THE MGT LIFETIME DISC DRIVE

The Multi-Computer Disc Drive

suitable for use with the

* Acorn BBC * Spectrum * QL * Atari ST * Amiga *
* Amstrad PC * IBM PC and Compatibles *

from

Miles Gordon Technology Ltd

USER MANUAL

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Notice

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INTRODUCTION TO THE LIFETIME DRIVE AND MGT

Thank you for buying the MGT Lifetime Disc Drive - a product
which we believe offers an innovative solution to those who use
more than one computer, or are planning to do so in the future.

What's different about the Lifetime is that we've made it
compatible with a whole range of different computers - the
Spectrum (we suggest you use our PLUS D Disc/Printer Interface
with the Lifetime), the BBC, the QL, the Atari ST, the Amiga, and
most PCs. In the case of the last three categories, no separate
disc interface will be required; the Spectrum, the QL, and some
BBC computers do require a separate interface.

There are a great number of different computers available, and
there may be others which work with the Lifetime range. If so,
please let us know. Equally, you may discover a computer which
you would expect to work with the Lifetime, but does not. Again,
your input would be helpful.

If you run into installation difficulties, your local dealer
should be able to help. However, if there are problems you
cannot solve, or if there are comments you would like to pass on,
please do not hesitate to call us at MGT. Our Customer Support
team is on 0792-791100 from Monday to Friday between 0900 and
1800. The Guarantee Form will tell you what to do if you get
into serious difficulty.

HOW THE LIFETIME DRIVE WORKS

To enable the Lifetime Drive to work with a range of computers,
we've fitted an external socket at the back of the Drive to which
you attach any one of a special series of MGT drive cables.
These in turn connect to your computers.

You'll also notice a set of red micro-switches at the back of the
Drive. These are connected to a printed circuit board inside the
casing. By changing the positions of the switches, as described
later, you set up the drive to work with your particular system.
In some cases, you'll also need to make small changes to your
computer's Disc Operating System to inform it that you are now
using a floppy disc drive or a second drive. Generally, these
changes will be well described in your computer manual, but we
also give guidance here, together with a few additional hints and
tips.

TYPES OF LIFETIME DRIVE

Four types of Lifetime Drive available from Spring 1989:

* THE LIFETIME 350 PA - a 3.5" disc drive with an
                        internal power supply.

* THE LIFETIME 350 NA - a 3.5" drive with no internal
                        power supply, but with a socket to
                        which an external power supply may be
                        fitted.

* THE LIFETIME 525 WA - a 5.25" drive with an internal
                        power supply.

* THE LIFETIME 525 XA - a 5.25" drive with no internal
                        power supply, but with a socket for
                        an external power supply.

Why four models? Well, in the first place there are some people
who will use software saved in the 5.25" format; others may have
data on 3.5" discs. You may, if you wish, use a 3.5" Lifetime
Drive together with your computer's internal 5.25" drive, or vice
versa. Using a combination of this sort will allow you to
transfer your files from one format to the other.

Then, there are some computers - notably the Amiga - which supply
the disc drive with electrical power - no further power source is
required, so the 350 NA or 525 XA may be more appropriate.
(Incidentally, don't worry if you want to use the PA or the WA
with a computer that supplies its own power, like the Amiga: the
Lifetime automatically senses this and continues to work.)
Customers outside the UK may also prefer to buy the Lifetime
without a power supply and to add their own regulated 5 volt
power supply instead. (Regulated 5 volt power supplies are
widely available in high street electrical retailers in the UK
too.)

To confirm which model you have, check the model number on the
outer box. The serial number on the underside of the Drive
itself will also begin with a P (for PA), an N, a W, or an X as
appropriate.

WHAT YOUR LIFETIME DRIVE PACKAGE SHOULD CONTAIN

* THE LIFETIME DRIVE itself.

* This manual.

* A dust cover - use this when the drive is not in use as
  extra security to prevent dust and dirt entering the
  drive mechanism.

* A single 3.5" or 5.25" disc as appropriate.

* A Guarantee Registration card. Be sure to read this
  carefully and to return the reply coupon to us
  immediately. FAILURE TO DO THIS COULD INVALIDATE YOUR
  GUARANTEE.

You will also need the appropriate Lifetime Drive cables to
connect the drive to your computers.

                    * * * * *

In the next sections, we describe how to install your Lifetime
Drive. Read the section for your computer very carefully.
PLEASE BE PARTICULARLY CAREFUL TO FOLLOW THE INSTRUCTIONS ABOUT
WHEN TO TURN THE ELECTRICAL POWER ON OR OFF.

In case of any difficulty in installation, please contact your
dealer or MGT.

DOUBLE-SIDED, DOUBLE DENSITY, 80-TRACK

Lifetime drives all have the capability to read both sides of a double-sided disc. To do this, there are two heads inside the drive mechanism itself, in the same way that you find two heads in a compact disc player. IT IS NOT NECESSARY TO TURN THE DISC OVER WHEN YOU WISH TO READ THE SECOND SIDE WITH A 3.5" OR 5.25" DISC DRIVE. In most cases, the heads are automatically brought into use by the computer and the disc interface. And when you display a catalogue, the listing will normally display the contents of both sides of the disc, without telling you what's on the first side and what's on the second. Only in the case of the BBC B computer is it necessary to identify the two sides of the disc separately.

Lifetime Drives operate in double density. This is standard for most disc drives available today. Earlier single density drives stored half the amount of material in the same space on the disc.

Finally, Lifetime Drives are 80-track mechanisms. The tracks are the number of "grooves" on the magnetic disc. (The grooves on a disc are separate and concentric - unlike the single groove on a long-playing record.) Some computers ask you to specify whether you are using a 40-track or 80-track disc drive in the installation process - and indeed some, including the PC and compatibles, assume that you are using a 40-track drive. In some cases also, you may find that you need to read from a disc which has been saved on a 40-track 5.25" mechanism, which was standard for several years. For this reason, the Lifetime 525 drives feature a 40/80 track switch on the front of the unit. Switch to 40-track if you wish to read a disc saved in the 40-track format.

If you decide to work with 40 tracks rather than 80, the amount of data you can save on a disc is halved - on a PC you will have a 360K instead of a 720K capacity, for example.

To get the best performance, we recommend that you use discs which will allow for 80-track, double-sided, double density performance. In the case of 5.25" discs, these are also referred to as 96 t.p.i. (tracks per inch), while standard 3.5" discs are 135 t.p.i. MGT-brand discs are guaranteed to give excellent performance.

HOW MANY DRIVES ARE YOU USING?

Many of you will already have a disc drive installed in your computer and will be using the Lifetime Drive as your second unit for backup or additional storage. Others may not have a drive already and will be using their Lifetime Drive as their only drive unit.

It makes a difference whether the Lifetime is your first or second drive in use. In the first place, when you type in a Basic command on your computer, you will need to state which drive you wish to read from or write to. Some computers refer to the first drive in use as A and the second as B, while others refer to the first drive as 0 and the second as 1. (This is confusing, but it's the terminology that the hardware developers choose to use; to make matters worse - or better, depending on your point of view - other machines refer to the first drive as 1 and the second as 2.) Your computer manual will tell you how to address your drive; and our notes below also give guidance.

But it's also important to set up the drive mechanism as either the first or second drive in use. Essentially, the drive needs to be able to respond to the signals which are sent to it. That's why the left-hand switch in the bank of micro-switches on the Lifetime Drive is used to select whether it is your first or second drive. In our illustrations at the back of this manual we show where the switch should be for either Drive 1 - the only or first drive in use - or Drive 2 - the second drive in use.

IF YOUR LIFETIME DRIVE APPEARS NOT TO BE RESPONDING TO BASIC COMMANDS AFTER INSTALLATION, PLEASE CHECK THAT YOU HAVE SET THE MICRO-SWITCHES CORRECTLY - CHECK WHETHER YOU'VE GOT IT SET AS DRIVE 1 OR 2.

If you wish to use the Lifetime Drive as either a third or fourth floppy drive - some computers allow this - please contact MGT for further instructions.

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TECHNOLOGY

AMSTRAD PC 1512/1640

Your Lifetime Drive must be one with a power supply to use with the Amstrad PCs.

* Before connecting the Lifetime Drive set the micro-switches at the back of the Drive as shown in Figure 8 (or 7 if the Lifetime is to serve as drive A).

* Disconnect the power to the Amstrad computer and remove the top cover.

* Look at the Lifetime Drive cable - which must be the version for the Amstrad PC. You'll see a small card at one end of the cable, which slots into the drive connector inside the computer. You'll be able to identify the connector in the computer because it's at the end of a multi-coloured stranded cable.

* Feed the card end of the Lifetime Drive cable through one of the expansion slots at the back of the computer and fit it into the drive connector inside the computer. Now you can replace the computer's top cover.

* Connect the other end of the Drive cable to the connector on the Lifetime Drive. Pull the metal ears into the lugs on the Drive connector to make the attachment secure.

* Turn the power on at the back of the Lifetime drive. The red power switch will then light up. Now you can turn the computer on and boot up your system.

* For the computer to recognize the drive you now need to add an extra command to the CONFIG.SYS file on your main directory or disc. Using EDLIN as described in your MSDOS manual add the command:
              DRIVPARM=/D:N/F:2
  where N=0 if you want to set up the Lifetime as Drive A, and 1 if you want to set it up as drive B. Ignore /F:2 if you are formatting to 360K with 525 models)

* You must now reboot your computer. Use Ctrl, Alt, Del. When the A> prompt (or C> for hard disc users) appears, you can format a blank disc on the Lifetime drive by typing FORMAT B: and proceeding using all the standard disc commands. But check that you've set the switches on the Lifetime correctly - in case you start to format the wrong disc!

IBM PC AND COMPATIBLES

Your Lifetime Drive must have a power supply to be used with PCs and compatibles.

* Turn all power off, and remove the cover from your computer. Inside the computer, locate the cable that is connected to your internal drive.

* Feed the Lifetime Drive cable through one of the expansion slots at the back of your computer. Connect the circuit board at the end of the Lifetime Drive cable to the empty socket on the cable that is connected to your internal drive. You can now replace the computer cover.

* Set the micro-switches on the Lifetime drive as shown in Figure 8 (Fig 7 to set the Lifetime as Drive A. Note the different switch settings for ATs showin in Fig 9 and 10.)

* Turn the Lifetime Drive on using the red switch at the back of the drive. The switch will light up. Then turn the computer on and boot up your system as usual.

* You now have to add a command to your CONFIG.SYS file. Copy the file DRIVER.SYS to your root directory if you have a hard disk. Using EDLIN as described in your computer manual, insert the following line:
        DEVICE=DRIVER.SYS/D:N/F:2
  where N=0 if you wish to set the Lifetime as Drive A,
        N=1 to set the Lifetime as Drive B.
  On some versions of MSDOS the DEVICE DRIVER command is replaced by
        DRIVPARM =/D:N/F:2
  (Ignore the /F:2 if formatting to 360K with the 5.25 model.)

* You must now reboot your computer. Use Ctrl, Alt, Del. When the A> prompt (or C> for hard disc users), appears you can format a blank disc on the Lifetime drive by typing FORMAT B: and proceeding using all the standard disc commands. But check that you've set the switches on the Lifetime correctly - in case you start to format the wrong disc!

If your Lifetime Drive appears not to work with the PC at first, turn the power off, disconnect the Lifetime cable from the connector inside the computer, and then reconnect it the other way round. Power up and try again.

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TECHNOLOGY

AMIGA

With the Amiga you can use the Lifetime drive without a power
supply. But it doesn't matter if you use the versions with a
power supply. It is unlikely that you would use a Lifetime 525
Drive with the Amiga, unless you were running a PC emulation as
described in the Amiga manual.

* Set up the Amiga as described in the Amiga manual but
  do not power up.

* Connect the Lifetime Drive cable to the Amiga and the
  Lifetime Drive, set the microswitches on the Drive as
  shown in Figure 6 and turn the power on at the back of
  the drive.

* Put the Amiga Workstation Disk in the internal drive
  and the Extras Disc in the Lifetime Drive.   Then turn
  the computer on. The usual screen will appear with an
  extra icon marked DF1:EXTRAS.

* To format a blank disc, place a blank disc in the
  Lifetime drive and the extra icon on the screen should
  then say DF1:BAD. Position the arrow cursor on the
  screen over the icon marked DFI:BAD and press the
  left-hand button on the mouse. The icon will then
  change colour. Position the cursor over the title bar
  at the top of the screen. Then hold down the right
  hand button on the mouse and move the cursor to the
  word DISK. When the menu appears, move the cursor to
  the word INITIALIZE and release the button. Another
  menu appears: place the cursor to the box marked
  CONTINUE and press the left-hand button on the mouse.
  The menu reappears: select CONTINUE again. The screen
  will confirm that the disc is being formatted. When it
  has finished formatting the cursor returns to the main
  screen.

  All standard disc commands will work by replacing the
  normal DF0 command with DF1 when you wish to use the
  Lifetime drive.

ATARI ST

You will need a Lifetime drive with a power supply to work with
the Atari ST.

* Connect the Atari as described in the Atari manual, but
  do not power up.

* Set the micro-switches on the Lifetime drive as shown
  in Figure 5, and connect the Lifetime Drive cable to
  the computer and drive.

* Plug the Lifetime drive into the mains and turn on at
  the back of the drive.

* Turn the computer on with the boot disk in the internal
  drive. The usual menu appears on the screen with an
  extra disc drive present. Your drive is now ready to
  use will all the standard disc drive commands, but when
  you wish to use the Lifetime Drive, refer to it as
  drive B instead of drive A.

* To format a disc in drive B, place a blank disc in the
  Lifetime Drive, then move the arrow cursor to the
  symbol for disc drive B. Press the left-hand button on
  the mouse and move the cursor to the word FILE at the
  top of the screen. A menu will appear. Position the
  cursor over the word FORMAT at the bottom of the menu
  and press the left-hand button on the mouse. A warning
  screen will appear to remind you not to format a disc
  that contains valuable data. To continue, position the
  cursor over the box marked OK and press the left-hand
  button. A FORMAT menu will appear which enables you to
  type a "disk label" - this is the name you wish to give
  the disc. Next, position the cursor over the box
  "DOUBLE SIDED" and press the left-hand mouse button:
  the box will then be highlighted with inverse white on
  black. To start formatting, place the cursor over the
  box marked FORMAT and press the left-hand button. When
  formatting is complete, place the cursor over the box
  marked EXIT, press the left-hand mouse button and the
  original screen will be restored, ready for you to
  start work.

THE ACORN RANGE

Acorn computers should be used with the 350 PA or 525 WA.

The Lifetime Drive will work with the BBC B, the Master and the
Compact computers from Acorn. Usually, your computer will come
ready-fitted with a disc interface, although some of the earlier
BBC B models may not have an interface installed.

   * With the power to the computer off, set the
     micro-switches on the Lifetime Drive as shown in Figure
     3 (or 4 if setting up the Lifetime as Drive B). Then
     connect the Lifetime Drive and its cable to the
     computer as instructed in the computer manual. Turn on
     the power to the Lifetime Drive, then the power to the
     computer.

   * Depending on the model of computer you have, you will
     probably see the letters DFS or ADFS towards the top
     left-hand corner of the screen. This is an indication
     that a disc interface is already installed in your
     computer. If the letters do not appear, you will need
     to cquire a disc interface. If your local stockist
     cannot help you, please contact MGT for further
     information.

   * If you are not familiar with the Acorn disc drive
     commands, they will be displayed if you type:
           * help DFS (or ADFS if appropriate)
     The disc commands are also explained in your computer
     manual.

   * Unlike most other computers, the BBC B reads each side
     of a disc in a double-sided disc drive as if it were a
     separate disc drive. Thus, if you are using the
     Lifetime Drive as Drive 0, the two sides of the disc
     are referred to as 0 and 2; if the Lifetime is Drive 1,
     the two sides are 1 and 3. This does not apply to the
     Master and the Compact computers.

   * To format a disc, type:
                 * Enable
                 * F80   (or * F40 to format to 40 tracks)
     Some BBC B models require a special boot disc in order
     to format. If you know that the DFS interface is
     present, but the Lifetime Drive appears not to work,
     contact your dealer or MGT for further assistance.

SINCLAIR QL

When using a Lifetime Drive with the QL, the Drive must have its own power supply (i.e. the PA or WA versions - or add an external power supply to the NA or XA versions.)

To use the Sinclair QL with a disc drive, you'll need to add a disc interface to your computer. Your dealer or the QL magazines - or MGT - will be able to tell you which interfaces are currently available.

The various disc interfaces are supplied with a manual and a Tool-Kit. Amongst other things, the Tool-Kit normally allows you to select the term flp1_ or mdv1_ when addressing the disc drive. We will not go into this here, since conventions vary from interface to interface.

   * When installing your Lifetime Drive, make sure as usual
     that all power is turned off before connections are
     made. Attach the Lifetime Drive and cable to the disc
     interface, which itself is normally fitted into the
     expansion socket on the left-hand side of the QL. Set
     the micro-switches on the Lifetime Drive according to
     Figure 1.

   * When all connections have been made, turn on the power
     to the Lifetime Drive, using the red switch at the back
     of the unit. Then turn on the power to the computer.

   * Then follow the instructions in your disc interface
     manual.

THE SPECTRUM RANGE

When used with Spectrum computers, the Lifetime Drive must have its own internal (PA or WA) or external power supply.

For all versions of the Spectrum except the +3, a separate interface will be required - and we recommend the MGT PLUS D interface, which allows cassette software to be transferred to disc and has excellent load/save rates. (With the Spectrum 128K +2A or Spectrum +3, a separate MGT interface - The Fixer - is also required.)

   * With all power off, connect the Lifetime Drive and
     cable to the PLUS D, and the PLUS D to the computer as
     described in the PLUS D manual.

   * Set the Lifetime's micro-switches to the positions
     shown in Figure 1.

   * Turn on the power to the Lifetime Drive, using the red
     switch at the back of the unit.

   * Then turn on the computer, and follow the instructions
     in the PLUS D manual. When setting up your Disc
     Operating System, identify the Lifetime Drive as being
     an 80-track, double-sided unit, which will give you a
     capacity of 780K with the PLUS D. The stepping rate
     can be set at 6 milliseconds, though the ideal access
     time may vary slightly from system to system.
     Experiment with between 3 and 8 milliseconds, until
     your Lifetime Drive sounds as though it is operating
     smoothly.

If you are using the Lifetime Drive with the Spectrum +3, the capacity of the drive is limited by the internal interface in the computer. However, using Locomotive's CP/M for the +3, formatted capacity can be increased to 706K. Micro-switch settings are as normal for the Spectrum, although you will of course have to set up the Drive as the second in use. For installation, follow the instructions in the +3 manual.

If you use the PLUS D/Lifetime/Fixer combination with the Spectrum +3, Lifetime disc operations are only possible in 48K mode, although with the +2a, 128K mode is available as well. In both cases it will be possible to transfer software directly to disc via the PLUS D.

WHAT IF THINGS GO WRONG?

* If the Lifetime Drive appears not to be working, please
  check the following carefully. (It may seem obvious,
  but even the most experienced user can sometimes miss
  the obvious.):

    - Do the micro-switch settings correspond to those
      shown in the illustration for your computer?

    - Is the power switched on: the mains power, the On
      switch on your computer and the disc drive?

    - Is there a disc in the drive?

    - Have you followed the instructions in this manual
      and in your computer or disc interface manual
      correctly?

If you've checked all this and you still can't work it
out, don't worry - we can help. There's a good chance
we'll have come across your difficulty before. Call
the MGT technical department, preferably between 3 p.m.
and 5 p.m., and be prepared to tell us:

    - When you bought the Lifetime Drive?

    - Whether you've ever had it working - with this
      computer, or with any others?

    - Which computer(s) you're using? Which interfaces
      too, if you're using an external disc interface?

    - Whether the on/off switch light and the disc
      access light come on.

    - Whether you've ever used another external disc
      drive with your unit before?

    - What micro-switch settings you've used.

And don't forget, if you find out anything new about the Lifetime
- that it works with computers we haven't mentioned, or in new
ways with those that we have - please let the team at MGT know!

OTHER MGT PRODUCTS

MGT provides a wide range of other disc drive and data storage products too. Talk to us or your dealer about:

* the MGT PLUS D - a disc/printer interface for
                    the Spectrum

* standard BBC (or Spectrum/QL) drives - 3.5" or
                    5.25" - single or dual format

* external 3.5" PC drives - 1 or 2 Mb

* replacement 3.5" drive kits for PCs with 5.25"
      drives - a kit for easy internal installation

* multi 3.5"/5.25" external drive units

* bare 3.5" or 5.25" drives for hobbyists

* hard cards for PCs

We also supply MGT-brand discs, and disc boxes for your libraries, as well as cleaning kits to prolong the life of the heads on your disc drive.

Further details of our entire product range, together with the names, addresses and phone numbers of accredited MGT dealers nationwide are available when you send a stamped addressed envelope to:

          MGT (Data Division)
          Lakeside
          Phoenix Way
          Swansea Enterprise Park
          Swansea SA7 9EH

LIFETIME DRIVE SPECIFICATIONS

350 Models

```
Unformatted Storage Capacity ........    1 Mb Double Density
Data Transfer Rate ...................    250 Kbit/sec
Recording Density ....................    8717 BPI
Recording Method .....................    MFM
Track Density ........................    135 TPI
Number of Cylinders ..................    80
Total No of Cylinders ................    160
Rotational Speed .....................    300 rpm
Average Latency Time .................    100 mSec
Motor Start Time .....................    0.5 sec
Access Time - Track to Track ........     3/6 mSec
            - Settling Time .........     15 mSec
            - Average with Settling .    94/173 mSec
DC Power Supply ......................    4.5 - 5.5 Volts
Power Consumption - Standby Mode ....     25 mWatts
                  - Read/Write Mode .     1.8 Watts
Shock - Operating ....................    5 G
      - Non-Operating ................    60 G
Vibration - Operating ................    5 - 100Hz / 2 G
                                          100 - 500Hz / 0.5 G
          - Non-Operating ...........     5 - 1000Hz / 4.5 G
Environmental: Ambient Temperature ..     Operating 5 - 55 C
                                          Storage -20 - 60 C
Relative Humidity ....................    Operating 20 - 80%
            Wet Bulb Maximum 29 C, No Condensation
Reliability:    MTBF: 12,000 POH Min;      MTTR: 30 Mins;
                                     Life: 5 years
Media Life - Passes per Track .......      3 x 10
           - Insertions .............      20,000 +
Error Rate      SOFT: 10        HARD: 10       SEEK: 10
```
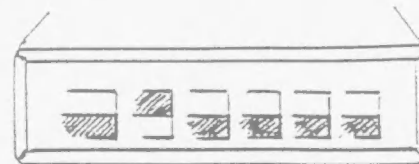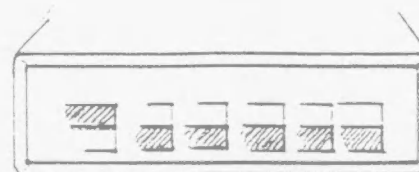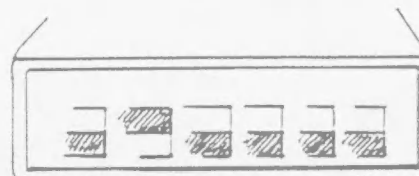
FIGURES

ON   OFF
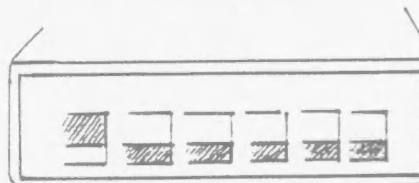
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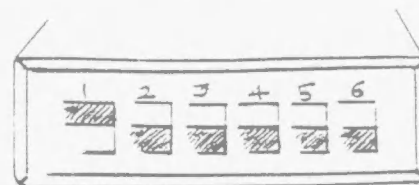
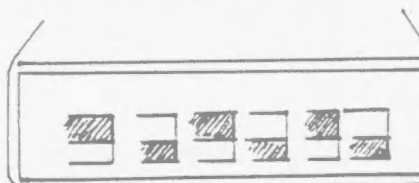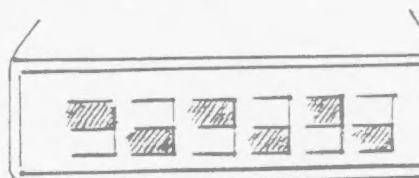(2) +D/QL -DRIVE B

(3) BBC - DRIVE A
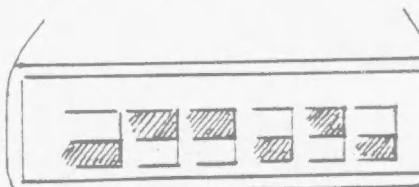
(4) BBC - DRIVE B

(5) ATARI

(6) AMIGA

(7) AMSTRAD + IBM - DRIVE A

(8) AMSTRAD + IBM - DRIVE B

(9) IBM AT - DISC READY,PIN 34