

# COMMODORE DPS-1101 DAISY WHEEL PRINTER

A Friendly Introduction to Your DPS-1101 Daisy Wheel Printer



**USER'S GUIDE**

**commodore**  
COMPUTERS

## USER'S GUIDE STATEMENT

“This equipment generates and uses radio frequency energy. If it is not properly installed and used in strict accordance with the manufacturer's instructions, this equipment may interfere with radio and television reception. This machine has been tested and found to comply with the limits for a Class B computing device peripheral in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. If you suspect interference, you can test this equipment by turning it off and on. If you determine that there is interference with radio or television reception, try one or more of the following measures to correct it:

- reorient the receiving antenna
- move the equipment away from the receiver
- change the relative positions of the equipment and the receiver
- plug the equipment into a different outlet so that the equipment and the receiver are on different branch circuits.

If necessary, consult your Commodore dealer or an experienced radio/television technician for additional suggestions. You may also wish to consult the following booklet, which was prepared by the Federal Communications Commission:

“How to Identify and Resolve Radio-TV Interference Problems”. This booklet is available from the U.S. Government Printing Office, Washington, D.C. 20402, Stock No. 004-000-00345-4.

# **COMMODORE DPS-1101 DAISY WHEEL PRINTER USER'S GUIDE**

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The information in this manual has been reviewed and is believed to be entirely reliable. No responsibility, however, is assumed for inaccuracies. The material in this manual is for information purposes only, and is subject to change without notice.

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The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that every entry should be supported by a valid receipt or invoice. This not only helps in tracking expenses but also ensures compliance with tax regulations. The document further outlines the steps for recording these transactions, from identifying the expense to entering it into the accounting system.

Next, the document addresses the process of reconciling bank statements. It explains how to compare the bank's records with the company's internal records to identify any discrepancies. Common reasons for these differences include bank fees, interest, and timing differences. The document provides a detailed guide on how to investigate these differences and adjust the accounts accordingly.

The third section focuses on the preparation of financial statements. It describes the various types of statements, such as the balance sheet, income statement, and cash flow statement, and how they are derived from the accounting records. The document also discusses the importance of reviewing these statements regularly to assess the company's financial health and performance.

Finally, the document covers the process of closing the books at the end of each accounting period. It details the necessary adjustments, such as depreciation and amortization, and the steps for transferring the ending balances to the beginning of the next period. The document concludes by emphasizing the importance of maintaining accurate and up-to-date financial records for the long-term success of the business.

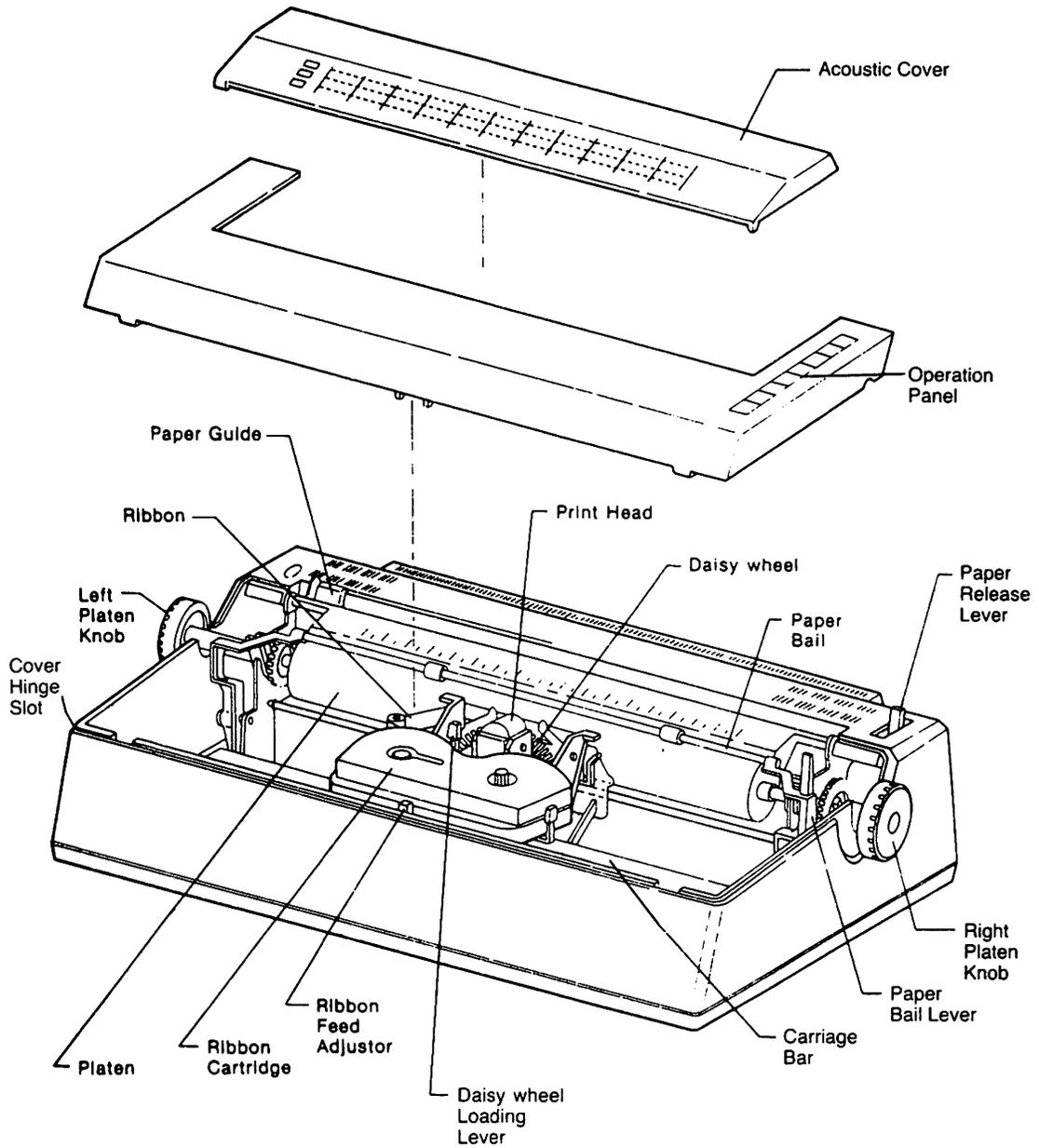
## OVERVIEW

*Chapter 1* of this guide tells you how to unpack, set up, and begin printing with your DPS-1101 printer. Once you have properly unpacked and set up the printer, the easiest way to begin printing is to use a word processing program. Simply follow the directions for printing given in your word processing manual. In most cases, you can print from a word processor by pressing two or three keys. For example, if you are using Easy Script on the Commodore 64, you only have to push the F1 function key and two letter keys—O (for Output) and P (for Print).

*Chapters 2 and 3* are primarily intended for users familiar with computer programming. These chapters cover the use of BASIC language commands and control codes.

*Chapter 4* explains the printer's Down Load capability. This advanced capability enables a programmer to create his or her own print table, through use of non-standard print wheels.

*Appendices A through G* provide detailed reference information.



**Figure 1 The DPS-1101**

## CHAPTER 1 HOW TO UNPACK, SET UP, AND USE THE PRINTER

### STEP-BY-STEP INSTRUCTIONS

**1. *Inspect the shipping carton for damage.***

If you find any external damage to the shipping carton and suspect that the printer may have been affected, contact your dealer.

**2. *Remove the plastic wrapping from the printer.***

**3. *Remove the styrofoam blocks located inside the printer.***

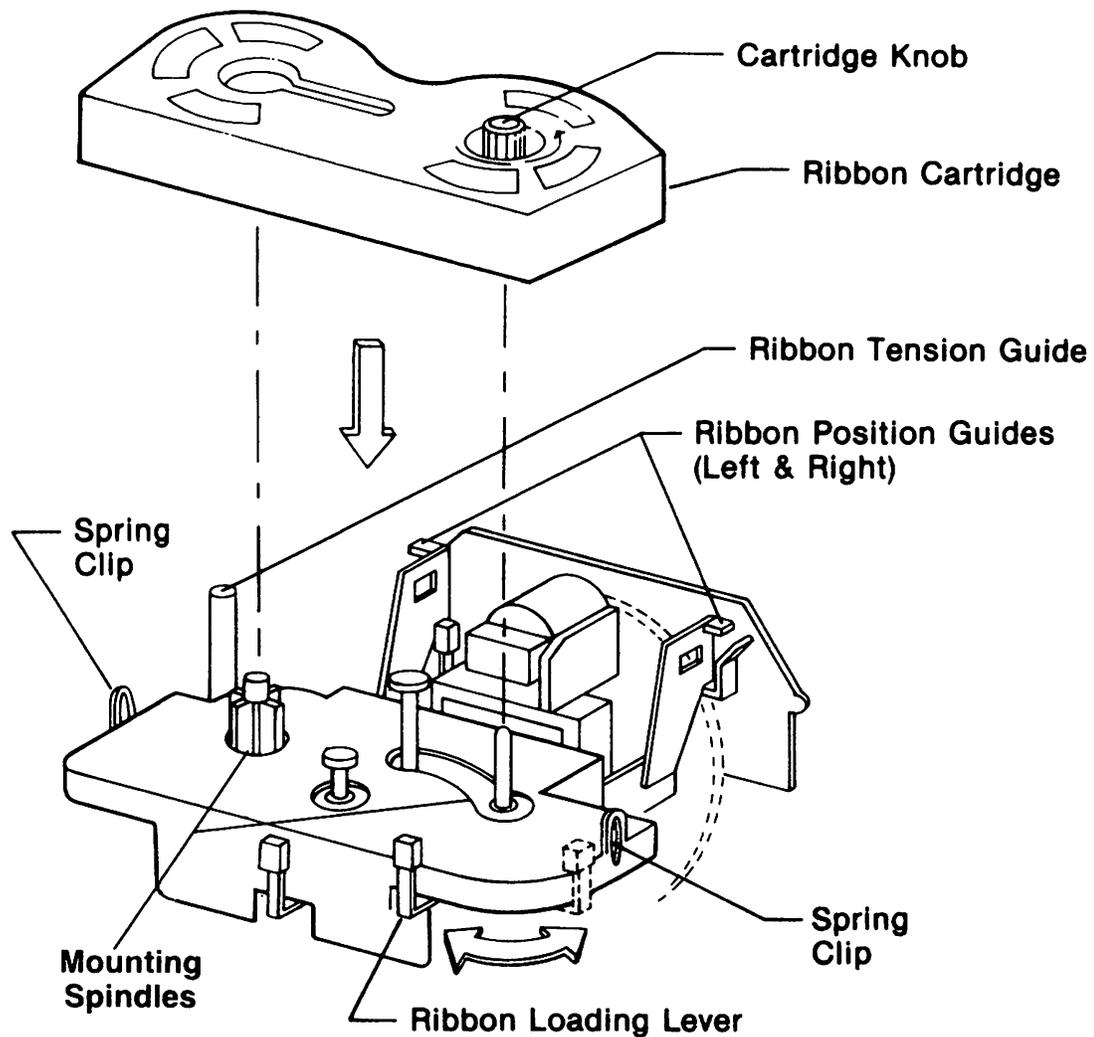
The block on the left contains the following items: power cord, interface cable, daisy wheel, ribbon cartridge, and rubber carriage stopper. If anything is missing, contact your dealer.

**4. *Remove the sheet of paper wrapped around the platen (see Figure 1).***

**5. *Remove the tape from the carriage bar (see Figure 1).***

**6. Install the ribbon cartridge (see Figure 2).**

- Move the ribbon load lever clockwise until it stops and locks into place.
- The ribbon feed adjustor should be set to SMALL except when printing with the proportional spacing feature on (described on page 6).
- Turn the cartridge knob in the direction of the arrows until you have wound about 6 inches of ribbon around the cartridge knob.
- With the ribbon facing the platen, place the cartridge on the two spindles and press down until it snaps into place in the spring clips on either side.
- Thread the ribbon around the ribbon tension guide and through the two ribbon position guides near the platen.
- Move the ribbon load lever counter-clockwise until it snaps into place.



**Figure 2 Installing the Ribbon Cartridge**

**7. Install the daisy wheel.**

Take the daisy wheel out of its plastic case. If it isn't already back, pull back the daisy wheel loading lever (see Figure 1) and drop the daisy

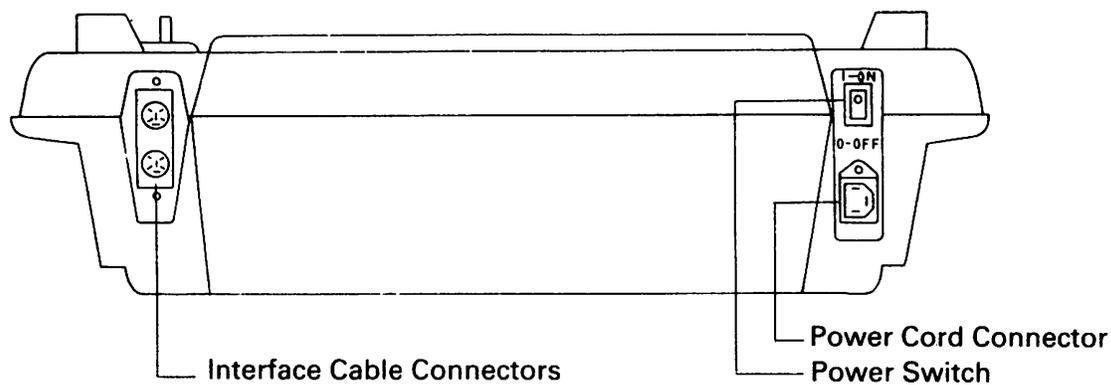
wheel into the space that opened up when you pulled back the lever. Make sure the raised letters on the daisy wheel are facing the platen, then push the loading lever forward to lock in the wheel.

**8. Attach the acoustic cover.**

Remove the plastic wrapping. Hold the cover perpendicular and slide it onto the two little pegs on either side of the cover hinge slot on the front/bottom of the opening of the printer (see Figure 1).

**9. Connect the power cord.**

Check the ON/OFF switch on the back of the printer (see Figure 3) and make sure the printer is OFF before you connect anything. Plug the power cord into the back of the printer under the ON/OFF switch and plug the other end into a grounded (3-prong) outlet. Don't turn the power on yet.



**Figure 3 Back Panel**

**10. Connect the interface cable.**

Make sure your computer (and disk drive or any other peripherals) is turned off. Both ends of the interface cable are identical so it doesn't matter which end you plug into the printer. It also doesn't matter which serial port that you plug the cable into (see Figure 3). If you have a disk drive hooked up to your computer, connect the printer interface cable to the drive. Otherwise, plug the cable into the computer.

**11. Insert paper.**

You can use continuous feed or single sheets. Either way, insert the paper just as you would for a typewriter. First line up the paper guide (see Figure 1) with the first white mark on the left end of the ruler. Then pull back the paper bail lever and insert the paper in the slot behind the ruler. Use the platen knob to roll the paper into position. If the paper comes up crooked, pull back the paper release lever and straighten the paper. Then close the paper release lever and push the paper bail into place.

## 12. **Turn on the power and run the selftest.**

You can turn on the power to peripherals in any order you want, but always turn on power to the computer last. If you want the printer to go through its selftest, insert a sheet of paper sideways (because the printer prints an extra long line of characters as part of the selftest) then press the Form Feed button while turning on the power. The selftest checks the Buffer RAM, operation of the print mechanism, and print quality. On the first line, the printer prints: Selftest. On the second line it should print: RAM ok. If it doesn't, or if it prints RAM BAD, you've got a problem and should contact your dealer. After those first two lines, the printer begins printing characters on one long line and then just continues to repeat that line. To stop the selftest, and ready the printer for use, turn the power switch OFF and then back ON again (anytime you turn the power on and off, wait a couple of seconds after you turn it off before you turn it on again so that the printer has time to reset).

## **OPERATION PANEL**

As you can see in Figure 1, the operation panel is located on the top, right hand side of the printer. The panel contains the following:

Spacing selection buttons—Allow you to choose the number of characters per inch that the printer will print. The choices are 10, 12, and 15. You can also choose proportional spacing (ps), which spaces characters according to their size. That means the printer gives more space for wider letters such as "m" and less space for letters such as "i".

Power indicator—Lights up when the printer is ON.

Alert indicator—Lights up when the ribbon or paper has run out and when you stop the printer with the Pause/Clear button. It blinks when an error occurs (if an error does occur, refer to the troubleshooting guide later in this chapter).

Pause/Clear button—Stops and restarts the printer while it is printing. Also turns off the alert indicator after you've corrected the problem that caused it to light up.

Form Feed button—Advances the paper through the printer until it reaches "top of form," which is automatically set by the printer each time it's turned on. The "form length" is set at 11 inches. So, if you're at the "top of form" and press the Form Feed button, the printer advances the paper 11 inches. However, if the printer has printed, say for instance, 5 vertical inches worth of text, and you press the Form Feed button, the printer will advance the paper 6 inches. You must first press the Pause/Clear button for the Form Feed button to work. Then, after you use the Form Feed button, press the Pause/Clear button to clear the printer for printing.

## DIP SWITCHES

The DIP (Dual In-line Package) switches are located on the inside of the printer, in the front right hand corner (see Figure 1). They are used to set various operating characteristics of the printer. There are two sets of switches, labeled SW1 and SW2. SW1 is on the right and has 9 numbered switches. SW2 is on the left and has 3 numbered switches. You can use a pen to set the DIP switches to either ON or OFF, depending on what features you want. Pushing a switch toward the outside of the printer sets it ON. Pushing it toward the inside of the printer sets it OFF. The following table shows the feature associated with each switch. Following the table, each feature is described.

**Table 1. DIP Switch Settings**

SW1	Function	OFF	ON	Factory setting
1	auto line feed	off	on	ON
2	impression level	low	high	OFF
3	ASCII code	CBM	ASCII	OFF
4	international	see Table 2		OFF
5	character			OFF
6	set			OFF
7	type of paper	cont	single	OFF
8	paper length	11"	12"	OFF
9	lines per vertical inch	6	8	OFF

SW2	Function	OFF	ON	Factory setting
1	device	see Table 3		OFF
2	number			OFF
3	setting			OFF

### Auto line feed

When this is ON, the printer automatically skips to the next line when it receives a carriage return code. So if you have a word processing package that only sends a carriage return code when you press the RETURN key, you should have the auto line feed ON. If it isn't on, the printer won't skip down a line, it will simply go back to the beginning of the current line and type over it. On the other hand, if your word processing package sends a line feed code along with the carriage return code, the auto line feed should be turned OFF. If it isn't, it will skip down two lines: one for the word processing line feed code, and one for the auto line feed DIP switch. Refer to your software instruction manual for the required setting.

### Impression level

When this is ON, the print mechanism strikes the characters on the daisy wheel with more force, causing a darker image on the paper.

### **ASCII code**

Chooses between ASCII and CBM character sets (see Appendix B). Your software package instructions should tell you which character set you should use.

### **International character sets**

Chooses from among the character sets of several countries (see Appendix D for a list of special daisy wheels needed for the various character sets). The following table lists the DIP switch settings needed for each country's character set.

**Table 2. Switch Settings for International Character Sets**

<b>Country</b>	<b>Switch 5</b>	<b>Switch 6</b>	<b>Switch 7</b>
USA	off	off	off
France	off	off	on
Germany	off	on	off
England	off	on	on
Denmark	on	off	off
Sweden	on	off	on
Italy	on	on	off
Spain	on	on	on

### **Type of paper**

Chooses between continuous-feed and single sheet paper. When set for single sheet (ON), the printer automatically stops printing at the end of a page. Remove that page, insert another, and press the Pause/Clear button to continue printing again.

### **Paper length**

Set this switch to correspond to the length (11" or 12") of the sheets of paper you are using (whether a single sheet or a sheet of continuous-feed paper).

### **Vertical line spacing**

Chooses between 6 lines per vertical inch (OFF) and 8 lines per vertical inch (ON).

### **Device number**

Allows you to change the device number of the printer. When you type in a command on the computer, you have to include a device number so that the computer knows where to send the command (to the disk drive, to the printer, etc.). The normal device number for a printer is 4. Usually, there is no reason to change the device number. But say, for instance, you have two printers connected to your computer. You would then need to change the device number of one of them so that the computer would know which was which. The following table lists the possible device numbers and indicates how to set the switches for each.

**Table 3. Switch Settings for Device Numbers**

Device number	Switch 1	Switch 2	Switch 3
4	off	off	off
5	off	off	on
6	off	on	off
7	off	on	on
8	on	off	off
9	on	off	on
10	on	on	off
11	on	on	on

**NOTES:**

- \* Always turn the printer OFF before setting any DIP switches.
- \* The printer will operate with the DIP switches at their factory setting. It is a good idea to change them **only** when specifically instructed to do so (word processing package instructions, computer user's guide instructions).

**TROUBLESHOOTING CHART**

This chart shows you how to deal with the minor problems that sometimes occur when setting up a printer. If you encounter a problem that you can't work out, contact your dealer or Commodore customer service representative.

Problem	Probable cause	Solution
printer won't print (power indicator off)	no power	check power cord connection check ON/OFF switch
printer won't print (power indicator on)	improper connection improper loading of ribbon cartridge	check interface cable connection reload ribbon cartridge
printer OK, but paper won't advance	paper is jammed	remove and re-insert paper set auto line feed DIP switch ON
printed characters are too light or broken	bad ribbon wrong ribbon cartridge setting	replace ribbon cartridge change setting of ribbon feed lever
ribbon won't advance	improper loading of ribbon cartridge	reload ribbon cartridge
printer double spaces	improper DIP switch setting	set auto line feed DIP switch OFF

## **SAFETY TIPS**

1. Wait at least two seconds to turn on the power after it has been turned off so that the printer can initialize properly.
2. Don't connect or disconnect the interface cable if either the printer or the computer is on.
3. Keep your fingers, jewelry, and clothing clear of moving parts.
4. Don't place the printer in direct sunlight.
5. Turn the printer off immediately if an object falls into the printer. Then remove the object.
6. Don't move the print head manually.
7. Avoid extremes in temperature and humidity in the operating environment of the printer (temperatures between 41 and 95 degrees Fahrenheit and humidity between 30 and 85 percent are acceptable).
8. Don't touch the carriage rail — it can get hot.

## CHAPTER 2 BASIC COMMANDS FOR PRINTING

In this chapter, you will see how to print program listings and program results. To do that, you should be able to do the following:

- Operate your COMMODORE computer.
- Write elementary programs in BASIC language.
- OPEN and CLOSE files.
- Read and Write files to various peripheral devices (such as a DATAS-SETTE™ recorder or Commodore Disk Drive).

If you are not familiar with any of the above items, take the time now to read and understand the **USER'S GUIDE** and **PROGRAMMER'S REFERENCE GUIDE** for your computer and/or peripherals.

### THE OPEN COMMAND:

This command creates a linkage or correspondence between a given physical device and a file number. Its format is as follows:

```
OPEN fn, dn, sa  
or OPEN fn, dn
```

where:

**fn**

Is the file number (any number from 1 to 255). If the file number is greater than 127, any printed lines will be double spaced.

**dn**

Is the device number of the peripheral that will be receiving the file. Unless you change it with the DIP switches, the device number for the printer will be 4.

**sa**

Is the secondary address, a way of instructing the printer to perform certain tasks. More about this feature later.

### THE PRINT# COMMAND:

This command works just like the BASIC PRINT command except that it directs the output to the printer instead of the video screen. There must be no space before the #, and spaces after the # are ignored. The format is as follows:

```
PRINT# fn
```

where:

fn

Is the file number (any number from 1 to 255). This number must correspond to a given OPEN command.

#### **THE CLOSE COMMAND:**

Always use this command to close files when you have finished using them. The format is as follows:

CLOSE fn

where:

fn

Is the file number of the file being closed. This number must correspond to a given OPEN command.

#### **THE CMD COMMAND:**

Good programming practice dictates never using this statement within a program; use in direct mode only.

This statement transfers the primary output device (video monitor) to the file number specified in the command. The file must have been previously OPENed. When this command is in effect, all output generated by a PRINT or LIST command will be sent to the file instead of the video monitor. The format of the command is as follows:

CMD fn

where:

fn

Is the file number to receive the output.

To re-direct the output back to the primary output device, the PRINT# command must be used to send a blank line to the CMD device prior to closing the file. If a SYNTAX ERROR occurs, output will not be redirected back to the video monitor.

#### **PRINTING IN DIRECT MODE**

Now that you have reviewed the BASIC printing commands, let's put them to use in some practical applications. The direct mode allows you to communicate with your printer by entering printing commands directly into your computer via the keyboard and having them executed immediately.

The following example illustrates the direct mode procedure for listing a short BASIC program. In the example below, a single statement BASIC program is keyed into the computer's memory. A LIST command prints the

program on your video monitor. A file (#3) is OPENed to your printer and CMD3 is issued to that file (the printer is now **listening**). Issue the LIST command again. This time the output is sent to your printer. To **unlisten** the printer, send a blank to the OPENed file (PRINT# 3). Now close the file with a CLOSE3. All output will now appear on the video monitor.

<b>You type:</b>	<b>The screen displays:</b>	<b>The printer prints:</b>
10 PRINT "TEST"	10 PRINT "TEST"	
LIST	LIST 10 PRINT "TEST"	
OPEN 3, 4	OPEN 3, 4 READY.	
CMD3	CMD3	READY.
LIST	LIST	10 PRINT "TEST" READY.
PRINT#3	PRINT#3 READY.	
CLOSE3	CLOSE3 READY.	

### **PRINTING A PROGRAM**

To print a program, follow the examples below.

OPEN 4, 4: CMD4: LIST	Prints the program.
OPEN 4, 4: CMD4: LIST 100-500	Prints lines 100-500 of a program.
OPEN 4, 4: CMD4, "program name": LIST	Prints the program name and the program.

After executing any of the above examples, type in the following:

PRINT#4  
CLOSE4

or

PRINT#4, CHR\$(12)                      This performs a Form Feed  
CLOSE4

### **PRINTING UNDER PROGRAM CONTROL**

You have seen how to print a listing of a simple BASIC program directly from the keyboard. Although it is not good programming practice, the following

example shows how to print a listing of a BASIC program under control of the program itself. First, type in the following simple program:

```
10 OPEN 3, 4
20 CMD3
30 PRINT"PROGRAM CONTROL"
40 LIST
```

Now type LIST and the program will be listed on your video monitor. Type in the RUN command and the following should be printed on your printer:

```
PROGRAM CONTROL
```

```
10 OPEN 3, 4
20 CMD3
30 PRINT"PROGRAM CONTROL"
40 LIST
```

```
READY.
```

Now, type in the following:

```
PRINT#3
CLOSE3
```

Here's what happened:

The RUN command instructed the computer to execute the program in its memory. First, file#3 (device#4) was opened. Next, the CMD command instructed the computer to direct all subsequent output to file#3. The program then PRINTed **PROGRAM CONTROL** on file#3. The LIST command instructed the computer to print a listing of the program in its memory on file#3.

**REMEMBER:** When using the LIST command within a program, you must type the **PRINT# fn** command to **unlisten** the printer. Then you must type in the **CLOSE fn** command to close the file. Both of these commands can be entered into the program or after you have RUN the program. Using the LIST command or the CMD command in a program is generally not a good programming practice. It is suggested that you only use them in Direct mode.

## SECONDARY ADDRESSING

Earlier you were introduced to the secondary address concept in the discussion of the OPEN statement. This feature allows you to instruct your printer to perform the following functions:

Function	Secondary Address
Print data exactly as received in upper case/shifted lower case mode	0 (default)
Print data exactly as received in lower case/shifted upper case mode	7
Reset the printer	10

For each function you must OPEN a file using the appropriate secondary address, then issue a PRINT# command to that file. That instructs the printer to perform the function defined by the secondary address.

A program that takes advantage of all the above functions could have 3 files open at the same time. To avoid confusion, we recommend that you associate the following file number, with the corresponding secondary address in all programs for your printer (all examples in this guide follow this convention):

File Number	Secondary Address	Example
4	0	OPEN 4, 4 (OPEN 4, 4, 0)
7	7	OPEN 7, 4, 7
10	10	OPEN 10, 4, 10

The reason that the secondary address of 0 has been assigned file#4 is that a file number of 0 is not allowed.

A secondary address of 0 causes the printer to print ASCII data exactly as received in upper case/shifted lower case mode. Upper case/shifted lower case mode is the equivalent of Upper-case/Graphic Character Mode (Graphic Mode) in dot matrix printers (except graphic characters). In this mode, you can get a program list in upper-case characters.

The format for this command is as follows:

```
OPEN 4, 4    (OPEN 4, 4, 0)
PRINT#4 <, variable/data>
CLOSE4
```

In global upper case/shifted lower case mode, you can print in local lower case/shifted upper case mode. When you want to print data in local lower case/shifted upper case, you should use the Cursor Down Code[CHR\$(17)]. Conversely, when you want to print data in local upper case/shifted lower case, you should use the Cursor Up Code [CHR\$(145)].

A secondary address of 7 allows the printer to print data exactly as received in lower case/shifted upper case mode. The SYNTAX of the secondary addressing of 7 is compatible with that of all serial printers.

The format for this command is as follows:

```
OPEN 4, 4, 7
PRINT#4 <, variable/data>
CLOSE4
```

or

```
OPEN 7, 4, 7
PRINT#7 <, variable/data>
CLOSE7
```

In global lower case/shifted upper case mode, you can print in local upper case/shifted lower case mode. When you want to print data in local upper case/shifted lower case, you should use the Cursor Up Code [CHR\$(145)]. Conversely, when you want to print data in local lower case/shifted upper case, you should use the Cursor Down Code [CHR\$(17)].

A secondary address of 10 resets the printer.

The format for this command is as follows:

```
OPEN 10, 4, 10  
PRINT#10  
CLOSE10
```



## CHAPTER THREE

### CONTROL CODES

#### ASCII CODES

<b>Code</b>	<b>Chr\$ Value</b>	<b>Function</b>
BS (Back Space)	Chr\$ (8)	Backspaces the carriage one character position.
HT (Horizontal Tab)	Chr\$ (9)	Advances the carriage to the next tab stop on the right. If no tab has been set, this code is ignored.
LF (Line Feed)	Chr\$ (10)	The printer feeds one line (either 1/6" or 1/8" depending on the DIP switch setting). At the bottom margin the printer feeds to the top margin.
FF (Form Feed)	Chr\$ (12)	Advances the paper to the next Top of Form (top margin). The amount of feed is determined by the DIP switch selectable form length.
CR (Carriage Return)	Chr\$ (13)	Moves the carriage to the left margin (with or without a line feed), depending on the DIP switch setting.
CD (Cursor Down)	Chr\$ (17)	Prints in lower case/shifted upper case mode. This local mode is cancelled by CR,LF,FF,CS,CU and auto carriage return codes.
ESC (Escape)	Chr\$ (27)	Used with other characters to form escape codes. Covered in the next section.
CS (Carriage Stand)	Chr\$ (141)	Moves the carriage to the left margin only when pin 3, DIP switch SW1 is OFF.
CU (Cursor Up)	Chr\$ (145)	Prints in upper case/shifted lower case mode. This local mode is cancelled by CR,LF,FF,CS,CD and auto carriage return codes.

## ESCAPE CODES

<b>Code</b>	<b>Chr\$ Value</b>	<b>Function</b>
ESC 1	Chr\$(27) + Chr\$(49)	Sets a horizontal tab stop at the current carriage location. Up to 16 tab stops can be set.
ESC 2	Chr\$(27) + Chr\$(50)	Clears all horizontal and vertical tabs.
ESC 8	\$1B38    \$1B \$38 Chr\$(27) + Chr\$(56)	Clears individual horizontal tabs at the current carriage location.
ESC 9	Chr\$(27) + Chr\$(57)	Sets the left margin at the current carriage location.
ESC 0	Chr\$(27) + Chr\$(48)	Sets the right margin at the current carriage location.
ESC T	Chr\$(27) + Chr\$(84)	Sets the top margin (Top of form) at the current carriage location.
ESC L	Chr\$(27) + Chr\$(76)	Sets bottom margin at the current carriage location.
ESC C	Chr\$(27) + Chr\$(67)	Clears the top and bottom margins.
ESC 5	Chr\$(27) + Chr\$(53)	Clears backward print mode.
ESC 6	Chr\$(27) + Chr\$(54)	Places the printer in backward print mode, provided that the last print line was terminated by an LF, ESC LF, or CR code before the ESC 6 code was received. In backward print, the carriage moves to the left instead of to the right. Tabs, carriage return, all paper movement functions are unaffected by backward print. Clear this mode with an ESC 5 or a CR code.

<b>Code</b>	<b>Chr\$ Value</b>	<b>Function</b>
ESC LF	Chr\$(27) + Chr\$(10)	Causes a negative line feed (the printer feeds in the opposite direction of normal line feed so that it prints on the line above the line just printed).
ESC D	Chr\$(27) + Chr\$(68)	Causes a negative half-line feed (1/2 VMI). If the VMI (see next section) is set by some odd number in terms of multiples of 1/48 inch, the amount of movement is determined on a round-off basis.
ESC U	Chr\$(27) + Chr\$(85)	Causes a half-line feed. If the VMI is set by some odd number in terms of multiples of 1/48 inch, the amount of movement determined on a round-off basis.
ESC US n	Chr\$(27) + Chr\$(31) + Chr\$(n)	Alters the standard HMI, which determines how the carriage spaces after printing a character. The "n" in the code corresponds to the "decimal data in the following: $HMI = (\text{decimal data} - 1) \times 1/120$ " (the maximum decimal data is 127).
ESC RS n	Chr\$(27) + Chr\$(30) + Chr\$(n)	Alters the standard VMI, which determines the paper feed amount. The "n" in the code corresponds to the "decimal data in the following: $VMI = (\text{decimal data} - 1) \times 1/48$ " The maximum decimal data is 127).
ESC FF n	Chr\$(27) + Chr\$(12) + Chr\$(n)	Sets the number of lines per page by using decimal data, which corresponds to the number of lines per page. The minimum number of lines per page is 1, the maximum is 126. $\text{Length} = \text{decimal data} \times \text{VMI}$ inches

<b>Code</b>	<b>Chr\$ Value</b>	<b>Function</b>
ESC S	Chr\$ + Chr\$(83)	Sets HMI to 10 CPI.
ESC HT n	Chr\$(27) + Chr\$(9) + Chr\$(n)	Positions the carriage at any of the first 128 print positions without setting any tabs. The "n" is the decimal data that represents the desired position. The left-most position is 1. Horizontal position = (decimal data - 1) x HMI
ESC VT n	Chr\$(27) + Chr\$(11) + Chr\$(n)	Positions the carriage on any of 128 possible lines on the page. The "n" is the decimal data that represents the desired line. The top line of the page is 1. Vertical Position = (decimal data - 1) x VMI. If the vertical position is beyond the bottom margin and before the top margin, the code is ignored.
ESC Y	Chr\$(27) + Chr\$(89)	Prints symbol 1.
ESC Z	Chr\$(27) + Chr\$(90)	Prints symbol 2.
ESC H	Chr\$(27) + Chr\$(72)	Prints symbol 3.
ESC I	Chr\$(27) + Chr\$(73)	Prints symbol 4.
ESC J	Chr\$(27) + Chr\$(74)	Prints symbol 5.
ESC K	Chr\$(27) + Chr\$(75)	Prints symbol 6.
ESC CR P	Chr\$(27) + Chr\$(13) + Chr\$(80)	Resets the printer to its initial power-up state.
ESC /	Chr\$(27) + Chr\$(255) (CBM ASCII mode)	Auto bi-directional printing ON.
ESC \	Chr\$(27) + Chr\$(92) (Standard ASCII mode)	Auto bi-directional printing OFF.

<b>Code</b>	<b>Chr\$ Value</b>	<b>Function</b>
ESC P	Chr\$(27) + Chr\$(80)	Proportional spacing (PS) ON. PS unit values represent one-half the width required by a proportionally-spaced character. The letter "A" for example has a PS value of 7, which is one-half the 14/120" spacing an "A" requires. Carriage movement is calculated by adding the PS unit values of the characters to be printed. Thus, if the carriage moves 10/120" after printing "A" and before printing "i" it's because that's the sum of the PS unit values of the "i" (3) and "A" (7).
ESC Q	Chr\$(27) + Chr\$(81)	Cancels proportional spacing and sets the printer to 10 characters per inch.
ESC DC1 n	Chr\$(27) + Chr\$(17) + Chr\$(n)	<p>Offset selection</p> <p>For proportional space printing, to add or subtract a constant to each value of the table, the sequence ESC DC1 n should be used. The value of "byte" is added to each value of the table or HMI if it is controlling size, as well as to the space character. This continues until another ESC DC1 n (n = byte) sequence is received, or until offset is cleared by a carriage return or the ESCX.</p> <p>"n" is as follows:</p> <ul style="list-style-type: none"> <li>Bits 0-5 = Size of offset</li> <li>Bit 6 = Sign of offset (1 = negative)</li> </ul> <p>If the resulting character size is zero, no carriage movement will occur.</p>

<b>Code</b>	<b>Chr\$ Value</b>	<b>Function</b>
ESC E	Chr\$(27) + Chr\$(69)	Auto underline ON.
ESC R	Chr\$(27) + Chr\$(82)	Auto underline OFF.
ESC O	Chr\$(27) + Chr\$(79)	Bold print ON. This mode is cancelled by a CR code.
ESC W	Chr\$(27) + Chr\$(87)	Shadow print ON. In shadow print, the printer prints a character twice with a carriage movement of 1/20" between the two. This mode is cancelled by a CR code.
ESC &	Chr\$(27) + Chr\$(38)	Bold/Shadow Print Mode OFF

**Note:** The auto underline, bold print and shadow print are mutually exclusive. That is, only one of them can be used at a time.

ESC %	Chr\$(27) + Chr\$(37)	Increases carriage settling time to 50 msec. That provides more time for mechanical vibration to subside before printing begins. That improves print quality, with the least sacrifice of print time.
ESC N	Chr\$(27) + Chr\$(78)	Cancels the increased carriage settling time mode.
ESC X	Chr\$(27) + Chr\$(88)	Cancels all of the following modes: auto underline bold print shadow print offset selection

## **DEFINITIONS**

The following are definitions of some terms used in the previous sections.

### **HMI (Horizontal Motion Index)**

The amount of carriage movement after a character is printed. 1 unit is 1/120" and 0 — 125 units can be designated.

### **VMI (Vertical Motion Index)**

The amount of line feed between printed lines. One unit is 1/48" and 0 — 125 units can be designated.

### **Absolute Horizontal Position**

The horizontal distance from the current position to the next. One unit is 1/120" and 0 — 1312 units can be designated.

### **Absolute Vertical Position**

The distance of the paper feed from the current position to the next line. One unit of this movement is 1/48" and 0 — 15,750 units can be designated.

### **Print position**

All the possible printing character numbers per line when characters are printed by the indicated HMI. Horizontal print position = HMI + 1. The printing number of characters is 110 when they are printed when HMI = 12 and the Horizontal Position is 1308.

### **Line Number**

The number of lines when the paper feed is made by the designated VMI. Vertical line number = VMI + 1  
The number of lines is 66, when a new line is made with VMI = 8 and the Horizontal Position is 520.

### **Lines Per Page**

The actual number of print lines per page of paper. Lines per page can be designated to any number from 1 through 126.

## **EXAMPLE PROGRAM**

We've included the following program as an example of how to incorporate some of the previously covered control codes into your own BASIC programs.

```
100 REM THIS PROGRAM DEMONSTRATES HOW TO USE CONTROL & ESCAPE CODES.
110 ESC$=CHR$(27) :REM CHR$(27) IS THE ESCAPE CHARACTER.
120 OPEN7,4,7 :REM OPEN LOWER CASE PRINTER CHANNEL.
130 PRINT#7,"THIS LINE IS PRINTED UNENHANCED."
140 REM USE TABLE OF CONTROL CODES TO FIND NECESSARY VALUES.
150 PRINT#7,CHR$(27)+CHR$(79); :REM SEND ESCAPE + BOLD PRINT CODE.
160 PRINT#7,"THIS LINE IS PRINTED IN BOLD PRINT."
170 PRINT#7,CHR$(27)+CHR$(26) :REM SEND ESCAPE + BOLD PRINT OFF CODE.
180 PRINT#7,CHR$(27)+CHR$(87); :REM SEND ESCAPE + SHADOW PRINT CODE.
190 PRINT#7,"THIS LINE IS PRINTED IN SHADOW PRINT."
200 PRINT#7,CHR$(27)+CHR$(26) :REM SEND ESCAPE + SHADOW PRINT OFF CODE.
210 PRINT#7,CHR$(27)+CHR$(69); :REM SEND ESCAPE + UNDERSCORE CODE.
220 PRINT#7,"THIS LINE IS PRINTED IN AUTO UNDERSCORE MODE."
230 PRINT#7,CHR$(27)+CHR$(82) :REM SEND ESCAPE + UNDERSCORE OFF CODE.
250 REM THE NEXT PRINTED LINE IS AN EXAMPLE OF NEGATIVE LINE FEED.
260 PRINT#7,"ARITHMETIC DIVIDE SIGN IS :::::"
270 PRINT#7,CHR$(27)+CHR$(10); :REM SEND ESCAPE + NEGATIVE LINE FEED.
280 PRINT#7,"-----"
300 REM SOME CONTROL CODES SHOWN IN THE TABLE DO NOT NEED ESCAPE CHARACTER.
310 PRINT#7,CHR$(12); :REM SEND FORM FEED CHARACTER.
320 PRINT#7,"THIS IS ON PAGE TWO."
350 REM THE NEXT ESCAPE EXAMPLE REQUIRES 3 VALUES ACCORDING TO THE TABLE.
360 PRINT#7,CHR$(27)+CHR$(9)+CHR$(15); :REM ESCAPE HORIZ. TAB TO COLUMN 15.
370 PRINT#7,"THIS STARTS PRINTING IN COLUMN 15."
380 CLOSE7
390 REM USE THE ABOVE EXAMPLES AS A GUIDE WHEN WRITING YOUR OWN PROGRAMS.
```



## CHAPTER 4 DOWN LOAD

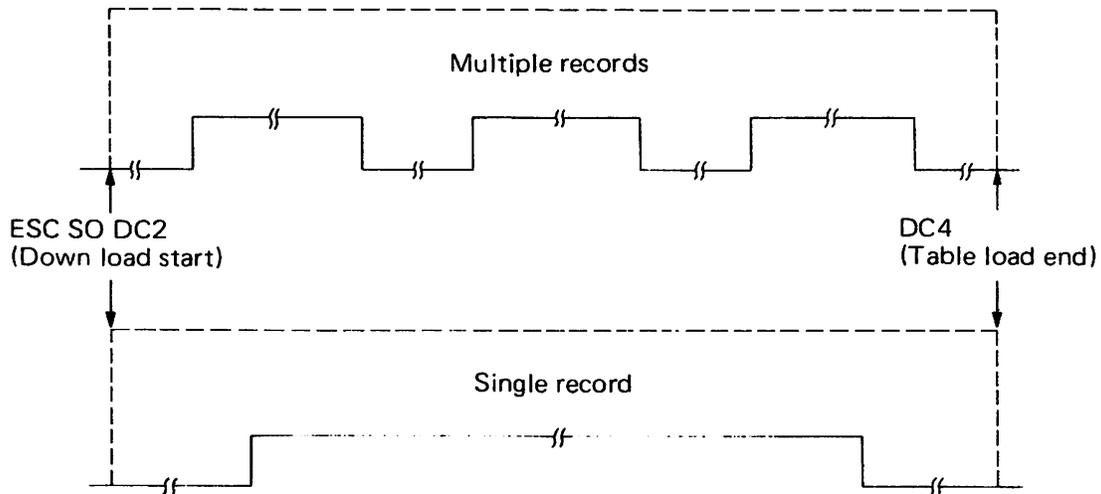
The Down Load feature enables a programmer to create his own print character table. This allows for the use of non-standard and special print wheels. It is basically a "look-up" table that specifies a particular print wheel spoke, hammer energy, and proportional space unit to be printed for any particular received character code.

Down load mode starts when ESC SO DC2 is received, and ends when DC4 is received. Once the down load procedure has been completed, the down load table is automatically selected. Down load is aborted when power is turned off, when an error occurs, or when a remote reset (ESC CR P) is received.

**NOTE:**

If you are using one of the daisy wheels described in Appendix E, there is no need to Down Load the character table. The tables for those wheels are in ROM. Select the appropriate table by setting the DIP SW1, switches 4, 5, and 6.

There are two variations of the down load procedure: down loading the table by a single record, and down loading by multiple records.





## 2 Record Type Character

Record type character must be an ASCII "0" or "9" will simply be ignored. Any character other than a "0", "1" or "9" is detected as a down load error.

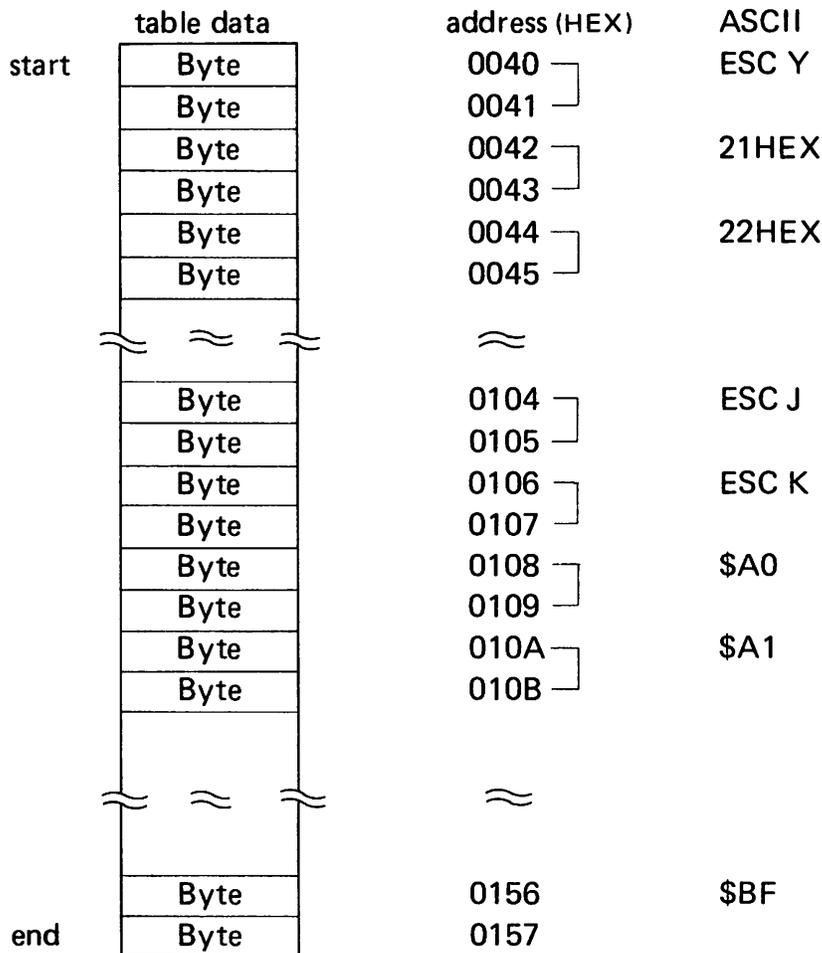
## 3. Byte Count

The byte count shows the number of total input bytes per 1 record.

The byte count shows the number of data bytes to follow, including the address and checksum.

## 4. Load Address

- The load address consists of 2 bytes.
- It specifies the starting address in memory where the table data is to be loaded.
- The block address allocated to this extends from HEX 0040 through 0107. A load address outside this range is interpreted as a down load error.
- The load address must be equal to two times the hex value of the first ASCII character of the record. (excluding ESC H, I, J, K)



Note:	Symbol	Code	Address (HEX)
	ESC Y	ASCII 20HEX	0040-0041
	ESC Z	ASCII 7FHEX	00FE-00FF
	ESC H		0100-0101
	ESC I		0102-0103
	ESC J		0104-0105
	ESC K		0106-0107

The load address of the first record is always HEX0040.

## 5. Table Data

The table data is shown in binary notation as follows:

Bit	....	7	6	5	4	3	2	1	0
1st Byte	....	P	H	H	H	Ps	Ps	Ps	Ps
2nd Byte	....	R	S	S	S	S	S	S	S

P ..... 1 Printable position  
0 Nonprinting position

H ..... Hammer energy 0 – 7

Ps ..... Proportional space value 0 – 15

R ..... Always 0

S ..... Spoke position 0 – 99

All of the 100 characters in the table data must be loaded. Otherwise, is interpreted as a down load error.

For any nonprinting print wheel positions, the “P” bit shown in the 1st byte must be a “0”. If ASCII code, which is equivalent to the print wheel position loaded at p=0 is input, the spacing volume will be the same as the space code.

Hammer energy consists of 8 levels from 0 through 7.

Proportional Space value can be chosen from the range of 0 – 15.

If Ps = 0, the carriage does not move.

Spoke position extends from 0 through 99. If any position outside this range is appointed, it is interpreted as a down load error.

When determining table data, see character level (APPENDIX D)

## 6. Checksum

It is “2’s” complement of the sum of all data bytes, starting with the byte count. Therefore, when all the data bytes starting with the byte count are added together, and the checksum is then added, the result must be zero. No end-around carry is used when the check sum is calculated.

If the checksum calculation results in a non-zero sum, it is interpreted as a down load error.

## SAMPLE PROGRAM

The following is a sample program to perform "down load". With this program, "down load" both for Standard ASCII mode and CBM ASCII mode can be performed.

```
1000 rem *****
1010 rem *
1020 rem * "Down Load Sample Program *
1030 rem *
1040 rem * (c) 1984 *
1050 rem * "Commodore Japan Limited *
1060 rem *
1070 rem *****
1080 :
1090 dim a(99),b(99),b1(191),b2(191)
1100 :
1110 esc$=chr$(27):cr$=chr$(13):lf$=chr$(10)
1120 so$=chr$(14) :d2$=chr$(18):d4$=chr$(20)
1130 ht$=chr$(9) :ff$=chr$(12)
1140 :
1150 open4,4
1160 print#4,esc$;cr$;"p" :rem remote reset
1170 :
1180 print chr$(147)
1190 print" which character mode do you select"
1200 print
1210 print" s = standard ascii mode"
1220 print" c = cbm ascii mode"
1230 print
1240 input " (s/c) c}}}" ;mode$
1250 if mode$="s" then gosub 1290 :goto 1390
1260 if mode$="c" then gosub 1340 :goto 1390
1270 goto 1180
1280 :
1290 print:print
1300 print"standard ascii mode selected"
1310 print:print"please set dip sw 103 on"
1320 return
1330 :
1340 print:print
1350 print"cbm ascii mode selected"
1360 print:print"please set dip sw 103 off"
1370 return
1380 :
```

```

1390 print:print:print
1400 print"press <<return>> when ready"
1410 geta$:ifa$=""then 1410
1420 if asc(a$)<>13 then 1410
1430 :
1440 print#4,"down load test";
1450 print chr$(147);
1460 if mode$="c" then gosub 1500
1470 if mode$="s" then gosub 1550
1480 goto1600
1490 :
1500 print#4," (cbm ascii mode)":print#4
1510 print:print
1520 print "                cbm ascii mode"
1530 return
1540 :
1550 print#4," (standard ascii mode)":print#4
1560 print:print
1570 print "                standard ascii mode"
1580 return
1590 :
1600 rem *****
1610 rem *      down load procedure body      *
1620 rem *****
1630 table=100                :rem table(all)
1640 for i=0 to table-1
1650 read s,p,h,ps            :rem data read
1660 print chr$(19);i
1670 a(i)=(p*128+h*16+ps)
1680 b(i)=s
1690 next i
1700 :
1710 t1=1:cs=32:ce=131
1720 s1=0                    :rem start high adrs ($00)
1730 s2=64                  :rem start low  adds ($20)
1740 :
1750 byte =3+table*2        :rem byte cont
1760 sum=byte+s1+s2        :rem sum set
1770 :
1780 print#4,esc$;so$;d2$; :rem down load set
1790 print#4,"s";          :rem start
1800 print#4,"l";          :rem type
1810 print#4,chr$(byte);   :rem byte count out
1820 :                      :rem check sum

```

```

1830 print#4,chr$(s1);           :rem load start(high)
1840 print#4,chr$(s2);           :rem load start(low)
1850 :
1860 print chr$(147);           :rem screen clr
1870 print:print
1880 print "                new code set"
1890 :
1900 for i=0 to table-1
1910 read code,cp
1920 print chr$(19);code,cp
1930 bl(code)=a(cp):b2(code)=b(cp)
1940 next i
1950 :
1960 print chr$(147);           :rem screen clr
1970 print:print
1980 print "                down loading"
1990 :
2000 for code=cs to ce
2010 :
2020 print#4,chr$(bl(code));:rem byte 1 out
2030 print#4,chr$(b2(code));:rem byte 2 outy.
2040 print chr$(19);code,bl(code),b2(code)
2050 sum = sum+bl(code)+b2(code):rem sum set
2060 next code
2070 :
2080 if sum<256 then goto 2100
2090 al=int(sum/256):sum=sum-(al*256)
2100 a3=255-sum                 :rem chk sum invert
2110 print#4,chr$(a3);         :rem check sum out
2120 print#4,d4$;             :rem down load end
2130 print"st";st
2140 :
2150 t1=t1+1
2160 if mode$="c" then if t1=2 then 2220
2170 :
2180 close4
2190 :
2200 goto 2280                 :rem goto print out
2210 :
2220 rem 2nd table for cbm mode
2230 s1=1:s2=08:table=32
2240 cs=160:ce=191
2250 goto 1750
2260 :

```

```

2270 rem *****
2280 rem * print data out routine *
2290 rem *****
2300 :
2310 print chr$(147) :rem screen clr
2320 print:print
2330 print"print character spectrum "
2340 print" & ascii code table"
2350 :
2360 open 4,4
2370 print#4,esc$;"q"; :rem prop space clr
2380 if mode$="c" then gosub 2450
2390 if mode$="s" then gosub 2580
2400 goto 2810
2410 :
2420 rem *****
2430 rem * character spectrum *
2440 rem *****
2450 for j=1 to 2 :rem cbm mode
2460 for i=32 to 63:print#4,chr$(i);:next i
2470 print#4
2480 for i=64 to 95:print#4,chr$(i);:next i
2490 print#4
2500 for i=160to 191:print#4,chr$(i);:next i
2510 print#4
2520 for i=192to 223:print#4,chr$(i);:next i
2530 print#4," "chr$(255)" ";
2540 gosub2690
2550 next j
2560 return
2570 :
2580 for j=1 to 2 :rem standard mode
2590 for i=32 to 63:print#4,chr$(i);:next i
2600 print#4
2610 for i=64 to 95:print#4,chr$(i);:next i
2620 print#4
2630 for i=96 to 127:print#4,chr$(i);:next i
2640 print#4," ";
2650 gosub2690
2660 next j
2670 return
2680 :
2690 print#4,esc$;"Y"; :rem esc y
2700 print#4,esc$;"Z"; :rem esc z

```

```

2710 print#4,esc$;"H";           :rem esc h
2720 print#4,esc$;"I";           :rem esc i
2730 print#4,esc$;"J";           :rem esc j
2740 print#4,esc$;"K"           :rem esc k
2750 print#4
2760 return
2770 :
2780 rem *****
2790 rem *   ascii code table   *
2800 rem *****
2810 print#4
2820 sp$=" ":a$="0123456789abcdef"
2830 print#4,sp$;sp$;
2840 :
2850 if mode$="c" then gosub 2890
2860 if mode$="s" then gosub 3070
2870 goto 3210
2880 :
2890 for i=0 to 15
2900 print#4,mid$(a$,i+1,1);sp$;
2910 next i
2920 print#4
2930 :
2940 for j=0 to 15
2950 print#4,mid$(a$,j+1,1);sp$;
2960 print#4,sp$;sp$;sp$;sp$;
2970 print#4,chr$(j+32);sp$;chr$(j+48);sp$;
2980 print#4,chr$(j+64);sp$;chr$(j+80);sp$;
2990 print#4,chr$(j+96);sp$;chr$(j+112);sp$;
3000 print#4,sp$;sp$;sp$;sp$;
3010 print#4,chr$(j+160);sp$;chr$(j+176);sp$;
3020 print#4,chr$(j+192);sp$;chr$(j+208);sp$;
3030 print#4,chr$(j+224);sp$;chr$(j+240)
3040 next j
3050 return
3060 :
3070 for i=0 to 7
3080 print#4,mid$(a$,i+1,1);sp$;
3090 next i
3100 print#4
3110 :
3120 for j=0 to 15
3130 print#4,mid$(a$,j+1,1);sp$;
3140 print#4,sp$;sp$;sp$;sp$;

```

```

3150 print#4,chr$(j+32);sp$;chr$(j+48);sp$;
3160 print#4,chr$(j+64);sp$;chr$(j+80);sp$;
3170 print#4,chr$(j+96);sp$;chr$(j+112)
3180 next j
3190 return
3200 :
3210 print#4
3220 print#4,"esc y ";esc$;"Y"
3230 print#4,"esc z ";esc$;"Z"
3240 print#4,"esc h ";esc$;"H"
3250 print#4,"esc i ";esc$;"I"
3260 print#4,"esc j ";esc$;"J"
3270 print#4,"esc k ";esc$;"K"
3280 :
3290 print#4,ff$; :rem form feed
3300 close4
3310 end
3320 :
3330 :
3340 :
3350 :
3360 rem *****
3370 rem * daisy wheel data set *
3380 rem *****
3390 :
3400 data 00,1,1,3:rem "."
3410 data 01,1,3,5:rem "z"
3420 data 02,1,6,5:rem "o"
3430 data 03,1,7,5:rem "b"
3440 data 04,1,4,5:rem "u"
3450 data 05,1,7,5:rem "d"
3460 data 06,1,2,3:rem "i"
3470 data 07,1,6,5:rem "a"
3480 data 08,1,6,5:rem "e"
3490 data 09,1,4,4:rem "s"
3500 data 10,1,2,4:rem "r"
3510 data 11,1,6,5:rem "n"
3520 data 12,1,7,5:rem "g"
3530 data 13,1,6,5:rem "c"
3540 data 14,1,6,5:rem "h"
3550 data 15,1,7,5:rem "p"
3560 :
3570 data 16,1,6,5:rem "k"
3580 data 17,1,4,5:rem "y"

```

```

3590 data 18,1,5,5:rem "["
3600 data 19,1,7,8:rem "@"
3610 data 20,1,5,6:rem "]"
3620 data 21,1,5,4:rem "back slash
3630 data 22,1,7,5:rem "q"
3640 data 23,1,4,5:rem "x"
3650 data 24,1,4,4:rem "t"
3660 data 25,1,7,6:rem "#"
3670 data 26,1,4,5:rem "~"
3680 data 27,1,5,5:rem "<"
3690 data 28,1,5,5:rem "l. bracket
3700 data 29,1,5,7:rem "cent
3710 data 30,1,5,6:rem "r. bracket
3720 data 31,1,1,4:rem "grave
3730 :
3740 data 32,1,7,7:rem "G"
3750 data 33,1,2,5:rem "umlaut
3760 data 34,1,7,7:rem "%"
3770 data 35,1,3,5:rem "J"
3780 data 36,1,7,7:rem "Q"
3790 data 37,1,7,5:rem "section
3800 data 38,1,6,7:rem "X"
3810 data 39,1,3,3:rem "!"
3820 data 40,1,7,7:rem "O"
3830 data 41,1,3,4:rem "/"
3840 data 42,1,7,7:rem "K"
3850 data 43,1,3,3:rem "("
3860 data 44,1,7,7:rem "H"
3870 data 45,1,4,3:rem "´"
3880 data 46,1,7,8:rem "M"
3890 data 47,1,4,3:rem ":"
3900 :
3910 data 48,1,4,3:rem ";"
3920 data 49,1,5,5:rem "="
3930 data 50,1,2,5:rem "underscore
3940 data 51,1,7,8:rem "W"
3950 data 52,1,3,3:rem ")"
3960 data 53,1,7,7:rem "U"
3970 data 54,1,2,3:rem "I"
3980 data 55,1,7,7:rem "N"
3990 data 56,1,6,5:rem "?"
4000 data 57,1,7,7:rem "D"
4010 data 58,1,2,4:rem ""
4020 data 59,1,7,7:rem "C"

```

```

4030 data 60,1,5,5:rem "*"
4040 data 61,1,7,7:rem "R"
4050 data 62,1,7,5:rem "$"
4060 data 63,1,3,6:rem "l"
4070 :
4080 data 64,1,4,6:rem "T"
4090 data 65,1,7,7:rem "A"
4100 data 66,1,4,7:rem "Y"
4110 data 67,1,7,7:rem "&"
4120 data 68,1,4,6:rem "V"
4130 data 69,1,7,6:rem "Z"
4140 data 70,1,7,5:rem "S"
4150 data 71,1,7,6:rem "P"
4160 data 72,1,6,6:rem "F"
4170 data 73,1,7,6:rem "B"
4180 data 74,1,7,5:rem "£"
4190 data 75,1,7,6:rem "E"
4200 data 76,1,6,5:rem "O"
4210 data 77,1,6,5:rem "9"
4220 data 78,1,7,5:rem "8"
4230 data 79,1,4,5:rem "7"
4240 :
4250 data 80,1,6,5:rem "6"
4260 data 81,1,6,5:rem "5"
4270 data 82,1,6,4:rem "4"
4280 data 83,1,6,5:rem "3"
4290 data 84,1,6,5:rem "2"
4300 data 85,1,6,2:rem "1"
4310 data 86,1,2,5:rem "+"
4320 data 87,1,5,5:rem "vertical line"
4330 data 88,1,5,5:rem ">"
4340 data 89,1,6,5:rem "c cedilla"
4350 data 90,1,3,4:rem "f"
4360 data 91,1,4,5:rem "logical not"
4370 data 92,1,4,3:rem "tilt"
4380 data 93,1,6,7:rem "w"
4390 data 94,1,3,3:rem "j"
4400 data 95,1,7,8:rem "m"
4410 :
4420 data 96,1,2,3:rem "l"
4430 data 97,1,6,5:rem "v"
4440 data 98,1,1,4:rem "-"
4450 data 99,1,1,3:rem ","
4460 :

```

```

4470 rem code assign data
4480 data 32,29:rem esc y ="cent"
4490 data 33,39:rem $21 = "!"
4500 data 34,58:rem $22 = ""
4510 data 35,25:rem $23 = "#"
4520 data 36,62:rem $24 = "$"
4530 data 37,34:rem $25 = "%"
4540 data 38,67:rem $26 = "&"
4550 data 39,45:rem $27 = "`"
4560 data 40,43:rem $28 = "("
4570 data 41,52:rem $29 = ")"
4580 data 42,60:rem $2a = "*"
4590 data 43,86:rem $2b = "+"
4600 data 44,99:rem $2c = ","
4610 data 45,98:rem $2d = "-"
4620 data 46,00:rem $2e = "."
4630 data 47,41:rem $2f = "/"
4640 :
4650 data 48,76:rem $30 = "0"
4660 data 49,85:rem $31 = "1"
4670 data 50,84:rem $32 = "2"
4680 data 51,83:rem $33 = "3"
4690 data 52,82:rem $34 = "4"
4700 data 53,81:rem $35 = "5"
4710 data 54,80:rem $36 = "6"
4720 data 55,79:rem $37 = "7"
4730 data 56,78:rem $38 = "8"
4740 data 57,77:rem $39 = "9"
4750 data 58,47:rem $3a = ":"
4760 data 59,48:rem $3b = ";"
4770 data 60,27:rem $3c = "<"
4780 data 61,49:rem $3d = "="
4790 data 62,88:rem $3e = ">"
4800 data 63,56:rem $3f = "?"
4810 :
4820 data 64,19:rem $40 = "@"
4830 data 65,65:rem $41 = "A"
4840 data 66,73:rem $42 = "B"
4850 data 67,59:rem $43 = "C"
4860 data 68,57:rem $44 = "D"
4870 data 69,75:rem $45 = "E"
4880 data 70,72:rem $46 = "F"
4890 data 71,32:rem $47 = "G"
4900 data 72,44:rem $48 = "H"

```

```

4910 data 73,54:rem $49 = "I"
4920 data 74,35:rem $4a = "J"
4930 data 75,42:rem $4b = "K"
4940 data 76,63:rem $4c = "L"
4950 data 77,46:rem $4d = "M"
4960 data 78,55:rem $4e = "N"
4970 data 79,40:rem $4f = "O"
4980 :
4990 data 80,71:rem $50 = "P"
5000 data 81,36:rem $51 = "Q"
5010 data 82,61:rem $52 = "R"
5020 data 83,70:rem $53 = "S"
5030 data 84,64:rem $54 = "T"
5040 data 85,53:rem $55 = "U"
5050 data 86,68:rem $56 = "V"
5060 data 87,51:rem $57 = "W"
5070 data 88,38:rem $58 = "X"
5080 data 89,66:rem $59 = "Y"
5090 data 90,69:rem $5a = "Z"
5100 data 91,18:rem $5b = "{"
5110 data 92,21:rem $5c = "back slash"
5120 data 93,20:rem $5d = "]"
5130 data 94,26:rem $5e = "^"
5140 data 95,50:rem $5f = "underscore"
5150 :
5160 data 96,31:rem $60 = "grave
5170 data 97,07:rem $61 = "a"
5180 data 98,03:rem $62 = "b"
5190 data 99,13:rem $63 = "c"
5200 data 100,05:rem $64 = "d"
5210 data 101,08:rem $65 = "e"
5220 data 102,90:rem $66 = "f"
5230 data 103,12:rem $67 = "g"
5240 data 104,14:rem $68 = "h"
5250 data 105,06:rem $69 = "i"
5260 data 106,94:rem $6a = "j"
5270 data 107,16:rem $6b = "k"
5280 data 108,96:rem $6c = "l"
5290 data 109,95:rem $6d = "m"
5300 data 110,11:rem $6e = "n"
5310 data 111,02:rem $6f = "o"
5320 :
5330 data 112,15:rem $70 = "p"
5340 data 113,22:rem $71 = "q"

```

```

5350 data 114,10:rem $72 = "r"
5360 data 115,09:rem $73 = "s"
5370 data 116,24:rem $74 = "t"
5380 data 117,04:rem $75 = "u"
5390 data 118,97:rem $76 = "v"
5400 data 119,93:rem $77 = "w"
5410 data 120,23:rem $78 = "x"
5420 data 121,17:rem $79 = "y"
5430 data 122,01:rem $7a = "z"
5440 data 123,28:rem $7b = "left bracket
5450 data 124,87:rem $7c = "vertical line
5460 data 125,30:rem $7d = "right bracketeady.
5470 data 126,92:rem $7e = "tilt"
5480 :
5490 data 127,91:rem esc z = "logical not"
5500 data 128,37:rem esc h = "section"
5510 data 129,74:rem esc i = "f"
5520 data 130,33:rem esc j = "umlaut"
5530 data 131,89:rem esc k = "c cedilla"
5540 :
5550 data 160,00:rem $a0 = "."
5560 data 161,00:rem $a1 = "."
5570 data 162,00:rem $a2 = "."
5580 data 163,00:rem $a3 = "."
5590 data 164,00:rem $a4 = "."
5600 data 165,00:rem $a5 = "."
5610 data 166,00:rem $a6 = "."
5620 data 167,00:rem $a7 = "."
5630 data 168,00:rem $a8 = "."
5640 data 169,00:rem $a9 = "."
5650 data 170,00:rem $aa = "."
5660 data 171,00:rem $ab = "."
5670 data 172,00:rem $ac = "."
5680 data 173,00:rem $ad = "."
5690 data 174,00:rem $ae = "."
5700 data 175,00:rem $af = "."
5710 :
5720 data 176,00:rem $b0 = "."
5730 data 177,00:rem $b1 = "."
5740 data 178,00:rem $b2 = "."
5750 data 179,00:rem $b3 = "."
5760 data 180,00:rem $b4 = "."
5770 data 181,00:rem $b5 = "."
5780 data 182,00:rem $b6 = "."

```

```

5790 data 183,00:rem $b7 = "."
5800 data 184,00:rem $b8 = "."
5810 data 185,00:rem $b9 = "."
5820 data 186,00:rem $ba = "."
5830 data 187,00:rem $bb = "."
5840 data 188,00:rem $bc = "."
5850 data 189,00:rem $bd = "."
5860 data 190,00:rem $be = "."
5870 data 191,00:rem $bf = "."

```

Down load for Standard ASCII mode results in the following:

DOWN LOAD TEST (STANDARD ASCII MODE)

```

!"#$%&'()*+,-./0123456789:;<=>?
@ABCDEFGHIJKLMN O PQRSTUVWXYZ[\]^_
`abcdefghijklmnopqrstu v wxyz{|}~  ç→$£"ç

```

```

!"#$%&'()*+,-./0123456789:;<=>?
@ABCDEFGHIJKLMN O PQRSTUVWXYZ[\]^_
`abcdefghijklmnopqrstu v wxyz{|}~  ç→$£"ç

```

	0	1	2	3	4	5	6	7
0			0	@	P	`	p	
1		!	1	A	Q	a	q	
2		"	2	B	R	b	r	
3		#	3	C	S	c	s	
4		\$	4	D	T	d	t	
5		%	5	E	U	e	u	
6		&	6	F	V	f	v	
7		'	7	G	W	g	w	
8		(	8	H	X	h	x	
9		)	9	I	Y	i	y	
A		*	:	J	Z	j	z	
B		+	;	K	[	k	{	
C		,	<	L	\	l		
D		-	=	M	]	m	}	
E		.	>	N	^	n	~	
F		/	?	O	_	o		

```

ESC Y   ¢
ESC Z   ¯
ESC H   $
ESC I   £
ESC J   ¨
ESC K   ¢

```

Down load for CBM ASCII mode results in the following:

```
down load test (cbm ascii mode)
```

```

!"#$%&'()*+,-./0123456789:;<=>?
@abcdefghijklmnopqrstuvwxyz[£]^_
.....
`ABCDEFGHIJKLMN!OPQRSTUVWXYZ{|}~  \  ¢~$£¨¢

```

```

!"#$%&'()*+,-./0123456789:;<=>?
@abcdefghijklmnopqrstuvwxyz[£]^_
.....
`ABCDEFGHIJKLMN!OPQRSTUVWXYZ{|}~  \  ¢~$£¨¢

```

	0	1	2	3	4	5	6	7	8	9	a	b	c	d	e	f
0			0	@	p						.	.	`	P		
1		!	1	a	q						.	.	A	Q		
2		"	2	b	r						.	.	B	R		
3		#	3	c	s						.	.	C	S		
4		\$	4	d	t						.	.	D	T		
5		%	5	e	u						.	.	E	U		
6		&	6	f	v						.	.	F	V		
7		'	7	g	w						.	.	G	W		
8		(	8	h	x						.	.	H	X		
9		)	9	i	y						.	.	I	Y		
a		*	:	j	z						.	.	J	Z		
b		+	;	k	[						.	.	K	{		
c		,	<	l	£						.	.	L			
d		-	=	m	]						.	.	M	}		
e		.	>	n	^						.	.	N	~		
f		/	?	o	_						.	.	O	¯		\

```

esc y   ¢
esc z   ¬
esc h   $
esc i   £
esc j   ¨
esc k   ¢

```

Note that each of the codes from \$A0 to \$BF (160 – 191) has a full stop (.) allocated. Feature of down load for CBM ASCII mode is the ability to allocate characters to \$A0–\$BF.

Now, to see down load being carried out more clearly, let me show you an example of making some ASCII code that is presumed you want to have. To start with, try it on Standard ASCII mode. Suppose you want to change ASCII code table into the following.

	0	1	2	3	4	5	6	7	
0				0	@	P	`	p	
1			!	1	A	Q	a	q	
2			"	2	B	R	b	r	
3			#	3	C	S	c	s	
4			\$	4	D	T	d	t	
5			%	5	E	U	e	u	
6			&	6	F	V	f	v	
7			'	7	G	W	g	w	
8			(	8	H	X	h	x	
9			)	9	I	Y	i	y	
A		*	:	J	Z	j	z		
B		+	;	K	[	k	{	123	
C		,	<	L	\	l		124	
D		-	=	M	]	m	}	125	
E		.	>	N	^	n	~	126	
F		/	?	O	_	o			

ESC	Y	¢	
ESC	Z	¬	£ 127
ESC	H	\$	{ 128
ESC	I	£	129
ESC	J	¨	} 130
ESC	K		

The figures written next to the characters that you want to change are ASCII codes. For the special characters printed by ESC sequence, codes are given for convenience.

The parts of the program are changed as follows.

```

5440 data 128,28:rem esc h = "left bracket
5450 data 129,87:rem esc i = "vertical line
5460 data 130,30:rem esc j = "right bracketeady.
5470 data 124,92:rem $7c = "tilt"
5480 :
5490 data 126,91:rem $7e = "logical not"
5500 data 125,37:rem $7d = "section"
5510 data 127,74:rem esc z = "f"
5520 data 123,33:rem $7b = "umlaut"

```

When the changed program is run, the result is as follows:

DOWN LOAD TEST (STANDARD ASCII MODE)

```

!"#$%&^()*+,-./0123456789:;<=>?
@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_
`abcdefghijklmnopqrstuvwxyz"~$- c f { | } g

```

```

!"#$%&^()*+,-./0123456789:;<=>?
@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_
`abcdefghijklmnopqrstuvwxyz"~$- c f { | } g

```

	0	1	2	3	4	5	6	7
0			0	@	P	`	p	
1		!	1	A	Q	a	q	
2		"	2	B	R	b	r	
3		#	3	C	S	c	s	
4		\$	4	D	T	d	t	
5		%	5	E	U	e	u	
6		&	6	F	V	f	v	
7		^	7	G	W	g	w	
8		(	8	H	X	h	x	
9		)	9	I	Y	i	y	
A		*	:	J	Z	j	z	
B		+	;	K	[	k	]	
C		,	<	L	\	l	~	
D		-	=	M	]	m	\$	
E		.	>	N	^	n	~	
F		/	?	O	_	o		

```

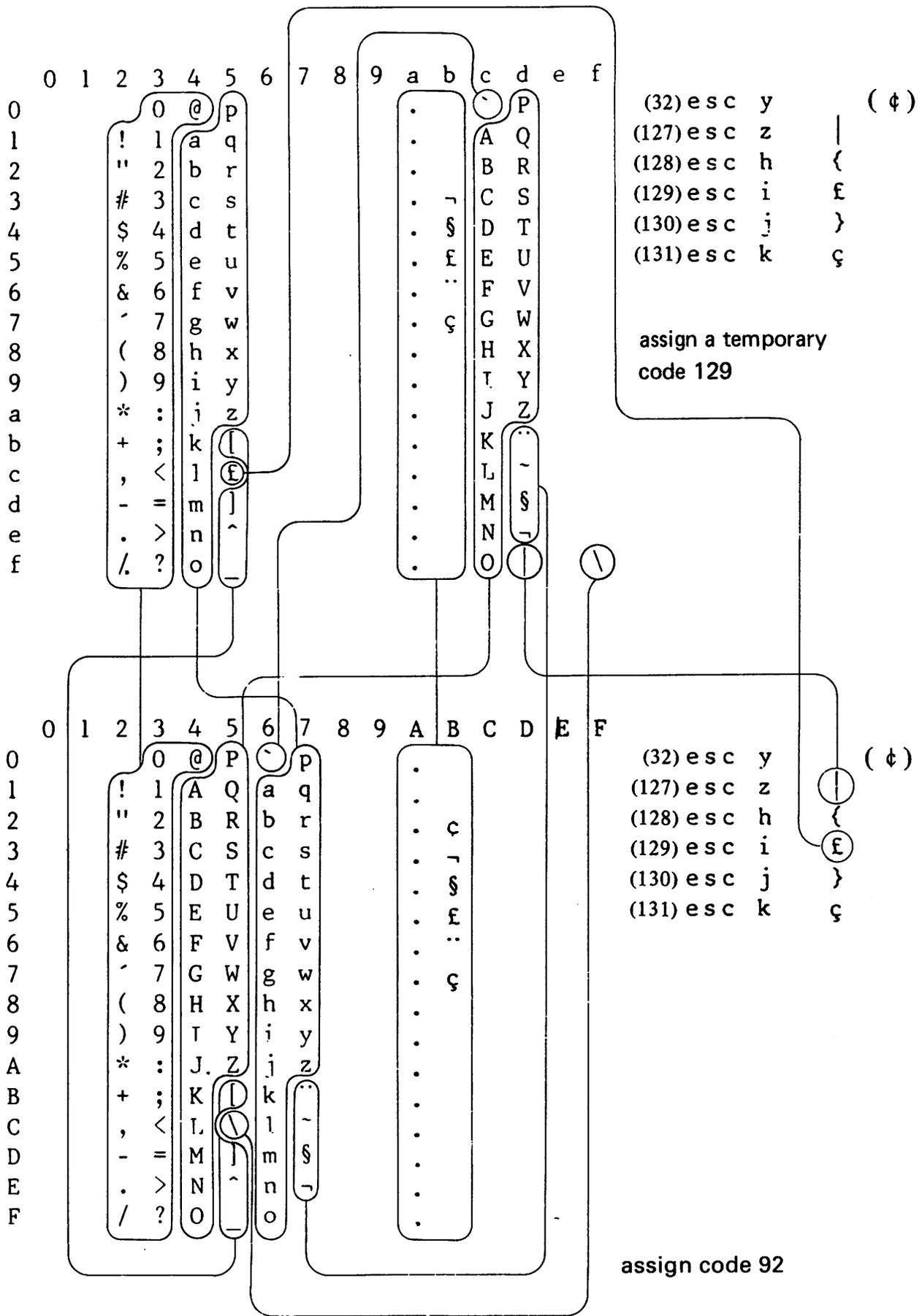
ESC Y   ¢
ESC Z   £
ESC H   {
ESC I   |
ESC J   }
ESC K   ¸

```

It is a little more complicated in down load for CBM ASCII mode. Suppose you want the following code table.

	0	1	2	3	4	5	6	7	8	9	a	b	c	d	e	f
0			0	@	p						.	˘	P			
1		!	1	a	q						.		A	Q		
2		"	2	b	r						.		B	R		
3		#	3	c	s						.	¬	C	S		
4		\$	4	d	t						.	§	D	T		
5		%	5	e	u						.	£	E	U		
6		&	6	f	v						.	ˆ	F	V		
7		'	7	g	w						.	ç	G	W		
8		(	8	h	x						.		H	X		
9		)	9	i	y						.		I	Y		
a		*	:	j	z						.		J	Z		
b		+	;	k	[						.		K	ˆ		
c		,	<	l	£						.		L	˘		
d		-	=	m	]						.		M	§		
e		.	>	n	^						.		N	¬		
f		/	?	o	_						.		O			\

To obtain this, you must first change the CBM ASCII code table to the Standard ASCII code table as follows:



## CBM ASCII MODE

32 – 64  
 65 – 90  
 91  
 92  
 93 – 95  
 128 (temporary code)  
 129 (temporary code)  
 130 – 131 (temporary code)  
 160 – 191  
 192  
 193 – 218  
 223

## STANDARD ASCII MODE

32 – 64  
 65 – 90  
 91  
 92  
 93 – 95  
 128 (temporary code)  
 129 (temporary code)  
 130 – 131 (temporary code)  
 160 – 191  
 192  
 65 – 90  
 127 (temporary code)

On the above new CBM ASCII code table, a space character is allocated to each of \$B0 – \$B2 and \$B8 – \$BF. A space character does not exist on the wheel. So, in order to get a space, allocate some character instead of the space and let it go non-print.

Now, of the previously changed program, the parts to be changed further are as follows:

```

3700 data 29,0,0,7:rem "cent

5450 data 129,74:rem esc i = "f"

5510 data 127,87:rem esc z = "vertical line"

5720 data 176,29:rem $b0 = " "
5730 data 177,29:rem $b1 = " "
5740 data 178,29:rem $b2 = " "
5750 data 179,91:rem $b3 = "logical not"
5760 data 180,37:rem $b4 = "section"
5770 data 181,74:rem $b5 = "f"
5780 data 182,33:rem $b6 = "umlaut"
5790 data 183,89:rem $b7 = "c cedilla"
5800 data 184,29:rem $b8 = " "
5810 data 185,29:rem $b9 = " "
5820 data 186,29:rem $ba = " "
5830 data 187,29:rem $bb = " "
5840 data 188,29:rem $bc = " "
5850 data 189,29:rem $bd = " "
5860 data 190,29:rem $be = " "
5870 data 191,29:rem $bf = " "
  
```

The results are as follows (Make sure you choose CBM ASCII mode).

down load test (cbm ascii mode)

```
!"#$%&^()*+,-./0123456789:;<=>?
@abcdefghijklmnopqrstuvwxyz[\]^_
..... ~$£"ç
`ABCDEFGHIJKLMNopQRSTUVWXYZ"~$~| \ |{£}ç
```

```
!"#$%&^()*+,-./0123456789:;<=>?
@abcdefghijklmnopqrstuvwxyz[\]^_
..... ~$£"ç
`ABCDEFGHIJKLMNopQRSTUVWXYZ"~$~| \ |{£}ç
```

	0	1	2	3	4	5	6	7	8	9	a	b	c	d	e	f
0				0	@	p					.	`	P			
1		!	1	a	q						.	A	Q			
2		"	2	b	r						.	B	R			
3		#	3	c	s						.	~	C	S		
4		\$	4	d	t						.	\$	D	T		
5		%	5	e	u						.	£	E	U		
6		&	6	f	v						.	"	F	V		
7		^	7	g	w						.	ç	G	W		
8		(	8	h	x						.		H	X		
9		)	9	i	y						.		I	Y		
a		*	:	j	z						.		J	Z		
b		+	;	k	[						.		K	"		
c		,	<	l	£						.		L	~		
d		-	=	m	]						.		M	\$		
e		.	>	n	^						.		N	~		
f		/	?	o	_						.		O			\

```
esc y
esc z |
esc h {
esc i £
esc j }
esc k ç
```

# APPENDICES

## APPENDIX A: DPS-1101 Daisy Wheel Printer Specifications

Print speed	: 17 cps (Shannon text, 10 character/inch)
Print wheel	: 100 characters/wheel TA compatible
Print wheel life	: 10 million characters/wheel
Number of characters per line	: 110 characters (10 pitch) 132 characters (12 pitch) 165 characters (15 pitch) 82 to 220 characters (Proportional spacing)
Max paper width	: 13" (Printable width 11")
Carriage motion	: Bi-directional, incremental motion: 1/120 inch
Minimum spacing speed	: Max 1,000 ms
Paper feed	: Bi-directional, Friction Feed
Minimum feed	: 1/48 inch
Ribbon	: Cartridge Type: IBM 82 Typewriter ribbon Single strike ribbon Multi strike ribbon
Interface	: Commodore Serial BUS
Temperature	: 5°C to 35°C (Operating)
Relative humidity	: 30% to 85% (Operating, Non-condensation)
Power	: AC 117V (North America), 220/240V (Europe) +/-10%, 50/60Hz Max. 50W
Dimension	: 23.8"W x 6.8"H x 13.5"D (607 x 173 x 343mm)
Weight	: 28.7 lbs (13kgs) approx.
Print Buffer	: 2K characters

# APPENDIX B: ASCII Code Table

## 1. CBM ASCII Code Table

1.1 Upper Case/Shifted Lower Case Mode (SA=0) : Global)  
 (Cursor Up Code [CHR\$(17)]) : Local )

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	0	16	32	48	64	80	96	112	128	144	160	176	192	208	224	240
	NUL		SP	0	@	P	SP	SP			SP	SP	`	p	SP	SP
1	1	17	33	49	65	81	97	113	129	145	161	177	193	209	225	241
		CD	!	1	A	Q	SP	SP		CU	SP	SP	a	q	SP	SP
2	2	18	34	50	66	82	98	114	130	146	162	178	194	210	226	242
		DC2	"	2	B	R	SP	SP			SP	SP	b	r	SP	SP
3	3	19	35	51	67	83	99	115	131	147	163	179	195	211	227	243
			#	3	C	S	SP	SP			SP	SP	c	s	SP	SP
4	4	20	36	52	68	84	100	116	132	148	164	180	196	212	228	244
		DC4	\$	4	D	T	SP	SP			SP	SP	d	t	SP	SP
5	5	21	37	53	69	85	101	117	133	149	165	181	197	213	229	245
			%	5	E	U	SP	SP			SP	SP	e	u	SP	SP
6	6	22	38	54	70	86	102	118	134	150	166	182	198	214	230	246
			&	6	F	V	SP	SP			SP	SP	f	v	SP	SP
7	7	23	39	55	71	87	103	119	135	151	167	183	199	215	231	247
			'	7	G	W	SP	SP			SP	SP	g	w	SP	SP
8	8	24	40	56	72	88	104	120	136	152	168	184	200	216	232	248
	BS		(	8	H	X	SP	SP			SP	SP	h	x	SP	SP
9	9	25	41	57	73	89	105	121	137	153	169	185	201	217	233	249
	HT		)	9	I	Y	SP	SP			SP	SP	i	y	SP	SP
A	10	26	42	58	74	90	106	122	138	154	170	186	202	218	234	250
	LF		*	:	J	Z	SP	SP			SP	SP	j	z	SP	SP
B	11	27	43	59	75	91	107	123	139	155	171	187	203	219	235	251
	VT	ESC	+	;	K	[	SP	SP			SP	SP	k	{	SP	SP
C	12	28	44	60	76	92	108	124	140	156	172	188	204	220	236	252
	FF		,	<	L	£	SP	SP			SP	SP	l		SP	SP
D	13	29	45	61	77	93	109	125	141	157	173	189	205	221	237	253
	CR		-	=	M	]	SP	SP	CS		SP	SP	m	}	SP	SP
E	14	30	46	62	78	94	110	126	142	158	174	190	206	222	238	254
	SO	RS	.	>	N	~	SP	SP			SP	SP	n	~	SP	SP
F	15	31	47	63	79	95	111	127	143	159	175	191	207	223	239	255
		US	/	?	O	_	SP	SP			SP	SP	o	~	SP	\

ESC Y	ç
ESC Z	~
ESC H	§
ESC I	£
ESC J	..
ESC K	ç

NOTE: CD is Commodore Cursor Down, but the standard notation is DC1

## 1.2 Lower Case/Shifted Upper Case Mode (SA=7

: Global)

(Cursor Down Code [CHR\$(17)] : Local )

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	0	16	32	48	64	80	96	112	128	144	160	176	192	208	224	240
	NUL		SP	0	@	p	SP	SP			SP	SP	`	P	SP	SP
1	1	17	33	49	65	81	97	113	129	145	161	177	193	209	225	241
		CD	!	1	a	q	SP	SP		CU	SP	SP	A	Q	SP	SP
2	2	18	34	50	66	82	98	114	130	146	162	178	194	210	226	242
		DC2	"	2	b	r	SP	SP			SP	SP	B	R	SP	SP
3	3	19	35	51	67	83	99	115	131	147	163	179	195	211	227	243
			#	3	c	s	SP	SP			SP	SP	C	S	SP	SP
4	4	20	36	52	68	84	100	116	132	148	164	180	196	212	228	244
		DC4	\$	4	d	t	SP	SP			SP	SP	D	T	SP	SP
5	5	21	37	53	69	85	101	117	133	149	165	181	197	213	229	245
			%	5	e	u	SP	SP			SP	SP	E	U	SP	SP
6	6	22	38	54	70	86	102	118	134	150	166	182	198	214	230	246
			&	6	f	v	SP	SP			SP	SP	F	V	SP	SP
7	7	23	39	55	71	87	103	119	135	151	167	183	199	215	231	247
			'	7	g	w	SP	SP			SP	SP	G	W	SP	SP
8	8	24	40	56	72	88	104	120	136	152	168	184	200	216	232	248
		BS	(	8	h	x	SP	SP			SP	SP	H	X	SP	SP
9	9	25	41	57	73	89	105	121	137	153	169	185	201	217	233	249
		HT	)	9	i	y	SP	SP			SP	SP	I	Y	SP	SP
A	10	26	42	58	74	90	106	122	138	154	170	186	202	218	234	250
		LF	*	:	j	z	SP	SP			SP	SP	J	Z	SP	SP
B	11	27	43	59	75	91	107	123	139	155	171	187	203	219	235	251
		VT	ESC	+	;	k	[	SP	SP			SP	SP	K	{	SP
C	12	28	44	60	76	92	108	124	140	156	172	188	204	220	236	252
		FF	,	<	l	£	SP	SP			SP	SP	L		SP	SP
D	13	29	45	61	77	93	109	125	141	157	173	189	205	221	237	253
		CR	-	=	m	]	SP	SP	CS		SP	SP	M	}	SP	SP
E	14	30	46	62	78	94	110	126	142	158	174	190	206	222	238	254
		SO	RS	.	>	n	^	SP	SP			SP	SP	N	~	SP
F	15	31	47	63	79	95	111	127	143	159	175	191	207	223	239	255
		US	/	?	o	_	SP	SP			SP	SP	O	-	SP	\

ESC Y	ç
ESC Z	~
ESC H	§
ESC I	£
ESC J	¨
ESC K	§

NOTE: CD is Commodore Cursor Down, but the standard notation is DC1

## 2. Standard ASCII Code Table

	0	1	2	3	4	5	6	7
0	0	16	32	48	64	80	96	112
	NUL		SP	0	@	P	`	p
1	1	17	33	49	65	81	97	113
		DC1	!	1	A	Q	a	q
2	2	18	34	50	66	82	98	114
		DC2	"	2	B	R	b	r
3	3	19	35	51	67	83	99	115
			#	3	C	S	c	s
4	4	20	36	52	68	84	100	116
		DC4	\$	4	D	T	d	t
5	5	21	37	53	69	85	101	117
			%	5	E	U	e	u
6	6	22	38	54	70	86	102	118
			&	6	F	V	f	v
7	7	23	39	55	71	87	103	119
			'	7	G	W	g	w
8	8	24	40	56	72	88	104	120
	BS		(	8	H	X	h	x
9	9	25	41	57	73	89	105	121
	HT		)	9	I	Y	i	y
A	10	26	42	58	74	90	106	122
	LF		*	:	J	Z	j	z
B	11	27	43	59	75	91	107	123
	VT	ESC	+	;	K	[	k	{
C	12	28	44	60	76	92	108	124
	FF		,	<	L	\	l	
D	13	29	45	61	77	93	109	125
	CR		-	=	M	]	m	}
E	14	30	46	62	78	94	110	126
	SO	RS	.	>	Ñ	~	n	~
F	15	31	47	63	79	95	111	127
		US	/	?	O	_	o	~

ESC Y	ç
ESC Z	~
ESC H	\$
ESC I	£
ESC J	..
ESC K	ç

## APPENDIX C: Visible Control Codes

### 1. Upper Case/Shifted Lower Case Mode (SA=0)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	0	16	32	48	64	80	96	112	128	144	160	176	192	208	224	240
	@	P							˘	p						
1	1	17	33	49	65	81	97	113	129	145	161	177	193	209	225	241
	A	Q							a	q						
2	2	18	34	50	66	82	98	114	130	146	162	178	194	210	226	242
	B	R							b	r						
3	3	19	35	51	67	83	99	115	131	147	163	179	195	211	227	243
	C	S							c	s						
4	4	20	36	52	68	84	100	116	132	148	164	180	196	212	228	244
	D	T							d	t						
5	5	21	37	53	69	85	101	117	133	149	165	181	197	213	229	245
	E	U							e	u						
6	6	22	38	54	70	86	102	118	134	150	166	182	198	214	230	246
	F	V							f	v						
7	7	23	39	55	71	87	103	119	135	151	167	183	199	215	231	247
	G	W							g	w						
8	8	24	40	56	72	88	104	120	136	152	168	184	200	216	232	248
	H	X							h	x						
9	9	25	41	57	73	89	105	121	137	153	169	185	201	217	233	249
	I	Y							i	y						
A	10	26	42	58	74	90	106	122	138	154	170	186	202	218	234	250
	LF*	Z							j	z						
B	11	27	43	59	75	91	107	123	139	155	171	187	203	219	235	251
	K	[							k	{						
C	12	28	44	60	76	92	108	124	140	156	172	188	204	220	236	252
	L	£							l							
D	13	29	45	61	77	93	109	125	141	157	173	189	205	221	237	253
	CR*	]							CS*	}						
E	14	30	46	62	78	94	110	126	142	158	174	190	206	222	238	254
	N	ˆ							n	˘						
F	15	31	47	63	79	95	111	127	143	159	175	191	207	223	239	255
	O	-							o	˘						

\* These three codes are functional command in quote mode

**Example: (Program Listing)**

```
100 REM CONTROL CHARACTERS
110 PRINT"S HOME"
120 PRINT"s CLR"
130 PRINT"Q CRSR DOWN"
140 PRINT"q CRSR UP"
150 PRINT"] CRSR RIGHT"
160 PRINT"} CRSR LEFT"
170 PRINT"R RVS ON"
180 PRINT"r RVS OFF"
190 PRINT"e F1"
200 PRINT"f F3"
210 PRINT"g F5"
220 PRINT"h F7"
230 PRINT"i F2"
240 PRINT"j F4"
250 PRINT"k F6"
260 PRINT"l F8"
270 PRINT"p BLACK"
280 PRINT"E WHITE"
290 PRINT"£ RED"
300 PRINT"~ CYAN"
310 PRINT"I PURPLE"
320 PRINT"^ GREEN"
330 PRINT"- BLUE"
340 PRINT"~ YELLOW"
350 REM COMMODORE 64
360 PRINT"a ORANGE"
370 PRINT"u BROWN"
380 PRINT"v LIGHT RED"
390 PRINT"w DARK GREY"
400 PRINT"x MED GREY"
410 PRINT"y LIGHT GREEN"
420 PRINT"z LIGHT BLUE"
430 PRINT"{ LIGHT GREY"
440 OPEN4,4:CMD4:LIST
```

READY.

## 2. Lower Case/Shifted Upper Case Mode (SA=7)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	0	16	32	48	64	80	96	112	128	144	160	176	192	208	224	240
	@	P							˘	P						
1	1	17	33	49	65	81	97	113	129	145	161	177	193	209	225	241
	a	q							A	Q						
2	2	18	34	50	66	82	98	114	130	146	162	178	194	210	226	242
	b	r							B	R						
3	3	19	35	51	67	83	99	115	131	147	163	179	195	211	227	243
	c	s							C	S						
4	4	20	36	52	68	84	100	116	132	148	164	180	196	212	228	244
	d	t							D	T						
5	5	21	37	53	69	85	101	117	133	149	165	181	197	213	229	245
	e	u							E	U						
6	6	22	38	54	70	86	102	118	134	150	166	182	198	214	230	246
	f	v							F	V						
7	7	23	39	55	71	87	103	119	135	151	167	183	199	215	231	247
	g	w							G	W						
8	8	24	40	56	72	88	104	120	136	152	168	184	200	216	232	248
	h	x							H	X						
9	9	25	41	57	73	89	105	121	137	153	169	185	201	217	233	249
	i	y							I	Y						
A	10	26	42	58	74	90	106	122	138	154	170	186	202	218	234	250
	LF*	z							J	Z						
B	11	27	43	59	75	91	107	123	139	155	171	187	203	219	235	251
	k	[							K	{						
C	12	28	44	60	76	92	108	124	140	156	172	188	204	220	236	252
	l	£							L							
D	13	29	45	61	77	93	109	125	141	157	173	189	205	221	237	253
	CR*	]							CS*	}						
E	14	30	46	62	78	94	110	126	142	158	174	190	206	222	238	254
	n	˘							N	˘						
F	15	31	47	63	79	95	111	127	143	159	175	191	207	223	239	255
	o	-							O	˘						

\* These three codes are functional command in quote mode

### Example: (Program Listing)

```
100 rem control characters
110 print"_s home"
120 print"_S clr"
130 print"_q crsr down"
140 print"_Q crsr up"
150 print"_] crsr right"
160 print"_} crsr left"
170 print"_r rvs on"
180 print"_R rvs off"
190 print"_E f1"
200 print"_F f3"
210 print"_G f5"
220 print"_H f7"
230 print"_I f2"
240 print"_J f4"
250 print"_K f6"
260 print"_L f8"
270 print"_P black"
280 print"_e white"
290 print"_f red"
300 print"_- cyan"
310 print"_I purple"
320 print"_^ green"
330 print"_- blue"
340 print"_~ yellow"
350 rem commodore 64
360 print"_A orange"
370 print"_U brown"
380 print"_V light red"
390 print"_W dark grey"
400 print"_X med grey"
410 print"_Y light green"
420 print"_Z light blue"
430 print"_{ light grey"
440 open 7,4,7:cmd7:list
```

ready.

## APPENDIX D: Daisy Wheel Selection Guide (Triumph-Adler)

Dip SW	6	5	4	Group	Typestyle	
					01	Typestyle
OFF	ON	OFF	OFF	Germany	01	<input type="checkbox"/> Primus 10
OFF	OFF	OFF	OFF	USA	02	<input type="checkbox"/> Herald Elite 10/12
OFF	ON	ON	ON	England	03	<input type="checkbox"/> Isabelle 10
OFF	OFF	ON	ON	France	04	<input type="checkbox"/> Helen 10/12
ON	ON	ON	ON	Italy	05	<input type="checkbox"/> Pica Modern 10
Down Load				Switzerland	06	<input type="checkbox"/> Prestige Cubic 10/12
ON	OFF	ON	ON	Luxembourg	07	<input type="checkbox"/> OCR-A1
Down Load				Sweden	08	<input type="checkbox"/> OCR-B1
ON	ON	ON	ON	Finland	09	<input type="checkbox"/> Prisma 10/12
Down Load				Netherlands	10	<input type="checkbox"/> Madeleine PS
Down Load				Norway	11	<input type="checkbox"/> Elite Modern 10/12
ON	OFF	OFF	OFF	Denmark	12	<input type="checkbox"/> Mini Cubic 12/15
Down Load				Latin America	13	<input type="checkbox"/> Herald Pica 10
Down Load				Puerto Rico	14	<input type="checkbox"/> Caroll Pica 10
Down Load				Canada (French)	15	<input type="checkbox"/> Caroll Elite 10/12
Down Load				South Africa	16	<input type="checkbox"/> Cubic PS
ON	ON	ON	ON	Spain	17	<input type="checkbox"/> John Italic 10/12
Down Load				Portugal	18	<input type="checkbox"/> Shadow 10/12
					19	<input type="checkbox"/> Cubic Italic 10/12
					20	<input type="checkbox"/> May PS
					21	<input type="checkbox"/> Tile 10/12
					22	<input type="checkbox"/> Mini Tile 12/15
					23	<input type="checkbox"/> Tile PS
					24	<input type="checkbox"/> Shadow Italic PS
					25	<input type="checkbox"/> Tile Narrator 10
					26	<input type="checkbox"/> Mercury PS
					27	<input type="checkbox"/> Caroll OCR
					28	<input type="checkbox"/> Promotion PS
					29	<input type="checkbox"/> Caroll Pica 10
					30	<input type="checkbox"/> Symbol 10

# APPENDIX E: Character Level

## 1. JUKI USA wheel

	2				3				4				5				6				7			
0	¢	29	6	5	0	76	5	5	@	19	7	8	P	71	7	6	`	31	2	4	p	15	6	5
1	!	39	4	3	1	85	4	5	A	65	7	7	Q	36	7	7	a	7	5	5	q	22	6	5
2	”	58	3	4	2	84	5	5	B	73	7	6	R	61	7	7	b	3	6	5	r	10	4	4
3	#	25	6	6	3	83	5	5	C	59	7	7	S	70	6	5	c	13	5	5	s	9	5	4
4	\$	62	7	5	4	82	5	5	D	57	7	7	T	64	4	6	d	5	6	5	t	24	4	4
5	%	34	6	7	5	81	5	5	E	75	6	6	U	53	7	7	e	8	5	5	u	4	5	5
6	&	67	7	7	6	80	5	5	F	72	5	6	V	68	5	6	f	90	4	4	v	97	4	5
7	'	45	2	3	7	79	4	5	G	32	7	7	W	51	7	8	g	12	6	5	w	93	5	7
8	(	43	4	3	8	78	6	5	H	44	7	7	X	38	5	7	h	14	5	5	x	23	4	5
9	)	52	4	3	9	77	5	5	I	54	4	3	Y	66	5	7	i	6	4	3	y	17	4	5
A	*	60	4	5	:	47	3	3	J	35	5	5	Z	69	6	6	j	94	4	3	z	1	4	5
B	+	86	2	5	;	48	3	3	K	42	6	7	[	18	4	5	k	16	5	5	{	28	4	5
C	,	99	2	3	<	27	4	5	L	63	4	6	\	21	4	4	l	96	5	8		87	4	5
D	-	98	2	4	=	49	4	5	M	46	7	8	]	20	4	6	m	95	5	8	}	30	4	6
E	·	0	1	3	>	88	4	5	N	55	7	7	^	26	3	5	n	11	5	5	~	92	3	5
F	/	41	4	4	?	56	5	5	O	40	7	7	_	50	3	5	o	2	5	5	^	91	3	5
																					§	37	7	5
																					£	74	7	5
																					”	33	3	5
																					ç	89	5	5

PS unit

Impression level

Spoke position

Character

## 2. Triumph-Adler USA wheel

	2				3				4				5				6				7				
0	¢	29	6	5	0	76	5	5	@	19	7	8	P	71	7	6	`	31	2	4	p	15	6	5	
1	!	39	4	3	1	85	4	5	A	65	7	7	Q	36	7	7	a	7	5	5	q	22	6	5	
2	"	58	3	4	2	84	5	5	B	73	7	6	R	61	7	7	b	3	6	5	r	10	4	4	
3	#	25	6	6	3	83	5	5	C	59	7	7	S	70	6	5	c	13	5	5	s	9	5	4	
4	\$	62	7	5	4	82	5	5	D	57	7	7	T	64	4	6	d	5	6	5	t	24	4	4	
5	%	34	6	7	5	81	5	5	E	75	6	6	U	53	7	7	e	8	5	5	u	4	5	5	
6	&	67	7	7	6	80	5	5	F	72	5	6	V	68	5	6	f	90	4	4	v	97	4	5	
7	'	45	2	3	7	79	4	5	G	32	7	7	W	51	7	8	g	12	6	5	w	93	5	7	
8	(	43	4	3	8	78	6	5	H	44	7	7	X	38	5	7	h	14	5	5	x	23	4	5	
9	)	52	4	3	9	77	5	5	I	54	4	3	Y	66	5	7	i	6	4	3	w	17	4	5	
A	*	60	4	5	:	47	3	3	J	35	5	5	Z	69	6	6	j	94	4	3	z	1	4	5	
B	+	86	2	5	;	48	3	3	K	42	6	7	[	18	4	5	k	16	5	5	½	28	4	5	
C	,	99	2	3	<	27	4	5	L	63	4	6	Ω	21	4	4	l	96	4	3	¶	87	4	5	
D	-	98	2	4	=	49	4	5	M	46	7	8	]	20	4	6	m	95	5	8	¼	30	4	6	
E	·	0	1	3	>	88	4	5	N	55	7	7	Δ	26	3	5	n	11	5	5	²	92	3	5	
F	/	41	4	4	?	56	5	5	O	40	7	7	_	50	3	5	o	2	5	5	μ	91	3	5	
																					§	37	7	5	
																						£	74	7	5
																						³	33	3	5
																						¥	89	5	5

PS unit

Impression level

Spoke position

Character

### 3. Triumph-Adler French wheel

	2				3				4				5				6				7			
0	‰	30	6	7					à	18	5	5					½	28	4	6				
1																								
2																								
3	£	74	7	5																				
4																								
5																								
6																								
7	'	45	2	3																				
8																								
9																								
A																								
B													°	31	3	4					é	87	5	5
C					<sup>2</sup>	92	3	5					ç	21	5	5					ù	20	5	5
D													§	37	7	5					è	88	5	5
E					<sup>3</sup>	33	3	5					ˆ	89	3	5					ˆ	27	3	5
F																					μ	91	5	6
																					§	37		
																					£	74		
																					<sup>3</sup>	33		
																					ˆ	89	5	5

PS unit

Impression level

Spoke position

Character

#### 4. Triumph-Adler Germany wheel

	2			3			4			5			6			7					
0		92	3	4				§	37	7	5				`	29	2	5			
1																					
2																					
3	#	25	6	6																	
4																					
5																					
6																					
7	'	45	2	3																	
8																					
9																					
A																					
B										Ä	26	7	7					ä	18	5	5
C					<	27	4	5		Ö	28	7	7					ö	19	5	5
D										Ü	30	7	7					ü	20	5	5
E					>	88	4	5		ˆ	89	3	5					β	21	6	5
F																		μ	91	5	6
																		§	37		
																		£	74		
																		³	33		
																		ˆ	89		

PS unit

Impression Level

Spoke position

Character

## 5. Triumph-Adler England wheel

	2			3			4			5			6			7		
0	¢	29	6	5			@	19	7	8			`	31	2	4		
1																		
2																		
3	£	74	7	5														
4																		
5																		
6																		
7	'	45	2	3														
8																		
9																		
A																		
B									[	18	4	5			{	28	4	5
C					<	27	4	5	\	21	4	4				87	4	5
D									]	20	4	6			}	30	4	6
E					>	88	4	5	^	26	3	5			~	92	3	5
F															^	91	3	5
															§	37		
															£	74		
															¨	33		
															¢	89		

- PS unit
- Impression level
- Spoke position
- Character

## 6. Triumph-Adler Denmark wheel

	2				3				4				5				6				7			
0	¢	92	3	4					¨	21	3	5					´	29	2	5				
1																								
2																								
3	#	25	6	6																				
4																								
5																								
6																								
7	'	45	2	3																				
8																								
9																								
A																								
B										Æ	30	7	8					æ	91	6	6			
C					<	27	4	5		Ø	28	7	7					ø	20	5	5			
D										Å	26	7	7					å	18	6	5			
E					>	88	4	5		ˆ	89	3	5					ˆ	87	2	2			
F																			19	4	5			
																		§	37					
																		£	74					
																		³	33					
																		ˆ	89					

PS unit

Impression level

Spoke position

Character

## 7. Triumph-Adler Sweden wheel

	2				3				4				5				6				7			
0	◇	92	5	5					▣	88	7	8					`	33	2	5				
1																								
2																								
3	#	25	6	6																				
4																								
5																								
6																								
7	'	45	2	3																				
8																								
9																								
A																								
B													Ä	26	7	7					ä	18	5	5
C					<	27	4	5					Ö	28	7	5					ö	19	5	5
D													Ü	30	7	7					å	91	6	5
E					>	29	4	5													ü	20	5	5
F																					μ	21	5	6
																					§	37		
																					£	74		
																					`	33	3	5
																					^	89		

— PS unit

— Impression level

— Spoke position

— Character

## 8. Triumph-Adler Italy wheel

	2				3				4				5				6				7			
0	%	30	6	8					§	37	7	5					u	20	5	5				
1																								
2																								
3	£	74	7	5																				
4																								
5																								
6																								
7	'	45	2	3																				
8																								
9																								
A																								
B										°	31	3	4								à	18	5	5
C					<sup>2</sup>	92	3	5		ç	21	5	5								ò	19	5	5
D										é	87	5	5								è	88	5	5
E					<sup>3</sup>	33	3	5													ì	29	4	3
F																					μ	91	5	5
																					§	37		
																					£	74		
																					<sup>3</sup>	33		
																					^	89		

PS unit

Impression level

Spoke position

Character

## 9. Triumph-Adler Spanish wheel

	2				3				4				5				6				7			
0	<u>a</u>	30	5	5					§	37	7	5					`	29	2	5				
1																								
2																								
3	£	74	7	5																				
4																								
5																								
6																								
7	'	87	2	2																				
8																								
9																								
A																								
B													i	20	4	3					o	31	3	4
C					<sup>2</sup>	92	3	5					Ñ	91	7	7					ñ	26	5	5
D													¿	21	5	5					ç	28	5	5
E					<sup>3</sup>	33	3	5													~	18	3	5
F																						88	4	5
																					§	37		
																					£	74		
																					<sup>3</sup>	33		
																					^	89		

PS unit

Impression level

Spoke position

Character

# APPENDIX F: Spoke Position

(JUKI USA Wheel)

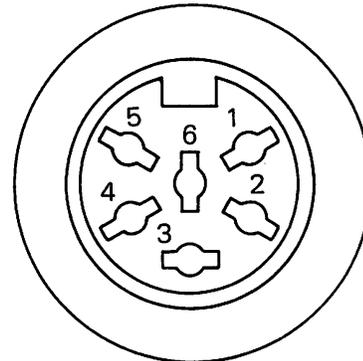
spoke position	character						
0	.	25	#	50	_	75	E
1	z	26	^	51	W	76	O
2	o	27	<	52	(	77	9
3	b	28	{	53	U	78	8
4	u	29	¢	54	I	79	7
5	d	30	}	55	N	80	6
6	i	31	,	56	?	81	5
7	a	32	G	57	D	82	4
8	e	33	..	58	"	83	3
9	s	34	%	59	C	84	2
10	r	35	J	60	*	85	1
11	n	36	Q	61	R	86	+
12	g	37	§	62	\$	87	
13	c	38	X	63	L	88	>
14	h	39	!	64	T	89	ç
15	p	40	O	65	A	90	f
16	k	41	/	66	Y	91	´
17	y	42	K	67	&	92	~
18	[	43	(	68	V	93	w
19	@	44	H	69	Z	94	j
20	]	45	'	70	S	95	m
21	\	46	M	71	P	96	l
22	q	47	:	72	F	97	v
23	x	48	;	73	B	98	-
24	t	49	=	74		99	,

Spoke position is numbered counter-clockwise, on the side with the raised characters.

## APPENDIX G: Serial Interface Information

### 1. The Connector

Pin No.	Signal
1	SERIAL SRQ
2	GND
3	SERIAL ATN
4	SERIAL CLK
5	SERIAL DATA
6	RESET



### 2. The Interface

- a. Plug the serial interface cable supplied with your printer into the Serial Bus connector. Refer to chapter one for details on how to connect your printer to your computer.
- b. When the printer is printing, no data will be transferred from the computer (the data line is said to be low). When the printer is at rest, data can be transferred from the computer (the data line is said high).
- c. When a printer error occurs, all control circuits inside the printer will stop.

## NOTES

## NOTES

## NOTES

## NOTES

## NOTES

## NOTES

# NOTES



## **Commodore offers a complete line of peripherals and accessories for other new and exciting applications.**

### **1541 Disk Drive**

The 1541 is one of the most cost/effective disk drives available. It has high capacity and high intelligence, yet is available at affordable prices.

### **Color Monitors**

Commodore monitors, designed specifically for Commodore computers, provide superior resolution compared to most television sets or other video monitors. They come complete with video adjustment controls and a speaker with volume control.

### **Accessories**

#### **Modems**

A Commodore modem allows your computer to communicate with other computers via standard telephone lines. Information may be instantly obtained including timely financial information, news and reference libraries. Turn your ordinary phone into a telecomputing information network.

#### **Joysticks and Game Paddles**

Increase your video game skills with the addition of a Commodore joystick or game paddle.

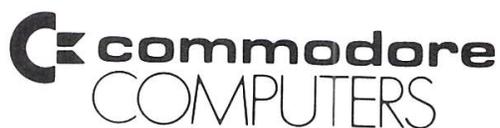
#### **Commodore Diskettes**

To ensure maximum performance from your 1541 disk drive, use quality Commodore diskettes.

### **Software**

Get more from your computer with Commodore Software. Whether it's productivity, educational or recreational, Commodore offers a complete line of software at affordable prices.

Commodore has a variety of other products available for your particular system. See your dealer for more details.



**Commodore Business Machines, Inc.  
Computer Systems Division  
1200 Wilson Drive, West Chester, PA 19380**