X/ProFile™

Installation Manual

November 8, 2005

Technical support is provided through your dealer, please contact them first.

If this is not possible, contact Sigma Seven Systems Ltd.:

by email: xprofile@SigmaSevenSystems.com

by mail: Box 98
Mill Bay, BC
V0R 2P0
Canada

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Table of Contents

Introduction

Thank you for purchasing your X/ProFile. Your X/ProFile provides an interface between an IDE storage device and the Apple parallel port hard disk interface. The Apple parallel port interface is also used to connect the Apple ProFile (and Apple Widget) hard disks to these computers manufactured by Apple Computer Inc.:

- Lisa
- Lisa 2
- Macintosh XL
- Apple][
- Apple ///

The X/ProFile provides:

1: The means to utilize economical and readily available IDE hard disks as the storage media via a standard 40 pin IDE header.

2: A Compact Flash socket which allows use of a compact flash card as the storage media or for backup.

3: Universal form factor designed for retrofit in:

- Lisa 2/Macintosh XL drive cage above the floppy drive
- Original Apple ProFile case in lieu of the original controller card
- Another external case

4: Easy-to-use copy function duplicates an exact image of data for backup and experimentation.

5: Improved performance in comparison with aging Apple parallel port hard disks.

6: Support for much greater storage capacity than the original Apple parallel port hard disks.

Much effort has been made to make the installation and use of this product easy and reliable. If a problem does arise, please contact the dealer from whom you purchased this product to obtain assistance; they are there to serve you.

Further Information...

For updates to this manual and other X/ProFile issues, check the X/ProFile web site at:

www.SigmaSevenSystems.com/xprofile

Internet based interest groups are a valuable source of assistance with operating systems, hardware issues, etc. See the web page above for current links.

Cautions

Potential Damage (Hurried installation)

Attempting to install your X/ProFile without understanding the procedure will probably lead to frustration and disappointment. In contrast to most software packages, irreversible damage not covered by the warranty may occur if the installation instructions are not followed. Please read this entire manual *before* doing anything else, it is in your best interest.

Potential Hardware Damage (ESD)

The electronic circuits associated with this installation are easily damaged by electrostatic discharge (ESD). You should attempt to eliminate the possibility of ESD by grounding yourself periodically to drain off any accumulated static charge. The simplest way to do this is to periodically (or continuously) touch a grounded metal portion of the chassis of the computer. Additional precautions to consider are: Do the installation under humid conditions; do *not* wear clothing made from static charge generating materials (cotton clothing is excellent; polyester and wool clothing are potential sources of static charge); do *not* do the installation in a carpeted area; do *not* transport (carry around) any circuit boards unless they are suitably protected by a static shielding bag or enclosure. All work should be done on a static-free surface, ideally this is a grounded electrically conductive workbench. Spreading metallic foil on your work surface is a possible alternative when nothing else is available.

Conventions

This document includes installation and technical information. The companion document "X/ProFile Operation Manual" includes operation and troubleshooting information.

In this manual, general information (which everyone should read to use the X/ProFile) is denoted by this typeface. If you wish to use the most general features of the X/ProFile, you need to read only these sections.

In this manual, advanced information (which you do not need to read to use the X/ProFile) is denoted by the grey vertical bar at the edge. If you wish, you may skip the advanced information sections; however, these sections contain information that will assist you in proficient use of the X/ProFile.

In this manual, technical information (which you do not need to read to use the X/ProFile effectively) is denoted by the black vertical bar at the edge. If you wish, you may skip the technical information sections; however, these sections contain information that may assist you in technical use and trouble-shooting the X/ProFile.

Compatibility

The X/ProFile has been designed to be compatible with existing interface hardware and software for the Apple ProFile. No special software is required or provided, the X/ProFile functions as if it were an original ProFile as far as your operating system is concerned.

The original Apple ProFile was manufactured in 5 MB and 10 MB sizes. The X/ProFile emulates these sizes and much larger sizes as well.

Depending on the software in use, your computer may support only one (or both) of the original sizes of the ProFile. For example, each Apple /// SOS ProFile driver was “hard-coded” to one of the original sizes.

Other software supports larger sizes, for example, ProDOS on the Apple][supports up to 32 MB, and MacWorks Plus II on the X/Lisa supports up to 2 GB when using System 6 or System 7. See Appendix F in the X/ProFile Operation Manual for details regarding suggested ProFile sizes for various operating systems.

The Apple Widget was also a 10 MB hard disk, but in contrast to the Apple ProFile, the Widget was internally mounted in some Lisa computers. Although the Widget and ProFile have some differences, they both connect to the computer via the same kind of parallel interface, so the X/ProFile can be used to replace a Widget.

The X/ProFile has been successfully tested with:
- Apple][e
- Apple][e with Applied Engineering Transwarp accelerator
- Apple ///
- Lisa (stock 5MHz), built-in and expansion slot ports
- Lisa with XLerator 18, built-in and expansion slot ports

The X/ProFile requires an IDE storage device that supports “Logical Block Addressing”, which is commonly available, except on the very oldest drives.

The X/ProFile does not use any special IDE transfer modes, so the device does not need to support UDMA, ATA/133 etc.

The configuration of data on the IDE storage device is an X/ProFile proprietary format, as such, you cannot move an X/ProFile Compact Flash card to/from another computer without re-initializing it.

Additional Items Required

In addition to the obvious items such as common hand tools and a suitable Apple computer, you will need some of the following items; contact your supplier for advice and assistance.

Storage Media

The X/ProFile does not include storage media; at least one of the following is required to use the X/ProFile.

In most cases, the capacity of the storage device will need to be a minimum of 4 times the desired size of ProFile you wish to emulate. See “Appendix E - IDE size vs STAR size” in the Operation Manual for details.

1) Compact Flash card

   The X/ProFile includes a Compact Flash socket compatible with Type I and Type II devices. If you wish to use a Compact Flash device, you will need to obtain this separately. (Due to its low “power-on hours” rating, the IBM MicroDrive is not recommended for regular use, but can be used for backup.)

2) 2.5" Hard Disk

   The X/ProFile includes a standard 40 pin IDE connector. You may connect a 2.5" hard disk to this connector using one of the readily available adapters to convert the hard disk’s connector to a standard 40 pin IDE cable. As well as the drive and adapter, you will require a 40 pin IDE cable.

3) 3.5" Hard Disk

   The X/ProFile includes a standard 40 pin IDE connector. You may connect a 3.5" hard disk to this connector. As well as the drive, you will require a 40 pin IDE cable.

Interface Card and software

It is assumed that your computer has the Apple parallel interface normally required to use an Apple ProFile hard disk.

1) X/Lisa

   All Lisa computers have one parallel port interface built-in, and can utilize a dual parallel port expansion card to connect additional drives. All common Lisa software provides support for multiple ProFile hard disks.

2) Apple][

   Apple][computers require a ProFile interface card and Apple][ProDOS or other software that supports the ProFile hard disk.

3) Apple ///

   Apple /// computers require a ProFile interface card and Apple /// SOS with the ProFile driver, or other software that supports the ProFile hard disk.

Power Supply

1) X/Lisa

When installed in a Lisa drive cage, an additional power supply is rarely required. However, if a 3.5" hard disk is used, it is strongly recommended that the Lisa power supply be the higher capacity “DataPower” type.

The X/Lisa “DataPower” power supply is labelled as part no. 699-0189, and rated 120 VAC, 60 Hz, 1.8 Amp, 150 W on the label beside the power cord connector. Units intended for use outside of North America are labelled part no. 699-0190, and 220-240 V~, 50 Hz, 1 A, 150 W (same power supply, different internal jumper configuration).

If the higher capacity X/Lisa power supply is not available, consider using a low power 2.5" laptop hard disk, or a Compact Flash card to minimize the additional power requirements. Another option is to use a separate regulated power supply for the hard disk and X/ProFile.

If you are installing a 2.5" or 3.5" hard disk, you will also need a suitable hard disk power cable to connect the drive/adapter to the X/ProFile.

2) ProFile case

If installed in an original Apple ProFile case, the “X/ProFile Regulator” (available separately) is required to provide safe working voltage to the X/ProFile and storage media. Connecting an X/ProFile to an original Apple ProFile power supply without the Regulator will damage the X/ProFile.

3) Other external case

When installed in another external case, a well regulated power supply is required. The power supply must provide 5V @ 150 mA to the X/ProFile as well as power to any fan and hard disk you wish to use.

Data Cable

The X/ProFile is connected to your computer’s parallel port using a data cable. If you are replacing an existing parallel port hard disk, you probably have the appropriate data cable. There are many possible configurations, contact your supplier for advice if your installation is not one of these common ones:

1) Internal installation in a Macintosh XL or Lisa 2/10 computer

These computers have a built-in cable for the internal parallel port. When the X/ProFile will be installed internally and connected to the internal port, no additional data cable is required.

2) Internal installation in a Lisa 2 computer having a back-panel parallel port

This computer requires a Sun20 style of data cable. If you are replacing an existing internal parallel port hard disk, you will re-use its data cable. If you are not replacing an existing parallel port hard disk, you can obtain a suitable data cable and installation instructions from your supplier.

3) Original Apple ProFile external case

Apple][, Apple ///, and Lisa computers require a data cable to connect to an X/ProFile installed in an external case.

The X/ProFile Regulator (available separately) includes a short adapter cable to provide a DB-25 back panel data connector like the one on the original Apple ProFile controller board. This permits the use of the same data cable used to connect an original Apple ProFile. If you are not replacing an existing parallel port hard disk, you can obtain a suitable data cable from your supplier.

4) Other external case

Depending on the case selected, you may prefer to use the cable described in either (2) or (3) above. Contact your supplier for advice.

Original Apple ProFile cable **New External cable** **Sun20 cable**

Figure 1. Data cables for: external drives (left, center) and internal Lisa 2 drive (right)

The original Apple ProFile cable is part number 590-0202-B. This can be replaced with a straight-through 25 pin cable approximately 35" (90 cm) long, with a DB-25 male plug on each end. Pin 7 should be removed from the DB-25 plugs before assembling the cable as some Apple parallel ports have this pin blocked.

The Sun20 data cable is a straight-through 25 pin ribbon cable approximately 35" (90 cm) long, with a 26 pin socket header on one end, a DB-25 male plug on the other end. Pin 7 should be removed from the DB-25 plug before assembling the cable as some Apple parallel ports have this pin blocked. Pin 26 of the socket header is unused.

Hardware Installation

If you have trouble deciphering these installation instructions, try having a technically knowledgeable person go over it with you. The installation should be simple and straightforward. Installation can be provided for shipping and handling costs, but contact your supplier first for special instructions and “return” authorization. Being involved in the installation yourself (even as an observer) will give you extra knowledge and confidence should a problem arise later. If you have a particular concern, contact your supplier for technical support.

Be sure to follow appropriate ESD control procedures when performing the installation.

Parts of the X/ProFile

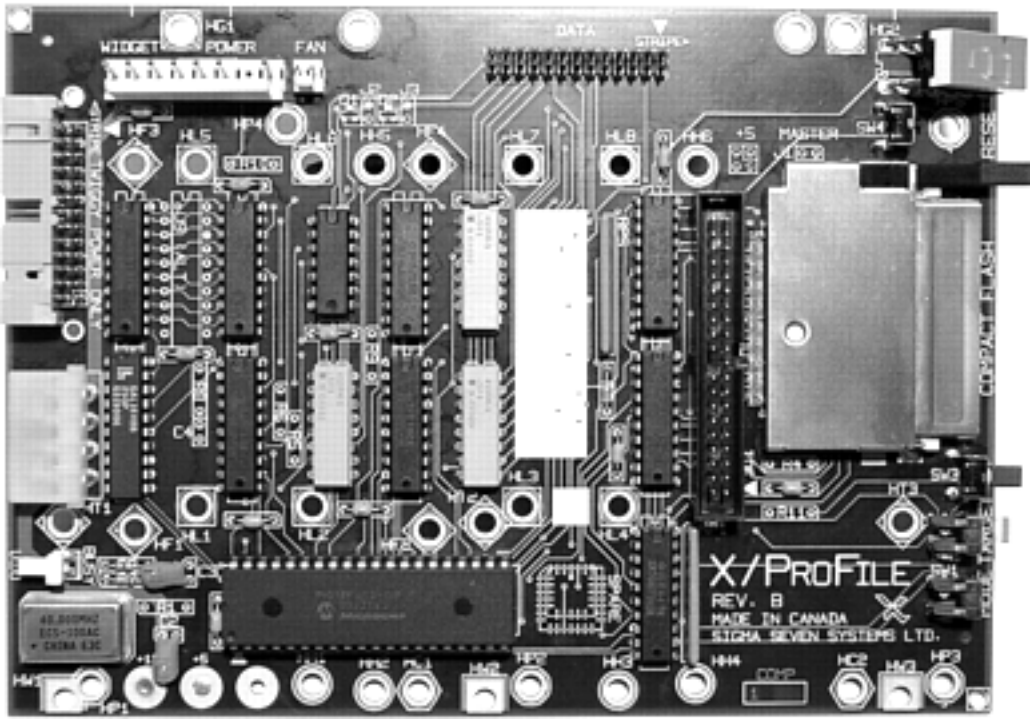

Figure 2. The X/ProFile circuit board

Before installation, familiarize yourself with the various parts of the X/ProFile as shown in Figures 2 and 3.

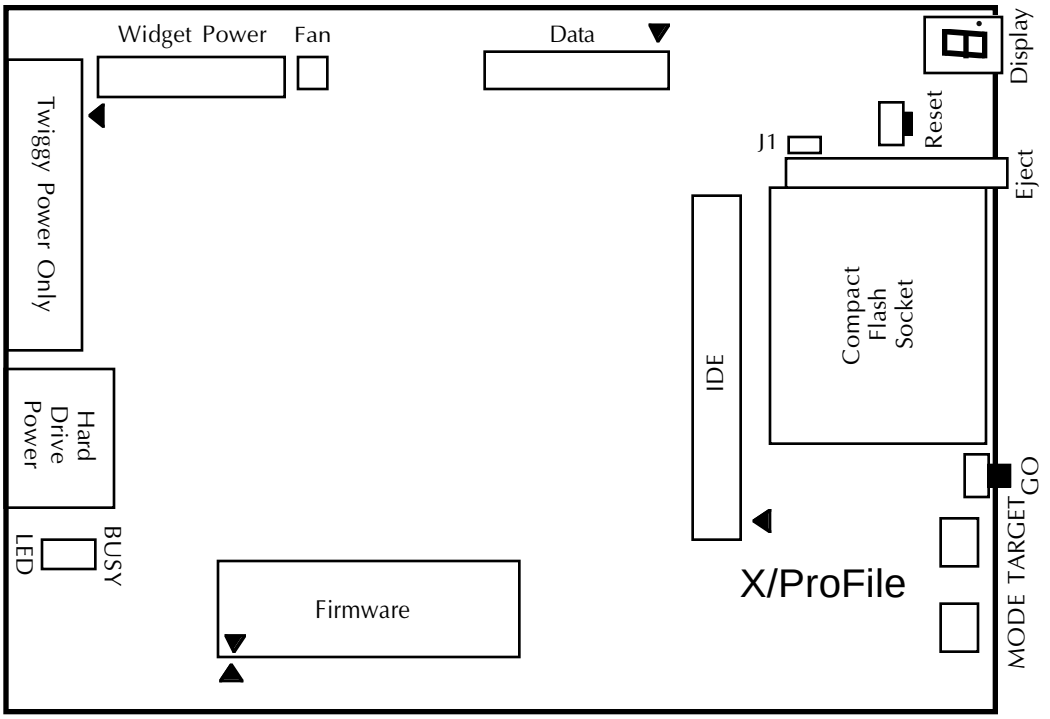

Figure 3. Major parts of the X/ProFile circuit board

The MODE rotary switch is used to select X/ProFile functions.

The TARGET rotary switch is used to specify function parameters. Underneath the target switch is the READY LED that functions as an activity indicator.

The GO push-button switch is used to confirm function selections.

The Compact Flash Socket can be used for storage, backup, or left empty.

The Eject button is used to remove media from the Compact Flash socket.

The RESET push-button switch is used to restart the X/ProFile.

The Display indicates the status of the X/ProFile.

The IDE connector can be used to connect to a standard IDE hard disk.

The Data connector is used to connect to the ProFile/Parallel port of the computer.

The Fan connector provides 12 volts for a cooling fan (optional).

The Widget Power connector is used to connect to the power available in a Macintosh XL.

The Twiggy Power Only connector is used to connect to the power available in a Lisa 2.

The Hard Drive Power connector is used to supply power to an attached IDE drive.

The BUSY LED connector is used for a front panel activity LED, such as that in the original Apple ProFile case. The READY LED under the TARGET switch has the same function.

Jumper location J1 is normally left open. Shorting the two signals together configures the Compact Flash socket to be the Primary (Master) IDE device.

Installation in an original Apple ProFile case

The X/ProFile is configured for easy retrofit in an original Apple ProFile case (see example in Figure 4). However, due to a voltage regulation issue with the original Apple ProFile power supply, you must use the X/ProFile Regulator (available separately) when installing in an Apple ProFile case.

In addition to power supply regulation, the X/ProFile Regulator also provides a cooling fan and facilitates mounting of a 2.5" or 3.5" drive in the drive area of the original ProFile case.

Instructions for installation of the X/ProFile in an original ProFile case are included in the documentation provided with the X/ProFile Regulator. Follow the installation instructions in the manual included with the X/ProFile Regulator, then continue with the X/ProFile Operation Manual.

Note: Connecting the X/ProFile to an original ProFile power supply without the X/ProFile Regulator may damage the X/ProFile and any IDE devices attached. Such damage is not covered by the warranty.

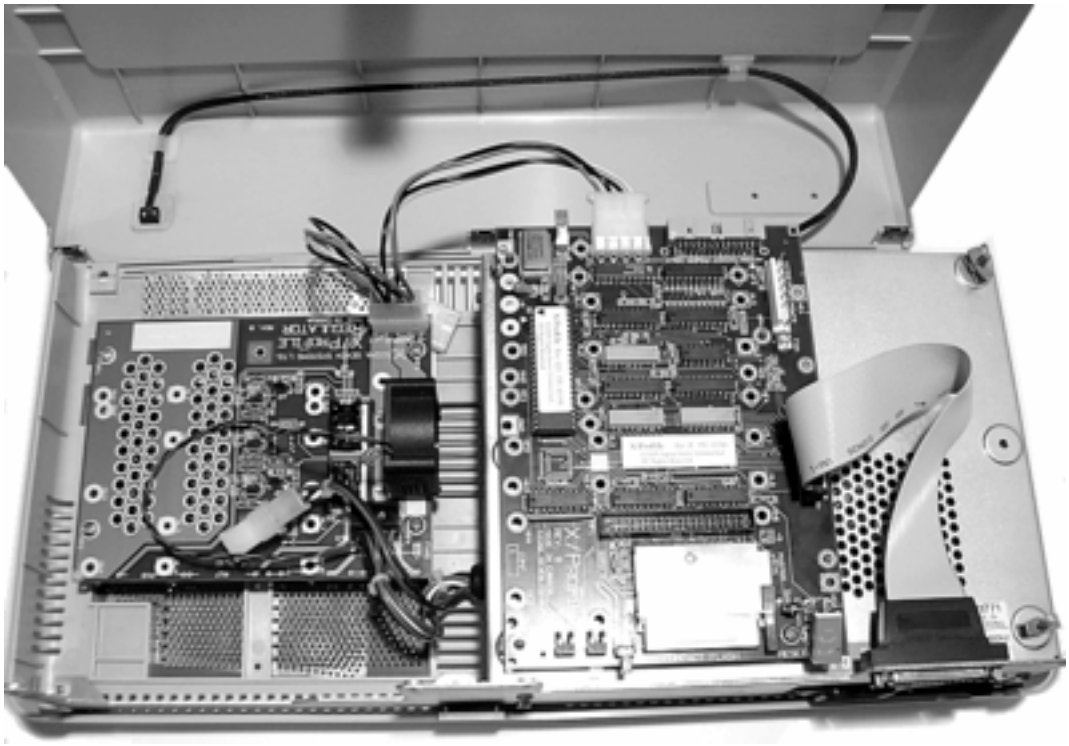

Figure 4. X/ProFile Regulator and X/ProFile in original Apple ProFile case (example)

Installation in an X/Lisa Drive Cage

In this document, the term X/Lisa is used when referring to both the Lisa 2 and the Macintosh XL.

Turn off the X/Lisa and disconnect the power cable before disassembly.

Remove the front cover of the X/Lisa by pressing upwards on the finger detents of the two latches under the front edge, and pulling out the bottom of the front cover (see Figures 5-7).

Figure 5. Locating the X/Lisa front cover latches

Figure 6. Releasing the X/Lisa front cover

Figure 7. Removing the X/Lisa front cover

Under the floppy drive is a knurled retaining screw for the drive cage. After loosening the screw a few turns, the cage can be slid out the front of the X/Lisa. Note the retaining screw is captive and (usually) is not completely removable.

Disconnect all of the cables from the drive cage so that you can work without straining any cables.

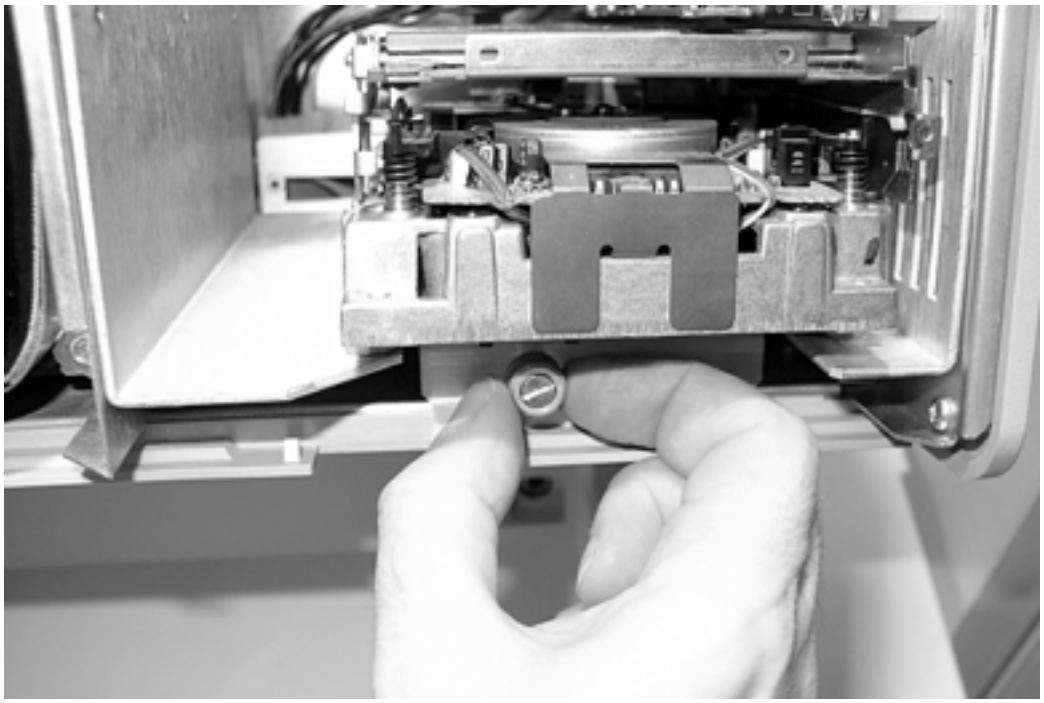

Figure 8. Loosening the X/Lisa drive cage retaining screw

If you are replacing an internal hard disk, remove it from the drive cage and set it aside.

Note that some old and non-functional internal hard disks have some residual value as spare parts for other X/Lisa hard disks. Contact your supplier to find out if any components of your particular drive are of value before discarding it.

Determine the model of X/Lisa drive cage that you are using (see Figure 9).

The Widget cage has a large round hole in the bottom (which may be occupied by a fan); the Twiggy cage does not.

The Widget cage has mounting holes close to the bottom of the sides. The Twiggy cage has mounting holes approximately half-way up the sides of the cage.

Note that a particular Macintosh XL or Lisa 2 might contain either drive cage. Do not attempt to identify the computer type by the drive cage, nor vice-versa.

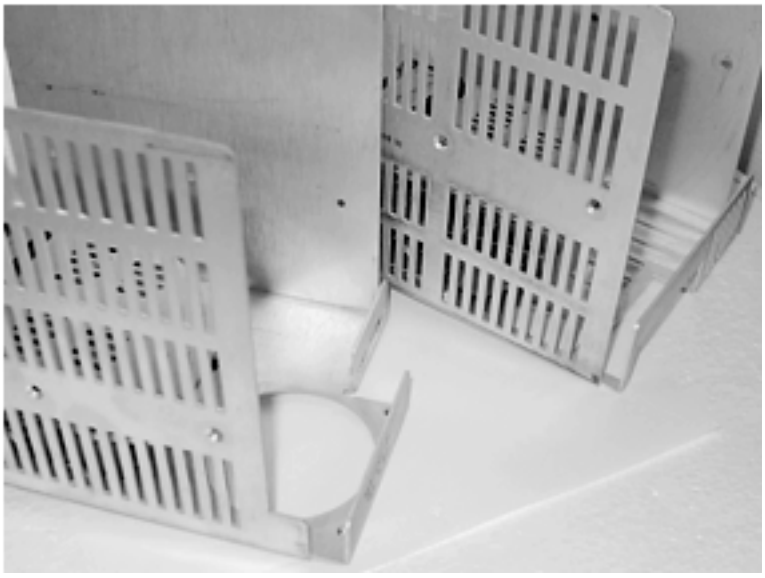

Figure 9. Widget (left) and Twiggy (right) X/Lisa drive cages

Locate the X/Lisa drive cage mounting hardware (supplied with the X/ProFile), shown in Figure 10.

This hardware includes 3 each of 6-32 short flat-head screws, 6-32 x 0.625" (16 mm) long threaded hexagonal spacers, 6-32 short round-head screws, and two each of 0.625" (16 mm) high nylon mounting posts with adhesive backing (#6 ~ 3.5 mm).

Figure 10. X/Lisa drive cage mounting hardware

If you are using a Widget cage, you will use the three mounting holes near the edge of the X/ProFile labelled HW1, HW2, HW3.

If you are using a Twiggy cage, you will use the three mounting holes of the X/ProFile labelled HT1, HT2, HT3. These are positioned about 1.25" (32 mm) from the HW holes.

Using the short round-head screws, attach the 3 hexagonal spacers to the bottom of the X/ProFile using the three HW or HT holes according to the style of your drive cage. Do not fully tighten these screws yet.

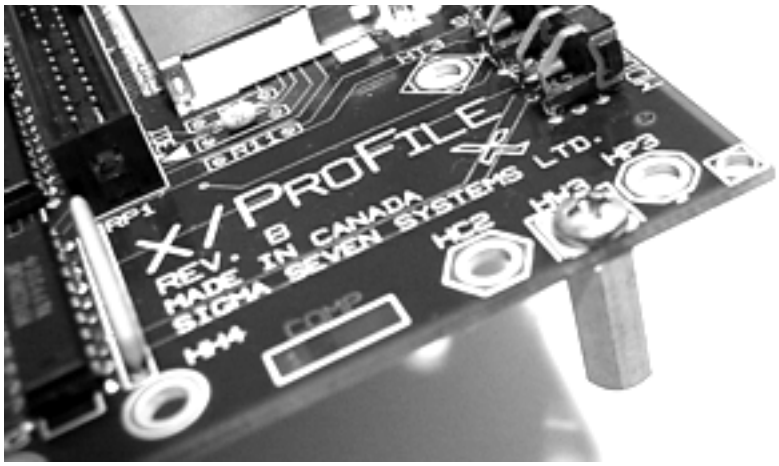

Figure 11. X/ProFile hexagonal mounting spacer in hole HW3 for Widget cage mounting Hole HT3 (for Twiggy cage mounting) is beside the TARGET switch

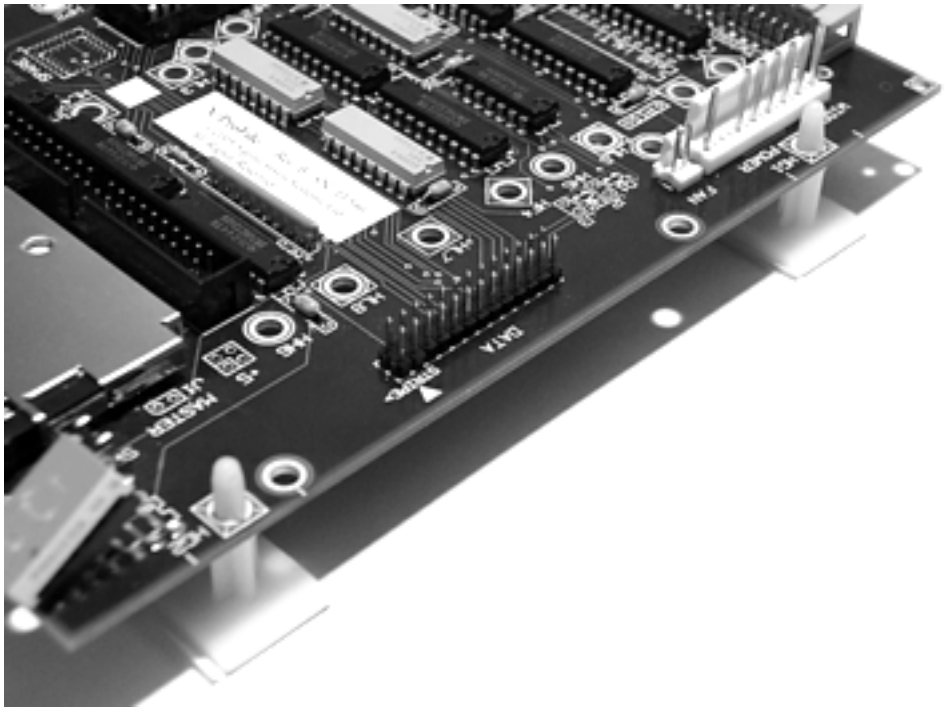

Figure 12. Nylon mounting posts inserted in holes HG1 and HG2

As shown in Figure 12, insert the two nylon mounting posts in the holes marked HG1 and HG2. Do not remove the protective backing from the adhesive.

Position the X/ProFile such that the three hexagonal spacers are approximately aligned with the mounting holes in the side of the X/Lisa drive cage that has ventilation slots.

If the drive cage is dusty or dirty, wipe it clean where the nylon mounting posts will be attached. If the cage is oily, clean the mounting locations with alcohol or glass cleaner.

As shown in Figure 13, use the three short flat-head screws to attach the hexagonal spacers on the bottom of the X/ProFile to the side of the drive cage having ventilation slots. The X/ProFile switches should be above the floppy drive.

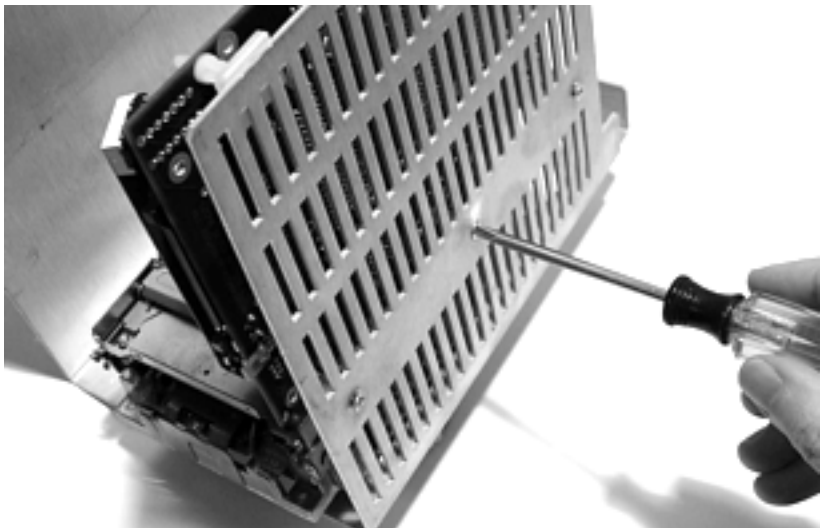

Figure 13. Preliminary attachment of the X/ProFile to the drive cage

Rotate the nylon mounting posts so the locking clip is closest to the edge of the X/ProFile (see Figures 14-16).

Hold the X/ProFile so that the bases of the nylon mounting posts are against the cage.

The edge of the nylon mounting posts should align with the top edge of the drive cage.

If the base of a nylon mounting post extends past the top edge of the drive cage, it may interfere with replacing the drive cage in the chassis. If necessary, loosen the round head screws so that you can move the X/ProFile slightly.

Tighten the three round-head screws to securely attach the hexagonal spacers to the X/ProFile.

Using a pencil, mark the drive cage with the vertical and horizontal positions of the nylon mounting posts.

Figure 14. Marking the nylon mounting post locations

Figure 15. Marking the nylon mounting post locations

Now remove the three flat-head screws from the drive cage to extract the X/ProFile with the hexagonal spacers still attached to the X/ProFile.

Check the pencil markings for the locations of the nylon mounting posts; if they are unclear or ambiguous, erase them and repeat the marking procedure.

Continue only when you are satisfied with the mounting locations for the nylon mounting posts. The nylon mounting posts cannot be relocated after they are attached.

Remove the nylon mounting posts from the X/ProFile — press in the small locking clip to remove the nylon mounting posts easily as shown in Figure 16.

Remove the protective backing from each nylon mounting post, and with the locking clip towards the top of the cage, press the nylon mounting post into place firmly where the cage was marked.

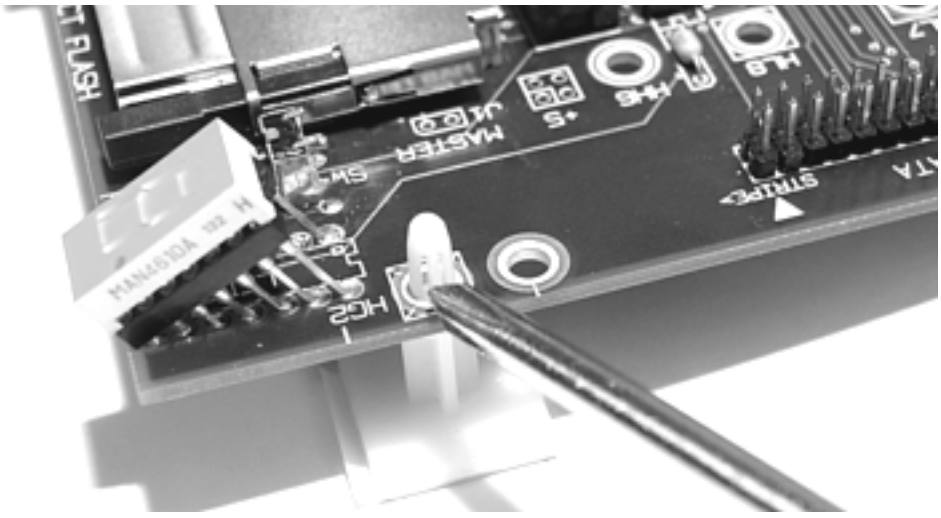

Figure 16. Pressing the nylon mounting post locking clip to remove the post

Final X/ProFile Mounting

Note: If you will be mounting a 3.5" or 2.5" hard disk on the X/ProFile, proceed with the corresponding section on page 28 or 33 now. After the storage device is mounted on the X/ProFile, continue with this section.

Mount the X/ProFile assembly on the drive cage as follows:

Press the X/ProFile onto the nylon mounting posts, and use the three flat-head screws to fasten the X/ProFile in place on the drive cage.

If the hexagonal spacers are misaligned from the holes in the drive cage, loosen the round head screws holding the hexagonal spacers to the X/ProFile (in some cases, you may need to remove the hard drive to access some of these screws).

Check the six mounting screws (fastening both ends of the three hexagonal spacers) to ensure they are tight.

If you have a drive cage fan, you may connect it to the “FAN” connector on the X/ProFile near the top of the drive cage.

> When the X/ProFile is used with Compact Flash media or a 2.5" hard drive, a fan is rarely required. If you are using a 3.5" hard drive that runs hot, you may wish to install a drive cage fan if you do not already have one.

Connecting the X/Lisa Drive Cage

Identify the Drive Cage Power Cable

Use this section to identify whether your computer has a Widget power cable or a Twiggy power cable then proceed with the corresponding section below.

If you cannot determine which power cable you have, contact your supplier for assistance.

In the drive cage area of an X/Lisa are a number of cables. One is the ribbon cable that attaches to the drive cage for accessing the floppy drive.

The other cables in the drive cage area may be hidden behind the X/Lisa on/off switch; gently extract the ends of the additional cables for comparison with Figure 17 and Figure 18 below to determine which kind of power cable you will connect to the X/ProFile.

Figure 17. Lisa 2/10 and Macintosh XL drive cage cables

Widget Power (left), Data (center), Floppy (right)

Some X/Lisa computers have an internal Widget Power connector. These computers also have a 26 pin ribbon cable for an internal parallel port hard disk, and a 20 pin ribbon cable for a 3.5" floppy drive. Such Lisa computers are sometimes referred to as a Lisa 2/10 or Macintosh XL. When a Widget Power connector is present, it is usually the case that the back panel of the computer includes an interrupt button, but no parallel port.

If your computer has a Widget Power cable, continue with “If you have a Widget Power Cable” on page 22.

Figure 18. Lisa 2 drive cage cables

Unused (left), Floppy (center), Twiggy Power (right)

Some X/Lisa computers have an unused 3 pin connector in the card cage area. These computers also have two 26 pin ribbon cables, one short and one long — the long cable is referred to as the Twiggy Power cable. Such Lisa computers are sometimes referred to as a Lisa 2. It is usually the case that the back panel of these computers includes a parallel port, but no interrupt button.

The short ribbon cable is normally connected to a small circuit board on the card cage labelled “Lite Adapter”. A short 20 pin ribbon cable connects the Lite Adapter to the 3.5" floppy drive. These components are not shown in the pictures in this manual.

In some cases, there will be a third 26 pin ribbon cable that is routed through the chassis to the parallel port on the back panel, this cable is sometimes referred to as a Sun20 data cable. This cable, or a suitable substitute, is required to connect the X/ProFile’s data connector to the parallel port on the back panel of a Lisa 2. See the section “Additional Items Required” on page 4 for more information.

If your computer has a Twiggy Power cable, continue with “If you have a Twiggy Power Cable” on page 24.

If you have a Widget Power Cable

Connect the Widget power cable from the X/Lisa drive cage area to the “WIDGET POWER” connector on the X/ProFile.

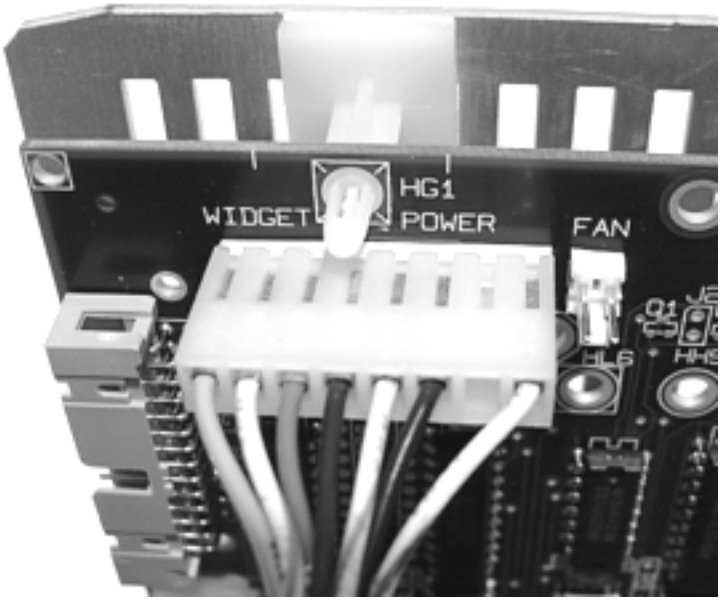

Figure 19. Widget Power connector

Caution: Do not connect the data ribbon cable to the “TWIGGY POWER ONLY” connector at the rear edge of the X/ProFile, or the computer may be damaged.

Connect the data ribbon cable from the X/Lisa drive cage area to the “DATA” header at the top edge of the X/ProFile.

Note: Orient the connector such that the two grooves in the plug are toward the edge of the X/ProFile as shown. In the figure, the grooves have been highlighted in white for clarity; on your connector, they will be more subtle. In an X/Lisa with a Widget power connector, this data cable rarely has a stripe to indicate orientation; even if a stripe is present, use the grooves in the connector to determine the correct orientation.

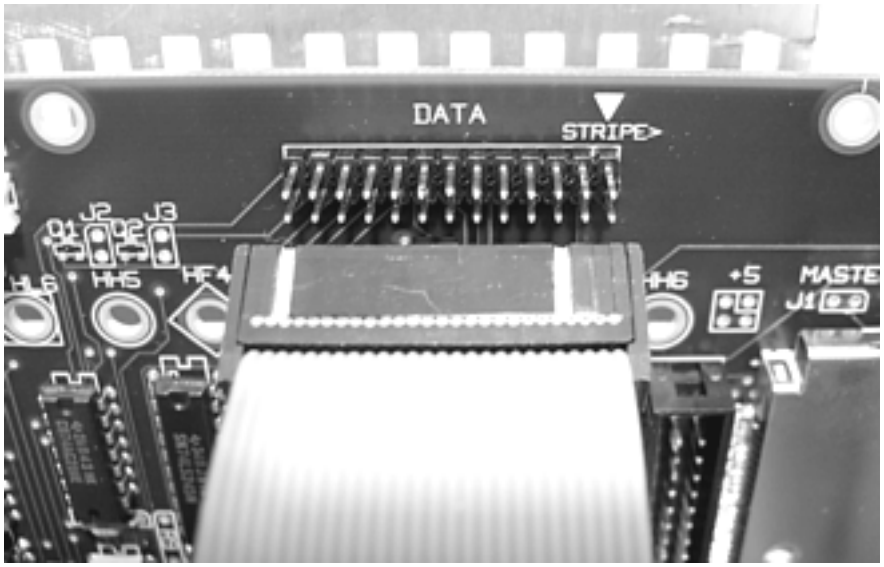

Figure 20. Data connector orientation (grooves highlighted in white)

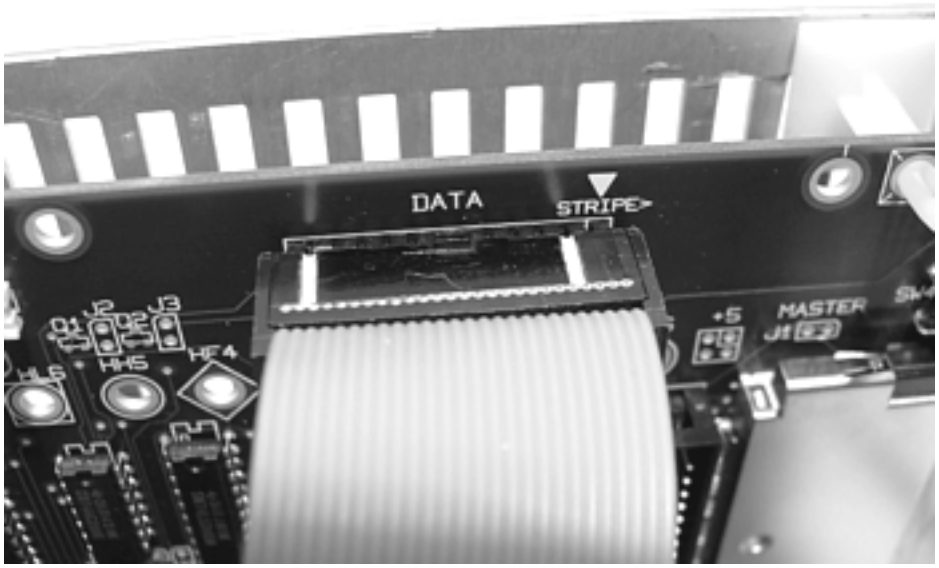

Figure 21. Data connector installed (grooves highlighted in white)

Attach the 20 pin ribbon cable to the floppy drive connector on the drive cage.

Since you have a Widget Power cable instead of a Twiggy Power cable, skip the next section, and continue with “Starting up an X/Lisa without installing the Drive Cage and Front Cover” on page 26.

If you have a Twiggy Power Cable

The drive cage area contains two internal ribbon cables of the same width that are connected inside the Lisa chassis.

If you are replacing a Sun20 hard disk, there will be a third cable that is routed through the chassis to connect to the back panel externally — this is a data ribbon cable.

One of the internal cables is longer than the other. The shorter cable is connected to the "Lite Adapter" circuit board for accessing the floppy drive. (The longer cable was originally designated for use with a second/upper "twiggy" drive in the Lisa 1.)

Caution: Do not connect the Twiggy Power ribbon cable to the "DATA" header, or the X/ProFile will be damaged!

Attach the longer internal ribbon cable to the "TWIGGY POWER ONLY" connector at the rear edge of the X/ProFile. In the picture, the grooves have been highlighted in white for clarity; on your connector, they will be more subtle. The Twiggy power connector on your X/ProFile may look slightly different from the one shown in the picture.

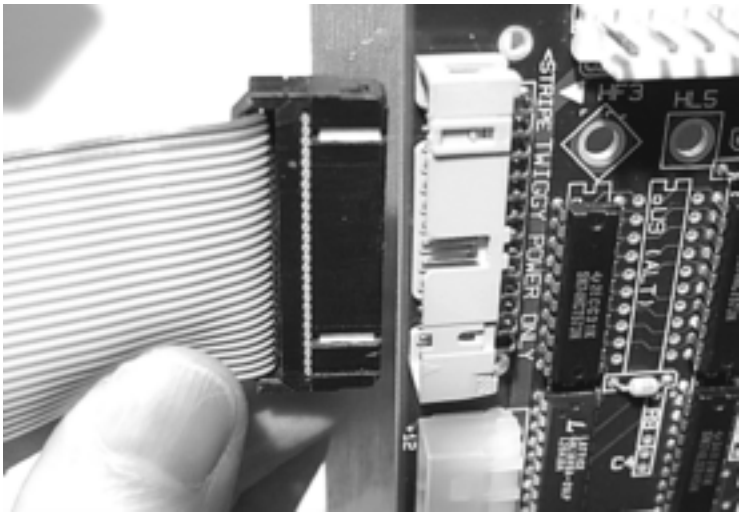

Figure 22. Twiggy Power connector orientation (grooves highlighted in white)

> Experienced technicians may notice a stripe on the Twiggy Power ribbon cable that does not correspond with the normal location of pin 1 for this type of connector. For the Twiggy Power cable only, always ignore the stripe and use the connector grooves for orientation. The X/ProFile header includes a polarization clip to assist with the correct orientation.

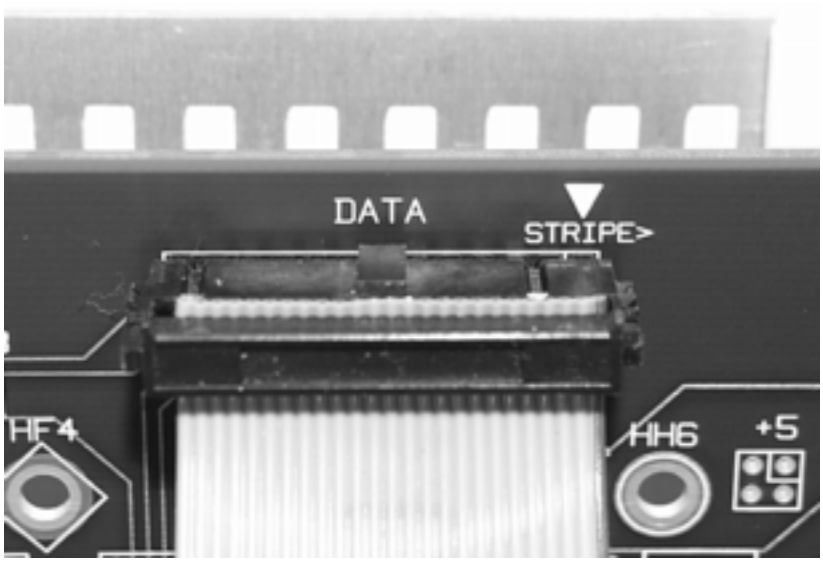

Figure 23. Sun20 data cable connected (hard to discern, the stripe is on the right)

If you are replacing a Sun20 internal hard disk, the X/ProFile uses the old data cable from the Sun20 internal hard disk, which is routed through the chassis to the parallel port on the back panel.

If you are not replacing a Sun20 internal drive, you may obtain this data cable from your X/ProFile supplier. See the section “Additional Items Required” for more information.

Connect the data cable to the “DATA” header at the top edge of the X/ProFile (see Figure 23). Orient the cable so that the stripe on the cable is by the triangle on the X/ProFile.

Attach the shorter internal ribbon cable to the “Lite Adapter” mounted on the side of the drive cage.

The unused 3 wire cable is left unattached.

> Due to the small gauge of the ribbon cable conductors, the power available from the Twiggy Power cable may be less than that required by some of the more “power hungry” 3.5" drives.
>
> Problems can be minimized by making sure you are using the DataPower version of the power supply, checking/adjusting the power supply output voltage, and cleaning the gold plated contacts of the edge connectors of the power supply and the card cage motherboard.
>
> It may be necessary to provide a different power connection for the hard drive; some X/Lisa expansion cards include a hard drive power connector, contact your supplier for more information.

Starting up an X/Lisa without installing the Drive Cage

The X/Lisa will not turn on unless the front cover is in place. However, some X/ProFile functions require access to the switches while the X/ProFile is operating.

It is sometimes convenient to place the drive cage on the table in front of the X/Lisa, and partially replace the front cover so you can turn on the X/Lisa and still have access to the X/ProFile switches.

The front cover power interlock is on the left end of the front cover, so it is possible to partially install the front cover with the right side ajar, leaving a gap for the drive cables to exit.

Figure 24. X/Lisa front cover ajar to permit start-up while cables are accessible

When the front cover is installed with the cables hanging out, be careful to avoid excessive crushing or crimping of the cables between the front cover and the chassis.

Note that the power interlock will disconnect the power immediately if the front cover comes loose. Minimize your use of the X/Lisa in this condition to avoid loss of data from this possibility.

Replacing the X/Lisa Drive Cage and Front Cover

To replace the X/Lisa front cover, insert the drive cage, making sure the cables are within the drive area and not pinched between the chassis and a side of the cage. Double check that the ribbon cable for the floppy drive has been reconnected.

Figure 25. Replacing the X/Lisa drive cage

As you slide the cage back into the X/Lisa, adjust the cables so they will not be pinched between the rear of the cage and the chassis. Make sure you have adequate lighting to check the rear of the cage area.

Note: If you have a Widget cage, you will need to dress all the cables towards the monitor side as there is little clearance between the Widget drive cage fan mount and the chassis.

Loosely fasten the drive cage retaining screw below the floppy drive. If the screw will not engage, the drive cage is not fully inserted into the chassis and the front cover may not close properly.

Replace the X/Lisa front cover by inserting the top edge first, then pressing the bottom edge into place to engage the latches. In case of resistance, check that the cage is fully inserted and there are no cables in front of the drive cage and associated components.

3.5" Drive Installation

If you are installing the X/ProFile in an X/Lisa drive cage, you should have already installed the hexagonal spacers and nylon mounting posts as directed above. The spacer mounting screws are difficult to access after a drive is mounted on the X/ProFile.

In addition to the 3.5" IDE drive, you will require a 40 pin IDE cable, and a 4 pin female-female hard disk power cable (it may be easier to locate a “Y” power splitter with two female connectors and one male connector; put electrical tape over the unused male connector to prevent short circuits).

To install a 3.5" drive on the X/ProFile, locate the long mounting hardware shown below. This includes 4 each of #6 x 0.75" (19 mm) long unthreaded spacers, #6 fibre washers, and 6-32 x 1" (25 mm) long round head screws (#6 ~ 3.5 mm diameter).

Figure 26. 3.5" drive mounting hardware

Note: Most drives have a “maximum engagement limit” for the mounting screws. Exceeding this limit can cause the screws to intrude on the drive’s electronics, damaging the drive. You may need to use additional or thicker washers to prevent this. You may use metal washers, they do not need to be insulating fibre washers.

If your IDE cable has 3 connectors, it is recommended that you use the connectors at the ends of the cable. As long as the orientation of the pin 1 stripe is observed, it does not matter on which side of each connector the ribbon cable exits.

When a 3.5" drive is mounted on the X/ProFile, the IDE cable is typically routed through the space between the drive and the X/ProFile circuit board.

As shown in Figure 27, attach the 40 pin IDE cable to the X/ProFile such that pin 1 of the connector and the stripe of the cable (the lower edge in Figure 27) are near the white triangle on the X/ProFile. To prevent excessive stress on the circuit board, squeeze the connector and circuit board together instead of pressing the connector against the circuit board.

Dress the ribbon cable so that it lies away from the Compact Flash socket as shown. If the cable exits the connector towards the Compact Flash socket, loosely fold it back the other way.

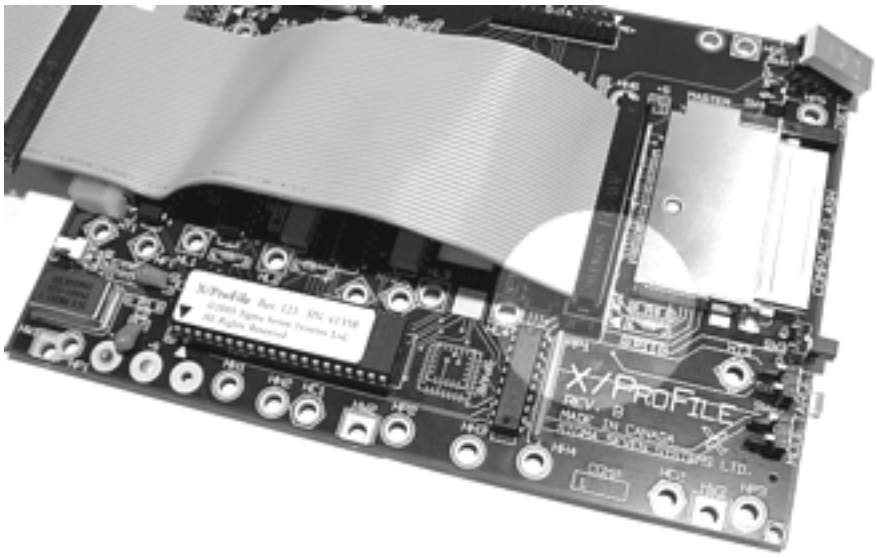

Figure 27. Connect the IDE cable to the X/ProFile with the stripe near the triangle

Before attaching the drive, identify (and if necessary, label) pin 1 of the drive's IDE connector so that you will know which way to attach the IDE cable later.

In most cases, the drive's jumpers should be set to make the drive the "Master" device.

Depending on the mounting screw locations of your drive, you may need to use the holes labelled HH2, HH3, HH5, HL8, or the holes labelled HH1, HH4, HL6, HH6.

Figures 28-33 show the general sequence for mounting a 3.5" hard disk on the X/ProFile.

Put the washers on the screws, and insert through the bottom side of the X/ProFile, through the spacers and into the bottom of the drive. The ribbon cable will be in the space between the drive and the X/ProFile. For best results, engage all of the screws before fully tightening any of them.

Take care to avoid bumping or dropping to prevent damage to the hard disk.

For easiest cable routing, mount the drive so the connector end of the drive is near the hard disk power connector on the X/ProFile circuit board (see Figure 28).

It can be helpful to have someone assist by holding the drive for you, or hold the X/ProFile on edge so that the screws and spacers are horizontal.

Attach the IDE and power cables between the X/ProFile and the drive.

Continue with Final X/ProFile Mounting on page 19 above.

Figure 28. Orienting a 3.5" drive over the IDE cable

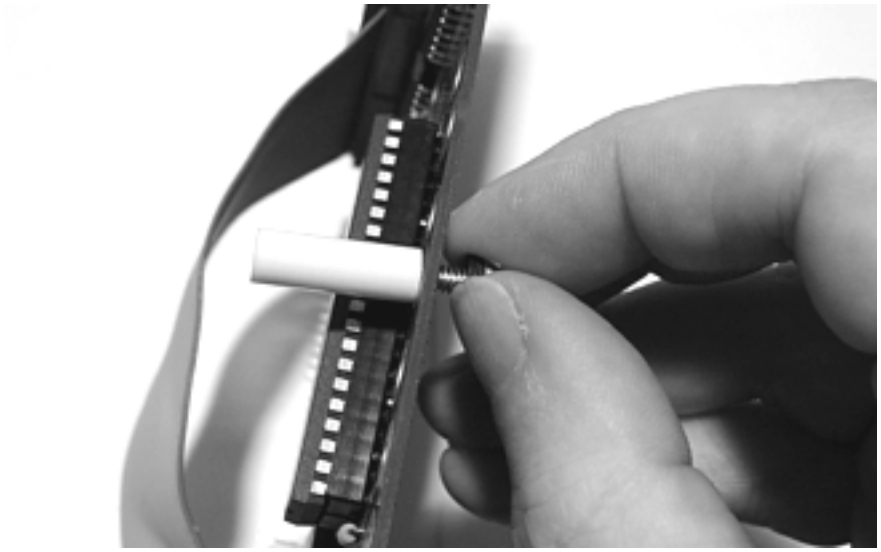

Figure 29. Preparing a drive mounting screw

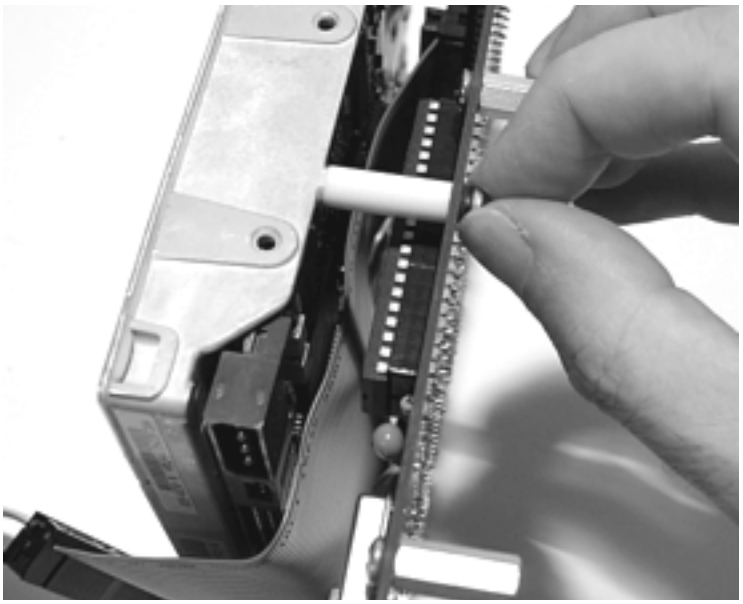

Figure 30. Attaching a drive mounting screw

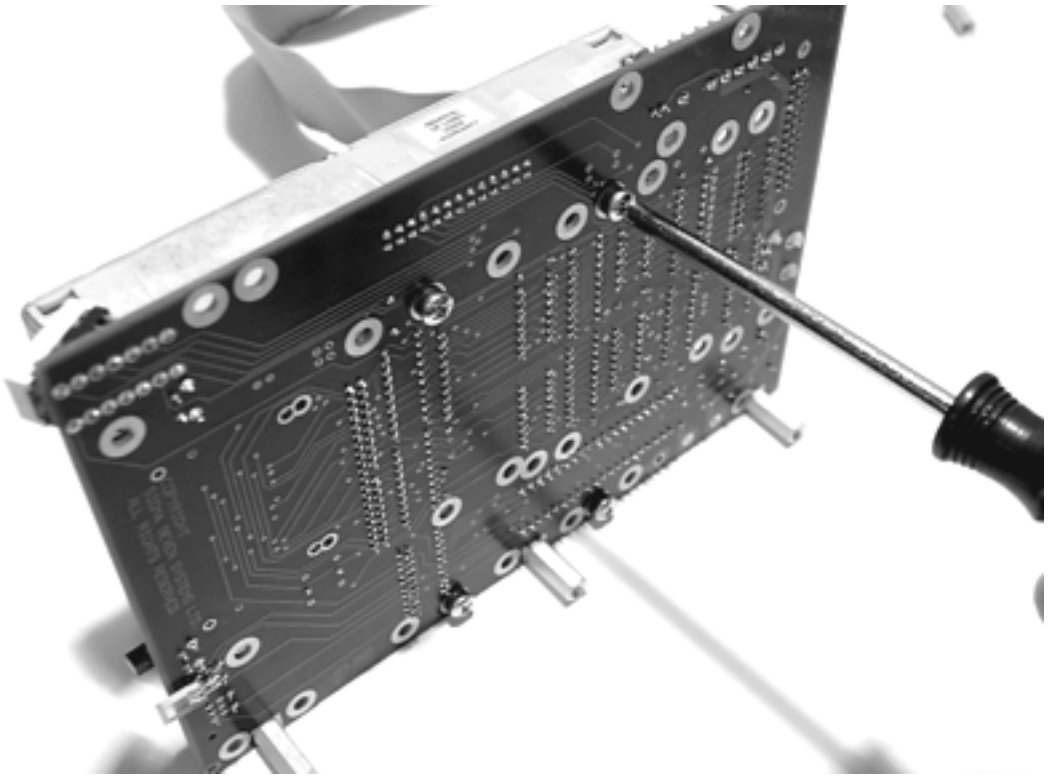

Figure 31. Tightening the drive mounting screws

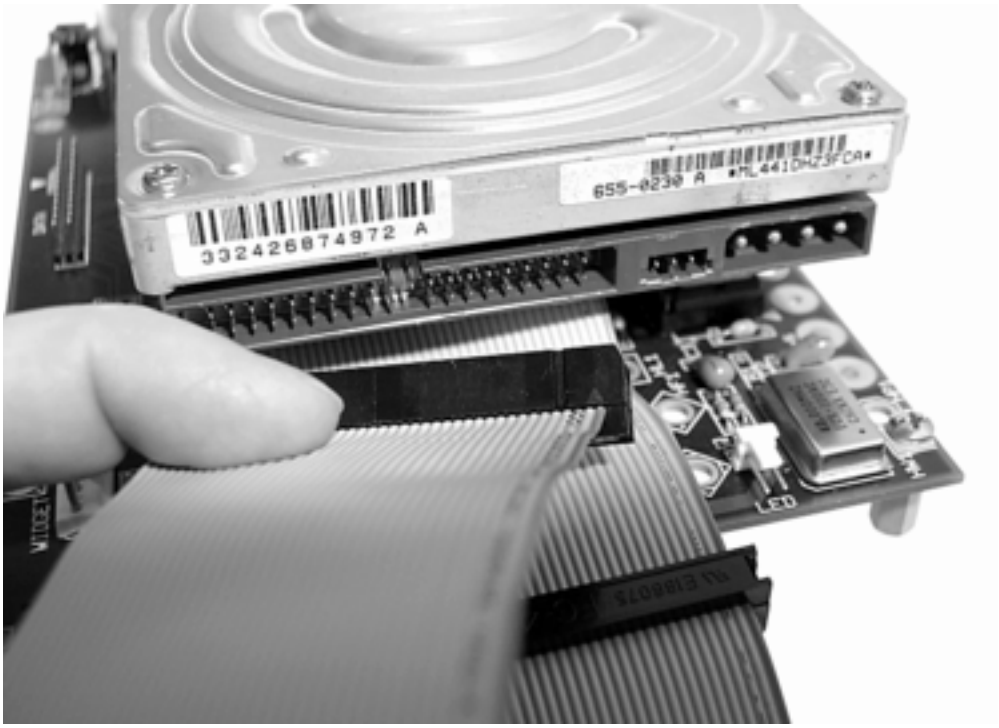

Figure 32. Attaching the IDE cable to the drive

Figure 33. 3.5" drive and IDE cable mounted on X/ProFile

2.5" Drive Installation

If you are installing the X/ProFile in an X/Lisa drive cage, you should have already installed the hexagonal spacers and nylon mounting posts as directed above. The spacer mounting screws are difficult to access after a drive is mounted on the X/ProFile.

In addition to the 2.5" IDE drive, you will require a standard 40 pin IDE cable, an adapter that converts the 0.1" spacing of the 40 pin cable to the 2 mm spacing of the 2.5" drive, and a suitable hard disk power cable that connects the X/ProFile to the adapter.

To install a 2.5" drive on the X/ProFile, locate the metric mounting hardware shown below. This includes 4 each of 11 mm M3 unthreaded spacers, M3 washers, and M3 x 16 mm round head screws (M3 ~ 3/32" diameter).

Figure 34. 2.5" laptop drive mounting hardware

Note: Most drives have a “maximum engagement limit” for the mounting screws. Exceeding this limit can cause the screws to intrude on the drive’s electronics, damaging the drive. You may need to use additional or thicker washers to prevent this. You may use metal washers, they do not need to be insulating fibre washers.

If your IDE cable has 3 connectors, it is recommended that you use the connectors at the ends of the cable. As long as the orientation of the pin 1 stripe is observed, it does not matter on which side of each connector the ribbon cable exits.

Before attaching the drive, identify (and if necessary, label) pin 1 of the drive’s IDE connector so that you will know which way to attach the IDE adapter and cable later.

Depending on the mounting screw locations of your drive, you may need to use the holes labelled HL1, HL4, HL5, HL8, or the holes labelled HL2, HL3, HL6, and HL7.

Figures 35-41 show the general sequence for mounting a 2.5" hard disk on the X/ProFile.

Put the washers on the screws, and insert through the bottom side of the X/ProFile, through the spacers and into the bottom of the drive. For best results, engage all of the screws before fully tightening any of them.

Take care to avoid bumping or dropping the assembly to prevent damage to the hard disk.

For easiest cable routing, mount the drive so the connector end of the drive is near the hard disk power connector on the X/ProFile circuit board (see Figures 37-38).

It can be helpful to have someone assist by holding the drive for you, or hold the X/ProFile on edge so that the screws and spacers are horizontal.

Attach the IDE adapter to the drive, then attach the IDE and power cables between the X/ProFile and the adapter. In most cases, drive and adapter jumpers (if any) should be configured to make the drive the IDE “Master” device.

Continue with Final X/ProFile Mounting on page 19 above.

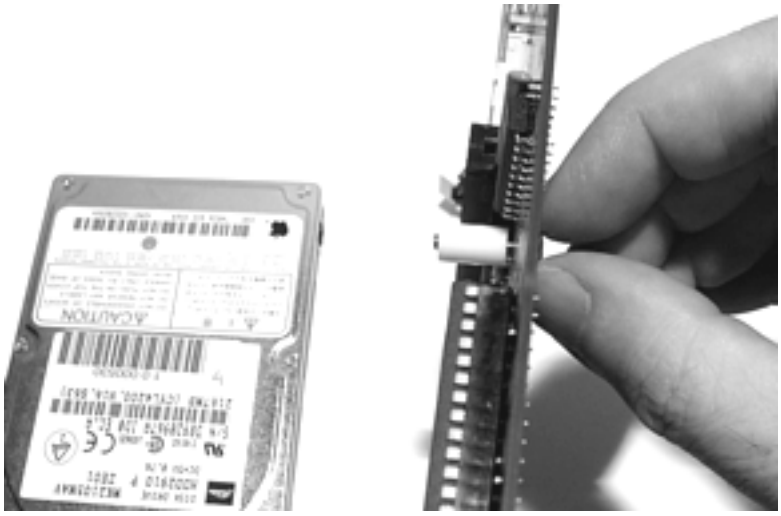

Figure 35. Preparing a 2.5" drive mounting screw

Figure 36. Attaching a 2.5" drive mounting screw

Figure 37. 2.5" drive mounted on X/ProFile

Figure 38. Adapter attached to 2.5" drive on X/ProFile

Figure 39. IDE cable connected to X/ProFile with stripe near white triangle

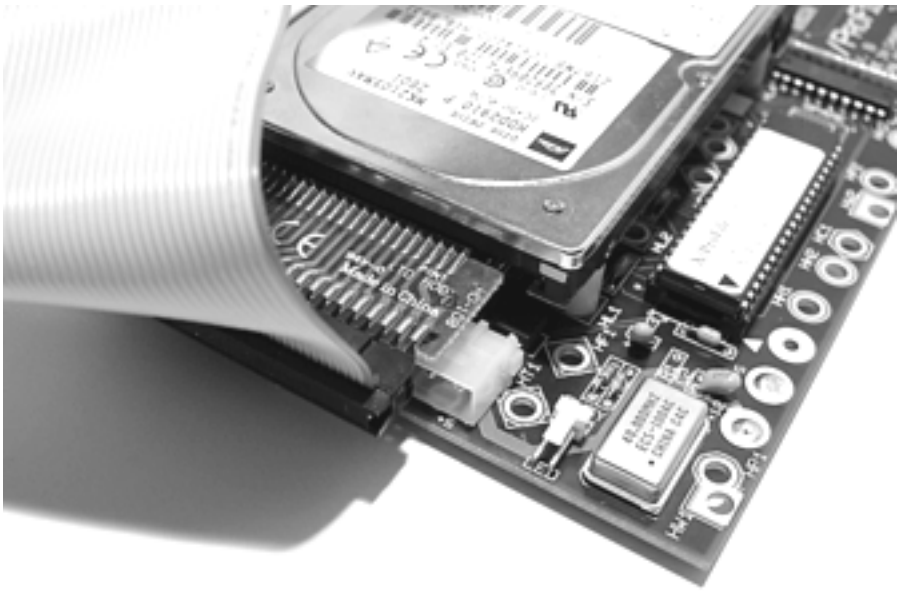

Figure 40. IDE cable connected to 2.5" drive adapter

Figure 41. 2.5" drive, adapter and IDE cable mounted on X/ProFile

Changing the Firmware

It may be desirable to change the Firmware chip in the X/ProFile to implement bug fixes or new features. See the X/ProFile Firmware section in the X/ProFile Operation Manual for more information.

Turn off and disconnect the power before working on the X/ProFile.

Pay especially close attention to ESD protection while handling any electronic parts not installed in a circuit board.

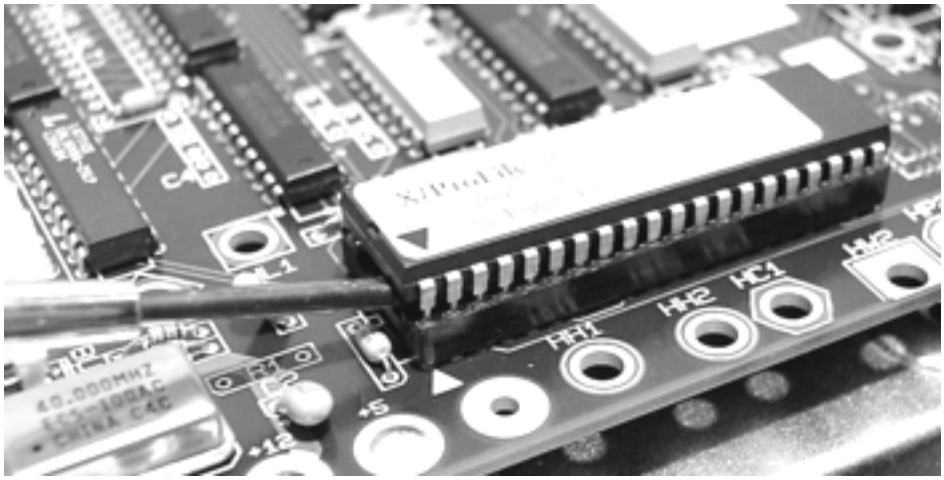

Figure 42. Removing the X/ProFile Firmware chip for upgrades

As shown above, use a screwdriver or other thin instrument to alternately pry up each end of the Firmware chip away from its socket, a little at a time (do not pry the socket from the circuit board!). After a few alternations, the part should be easily removable from the socket. Put the old Firmware chip in the anti-static packing that was used to ship the new Firmware chip.

When inserting the new Firmware chip, be careful to orient it with the triangle that denotes pin 1 closest to the triangle on the printed circuit board.

Caution: If the Firmware chip is installed backwards, it will be damaged when power is applied.

Position the Firmware chip over the socket such that all pins are aligned with receptacles, and press the chip into the socket. To prevent excessive stress on the circuit board, squeeze the chip and circuit board together, or support the bottom of the circuit board otherwise.

Inspect your work to ensure that the chip is properly oriented and successfully inserted in the socket; look especially for pins that may have been inadvertently folded under the chip.

Trouble-shooting

Troubleshooting information is included in the X/ProFile Operation Manual.

Glossary

ESD	ElectroStatic Discharge - Transfer of static electrical charge which can result in damage or destruction of electronic components.
Firmware	Firmware - Software encoded into the electronics of the firmware chip; the operating instructions used by the microcontroller that runs the X/ProFile.
Hard-coded	Hard Coded - An item set when software is created, with the assumption that it will never need to be changed. The result is that it is difficult or impossible to change later, and the exterior world must conform to the parameters of the set item.
IDE	Integrated Drive Electronics - A pervasive standard for a low cost computer storage media interface.
LBA	Logical Block Addressing - A feature of IDE devices that facilitates addressing sectors using a simple and device-independent linear number rather than by cylinder, head, and sector numbers.
LED	Light Emitting Diode - A solid state lamp commonly used in electronics for displays and indicators.
Lisa OS	Lisa Office System - An operating system created by Apple for an X/Lisa computer. Released versions include 1.0, 2.0, 3.0, and 3.1. The suite of applications for the Lisa OS was called “Lisa 7/7”.
Sector	Sector - The smallest amount of data that can be read or written to a storage device. Typically 512 bytes for IDE devices, and 532 bytes for an Apple ProFile. The extra 20 bytes used by the ProFile are Tag bytes. A sector may also be called a block.
SOS	Sophisticated Operating System - An operating system used by the Apple /// computer.
STAR	STorage ARea - An X/ProFile term referring to the space allocated on storage media (hard disk, compact flash card, etc.) for data.
Tag Byte	Tag Byte - Tag bytes are associated with a sector of data, but are not available to applications to store documents or other information. A tag byte contains extra information used by the operating system to mark sectors for housekeeping, potential data recovery, etc.
X/Lisa	Macintosh XL or Lisa - Term used in this text when referring to Macintosh XL and Lisa computers in general.

Frequently Used X/ProFile Switch Settings

(Complete list in Appendix C of the X/ProFile Operation Manual)

MODE switch settings

Function	Primary	Secondary
Run or Show Info	0 ←	1 ↖
Auto Prep/Run	2 ↖	3 ↖
Prep STAR Type 4	4 ↑	5 ↗
Prep STAR Type 6	6 ↗	7 ↗
Prep STAR Type 8	8 →	9 ↘
Erase	A ↘	B ↘
Copy From	C ↓	D ↙
Compare From	E ↙	F ↙

TARGET switch settings for Run, Info, Flag (MODE = 0, 1)

Function	Even	Odd
Run	0 ←	1 ↖
Clear All Flags	4 ↑	5 ↗
Set Run Flag	6 ↗	7 ↗
Set Write Flag	8 →	9 ↘
Set Copy-To Flag	A ↘	B ↘
Firmware Version	C ↓	C ↓
Manufacturing Data	D ↙	D ↙
STAR Info	E ↙	F ↙

TARGET switch settings for Auto Prep, Prep 4, Prep 6, and Prep 8 (MODE = 2-9)

STAR Size	Even	Odd	Sectors	Capacity
5 MB	0 ←	1 ↖	00 26 00	4864 K
10 MB	2 ↖	3 ↖	00 4C 00	9728 K
16 MB	4 ↑	5 ↗	00 7F F0	16384 K
32 MB	6 ↗	7 ↗	00 FF F0	32760 K
256 MB	8 →	9 ↘	07 FF F0	131064 K
2 GB	A ↘	B ↘	3F FF F0	524280 K
4 GB	C ↓	D ↙	7F FF F0	4194296 K
8 GB	E ↙	F ↙	FF FF F0	8388600 K

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www.SigmaSevenSystems.com/xprofile