X/ProFile™

Operation Manual

Applies to Firmware Command Set 02

November 8, 2005

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

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

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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.

Conventions

This document includes operation, trouble-shooting, and technical information. Refer to the separate document "X/ProFile Installation Manual" for instructions related to installing the hardware.

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.

Hardware Installation

Installation of the X/ProFile, and hard disk if desired, are included in the separate X/ProFile Installation Manual.

If you are installing the X/ProFile in an original Apple ProFile case, use the manual included with the X/ProFile Regulator instead of the X/ProFile Installation Manual.

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 on page 44 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.

X/ProFile Controls

Before operation, familiarize yourself with the controls of the X/ProFile.

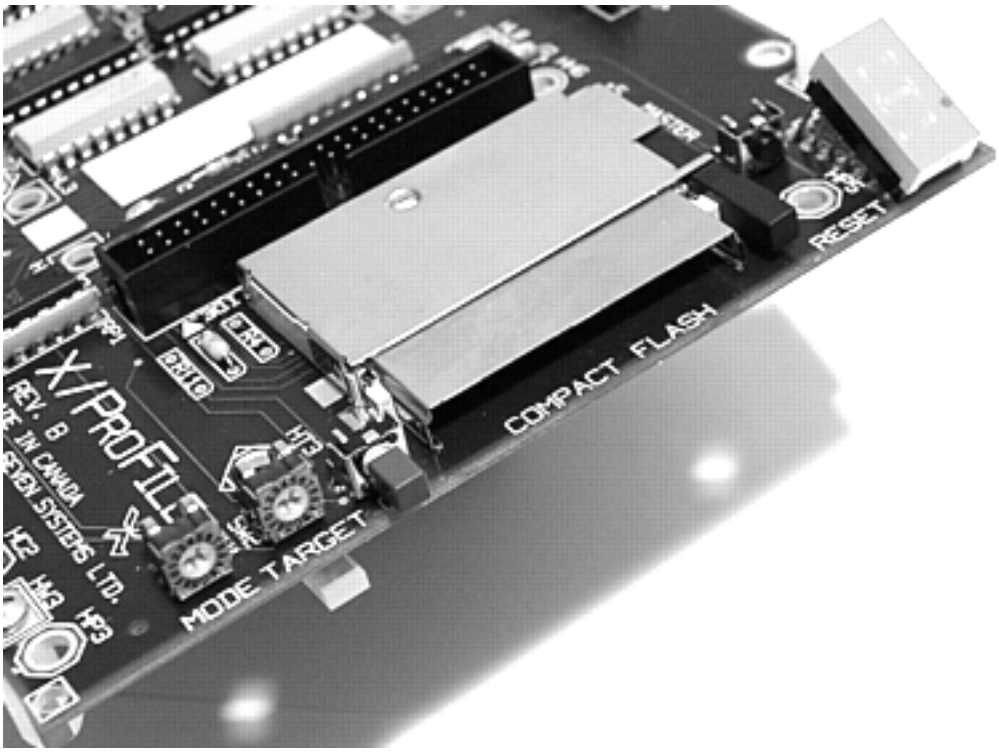

Figure 1. X/ProFile controls include (left to right):

MODE and TARGET rotary switches, GO pushbutton,
COMPACT FLASH socket, Eject button, RESET switch, Display
Beneath the TARGET switch is the READY LED

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. It may be blue or another colour.

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.

X/ProFile Operation

After installing the hardware, you may be eager to get working quickly. Although it is best to carefully read and understand this manual first, you may find it useful to consult “Appendix G - QuickStart” on page 45 for assistance with your configuration decisions.

IDE Devices - Primary and Secondary

The IDE bus supports two devices, commonly referred to as Master and Slave, or Primary and Secondary. When using the X/ProFile these are commonly shown as Pri and Sec.

An IDE device can be either Primary or Secondary; each device has a jumper to select which it will be.

You do not need to have two IDE devices to use the X/ProFile. If you have two devices connected to one X/ProFile, your computer can use only one at a time. However, a copy feature provides the means to backup data from one device to another using the X/ProFile.

If your Apple computer has more than one parallel port, you may connect more than one X/ProFile to have concurrent access to multiple hard disks.

Compact Flash

The built-in Compact Flash card socket can be used for the storage medium in lieu of a hard disk. The X/ProFile can also use a Compact Flash card to copy the data from/to an IDE hard disk for backup/restore.

The built-in Compact Flash card socket is configured as the Secondary IDE device.

Compact Flash memory cards are inexpensive and very convenient when you wish to have different operating systems available.

In addition, Compact Flash has very low power requirements, making it especially suitable for X/ProFiles installed internally in those Lisa 2 computers that have the lower capacity power supply.

Inserting a Compact Flash card

Turn off the power and insert the socket end of the card with the “label-side” away from the X/ProFile circuit board. When a card has a label on both sides, the “label-side” typically is the one showing the size (eg. “256 MB”) of the card.

Most Compact Flash cards are fully inserted when they are nearly flush with the edge of the X/ProFile circuit board. Do not press on the eject button while inserting a card, allow it to extend as the card is inserted.

Removing a Compact Flash card

If the X/ProFile is in use by the computer, first unmount (eject, put away, etc.) the disk. Then turn off the power and press the eject button.

Because it has no moving parts, flash memory provides quick access to any part of its data. Depending on the application, you may find that Compact Flash is faster at reading, but slower at writing, than an old hard disk. Modern hard disks have good seek performance and a large built-in cache, which makes them the top performer.

The X/ProFile Compact Flash socket accepts Type I and Type II devices.

Note: The X/ProFile's Compact Flash socket does not support "Hot Swap". Make sure you turn off the power to the X/ProFile while inserting or removing Compact Flash cards.

Since they have no moving parts, Compact Flash cards are rugged and mechanically durable. However, the memory cells in a flash device "wear out" if written-to many times. Cells in current Compact Flash memory cards are typically rated for 100000 (or more) write cycles. Although a controller in the memory card provides "wear levelling" to distribute writes throughout the device, it is possible to wear-out flash memory in some applications. If your X/ProFile will be used continuously or intensively, you may wish to use Compact Flash memory only for backup purposes.

The IBM MicroDrive is compatible with the X/ProFile's Compact Flash socket, however the MicroDrive is not suitable for extended use as it is not rated for many hours of continuous operation — its lifetime could be short when used in the X/ProFile. The MicroDrive is suitable as a backup device as long as it is removed from the X/ProFile when the copy is complete.

The built-in Compact Flash socket is configured as the Secondary IDE device. If you do not install a Compact Flash card in the socket, you can connect two devices (one Primary, one Secondary) to the 40 pin IDE connector.

When both primary and secondary devices are connected to the X/ProFile, only one will be available to the computer at a time.

Odd and Even STorage AReas (STARs)

The portion of storage media used for ProFile disk emulation is called a STorage ARea (STAR).

The X/ProFile supports two STARs on each IDE device. These are referred to as the Odd STAR and the Even STAR.

The two STARs can be different sizes, and can contain different operating systems, although only one will be available to the computer at a time.

Each STAR can use, at most, half of an IDE device, regardless of the size of the other STAR.

> The Copy function provides the means to copy one STAR to another. The destination can be the same device (eg. Even to Odd on the Primary device), or one of the STARs on the other device if there is sufficient space (eg. Even on the Primary device to Even on the Secondary device).

STAR Types

Before using the X/ProFile, you must decide which STAR Type you will use.

Use STAR Type 6 if you are unsure which Type to select. In most cases, STAR Type 6 is the best compromise in performance and compatibility. STAR Type 4 makes more efficient use of the storage media, so it may be preferable when a small capacity Compact Flash card is used. If you are using MacWorks Plus II, STAR Type 8 is best.

The STAR Type affects operating system compatibility, how efficiently the storage media is used, and has a minor effect on performance.

The original Apple ProFile used a proprietary storage format which included 20 bytes of additional “tag” data for every 512 data bytes, making each sector on the disk a total of 532 bytes. In contrast, modern IDE devices generally have a sector size of 512 bytes. The X/ProFile provides three different STAR types which accommodate the additional 20 tag bytes in different ways.

Note that each STAR is independent of the other STAR on the same storage media. For example, you can use different STAR Types for the Odd and Even STARs on one Compact Flash card.

STAR Type 4

STAR Type 4 may be a good choice for maximum storage capacity on small IDE devices when using a Lisa, ProDOS, or SOS operating system.

This STAR Type includes support for the 20 extra tag bytes, making it compatible with all software, including Lisa operating systems and ProDOS.

> To provide room for storing the tag bytes, 16 ProFile sectors are stored using 17 IDE device sectors. As a result, about 2% of the IDE device's storage capacity is wasted. This means that a 32 MB compact flash card will provide two STARs of approximately 15 MB of ProFile storage each.
>
> Since more than one set of tag bytes are stored in the 17th sector, there is a degradation in write performance, as the X/ProFile must read the tag sector from the IDE device before writing it back.

STAR Type 6

STAR Type 6 is the best choice when using a Lisa, ProDOS, or SOS operating system and as long as the size of the IDE device is not a concern.

This STAR Type includes support for the 20 extra tag bytes, making it compatible with all software, including Lisa operating systems and ProDOS.

> To provide room for storing the tag bytes, each ProFile sector is stored using two IDE device sectors. As a result, 48% of the IDE device's storage capacity is wasted. This means that a 64 MB compact flash card will provide two STARs of approximately 16 MB of ProFile storage each.

STAR Type 8

STAR Type 8 is recommended for maximum performance and capacity if you are using MacWorks Plus II.

This STAR Type discards the tag bytes, making it incompatible with most operating systems. However, it is compatible with MacWorks Plus II, and by eliminating the storage of tag data on the IDE device, performance is improved.

> Since no extra sectors are used for tag bytes, no storage space is wasted, so a 64 MB compact flash card will provide two STARs of almost 32 MB of ProFile storage each.
>
> As one IDE storage sector is used for each ProFile sector, maximum read and write performance is attained. In addition, copying a STAR is faster.

X/ProFile Display

The X/ProFile includes a single character 7 segment Display beside the reset switch.

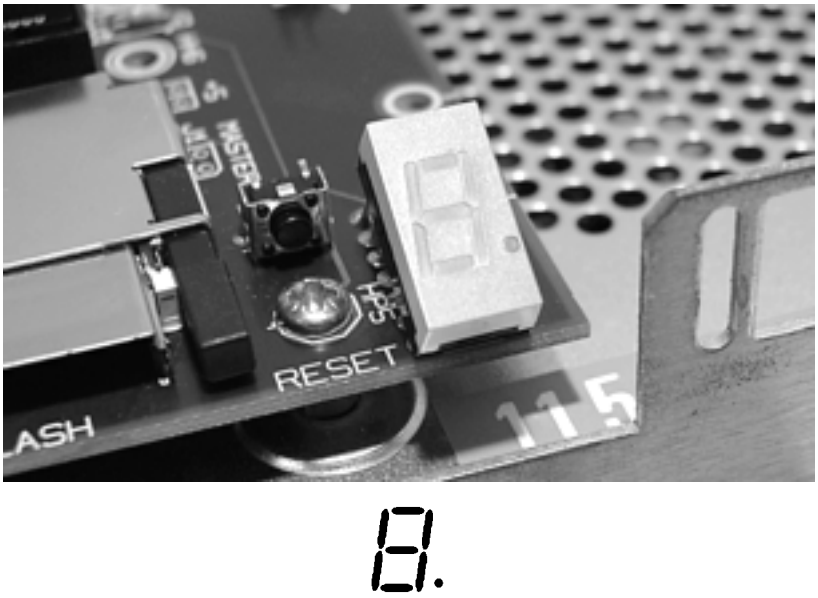

Figure 2. The single character Display beside the X/ProFile RESET switch

Messages are conveyed by briefly displaying one character at a time on the Display. For example, the Display may flash the individual characters S U C C E S S in sequence to indicate a function has completed successfully.

The sequence repeats so that you can read the message again if necessary. Watch for the flash of the READY LED (under the TARGET switch) to determine the start of a Display sequence.

While the GO switch is pressed, messages are displayed more rapidly. This can be helpful to return to part of a message more quickly.

The decimal point illuminates during IDE device activity.

See Appendix A on page 33 for a summary of the characters and messages displayed.

In some cases, the READY LED (either on the front panel of a ProFile case, or under the TARGET switch on the X/ProFile) will flash in a coded pattern. If your X/ProFile is installed in a case where you cannot normally see the single character Display, the repeated pattern of flashes of the READY LED indicates you should check the Display to see the message. See Appendix B on page 35 for a list of flash patterns.

Selecting Functions

X/ProFile functions are selected using the two rotary and push-button switches on the end. The switches used most are labelled MODE, TARGET and GO. There is also a RESET switch between the Compact Flash Eject button and the Display.

Caution: If the front panel of an X/Lisa is removed while the computer is running, power will be disconnected immediately, and any unsaved work in progress will be lost. To avoid lost or damaged files, shutdown the computer properly before removing the front panel to change the switches.

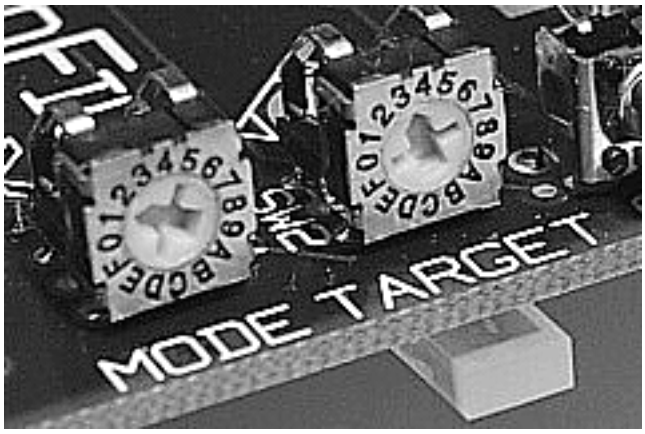

Figure 3. MODE and TARGET rotary switches

Figure 3 shows the MODE switch set to 1, and the TARGET switch set to 3. Use a small flat screwdriver to adjust the switches as desired. It may be helpful to use a magnifying glass to see the dial and pointer/actuator more easily.

As the switch actuator is rotated, a bump in resistance will be felt as the switch enters each detent position. When changing a switch, take care to set the rotary actuator at one of these physical detent positions. If the actuator is left between these positions, the setting is undetermined and may not be as intended. If you are unsure of the switch position, check that the Display indicates what you expected; if not, adjust the switches so that the Display indicates the correct code.

As described in detail below, after setting the MODE and TARGET switches according to the function desired, you will turn on the power to the X/ProFile (or press the reset button). The X/ProFile will perform its power up sequence, and the Display will show the Mode and Target numbers selected. If the settings are not what you intended, check/change the MODE and TARGET switches and wait for the Display to confirm the change.

The MODE switch

The MODE rotary switch has 16 positions, labelled 0-F. This selects the operating mode of the X/ProFile. These functions are described in more detail below.

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 ←

Note that even values select the Primary IDE device, and odd values select the Secondary IDE device.

The TARGET switch

The TARGET rotary switch has 16 positions, labelled 0-F. The function of the TARGET rotary switch depends on the MODE selected. These functions are described below in context.

The GO switch

The GO pushbutton switch is between the TARGET switch and the Compact Flash socket. It may be blue or another colour.

The main function of the GO switch is to provide an opportunity to review and confirm the MODE and TARGET switch settings.

When the X/ProFile recognizes the GO switch is pressed, it will display  , indicating you should release the switch to proceed.

While the GO switch is pressed, messages are displayed more rapidly. This can be helpful to return to part of a message more quickly.

See Appendix C on page 36 for a summary of switch settings.

STAR Preparation

Before the X/ProFile can emulate a ProFile for use by your computer, the X/ProFile must prepare a STAR on the IDE storage device. The preparation process involves writing a small amount of proprietary X/ProFile data to the designated device according to the desired size and type of STAR.

Warning: Preparing a STAR will erase existing data on the IDE device. However preparing the Even STAR on a device does not prepare or otherwise affect the Odd STAR and vice-versa.

To prepare a STAR, it is necessary to specify the maximum size of ProFile storage to emulate, this is the STAR Size.

Note: Some operating systems (Lisa OS and Apple /// SOS for example) do not support a size other than the original Apple ProFile sizes (5 MB and/or 10 MB).

See Appendix F on page 44 for suggested STAR Sizes for common operating systems.

Some operating systems may not be able to use more than 15 bits or two bytes for the sector number, limiting the maximum emulated drive size to 16 or 32 MB.

Before deciding on a STAR size, also consider your backup requirements. If you will want to back-up a large disk to a smaller device such as a Compact Flash card, consider that two STARs must always fit on each device. To make sure everything fits, it may be most efficient to first prepare the STAR on the smaller device (eg. a Compact Flash card that will be used for backup), and then copy the STAR to the larger device for formatting by the operating system. Thereafter, subsequent STAR copies from the larger device to the smaller device will fit.

Sample formatting times

Note that the operating system will need to format/initialize the X/ProFile once it is running; selecting a very large limit can result in a formatting time of a few hours.

Below are sample times observed when formatting under MacWorks Plus II, using the internal port of a stock Lisa 2/10 (no XLerator). Time A is using a Hitachi Deskstar 7200 RPM 160 GB hard disk (circa 2005). Time B is using a Kingston 64 MB Compact Flash card. Formatting/initialization times may be substantially longer under other operating systems and with different IDE devices.

STAR Size	STAR Type	Time A
5 MB	6	< 1 min
10 MB	6	1.5 min
16 MB	6	2.5 min
32 MB	6	5 min
256 MB	8	38 min
2 GB	8	300 min

STAR Size	STAR Type	Time B
10 MB	4	7.3 min
10 MB	6	6.5 min
10 MB	8	1.8 min

TARGET switch settings for STAR Preparation

During STAR preparation, the TARGET switch selects the maximum size of the STAR.

Note: Each STAR can use, at most, half of an IDE device, regardless of the size of the other STAR.

The size set by the TARGET switch is a maximum limit. If the IDE device does not have sufficient room to reach the limit selected, the X/ProFile will configure the STAR to have fewer emulated ProFile sectors so it will fit the available space.

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

For example, to select a 10 MB Odd STAR, set the TARGET switch to 3.

Note that Even values select the Even STAR, and Odd values select the Odd STAR.

> The Sectors and Capacity columns correspond to the emulated ProFile characteristics sent to the computer.
>
> The IDE device size required also depends on the STAR Type selected. For example, if STAR Type 6 is selected, a 5 MB limit requires 10 MB of IDE storage space per STAR, so a 20 MB or larger device would be required to hold the two STARs. See Appendix D for a table of device size vs STAR size.

If you are using driver software that has a hard-coded device size (such as the Apple /// SOS), the computer will not work properly if the STAR is smaller than the limit selected. As a result, you should double check the combination of STAR Type, STAR Size, and IDE device size to make sure the STAR will work as desired.

Having decided on a STAR Size limit, there are two ways to prepare a new STAR: using Auto Prep/Run, or manually as described below.

Auto Prep/Run

In some cases, such as installation in an X/Lisa drive cage, it is awkward to access the switches on the X/ProFile to confirm functions while it is running. To facilitate operating under these circumstances, Auto Prep/Run will prepare a STAR, then begin running.

If you use Auto Prep/Run with an operating system with hard-coded ProFile sizes, double-check that your IDE device is large enough to support STAR Type 6 with the desired size (ie. the IDE device must be at least 20 MB for a 5 MB STAR, and 40 MB for a 10 MB STAR).

To use Auto Prep/Run, set the MODE switch to select the desired device as follows:

2 ↖ Primary Device
3 ↖ Secondary Device

Note: The Compact Flash socket built-in to the X/ProFile is configured as the Secondary device. Devices connected to the 40 pin IDE connector are usually configured as the Primary device.

Set the TARGET switch to select the Even/Odd STAR as desired, and the STAR limit as discussed in "TARGET switch settings for STAR Preparation" above.

When power is applied, the X/ProFile will check the designated STAR.

If the STAR is not valid (ie. the first time this function is performed), the STAR will be prepared automatically. Upon successful completion, the X/ProFile will automatically reset and enter Run mode.

If the STAR is already valid, it will automatically enter Run mode and be ready for normal operation.

Once in Run mode, the X/ProFile is ready for formatting / initialization using the operating system or software specific to your computer. When using your operating system to format the STAR, allow at least 1 minute per MB (although many devices will format more quickly).

> Regardless of the TARGET switch setting, Auto Prep/Run does not replace a pre-existing STAR, eg. when a STAR has been successfully prepared manually prior to selecting Auto Prep/Run, it will be Run as-is.
>
> Auto Prep/Run will Prepare with STAR Type 6 when the STAR size limit is 32MB or less, and STAR Type 8 when the limit is greater than 32 MB. If you wish to use a different STAR Type, you will need to Prepare the STAR manually (as discussed below) instead of using Auto Prep/Run.

Note: Auto Prep/Run will only prepare a STAR with the size selected by the TARGET switch if the STAR has not yet been prepared. This means that you cannot use Auto Prep/Run to change the size of a STAR. To change a STAR, you either need to use the procedure described in "Preparing a STAR Manually", or use the "Erase" function to remove the STAR information so Auto Prep/Run will prepare the STAR again. In lieu of these operations, recall that each device can have two STARs, so it may be expedient to switch to Auto Prep/Run with the Odd STAR if the initial choice of the size of the Even STAR was in error.

Preparing a STAR Manually

When Auto Prep/Run does not provide sufficient control, the STAR can be prepared manually as follows:

Select the desired device and STAR Type using the MODE switch. (Consult "STAR Types" on page 7 if necessary.)

Function	Primary	Secondary
Prep STAR Type 4	4 ↑	5 ↗
Prep STAR Type 6	6 ↗	7 ↗
Prep STAR Type 8	8 →	9 ↘

Even values select the Primary IDE device, and odd values select the Secondary IDE device.

Note: The Compact Flash socket built-in to the X/ProFile is configured as the Secondary device. A device connected to the 40 pin IDE connector is usually configured as the Primary device.

Set the TARGET switch to select the desired STAR Size limit (as discussed in "TARGET switch settings for STAR Preparation" above), as well as the Even/Odd STAR as desired.

After selecting the STAR Type and maximum size using the MODE and TARGET switches, turn on the power to the X/ProFile (or press the reset button if the power is already on).

The X/ProFile will perform its power up sequence, and display the Mode and Target numbers selected.

If the settings are not what you intended, change the MODE/TARGET switch and wait for the Display to confirm the change.

To confirm the switch settings, press and hold the GO switch. When the X/ProFile recognizes the switch is pressed, it will display ⊐, indicating you should release the switch to proceed.

It may take up to a minute for an IDE device to finish its diagnostics and begin operation, or it may proceed immediately. During the diagnostics, the Display will show two vertical bars ||, and the decimal point may light brightly or dimly depending on the IDE device.

The X/ProFile will check the selected device, and display PrEP followed by the STAR Type number, then Pri or SEC, and Ev or Od (Primary/Secondary, and Even/Odd corresponding to the device and STAR selected), followed by r

For example, when preparing an Odd STAR of type 6 on the Secondary device, the Display will show

PrEP-6-SEC Od r

The Display will then repeat. If you change your mind, press the reset button and select a different function.

To continue, hold down the GO switch. The X/ProFile will count down from 5 to 0, then proceed with preparing the STAR. If you release the switch before the count-down is completed, the preparation will be cancelled and the X/ProFile will reset.

During STAR preparation, the Display will show = (this may appear only briefly).

When STAR preparation is complete (after a few seconds), the X/ProFile will display SUCCESS, usually with a prefix as follows:

If the IDE device was larger than necessary, the message will be preceded by an overbar, ie. ‾SUCCESS, indicating that you could select a larger limit if desired and if your operating system would support it.

If the 5 MB limit was selected, but the device is not large enough for such a STAR, the Display will show Lo5-SUCCESS. If you are using an operating system such as the Apple /// SOS or the Lisa OS that has a hard-coded device size, this will not work properly. In this case, try again using a STAR Type of 4, or use a larger IDE device.

If the 10 MB limit was selected, but the device is not large enough for such a STAR, the Display will show Lo 10-SUCCESS. If you are using an operating system such as the Apple /// SOS or the Lisa OS that has a hard-coded device size, this will not work properly. In this case, try again using a STAR Type of 4, or use a larger IDE device, or select the 5 MB limit.

If a limit higher than 10 MB was selected, but the device is not large enough for the STAR to reach that limit, the Display will be preceded by an underscore _SUCCESS indicating that the STAR is smaller than the limit. In this case the STAR can be used with an operating system (such as MacWorks Plus II) that reads the actual device size from the ProFile, as long as the STAR's actual size is within the limits of compatibility of the operating system.

After preparation of the STAR is complete, you can then proceed with another function such as "Running a STAR with the X/ProFile", or turn off the power and continue another time.

Pressing the GO switch while the Display is showing SUCCESS has the same effect as resetting the X/ProFile in preparation for another function.

Note: To use the X/ProFile, it is not necessary to prepare both Odd and Even STARs on a device, or on both Primary and Secondary devices. Only a STAR that you wish to Run needs to be prepared.

Preparing the Even STAR on a device does not prepare or otherwise affect the Odd STAR and vice-versa.

Running a STAR with the X/ProFile

To access the X/ProFile from your computer, the X/ProFile must be operating in Run mode.

After preparing a STAR, it is ready to Run and use with your computer — switch the X/ProFile to Run mode as follows:

Set the MODE switch to select the desired device as follows:

0 ← Primary Device
1 ↖ Secondary Device

Set the TARGET switch to select the desired STAR as follows:

0 ← Even STAR
1 ↖ Odd STAR

Turn on the power, or press RESET if the X/ProFile is already on.

After power-on or reset, it may take up to a minute for an IDE device to finish its diagnostics and begin operation. During this time, the Display will show two vertical bars ||.

After finishing the reset sequence, the X/ProFile Display will usually show a clockwise chase sequence indicating it is running and waiting for a command from the computer.

In some cases where the computer is off, the X/ProFile may be held in a stalled state; when this occurs, the Display may show a counter-clockwise chase sequence, or the Display may appear to be stationary. Start-up the computer's operating system to begin operation.

Once the computer is running, use the tools applicable to your operating system to format the STAR, just as you would with any original Apple ProFile. Consult the documentation for your operating system for directions. When using your operating system to format the STAR, allow at least 1 minute per MB (although many devices will format more quickly).

Caution: The STAR is available to the computer only while the X/ProFile is operating in Run mode. If you wish to use another X/ProFile function to Prepare, Copy, Compare, or adjust Flags of STARs, be sure to unmount (eject, put away, etc.) the ProFile from the computer before switching to another function or mode.

Similarly, once the X/ProFile is running a STAR from a particular device, and the computer has recognized it, do not attempt to change to another STAR without first unmounting (ejecting, putting away, etc.) the ProFile using the computer's operating system.

To be safe, shut-down the computer, then change the X/ProFile settings, and start-up again.

> When experimenting, it may be convenient to use Auto Prep/Run instead of Run mode, as the TARGET switch can be left as-is, and only the MODE switch needs to be changed to 2 (Primary) or 3 (Secondary).
>
> However, Auto Prep/Run will automatically prepare the device when necessary without waiting for confirmation. If there is a risk of inadvertently inserting the wrong Compact Flash card (eg. a camera card), Run mode may be preferable.

Run Mode Display

While running, the X/ProFile Display indicates the operations initiated by the computer. During periods of rapid activity, the Display may be dim or blurred as different characters are displayed in quick succession.

The decimal point of the Display lights to indicate IDE activity. It may be dim if the IDE device responds quickly to requests.

The READY LED is lit unless the X/ProFile is processing a command.

The clockwise chase sequence indicates the X/ProFile is idle, awaiting a command from the computer.

- Three horizontal bars indicate the X/ProFile is being reset by the computer.
- Two vertical bars indicate the X/ProFile is waiting for an IDE device to finish its diagnostics and enter its ready state after a reset.
- The dash indicates the computer is reading the STAR Size and other information.
- The dash with left vertical bar indicates a read operation is in progress.
- The dash with right vertical bar indicates a write operation is in progress.
- The step indicates a write-with-verify operation is in progress.

> "Write with Verify" is typically used only by the Apple][and Apple ///.
>
> A small counter-clockwise chase sequence indicates the computer is holding the "command" or "reset" signal low. This may occur when the computer is off, restarting, or has crashed.

STAR Flags

Each STAR includes some flags that can be set to help prevent inadvertent loss of data.

Flag	Description
Run	When set, the STAR cannot be used in Run mode unless the "over-ride flag?" message is confirmed when prompted. This flag can be used to protect a backup from inadvertent changes due to running it by mistake.
Write	When set, the STAR can be used in Run mode, but data written from the computer to the STAR is ignored. This flag can be used to protect a STAR from inadvertent changes while retaining access to it. Some operating systems may crash or malfunction when attempts to write data to a device fail. If you use this flag, test carefully. There is no over-ride for this flag; it must be cleared to re-enable writing to the STAR.
Copy-To	When set, the STAR cannot be used as the destination for a copy command unless the "over-ride flag?" message is confirmed when prompted. This flag can be used to protect an archive from being over-written inadvertently with the copy command.
Preparation	When set, the STAR cannot be prepared again unless the "over-ride flag?" message is confirmed when prompted. This flag is set automatically when any of the Run, Write, or Copy-To flags is set.
Erase	When set, the device will not be erased with the erase function unless the "over-ride flag?" message is confirmed when prompted. This flag is set automatically when any of the Run, Write, or Copy-To flags is set.

The default for a newly prepared STAR is to have no flags set (all functions permitted).

To examine the current flag settings for a STAR, see the Show STAR Info function below.

STAR Flag Adjustments

To adjust flags for a STAR, select the desired device (primary/secondary), STAR (even/odd), and flag operation as indicated below, then turn on the power or press the RESET button.

The X/ProFile will perform its power up sequence, and display the Mode and Target numbers selected.

If the settings are not what you intended, change the MODE/TARGET switch and wait for the Display to confirm the change.

To confirm the switch settings, press and hold the GO switch. When the X/ProFile recognizes the switch is pressed, it will display  , indicating you should release the switch to proceed.

Set the MODE switch to select the desired device as follows:

0 ← Primary Device
1 ↖ Secondary Device

Set the TARGET switch to select the desired function and STAR as follows:

Function	Even	Odd
Clear All Flags	4 ↑	5 ↗
Set Run Flag	6 ↗	7 ↗
Set Write Flag	8 →	9 ↘
Set Copy-To Flag	A ↘	B ↘

After a STAR flag is adjusted successfully, the X/ProFile will display SUCCESS.

If a problem occurs, an error code will be shown; see Appendix D on page 38.

Pressing the GO switch while the Display is showing SUCCESS has the same effect as resetting the X/ProFile in preparation for another function.

Setting any of the Run, Write, or Copy-To flags will also set the Preparation and Erase flags.

To set more than one of the Run, Write, and Copy-To flags, repeat the Set Flag procedure for each flag you wish to set.

To clear a flag and leave some other flag(s) set, use the Clear All Flags function, then set again the flag(s) you want to remain set.

STAR Flag Over-Ride

When set, a STAR flag restricts the corresponding function.

When attempting to perform those functions, the Display will show Pri or SEC, and En or Od (Primary/Secondary, and Even/Odd corresponding to the device and STAR selected), followed by or-FLAG? This indicates the function is restricted due to the flag set for that STAR.

For example, when a function is restricted by a flag for the Even STAR on the Secondary device, the Display will show

SEC En or-FLAG?

To over-ride the flag and proceed with the function, press and hold the GO switch. The X/ProFile will count down from 5 to 0, then proceed with the function originally selected as usual.

If the GO switch is released before the over-ride count-down is completed, the over-ride will be cancelled and the X/ProFile will display a corresponding error code.

Over-riding a flag does not clear the flag. For example, if the Run flag is set, over-riding the flag will permit running the STAR, but the next time the Run function is invoked, the over-ride will be requested again.

Preparing a STAR and Erasing an IDE device do clear all of the flags on the affected STAR(s). When a STAR is copied, the flags of the destination are cleared, regardless of any flags set in the source STAR. If you want any flags set in the copy, they must be set for the destination STAR after the copy function is completed.

The flag over-ride feature cannot be used to bypass the Write flag.

Show STAR Info

This function displays information about the selected STAR. To activate this function, set the MODE and TARGET switches as indicated below, and turn on the power or press the RESET button.

The X/ProFile will perform its power up sequence, and display the Mode and Target numbers selected.

If the settings are not what you intended, change the MODE/TARGET switch and wait for the Display to confirm the change.

To confirm the switch settings, press and hold the GO switch. When the X/ProFile recognizes the switch is pressed, it will display U, indicating you should release the switch to proceed.

Set the MODE switch to select the desired device as follows:

0 ← Primary Device
1 ↖ Secondary Device

Set the TARGET switch to select the desired STAR as follows:

E ↙ Even STAR
F ↙ Odd STAR

After the IDE diagnostics delay, the X/ProFile will flash the READY LED, then display Pri or SEC (Primary or Secondary, corresponding to the device selected), then En or Od (Even or Odd corresponding to the STAR selected), followed by STAR specific information as indicated by these symbols followed by two hexadecimal digits:

= - The STAR Type, eg. = -06

" - The high byte of the number of ProFile sectors of the STAR, eg. " -00

- - The mid byte of the number of ProFile sectors of the STAR, eg. - -26

_ - The low byte of the number of ProFile sectors of the STAR, eg. _ -00

These are followed by the display of flags for the STAR. Each flag is represented by a single Display character (r, u, c, ı , n, o).

If the flag is set, the character is shown with an overbar (eg. r̄ instead of r).

The default for a newly prepared STAR is to have no flags set.

r Run flag. When set (r̄), the STAR cannot be used in Run mode unless the "over-ride flag?" message is confirmed when prompted.

u Write flag. When set (ū), the STAR can be used in Run mode, but data written to the STAR by the computer is ignored.

c Copy-To flag. When set (c̄), the STAR cannot be used as the destination for the copy function unless the "over-ride flag?" message is confirmed when prompted.

ı Preparation flag. When set (ı̄), the STAR cannot be prepared again unless the "over-ride flag?" message is confirmed when prompted.

- Erase flag. When set (r̄), the device will not be erased with the erase function unless the “over-ride flag?” message is confirmed when prompted.
- Copy-To-Other flag. When set (c̄), the STAR cannot be copied to another IDE device unless the “over-ride flag?” message is confirmed when prompted.

While the GO switch is depressed, messages are displayed more rapidly. This can be helpful to return to part of a message more quickly.

If the corresponding device is missing, not initialized, or generated an error, a corresponding code will be displayed instead of the device specific information. See Appendix D - Error Codes on page 38.

Copying a STAR

Caution: The STAR is available to the computer only while the X/ProFile is in Run mode. If you wish to copy a STAR (or use any other X/ProFile function), be sure to unmount (eject, put away, etc.) the ProFile from the computer before switching from Run mode to the desired function.

It can be useful to duplicate a STAR to make a backup, perform experiments, etc. To copy one STAR to another, proceed as follows:

Set the MODE and TARGET switch to select the source and destination STAR as indicated below, and turn on the power or press the RESET button.

The X/ProFile will perform its power up sequence, and display the Mode and Target numbers selected.

If the settings are not what you intended, change the MODE/TARGET switch and wait for the Display to confirm the change.

To confirm the switch settings, press and hold the GO switch. When the X/ProFile recognizes the switch is pressed, it will display U, indicating you should release the switch to proceed.

MODE	TARGET	Copy Source STAR	To Destination STAR
C ↓	0 ←	Primary, Even	Secondary, Even
C ↓	1 ↖	Primary, Odd	Secondary, Even
C ↓	2 ↖	Primary, Even	Secondary, Odd
C ↓	3 ↖	Primary, Odd	Secondary, Odd
C ↓	E ↙	Primary, Even	Primary, Odd
C ↓	F ↙	Primary, Odd	Primary, Even
D ↙	0 ←	Secondary, Even	Primary, Even
D ↙	1 ↖	Secondary, Odd	Primary, Even
D ↙	2 ↖	Secondary, Even	Primary, Odd
D ↙	3 ↖	Secondary, Odd	Primary, Odd
D ↙	E ↙	Secondary, Even	Secondary, Odd
D ↙	F ↙	Secondary, Odd	Secondary, Even

Other settings of the TARGET switch (4-D) are reserved.

The X/ProFile will check the selected devices, and report error code r-CE if the destination device is too small to hold the STAR. (As detailed above, a device must be large enough to hold two STARs of a desired size.) Other error codes are listed in Appendix D on page 38.

If there is no problem, the Display will show COPY2 followed by Pri or SEC, and Ev or Od (Primary/Secondary, and Even/Odd corresponding to the device and STAR selected), followed by r?

For example, when copying the Even STAR of the Primary device, to the Odd STAR of the Secondary device, the Display will show

COPY2 SEC Odd

The Display will then repeat. If you change your mind, press the reset button and select a different function.

To continue, hold down the GO switch. The X/ProFile will count down from 5 to 0, then proceed with copying the STAR. If you release the switch before the count-down is completed, the copy will be cancelled and the X/ProFile will reset.

During copying, the Display will count down from F to 0 to indicate progress. Depending on the speed of the IDE device(s), a small STAR may take a minute or so to copy, a large STAR may take a few hours.

After the data is copied, the READY LED is illuminated and the STARs are compared to verify that the copy was successful. The Display will count-down again from F to 0 to indicate the progress. You can skip the verification process by pressing reset or the GO switch.

When the STAR copy and verification is completed successfully, the X/ProFile will display SUCCESS. If a problem was detected, an error code will be displayed instead.

Pressing the GO switch while the Display is showing SUCCESS has the same effect as resetting the X/ProFile in preparation for another function.

Comparing STARs

If you wish to compare two STARs to see if they are identical, proceed as follows:

Set the MODE and TARGET switch to select the STARs to compare as indicated below, and turn on the power or press the RESET button.

The X/ProFile will perform its power up sequence, and display the Mode and Target numbers selected.

If the settings are not what you intended, change the MODE/TARGET switch and wait for the Display to confirm the change.

To confirm the switch settings, press and hold the GO switch. When the X/ProFile recognizes the switch is pressed, it will display -, indicating you should release the switch to proceed.

MODE	TARGET	Compare STAR	To STAR
E ↙	0 ←	Primary, Even	Secondary, Even
E ↙	1 ↖	Primary, Odd	Secondary, Even
E ↙	2 ↖	Primary, Even	Secondary, Odd
E ↙	3 ↑	Primary, Odd	Secondary, Odd
E ↙	E ↙	Primary, Even	Primary, Odd
E ↙	F ↙	Primary, Odd	Primary, Even
F ↙	0 ←	Secondary, Even	Primary, Even
F ↙	1 ↖	Secondary, Odd	Primary, Even
F ↙	2 ↖	Secondary, Even	Primary, Odd
F ↙	3 ↑	Secondary, Odd	Primary, Odd
F ↙	E ↙	Secondary, Even	Secondary, Odd
F ↙	F ↙	Secondary, Odd	Secondary, Even

Other settings of the TARGET switch (4-D) are reserved.

During the comparison, the READY LED is illuminated and the Display will count-down from F to 0 to indicate the progress. You can stop the comparison process by pressing reset.

If the STARs contain different data, the error code r-CF will be displayed.

If the STARs compare equal, the X/ProFile will display SUCCESS.

If the STARs cannot be compared because they are different sizes, the error code r-CE will be displayed. Other error codes are listed in Appendix D on page 38.

Pressing the GO switch while the Display is showing SUCCESS has the same effect as resetting the X/ProFile in preparation for another function.

The Compare function compares the data contained in the two STARs, but ignores any STAR flags that may be different.

Note: The Copy function automatically compares STARs after copying to verify the copy was successful.

Erasing an IDE device

Caution: This function erases data, including both the Odd and Even STARs, on the selected device.

If you wish to re-use an IDE storage device on something other than the X/ProFile, you may need to erase the device so that the computer/camera/etc. will conclude it is safe to over-write it.

This function is also useful to clear STARs from a storage device so that Auto Prep/Run will see the media as not having been prepared.

Note: you do not need to use this Erase function to manually prepare the X/ProFile with a new device, STAR Size or STAR Type.

To erase the IDE device:

Set the MODE switch according to the IDE device you wish to erase:

A ↘ Primary
B ↘ Secondary

Set the TARGET switch to select the desired erase mode:

C ↓ All sectors (Erases both Odd and Even STARs)
D ↙ First 256 sectors (Erases both Odd and Even STARs)

Other settings of the TARGET switch (0-B, E-F) are reserved.

Note: Erasing all sectors of a large IDE device will take a long time.

Turn on the power, or press the RESET button. Confirm the Mode/Target choice by pressing the GO button .

The X/ProFile will perform its power up sequence, and display the Mode and Target numbers selected.

If the settings are not what you intended, change the MODE/TARGET switch and wait for the Display to confirm the change.

To confirm the switch settings, press and hold the GO switch. When the X/ProFile recognizes the switch is pressed, it will display 5, indicating you should release the switch to proceed.

The Display will show ErASE-ALL?

The Display will then repeat. If you change your mind, press the reset button and select a different function.

To continue, hold down the GO switch. The X/ProFile will count down from 5 to 0, then proceed with erasing the device. If you release the switch before the count-down is completed, the function will be cancelled and the X/ProFile will reset.

Erase will over-write the selected sectors of the IDE device with zeros.

If “All sectors” was selected, the Display will count down from F to 0 according to the progress.

On completion, the X/ProFile will display SUCCESS.

Pressing the GO switch while the Display is showing SUCCESS has the same effect as resetting the X/ProFile in preparation for another function.

> For compatability with most devices, the X/ProFile uses 28 bit LBA commands. As a result, the Erase function erases the first 268435455 sectors (~130 GB) of larger IDE devices.

X/ProFile Firmware

The X/ProFile electronics includes Firmware (software instructions stored on-board). This Firmware controls the operation of the X/ProFile.

The Firmware version is printed on the label on the Firmware chip.

The last 3 digits of the revision number are shown on the first line of the label. For example "... Rev. 121 ...", which corresponds to a Firmware Info display of H-F 1 L-21

The sub-version number is shown on the last line of the label. For example "-01" which corresponds to a Firmware Info display of L-01

Use the Show Firmware Info function for more detail or if the label is missing or illegible.

You may check whether a new version of the Firmware is available by contacting your supplier, or check the X/ProFile web site at:

www.SigmaSevenSystems.com/xprofile

Show Firmware Info

This function displays information about the X/ProFile Firmware. To activate this function, set the MODE and TARGET switches as indicated below, and turn on the power or press the RESET button.

The X/ProFile will perform its power up sequence, and display the Mode and Target numbers selected.

If the settings are not what you intended, change the MODE/TARGET switch and wait for the Display to confirm the change.

To confirm the switch settings, press and hold the GO switch. When the X/ProFile recognizes the switch is pressed, it will display U, indicating you should release the switch to proceed.

Set the MODE switch as follows:

0 ← Show Info

Set the TARGET switch to select the desired data as follows:

C ↓ Firmware Version
D ↙ Manufacturing Data

The Firmware setting displays information about the X/ProFile Firmware as follows:

H- The high byte of the Firmware revision number, eg. H-F 1

L- The low byte of the Firmware revision number, eg. L-21

U- The command set version that is supported by the Firmware, eg. U-02

h- The high byte of the Firmware sub-version number, eg. h-00

L- The low byte of the Firmware sub-version number, eg. L-01

The revision number will change with significant changes in the Firmware; in particular when changes to the Firmware affect compatibility with STARs made by an earlier version.

The sub-version number will change with less significant changes in the Firmware. ie. those that do not affect compatibility with earlier versions.

The command set version will change if functions are added or if switch positions are modified in the Firmware. To avoid confusion, ensure your manual corresponds to the command set of your Firmware. The front of the manual indicates the applicable command set.

The Manufacturing Data setting displays proprietary information about the Firmware that is unrelated to the function of the X/ProFile. Although unlikely, you may be asked for this information to facilitate investigation of a technical support issue.

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 Installation Manual for instructions.

Trouble-shooting

Isolate the Problem

Disconnect the X/ProFile and see if the computer operates correctly without it.

Conceptual Check

Review the portions of this manual that apply to the function/mode you are using to make sure you are correctly anticipating the results.

Visual Check

Check for damage to the X/ProFile circuit board (eg. deep scratches from tools, abrasion, etc.).

Check cables for broken conductors due to excessive crimping, folding, crushing, etc.

Check cables for short circuits caused by damaged or missing insulation.

Double-check that all cables are inserted in the correct connectors, are fully inserted, and properly aligned (not shifted over by 1 pin).

Power Supply Check

Check the +12 and +5 voltages at the hard disk power connector. These should be within 5% of the nominal voltage. If the voltage is low, there may be a power supply problem or overload.

In an X/Lisa or other computer where the power supply is shared between the computer and X/ProFile, try removing expansion cards, extra memory, etc. to reduce the load on the power supply.

X/Lisa Power Supplies

Problems can be minimized by gently cleaning the gold plated contacts of the edge connectors of the power supply and the card cage motherboard.

The X/Lisa power supply output voltage can be adjusted; contact your supplier for assistance.

When using an X/Lisa, it is recommended that the 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).

When using the Twiggy Power cable, the power available may be less than that required by some of the more “power hungry” 3.5" hard disks due to the small gauge of the ribbon cable conductors. In this case, it may be helpful to provide a different power connection for the hard disk; some X/Lisa expansion cards include a hard disk power connector, contact your supplier for more information.

When the power demands in the computer are unusually high, it can be appropriate to use an external power supply to provide power to the hard disk and/or X/ProFile. Contact your supplier for assistance.

Compact Flash cards have very low power requirements. If the power supply seems marginal, try using a Compact Flash card instead of a hard disk.

Device Check

If you have a hard disk connected to the X/ProFile, disconnect the IDE cable from the X/ProFile and check if the X/ProFile works using a Compact Flash card.

If you have problems with a Compact Flash card, try a different card. There is some variation between brands, so test a card from a different manufacturer when possible.

Intermittent problems

The usual cause of an intermittent problem is a bad cable or contact.

Check that the cables attached to the X/ProFile are fully inserted and not crimped or damaged.

If the parallel cable between the X/ProFile and the computer is too long or of poor quality, problems may arise. Try a different cable, as short as possible. Try an original Apple ProFile shielded cable. Try repositioning the cable to avoid sources of electrical interference (monitors, transformers, etc.)

If the computer and X/ProFile have separate power supplies, make sure they are connected to the same electrical circuit. To be sure there are no problems caused by ground potential differences between electrical outlets, connect everything to one power bar.

Persistent problems

If a hardware problem persists, disconnect the X/ProFile and see if the computer operates correctly without it. If the computer behaves correctly without the X/ProFile, check for obvious damage to the X/ProFile board. Check that the cables are properly seated. If the X/ProFile board passes this inspection, re-connect it and test the computer again. If the problem recurs, remove the IDE storage devices and try a known-good IDE storage device. If the board fails a visual inspection or if the problem persists, call your supplier for technical support and to receive return authorization before you return the X/ProFile.

Reporting a problem

If no clear cause of a problem is found, record a precise method of recreating the failure, its frequency, your system configuration (Computer type, amount of RAM in memory slots, expansion cards, operating system version, etc.). Report this information to whomever you purchased the X/ProFile from or their designated technical support staff. Consider that in the case of problems not previously reported, the time it will take to provide a solution to a problem is often related to how much relevant and accurate information you can supply.

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.
Hot Swap	Hot Swap - Changing a component such as a hard disk or Compact Flash card while the unit is running (eg. without turning off the power). The X/ProFile does not support changing devices while the power is on.
IDE	Integrated Drive Electronics - A common 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”.
RAM	Random Access Memory - the main memory of the computer, erased when the computer is turned off.
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.

Appendix A - Display Codes

The decimal point of the Display indicates IDE activity.

While the GO switch is depressed, messages are displayed more rapidly. This can be helpful to return to part of a message more quickly.

The following digits appear on the X/ProFile Display to communicate hexadecimal numbers. Some of these figures are also used for reporting error conditions, in which case the figure precedes the dash rather than following it.

Hexadecimal Digits

0	4	8	C
1	5	9	D
2	6	A	E
3	7	b	F

The following messages and codes are used by the X/ProFile, watch for the flash of the READY LED to determine the start of a Display sequence.

Message	Description
or-FLAG?	(Over-Ride Flag?) A flag is set that restricts the selected function, press the GO switch to over-ride the flag and proceed with the function.
Er ASE-ALL?	X/ProFile is waiting for confirmation to erase the IDE device.
SUCCESS	X/ProFile has completed the selected function. When preparing a STAR, this may be preceded by a qualifier as follows:
¯SUCCESS	(Overbar) Precedes SUCCESS to indicate the IDE device is larger than the selected STAR limit. Hence a larger STAR limit could be selected if the operating system supports it.
_SUCCESS	(Underscore) Precedes SUCCESS to indicate the IDE device is smaller than the selected STAR limit. This is not a problem if the operating system to be used supports intermediate sizes of ProFiles.
Lo5-SUCCESS	Lo5- Precedes SUCCESS to indicate the IDE device is too small for a 5 MB STAR. Use a larger device or try STAR Type 4.
Lo 10-SUCCESS	Lo10- Precedes SUCCESS to indicate the IDE device is too small for a 10 MB STAR. Specify the 5 MB limit, use a larger device, or try STAR Type 4.
Pr EP	STAR preparation has been selected; the indicated STAR will be prepared for use with the type displayed.
COPY?	Copy function has been selected, the indicated STAR will be overwritten.

Display	Description
r	Read in progress
W	Write in progress
V	Write with Verify in progress
=	X/ProFile reset in progress
II	Waiting for IDE diagnostics to complete
Pri	Primary (Master) device prefix
SEC	Secondary (Slave) device prefix
En	Even STAR prefix
Od	Odd STAR prefix
=	Preparing STAR
U	GO button is pressed... release it

When displaying STAR information, the following codes are used:

=-	STAR Type follows (4, 6 or 8)
--	The high byte of the number of ProFile sectors follows
--	The mid byte of the number of ProFile sectors follows
--	The low byte of the number of ProFile sectors follows
r	Run flag is not set - this STAR can be used in Run mode
r	Run flag is set - this STAR cannot be used in Run mode unless over-ride is selected
w	Write flag is not set - this STAR can be written-to in Run mode
w	Write flag is set - this STAR cannot be written-to in Run mode (data written by the computer will be ignored)
c	Copy-To flag is not set - this STAR can be replaced via the Copy function
c	Copy-To flag is set - this STAR cannot be replaced via the Copy function unless over-ride is selected
p	Preparation flag is not set - this STAR can be replaced via the STAR prep function
p	Preparation flag is set - this STAR cannot be replaced via the STAR prep function unless over-ride is selected
e	Erase flag is not set - the IDE device can be erased
e	Erase flag is set - the IDE device cannot be cleared with the Erase function unless over-ride is selected
o	Copy-To-Other flag is not set - this STAR can be copied to other IDE devices
o	Copy-To-Other flag is set - this STAR cannot be copied to another IDE device unless over-ride is selected

Appendix B - Flash Codes

The X/ProFile will flash the READY LED to indicate a condition requiring your attention. When this occurs, check the Display for further information.

Sequence	**Description**
short long short	See message on Display and/or waiting for switch
long short long short	Prep command
long short short	Copy command
short long short short	Compare command
long long long short short	Compare failed
short long long short	Erase command
long short	Flag Adjust command
long long short short	IDE Error
long long long short short short	Error
long long short short long short short	Firmware Stack OverFlow

Appendix C - Summary of Switch Settings

These MODE and TARGET switch settings apply to Command Set 02. You can determine the version of the command set supported by your X/ProFile via the Show Firmware Info function on page 28.

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

MODE and TARGET switch settings for Erase (both Even and Odd)

MODE	Device	Erase	TARGET
A ↘	Primary	All sectors	C ↓
A ↘	Primary	256 sectors	D ↙
B ↘	Secondary	All sectors	C ↓
B ↘	Secondary	256 sectors	D ↙

MODE and TARGET switch settings for Copy

MODE	TARGET	Copy Source STAR	To Destination STAR
C ↓	0 ←	Primary, Even	Secondary, Even
C ↓	1 ↖	Primary, Odd	Secondary, Even
C ↓	2 ↖	Primary, Even	Secondary, Odd
C ↓	3 ↖	Primary, Odd	Secondary, Odd
C ↓	E ↙	Primary, Even	Primary, Odd
C ↓	F ↙	Primary, Odd	Primary, Even
D ↙	0 ←	Secondary, Even	Primary, Even
D ↙	1 ↖	Secondary, Odd	Primary, Even
D ↙	2 ↖	Secondary, Even	Primary, Odd
D ↙	3 ↖	Secondary, Odd	Primary, Odd
D ↙	E ↙	Secondary, Even	Secondary, Odd
D ↙	F ↙	Secondary, Odd	Secondary, Even

MODE and TARGET switch settings for Compare

MODE	TARGET	Compare STAR	To STAR
E ↙	0 ←	Primary, Even	Secondary, Even
E ↙	1 ↖	Primary, Odd	Secondary, Even
E ↙	2 ↖	Primary, Even	Secondary, Odd
E ↙	3 ↖	Primary, Odd	Secondary, Odd
E ↙	E ↙	Primary, Even	Primary, Odd
E ↙	F ↙	Primary, Odd	Primary, Even
F ↙	0 ←	Secondary, Even	Primary, Even
F ↙	1 ↖	Secondary, Odd	Primary, Even
F ↙	2 ↖	Secondary, Even	Primary, Odd
F ↙	3 ↖	Secondary, Odd	Primary, Odd
F ↙	E ↙	Secondary, Even	Secondary, Odd
F ↙	F ↙	Secondary, Odd	Secondary, Even

Appendix D - Error Codes

If an error occurs, the X/ProFile will stop the function it was performing and display information regarding the error. The Display will repeat until the X/ProFile is reset. Watch for the flash of the READY LED to determine the start of a Display sequence.

While the GO switch is depressed, messages are displayed more rapidly. This can be helpful to return to part of a message more quickly.

As it may be difficult to reproduce an error, always write down the error codes that occur before resetting the X/ProFile. When requesting technical support, it may also be necessary to provide information regarding the IDE device(s) you were using when the error occurred, and the MODE and TARGET switch settings.

Some types of errors produce more than one piece of information. Each piece of error information is composed of a prefix followed by a dash and a pair of hexadecimal digits.

Prefixes used for error reporting are as follows:

Prefix	Description
r -	prefix for X/ProFile error code (see list below)
n -	prefix for additional data
u -	prefix for IDE Status register data
o -	prefix for IDE Error register data
c -	prefix for count overrun data
H -	prefix for high byte of address or Firmware revision
L -	prefix for low byte of address or Firmware revision
h -	prefix for high byte of calling address
l -	prefix for low byte of calling address

The following error numbers will be preceded by r -

Error	Name	Description
11	BadMode	unimplemented mode selected
12	BadTarget	unimplemented target setting for the mode selected
20	CannotRun	Cannot perform the requested action (unknown reason)
21	CRNoDevice	Storage device is missing/not responding (check cables, master/slave jumper)
22	CRNoLBA	Storage device does not support Logical Block Addressing (use a newer device)
25	CRNoSTAR	STAR does not appear to have a valid STAR signature
26	CRSTARCRCFailed	STAR checksum is incorrect
28	CRSTARVersionTooNew	STAR requires a newer version of firmware
2A	CRSTARTypeUnknown	STAR Type is unrecognized
2C	CRPrivilegeFlagSet	STAR is flagged to not permit the action and override was not permitted/selected

30	CannotErase	Cannot perform the requested action (unknown reason)
31	CENoDevice	Device is missing/not responding (check cables, master/slave jumper)
32	CENoLBA	Device does not support Logical Block Addressing (use a newer device)
35	CENoSTAR	STAR does not appear to have a valid STAR signature
36	CESTARCRCFailed	STAR checksum is incorrect
38	CESTARVersionTooNew	STAR requires a newer version of firmware
3A	CESTARTypeUnknown	STAR Type is unrecognized
3C	CEPrivilegeFlagSet	STAR is flagged to not permit the action and override was not permitted/selected
40	CannotPrep	Cannot perform the requested action (unknown reason)
41	CPNoDevice	Device is missing/not responding (check cables, master/slave jumper)
42	CPNoLBA	Device does not support Logical Block Addressing (use a newer device)
45	CPNoSTAR	STAR does not appear to have a valid STAR signature
46	CPSTARCRCFailed	STAR checksum is incorrect
48	CPSTARVersionTooNew	STAR requires a newer version of firmware
4A	CPSTARTypeUnknown	STAR Type is unrecognized
4C	CPPrivilegeFlagSet	STAR is flagged to not permit the action and override was not permitted/selected
50	CannotCopy	Cannot perform the requested action (unknown reason)
51	CCNoDevice	Device is missing/not responding (check cables, master/slave jumper)
52	CCNoLBA	Device does not support Logical Block Addressing (use a newer device)
55	CCNoSTAR	STAR does not appear to have a valid STAR signature
56	CCSTARCRCFailed	STAR checksum is incorrect
58	CCSTARVersionTooNew	STAR requires a newer version of firmware
5A	CCSTARTypeUnknown	STAR Type is unrecognized
5C	CCPrivilegeFlagSet	STAR is flagged to not permit the action and override was not permitted/selected
60	CannotCompare	Cannot perform the requested action (unknown reason)
61	CVNoDevice	Device is missing/not responding (check cables, master/slave jumper)
62	CVNoLBA	Device does not support Logical Block Addressing (use a newer device)
65	CVNoSTAR	STAR does not appear to have a valid STAR signature
66	CVSTARCRCFailed	STAR checksum is incorrect

68	CVSTARVersionTooNew	STAR requires a newer version of firmware
6A	CVSTARTypeUnknown	STAR Type is unrecognized
6C	CVPrivilegeFlagSet	STAR is flagged to not permit the action and override was not permitted/selected
70	CannotFlag	Cannot perform the requested action (unknown reason)
71	CFNoDevice	Device is missing/not responding (check cables, master/slave jumper)
72	CFNoLBA	Device does not support Logical Block Addressing (use a newer device)
75	CFNoSTAR	STAR does not appear to have a valid STAR signature
76	CFSTARCRCFailed	STAR checksum is incorrect
78	CFSTARVersionTooNew	STAR requires a newer version of firmware
7A	CFSTARTypeUnknown	STAR Type is unrecognized
7C	CFPrivilegeFlagSet	STAR is flagged to not permit the action and override was not permitted/selected
C1	PRead_1	IDE error stage 1 in ProFile read command
C2	PRead_2	IDE error stage 2 in ProFile read command
C3	PRead_3	IDE error stage 3 in ProFile read command
C4	PRead_4	IDE error stage 4 in ProFile read command
C5	PRead_T	IDE error reading tags for ProFile read command
CE	DestinationTooSmall	Cannot Copy or Compare as destination device is too small for size of STAR
CF	CompareFailed	Compare failed, source and destination STARs are not equal
D0	PWrite_1	IDE error stage 1 in ProFile write command
D1	PWrite_2	IDE error stage 2 in ProFile write command
D2	PWrite_3	IDE error stage 3 in ProFile write command
D3	PWrite_4	IDE error stage 4 in ProFile write command
D4	PWrite_5	IDE error stage 5 in ProFile write command
D5	PWrite_D	IDE error writing data block in ProFile write command
D6	PWrite_T	IDE error writing tag block in ProFile write command
D7	PWrite_TR	IDE error reading tag block in ProFile write command
D8	PWrite_TW	IDE error rewriting tag block in ProFile write command
DA	IDESelectFailed	unable to select IDE device
DB	IDESelectReset	soft reset after attempting to select IDE device failed
DC	IDENotReady	IDE device did not come ready in time
DD	IDENotReady_ReadDataEntry	IDE device did not come ready for read block
DE	IDECommand_Read	IDE device did not accept read command
DF	IDENotDRQ_ReadDataExit	IDE device did not complete read block

E0	IDENotReady_WriteDataEntry	IDE device did not come ready for write block
E1	IDECommand_Write	IDE device did not accept write command
E2	IDENotDRQ_WriteDataExit	IDE device did not complete write block
E3	IDENotReady_VerifyDataEntry	IDE device did not come ready for verify block
E4	IDECommand_Verify	IDE device did not accept read command for verify
E5	IDENotDRQ_VerifyDataExit	IDE device did not complete verify block
E6	LoadSTAREntry	IDE device load STAR failed to come ready
E7	LoadSTARCommand	IDE device load STAR command error
E8	LoadSTARTransfer	IDE device load STAR transfer failed
E9	LoadSTARRead2	IDE device load STAR failed to come ready for second read
EA	LoadSTARCommand2	IDE device load STAR command error for second read
EB	LoadSTARTransfer2	IDE device load STAR transfer failed for second read
EC	LoadSTARComplete	IDE device load STAR failed to complete
ED	IdentifyDevice	identify device command failed
EE	IdentifyDeviceDRQ	identify device command did not transfer a whole block
EF	IdentifyDeviceExit	identify device command did not complete successfully
F0	IdentifyDeviceTransfer	identify device transfer failed
F1	IDENotReady_EraseEnd	Erase device did not complete as expected
F2	IDEResetFailed	failed to reset IDE bus
F3	Brownout	brownout reset (under-voltage condition), check power supply
F4	LowVoltageDetect	under-voltage, check power supply
F5	SpuriousCMDInterrupt	unexpected CMD interrupt
F6	SpuriousTimerInterrupt	unexpected timer interrupt
F7	Surprise	unexpected error condition
F8	IDESoftResetFailed	unable to perform soft reset of IDE devices
F9	IDEHardResetFailed	unable to reset IDE bus, no devices attached?
FA	Asleep	processor took an unscheduled nap
FB	LowPriorityInterrupt	unexpected low priority interrupt
FC	UnknownInterrupt	unexpected high priority interrupt
FD	InterruptDispatcher	interrupt has the unknown dispatch code shown
FE	StackOverflow	stack overflowed
FF	StackUnderflow	stack underflowed

Appendix E - IDE size vs STAR Size

The X/ProFile reserves space for two STARs (Odd and Even) on each IDE device.

The maximum space available for a STAR is half of the size of the IDE device, regardless of the size of the other STAR.

Depending on the type of STAR, the space required to store each STAR on the IDE device may be 6% or 100% larger than the STAR capacity.

Combining the factors of two STARs per device and STAR Type, the IDE device must be approximately 2 to 4 times larger than the desired size of STAR.

STAR Type	ProFile Size	ProFile Blocks	Minimum IDE Device Size		
			Blocks (Hex)	Blocks (Dec)	Approx.‡
4	5 MB	2600	5180	20864	~ 10.5 MB
4	10 MB	4C00	A240	41536	~ 20.8 MB
4	16 MB	7FF0	1109E	69790	~ 34.9 MB
4	32 MB	FFF0	2209E	139422	~ 69.8 MB
4	256 MB	7FFF0	11009E	1114270	~ 558 MB
4	2 GB	3FFFF0	88009E	8913054	~ 4.5 GB
6	5 MB	2600	98C0	39104	~ 19.6 MB
6	10 MB	4C00	130C0	78016	~ 39.1 MB
6	16 MB	7FF0	20080	131200	~ 65.6 MB
6	32 MB	FFF0	40080	262272	~ 131.2 MB
6	256 MB	7FFF0	200080	2097280	~ 1.04 GB
6	2 GB	3FFFF0	1000080	16777344	~ 8.4 GB
8	5 MB	2600	4CC0	19648	~ 9.9 MB
8	10 MB	4C00	98C0	39104	~ 19.6 MB
8	16 MB	7FF0	100A0	65696	~ 32.9 MB
8	32 MB	FFF0	200A0	131232	~ 65.7 MB
8	256 MB	7FFF0	1000A0	1048736	~ 525 MB
8	2 GB	3FFFF0	8000A0	8388768	~ 4.2 GB

‡ Marketing materials for storage devices sometimes use a factor of 1000 instead of 1024 when calculating MB or GB of storage capacity. For this table only, the approximate size is calculated using 1024 bytes per K, 1000 K per M, and 1,000,000 K per G. This overstates the requirement for those devices whose advertised capacity is calculated as 1024 * 1024 bytes per MB, but understates the requirement for devices calculated as 1000 * 1000 bytes per MB.

As the operating systems that can use large STARs are also the ones that read the actual size of the ProFile, it is probably not an issue whether a large STAR is 250 MB or 256 MB. However, if you need a particular size of STAR, double-check the actual number of 512 byte blocks of your IDE device rather than interpreting the advertised capacity in KB or MB.

There is overhead of approximately 96 KB for partition information so the space available for a STAR is actually 48 KB less than half the size of the IDE device.

To calculate the precise size of IDE device required for an specific size of STAR, use one of the following formulas (numeric constants are in hexadecimal form). These formulas include the fact that two STARs must fit on the device.

Type	**IDE device size required (blocks)**
4	[(Number of ProFile blocks) * 2000 / F0F] + C0
6	[(Number of ProFile blocks) * 4] + C0
8	[(Number of ProFile blocks) * 2] + C0

Decimal equivalents: $C0 = 192, $F0F = 3855, $2000 = 8192

Determining STAR Type based on IDE device size and desired STAR Size

When manually preparing a STAR with a particular size in mind, it may be appropriate to decide on the Type based on the size of media. For example:

5 MB desired STAR Size

Storage Media > 20MB	Use STAR Type 6
Storage Media < 20 MB, and > 11 MB	Use STAR Type 4
Storage Media < 11 MB	Use larger Storage Media

10 MB desired STAR Size

Storage Media > 40MB	Use STAR Type 6
Storage Media < 40 MB, and > 21 MB	Use STAR Type 4
Storage Media < 21 MB	Use larger Storage Media or consider 5MB STAR Size

32 MB desired STAR Size

Storage Media > 132 MB	Use STAR Type 6
Storage Media < 132 MB, and > 70 MB	Use STAR Type 4
Storage Media < 70 MB	Use larger Storage Media or accept STAR < 32 MB

For other STAR Sizes, and more precise guidelines, use the larger table at the beginning of Appendix E.

Appendix F - Suggested STAR Sizes for Common Operating Systems

Some operating systems have ProFile drivers that are hard-coded to a specific size (ie. 5 MB or 10 MB), other drivers read the actual size from the ProFile, but are limited to the maximum number of sectors they support.

This table shows suggested STAR Size limits for common operating systems. Note that these limits were determined by experiment, so there may be cases where different limits should be used.

Where the minimum is shown as < 5 MB, the practical limit depends on the amount of disk space needed by the operating system for directory overhead, etc.

Operating System	**Max.**	**Min.**	**Note**
Lisa 1.0	5 MB	5 MB	(1)
Lisa 2.0	10 MB	5 MB	(1)
Lisa 3.0	10 MB	5 MB	(1)
Lisa 3.1	10 MB	5 MB	(1)
MacWorks XL 3.0	16 MB	< 5 MB	(3) (4)
MacWorks Plus 1.0.18	32 MB	< 5 MB	(4)
MacWorks Plus 1.1h	2 GB	< 5 MB	(4)
MacWorks Plus II 2.x	2 GB	< 5 MB	(4)
Apple][ProDOS	32 MB	< 5 MB	(4)
Apple /// SOS	10 MB	5 MB	(1) (2)

Notes:

(1) Drivers for this operating system are hard-coded and expect ProFiles to be an exact size. Using a size other than the Max/Min indicated may cause a crash or malfunction.

(2) The Apple /// has different drivers for 5MB and 10 MB ProFiles, always use the corresponding size of STAR for the driver in use.

(3) It appears that the driver in MacWorks XL 3.0 may support a disk of 32 MB, however the Macintosh File System (MFS) has a limit of 20 MB. Selecting a 16 MB limit will provide compatibilty with most early Macintosh System versions under MacWorks XL 3.0.

(4) This operating system reads the actual size of the ProFile, so arbitrary sizes between the minimum and maximum sizes are supported.

Appendix G - QuickStart

After installing the X/ProFile, you might use the following procedure to get up and running quickly. This is not a substitute for reading the manual and understanding the features and limitations of the X/ProFile.

In particular, if you plan to use the X/ProFile Copy feature to back-up your STARs, you may want to pick a smaller size limit so that the STARs will fit on your backup media.

Easy X/ProFile Decision Tree

This decision tree assumes a typical configuration suited to Auto Prep/Run.

i) Select MODE switch to the Auto Prep/Run function according to the storage device...

Using Compact Flash socket?	Set MODE switch to 3
Using device connected to IDE Cable?	Set MODE switch to 2 Assumes device jumpers set to Primary (Master)

ii) Set TARGET switch according to the desired STAR Size...

If you do not already know what size of STAR you wish to use, see "(iv) Selecting a suitable STAR Size for your operating system" below.

TARGET switch values shown are for the Even STAR.
To use the Odd STAR, add 1 to the TARGET value.

5 MB Limit	Set TARGET to 0 Storage Media must be > 20 MB
10 MB Limit	Set TARGET to 2 Storage Media must be > 40 MB
16 MB Limit	Set TARGET to 4 If the storage media is > 66 MB, the full 16 MB STAR will be attained. If the media capacity is < 66 MB, the STAR will be less than 16 MB.
32 MB Limit	Set TARGET to 6 If the storage media is > 132 MB, the full 32 MB STAR will be attained. If the media capacity is < 132 MB, the STAR will be less than 32 MB.
2 GB Limit	Set TARGET to A If the storage media is > 4.2 GB, the full 2 GB STAR will be attained. If the media capacity is < 4.2 GB, the STAR will be less than 2 GB. Using a smaller limit will make formatting/initializing the disk and backing up the STAR much faster.

iii) X/ProFile is ready to Auto Prep/Run

After setting the MODE and TARGET switches as determined above, turn on the power to the X/ProFile.

When power is applied, the X/ProFile will check the designated device (Primary/Secondary) and STAR (Even/Odd).

If the STAR is not valid (ie. the first time this function is performed), the STAR will be prepared automatically. Upon successful completion, the X/ProFile will automatically reset and enter Run mode.

If the STAR is already valid, it will automatically enter Run mode and be ready for normal operation.

Once in Run mode, the X/ProFile is ready for formatting / initialization using the operating system or software specific to your computer. When using your operating system to format the STAR, allow at least 1 minute per MB (although many devices will format more quickly).

Note: Auto Prep/Run will only prepare a STAR with the size selected by the TARGET switch if the STAR has not yet been prepared. This means that you cannot use Auto Prep/Run to change the size of a STAR. To change a STAR, you either need to use the procedure described in "Preparing a STAR Manually", or use the "Erase" function to remove the STAR information so Auto Prep/Run will prepare the STAR again. In lieu of these operations, recall that each device can have two STARs, so it may be expedient to switch to Auto Prep/Run with the Odd STAR if the initial choice of the size of the Even STAR was in error.

iv) Selecting a suitable STAR Size for your operating system

Locate your Computer Operating System below, and note the recommended Limit and comments.

Apple][ProDOS	Use 32 MB Limit or less Consider using a smaller limit if you wish to backup to a Compact Flash card under 132 MB.
Apple /// SOS	Use 5 MB or 10 MB Limit Must use exactly 5 MB or 10 MB; the size must correspond to the SOS driver you are using. If possible, check that the Prep result does not show Lo5 or Lo10 or an error will occur when the driver attempts to write past the end of the disk.

X/Lisa with MacWorks Plus II	Use 2 GB Limit or less Using a smaller limit can make initializing the disk and backing up the STAR much faster, and allow backup to a Compact Flash card.
X/Lisa with MacWorks Plus 1.1h	Use 2 GB Limit or less Using a smaller limit can make initializing the disk and backing up the STAR much faster, and allow backup to a Compact Flash card.
X/Lisa with MacWorks Plus 1.0.18	Use 32 MB Limit or less Consider using a smaller limit if you wish to backup to a Compact Flash card under 132 MB.
X/Lisa with MacWorks XL 3.0	Use 16 MB Limit or less Consider using a smaller limit if you wish to backup to a Compact Flash card under 66 MB.
X/Lisa with Lisa Office System 1.0	Use 5 MB Limit Must use exactly 5 MB. If possible, check that the Prep result does not show Lo5 or Lo10 or an error will occur during initialization when the driver attempts to write past the end of the disk.
X/Lisa with Lisa Office System 2.0 and up	Use 5 MB or 10 MB Limit Must use exactly 5 MB or 10 MB. If possible, check that the Prep result does not show Lo5 or Lo10 or an error will occur during initialization when the driver attempts to write past the end of the disk.
Computer/Operating System not listed	Start with the 5MB Limit (the most common ProFile size) or contact your supplier to discuss compatibility. If possible, check that the Prep result does not show Lo5 or an error may occur if the driver attempts to write past the end of the disk.

Frequently Used Switch Settings

(Complete list on pages 36-37)

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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