

--EPSON PACKAGE DOCUMENTATION--

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The programs contained on the Diskette or Tape you have received contain a number of program modules which will allow you to gain superior control of your EPSON MX80 Printer when used with a Model I or Model III Computer. The following programs are contained on the distribution media you have received:

EPSON/SUB
 BIGLETT/BAS
 LABEL/BAS
 SCHEDUL/BAS
 JKLND80/BAS *
 JKLND21/BAS *
 DEFSTATE/BAS
 MX80/CMD *
 SCRUMP/ASC
 DEMO/BAS

The programs marked with an * require a disk system to be present and active. The program named DEFSTATE/BAS will work only with DISK BASIC or other BASICS with the defined statement support.

We will now present documentation for each of the modules.

■ EPSON/SUB ■

This is a one line program that is designed to be merged into any BASIC program. It contains a number of remark lines which describe its functions. All of the REMark lines may be deleted once you have merged the module into your BASIC program.

It gives you the ability to issue any of the EPSON MX80 commands by LPRINTing a Two Letter Command. The two letter command is a mnemonic for the actual command so that the two letters represent what the command is to do. For example to use the Double Strike mode just issue the command LPRINT DS\$, etc.

The easiest way to learn to use this valuable subroutine is to print it out on your printer by LLISTing it after you have loaded it into BASIC. Then you can scan the REM statements for the purpose of each command. The program DEMO/BAS will illustrate in detail its use if more instruction is necessary.

■ BIGLETT/BAS ■

This program gives you several different possibilities for using your printer as well as your video monitor. Basically it allows you to

directly type large letters onto your video monitor. You type these letters just as you would normally type and they appear on the screen.

When you have composed large letters on your screen to your satisfaction you can dump these to your MX80 by hitting the @ key. A complete list of the available commands for this program is available within the program itself by executing menu option number three (3).

The screen you compose can also be dumped to Disk (if a disk is available) by answering the appropriate prompts in the program with that option. This will cause a image to be saved on disk that can, at a later date, be PRINTed to your MX80. The graphics are stored in the proper format for the MX80. This option can be useful when you wish to combine regular text and the large letters into one document that you are printing. This is done by preparing the large letter file and then a regular text file. PRINT the disk file and then follow it by printing the regular text file.

■■■ LABEL/BAS ■■■

This program allows the easy construction of labels using your MX80. It is necessary for the user to enter the lines that he wishes to appear on the labels in DATA lines at the end of the program and in the format that is specified in the REM statements that are at the end of the program.

The program is set up for normal mailing labels that have five lines and come on pinfeed paper with one label across. It also supposed that these labels are attached firmly enough to the paper that they are on to avoid jamming the printer as some labels (especially cheap ones) are prone to do.

If the labels you are using are in another format you will be able to easily modify the program by examining the REM remarks that are provided detailing its construction.

If you wish to have several labels that you print over and over again it is possible to use this program to store the various labels. Just put REM or ? before each of the lines that will not be used for the current label you wish to print.

This program also illustrates how you can easily control the printer for advanced types of printing jobs.

■■■ SCHEDUL/BAS ■■■

This program demonstrates how a specialized type of printed form might be designed. It is REMed for easy understanding. It also illustrates the use of the horizontal tab feature of your MX80. Careful examination of the program will give you a wealth of information on the possibilities of your printer.

JKLNDB0/BAS and JKLND21/BAS

These two one line programs are designed to be merged into your BASIC program. They will modify NEWDOS80 or NEWDOS 2.1 so that the JKL printer dump routine will dump graphics to your printer even though you set it to the regular full feature mode. Once the pokes have been made any time you press JKL the exact contents of the screen will be sent to the printer.

Incidentally, to get proper proportions try using the printer in the compressed character format.

DEFSTATE/BAS

This program is designed to be merged into your BASIC program. Once there it allows you to use the DEFINED Statements that the merged lines create. The various REMs in this program module will detail the use of each of the defined statements. Consult your IRSDOS Disk Basic manual for details about Defined Statements.

The easiest way to quickly understand how to use the DEFINED Statements is to closely examine the various demonstration programs and see how they use the DEFSTATE/BAS module.

MX80/CMD

This is a assembly language program that works from DOS. It allows all of the MX80 commands to be sent directly from DOS.

To use the program just go to DOS ready and type MX80. In a few seconds the screen will fill with a one page listing of all of the commands possible and the format for these commands. Any number of commands can be sent at the same time with each command separated from the previous one by a comma. A sample of the format would be as follows:

MX80 X,E,B,D

The above command would reset the printer as if it had just been turned on (X), and then set it for emphasized printing along with double strike printing and it would also ring the bell of the printer.

SCRDUMP/BAS

This is a short basic subroutine that can be merged into any BASIC program. It will dump the contents of the screen to the printer from BASIC and will convert the graphic characters to the proper format for the Epson Printer when it is set in its regular full feature mode. A sample of its use can be observed in BIGLETT/BAS.

DEMO/BAS

This is a demonstration program that will demonstrate the use of many of the programs in the EPSON PACK. First you should LIST the program and then run it and follow along with the various prompts it gives and the references to the listing that you have made of it. In this manner you will quickly learn all of the many features and possibilities of the programs you have received in the EPSON PACK.

IMPORTANT NOTE TO THE PURCHASER OF THIS SOFTWARE:

If you have any problems with this software write:

Roger Smith
PO BOX 13738
Arlington, Texas 76013

Please include a self addressed stamped envelope.
We will be happy to help you with any problem or question.

EPSON PACK DOCUMENTATION

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Distributed by TEXAS COMPUTER SYSTEMS

This documentation is provided to outline the use and operation of the various programs contained on the diskette of software you have received. These programs are designed to operate on a MIBO, MIBOFT, and the M100. Many of the program modules also support the addition of the *GRAFTRAX80* option to the MIBO and MIBOFT. These programs are designed to run on a TRS80 Model I or Model III computers under most of the standard operating systems for these computers.

MX100 support: Most of the program modules included on the diskette will work with the M100. The M100 does not support TRS80 Block Graphics or *italics* (in other words the *Graftrax* on the M100 does not have italics). The **Bit-Image** mode is fully supported however.

Following is a list of the programs on the distribution media that you have received:

EPSON/SUB 1	BIGLETT/BAS 11
LABEL/BAS 11	SCHEDULE/BAS 11
JKL/BAS 11	DEFSTATE/BAS 11
MIBO/CMD 1	SCRDUMP/ASC 11
DEMO/BAS 1	MEMU/EP1 1
EPSONGT/SUB 111	EPSONGTO/SUB 111
GRAFIX/BAS 111	GRAFTTEST 111
GRAFDemo/DME 111	MEMU/EP2 111
DEMO2/BAS 111	

1-----may not be used with *GRAFTRAX80* option installed.

11-----Works with or without *GRAFTRAX80*.

111-----Works ONLY with *GRAFTRAX80* option.

DIP SWITCH SETTINGS: We suggest that dip switch 3 of the SW-2 set of switches be set to the on position and switch 4 to the off position. Switches 1 and 2 can be either way depending on what special characters you want to use (see EPSON documentation). We left them off for all of our tests for our programs. For *GRAFTRAX80* users we suggest that SW-1 switches be set with 6, 7 and 8 on; 4 and 5 off; 2 and 3 on; 1 off. Again we made our tests for our programs with these settings.

EPSON/SUB

The one or two lines of this program should be merged with

your BASIC program. The REMarks can be deleted. This module sets up special mnemonic codes for various commands to your printer. For example: LPRINT D90 will activate printing in the Double Strike mode. Examine DEMO/BAS program to see other examples of use for this module.

BIGLETT/BAS

This program will allow display of Large *GRAPHIC* letters to your display or to your printer. Follow the prompts included in the program for its use. A display of letters may also be saved to DISK but will not always PRINT correctly later unless you set your operating system properly which will take experimentation by the USER.

LABEL/BAS

This program allows the easy construction of LABELS using your EPSON printer. The user must enter the contents of the label he desires in the DATA lines at the end of the program. A set of sample DATA lines is included there. Study the REMarks for details on how these DATA lines should be set up. The program is designed for normal 5 line labels that are one across. We suggest purchasing a good quality Label to avoid jamming your printer. If you have several Labels to print just create the DATA lines and put REM's at the beginning of the DATA lines that you will not be using.

SCHEDULE/BAS

This program is for demonstration purposes only. It illustrates how to set up a scheduling form and gives you some good ideas how to use the vertical tab features of your printer. Examine the REMarks for details on how this form was set up.

DEFSTATE/SUB

Merge this program with your BASIC program. You may now use the DEFINED statements to do automatic centering, etc. Please examine the program DEMO/BAS and DEMO2/BAS to see various illustrations of the use of these statements. Also examine the REMarks in the program itself.

GRAFIX/BAS A Bit Image Text Editor

This software module allows the user to utilize the Bit-Image graphics capability of the Graftrax80 option to the M180 and the M180FT printers. The program allows extremely easy creation of characters, symbols, and other graphic items. This documentation will outline the theory of operation of Bit-Image graphics and then discuss the actual operation of the program.

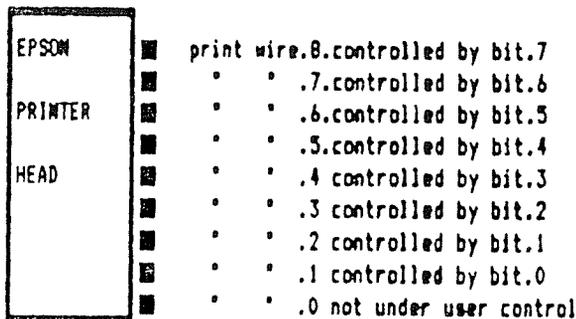
THEORY

Basically, Bit-Image graphics means that the user has control of the top eight print wires of the Print Head. The user can select which combination of print wires will fire. Any or all of the print wires can be fired on any given strike of the print head. A single strike of the print head is simply the firing of the selected combination of print wires. If all eight print wires are programmed to fire then a single column of eight dots will be produced. Five strikes of the Print Head normally take up the width of one ASCII character. Spacing between an ASCII character is made up of one strike of the Print head during which none of the print wires is fired. This means there are 480 strikes of the Print Head possible on one line of printing when in the single density Bit-Image mode. In the double density mode a total of 960 strikes would be possible. How does the user tell the printer which print wires to fire on a given strike?

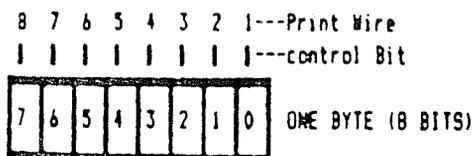
Each of the Print Wires can be set to on or off. If the print wire is on it will fire. If the print wire is off it will not fire. This on/off situation immediately suggests a BINARY number control of the Print Head. One single BYTE in the Binary number base can represent the numbers 0 to 255. The number 255 would be written as 11111111 and the number 0 would be written as 00000000. Each of the ones or zeros is called a BIT. Now we see how the term Bit-Image graphics was derived.

To control the eight Print Wires is now a simple task. If we send a byte of code to the printer when it has been set to the Bit-Image mode the print wires will be fired according to the bits of the byte we send. If a bit is on (a one) then the wire will fire. If the bit is off (a zero) then the wire will not fire. EXAMPLE: If we send the byte represented by 255 (decimal) or 11111111 (binary) then all eight print wires will fire and a column of eight dots will be printed.

If we send the byte 10101010 (binary) then wires 7, 5, 3 and 1 will fire per Diagram #1:



In other words to cause a selection of Print Wires to fire just consult Diagram #1 and set the bits from left to right either on or off depending on whether you want the appropriate Print Wire to fire or not fire during a single strike. For those of you not quite clear on which bit is which consult Diagram #2 which shows the bit positions of a one byte (eight bit) number:



As mentioned in the GRAFTRAX80 Documentation the bottom most print wire on the Head (the ninth one) cannot be addressed. This is due to there being only eight bits in a byte and thus no bit is available to control this wire. Do not despair however. By proper line spacing you can still print a dot at that print position as shown in the demo program for Double High Letters.

BIT-IMAGE BASICS

Turn to page 19 of the Documentation you received from EPSON with your GRAFTRAX80 package. At the top of the page you will see an example of how the user sends bytes to the printer from BASIC in the bit-image mode. The notes shown for each line indicate what the line is doing. (NOTE: In Model III operation you can sometimes send the 0 directly as CHR\$(0) depending on the operating system you are using). The example could also have been written as follows and would have worked just as well (and made more sense):

```

10 LPRINT CHR$(27);"K";CHR$(50)
20 POKE 14312,0
30 IF PEEK(14312)<>63 THEN 30
40 FOR J=1 TO 50
50 LPRINT CHR$(1);
60 NEXT J
70 END

```

Here are some specific steps to follow when using bit-image graphics:

1. Set up a line just like line 10. Substitute for CHR\$(50) a CHR\$(N) where N=number of strikes you want the Print Head to make. If you wish more than 256 strikes then change the value of line 20 to a 1 instead of a 0 and then set the value of N to the number of strikes minus 256. EXAMPLE: You wish to print 400 strikes. Change line 20 to 1 and set value of N=144 (400-256=144).

2. Send a number of bytes to the printer as shown in lines 40-60. Be sure that the number of bytes sent is the same as the number designated in lines 10-20 as indicated in step 1.

3. To send a selection of bytes rather than the same byte over and over again (as in the example) merely put the bytes into a DATA line and read them from the DATA line one at a time and then send them to the printer in the place of the CHR\$(1) in line 50. Here is a simple example showing how this would be done:

```

10 LPRINT CHR$(27);"K";CHR$(10)
20 POKE 14312,0
30 IF PEEK(14312)<>63 THEN 20
40 DATA 128,64,32,20,8,20,2,1,4,4
50 FOR I=1 TO 10
60 READ A
70 LPRINT CHR$(A);
80 NEXT I
90 END

```

In general you could use this exact subroutine on both Model I and Model III by just plugging in the appropriate values. The number of data elements must always equal the number of strikes desired.

How do you decide what bytes you wish to use in the DATA line?

The SCREEN Editor

A special program called BRAFIX/BAS is supplied on

the diskette you have received. This program supplies the answer to the question at the end of the last section. With this simple Screen Oriented Editor you can create up to 20 strikes of bit-image graphics at a time. The program will test these graphics for you and if they are what you desire will create a BASIC program line that looks like line 40 of the above example. This line can then be saved to diskette if you like in a file called BRAFIX/DAT.

Now let's examine BRAFIX/BAS and learn how to use it. First of all let's load the program:

From DOS READY type BASIC and press ENTER. From BASIC type RUN"BRAFX/BAS". The program will load into memory and begin execution.

In a few seconds Monitor will show the display shown in Diagram #3 below:

BRAFX 88...A Bit Image Mode Graphics Generator
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	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
2	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
3	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
4	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
5	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
6	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
7	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
8	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

<ENTER> = PLACE A GRAPHIC BLOCK <C> = CLS SCREEN
<CLEAR> = ERASE BLOCK AT CURSOR <ARROWS> = MOVE CURSOR
<?> EXIT AND CALCULATE BIT GRAPHIC CODES

To get acquainted with the program try the following experiments:

1. Press the Right Arrow key. The cursor (the flashing graphic block) will move one grid park (a plus sign) to the Right.
2. Press the Left Arrow key. The cursor will move one grid park to the Left.
3. Press the Left Arrow key again. Nothing will happen! Why? The program automatically restricts the user to the actual grid shown.
4. Try the Up and Down Arrow keys. You will see that they control up and down movement and that you still are not allowed to go outside the grid.

5. Place the cursor somewhere on the grid on top of a plus. Press ENTER. A large graphic block will appear at that point. This block will represent one print wire on the print head. Each column of pluses represents one strike of the Print head. When ever you press ENTER a graphic block will appear at the location of the cursor.

6. Place the cursor on top of a block that you have turned on (a place where there is a large graphic block) and press the CLEAR key. The graphic block will disappear. The CLEAR key allows you to erase a block when you change your mind about the location of a wire to be turned on.

7. Move the cursor to various places on the grid and press ENTER to place blocks here and there and also experiment with erasing some of them with the CLEAR key. See how easy it is to build various symbols, characters or other graphic information.

8. Press the letter C. The whole grid will be cleared. This command is used when you wish to start over. Any blocks that have been turned on will be erased.

9. Now go ahead and create a graphic or character or symbol on the grid using the above commands. A typical graphic creation might appear as shown in the top illustration of a typical screen on the right hand portion of this page.

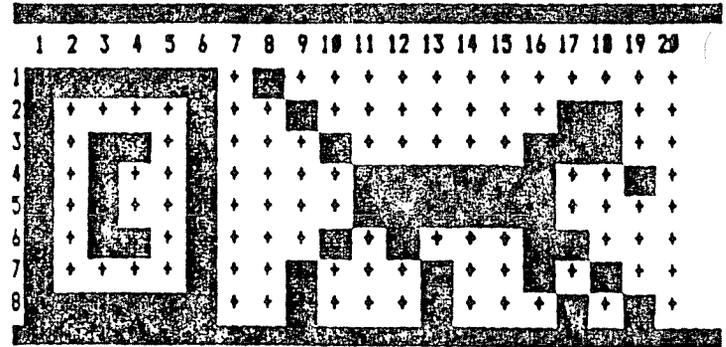
10. When you are finished with step 9 press the @ key. The screen will clear and you will see a reduced size version of your creation appear inbetween two heavy graphic bars. Below the bars a series of 20 numbers will appear. These are the bytes necessary to create the graphics that you have designed. An example of what you might see is shown in the second illustration from the top on the right hand portion of this page.

11. A prompt will appear asking you to press ENTER when the printer is ready and on line. When the printer is on line press ENTER.

12. A sample of your graphic will be printed on the printer. Beside it will appear the bytes used in its creation. An example of the printed result of the bit-image graphics illustrated on the right appears as the third illustration on the right of this page.

13. You will then be prompted whether you wish to save the generated DATA to diskette. If you respond with a Y the program will generate a BASIC program line and save it to diskette in a file called GRAFIX/DAT. You will be asked to provide a line number for this line. Use a line number that you have not already used.

GRAFIX 80...A Bit Image Mode Graphics Generator
(c)1981 by Roger Balth



<ENTER> = PLACE A GRAPHIC BLOCK <C> = CLS SCREEN
<CLEAR> = ERASE BLOCK AT CURSOR <ARROWS> = MOVE CURSOR
<@> EXIT AND CALCULATE BIT GRAPHIC CODES

GRAPHICS REDUCTION AND BINARY NUMBER TOTALS



255,129,189,165,129,255,0,128,67,36,24,28,27,24,24,62,101,98,17,
0,
PRESS <ENTER> WHEN LINE PRINTER READY?

☐ ... 255,129,189,165,129,255,0,128,67,36,24,28,27,24,
24,62,101,98,17,0,

And that in a nutshell is how to use GRAFIX/BAS.

GRAFIX/BAS NOTES

1. In line 60 of the GRAFIX/BAS program the name of the file in which created DATA lines are stored is defined as GRAFIX/DAT. You may change this filespec to any that you desire. Please note that the program on your diskette called GRAFTEST expects the name of this DATA file to be GRAFIX/DAT and you would need to make the appropriate changes in that program if you change the name of the default filespec.

2. How do you create graphics that are larger than the grid that is provided by the GRAFIX/BAS screen monitor? Merely design the graphics in pieces. Then join all the pieces together in one program. Be sure to change the line spacing to take care of the extra space that would appear between pieces. Usually 20/216 would be a good setting for the spacing. See our example program called BRAFDEMO.

3. Print out a listing of GRAFIX/BAS and BRAFDEMO to your printer and study the REMarks to gain other ideas on how to use Bit-image graphics.

4. We will be happy to answer questions about our EPSON Pack software. But you must follow certain guidelines in submitting your questions. These are: 1) Submit your questions in writing. Be sure to give enough details so we may understand your question. Tell us your operating system and your computer. 2) Send a self addressed stamped envelope. No answers will be furnished UNLESS these guidelines are observed.

GRAFTEST

This program will test the lines of BASIC program DATA created by the GRAFIX/BAS. You will be prompted for the number of lines of data you wish to test. You may enter less than the number of DATA lines present but only the first M (where n is the number of lines you specify) will be tested. You will also be given the option of printing in single or double density (480 or 960) modes. The program will then print out a number of your graphic creations in a row. By examining the logic and REMarks you will be able to see how easy it is to incorporate the graphics you design into a BASIC program.

JKL PATCHES

The two patches provided as POKES for NEWDOS's JKL function are for NEWDOS 2.1 and NEWDOS80 1.0. They will not work and should not be used with NEWDOS80 2.0 which has been modified considerably. It is possible to make JKL work properly on NEWDOS80 2.0 for both Model I and Model III. This will require the use of the SUPERZAP program included with the NEWDOS80 2.0 system. Here is the exact procedure:

MODEL I

From DOS READY type SUPERZAP and press ENTER. When the program comes up type DFS and press ENTER. You will be prompted for a FILESPEC. Type SYS3/SYS and press ENTER. You will be prompted for a relative sector. Type the number 4 and press ENTER. Enter the Modification mode of SUPERZAP by typing MOD C1. The cursor will flash over a portion of the display. The HEX byte underneath the cursor should be 3E. The byte following this 3E should be 2E. If these are not the bytes at that point verify that you are in relative sector 4 and then search in the vicinity of position C1 for those two bytes. Change the 3E byte to C6 and the 2E byte to 20. Press ENTER. You will be prompted to press Y. Press the letter Y. The change you have just made will be written to the diskette. **DO NOT MAKE THIS CHANGE TO YOUR MASTER COPY BUT ONLY TO A BACKUP COPY.**

MODEL III

Exactly the same steps as above except type MOD 9C and modify the same bytes as above.

Now whenever you use the JKL function the graphics will be properly printed to your printer. Be sure your printer is in the EPSON mode and not the RADIO SHACK mode.

We do not guarantee the above patches to work on every copy of NEWDOS. Changes made by Apparat may make our patches unworkable and we have no control over the changes that they may make.

GRAFDEMO/ONE

This program will illustrate the creation of graphics larger than can be constructed at one time on the Grid provided with your GRAFIX/BAS module. We have constructed graphics to

print the word EPSON in double high letters using a 16 x 10 matrix. The REMark statements and the on screen information will give you full details on how the program works. It is obvious from this example that it is possible to create a full character set that looks just as you wish it to and is of whatever size you desire. To construct each letter of this set I used the GRAFII/BAS monitor and in the first 10 columns designed the upper half of the letter and in the last 10 columns designed the lower half of the letter. Obviously the DATA lines could be reorganized for easier reading into a control array for use of an entire alternate character set of your own creation.

MENU/EP1

MENU/EP2

MENU/EP1 will display a list of all the program modules included on your diskette that are used on the M180 and M180FT which do not have the GRAFTRAX80 option installed. MENU/EP2 will display a list of the programs that will work when the GRAFTRAX80 option HAS been installed. Some of the programs will work on both versions of these printers and these programs are the ones that appear on both menus.

OTHER PROGRAMS

M180/CMD does not support the extended features of the GRAFTRAX80 option. EPSONGT/SUB is the same as the EPSON/SUB but has the extra command features of the GRAFTRAX80 option contained in it. The EPSONGT04SUB is the same as the EPSONGT/SUB except it does not have the REMark statements in it. DEMO2/BAS is the same as DEMO/BAS but it has the necessary changes and additions for the GRAFTRAX80 option.

IMPORT .

NOTES

The MORE HEAD command for the GRAFTRAX80 option does not work on any EPSON printer that we have tested it on. As a result it is not supported on this software. You may use the BACKSPACE command to simulate it.

When the printer runs out of paper the command to print on the remainder of the sheet appears not to work and we have not been able to get it to work on any EPSON printer. As a result we are not supporting that command in this software. The easiest solution to this problem is to put a piece of tape over the reed switch that controls this function and then everything will work just fine.

MX80/CMD

This is an assembly language program that works from DOS. It allows many of the M180 commands to be sent directly to the printer DOS READY. It does not support the special features of the GRAFTRAX80 option. From DOS type MX80 and you will see a one page menu of the possible commands supported and the format for issuing a command. A sample command might be as follows: MX80 X, E, B, D. This command would reset the printer, turn on emphasized printing and double strike mode and ring the BELL of the printer.

SCRDUMP/BAS

This BASIC subroutine can be merged with your BASIC program and will allow the dumping of the contents of your Display to the printer with the graphics being properly reproduced.

DEMO/BAS

This program will demonstrate many of the possibilities of your EPSON printer. Hundreds of REMarks have been provided to help you see the capabilities of this software package and your printer. DEMO2/BAS is the same program but uses the extra features of the GRAFTRAX80 option to the EPSON printer line. We suggest you LIST the program before running it so that you may follow along with the line references that are given thru out.