NATIVE

TABLE OF CONTENTS

1. READ THIS FIRST

Tandy Model 200 character shapes are the same as Model 102 character shapes. Tandy Model 100 shapes differ slightly. All of this manual was printed on a well worn 9-pin dot matrix printer after NATIVE enlightened the printer.

Different computers were used to run NATIVE to make the printout samples differ suitably in section 7 of this manual. A Tandy Model 102 was used to run NATIVE to make the other sections of this manual, so in these sections the shape of every character you see is native to Model 102 computers.

Ron Wiesen Technical Products produced this manual in this fashion so that you have, in your hands, tangible evidence of the precision of NATIVE.

In case you're curious, the preparation and typesetting of this manual was done with SuperROM™. Another product could have been used because NATIVE does not conflict with any other products.

 Questions regarding the content of this manual should be addressed to:

RWTP
111 Gary Lane
Cocoa, Fla. 32922
Tel: (407) 632-6864

SuperROM is a trademark of Portable Computer Support Group.

2. WHAT NATIVE DOES

After you use NATIVE, your printer portrays characters on paper exactly as your computer portrays them on its screen. In many cases, the use of NATIVE also lets your printer go much faster than you ever thought was possible.

NATIVE speaks to your printer in its native language and describes the character shapes that are native to your computer screen. When you use your printer afterwards, it portrays characters on paper precisely as they were described by NATIVE. That is, precisely as your computer portrays them on its screen.

Once your printer has been enlightened, NATIVE plays no further role. Your printer remains enlightened as long as its power remains on. You may want to remove NATIVE from your computer to recover the tiny amount of memory it occupies.

2.1. Computer/Printer Differences

Manufacturers who make both computers as well as printers are rare. Computers are made by certain manufacturers and printers are made by other manufacturers.

Because of this, there is some variety in the way characters are portrayed on computer screens. Computer manufacturers compete with each other by such variety.

Manufacturers who make printers are many. Because of this, there is a great variety in the way printers portray characters on paper. Printer manufacturers, like their computer counterparts, compete with each other by offering such variety.

They also compete by a variety of other features. A notable feature of some printers is to accept and retain character shape descriptions which are sent by a computer. These are subsequently used during character mode operation to portray character shapes which are not offered by the printer manufacturer. NATIVE uses this feature.

For a given shape, however, the way to describe it varies among printer manufacturers. It even varies among different printer models of the same manufacturer.

2.2. Screen/Paper Differences

The huge variety of character portrayal by computers and by printers makes it impossible for all the characters to appear the same on computer screens and on paper. So the difference in appearance is a pain which you suffer.

Vendors who make software application programs recognize this pain and try to reduce it. Claims of "What You See Is What You Get", called WYSIWYG, are made but rarely delivered. These

vendors use character shapes and sets of characters that are unique to their software, but the shapes are unlike the shapes used by the computer or by the printer.

A vendor offers many shapes and sets of characters for each program. Vendors compete by a variety of such offerings. Because of this, there is an enormous variety to bewilder you.

Some computer screens and some printers can operate in a graphic mode in addition to character mode operation. Vendor software combines the graphic mode features of the computer screens and of the printers. The vendors software puts the computer screen and the printer into a graphic mode. As you press each key on the computer keyboard, the software laboriously paints a graphic "picture" of a character on the computer screen. The software usually keeps up with your typing speed. When you send your "accumulated" work to the printer, the software must paint "many" graphic pictures on the paper. Sadly, graphic mode is the slowest print mode for any printer and the most expensive feature.

3. WHAT YOU NEED TO KNOW

Know which computer you own and know which emulation your printer uses. These determine which NATIVE program is right for you.

3.1. Which Computer You Own

Obviously you know which computer you own. Find your computer in Table 1. Folks who own several computers may need more than one NATIVE program.

3.2. What Emulation Means

Emulation is a command language that a computer must use to control the features of a printer. Printer manufacturers are so competitive that their printers mimic the operations of the most popular models. The command language of popular models is called an "emulation" when other manufacturers mimic it. Eventually, even the original manufacturer calls it an emulation!

3.3. Which Emulation You Have

Use your printer manual to find out which emulation your printer uses. Then find the emulation in Table 2.

3.3.1. When You Have More Than One

Folks who own printers that have more than one emulation need only choose one, as long as it's an emulation in Table 2. Use your printer manual to find out how to engage the emulation. Typically this is done with DIP switches or with front panel controls. For example, the Model DMP137 is a Tandy make which has a DIP switch to select either Epson emulation or IBM emulation.

3.3.2. When You Don't Know

When the emulation is not known, see if your printer is listed in Table 4 and note the emulation type for the series and range of character codes. If the emulation is still not known, contact the Customer Support group of the printer manufacturer and have Table 2 and Table 3 handy. Ask the following questions:

- Does my printer have (Table 2) emulations?
- If there's more than one, how do I engage the (Table 2) one?
- Must any controls be set to allow user defined characters?
- For user defined characters, is the (Table 3) code range OK?

3.4. Which NATIVE Program to Use

Use any NATIVE program that mates your computer with the emulation used by your printer. The range of character codes that your printer accepts for character shape descriptions may also be a consideration.

3.4.1. NATIVE Program Names

NATIVE programs are named according to a convention which combines the computer model, the printer emulation, a range of character codes, and in some cases an option. The convention is shown below.

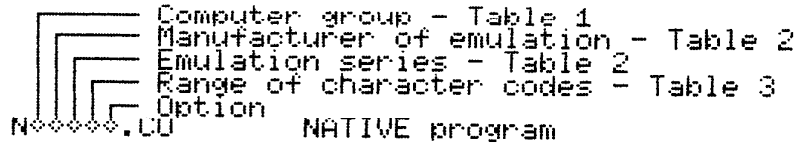


Table 1. Computer Group

N?◇◇◇_.CO

?	Computer Group
1	Tandy Model 100 and Model 102
2	Tandy Model 200

Table 2. Manufacturer of Emulation and Emulation Series

N◇??◇_.CO

?◇ ◇?	Manufacturer of Emulation Emulation Series
E◇	Epson emulation
EX EQ	_X series 9-pin (JX, FX, etc.) LQ series 24-pin

Table 3. Range of Character Codes

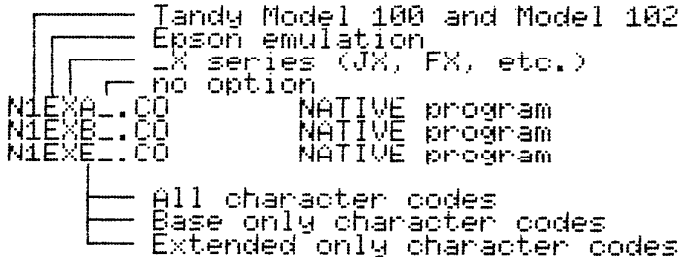
N◇◇◇?_.CO

?	Range of Character Codes
A	All (32..255)
B	Base only (32..127)
E	Extended only (128..255)

3.4.2. When You Have More Than One

Many NATIVE programs are supplied. Generally, several work for any one printer and they fit your need for: different ranges of character codes, different emulations within the printer, or options.

For example, a person who owns a Tandy Model 100 computer and a Mannesmann Tally Model MT85 printer can use three NATIVE programs to cover three ranges of character codes: N1EXA_.CO, N1EXB_.CO and N1EXE_.CO. The chart below shows the details.



3.4.3. When You Don't Know

For each NATIVE program, run it and then test it by printing the PRTEST.DO file. Label each printout to show which NATIVE program was run. Compare all the printouts to see the effects of each program.

Table 4. Some Printers vs. Emulation Type

MANUFACTURER	MODEL	E TYPE	NOTES
Antex Data Systems	ADS-2000	XA XB XE	
Blue Chip Electronics	120/10	XA XB XE	
Brother	HL-6 laser printer	XA XB XE	set panel: FX-850 emulation
Brother	M-1109	XA XB XE	DIP switch 2-2 ON
Brother	M-1509	XA XB XE	DIP switch 2-5 OFF
Centronics	H80-1 and H80-2	XA XB XE	
Centronics	H136A	XA XB XE	
Copal Inc	SC-1500	XA XB XE	
Copal Inc	SC-5500	XA XB XE	
Datasouth	Personal Printer I	XA XB XE	
Datasouth	Personal Printer II	XA XB XE	
Epson	FX+ Series	XA XB XE	
Epson	FX-80	XA XB XE	DIP switch 1-4 OFF
Epson	FX-85	XA XB XE	Epson mode
Epson	FX-185	XA XB XE	Epson mode
Epson	JX-80 Color Printer	XA XB XE	
Epson	LQ-510	QB QE	DIP switch 2-5 OFF
Epson	LQ-800	QB	DIP switch 1-4 OFF
Epson	LQ-1000	QB	DIP switch 1-4 OFF
Epson	LQ-1500	XA XB XE	DIP switch 1-4 OFF
Epson	LQ-5000+	QB QE	
Epson	Spectrum LX-80	XA XB XE	
Hewlett Packard	DeskJet Plus laser printer	XA XB XE	optional Epson FX-80 emulation cartridge
Mannesmann Tally	MT85	XA XB XE	Epson mode
Mannesmann Tally	MT86	XA XB XE	Epson mode
Matra Communication	SCANSET Mini Printer Plus	XA XB XE	IBM mode
NEC	PINWRITER P660	XA XB XE	
NEC	PINWRITER P665	XA XB XE	
NEC	PINWRITER P760	XA XB XE	
NEC	PINWRITER P765	XA XB XE	
Okidata	320	XB	Epson mode
Panasonic	KX-P1092	XA XB XE	
Panasonic	KX-P1592	XA XB XE	
Sakata	SP-1500	XA XB XE	
Seikosha	SP-1000A	XA XB XE	
Smith-Corona	D-200	XA XB XE	standard mode
Smith-Corona	D-300	XA XB XE	standard mode
Star Micronics	NB-15	XA XB XE	
Star Micronics	SD-10/15	XA XB XE	IBM mode
Star Micronics	SG-10/15	XA XB XE	IBM mode
Star Micronics	SR-10/15	XA XB XE	IBM mode
Tandy	DMP135	XB	DIP switch 1 ON
Tandy	DMP136	XA XB XE	
Tandy	DMP137	XA XB XE	DIP switch 1 ON
Tandy	DMP204	QB	DIP switch 4 ON
Tandy	DMP250	QB QE	set panel: EMULATION>EPSON

4. INSTALLATION

Installation of NATIVE is simple. Just load a NATIVE program into the memory of your computer and prepare your printer for operation.

4.1. Things You Need

You need a disk drive, the NATIVE diskette, your printer, and a cable between the printer and the parallel printer port of your computer.

4.2. Procedure

The following procedure assumes that a disk drive is attached to your computer and that a Disk Operating System (DOS) is installed in your computer.

1) Insert the NATIVE diskette into your disk drive. Apply power to your disk drive.

2) Use your DOS to load one or more NATIVE programs into the memory of your computer. You may rename a NATIVE program as you see fit, but during operation the program reports its original name. If you want to test the effects of NATIVE, load the PRTEST.DO file.

3) Turn off the power to the printer. Although this is not strictly needed, it avoids confusion. Most printers don't change configuration settings (look at DIP switch settings) while the power is turned on.

4) Attach one end of the printer cable to the parallel printer port of your computer. Attach the other end to the parallel port of your printer. Note that NATIVE uses parallel printer interfaces, not serial interfaces.

5) Load paper into your printer and then prepare it for operation. Refer to your printer manual and if needed set the configuration controls (DIP switches, front panel, etc.) for the following.

- o select an emulation (if more than one is available)
- o allow user defined characters (no line buffer on some models)

5. OPERATION

NATIVE operation does not require any assistance from you. You simply execute a NATIVE program and it leaves your printer ready for operation.

You can abort NATIVE (or any other program) execution by pressing the reset button on the computer. Before you execute NATIVE, observe the following caution which assures no file loss due to an abort.

-- CAUTION --

Disable the auto startup program. It's also called the Initial Program Load (IPL) program. For all Tandy computers this is done in BASIC by typing IPL and then pressing the ENTER key.

5.1. Make Printer Ready

Turn on the power to the printer. If the printer is not ready (not on-line), refer to your printer manual for the steps needed to make it ready.

5.2. Run NATIVE Program

Execute the NATIVE program. For all Tandy computers this is done from the main menu in one of two ways:

- set the cursor on the NATIVE program name and press ENTER.
- type the NATIVE program name and press ENTER.

5.3. What to Expect

When you run NATIVE, it reports its name and serial number at the top of the computer screen. Then in the lower part of the screen, NATIVE portrays each character shape and sends its description to your printer.

5.3.1. When Everything is OK

When your printer operates properly, it remains quiet while it accepts each character shape in turn. After NATIVE has sent all character shapes, your computer beeps and returns to the main menu.

As long as power remains on to your printer, it retains the character shapes and portrays them in all subsequent printing operations. You may notice that printing operations with the NATIVE character shapes are as much as three times faster than for the printers internal character shapes!

5.3.2. When Something is Wrong

When you run NATIVE but it does not portray character shapes on your computer screen, your printer is not ready (not on-line). Either make the printer ready so NATIVE can proceed, or abort NATIVE execution by pressing the reset button on the computer.

When your printer does not remain quiet while NATIVE sends character shapes, either the printer emulation is incorrect or the range of character codes is incorrect. Use a NATIVE program that is compatible with your printers emulation and range of character codes, or select a compatible emulation if your printer has more than one emulation.

6. APPLICATIONS

NATIVE makes many applications possible for your computer and printer. A few are described here, but with NATIVE the only limit is your imagination.

6.1. Accessary Files

Accessary files come with NATIVE. One is for testing NATIVE and your printer. The others are for your convenience in using the character shapes that are native to your computer.

6.1.1. Testing with PRTEST.DO

The PRTEST.DO file completely exercises the character portraying abilities of your printer. You print the file as you would print any file: put the cursor on PRTEST.DO, press ENTER, and then simultaneously press SHIFT and PRINT. The horizontal format does not exceed 79 characters so you don't need to worry about WIDTH.

The vertical format of PRTEST.DO has a title line and 7 line groups. An empty (blank) line separates the title and each line group. Each line group has 4 lines: 3 lines for 3-digit decimal character codes, and 1 line of character shapes produced by the character codes.

All printable character codes are included:

- 032 to 126 are base ASCII codes and all printers handle them.
- 128 to 255 are extended codes.

Note that some printers handle all the codes, but some do not. Use PRTEST.DO to test your printer BEFORE and AFTER running NATIVE. You may find that your printer behaves badly without NATIVE and it behaves perfectly with NATIVE. Pay attention to how your printer handles codes 128 to 255, and in particular, codes 128 to 159.

6.1.2. Keyboard Template KCHART.DO

The KCHART.DO file is a keyboard template for your computer. After you run NATIVE you can print this file. You print the file as you would print any file: put the cursor on KCHART.DO, press ENTER, and then simultaneously press SHIFT and PRINT. The horizontal format does not exceed 79 characters so you don't need to worry about WIDTH.

After you print the file you have a picture of your computers keyboard layout. This picture is a convenient reference which shows the character shapes that are native to your computer for each of its keys. Each key position shows the character shapes it produces in conjunction with SHIFT, GRPH, and CODE.

Note that the shapes which are printed are native to the computer that you used to run NATIVE, not the computer you used to print the file. The Model 100 character shapes are different than those of the Model 102 and Model 200. So if you own different models, run NATIVE for each computer and then print the file.

6.1.3. Character to Key Map KEYMAP.DO

The KEYMAP.DO file is a key map which is formatted for display on your computer screen. It has no carriage returns. You view the file as you would view any file: put the cursor on KEYMAP.DO, and then press ENTER.

Whenever you view the file you see a picture of all the character shapes and you see how each shape relates to a keytop in conjunction with SHIFT, GRPH, and CODE. This picture is a convenient reference.

The horizontal format has 5 columns which are titled. Below the titles are the character shapes for each key in ascending keytop order: 1, 2, 3, 4, 5, 6..., then the next keytop group Q, W, E, R, T, Y..., and so on. Each key has up six different character shapes in conjunction with SHIFT, GRPH, and CODE. The character shapes for the first three keys are shown in the sample below.

grph	GRPH	Keytop	code	CODE
π	▪	1!	á	¡
Ω	▪	2@		
◇	▪	3#	é	

Note that the shapes that you see when you view the file are native to the computer. The Model 100 character shapes are different than those of the Model 102 and Model 200. So if you own different models, the file will view differently in each computer.

Although the file is made for screen view, if you wish you can print the file after you run NATIVE. You print the file as you would print any file: put the cursor on KEYMAP.DO, press ENTER, and then simultaneously press SHIFT and PRINT. The horizontal format is excessive so use a print WIDTH of 40 to get a screen wide printout.

6.2. Using Extended Characters

Character codes above 127 are not in accordance with ASCII. In fact, there is no standard for such codes. They are the so-called extended ASCII codes and they are widely in use. Consequently, there are two problems.

First, the character shapes for these codes vary among different computers and different printers. NATIVE solves this problem.

Second, terminal programs (TELCOM), modems, and telecommunication facilities (data service networks, BBS, and so on) don't handle them in a consistent way if at all. Another RWTP product solves this problem.

Problems and solutions aside, here's how to use the character shapes of the extended ASCII codes for the Model 100, 102, and 200.

6.2.1. Line Draw

There are 11 line draw characters: four corners, four T butts, a cross, a vertical, and a horizontal. In conjunction with SHIFT and GRPH, your computer maps the line draw characters to three rows of keytops as shown below.

```
U  I  O  P        ┌  ┬  ┐  ─
 J  K  L  :       ├  ┼  ┤  │
  M  <  >          └  ┴  ┘
```

You can apply them for table rulings as done in this manual. Rectangular line art as found in the KCHART.DO file is another application. Mazes, puzzles, games and the like beg for line draw characters.

With NATIVE you can print files that contain your line draw creations the same way you print your other files.

6.2.2. Arrows

There are 5 arrow characters. In conjunction with GRPH, your computer maps the arrow characters to three rows of keytops as shown below.

```
   O              ↑
K  L  ;        ←  →  ↕
  ,               ↓
```

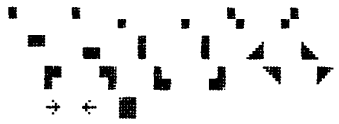
You can apply them as directional and series indicators. Except for the dual arrow, you can use an arrow by itself or join it with a line draw character to make a longer arrow.

With NATIVE you can print files that contain arrows the same way you print your other files.

6.2.3. Block Art

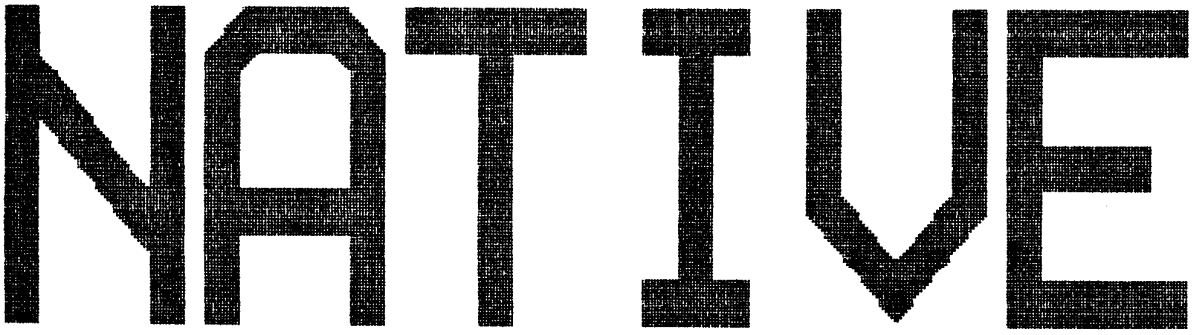
There are 20 block art characters: four white corners, four black corners, four white or black sides, two white or black diagonals, four white or black wedges, a white block, and a black block. In conjunction with SHIFT and GRPH, your computer maps the block art characters to four rows of keytops as shown below. The four white corners are mapped to the 1, 2, 3, and 4 keytops and they are the hardest to visualize. The four black corners are mapped to the A, S, D, and F keytops and they are easy to visualize. The two diagonals are mapped to the 5, and 6 keytops; they can be visualized as white or black. The four wedges are mapped to the T, Y, G, and H keytops. The white and black blocks are mapped to the Z and X keytops; the white block is impossible to see so it's shown between two arrows.

```
1  2  3  4  5  6
 Q  W  E  R  T  Y
  A  S  D  F  G  H
   Z  X
```



The invisible white block is a legitimate substitute for a space and it has several uses which a space can't meet: part of a file name; leftmost and rightmost character for proper centering by some word processors (SuperROM).

You can apply block art characters for pictures or for bold line art as found in the KCHART.DO file. You can use just the black block and wedges to make large bold well formed lettering as shown in the example below.



6.3. Making Characters Join on Paper

The line draw and block art characters must join horizontally and vertically to portray continuous objects. Your printer does not leave any horizontal space between characters, so there is no horizontal problem. But as a rule, your printer sets the lines at 6 lines/inch which leaves vertical space between the lines. This is fine for text characters which must appear distinct, but it leaves unjointed the line draw and block art characters.

When you want continuous objects made from lines of line draw or block art characters, you must make your printer use whatever vertical spacing it needs to join the characters. The exact spacing needed depends on your printer: 8, 9, or 7.5 lines/inch. For example, the printer that made this manual needed 8 lines/inch to join line draw and block art characters.

6.3.1. Lines per Inch Commands

To make your printer change line spacing, you must insert printer commands into your files. For all Epson emulations, the commands you need are shown below.

Use the 6 lines/inch command for text.

One of two commands will make your printer join continuous objects. First try to join line draw or block art characters by using the 8 lines/inch command. If the characters don't perfectly join at 8 lines/inch, then they are either separated or overlapped. In either case, use the other command. It will perfectly join the characters... trust me!

	Purpose	ASCII	Decimal
o	text, 6 lines/inch	_ESC_2_	027,050
o	join, 8 lines/inch	_ESC_0_	027,048
o	join, 9 or 7.5 lines/inch	_ESC_3_CAN_	027,051,024

6.3.2. Control Character Insertion with TEXT

The Escape character is an ASCII control character. In the TEXT program of your computer, simultaneously press CTRL and P and then keep CTRL depressed and press ESC. This inserts an Escape character into your file and the TEXT program shows the ^[symbol.

Insert normal characters (2, 0, or 3 in commands above) in the normal fashion.

With the exception of the Control @ character (NUL), the TEXT program lets you insert other ASCII control characters in the same fashion. For example, to insert the Control X character (CAN in command above) you simultaneously press CTRL and P and then keep CTRL depressed and press the X key.

6.3.3. Printing Control Characters with TEXT

The TEXT program of your computer prints files one of two ways. TEXT converts control characters to symbols (e.g., Control D character converts to the ^D symbol) when you simultaneously press SHIFT and PRINT. Likewise, when you press PRINT alone to print only a screen portion TEXT converts the control characters to symbols.

But when you want the control characters to reach your printer, it's a bit different procedure. From the main menu you print files that contain control characters as follows: put the cursor on the file name, press ENTER, press F3 (Save to:), type LPT: and then press ENTER. In this case TEXT sends the file as is, including control characters, directly to your printer.

6.4. Printer Commands in PASTEX.DO

You can look in your printer manual for various printer commands and insert them into your files. In this way your printouts can have various print treatments like:

bold
underline
wide pitch characters
narrow pitch characters.

The PASTEX.DO file comes with NATIVE. It is a collection of printer commands of the Epson emulations. The horizontal format has 3 columns which are titled. Below the titles are 2-line entries. The first line of each entry is a printer command you can paste into your file where you want the command action to engage. The second line of each entry is only informative and it has 3 columns: an action description, the command code in ASCII form, and the command code in decimal form.

Your printer might not engage every command that is in the PASTEX.DO file. The commands in PASTEX.DO are sequenced to provide a command diagnostic exercise of your printer when you print the file. You print the file as you would print any file that contains control characters: put the cursor on PASTEX.DO, press ENTER, press F3 (Save to:), type LPT: and then press ENTER. Study the printout and note if each action description in the left column engages on your printer.

7. PRINTOUT SAMPLES

This section contains printout samples of the PRTEST.DO and KCHART.DO files. Each sample is a one page printout. The samples were printed after NATIVE had enlightened the printer about the shapes for the full range of all (N1EXA_) character codes. A Model 100 computer ran NATIVE for the samples native to it. A Model 102 computer ran NATIVE for the samples native to it and to the Model 200.

The printouts are:

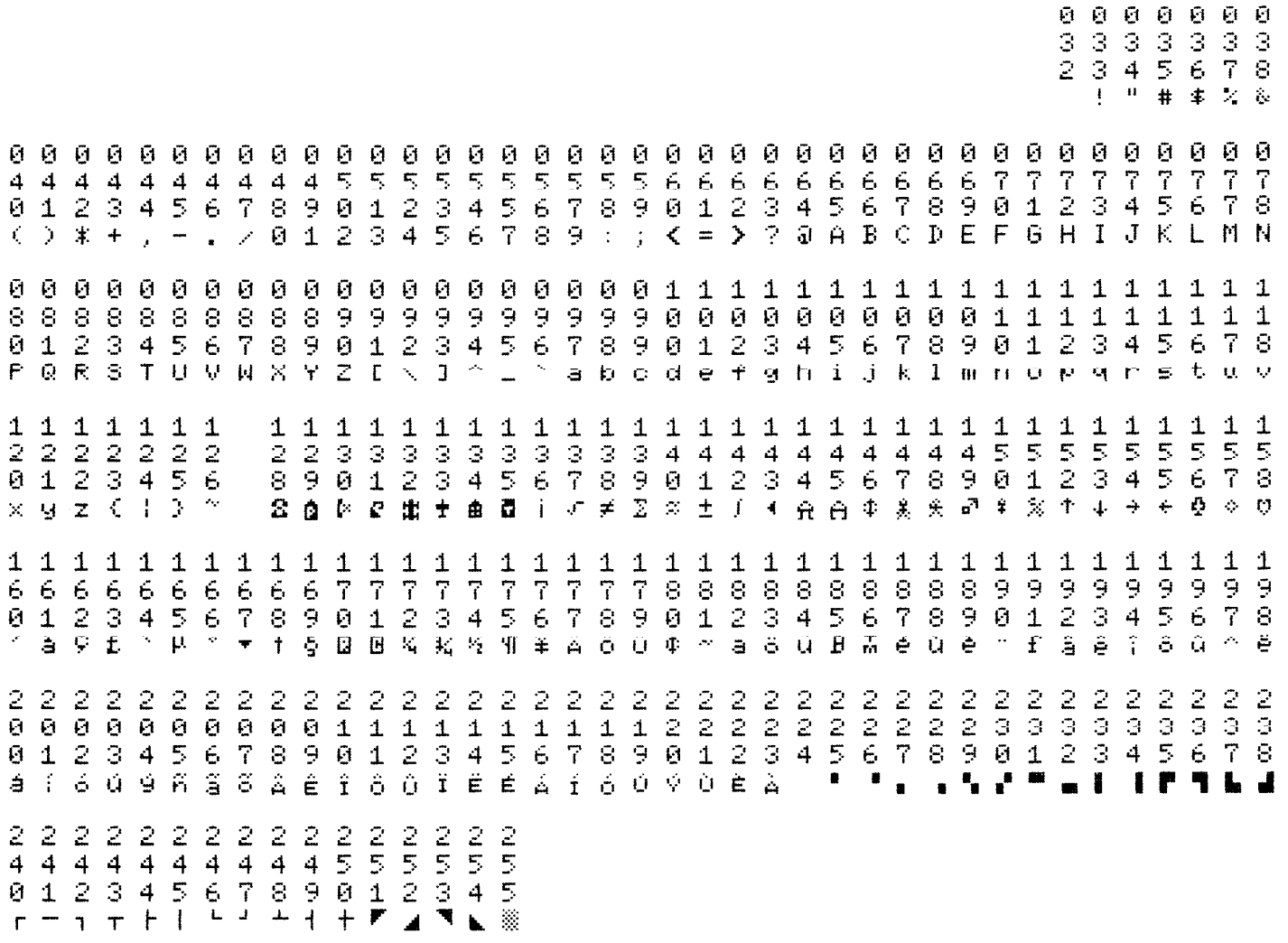
Sample 1. SHIFT+PRINT PRTEST.DO for Model 100
Sample 2. SHIFT+PRINT PRTEST.DO for Model 102/200
Sample 3. SHIFT+PRINT KCHART.DO for Model 100
Sample 4. SHIFT+PRINT 8 lines/inch KCHART.DO for Model 100
Sample 5. Save to LPT: 8 lines/inch KCHART.DO for Model 100
Sample 6. Save to LPT: 8 lines/inch KCHART.DO for Model 102/200

Sample 1 or Sample 2 corresponds to character shapes that are native to your computer. Use the SHIFT+PRINT method to make your own printout of the PRTEST.DO file and compare it with the appropriate sample.

Sample 3 and Sample 4 illustrate how to insert printer commands in a file, as explained in Section 6.3. Sample 3 shows KCHART.DO printed at your printers default line spacing. Sample 4 shows KCHART.DO after control characters were inserted to switch portions of a printout between 8 line/inch and 6 line/inch spacing. Because the SHIFT+PRINT method was used to make Sample 4, the control characters print as symbols and do not act as printer commands.

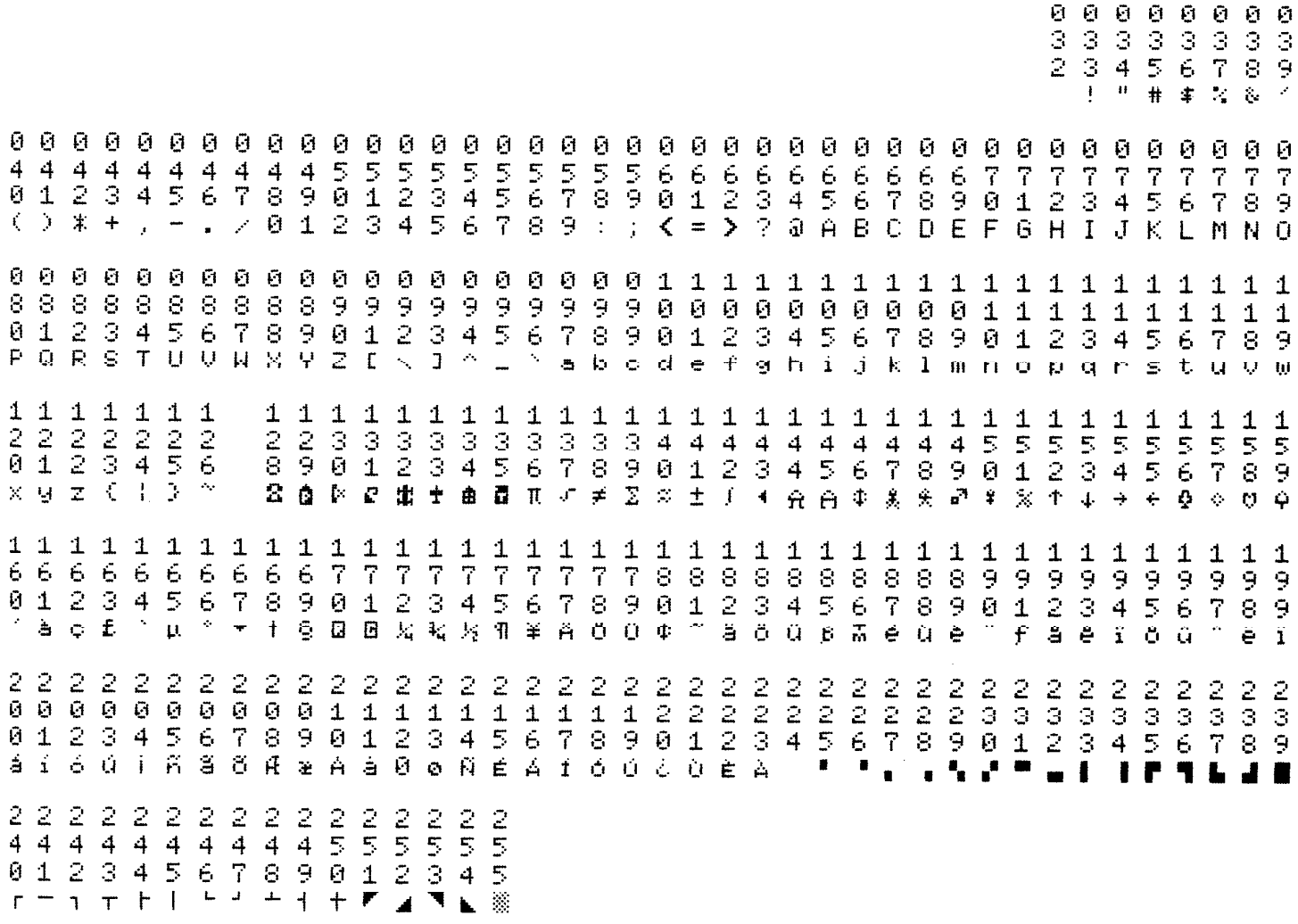
Sample 5 or Sample 6 corresponds to character shapes that are native to your computer. They were made by the Save to LPT: method and they demonstrate how portions of a printout can switch between 8 line/inch and 6 line/inch spacing. Modify your copy of the KCHART.DO file (Sample 4) and then make your own printout and compare it with the appropriate sample.

Printer Test of Character Codes 32 to 126 and 128 to 255



Sample 1. SHIFT+PRINT PRTEST.DO for Model 100

Printer Test of Character Codes 32 to 126 and 128 to 255

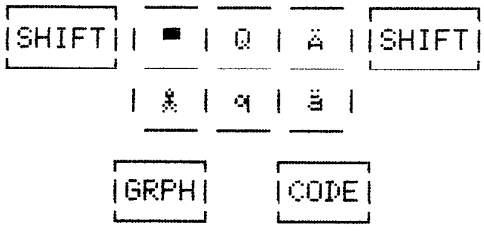


Sample 2. SHIFT+PRINT PRTEST.DO for Model 102/200

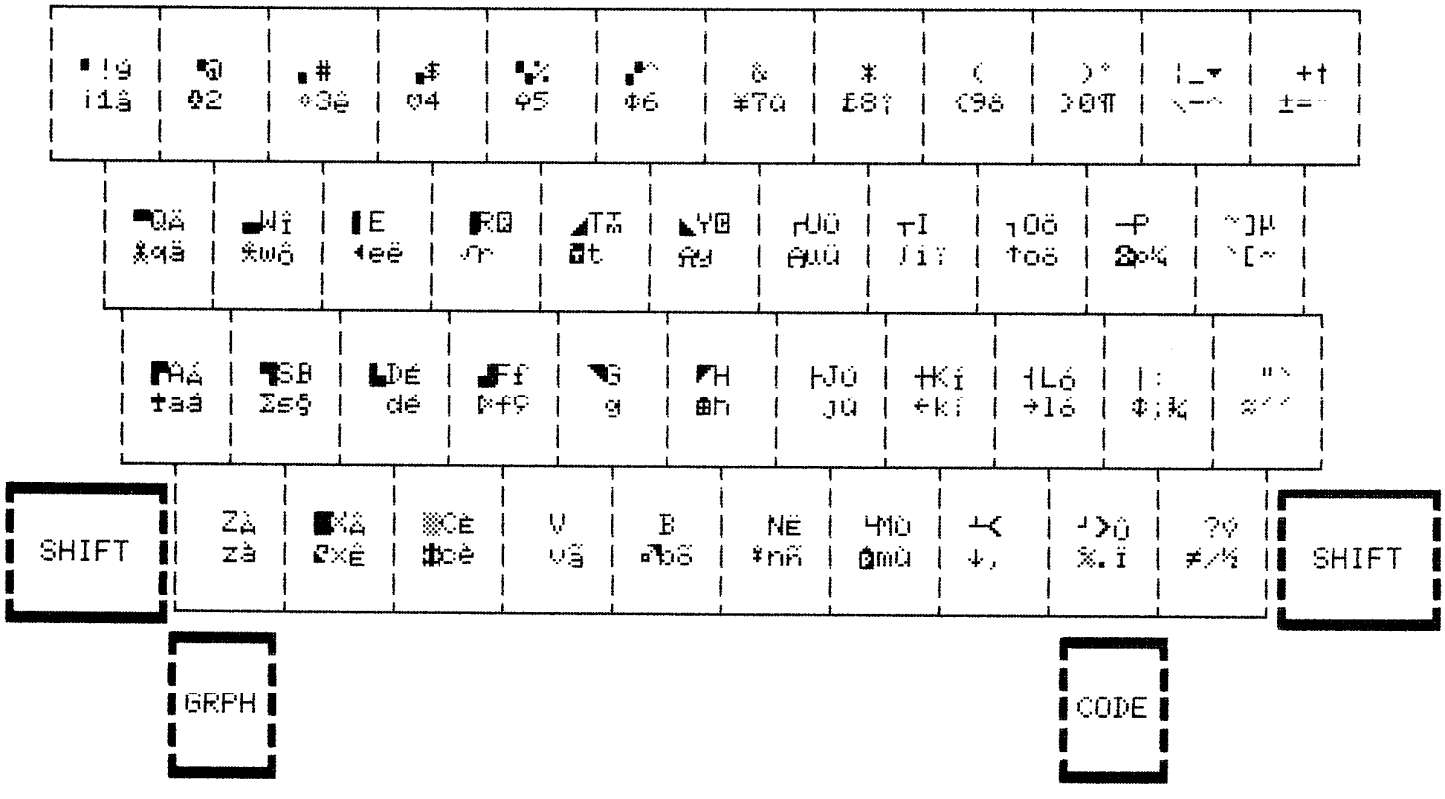
MODEL 100/102/200 KEYS

The Model 100/102/200 has 44 "QWERTY" keys. Using SHIFT, GRPH, and CODE, each key produces up to six different characters. The "Q" key example below shows this. Following the example, the layout of the SHIFT, GRPH, CODE, and the 44 "QWERTY" keys are shown. The related characters are shown inside each "QWERTY" key position.

the "Q" key



the 44 "QWERTY" keys

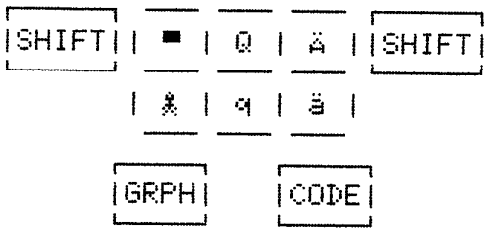


Sample 3. SHIFT+PRINT KCHART.DO for Model 100

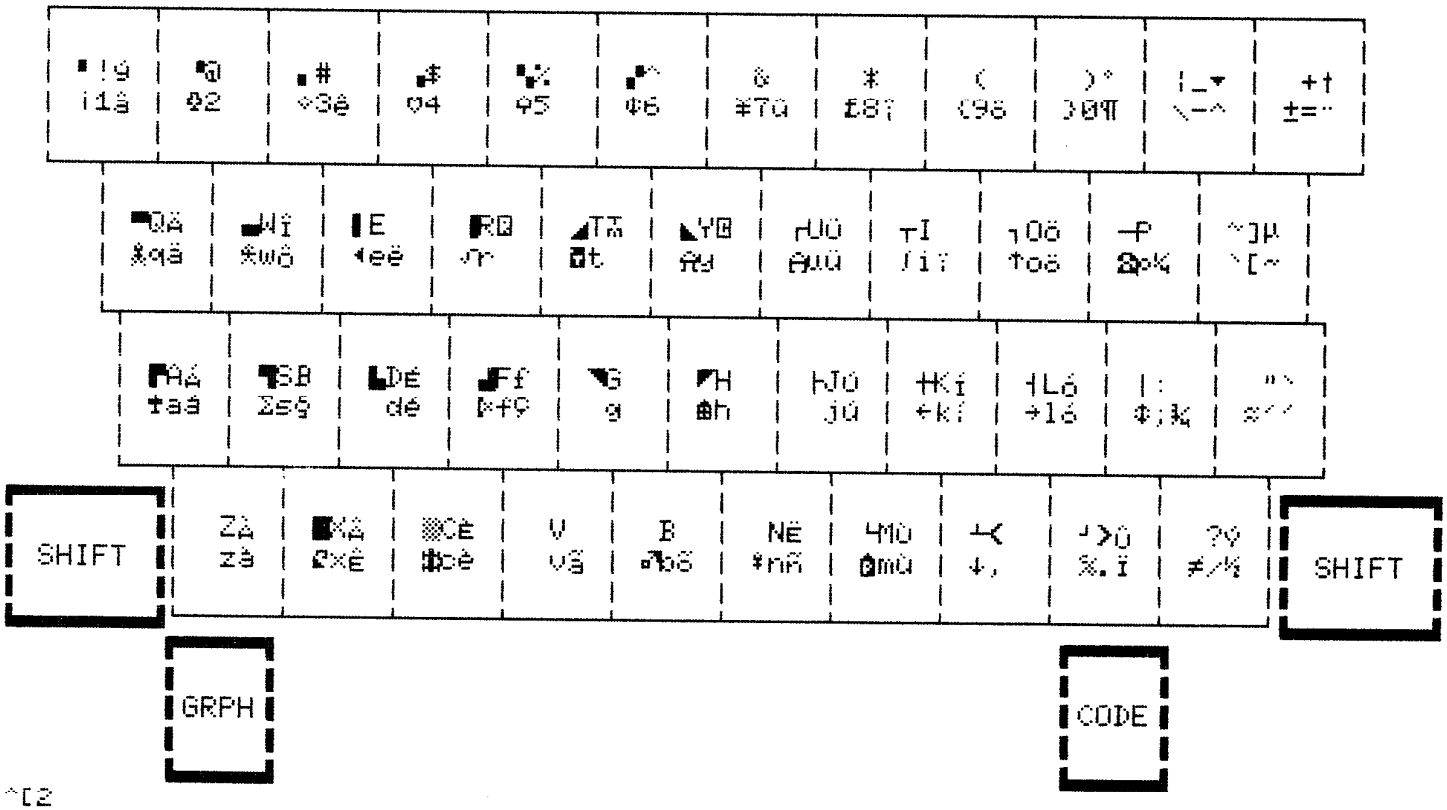
MODEL 100/102/200 KEYS

The Model 100/102/200 has 44 "QWERTY" keys. Using SHIFT, GRPH, and CODE, each key produces up to six different characters. The "Q" key example below shows this. Following the example, the layout of the SHIFT, GRPH, CODE, and the 44 "QWERTY" keys are shown. The related characters are shown inside each "QWERTY" key position.
^[0

the "Q" key



the 44 "QWERTY" keys



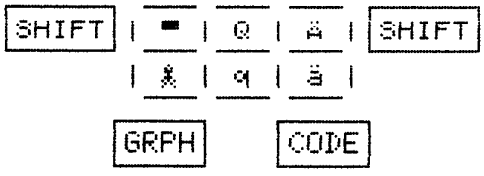
^[2

Sample 4. SHIFT+PRINT 8 lines/inch KCHART.DO for Model 100

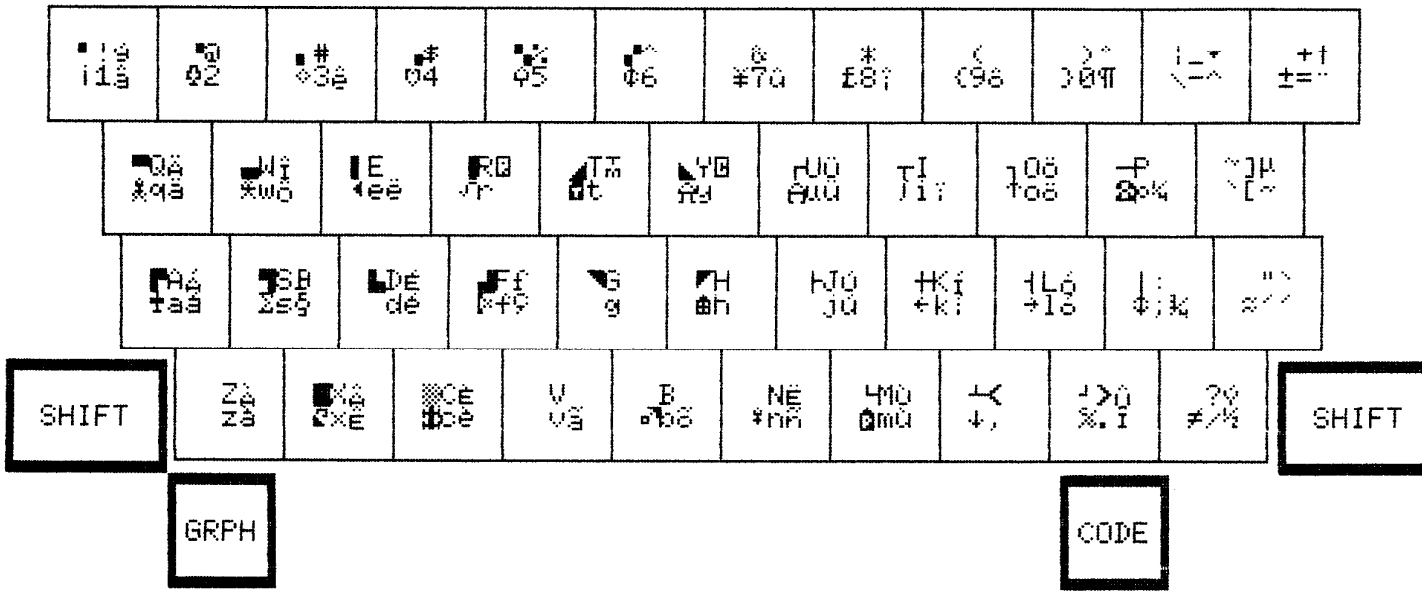
MODEL 100/102/200 KEYS

The Model 100/102/200 has 44 "QWERTY" keys. Using SHIFT, GRPH, and CODE, each key produces up to six different characters. The "Q" key example below shows this. Following the example, the layout of the SHIFT, GRPH, CODE, and the 44 "QWERTY" keys are shown. The related characters are shown inside each "QWERTY" key position.

the "Q" key



the 44 "QWERTY" keys

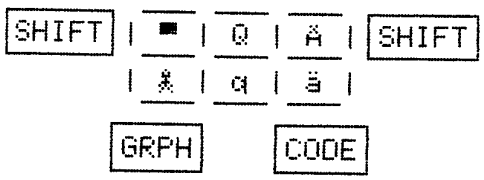


Sample 5. Save to LPT: 8 lines/inch KCHART.DO for Model 100

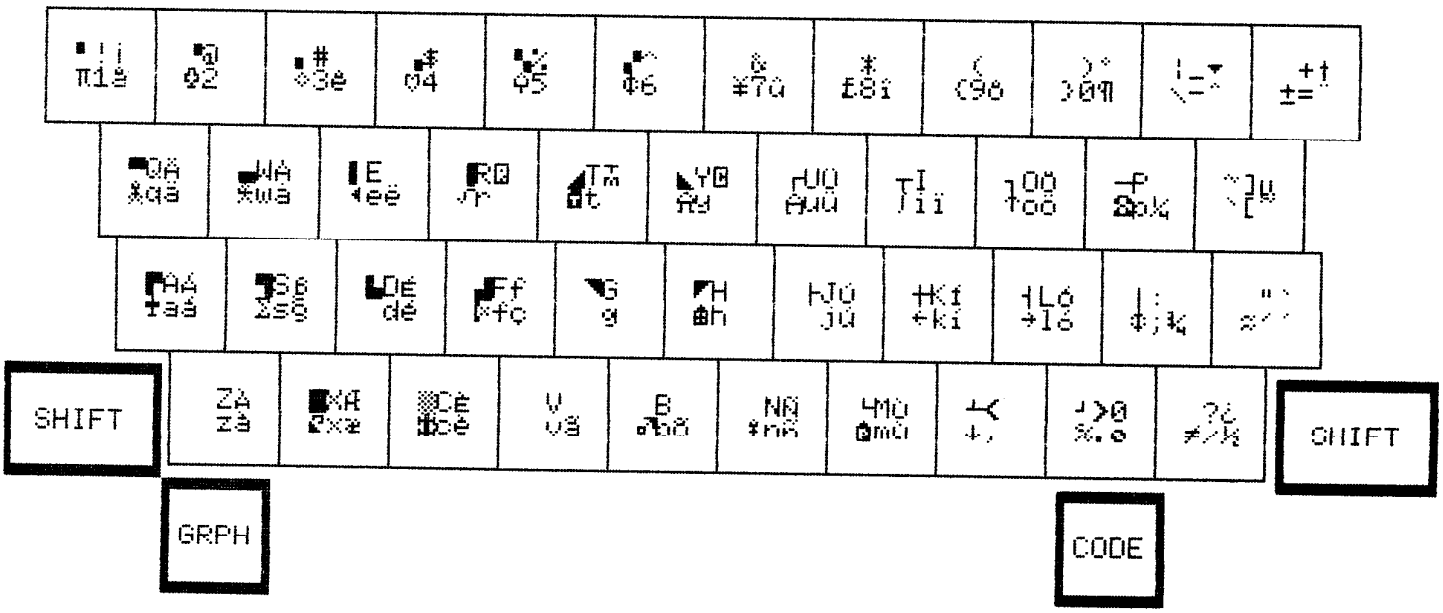
MODEL 100/102/200 KEYS

The Model 100/102/200 has 44 "QWERTY" keys. Using SHIFT, GRPH, and CODE, each key produces up to six different characters. The "Q" key example below shows this. Following the example, the layout of the SHIFT, GRPH, CODE, and the 44 "QWERTY" keys are shown. The related characters are shown inside each "QWERTY" key position.

the "Q" key



the 44 "QWERTY" keys



Sample 6. Save to LPT: 8 lines/inch KCHART.DO for Model 102/200

8. TECHNICAL SPECIFICATIONS

Most folks are content to know what NATIVE does and how to use it. They use it, they like it, and they don't care to know how it works. If you are content, don't read this section.

Some folks are curious and want to know how things work. They disassemble things to see how they are made. If you are curious, read this section. From the technical specifications of NATIVE, that are given below, "techie" types can glean how it works and perhaps won't bother to disassemble it. Nah!

HIMEM requirement
N◇◇◇◇◇ none

Program file size including 6-byte .CO file header (bytes)
N◇◇◇◇◇ 269 ±57

Algorithm for transform of 6x8 screen shape to paper shape
N1EQ◇◇ 180° X-axis, 12x24-pin (6 and 6 interlace blanks)
N1EX◇◇ 180° X-axis, 11x09-pin (6 and 5 interlace blanks)
N2EQ◇◇ 090° Z-axis, 12x24-pin (6 and 6 interlace blanks)
N2EX◇◇ 090° Z-axis, 11x09-pin (6 and 5 interlace blanks)

Shape data input from computer (bytes)
N1◇◇A_ 1248
N1◇◇B_ 480
N1◇◇E_ 768
N2◇◇A_ 1792
N2◇◇B_ 768
N2◇◇E_ 1024

Shape data output to printer (bytes)
N◇EQA_ 9871
N◇EQB_ 4239
N◇EQE_ 5647
N◇EXA_ 3819
N◇EXB_ 1643
N◇EXE_ 2187

Input efficiency (computer data/computer data plus program size)
N◇E◇◇_ max. 89.69% (N2EXA_)
N◇E◇◇_ mean 77.35%
N◇E◇◇_ min. 60.38% (N1EQB_)

Output efficiency (printer data/printer data plus program size)
N◇E◇◇_ max. 97.08% (N2EQA_)
N◇E◇◇_ mean 93.20%
N◇E◇◇_ min. 88.00% (N1EXB_)

Overall efficiency (all data/all data plus twice program size)
N◇E◇◇_ max. 95.15% (N2EQA_)
N◇E◇◇_ mean 89.88%
N◇E◇◇_ min. 82.57% (N1EXB_)

Shape data expansion ratios (printer/computer)

```
N◇E◇◇_ max. 8.831:1 (N1E0B_)
N◇E◇◇_ mean 4.698:1
N◇E◇◇_ min. 2.131:1 (N2EXA_)

N◇E0◇_ max. 8.831:1 (N1E0B_)
N◇E0◇_ mean 6.779:1
N◇E0◇_ min. 5.508:1 (N2E0A_)

N◇EX◇_ max. 3.423:1 (N1EXB_)
N◇EX◇_ mean 2.623:1
N◇EX◇_ min. 2.131:1 (N2EXA_)

N1E◇◇_ max. 8.831:1 (N1E0B_)
N1E◇◇_ mean 5.571:1
N1E◇◇_ min. 2.848:1 (N1EXE_)

N2E◇◇_ max. 5.512:1 (N2E0B_)
N2E◇◇_ mean 3.825:1
N2E◇◇_ min. 2.131:1 (N2EXA_)
```

Safeguards

```
N◇◇◇◇◇ print vector to System Return; restored on exit
N◇◇◇◇◇ initial copy of printer ROM to printer RAM
```

Conveniences

```
N◇◇◇◇◇ does not conflict with other user programs
N◇◇◇◇◇ does not reset printer (user set-up remains)
N◇◇◇◇◇ displays 6-character internal program name
N◇◇◇◇◇ displays each character shape sent to printer
N◇◇◇◇◇ waits when printer ready signal is absent
N◇◇◇◇◇ has no user input; beeps on exit
```

Security measures

```
N◇◇◇◇◇ 5-character serial number (displays)
N◇◇◇◇◇ 1-byte cyclic redundancy checksum
```