive efforts to read a track of data and will revert to sector by sector mode if a full track cannot be read without error. If an error occurs it will be logged on the console and the copy process continues. Once the copy process is complete, the new disk can be edited by normal means without BDOS errors occurring. Try to put the defective disk in all your drives because the slight head alignment differences between drives may be enough to allow the data to be read.

### **Lifeboat, FMG and Cybernetics Double Density Formats**

Lifeboat, FMG and Cybernetics double density formats are not compatible with ATON CP/M. Lifeboat extended density format is compatible with ATON CP/M. Convert files on these incompatible formats to single density to transfer them to ATON CP/M. The ATON system can read P&T single sided double density but not P&T double sided double density disk formats.

### **Corvus Disk**

ATON CP/M (64K Level I) can be used with the Corvus disk using the C-LINK software supplied by Corvus. At every warm boot, CP/M checks the current disk number. If it is greater than 3, it resets it to zero, assuming that there is only the four possible floppy drives on the system. To bypass this check so that the default drive can remain set on E: or any other drive, run the SUBMIT file CVPATCH:

1. SUBMIT CVPATCH
2. Reboot the system to avoid false 'SYNCHRONIZATION ERROR' MESSAGE.
3. MOVCPM
4. SYSGEN

### **AUTO EXEC**

The automatic execution program will allow you to set up command lines in lower case letters. Note that the program file name must be in upper case or CP/M won't find the file and will give you a "?" error message.

### **Installing WordStar**

WordStar 2.10, 3.00 or 3.30 can be installed in a number of ways. The simplest technique is to select the ADM-3A or SOROC-120 terminal option. This does not allow use of the cursor keys. With the ADM-3A option, no reverse video is used. With the SOROC-120, the reverse video is available, with the text in reverse video. This has the advantage of also working on serial ports A and B, whereas the techniques below only work on the console. You may wish to have two versions of WordStar on the disk, one installed



as above for use on a serial port and one installed as below for use on the console. Use the ADDS-25 option for a Radio Shack DT-1 terminal on the serial port.

WordStar 3.00 and 3.30 can also be installed using memory mapped video. This offers greatly improved display speed, reverse video with the text in normal video and use of the cursor keys.

To install WordStar 3.00 (see below for WordStar 3.30):

1. Execute the INSTALL program.
  - a. Answer N to "Do you want a normal first time installation of WordStar?"
  - b. Answer B for installation option.
  - c. Answer WSU.COM for "File name of WordStar to be installed." Be sure that WSU.COM is an unaltered version of WordStar.
  - d. Answer WS.COM for "File name for saving INSTALLED WordStar."
  - e. Answer % for WordStar terminal menu.
  - f. Answer N for "Does CP/M leave the Video Board enabled?"
  - g. Answer Y for "TRS-80 Model 2 terminal OK?"
  - h. Enter the appropriate choice for your printer on the printer selection code. C for daisy wheel Radio Shack printer, A for dot matrix Radio Shack printers, possibly other choices for non-Radio Shack printers.
  - i. Enter N for the communications protocol. If you use X-ON, X-OFF protocol here, then specify the DCD/CTS protocol with transparent (option B) printer mode via SYSDEF.
  - j. Enter L for the drive selection.
2. Patch the WS.COM file using the command SUBMIT WS30PAT. This may take several minutes to execute. If this patch file is not run, then WordStar will crash after a short period and the cursor keys described in Step 3 below will not be available.
3. If you wish to use the cursor keys, it will be necessary to remove the key code remapping done by the operating system. If you use this technique to enable the cursor keys for WordStar, it may disable them for other application programs.
  - a. Execute the SYSDEF program.
  - b. Select option 6 - Keyboard mapping table.
  - c. Select option 0 - Add, delete or change table entries.

- d. Enter 1C for first character.
  - e. Enter - for second character.
  - f. Enter 1D
  - g. Enter -
  - h. Enter 1E
  - i. Enter -
  - j. Enter 1F
  - k. Enter -
  - l. Press the "Enter" key twice.
  - m. Use option 8 to write the modified mapping table to disk.
4. Be sure to use the SYSDEF program to set printer "lines per page" to "page length" so that WordStar can properly do page formatting when printing.

To install WordStar 3.3:

- 1. Execute the WINSTALL program.
  - a. Answer Y to "Would you like to continue?"
  - b. Answer WS for the product name.
  - c. Enter "ENTER" for drive name.
  - d. Enter "ENTER" for the uninstalled WordStar file name.
  - e. Enter "ENTER" for the installed WordStar file name.
  - f. Answer N to the question "Is your terminal on this list?" - which includes TRS-80 Model II.
  - g. Answer 2 to select second menu of standard terminal types.
  - h. Enter K to select SOROC IQ-120/140.
  - i. Enter "ENTER" to verify selection.
  - j. Select features from other menus such as printer type, WordStar features, etc. as required. If you select the X-ON, X-OFF printer protocol, then specify the DCD/CTS protocol with transparent (option B) printer mode via SYSDEF.
  - k. Finally, select X to exit from install program. At this point WS.COM is usable on terminals attached to the serial ports as well as on the

console. You may wish to save a copy of WS.COM for use on the serial ports.

1. Now follow steps 2, 3 and 4 from the WordStar 3.0 installation above, using the file name WS33PAT.SUB instead of WS30PAT.SUB. This will modify WS.COM so that it will make use of memory mapped video and the cursor keys (if step 3 is used).

#### **dBASE II Version 2.4**

Use the ADM-3A option (C) if you do not want reverse video on the screen or the SOROC option (U) if you want reverse video. With this version of dBase, the cursor keys will work whether or not they are mapped for the ADM3/SOROC or are in "native" TRS-80 mode. This means the cursor keys will still work even if you have remapped them for use with WordStar.

#### **SuperCalc and SuperCalc 2**

Use the Lear Siegler ADM-3A or SOROC option if you do not want reverse video on the screen. SuperCalc does not implement reverse video for the SOROC-120 but a hidden custom installation option can be used as follows:

- a. Choose option H for Televideo.
- b. Choose option 2 for Televideo 912/920.
- c. Choose option B to return to previous menu.
- d. Choose option X for custom installation.
- e. Choose option N to not erase previous values.
- f. Choose option A to edit screen contents.
- g. Choose option 1 for clear screen.
- h. Choose option Y to change clear screen code.
- i. Enter 1 for number of bytes to follow.
- j. Enter 1A for clear screen code.
- k. Choose option X to return to menu.
- l. Choose option B to edit attribute data.
- m. Choose 1 for set start cursor attribute.
- n. Choose Y to change set cursor attribute.
- o. Enter 2 for number of bytes to follow.

- p. Enter 1B for first data byte.
- q. Enter 29 for second data byte.
- r. Choose 2 for clear start cursor attribute.
- s. Choose Y to change clear cursor attribute.
- t. Enter 2 for number of bytes to follow.
- u. Enter 1B for first data byte.
- v. Enter 28 for second data byte.
  
- w. Choose X to exit menu.
- x. Choose E to edit miscellaneous data.
- y. Choose 8 (SuperCalc) or B (SuperCalc 2) to edit number of CRT attributes.
- z. Enter 2 for number of characters.
- aa. Enter N for no guard characters.
- ab. Choose X to exit menu.
- ac. If you wish to use the same cursor positioning keys as WordStar, i.e., you performed Step 3 of the WordStar 3.0 installation described above, then you should also do the following:
  - 1. Choose C to edit input keys.
  - 2. Choose 2 for UP key.
  - 3. Choose Y to modify the UP key.
  - 4. Hit the up arrow key. If you performed Step 3 of the WordStar installation described above, this will show as two up arrow characters (like the character on the 6 key); otherwise it will show as an up arrow followed by a K.
  - 5. In a similar fashion, change the other three keys.
  - 6. Choose X to exit the menu.
- ad. Choose F to edit terminal name.
- ae. Enter ATON CP/M 2.25 for terminal name.
- af. Enter X to exit menu.

8. Use 3 to set clear screen to &H1A.
9. Use 4 to set position cursor:
  - a. Start cursor positioning is &E=
  - b. Upper left corner is 0,0 (Answer N).
  - c. Row position is first (Answer Y).
  - d. Row number is modified by adding a value before sending (Answer 5).
  - e. Value added is 32 decimal.
  - f. Sequence separating row and column is null (empty).
  - g. The column number is modified by adding a value before sending (Answer 5).
  - h. Value added is 32 decimal.
  - i. Sequence ending cursor positioning is null (empty).
10. Both the initialize and reset Multiplan strings are null (empty).
11. Set erase to end of line to &ET.
12. Set erase to end of screen to &EY.
13. Use 9 to select reverse video.
  - a. Terminal has non-destructive reverse video (answer Y).
  - b. Starting sequence is &E)
  - c. Ending sequence is &E(
  - d. Terminal does not require special sequence to turn off reverse video (answer N).
14. Keyboard click and cursor on/off are all null (empty).
15. The sound bell character is &H07.
16. Number of rows is 24, columns if 80.
17. Set terminal name to ATON CP/M 2.25.
18. Select 0 to exit select mode and start tests.
19. After tests are complete, select 0 to complete installation.
20. Use the SYSDEF program to set printer "lines per page" to "page length" so that MultiPlan can properly do page formatting when printing.

### **Peach Text/Magic Wand**

Have your dealer set up Peach Text or Magic Wand to use the Lifeboat 2.25 driver - TRMTRS2A.HEX.