THE DISCIPLE

The multi-purpose interface from
Miles Gordon Technology for

ROCKFORT PRODUCTS

USER MANUAL

Copyright 1987

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**The multi-purpose interface
from Miles Gordon Technology
for Rockfort Products**

INTRODUCTORY MANUAL

Copyright 1986

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INTRODUCTION

The Disciple is an interface which allows the Spectrum range of computers to be connected directly and simultaneously to:

* One or two disk drives with the standard Shugart SA400 type connector. The Disciple will accept 5 1/4" or 3 1/2" drives, whether they are 40 track or 80 track, single sided or double sided, single density or double density.

* Any Centronics parallel-type printer.

* One or two standard (Atari-type) joysticks.

* Most other standard Spectrum peripherals.

OTHER KEY FEATURES of the Disciple are:

* Rapid transfer speed: in double density mode, a 48K file can be loaded from disk in approximately 3.5 seconds, a 128K file in less than 10 seconds.

* Large storage capacity: using two double sided, double density disk drives, up to 1.56 Megabytes is available. None of the computer's memory is used by the Disciple.

* A snapshot button allows instant transfer of everything held in the computer's memory to disk.

* A powerful printer interface permits graphics and full-screen printing; a unique facility is that the Disciple can interrupt a game at any point and print out the entire graphics screen.

* Two network connectors provide a network which is compatible with Sinclair Interface 1; with the Disciple attached, up to 63 computers can interact in a system using a single disk drive or printer.

* All the Disciple interfaces use a simplified syntax similar to the Spectrum's own BASIC. Or the normal Microdrive commands can be used, if preferred.

SETTING UP YOUR SYSTEM

IMPORTANT: Before connecting any peripheral to your computer, always disconnect the power supply first. Failure to do so could damage your computer.
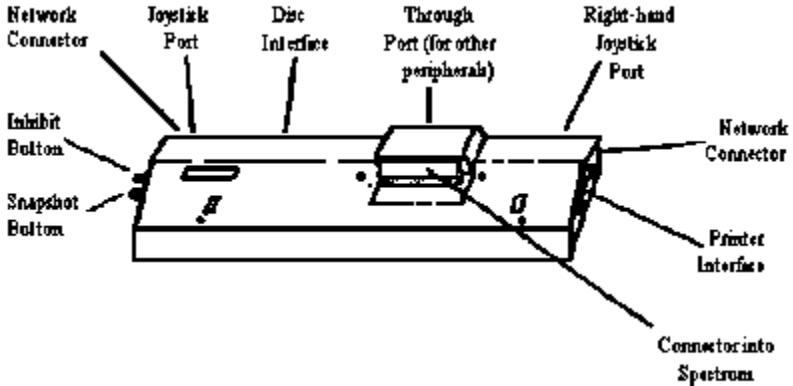
Figure 1

With the power off, carefully connect the peripherals you are using into their sockets, as shown in the diagram above. The front half of your Disciple will fit neatly underneath the computer, supporting it at a convenient typing angle. When the Disciple is in place, tighten the screws at the base of the unit for a secure attachment to the computer. If you normally use the Sinclair Interface 1, do not connect it yet; you will be told how to use Interface 1 with the Disciple in the later section - The Inhibit Button.

Press the Inhibit Button twice. You will notice that when the Inhibit Button is on, it will lock into place; when it is off, it will spring out of the lock. Make sure that the Inhibit Button is off before you start work.

For the first steps, you will need to have your cassette recorder attached to the Spectrum in the normal way.

Connect the power and the normal Spectrum introductory screen will appear on your monitor/TV. Turn on the disk drive power and insert a blank disk.

If you are using a Spectrum 12BK or Plus 2, go into the Edit node, and then move the cursor to select Screen. Then press ENTER. This has the effect of removing the logo from the bottom of the screen, and the commands that you enter will appear at the bottom of the screen instead of at the top.

MAKING THE DISCIPLE COMPATIBLE WITH YOUR SYSTEM

The Disciple has been designed to work with a wide variety of disk drives and printers, but each of these may have a slightly different mode of operation. To enable the Disciple to be compatible with your system, therefore, your first step is to give the Disciple instructions telling it which peripherals you are using, and how you intend to use them. You will only need to do this the first time you use your system, because the information will then be permanently stored on disk, ready for use as soon as you connect the Disciple.

This is how to set the parameters for your system.

* Load the cassette tape supplied with your Disciple as follows:

- Set up your system - including a cassette recorder - as shown in the diagram. Insert the cassette in your cassette recorder, and set the recorder's volume level at about 3/4 of maximum volume.
- Type   LOAD ""
- Press   ENTER
- Press "Play" on your cassette recorder.

* While the program is loading, insert a floppy disk into your disk drive. (If you are using two disk drives, you must insert it into drive 1 - your disk drive manual may refer to it as drive A). If possible, use a floppy disk which has never been used before.

* Wait until the message "Press any key to continue" appears on the screen. (If this message does not appear at the end of loading, check that the lead from the recorder into the computer has been correctly attached - refer to your Spectrum manual. If the connections are correct, try adjusting the volume level on the recorder and start again. Red and blue horizontal lines on the screen during loading should indicate that the program is loading properly.

* Press any key. You will then be asked a series of simple questions about your system. Type in the answers to each of the questions in turn, remembering to press "ENTER" when you are satisfied that your answer is correct. If you make a mistake, don't worry; you'll be offered the opportunity to go through the questions again at the end, if you need to.

These are the questions you'll be asked. Study them and decide on the answers before you start work on the computer. Write your answers in pencil on the dotted lines below, so that you have a record of the values you enter - in case you wish to change them later.

1(a) **Is disk drive 1 a 40 track drive?**   (Your answer) ...Yes/No...

  (b) **Is disk drive 1 an 80 track drive?**   ...Yes/No...

   You answer these questions by entering y (= yes) or no (= no). If you answer no to both questions, you will be told: **You must have a disk drive 1.**

  (c) **Is disk drive 1 double sided?**   ...Yes/No...

   If you answer no, the Disciple assumes that disk drive 1 is single sided.

   On a number of occasions, new users have called us to say that when they try to answer this question, the computer gives a "Nonsense in Basic" error message, and they are unable to proceed any further. If this happens, it's because proper contact is not being made between the computer and the Disciple. In most cases the cause will be either:
     a) The computer's edge connector is dirty or fractured; or
     b) The computer has a fault on the M1 line. Unfortunately, this seems to be a fairly common occurrence amongst all types of Spectrum. The fault only shows itself when devices dependent upon the M1 line - such as Interface 1 or the Disciple - are connected.
   If you have this problem, then:
     i) Try the Disciple with another Spectrum. (Use the other Spectrum's power supply too, in case the problem lies there.
     ii) If (i) works, try cleaning your computer's edge connector, then reconnect the Disciple and try again. If you still have no success, it means a visit to the repair shop for your computer.
     iii) If (i) falls, then follow the instructions in the Guarantee Details at the end of this manual and return the Disciple to us.

(d) **Is disk drive 2 a 40 track drive?**   ...Yes/No...

(e) **Is disk drive 2 an 80 track drive?**   ...Yes/No...

If you answer no to both these questions about disk drive 2, it is
assumed that you are not using a second disk drive, and you will be
asked question 2 onwards. If you answer yes to either question, you
will also be asked:

(f) **Is disk drive 2 double sided?**   ...Yes/No...

If you answer no, the Disciple assumes that drive 2 is single-sided.

2. **Enter disk drive stepping rate in milliseconds.**   ....

Normally, the setting will be 6 milliseconds - your disk drive manual
will probably tell you. Some older drives and 3" drives may have a
slower stepping rate. Typically, this might mean that when you come
to the "Format" command later, formatting may not be successful. In
this is the case, try slowing the stepping rate down to 12. All you
type in here is the appropriate number.

3(a) **Are you using the Disciple's printer port?**   ...Yes/No...

Answer no if you're not using a printer, yes if you're using
Centronics/parallel printer. But if you are using any other sort of
printer (for example, a serial printer connected to Interface 1, or
the ZX printer connected at the through port) you should also answer
no. If you answer no, you will move straight on to question 4.

(b) **Would you like to configure the printer?**   ...Yes/No...

It will probably be unnecessary to configure the printer if you are
using an Epson-type printer, because the utilities software has
already been set up to allow the Disciple to work with these printers.
If you answer no, you will then be asked question 4 onwards.

Answer yes to this question if you are using any other sort of
Centronics parallel printer. You'll need to refer to the section on
printer control codes in your printer manual to answer the following
questions. If you have difficulty, your dealer should be able to help.

In the next questions, which require more than a Yes/No answer, press
ENTER when you are sure that you have typed in your answer correctly.

(c) **Enter decimal values, separated by commas, for printer initialisation.**
. . . .

In your printer manual, find the code for initialising the printer.
The manual will refer to an ASCII code, and decimal and hexadecimal
values. Here, and in the questions which follow, enter the decimal
values, separated by a comma.

If you cannot find the code for initialisation in your printer manual,
simply type in 13 - which is the decimal code for a carriage return.

(You can also simply press ENTER, in which case the Disciple will
automatically default to the pre-set Epson printer code - the default
for initialisation is 27,64.)

(d) **Enter the number of line feeds after a carriage return.** . . . .

No decimal codes this time, just the number of line feeds you need.
(Default: 1)

(e) **Enter control codes in decimal for character pitch.**   . . . .

Character pitch means the number of characters printed per inch
(expressed as CPI). Your printer may allow you to select Near Letter
Quality (normally 10 CPI); or in draft mode, pica pitch (also 10 CPI),
elite pitch (12 CPI), condensed pitch (17.16 CPI), and perhaps
condensed elite pitch (20 CPI).

Choose the pitch you wish to use and find the control codes in your
printer manual. Type In the decimal values, separated by commas.

Normal pitch is generally pica. If your printer manual does not give
a control code for pica but you wish to use pica pitch, try the code
for cancel elite pitch or cancel emphasised print instead.
                              (Default 27,80)

(f) **Enter the number of spaces before your left-hand margin** ....

Simply type the number of spaces you need.
                              (Default: 1)

(g) **Enter line width as number of characters per line.**   ....

With normal A4-sized paper, most printers will allow you to print up
to 80 characters per line in pica, or 132 characters in condensed
character mode. Some printers allow you to load wider sheets of paper
so that you can print up to 255 characters per line - particularly
useful for spreadsheets. Check the capabilities of your printer, then
decide how many characters per line you wish to print, and enter this
as a number in answer to the question.
                              (Default: 80)

(Note that the line width you define will be the **maximum** width
available. If you are using a word processing program which permits
64 characters per line and you have set your printer line width at 80,
then only the first 64 character spaces on each line will be printed
and you will have a blank margin on the right-hand side equivalent to
16 character spaces. Similarly, if you copy a Spectrum screen, you
will produce a print-out 32 characters wide and 24 characters deep
only - because these are the dimensions of the Spectrum screen.

If you want to, you can centre these print-outs on your paper by
changing the left-hand margin settings later.)

(h) **Enter control codes in decimal for printing n/72 inch line spacing.**
                                                  ....

In your printer manual, you will be offered several different options
for line spacing. Find the control codes for setting n/72 inch line

spacing. The decimal code will have numeric values and will then ask
you to type in a value for "n". Don't worry about the n; simply type
in the numeric values as shown, separated by commas.
                        (Default: 27,65)

(i) **When printing text, what line spacing do you wish to use?**
                                    . . . .

Normal single-line spacing is 12/72" - here you would enter 12.
Double line spacing is 24/72" - here you would enter 24. Enter the
number you select.   (Default: 12)

(j) **Enter control codes in decimal for bit-image character mode (= graphic
    character printing)**   . . . .

This is the code required if you wish to print user-defined or screen
graphics (for example, if you wish to copy a screen from a game to
your printer). Find the section in your printer manual dealing with
dot graphics or bit image. You may be offered a choice of single,
double or quadruple density graphics mode. Single density allows a
print-out at normal character size; if you are copying a screen, your
print-out will have a line-width equivalent to 32 characters. Double
density will print at half this size and quadruple density at quarter
size.

The decimal value for the mode you choose will probably be stated in
your manual in a format similar to:
        27   75   (n1)   (n2)   (data1)   (data2)
When you type in the code you only need to enter the figures before
n1, separated by commas. (Default: 27,75)

(k) **Do you want to print the graphics characters for ⊙, £ and # ?**
                                    . . . Yes/No. . .

(l) **Are there any other control codes from your printer manual which you wish
    to set permanently? Enter the decimal values consecutively here,
    separating each value with a comma.**
                    . . . .

We have now dealt with all the important printer control codes,
However, your printer will probably offer you many more options; if
you need any of them, you type them in now. You may wish to print in
italics - the Epson decimal values are 27,52; and you may wish to set
the left-hand margin 8 characters further in so that you centre a 64
character line on the paper - the Epson code would be 27,108,8. If
these were the extra control codes you wished to enter, you would
type: 27, 52, 27, 108, 8

Note that you can only do as much as your printer allows you to do.
For example, some printers will not allow you to use condensed or
emphasised print in Near Letter Quality. Thus, if you entered the
codes when the printer is in this mode, they would not work.

Also note that if you wish to come back to this program later to
change some of the settings, you must retype all the codes, not just
the ones you are changing. If you change one of the codes only, the
Disciple will revert to the default codes for all the others.

4. **Would you like the borders to flash during disk operation?**
                                                      ...Yes/No...

(We find it useful to keep the borders flashing, to show that
everything's performing well; but we know that some users prefer the
plain screen. Our suggestion: try with borders flashing at first. If
you don't like it you can always come back and change it later.

5(a) **Are you using the network?**   ...Yes/No...

If you answer yes, you are asked:

(b) **Are you the master machine in a shared access network?**
                                                      ...Yes/No...

A shared access network is one in which a number of computers are
linked together, all sharing a single disk drive and a single printer
between them The master machine is the computer to which the disk
drive and the printer are attached.

If you answer yes to this question, you will automatically be identified as station number 1 and your operating system will include he routines required to control a shared access network. You will then be asked question 6(a).

If you answer no, you are asked:

(c) What station number are you?   ....

If yon enter a station number between 2 and 9 then you will be recognised as one of the "assistant" stations in the network. (An assistant station is one which has its own disk drive, but which is not actually the master - which is always station number 1. If you enter a station number between 10 and 63, then you will be a "pupil" station - in other words, a station without its own disk drive or printer. (Refer to the section on networking later in the manual for more details of master, assistant and pupil stations.)

If you enter station number 0 then you will switch off the network facilities.

After setting up the network, yon have completed your SYSTEM FILE. You may be satisfied with your answers and ready to save the system file to disk, or you may wish to retype some of your answers. Check that you have a disk in disk drive 1, and then go on to answer the final questions, which may include:

6(a) Would you like to format a disk?   ...Yes/No...

Answer yes only if you're now satisfied with all your answers, and you are using a brand new disk or wish to erase files previously stored on the disk. **Be very careful not to format a disk which contain any files you wish to keep - formatting wipes the disk clean.**

If you answer no, you will then be asked question 7.

(b) **In double density?**   ...Yes/No...

Answer yes if you have a double density disk drive. If you answer no, the Disciple will assume you are working in single density.

(c) **Are you sure?**   ...Yes/No...

Are you sure you want to format? - a final check. If you answer yes, your disk in drive 1 will be formatted and the system file which you have created will be saved automatically at the same time. We call the disk which contains your system file the SYSTEM DISK. After formatting (which takes a minute or two), you'll be asked question 9.

You may find at this stage that the formatting cannot be completed. If this happens, go through the utilities program again trying the following:
   i)   Use a different disk. If this doesn't work:-
   ii) Change the stepping rate - if last time you typed in 6 milliseconds, try 12, then 24, then 40, then 64. If, after these attempts, there's still no success:
   iii) Format in single density instead of double density - some older disk drives struggle to work in double density.
   iv) Check (with your dealer) that the drive is of the right type - i.e. BBC-computer compatible (= Shugart 400 standard) and with a standard BBC-type cable. Try using another drive - perhaps the heads on your drive are not centring or need cleaning.
   v)   If none of these attempts work, return the Disciple to us, following the instructions in Guarantee Details.

7. **Would you like to save the system file?**

If you chose not to format your disk, it may have been because you did not want to erase old files on it. However, you may be satisfied with your system file and ready to save it. If you answer yes to this question, the system file will be saved to disk, but the disk will not be formatted. You'll then go to question 9.

If you are not satisfied with your system file answers, type no.

8. **Would you like to repeat?**

    If you are not satisfied with some of your previous answers, enter yes
    and you will be returned to the beginning of the utilities program
    You may wish to change only one of your previous answers. However,
    you should type the correct answers to all the questions, not simply
    to the one that you wish to change now.

9. **Would you like to save this utilities program on disk?**

    You won't need the utilities program again unless you change your disk
    drives or decide to change the printer controls or to use the network
    in a different way. But if you are likely to change any of these
    later, answer yes; you'll save time if you can load the utilities
    program from disk instead of cassette. If you answer yes, you'll see
    that the files "loader", "mover", "music" and "copysys" are saved to
    disk and appear in the disk directory, which is now automatically
    displayed. If you need the utilities program later, load the file
    called "loader".

Your system disk now contains all the information necessary to make the
Disciple's disk, printer and network interfaces compatible with your system
From this point onwards, all you'll need to do is load your system disk and
you'll be ready to start work.

We recommend that you copy the system file onto several disks ready for future
use. You'll learn how to do this later in this manual, in the section
Formatting New Disks.

USING A DISK DRIVE

(Before you start using the Disciple with a disk drive, please follow the instructions in the previous section - "Making the Disciple compatible with your system.)

Loading the Disk Operating System

Connect the computer, the Disciple and the disk drive(s) to the correct connectors, and then turn on the power. The normal title screen for the computer will be displayed,

Insert your system disk in disk drive 1. (Your manual may call it drive A.)

Type RUN, then ENTER. The disk unit will come to life and the operating system will be loaded. When loading is complete, the screen will display:

        Miles Gordon Technology DOS 3b

and an OK message - 0.K.   GDOS 3,0:1

Some users have found that the Miles Gordon Technology copyright message appears but not the 0. . message, and the computer keyboard appears to have locked up. This has been because they have indicated that they are using the Disciple's printer port as they set up their system disk, but have then failed either to connect the printer or to switch it on (it should be on-line). Press the BREAK key to unlock the computer and allow the "system" to finish loading.

The Catalogue

To find out what programmes are stored on your system disk, type:
        CAT 1 (or CAT 2 if you wish to access drive 2) - ENTER

In about two seconds the screen will display:
        - The heading Disciple Disk 1 (or 2) Directory.
        - A list of files on the disk with various comments. (The maximum
          number of files is 80).
        - The amount of space left free on the disk in kilobytes.

Each directory entry is in the form of a file name which can be up to ten characters long in either upper or lower case characters. The file names are not listed in alphabetical order, but in the order in which they were saved to disk.

A typical catalogue screen is as follows:

1	system	14	CDE	0, 6656
2	loader	11	BAS	500
3	mover	1	CDE	49000, 60
4	music	4	CDE	40300, 1750
5	copysys	14	CDE	42800, 6656
6	snap F	97	SNP 48K	
7	screen	14	SCREEN$	
8	listing	34	M/DRIVE	
9	data	8	SPECIAL	
10	numeric	4	D.ARRAY	
11	character	5	$.ARRAY	

Number of free K-Bytes = 677

In the first column the program number is shown. This is automatically selected by the Disciple. When you save a file, the Disciple will place it in the first available space in the directory. Thus, if you erased file number 9, the next program you saved would become the new program 9.

The second column is for the file-name - up to ten characters long.

The third column shows the number of disk sectors used. In double density each sector holds 512 bytes, so divide the number of sectors shown by 2 to find out the approximate number of kilobytes used to store the file. In single density, each sector holds 256 bytes, so divide by 4 if you need to know the number of kilobytes used.

The fourth column is for the type of file:

```
BAS      = Basic
CDE      = Code
SNP 48K  = 48K Snapshot file
SNP128K  = 128K Snapshot file
SCREEN$  = Screen file
M/DRIVE  = Microdrive file
SPECIAL  = Special file, as used by some software
           houses - for example, word processing files,
           editor/assemblers
D.ARRAY  = Data array
$.ARRAY  = Character array
OPENTYP  = File created by OPEN # statement
EXECUTE  = Execute file
```

You may not fully understand the significance of all these different types of file yet. There will be further explanation later in the manual, and the regular newsletters published by the Disciple Users' Club explore the more specialised file-types in detail.

The right-hand column in the catalogue tells you the starting address of the file and, after the comma, the number of bytes used if it is a code file. If it is a file in Basic, the number will show the line at which the program starts.

The amount of free space left on the disk is displayed in kilobytes at the bottom of the screen.

If your directory fills the screen, and you wish to scroll down to the next screen, press ENTER.

You can also display an abbreviated directory by typing CAT 1! (or CAT 2!). This would show the same directory in the following format:

```
system      loader      mover       music
copysys     snap F      screen      listing
data        numeric     character
```

Both the full and the abbreviated directory can be listed on screen
simultaneously. Or you could, for example, list disk 1 in full and disk 2 in
the abbreviated form.

If you wish to print out the catalogue on your printer, you can use the special
CAT #3 command. For example, to send the catalogue on drive 1 to the printer,
you enter:

                    CAT #3;1
To print an abbreviated catalogue from drive 2, you would enter:
                    CAT #3;2!

Disk Drive Syntax

When you use the Disciple and a disk drive, Basic commands typed on the
computer keyboard are followed by a Syntax Separator - a code to let the
computer know that the instructions are directed toward the disk drive, and
not, for example, toward a cassette recorder.

For ease of explanation in the manual, the syntax operator will be referred to
as D1, meaning that the instruction is for drive number 1. However, when you
are working on the computer, the following options are also available:

        D1 or d1   = a command for drive 1
        D2 or d2   = a command for drive 2
        D* or d*   = a command for the last drive in use

(Programmers should note that D* is particularly useful when your disk file
autoruns and calls up another file on the same disk unit. You should also note
that a variable can be assigned for drive number 1 or 2 but not for *.)

By typing an upper case D rather than a lower case d when saving a file, the
abbreviated disk catalogue will be displayed automatically when the save is
complete. A new catalogue also appears automatically if you type an upper case
D when erasing or renaming a file.

(For those who are familiar with the Sinclair Microdrives, note that you can use Sinclair Microdrive syntax with the Disciple. For example, to load a file from drive 1, you could type:

    LOAD *"m";1;"file-name"

In this case, the syntax operator D1 is replaced by *"m";1;
For further details of Microdrive commands, refer to the Microdrive manual.)

Saving a File and Verifying

On the ZX Spectrum, you save programs on cassette using statements which you are probably familiar with. As an example, type in this short program called Squares:

        10   REM   Squares
        20   FOR   n=1 TO 10
        30   PRINT n, n*n
        40   NEXT   n

To save on cassette, you would type:

        SAVE "Squares"   ENTER

To save the program on the disk in drive 1, you type:

        SAVE D1 "Squares"ENTER

(Remember that D1 can be either d or D, 1 or 2 or *)

The screen border will flash, and after about 2 seconds the program will be saved. Try it and see.

As described in the last section, if you have SAVEd using a capital D, the disk directory is automatically displayed. If you have done the example, you will see the program Squares shown on the directory as the last entry, followed by BAS (showing that this is a BASIC program file), and then the figure 1 (showing that 1 sector has been used).

If you wish, you can now do a further check to ensure that the program has been saved, by entering:

        VERIFY D1 "Squares"

Provided the program has been saved correctly, the screen will display the OK message. (If you ever have difficulty with saving a file, check that you have started with a formatted disk - see the later section in this manual.)

Now, with the program saved to disk, you can clear it from the Spectrum's memory by entering:

        NEW

Loading a program

Next, you can re-load the program Squares by entering:

        LOAD D1 "Squares"

The program will be loaded when the OK message appears. But so far we haven't typed in an instruction which will make the program run. Let's do that now by entering:

        SAVE D1 "Squares" LINE 10

Of course, we already have a program called Squares on the disk, so you will be asked if you wish to overwrite the old one. You must enter either Y (= Yes) or N (= No).

We will enter: Y
Then: LOAD D1 "Squares"

By now, you will probably have realised that all the normal Basic statements that are used with a cassette-based system can be used with the Disciple and a disk drive - with the simple addition of the short syntax operator, D1.

Breaking into a Program

To break into the program and stop Squares running, use the normal Spectrum command - BREAK.

Note that BREAK will stop the computer running all normal routines, but it will have no effect during a disk read/write operation until the disk activity has been completed.

Renaming a file

To rename a file, we use the two keywords ERASE and TO. For example, to rename your program Squares as Example 1, you enter:

        ERASE D1 "Squares" TO "Example 1"

The catalogue which automatically appears (if you have typed in a capital D) confirms that the file-name has been changed.

Note that your file-names can be any combination of letters and numbers - or even spaces - but the maximum number of characters you can use is ten. The Disciple allows you to type your file-names in upper or lower case letters (or both); in the catalogue, the file-names will appear exactly as you originally typed them, but when you re-load a file it will not matter if letters originally typed as lower case letters are changed to upper case or vice versa.

Copying a file

To copy a file we use the keywords SAVE and TO, Try copying the program you have written by entering:

        SAVE D1 "Example 1" TO D1 "Newcopy"

You will see that before the copy is made, you are given the opportunity to change the disk. It you don't need to change the disk, simply press the SPACE bar and the file will be copied with the new file-name.

You could also give the instruction:

        SAVE D1 "Example 1" TO D1

This would mean that you wished to copy the file onto drive 1 and to keep the same file-name. This is obviously useful if you wish to make a back-up copy of a file onto another disk. Again, you are given the opportunity to change the disk before you press the SPACE bar to make the copy. If you don't change the disk but press the SPACE bar, you'll be given the message that the "File-name exists" and you'll be asked whether you wish to overwrite the existing file. Press Y (= yes) to overwrite, or N (= no) to cancel the command.

If you are using two disk drives with the Disciple, you can also copy a file from one drive to the other, using the syntax:

        SAVE D1 "File-name" to D2

If you add a file-name after D2, the new copy will have this as its new file-name; otherwise, the new copy will have the same name as the original file.

When copying is complete there is an automatic NEW instruction to the computer and the computer's title screen is displayed. To check that the copy has been made, call the CATalogue by entering CAT 1.

Erasing a file

Suppose you have finished with the program now called Example 1. To erase it from the directory of the disk, enter:

        ERASE D1 "Example 1"

During the ERASE, the border will flash, and the catalogue will be displayed automatically (if a capital D has bees typed), showing that the file is no longer available and that more space on the disk has been made free.

(Programmers -note that, unlike Interface 1, the Disciple returns an error message if you try to ERASE a non-existent file. When using programs originally written for Microdrive with the Disciple, you will sometimes have to delete an ERASE command in the listing to avoid the error message.)

Creating an Autoload file

An autoload file is one which loads as soon as you RUN the operating system; you are allowed one autoload file per system disk.

For an illustration of an autoload file, let's rename the file Newcopy. Enter:

        ERASE D1 "Newcopy" TO "Autoload"

The new catalogue should tell you that the file is now called Autoload. Now turn off the power to your Spectrum; everything in the computer's memory, including the disk operating system will be lost.

Turn on the power again and load the operating system from your system disk by entering RUN. Your Autoload file (which, you'll remember, is the original Squares program) will be loaded at the same time, and instead of the normal Disciple title screen you'll see the Squares program running.

If, however, you do not want your autoload program to autoload, then enter:

                RUN boot
instead of:
                RUN

Using the Spectrum's Reset Button

If you use a ZX Spectrum +, a ZX Spectrum 128K, or a Spectrum 128K+2, your computer will have a reset button which allows you to reset your system without having to turn off the power.

But when you press the computer's reset button once, the Disciple still retains the operating system in its own memory. You don't have to reload the Disciple's operating system - you can just carry on giving normal Disciple commands.

However, if the computer's reset button is pressed twice consecutively, the Disciple's operating system is no longer retained in memory. To be able to use Disciple commands, you will first have to load the operating system from your system disk (or technically, "boot up") afresh.

Saving a file with the Snapshot Button

By holding down the CAPS SHIFT key on your Spectrum's keyboard and then
pressing the Snapshot bottom on the Disciple once at any time during the course
of a program, you are able effectively to "take a photograph" of anything held
in the computer's memory at that time, and save it to the last drive in use,
shown by the indicator light on the disk drive.

Make sure that the Disciple is connected and that your system is booted up with
the system disk in drive 1. Then load in any program (a game is best for
demonstration) in the normal way - from disk or from cassette. (If you're
loading from cassette, use the Spectrum's normal LOAD "" command.)

When the program has loaded, press CAPS SHIFT and the Snapshot Button
simultaneously. You'll notice that your program will be frozen at its current
status, and you will see a number of thin multi-coloured lines filling the
borders. You now have the following options:

Press key 3 on the Spectrum to save only the current SCREEN. A screen save
will occupy 7k of memory space on the disk. The border will flash until the
save is complete, and when the flashing has finished, you can continue with the
program from the point at which you left it.

Press key 4 on the Spectrum for a 48K PROGRAM to be saved to disk. Every time
you save a 48K file, 48K of memory space (or actually 97 sectors) will be used
on the disk. When you press key 4, the borders will flash, showing that the
program is being saved. When the borders stop flashing, the save will be
complete and the program will resume from the point at which you left it. (If
you want to, you can take more snapshots at later points in the program until
your disk is full. If your drive has a capacity of 780K and you are using an
empty formatted disk, the maximum camber of 48K snapshot saves you could take
would be 16.)

Press key 5 on the Spectrum for a 128K PROGRAM to be saved to disk. Every time
you save a 128k file, 128K of memory space will be used on the disk (= 258
sectors). Again, the borders will flash for a few moments, but then the
program will appear to be frozen again. If the picture on your screen (the
picture - not the border) has changed, press key Y (= yes) on the Spectrum; if

the picture has not changed, press the key N (= no) on your Spectrum. The borders will then continue to flash until your 128K save is complete, You will then be able to resume from the point at which you left the program.

If you have loaded the program on drive 1, but wish to save your snapshot file to drive 2 - or vice versa - press the CAPS SHIFT key on the Spectrum at the same time as pressing key 3, 4 or 5.

When you've saved a snapshot file, press the computer reset button (or in the case of the Spectrum 48K, turn off the power and boot up the system again) and call up the catalogue - enter CAT 1. You'll see that your snapshot file is labelled "Snap A/B/C" etc, with the letter of the alphabet dependent upon the file's position in the directory. Clearly it will be difficult to remember the precise contents of your snapshot file if this were the only name possible. So you'll need to give your snapshot file an identifiable file-name. First, choose a new name for the file you have snapshotted and then rename it using the ERASE ... TO keywords. (In case you've forgotten how to do this, refer to the section RENAMING A FILE). Use a capital D in the syntax operator, so that the new catalogue is automatically displayed.

To reload the snapshot files, you enter:

```
LOAD D1 "Your new file-name" S         (for a 48K file)
LOAD D1 "Your new file-name" K         (for a 128K file)
LOAD D1 "Your new file-name" SCREEN$   (for a screen file)
```

The S, K and SCREEN$ identifiers are important, and without them the programs will not load. (If you are using Microdrive syntax, you will also need to type in the correct identifier at the end of the LOAD command for snapshot files.)

Abbreviated Syntax

Now that you've learnt the basic disk drive commands, we can introduce you to a much easier way of loading a file. You can enter just:

```
LOAD p6
```

This has the effect of loading the program labelled number 6 in the directory. This command will be particularly useful when loading a code file. Normally you would have to type, for example:

        LOAD D1 "music" CODE 40300,1750

- stating the start address and the number of bytes used. But using the abbreviated syntax, you can simply enter:

        LOAD p4

MERGE and VERIFY can also be used with the program number in this way.

Using the "p" command, you do not need to type S, K, or SCREEN$ in order to load snapshot files.

Wild-Card files

Wild-card files allow you to CATalogue, copy (using the SAVE ... TO syntax), or ERASE a group of similar files in a single operation. Let us imagine, for example, that you have a series of files called:

        numbers1, numbers2, numbers3, numbers4

To erase all of them, you could enter:

        ERASE D1 "n*"

The effect of the star is to say that all the rest of the file-name doesn't matter: you wish to erase all files commencing with "n". Be careful: this really means all files beginning with "n".

You could also enter:

        ERASE D1 "??mb*"

You would then erase all the files which have "nb" as their third and fourth letters. The effect of each question mark is to say that "this letter is of no significance".

The same syntax - using ? and * - is available for the SAVE ... TO and CATalogue commands. Thus, if you wanted to copy all the files on disk 1 to disk 2, you could enter:

        SAVE D1 "*" TO D2

Or, if you wanted to copy your "numbers" files to drive 2 and also give them a new file-name, you could enter:

        SAVE D1 "numbers*" TO D2 "figures*"

(Note that if you are using wild-cards, the new file-name must have the same number of letters as the first - in this case seven letters.

Also note that when you copy files, whether from one disk to another or to the same disk, it is not possible to copy a snapshot file. This precaution is necessary in the interests of the software houses, who would not wish to support a device which could encourage commercial piracy. It is possible, of course, to take a second snapshot of the same file.)

The Inhibit Button

You may find that you have a peripheral which appears not to work with the Disciple. This may be because the peripheral in question has its own ROM and there is interference between the ROM on the Disciple, and that on the peripheral. (This is the case, for example, when you use Interface 1 with the Disciple.) In these cases, follow this procedure:

1.   With the power off, attach the peripheral behind the Disciple. Keep the disk drive attached and make sure you have a system disk ready.

2.   Turn the power on and load in the Disciple's operating system by entering RUN. You can load a program from disk if you want to.

3.   Press the Inhibit Button once, so that it is locked in; this gives you the capability of switching off the Disciple's operating system To actually turn off the system, enter OUT 31,0. You can now no longer use your disk drive (although the Disciple's printer and joystick ports remain active), but you will probably be able to use your peripheral. If now, for example, you entered CAT 1 with Interface 1 and a Microdrive attached behind the Disciple, you would display the Microdrive's directory, not the Disciple's.

4.   When you wish to use the Disciple's disk drive again, you can either press the Inhibit Button again (so that it is no longer latched in), or you can enter OUT 31,16. You can then continue to use the Disciple in the normal way. So, if you have loaded a program from Microdrive into the computer, you could now save it to disk, with either the SAVE command, or with the Snapshot Button.

(Programmer's note: You can use OUT 31,0 and OUT 31,16 in your programs to turn the Disciple's DOS on and off. See List 1 in Appendix A.)

Formatting New Disks

Before a floppy disk is used for the first time, it must be formatted. You can also format a previously used disk; the effect will be to wipe the disk clean of information.

You must therefore be careful not to format a disk which contains any files you wish to keep. It is also risky to format a disk while you are holding a program in the Spectrum's memory. (This is because the format command uses approximately 8000 bytes of Spectrum memory from address 49152 upwards. Any program residing here will be overwritten with format information.)

To format, insert the disk in drive 1 or 2 and enter:

            FORMAT D1 (or D2)   - for double density format, or
            FORMAT SD1 (or SD2)   - for single density format.

It is good practice to ensure that you always have spare formatted disks when you start work; then, if you fill your original working disk, you can easily substitute a spare disk without interrupting your program to format.

After formatting a new disk, it is always a good idea to copy the Disciple's system file onto it, so that you always have a spare system disk available. You can do this by entering:

        SAVE D1 "Sys 3b" CODE 0,6656

If you are using two disk drives, the following command is available:

        FORMAT D1 TO 2

This command formats the disk in drive 1 and copies the contents of the disk in drive 2 to the disk in drive 1, sector by sector. BE VERY CAREFUL NOT TO FORMAT THE WRONG DISK. Remember that the first-named disk is always the one which is cleared of data, and the second-named whose contents are copied. Because the copying is done a sector at a time, the copying process takes much longer than when you use the SAVE ... TO command; but the FORMAT ... TO command will give you a new disk which is identical in every respect to the one which has been copied.

Care of your Disks

Your floppy disks are valuable, not only because of the information they hold, but also because of the time you have spent creating them. Make these safety procedures a habit:

        - Return the disk to its envelope when not in use.

        - Remove disks from the drive before you turn power off; don't insert them in the drive until you have turned power on.

        - Don't write on the disk jacket or label with a pencil or a ball-point pen. Use a felt tip.

        - Don't expose the disk to direct sunlight or heat.

        - Heat and contamination from a carelessly dropped cigarette ash can damage the disk.

- Don't touch or attempt to clean the disk surface.

- Replace storage envelopes when they become worn, cracked, or distorted.

Error Reports

There are a number of standard Spectrum error messages which will appear on screen if the command you have typed in cannot be obeyed. For full details, consult the Spectrum manual.

When you are using the Disciple, these standard error messages may continue to appear, but there are some additional error reports which refer specifically to disk handling problems. These are some of the more important you may meet:

FORMAT DATA LOST

This means that the disk has been damaged or the file has been corrupted - perhaps by a magnetic field. You will not be able to access the current file, and other files may also have been lost.

When this message appears, copy any remaining files on the disk to another disk immediately. You could then try reformatting your disk, and if there is no permanent damage you may be able to use it again. But don't store important files on this disk, in case the damage is more permanent.

SECTOR DATA LOST

This means that the information you've tried to save has been corrupted - perhaps again by electrical or magnetic interference while saving. You'll need to rewrite the file and save it again. This shows the importance of always making a back-up copy of your files.

The disk itself has not been damaged and need not be reformatted.

If the Sector Data or Format Data Lost messages appear regularly, this may indicate a problem with your disk drive. The head(s) may be dirty, or the drive may not be centring the disks correctly on insertion. The first

action to take would be to clean the heads using the drive cleaners supplied by your local dealer. If this fails, repairs may be necessary.

DISK WRITE PROTECTED

You cannot save, erase or otherwise modify files on this disk because you have covered the security lock on the right-hand side of the disk with the label supplied when you buy the disk.

NO DISK IN DRIVE

Check that the disk has been correctly inserted. (Is it the right way up?) If it has, there is likely to be something wrong with the drive itself, or you may have an incompatible peripheral attached.

DISK DIRECTORY FULL

Either you are trying to save more than 80 files on one disk; or, if you have used fewer than 80 files, there is simply no more space available on the disk for new data. Save your file on a new disk.

When a file save cannot be completed, the Disciple frees the disk space used for the file up to that point; so you can still use the first, limited capacity disk for smaller files.

FILE NOT FOUND

You are trying to load, copy, verify, erase, or rename a file which is not present on the disk. Check that you have typed in the file-name correctly. (Make sure you have remembered the 'S' if you are loading a Snapshot file.)

INVALID STATION NUMBER

When using the network, you have typed in a station number beyond the permissible range 0-63. Or, if you are a pupil station, you are trying to identify yourself as the master machine - station 1. (See the section on **Networking** for further details.)

USING JOYSTICKS

There are two Atari-type joystick ports on the Disciple, one on the left as you look at the computer from the front with the Disciple attached, and the other on the right. If you are using only one joystick, you must always connect it to the right-hand port (as Figure 1).

When you load commercial software programs, you are normally asked to select either Kempston or Sinclair (Interface 2) compatibility. When using the right-hand joystick port you can select either Kempston or Sinclair modes. When using the left-hand joystick, you can only select Sinclair mode.

Once connected, the joysticks are operational immediately.

Occasionally, you may encounter a game which appears not to work with the joystick in the Kempston mode. It this is the case, select the "keyboard" control option from the menu at the beginning of the game instead of the Kempston option. Then, when you are asked to press the keys which you wish to use for Up/Down/Fire etc, move the joystick in the appropriate direction instead. You will then find that you have full joystick control.

USING A PRINTER

One of the features of the Disciple is the ease with which a printer may be used. Simply connect your Centronics parallel-type printer at the printer port, set up the appropriate system for the printer (as described in **MAKING THE DISCIPLE COMPATIBLE WITH YOUR SYSTEM**, and you are then able to operate the printer using three simple printer commands - LPRINT, LLIST and SAVE SCREEN$ 1. (COPY SCREEN$ 1 is an alternative to COPY SCREEN$.)

LPRINT and LLIST have exactly the same meaning as PRINT and LIST, except that instead of making information appear on the screen, they send it to your printer. To see how they work, set up your system with the printer and enter the following program:

```
10  LPRINT  "This program"
20  LPRINT  "prints out the character set"
30  FOR n=32 TO 255
40  LPRINT CHR$ n;
50  NEXT n
    RUN
```

When you run the program, the LPRINT command sends the heading and the list of characters directly to the printer.

Now enter LLIST - and the listing of your program is sent to the printer.

Then enter LIST to restore the program listing to the screen. Finally, enter SAVE SCREEN$ 1. Now the contents of the screen are copied (technically, "dumped") to the printer.

SAVE SCREEN$ 1 is a particularly powerful command. If you've set up your system to print graphics, you can dump screen pictures to your printer.

(Note one peculiarity of the Spectrum Basic though. If you have written a program listing on screen, you cannot dump the screen directly to your printer. First, you have to enter LIST; only then can you enter SAVE SCREEN$ 1 to dump the listing to your printer. This is hardly a problem - a faster way of achieving the same result is to write your program, then to enter LLIST.)

If you have an Epson-compatible printer (or one which understands the control code ESC * for bit image graphics selection), you will probably be able to use SAVE SCREEN$ 2. This will allow you to print a double-sized screen dump sideways down the page on your printer, with the various colours on the screen interpreted as shades on the print-out.

The Disciple accepts two commands - TAB and AT - which allow you to position your text at a certain point on the printed line. Enter this statement:

        LPRINT TAB 8; "This line is indented"

Now enter:

        LPRINT AT 4,4; "This line is less indented"

The number in the two commands tells the computer at which character position on the line printing should begin.

Finally, programmers should note that if a control character is to be sent to the printer using LPRINT, then you must always precede it with CHR$ 27 (even when you want to output CHR$ 27). To output CHR$ 27, CHR$ 65, CHR$ 40 you would enter:

        LPRINT CHR$ 27; CHR$ 27; CHR$ 27; CHR$ 65; CHR$ 27; CHR$ 40

Or, a simpler way would be to enter POKE @ 6,1, as described in Appendix B. It is then not necessary to precede the control characters with CHR$ 27. When you've finished, enter POKE @ 6,0.

Snapshot Printing

Uniquely, the Disciple allows you to temporarily halt a program at any point and to print out the current screen contents. This facility offers exciting new possibilities to games players. In an adventure game, for example, you can print out the screen at each new location, gradually building up a complete picture of all the available screens.

To experiment with snapshot printing, load a normal commercial program, preferably a game with good graphics to show the facility at its best. When you wish to print a screen, hold down the CAPS SHIFT key on the Spectrum and press the Snapshot Button - in the same way as if taking a snapshot save. As usual, the program is paused; if you then press key 1 on the Spectrum, you will send a 32-column screen dump to the printer. If instead you press key 2 on the Spectrum and you have an Epson-compatible printer (that understands ESC *), you should be able to send a double-sized screen dump to the printer - just as if you had entered the command SAVE SCREEN$ 2.

When printing is complete, the program will resume from the point at which you left it.

Printing from a Commercial Word Processor and other Serious Software

Commonly, commercially produced word processors and spreadsheets have a special printer driver built into the software to allow you to send your work to a printer. In some cases, it will be possible to follow the instructions in the software package to set up the printer driver for your printer, and increasingly, the major pieces of serious software for the Spectrum are being modified to allow for printing with the Disciple.

If the software you wish to use does not offer the option of printing with the Disciple, and you have no success when you try to print, try the following:

i) If you are offered the opportunity to define your own printer driver by the software package, choose this option and then enter POKE @ 6,1. Then, when you've finished your printing, enter POKE @ 6,0. Or, if you can get a Basic listing of the program, type these two statements into the program at the points where printing commences and ends respectively. For example, Tasword II will print successfully with POKE @ 6,1 at line 279 and POKE @ 6,0 at line 281. The very powerful POKE @ 6,n statement is explained in Appendix B.

ii) If this fails, contact the User Club - another user may have solved your problem.

iii) Or contact the software house for more advice. (The reason why more and more software is now being modified for printing with the Disciple is because of user pressure on software houses.)

NETWORKING

The two network connectors allow computers with the Disciple to communicate with up to 62 similar computers/Disciples. It is important to note that this can be a SHARED ACCESS NETWORK with all stations sharing a single disk drive and printer held at the master station, and with the master computer controlling all the other machines. This makes the Disciple particularly effective in a school classroom Or you can use an INDEPENDENT STATION NETWORK, in which up to 8 computers, each equipped with Disciple, disk drive and possibly printer, come together to exchange files.

We refer below to MASTER stations, ASSISTANT stations and PUPIL stations.
- A MASTER station is a computer/Disciple which has at least a single disk drive (and at most two drives and a printer) attached. In a shared access network, there must be a single master station, which controls and can override the activities of all other stations, as well as serving as a central file source and printing facility.
- In any network there can be up to 8 ASSISTANT stations, each of which is a computer/Disciple with at least a single disk drive (and at most two drives and a printer) attached. Assistant stations are optional in a shared access network, and serve as extra banks of memory for the master station and extra printing positions.
  In an independent station network, all computers are set up as if they were assistant stations.
- A PUPIL station is a computer/Disciple with no disk drive or printer attached, and which, in a shared access network, shares the drives and printers held at master and assistant stations. There can be up to 54 pupil stations in a shared access network.

Setting up the network

For each computer in the network, you will need to supply a screened cable (microphone-style) with two standard 3.5mm jack-plugs, one attached at each end of the cable. (The cables are not supplied because you will know best how long you need them to be; both cables and jack-plugs are cheap and easy to buy.)

To link computers in the network, plug one end of the network lead into either of the Disciple's network sockets on the first computer and the other end into the nearest Disciple network socket on the next computer. This second computer can then be connected to a third in the same way, using its other network socket, and so on.

The Shared Access Network

Link your computers with network leads as described above, and fit the single master station and (optionally) up to 8 assistant stations with disk drive(s) and printer(s). All computers at pupil stations must have the Disciple and a screen.

The master station and assistant stations create their own system files, typing in the appropriate codes for the drives and printer as described in **MAKING THE DISCIPLE COMPATIBLE WITH YOUR PERIPHERALS**. In the section in the system file on networking, the master identifies itself as the master machine in a shared access network, and is then automatically allocated station number 1. Assistant machines identify themselves with station numbers from 2 to 9 - make sure that each station uses a different number. The system files are then saved for permanent use on system disks as usual. If, as in a school classroom, the computers are in fixed positions and you intend to use the network regularly, you will simply be able to boot up the master and the assistants from their respective system disks on subsequent occasions.

With their system disks in drive 1, the master and assistants then load their systems normally by entering RUN.

Without disk drives, pupil stations obviously cannot boot up from a system disk. Instead each pupil is allocated a station number between 10 and 63. Then, after each pupil station is turned on, a FORMAT n command is entered. Station number 10, for example, enters:

        FORMAT N10   (Here and elsewhere, you may use a lover-case "n")

When the Disciple receives this command, it understands that it is a pupil in the network (from FORMAT n) and that its station number is 10.

You are now ready to start work with the network. But first, you should note that no matter which of the network operations described below you are using, it is never possible to transfer a snapshotted file from one machine to another across the network. These are the Disciple's shared access network commands:

- The Master sends a file to all stations.

First the master loads a file from disk using the normal command:

    LOAD D1 "file-name"

Pupil stations indicate that they are ready to receive a file; each must enter:

    LOAD N0

0 indicates that this is a broadcast command. The master then enters:

    SAVE N0

- A Pupil or Assistant sends a file to all stations.

A current file held at a pupil or assistant station can be broadcast in the same way. All receiving stations enter:

    LOAD N0

Then the station holding the file to be broadcast enters:

    SAVE N0

- The Master or Assistant sends a file to one station.

Again, the master first loads the file from disk. Then to send to, say, station 11, the master enters:

    SAVE N11

And to receive the file, station 11 replies to the master - station 1 - by entering:

    LOAD N1

- A Pupil or Assistant sends a file to another Pupil or Assistant station.

A pupil or assistant station can send its current file, identifying the number of the receiving station. For example, to send to station 50, the sender enters:

    SAVE N50

To receive the file, station 50 replies. If the sender is station 15, the command is:

    LOAD N15

By now you will have understood the principle that there must be an exchange of messages between sending and receiving stations before files can be transmitted across the network. But this is only true if the station receiving the message is a pupil or an assistant. The master station does not need to reply to messages from assistants or pupils, as shown in the next batch of network commands.

- A Pupil inspects the directory on the master disk.

The pupil station enters:

    CAT 1

- A Pupil loads a file from the master disk.

The pupil station enters:

    LOAD D1 "file-name"

- A Pupil sends a file to the master disk.

The Pupil enters:

    SAVE D1 "file-name"

It is good practice for the pupil stations to include a station identifier (perhaps their station number) within the name of the file that they are sending to the master disk; otherwise it will be difficult to establish which station was responsible for each of the files on the master disk.

The master station is also able to "steal a screen" from a pupil station, in order to inspect the work being done at that position. The master can also force a file upon any pupil station. For these operations, a special F command is used, and the pupil stations do not need to send a message back to the master.

- The Master "steals a screen" from a Pupil station.

To check on progress being made at pupil station 15, the master enters:

    LOAD F15 SCREEN$

Work at station 15 will be halted temporarily while the screen is transferred to the master's screen. When the LOAD is complete, work at the pupil station can continue.

- The Master forces a program upon a Pupil station.

To force its current file upon pupil station 20, the master enters:

    SAVE F20

When a file is forced upon a pupil station, the current file held at that station is lost.

When the network is in use, pupil stations cannot erase flies or use the "p" command for LOADing; but the master and assistant stations can continue to use the standard Disciple disk commands - CAT, SAVE, VERIFY, LOAD, ERASE, ERASE..TO, SAVE..TO - normally. Master and assistant stations can also continue to use the snapshot button for saving and printing, and send the normal Disciple commands to the printer. So:

- To print out work done at a Pupil station.

First send the file back from the pupil to the drive at the master station (use SAVE D1 "file-name"). Then the master station can load the file and LLIST, LPRINT, or SAVE SCREEN$ 1 (or 2) as required.

Or, after stealing a screen from a pupil station, the master can use the Disciple's snapshot printing facility to do a screen dump.

If a station tries to access a disk drive while another station is already using it, or to communicate with a station already engaged in a network operation, the Disciple will allow the first task to be completed before the second commences; there will be a short waiting period for the second station but it is not necessary to repeat the command. Pupils will know that their network task has been completed when the OK message appears on their screens. Should two stations try to communicate with another computer or access the same disk drive at the same instant, priority will be given to the computer with the lowest station number.

The Independent Station Network

This is a network in which up to 8 stations act as independent units, equipped with their own disk drives and perhaps printers, but choose to be linked together for the transfer of files.

Set up each station as described in **Setting up the Network** Each computer will need to create its own system file, following the instructions in **MAKING THE DISCIPLE COMPATIBLE WITH YOUR SYSTEM** When dealing with the section on networking in the system file, all computers will state that they are not the

master machine in a shared access system, but they may wish to type in a station number from 2 to 9, which will then be stored permanently on their system disks.

Each computer loads the system file by entering RUN with the system disk in drive 1. If you have set your station number in the system file, you are ready to join the network immediately. If not, you should now enter a FORMAT N command with your station number. If you are station 4, you enter:

FORMAT N4

(In an independent station network, you must load your system file before you enter the FORMAT command. Be careful not to enter a FORMAT D rather than a FORMAT N command, or you may find that you've formatted a disk instead of setting up a station.)

You can now transfer files as follows:

- Send a file to all stations.

The sender first loads the file from his disk, in the normal way. Meanwhile, in preparation to receive the file, the other stations enter:

LOAD N0

The sender then enters:

SAVE N0

0 indicates that the file is to be broadcast to all stations.

- Send a file to one station

After loading the file from his disk, the sender types a command including the number of the receiving station. For example, to send to station 4, he enters:

SAVE N4

The receiving station has to identify the sender's station number. If the sender is station 3, he enters:

        LOAD N3

All standard Disciple commands for disk and printer operation may also be used in an independent station network; but the additional network commands described in **The Shared Access Network** above are not available.

USING OTHER PERIPHERALS

Most other Spectrum peripherals can be connected to the Disciple via the
through port at the back of the unit.

In the rare cases when peripherals may not work with the Disciple, try
disabling the disk operating system, as described in the section **The Inhibit
Button**. This will solve most problems, although the mice and midi interfaces
that we know of are currently incompatible. We regularly discuss any
incompatibility problems that arise with hardware and software manufacturers
and will always attempt to find solutions - though they will not always be
instant. In fact, in the coming months, it is hoped that we will be able to
produce a mouse environment for the Disciple if there is sufficient demand.
Details of our progress will be reported in the Disciple Users' Group
newsletter.

ADVANCED USER'S SUPPLEMENT

In this section of the manual, we describe:

  - Advanced Disciple syntax   (Appendix A)
  - Details of Disciple POKE @ statements to change system variables
                                                (Appendix B)
  - An introduction to Disciple command codes(Appendix C)
  - Technical specifications   (Appendix D)

Much of this information may be difficult for an inexperienced user to understand. We recognise also that the truly advanced user - the programmer and the hardware designer - may need more information than we are able to include here.

Whatever reason you may have for needing extra information - whether it is to catch up on general background reading or to discover the detailed inner workings of the Disciple - we'd like to recommend membership of INDUG, the Independent Disciple Users Group, which can be contacted at 34 Bourton Road, Gloucester GL4 0LE, England. INDUG publishes a regular newsletter, FORMAT, helping with problems and queries of ail types, as well as providing a number of other services to Disciple users.

APPENDIX A: ADVANCED DISCIPLE SYNTAX

Reading from and Writing to a Sector

            LOAD @ D, T, S, Address
            SAVE @ D, T, S, Address

This command is used for reading from or writing to a specified track and
sector on the disk to a memory location in the Spectrum memory area, where:

        D = the drive number (type either 1 or 2 - the number only, not the D)
        T = the track number from 0 to 39   (40 track)
                or   0 to 79   (80 track)
            To read the second side on a double-sided disk drive
                then   128 to 167 (40 track)
                or   128 to 207 (80 track)
        S = the sector number - from 1 to 10
        Address = the start address of any location in the Spectrum memory.
                    Nb: if a single density disk is read, 256 bytes will be
                    used, and in double density, 512 bytes will be used.

Working with a monitor program, this powerful command allows you to access a
single sector on the disk from Basic. This will be useful if, for example, you
wish to examine and correct a corrupted sector on the disk (and incidentally
the Disciple's Sector Data Lost error message tells you the corrupted track and
sector number); or for breaking into, examining and modifying a snapshot file.

Using Streams and Channels

    i)   OPEN #S; D1 "file-name" IN or OUT

  This command is used to open a file on the disk and attach a stream number to
  it, so that you can PRINT out to or INPUT from that stream, where:

        S = Stream number - from 4 to 16 (type the number only)
        D = D1 or D2 (drive number - type D as well as the drive number)
        IN = When you specifically require an input or read file opened
        OUT = When you specifically require an output or write file opened.

The Disciple's OPEN # command differs from the Interface 1 command with the addition of the IN and OUT statements. However, if you choose not to specify the IN or OUT, them the default is the same as Interface 1: an input file if the file-name is found in the directory, and an output file if the file-name is not found in the directory.

You can also use:

```
OPEN #S; "m"; 1; "file-name"
```

- for Interface 1/Microdrive compatibility.

Files created with the OPEN # statement are identified as OPENTYP files in the catalogue.

ii)   CLOSE #*S

This command closes the file and the stream opened in the previous command. Here, S = Stream number. If you do not type in the stream number, then all current open streams will be closed.

The * in this command is used to fail syntax, correcting the bug in the Spectrum ROM, and must be used. If you are using programs originally written for Microdrive with the Disciple, you will have to add the * to any CLOSE # statements.

This is an example of a write file:

```
10      OPEN #4; D1 "Test" OUT
20      PRINT #4; "This is a test"
30      CLOSE #*4

100     OPEN #4; D1 "Test" IN
110     INPUT #4; A$
120     PRINT A$
130     CLOSE #*4
```

NOTE that:
   a) You can only open output files to one disk drive at a time.
   b) You can open input files from more than one disk drive at a time.
   c) You can have as many open files as there are streams available.

iii) MOVE is a command which moves a file, one sector at a time, to either another file or a stream. (It differs from the Interface 1 MOVE command; with the Disciple, there is no need to OPEN a file before MOVEing from file to file.)

          MOVE D1 "file-name" TO #S

This command reads the file and outputs it to the specified stream, (where D1 = D1 or D2, and S = the stream number, from 4 to 16.)

          MOVE D1 "file-name" TO D1 "file-name"

This command reads the file and writes it to the second file.

iv)   CLEAR #

This command clears all streams and channels that may be open.

v)   CLS #

This command clears the screen and attribute area, and resets BORDER, PAPER, INVERSE, BRIGHT, OVER and FLASH.

The Execute File

An execute file is a machine code file occupying up to one sector length (510 bytes) of memory. When loaded from disk it is executed (RANDOMIZE USR) in the DRAM, and not in the Spectrum memory as other files are. An execute file gives the programmer the ability to execute utility routines - such as renumbering a program - without affecting or using the Spectrum memory.

To save a sector length of memory as an execute file, enter:

        SAVE D1 "file-name",I,Address

- where:
        D1 = D1 or D2 (drive number)
        I = the execute file identifier - simply type X
        Address = the location in the Spectrum of the machine-code program
                Note that the program must be able to run at address
                1BD6 Hex or 7126 Decimal, and that any calls to the
                Spectrum ROM must be done by RST 10H, DEFW (ROM Routine)

To load the execute file and run it internally in the Disciple DRAM area, enter:

        LOAD D1 "file-name" I
  or   LOAD p(n)   (in other words, the normal abbreviated
                              syntax for LOAD.)

After execution, control is returned to the user program.

APPENDIX B - THE POKE @ COMMAND

The POKE @ command allows a value between 0 and 255 to be stored in the variables area of the disk operating system (GDOS). POKE @ statements can either be entered while work is in progress, to effect temporary changes to the system variables, or written directly into Basic program listings to cause changes every time the program is run. By reading through the descriptions of the first few POKE @ commands, you will quickly see how they can be used.

POKE @ 0,n   (n = 0 to 8)   [RBCC]   default 7

The border colour change occurs essentially every time a sector is read from or written to the disk. This variable is ANDed with the sector value, then output to the screen border.
    If 0 is chosen, no border color change will occur.
    If 7 is chosen, all sectors will change the border colour.

Therefore, if you originally set up your "system" file to allow flashing borders, but wish temporarily to stop the flashing, you can enter POKE @ 0,0; this would avoid the need to make a permanent change to your system file.

POKE @ 1,n   (n = 40 or 80 + 128)   [TRAKS1]   default 208

This variable holds the number of tracks and whether double or single-sided for disk drive one.

POKE @ 2,n   (n = 40 or 80 + 128)   [TRAKS2]   default 208

This variable holds the number of tracks and whether double or single-sided for disk drive two.

POKE @ 3,n   (n = 0 to 255)   [STPRAT]   default 6

This variable allows you to set the GDOS for the different step rates of drives (usually 12 to 30 milliseconds). The step rate is not allowed to go lower than 6 milliseconds.

POKE @ 4, n   (n = 0 to 63)   [NSTAT]   default 1

This variable sets the network station number. Remember that numbers are
reserved as follows:

        0   = network off
        1   = master station
        2-9   = assistant stations
        10-63   = pupil stations

POKE @ 5, n   (n = 0 to 255)   [WIDTH]   default 80

This variable sets the number of characters allowed per line when using LPRINT
and LLIST with the Centronics printer port.

POKE @ 6, n   (n = 0 or 1)   [PCODE]   default 0

If the setting is 0, then the printer driver looks for attribute codes such as
TAB and AT within LPRINT and LLIST commands.
If the setting is 1, then the printer driver outputs directly to the printer
the absolute value of the code 0 to 255. This is essential for sending control
codes to the printer. E.g:
        POKE @ 6,1: LPRINT CHR$ 27; CHR$ 65: POKE @ 6,0

The POKE @ 6 statement will often need to be written into programs for serious
applications - word processors, spreadsheets, etc - to allow codes embedded in
the software to be sent directly through to the printer without interference
from the Disciple. See page 37 for details of POKE @ 6 with Tasword II.

POKE @ 7, n   (n = 0 to 255)   [LSPCE]   default 12

This variable sets the printer line feed in increments of n/72 of an inch
during graphics printing.

POKE @ 8, n   (n = 0 to 255)   [LFEED]   default 1

This variable sets the number of line feeds automatically executed by the
printer driver after a carriage return.

POKE @ 9,n   (n = 0 to 255)   [LMARG]   default 0

This variable sets the number of spaces inserted automatically by the printer driver after a carriage return. It is used for left-hand margin control.

POKE @ 10,n   (n = 0 or 1)   [GRAPH]   default 1

If the setting is 1, the printer driver generates the graphic representation of £, # and © on LPRINT and LLIST statements.
If the setting is 0, the normal printer character is output.

POKE @ 11,n   (n = 0 or 1)   [ZXPNT]   default 0

If the setting is 0, then GDOS uses the Centronics printer port.
If 1, then the printer channel is unchanged by GDOS. It is assumed that you are using a serial printer with Interface 1 or the ZX printer attached at the through connector.

POKE @ 14,n (and POKE @ 15,n)   (n = 0 to 65536)   [DNERR]
                                      default 0

If the setting is 0, then GDOS returns to the Spectrum on errors which do not relate to hook codes or GDOS syntax statements.
If an address is poked into these two locations, it makes a call indirectly to this address for further syntax checking. Necessary when adding extra commands to the syntax.

APPENDIX C - DISCIPLE COMMAND CODES

The command codes are used in machine code routines to effect control of the disk subroutines, enabling serious programmers and software houses to directly drive the disk unit for their own purposes.

When using Sinclair hook codes or command codes and an error is found - e.g. **disk full** or **bad sector**, then a return is made with the carry flag set and the register "A" holding the error number for interpretation by the calling routine.

The command codes recognised by the Disciple are as follows:

HXFER	33h
OFSM	34h
HOFLE	35h
SBYT	36h
HSVBK	37h
CFSM	38h
PNTP	39h
COPS	3Ah
HGFLE	3Bh
LBYT	3Ch
HLDBK	3Dh
WSAD	3Eh
RSAD	3Fh
REST	40h
HERAZ	41h

HXFER
33h
Transfer the file description and header to the Disk File Channel Area (DFCA). Register IX must point to the first byte (DSTR1) of the user's 24 byte file information area (UFIA). Expect this command code to use the registers HL, DE, BC and A. Please note that all command codes corrupt register HL.

OFSM
34h
Open file sector map with the information contained in the DFCA. 11 bytes from NSTR1 are used to set up the file name. A return is made with the disk buffer pointer (RPT) set to the start of the disk buffer RAM (DRAM).

HOFLE
35h
Open a file. IX must point to the user's file information area (UFIA). This code combines the functions of HXFER and OFSM, also setting the 9 bytes of header information from HD00 to the beginning of the file. This header to the file allows the normal **Load D1 ""** syntax to call the file.

SBYT
36h
Save the byte in register "A" to DRAM at the location pointed to by RPT. If the disk buffer is full, an automatic sector save to disk will take place, and there will be an update of RPT and the value entered at the beginning of the DRAM

HSVBK
37h
Save a block of data to the disk where register DE points to the start of the data and register BC holds the byte count.

CFSM
38h
Close file sector map. This routine empties the DRAM and copies the header area onto the directory, closes the file, then updates the directory.

PNTP
39h
Output the 8 bit code in register "A" to the printer port, after checking busy status of the printer.

COPS
3Ah
Copy the screen RAM to the printer in high resolution screen graphics as set up under the graphics control variables.

HGFLE
3Bh
Get a file from disk. IX register must point to the start of the UFIA. The return is made with the first sector of the file loaded into DRAM and RPT pointing to the first byte (usually the header information).

LBYT
3Ch
Load the byte pointed to by RPT from DRAM, and return with it in register "A" and RPT updated. If the buffer is empty, another sector is read from the disk. (Be careful: is there another sector?)

HLDBK Load a block of data from disk to the memory pointed to by
3Dh   the register DE with the block count in register BC.

WSAD   Write sector at DE. Writes the contents of the DRAM at the track
3Eh   pointed to by D and the sector pointed to by E, and sets the
           pointer to the start of DRAM

RSAD   Read sector at DE. Reads the sector at track D, sector E into
3Fh   the DRAM, and sets the pointer RPT to the start of DRAM

REST   Restore disk drive to Track 00. The drive number is taken from
40h   DFCA.

HERAZ Erase the file on disk with the information contained in UFIA - so
41h   make sure that IX points to this.

USER FILE INFORMATION AREA (UFIA)

No. of bytes	Name	Description
1	DSTR1	Drive number (1 or 2)
1	FSTR1	Program number
1	SSTR1	Stream number
1	LSTR1	Device type (D or d)
1	NSTR1	Directory description (see below)
10	NSTR2	File name
1	HD00	File type (see below)
2	HD0B	Length of file
2	HD0D	Start address of file
2	HD0F	Length of file - variables length (Basic)
2	HD11	Autostart line number (Basic)

24 bytes

DIRECTORY DESCRIPTION	FILE TYPE	
1 Basic file	0	Basic file
2 Data array	1	Data array
3 String array	2	String array
4 Code file	3	Code file
5 Snapshot 48K		
6 Microdrive file		
7 Screen$ file		
8 Special file		
9 Snapshot 128K		
10 Opentype file		
11 Execute file		

DISCIPLE COMMAND CODES IN USE - EXAMPLES

These examples show How to use the command codes; firstly to save a code file from screen memory, then to load it back into screen memory. Please remember to save your registers before using a command code.

```
0000               00001  ;*********************
0000               00002
0000               00003  ;Example ONE
0000               00004
0000               00005  ;Save a code file from
0000               00006  ;screen memory
0000               00007
0000               00008  ;*********************
0000               00009
0000               00010        ORG   49000
BF68               00011
BF68               00012
BF68               00013  ;Open file and set header
BF68               00014
BF68 DB21E8BF      00015  SAVE   LD   IX,DSTR1
BF6C CF            00016         RST  8
BF6D 35            00017         DEFB 35h       ;HOFLE
BF6E               00018
BF6E               00019
BF6E               00020  ;Save data block to disk
BF6E               00021
BF6E ED5BFABF      00022         LD   DE,(HDOD)
BF72 ED4BF8BF      00023         LD   BC,(HDOB)
BF76 CF            00024         RST  8
BF77 37            00025         DEFB 37h       ;HSVBK
BF78               00026
BF78               00027
BF78               00028  ;Close the file
BF78               00029
BF78 CF            00030         RST  8
```

```
BF79 38          00031          DEFB 38h        ;CFSM
BF7A             00032
BF7A C9          00033          RET
BF7B             00034
BF7B             00035
BF7B             00036  ;********************
BF7B             00037
BF7B             00038  ;Example TWO
BF7B             00039
BF7B             00040  ;Load a code file into
BF7B             00041  ;screen memory
BF7B             00042
BF7B             00043  ;********************
BF7B             00044
BF7B             00045          ORG   49100
BFCC             00046
BFCC             00047
BFCC             00048  ;Get a file from disk
BFCC             00049
BFCC DD21E8BF    00050  LOAD    LD   IX,DSTR1
BFD0 CF          00051          RST  8
BFD1 3B          00052          DEFB 3Bh        ;HGFLE
BFD2             00053
BFD2             00054
BFD2             00055  ;Load header of disk file
BFD2             00056
BFD2 11F7BF      00057          LD   DE,HD00
BFD5 0609        00058          LD   B,9
BFD7 CF          00059  LOOP    RST  8
BFD8 3C          00060          DEFB 3Ch        ;LBYT
BFD9 12          00061          LD   (DE),A
BFDA 13          00062          INC  DE
BFDB 10FA        00063          DJNZ LOOP
BFDD             00064
BFDD             00065
BFDD             00066  ;Load data block to memory
BFDD             00067
```

```
BFDD ED5BFADF   00068           LD    DE, (HDOD)
BFE1 ED4BF8DF   00069           LD    BC, (HDOB)
BFE5 CF         00070           RST   8
BFE6 3D         00071           DEFB 3Dh        ;HLDBK
BFE7            00072
BFE7 C9         00073           RET
BFE8            00074
BFE8            00075
BFE8            00076
BFE8            00077   ;User File Information Area
BFE8            00078
BFE8 01         00079   DSTR1   DEFB 1          ;Drive
BFE9 00         00080   FSTR1   DEFB 0          ;N/A
BFEA 00         00081   SSTR1   DEFB 0          ;N/A
BFEB 64         00082   LSTR1   DEFB 'd'        ;Device
BFEC 07         00083   NSTR1   DEFB 7          ;Screen$
BFED 54727920   00084   NSTR2   DEFN 'Try 1      '
BFF1 31202020
BFF5 2020
BFF7 03         00085   HD00    DEFB 3          ;Code file
BFF8 001B       00086   HD0B    DEFW 6912       ;Length
BFFA 0040       00087   HD0D    DEFW 16384      ;Start
BFFC 0000       00088   HD0F    DEFW 0          ;N/A
BFFE FFFF       00089   HD11    DEFW 0FFFFh     ;Not used
```

TECHNICAL SPECIFICATIONS

Compatibility: With the entire rape of ZX Spectrum computers, including the ZX Spectrum 128K.

Dimensions: 295mm wide x 94mm deep x 27mm high at rear.

Power requirement: Power is taken from the Spectrum 9 volt line with internal regulation, drawing +5 volts at 200 mAps with 800 mWatt dissipation.

DISK INTERFACE: Standard SA400 supporting single/double density operation. A BBC Micro type 34-way IDC connector allows connection to 2 disk drives of 3.5" or 5.25" type.

Storage capacity: (formatted)	Single Density	Double Density
40 track single sided	80K	180K
40 track double sided	180K	380K
80 track single sided	180K	380K
80 track double sided	380K	780K

	Single Density	Double Density
Data transfer rate:	125 Kbits/sec	250 Kbits/sec
Nominal access and load time of 7K screen load:	800 mSeconds	350 mSeconds
Typical access/load time:	1 second	0.5 second

PRINTED INTERFACE: Standard Centronics parallel.
8 bit data output with strobe line.
1 bit input on BUSY line.

Connector: 26-way (BBC Micro-type) IDC compatible for 36-way printer connection.

Driver: Resident in disk operating system, with standard LPRINT/LLIST commands and high resolution screen and user-defined graphics capability.

DUAL JOYSTICK INTERFACE: Kempston or Sinclair standard for single joystick
                            use; Sinclair standard for dual joystick use.

Connector: 9-pin "D" type Atari standard connector.

NETWORK SYSTEM: Sinclair Interface 1 compatible.

Connectors: 2 PC-mounted Jack sockets - 3.5mm.

Software Driver: Disk operating system supports file server and shared
                 resource facility.

Part Details

	Decimal	Hexadecimal	In	Out
DISK	27	1B	STATUS REG	COMMAND REG
	91	5B	TRACK REG	TRACK REG
	155	9B	SECTOR REG	SECTOR REG
	219	DB	DATA REG	DATA REG
CONTROL AND JOYSTICK	31	1F	JOYSTICK ONE	CONTROL
			Bit 0 RIGHT	DISK ONE OR TWO
			Bit 1 LEFT	SIDE SELECT
			Bit 2 DOWN	SINGLE/DOUBLE DENSITY
			Bit 3 UP	ROM BANK SELECT
			Bit 4 FIRE	INHIBIT SWITCH CONTROL
			Bit 5 ------	EXT. SELECT
			Bit 6 PRINTER BUSY	PRINTER STROBE
			Bit 7 NETWORK	NETWORK
NET - WAIT	59	3B	WAIT WHEN NET = 1	--------
BOOT	123	7B	SET BOOT	RESET BOOT
PATCH	187	BB	SET PATCH	RESET PATCH
PRINTER	251	FB	--------	OUT PRINTER DATA
JOYSTICK 2	254	FE	JOYSTICK 2	--------

DISK CONNECTOR PIN DESCRIPTION

```
33 31 29 27 25 23 21 19 17 15 13 11  9  7  5  3  1.
 ●  ●  ●  ●  ●  ●  ●  ●  ●  ●  ●  ●  ●  ●  ●  ●  ●

34 32 30 28 26 24 22 20 18 16 14 12 10  8  6  4  2.
 ●  ●  ●  ●  ●  ●  ●  ●  ●  ●  ●  ●  ●  ●  ●  ●  ●
```
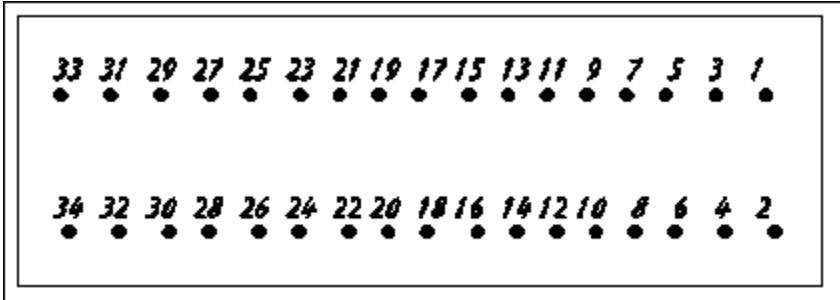
Viewed from the back of the Disciple

Pin		
1 to 33 (all odd numbers)	All 0 volts (ground)	
8	Index	IN
10	Disk One select	OUT
12	Disk Two select	OUT
16	Motor on signal	OUT
18	Direction of step	OUT
20	Step pulse	OUT
22	Write data	OUT
24	Write gate	OUT
26	Track 00	IN
28	Write protect	IN
30	Read data	IN
32	Side select	OUT

PRINTER CONNECTOR PIN DESCRIPTION

```
25 23 21 19 17 15 13 11  9  7  5  3  1
 •  •  •  •  •  •  •  •  •  •  •  •  •

    •  •  •  •  •  •  •  •  •  •  •  •  •
   26 24 22 20 18 16 14 12 10  8  6  4  2
```

View from side of the Disciple
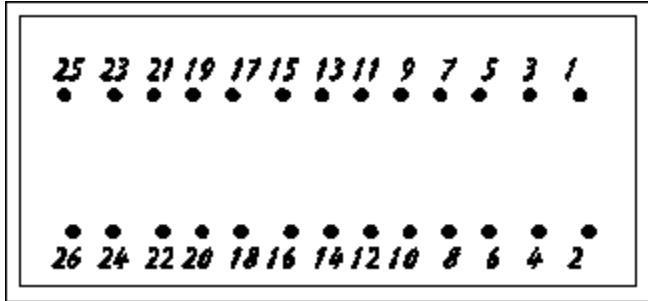
Pin		
1	Printer strobe	OUT
3	Data bit 0	OUT
5	Data bit 1	OUT
7	Data bit 2	OUT
9	Data bit 3	OUT
11	Data bit 4	OUT
13	Data bit 5	OUT
15	Data bit 6	OUT
17	Data bit 7	OUT
21	Input busy	IN
2 to 22 (all even numbers)		All 0 volts (ground)

```
RUN                                     Boots system
```

Disk operations (In this guide, D1 could also be D2 or D*; (n) indicates that
                      an appropriate number used in the command.)

```
CAT 1                                   Displays directory
CAT 1!                                  Displays abbreviated directory
SAVE D1 "file-name"                     Saves file
VERIFY D1 "file-name"                   Confirms save has been made
LOAD D1 "file-name"                     Loads file (except snapshot files)
LOAD D1 "file-name" S                   Loads 48K snapshot file
LOAD D1 "file-name" K                   Loads 128K snapshot file
LOAD D1 "file-name" SCREEN$             Loads screen file
LOAD p(n)                               Loads the program (from its number)
ERASE D1 "file-name" TO "new file-name" Renames a file
ERASE D1 "file-name"                    Erases a file
SAVE D1 "file-name" TO D1 "file-name"   Copies a file
FORMAT D1                               Formats disk in double density
FORMAT SD1                              Formats disk in single density
FORMAT D1 TO 2              Formats drive 1; copies drive 2 to 1
OPEN #(n); D1 "file-name" IN or OUT     Opens a file; attaches stream no.
CLOSE #*(n)                             Closes a file and stream no.
CLOSE #*                                Closes all open files
MOVE D1 "file-name" TO #(n)      Reads file; outputs to specified stream
MOVE D1 "file-name" TO D1 "file-name"Reads file; writes it to second file
CLEAR #                                 Clears all open streams & channels
CLS #                                   Clears screen and attributes area
SAVE D1 "file-name"I,Address            Saves sector length memory to disk
LOAD D1 "file-name"I           Executes file; runs it internally in
                                        Disciple DRAM area
LOAD @ D,T,S,Address           Reads a specified track/sector to memory
SAVE @ D,T,S,Address           Writes to specified track/sector on disk
SAVE .. TO, ERASE, CAT can be used with * and ? for wild-card operations.
```

Snapshot Button + CAPS SHIFT halts program temporarily; allows selection of:
1 - 32-column screen dump to printer   2 - Double-sized screen dump to printer
3 - Screen save   4 - 48K snapshot save   5 - 128K snapshot save

Printer operations

LLIST	Prints out a program listing
LPRINT "statement"	Prints out statement
SAVE SCREEN$1	Prints 32-column screen dump
SAVE SCREEN$2	Prints double-sized screen dump
LPRINT TAB n; "statement"	Prints statement with tab at position n on current line
LPRINT AT n,m; "statement"	Prints statement at position m on line m

Network commands (x indicates station number; s=sender; r=receiver)

FORMAT Nx   Sets station number
(Station 1 is master, 2-9 are assistants, 10-63 are pupil stations; station 0
   is reserved for broadcasts. Masters and assistants can set station number
   in their system files.)

Receiving stations: LOAD N0 }   Master, assistant or pupil station sends
Sending station: SAVE N0 }   current file to all other stations

Station s: SAVE Nr }   Pupil or assistant sends current file to
Station r: LOAD Ns }   another pupil or assistant station

(Network commands above can be used in shared access or independent station
networks; those below can only be used in shared access networks.)

Master: SAVE Nr   }   Current master file sent to one station
Station r: LOAD N1 }

Pupil: CAT 1   Pupil calls catalogue from master disk drive
Pupil: LOAD D1 "file-name"   Pupil loads file from master disk drive
Pupil: SAVE d1 "file-name"   Pupil saves file on master disk drive

Master: LOAD Fx SCREEN$ Master inspects screen from pupil x
Master: SAVE Fx   Master forces its current file on pupil x

Thank you for buying the Disciple. To ensure your satisfaction, the product is guaranteed by Rockfort Products for a period of 90 days from the date of purchase, subject to the conditions listed below:-

1.   The Guarantee Registration Form must be completed and returned to the address shown within ten days of the product's purchase. Keep the Repairs Information Form and the Customer's Copy in a safe place. Also keep proof of your purchase - your original sales receipt, a dated retailer's branch stamp, or a copy of your credit card voucher.
2.   The guarantee applies only to the original purchaser and is not transferable. It is applicable only in the UK.
3.   The guarantee is invalidated if the product is opened, modified, repaired, or otherwise tampered with by any party other than Rockfort Products, Miles Gordon Technology or their appointed agents.
4.   Claims under the guarantee should be referred to the dealer from where the unit was purchased. If this is not possible, contact us directly.
5.   When making a claim for repair under guarantee, you must produce your completed Repairs Information Form and proof of purchase. Any product which is not accompanied by proof of purchase will be returned unrepaired to the sender.
6.   Customers are liable for the carriage cost of units returned under the claims procedure. If posting the unit, please obtain a postage receipt and keep it safe until you receive the returned product.
7.   If, after we test the product, no fault can be found, we reserve the right to charge a reasonable fee for testing and returning the unit.
8.   Your repaired product will be returned to you at the address given on the Repairs Information Form. We will process your repair as quickly as possible and you should expect to receive your repaired product within 28 days. If after this time you have not received your repaired product, please telephone 01-203-0191, quoting the details on the Customer's Copy.
9.   The liability of the company under this guarantee is limited to the cost of repair or complete replacement (at the discretion of the company) of the defective equipment.
10.   This guarantee does not affect the purchaser's statutory rights.
NOTE
Pack the product carefully (preferably in the original packing) to prevent damage in transit; if the product is found on receipt to be damaged as a result of inadequate packing, you will be responsible for charges to repair such damage.

Customer's Copy - Please retain this copy in a safe place.

Serial Number (see underside of product).......... Purchase date ....

Purchased from (Dealer) .... Address ....

Date returned for repair .... Postal details ....

Repairs Information Form - Please complete this form and return it with the product if it needs repair under guarantee.

Customer's name (CAPITALS) ....

Customer's address ....

Serial number .... Purchase date ....

Purchased from .... Address ....

Date returned for repair ....

Brief Description of fault (Use a separate sheet if necessary)

Guarantee Registration Form - Your guarantee is only valid if this form is returned to Rockfort Products at 81 Church Road, London NW4 4BP within 10 days of purchase.

Customer's name (CAPITALS) ....

Customer's address ....

Serial number .... Purchase date ....

Purchased from .... Address ....