X/ProFile™
Regulator

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
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Introduction

Thank you for purchasing your X/ProFile Regulator. Your X/ProFile Regulator provides voltage regulation for an X/ProFile installed in an original Apple ProFile case to be used by the Lisa, Macintosh XL, Apple][and Apple /// computers.

The X/ProFile Regulator features:

   1: Voltage regulation and over-voltage protection

   2: Cooling fan

   3: Convenient mounting of a 2.5" or 3.5" hard drive

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.

For the Latest 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.

Compatibility

The X/ProFile Regulator is designed for use solely with an original Apple ProFile power supply (typically labelled ASTEC AA11771). This Apple ProFile power supply has a nominal output rating of +5V@2.0A and +12V@1.5A. Using a different power supply with a higher rating or different regulation characteristics might destroy the X/ProFile Regulator within seconds.

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. Being involved in the installation yourself (even as an observer) will give you extra knowledge and confidence should a problem arise later. Installation can be provided for shipping and handling costs, but contact your supplier first for special instructions and "return" authorization. If you have a particular concern, contact your supplier for technical support.

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

X/ProFile Regulator Connectors

Before installation, familiarize yourself with the various components of the X/ProFile Regulator shown in Figures 1 and 2.
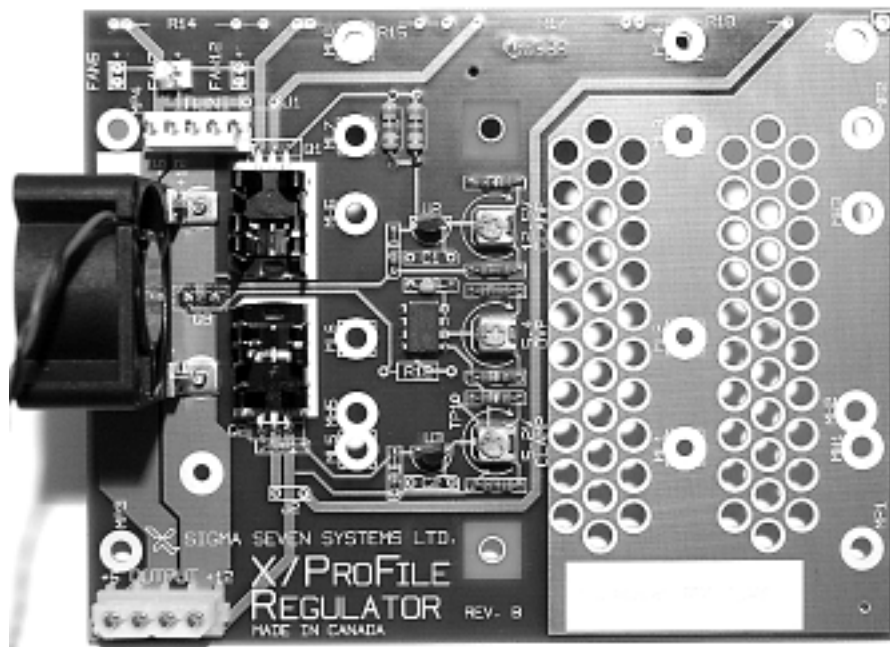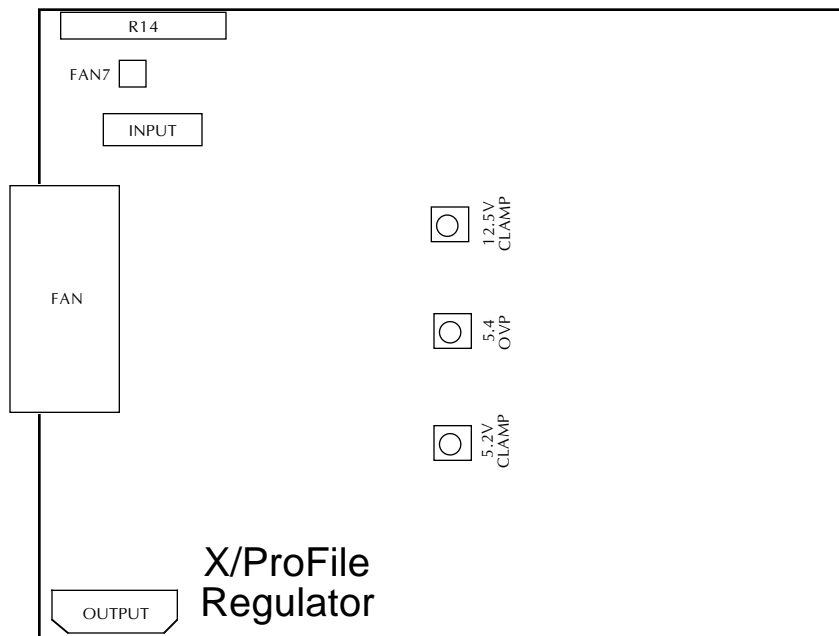

Figure 1. X/ProFile Regulator circuit board

Figure 2. Major parts of the X/ProFile Regulator

The INPUT connector is connected to the original ProFile power supply.

The FAN7 connector provides power to the fan.

The OUTPUT connector provides regulated power to the X/ProFile.

Caution: There are adjustments labelled 5.2V CLAMP, 12.5V CLAMP, and 5.4 OVP. These are set at the factory for proper performance. Do not alter these adjustments, as improper voltages may result, causing damage to the X/ProFile and IDE device(s).

Preparing the Apple ProFile case

Removing the Top Cover

Disconnect any cables from the ProFile, and place it upside down on a flat, soft surface.
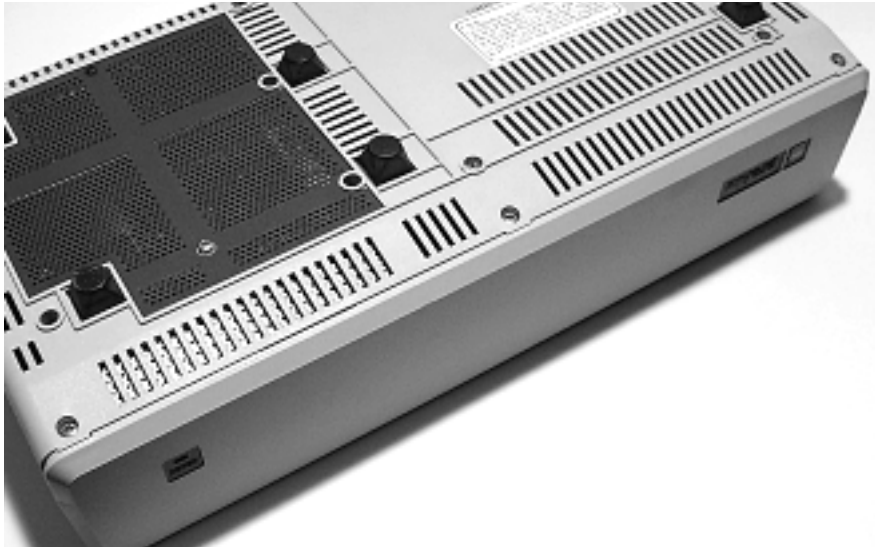
Figure 3. ProFile inverted

As show in Figure 4, remove the three screws from the bottom along the front edge of the case.

Figure 4. Removing the top cover screws

Figure 5. Removing the escutcheon plate screws

While holding the top and bottom of the case together, turn the ProFile right-side up. Orient the ProFile so you can access the rear.

As shown in Figures 5 and 6, remove the two screws at the top of an escutcheon plate, then remove it by tilting out the top edge then lifting the plate.

Repeat to remove the other rear escutcheon plate. Set the plates aside.

Figure 6. After removing the screws, the escutcheon plate is lifted out

Figure 7. Raising the rear of the top cover

As shown in Figure 7, start to remove the top cover by lifting it from the rear. Be gentle as the old plastic parts may be brittle.

Note: Inside, there is a small cable attaching the top cover to the ProFile controller board. Do not withdraw the top cover suddenly.


Figure 8. The top cover comes free after the latches at the front disengage

With some encouragement, the top cover will detach from the latches at the front of the ProFile. You may need to pull out the bottom of the front edge of the top cover slightly. When it comes free, continue to rotate the top cover upwards from the rear, keeping the front close to the ProFile chassis. While moving the top cover, minimize the strain on the cable connecting the top cover to the controller board.

Position the top cover upside down in front of the ProFile chassis.

Locate the thin cable that connects the top cover to the controller board. This cable is for the READY LED on the front panel.
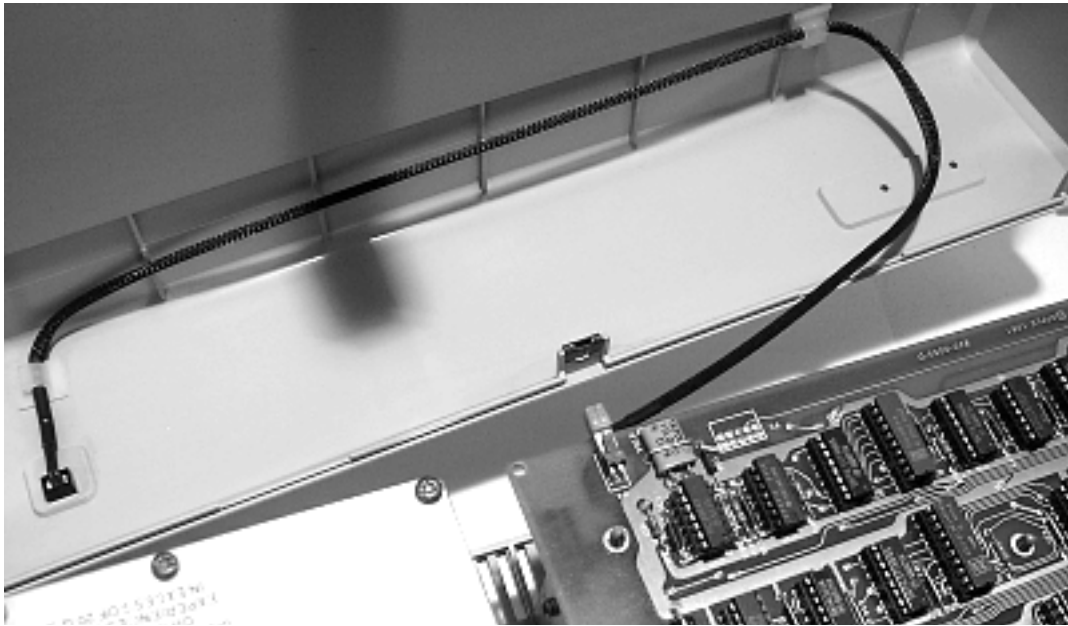
Figure 9. Identifying the READY LED cable
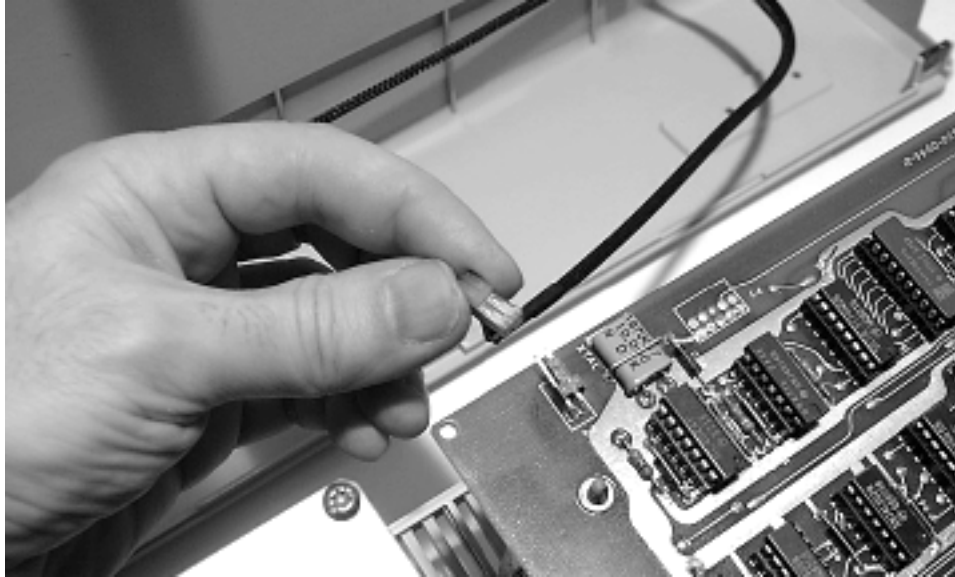
Figure 10. Disconnecting the READY LED cable

As shown in Figure 10, grasp the connector for the READY LED cable and disconnect it from the controller board by pulling horizontally away from the controller board. Do not pull on the cable itself or the connector may detach from the wires.

Put the top cover aside.

Preserving the Old Hard Disk

As shown in Figures 11 and 12, after the top cover has been removed, the hard disk assembly is exposed such that the head position motor can be rotated by accident.

As noted on the side of the hard disk assembly, avoid moving the V shaped "interrupter" to minimize the chance of internal damage.

Even if your original hard disk is non-functional, it may have value as a parts donor for other ProFiles. Contact your supplier to determine whether your old hard disk and controller board have value as spare parts before discarding them.
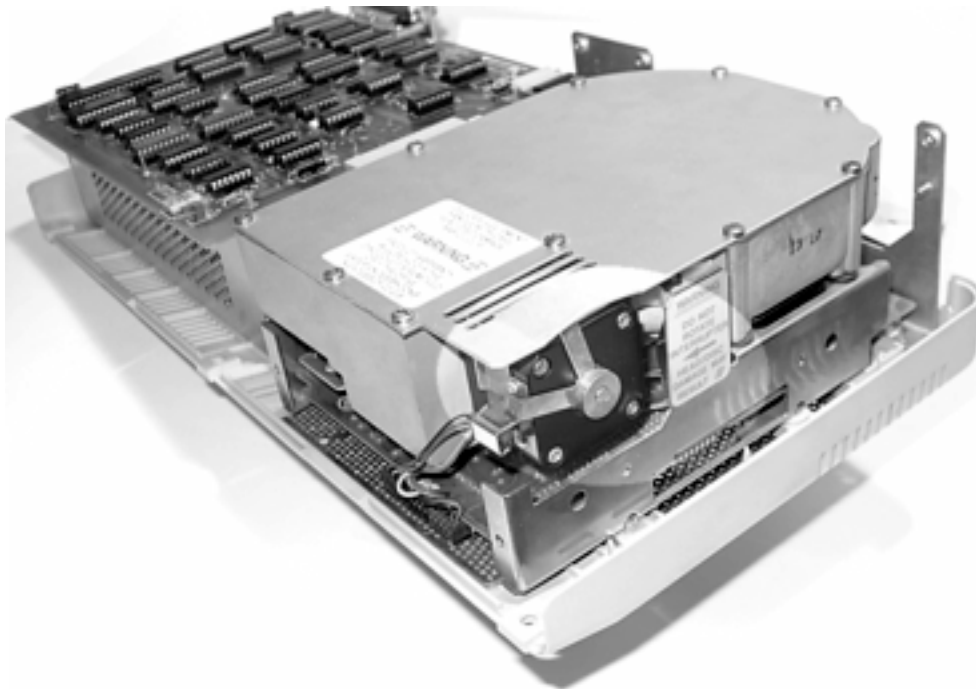
Figure 11. The original hard drive head position motor is exposed at one corner
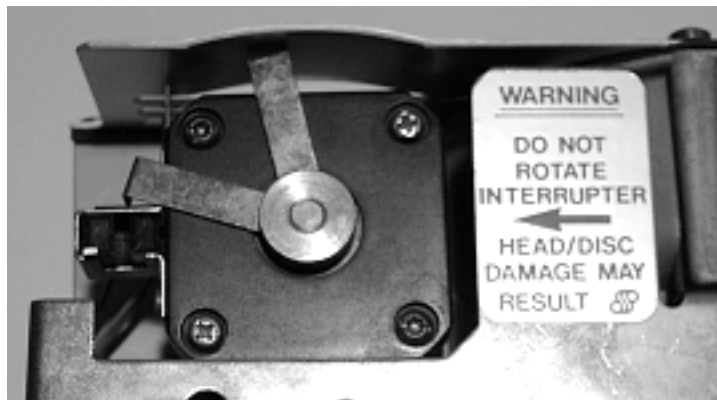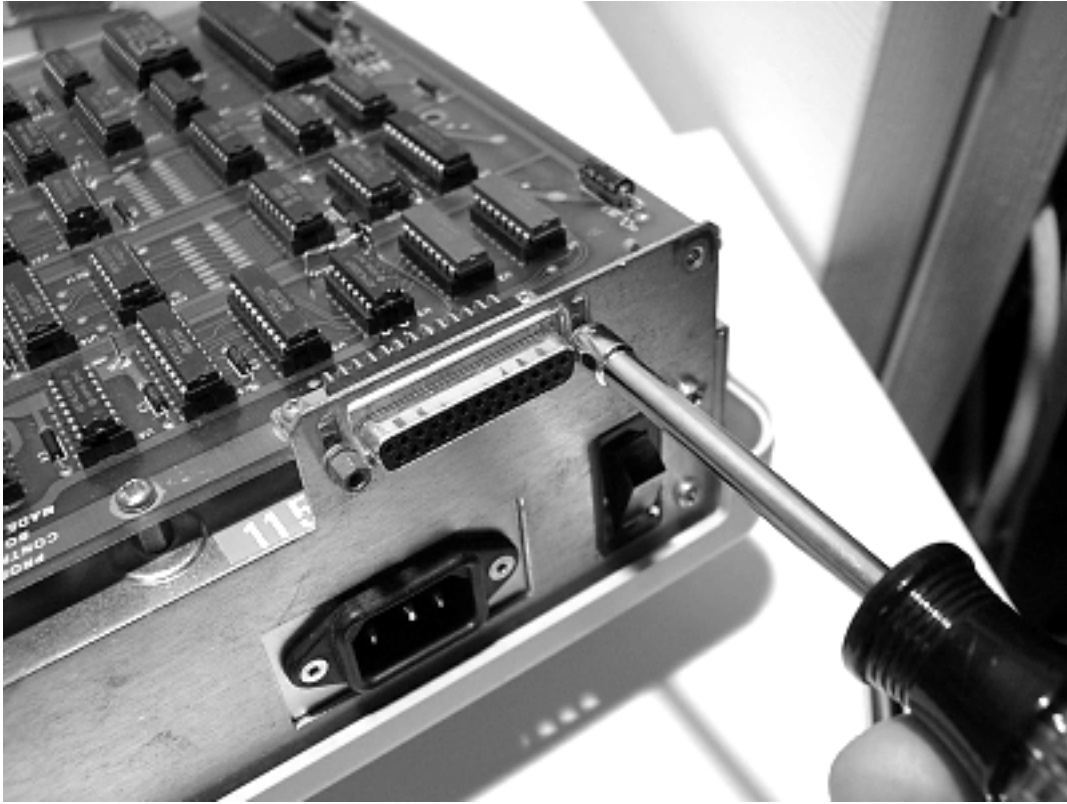

Figure 12. Do not disturb the hard drive head position motor
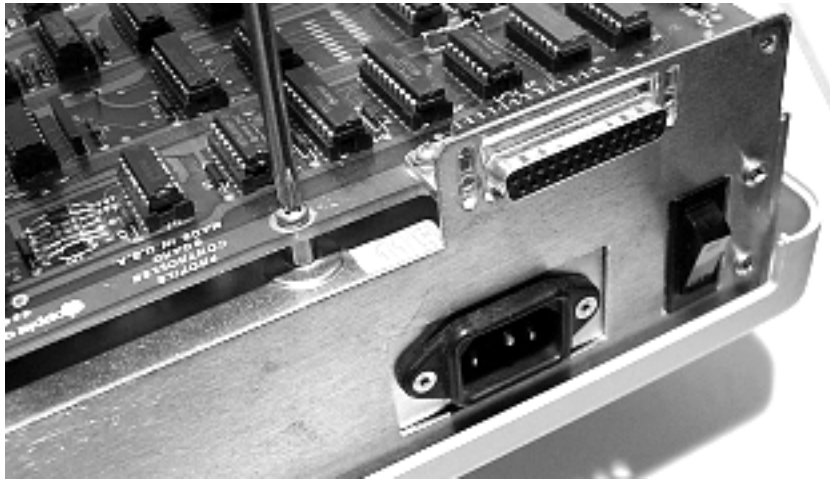
Removing the original Controller Board

Figure 13. Removing the data connector screwlocks

Locate the DB-25 data connector above the ProFile's power switch.

Examine the connector to determine if it is fastened to the rear panel of the metal chassis of the ProFile. On some ProFiles the connector is not fastened to the chassis, in which case you may leave the screwlocks in place.

If your connector is fastened to the chassis as in Figure 13, remove the two screwlocks. If you do not have a nut-driver, you can use a small adjustable wrench or pliers.

Figure 14. Removing the controller board grounding screw

Locate the grounding screw holding the controller board to the power supply (Figure 14). Remove the screw and set aside; this screw is used to install the X/ProFile later.

Locate the power supply connector near the hard disk assembly. Grasp the sides of the connector and pull horizontally to disconnect it from the controller board (Figure 15).
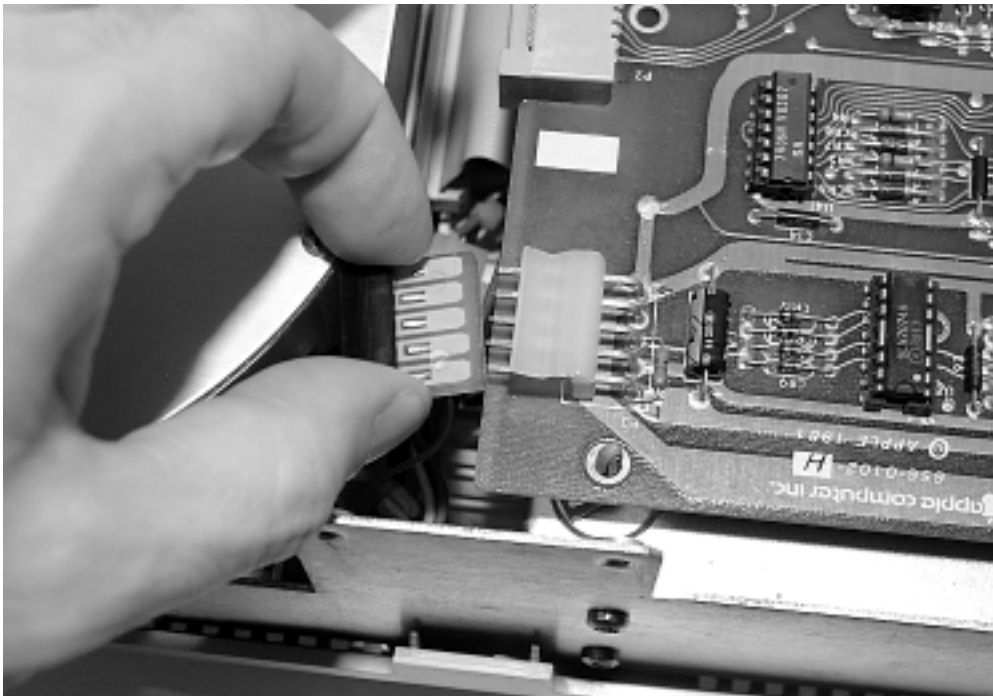
Figure 15. Detaching the power supply from the controller board

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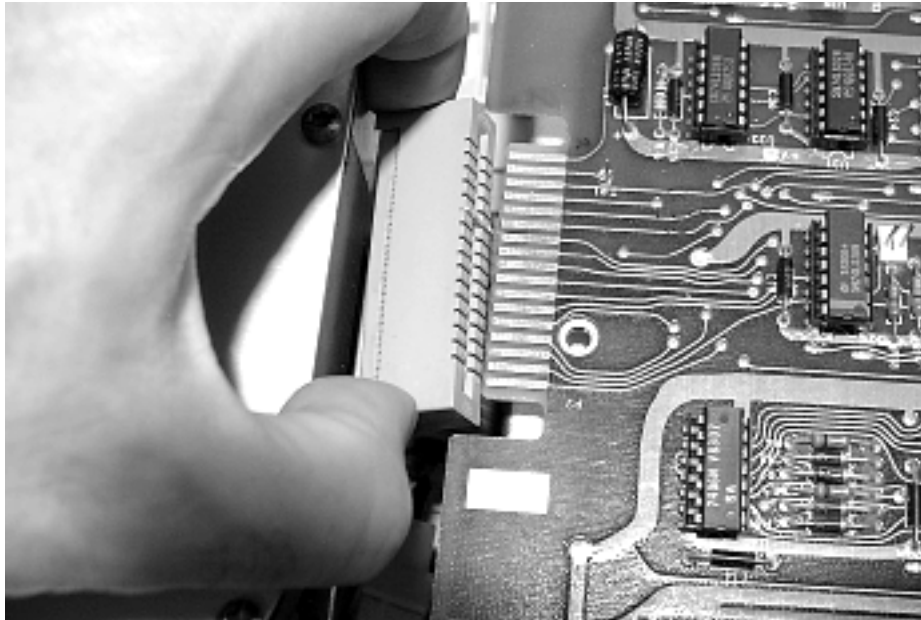
Figure 16. Detaching the analog board ribbon cable from the controller board

Locate the analog board ribbon cable connector near the hard disk assembly. Grasp the sides of the connector and pull horizontally to disconnect it from the controller board (Figure 16).
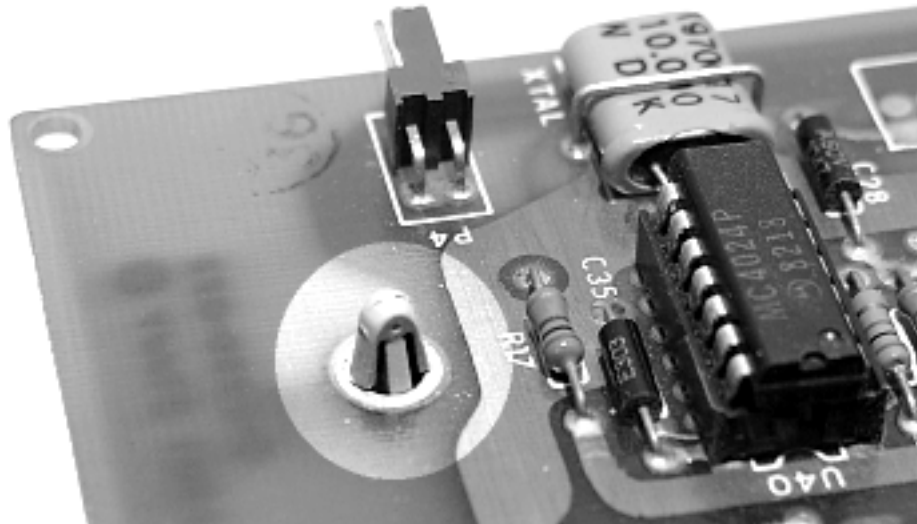
As highlighted in Figure 17, locate the circuit board mounting clip near connector P4 (P4 is used for the cable to the READY LED).

Figure 17. Identifying a circuit board mounting clip — your clips may be rotated

In most ProFiles, there are 5 of these clips holding the controller board as highlighted in Figure 18. If you have trouble locating all the clips, look from the side between the controller board and the power supply.

Note that the circuit board is held in place by the spring action of the sides of the clips.
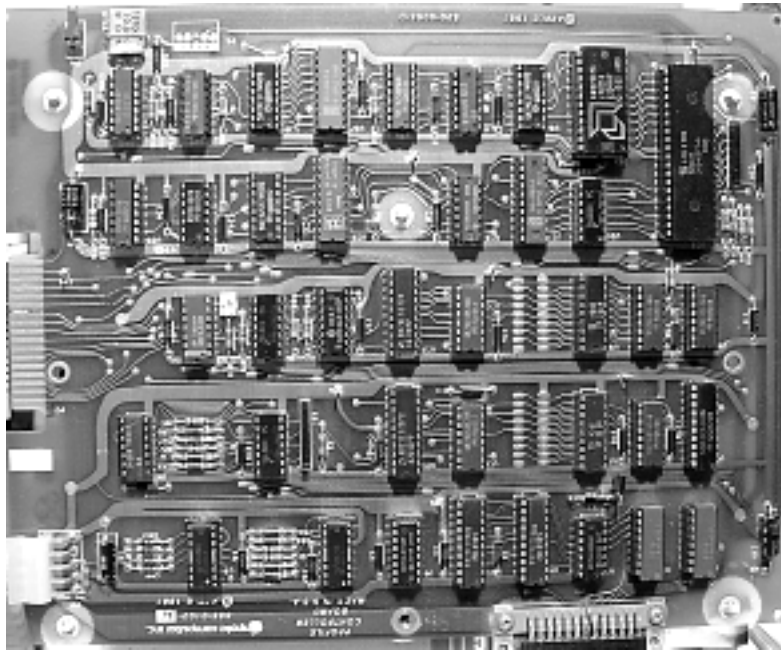
Figure 18. The five typical controller board mounting clip locations

As shown in Figure 19, release the circuit board from each clip by squeezing the clip and lifting the circuit board slightly around that clip. Note that your pliers cannot be tight against the circuit board or you will not be able to lift it.

The clips are used to mount the X/ProFile, so treat them with care. Do not attempt to remove the circuit board completely until all of the clips are detached as this can break the clips.

As you go around the board releasing clips and raising the board slightly, some clips may re-attach, so you may need to go around more than once.

It is normal to bend the circuit board slightly to perform this task.
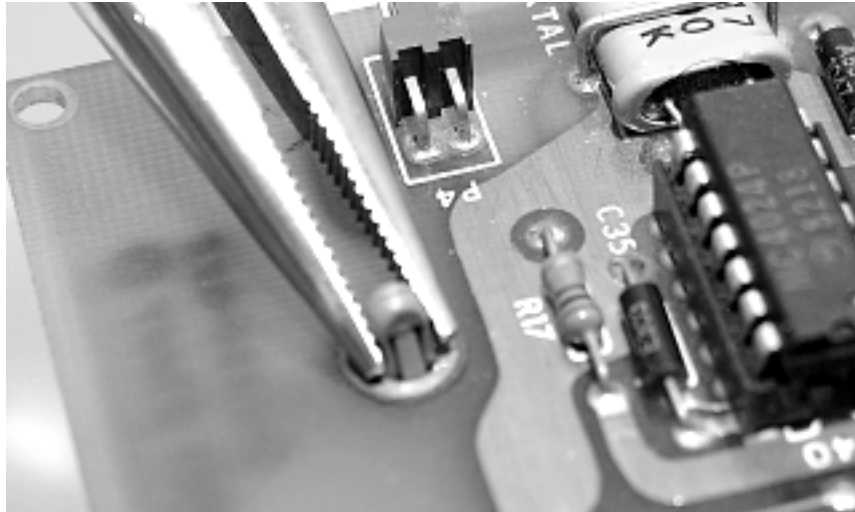
Figure 19. Releasing the circuit board by squeezing a clip

Once all clips have been released, remove the circuit board from the ProFile chassis and set it aside on a static free surface. If you removed the screwlocks from the data connector, re-attach them to the data connector for safekeeping.

Removing the original Hard Disk Assembly

Before removing the hard disk assembly, you should have removed the top cover and controller board as described above.

With the ProFile upright, locate the two-wire connector between the power supply and the hard disk assembly (Figure 20).
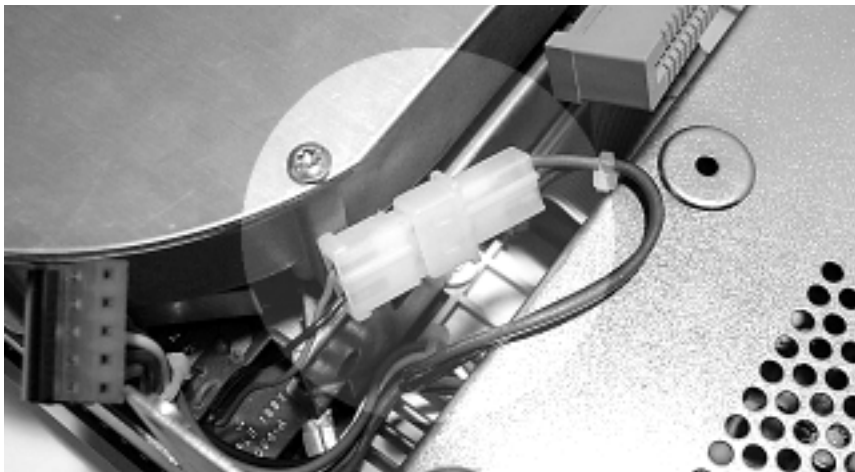

Figure 20. Identifying the two-wire hard disk power connector

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Figure 21. Disconnecting the two-wire hard disk power connector

Detach the two-wire power connector by grasping the two ends of the nylon housing and pulling apart. Use care as the connector may detach suddenly.

Turn the ProFile upside down to access the four mounting screws for the original hard disk.
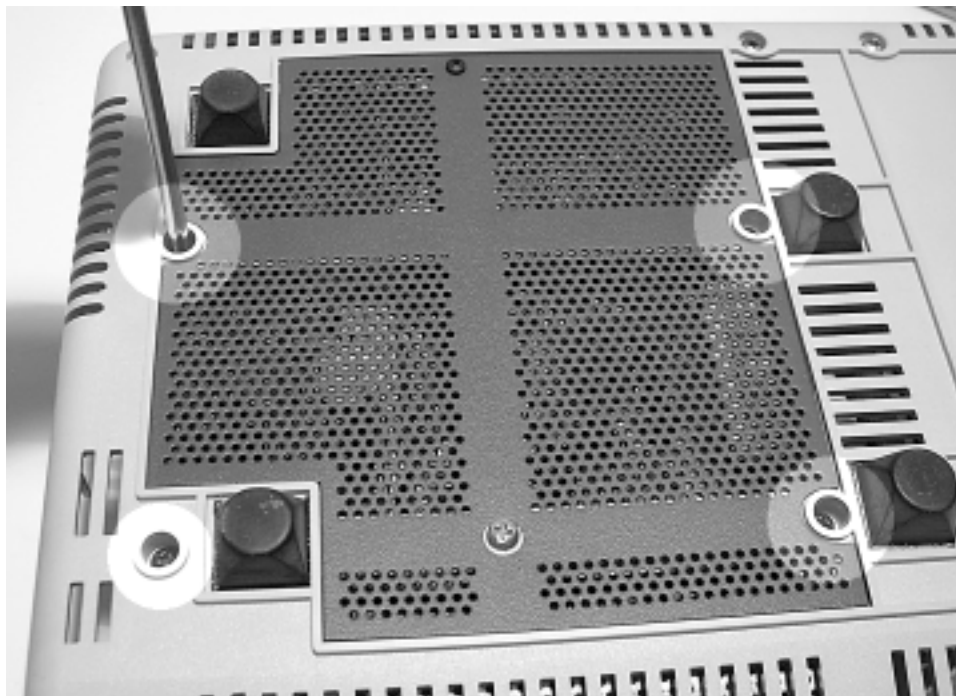

Figure 22. Removing the four hard disk mounting screws

As shown in Figure 22, remove the four screws attaching the original hard disk to the chassis. Put the screws aside for use in mounting the X/ProFile Regulator.

Carefully lift the chassis vertically: the hard disk should remain on the work surface as shown at the top of Figure 23.

Place the chassis right-side up on your work surface.

Put the original hard disk and original controller board aside for storage.
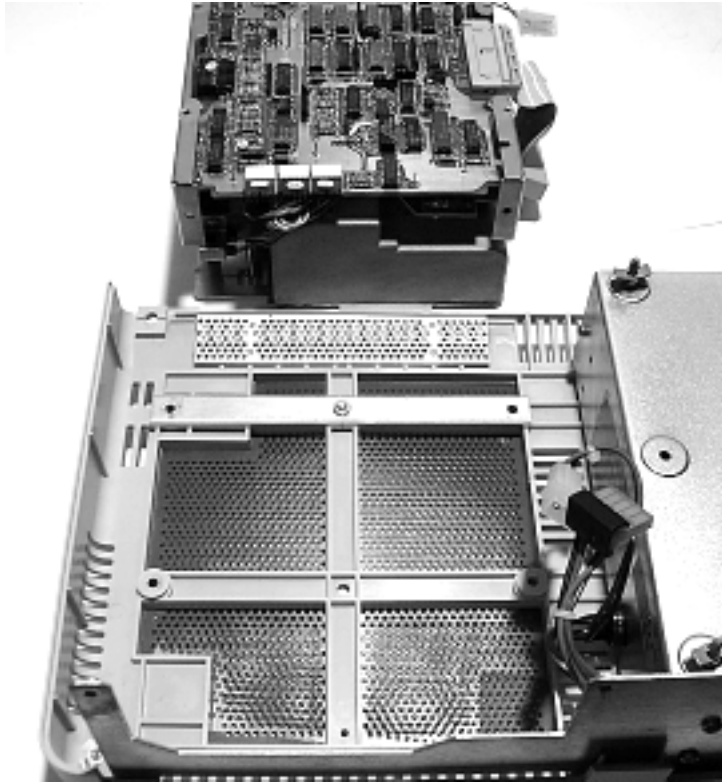
Figure 23. After removing the original hard disk

With the original controller board and hard disk removed, the ProFile chassis is ready for installation of the X/ProFile and X/ProFile Regulator.

Mounting the X/ProFile Regulator

Installing the Fan

Locate the fan and mounting hardware supplied with the X/ProFile Regulator (see Figure 24). The mounting hardware consists of two 1" (25 mm) long 4-40 screws (#4 ~ 2.5 mm).
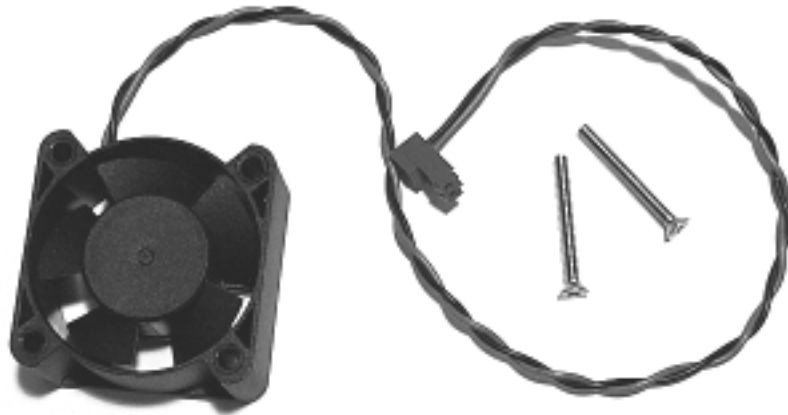
Figure 24. The X/ProFile Regulator fan and mounting hardware

As shown in Figure 25, position the fan with the label side towards the heatsinks on the X/ProFile Regulator, and secure by inserting the two screws through the fan and into the metal brackets already mounted to the circuit board.
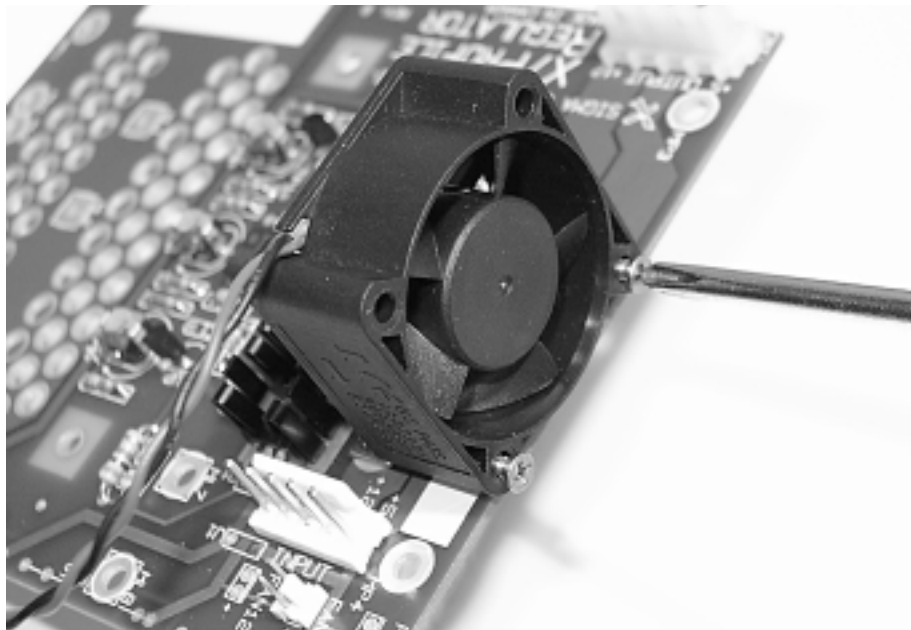
Figure 25. Mounting the fan to the X/ProFile Regulator

Figure 26. Connecting the fan to the FAN7 connector of the X/ProFile Regulator

As shown in Figure 26, plug the fan into the FAN7 connector on the X/ProFile Regulator.

Note: FAN7 runs the fan at 7 volts to minimize audible noise. If you have a hard drive that runs hot, you may plug the fan into the FAN connector on the X/ProFile instead to have it run on 12 volts and thus at full speed for maximum cooling.

Caution: Under some load configurations, the fan is necessary to maintain comfortable working conditions for the X/ProFile Regulator. Make sure you install and connect the fan.
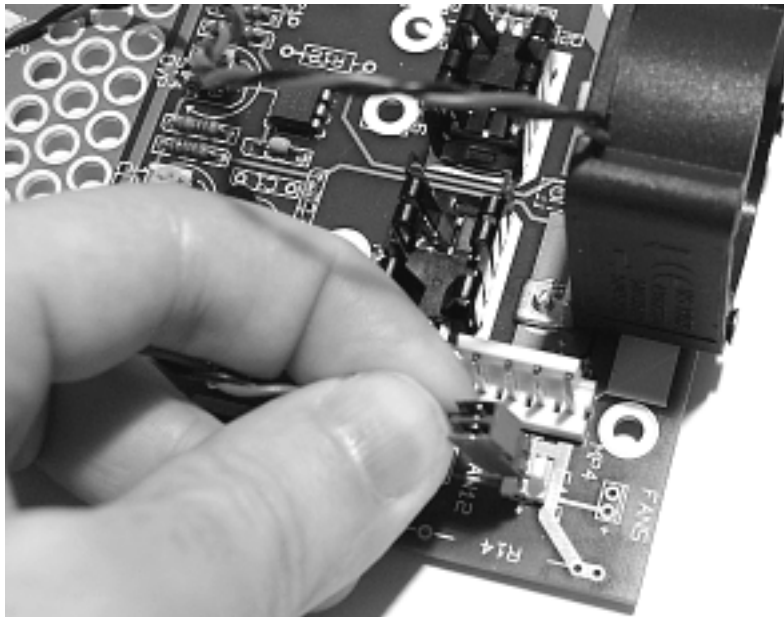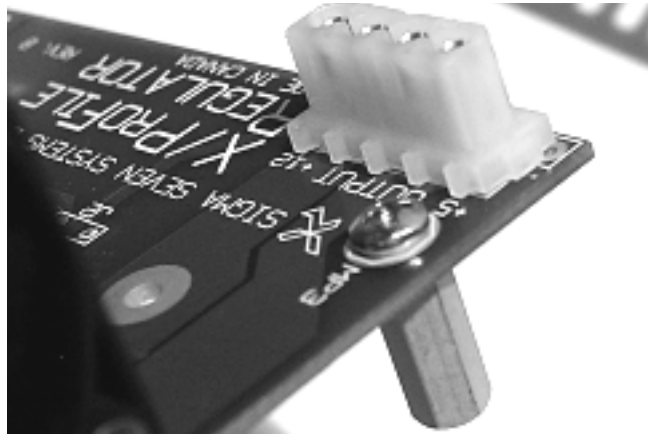
Installing the Mounting Hardware

The X/ProFile Regulator uses the mounting hardware supplied with the X/ProFile (not the Regulator). Locate the mounting hardware shown in Figure 27. This includes 4 each of 6-32 short round-head screws, and #6 threaded hexagonal spacers (#6 ~ 3.5 mm).

Figure 27. The X/ProFile Regulator mounting hardware is included with the X/ProFile

Figure 28. Hexagonal mounting spacer attached to the X/ProFile Regulator

Using the four short round-head screws, attach the hexagonal spacers to the bottom of the X/ProFile Regulator through the holes marked MP1, MP2, MP3, and MP4.

If you will be installing a 3.5" or 2.5" hard drive, proceed with the corresponding instructions (below) before installing the X/ProFile Regulator in the ProFile chassis. If you will be using a Compact Flash card only, proceed with "Mounting the X/ProFile Regulator in the ProFile Chassis" on page 24.

3.5" Drive Installation

Before installing a 3.5" drive, you should have installed the hexagonal mounting spacers (as directed above) as the mounting spacer bolts are not easily accessible after a 3.5" drive is mounted on the X/ProFile Regulator.

In addition to the 3.5" IDE drive, you will require a 40 pin IDE cable.

To install a 3.5" drive on the X/ProFile Regulator, locate the long mounting hardware shown below. This hardware is included with the X/ProFile (not the Regulator), and includes 4 each of 6-32 x 1" (25 mm) long round head bolts, #6 x 0.75" (19 mm) long unthreaded spacers, #6 fibre washers (#6 ~ 3.5 mm).

Figure 29. The 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.

Before attaching the drive, identify (and if necessary, label) pin 1 of the 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 bolt locations of your drive, you may need to use the holes labelled MH1, MH3, ML5, MH6, or the holes labelled MH2, MH4, MH5, ML8.

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

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

For easiest cable routing, mount the drive so the connector end of the drive is near the "X/ProFile Regulator" designation on the circuit board.

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

Figure 30. A 3.5" drive mounted to the X/ProFile Regulator

Proceed with "Mounting the X/ProFile Regulator in the ProFile Chassis" on page 24.

2.5" Drive Installation

In addition to the 2.5" IDE drive, you will require a standard 40 pin IDE cable, and an adapter that converts the 0.1" spacing of a typical 40 pin IDE connector to the 2 mm pin spacing of the 2.5" drive.

To install a 2.5" drive on the X/ProFile Regulator, locate the metric mounting hardware shown below. This hardware is included with the X/ProFile (not the Regulator), and includes 4 each of M3 x 16 mm round head bolts, 11 mm M3 unthreaded spacers, M3 fibre washers (M3 ~ 3/32" diameter).

Figure 31. The 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.

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 bolt locations of your drive, you may need to use the holes labelled ML1, ML4, ML5, ML8, or the holes labelled ML2, ML3, ML6, and ML7.

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

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

For easiest cable routing, mount the drive so the connector end of the drive is near the "X/ProFile Regulator" designation on the circuit board.

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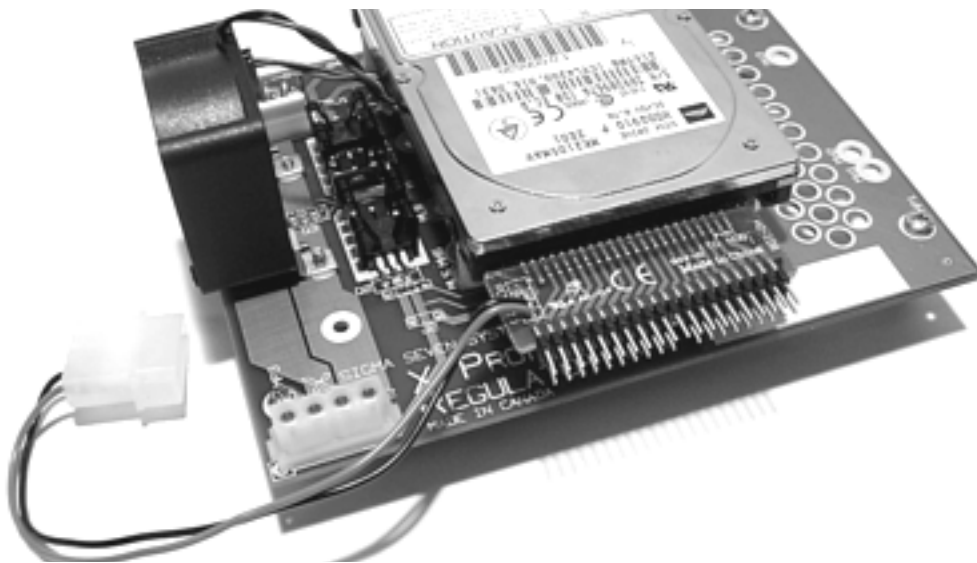

Figure 32. A 2.5" drive mounted to the X/ProFile Regulator
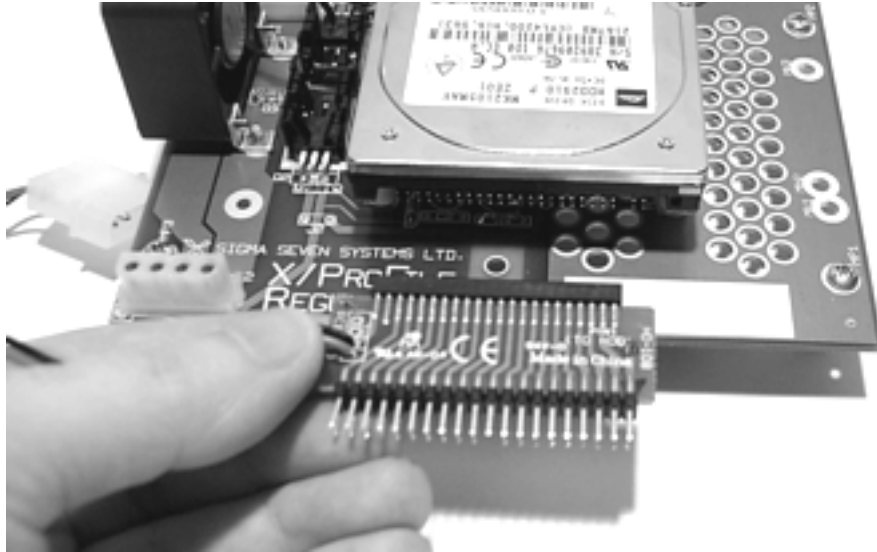
Figure 33. Attaching the adapter to the 2.5" drive

Attach the adapter to the drive. In most cases, the drive and adapter jumpers (if any) should be configured to make the drive the IDE "Master" device. Note: the adapter is not included; your adapter may look different from the one shown.
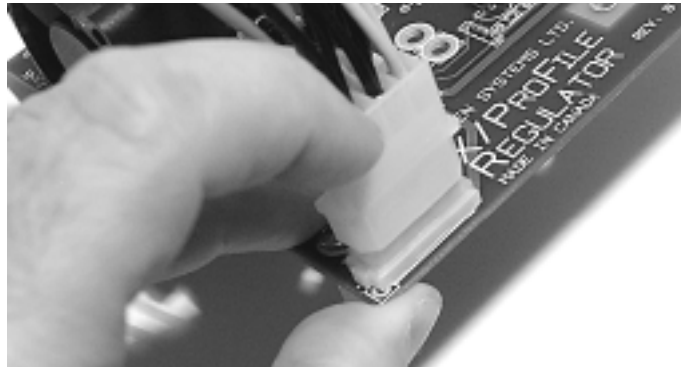

Figure 34. A 2.5" drive and adapter mounted to the X/ProFile Regulator

Proceed with "Mounting the X/ProFile Regulator in the ProFile Chassis" below.

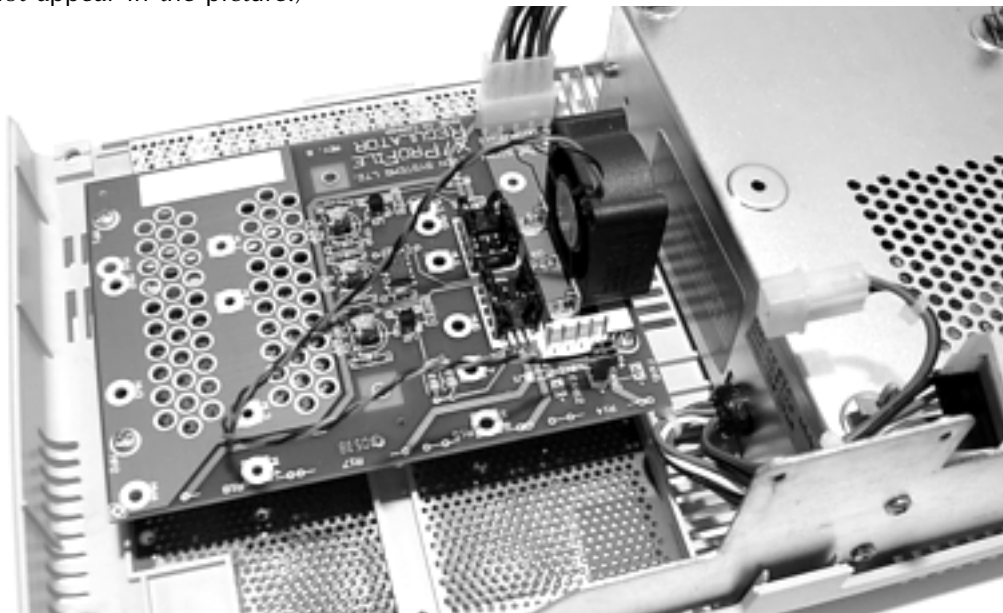# Mounting the X/ProFile Regulator in the ProFile Chassis

Before mounting the X/ProFile Regulator in the ProFile chassis, connect the supplied Y power cable to the output connector. To prevent excessive stress on the circuit board, squeeze the connector and circuit board together instead of pressing the connector and circuit board against the table.

If you also have mounted a 2.5" or 3.5" drive, connect one leg of the power cable to the drive (or 2.5" adapter).

Figure 35. Connecting the power cable to the OUTPUT connector

As shown in Figure 36, orient the X/ProFile Regulator in the ProFile chassis such that the fan is closest to the power supply, and the mounting spacers are over the mounting holes for the original hard disk. (You may have attached a hard drive to the X/ProFile Regulator, this does not appear in the picture.)

Figure 36. The mounting position of the X/ProFile Regulator in the ProFile chassis

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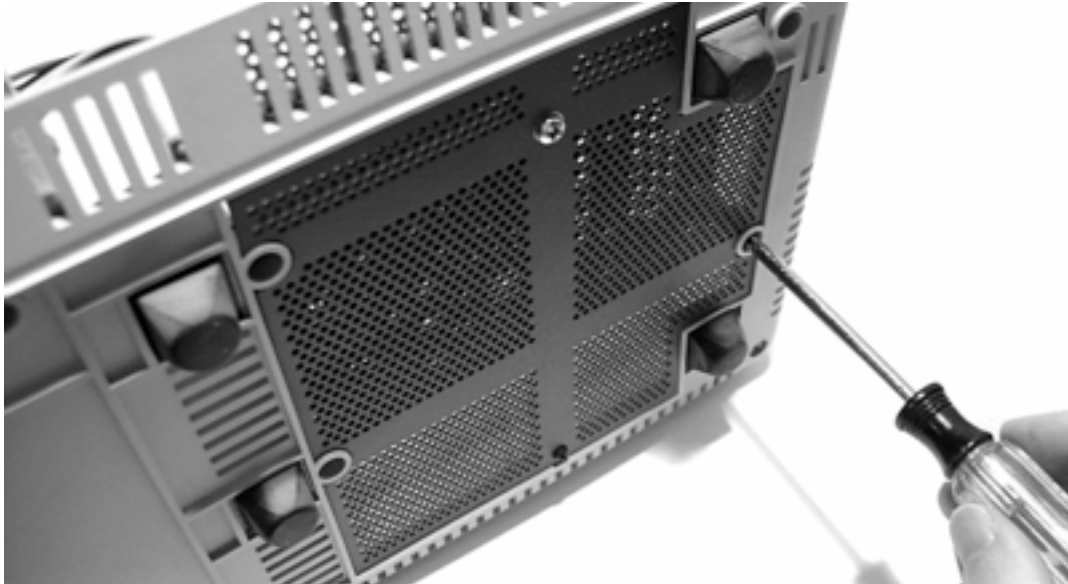
Figure 37. Attaching the X/ProFile Regulator from the bottom of the chassis

Using the four screws that held the original hard disk in place, attach the X/ProFile Regulator to the chassis from the bottom side. As shown in Figure 37, it may be convenient to stand the chassis on the back panel to do this; if you do so, have your assistant hold the chassis or use a box to keep the chassis from falling over and causing damage.

As shown in Figure 38 below, connect the five-wire cable from the Power Supply to the INPUT connector on the X/ProFile Regulator.
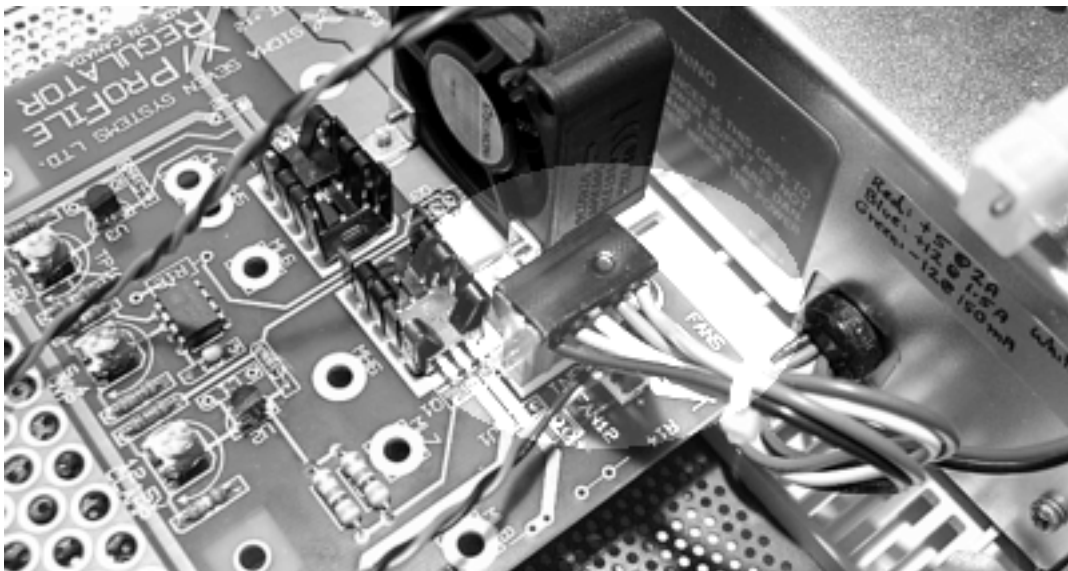
Figure 38. The power supply is connected to the INPUT connector
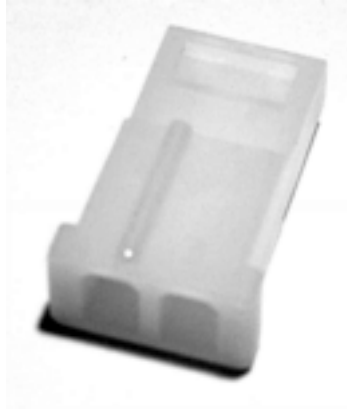
Figure 39. Empty connector shell

Locate the nylon empty connector shell shown in Figure 39. The empty connector shell is provided with the X/ProFile Regulator.

Insert the empty connector shell into the power supply's two-wire connector as shown in Figure 40; the connector shell fits one way only. This shell is to protect the pins of the unused connector from inadvertently touching something and causing a short-circuit.
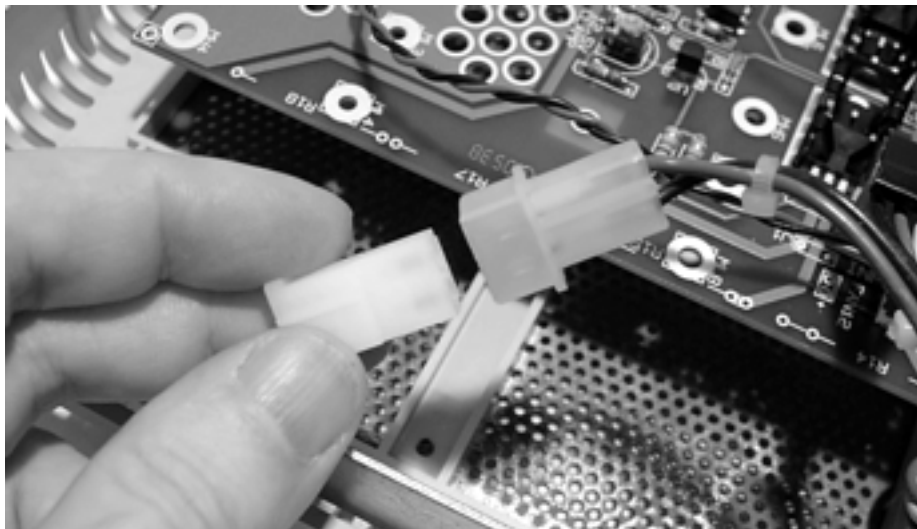
Figure 40. Inserting the empty connector shell into the two pin connector

The installation of the X/ProFile Regulator is now complete. Continue with Mounting the X/ProFile below.

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Mounting the X/ProFile

If you have installed a 2.5" or 3.5" drive on the X/ProFile Regulator, connect the 40 pin IDE cable to the X/ProFile such that th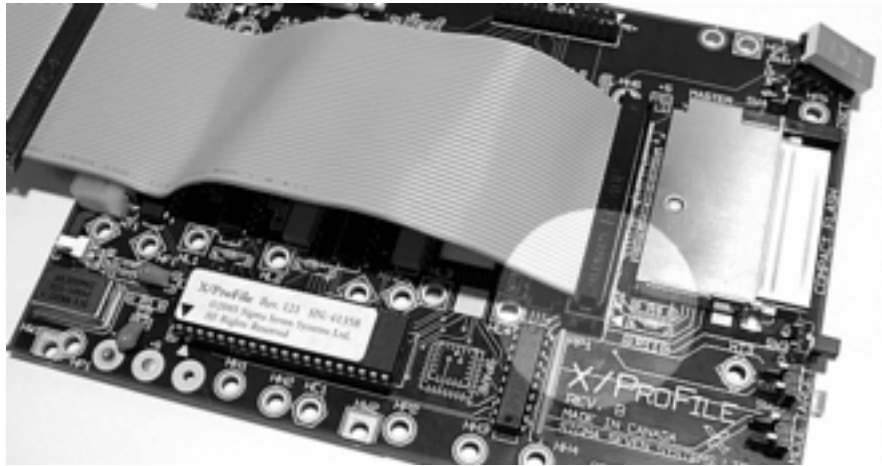e stripe of the cable and pin 1 of the connector is near the white triangle on the X/ProFile. To prevent excessive stress on the circuit board, squeeze the connector and circuit board together.

Figure 41. Connect the IDE cable to the X/ProFile with the stripe near the triangle

As shown in Figure 42, position the X/ProFile on the power supply with the switches and Compact Flash socket toward the rear of the ProFile chassis. (You may have installed a hard drive and IDE cable, which are not shown in the picture.)
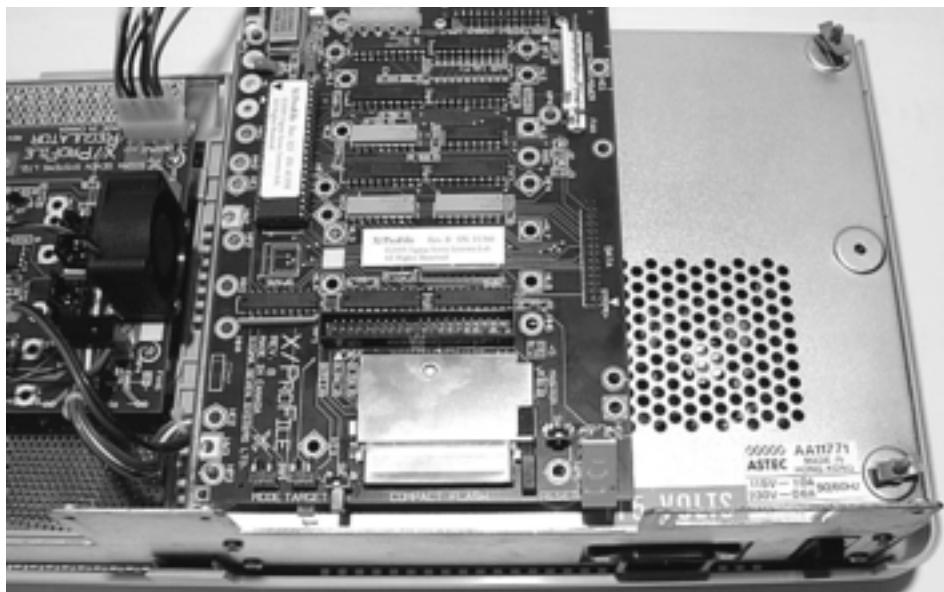
Figure 42. Positioning the X/ProFile on the ProFile power supply

Figure 43. Inserting the grounding screw

Check that the mounting clips on the power supply engage the holes marked HP1, HP3, and HP4. Press the X/ProFile down over the mounting clips.

Insert and fasten the grounding screw through hole HP5, beside the Display and RESET button.

Locate the short data cable shown in Figure 44. This cable is provided with the X/ProFile Regulator.

Figure 44. Short data cable

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Figure 45. Connect the data cable to the X/ProFile with the stripe near the triangle

Connect the short data cable to DATA connector of the X/ProFile such that stripe of the cable is near the white triangle on the X/ProFile (lower edge in Figure 45). To prevent excessive stress on the circuit board, squeeze the connector and circuit board together instead of pressing the connector against the circuit board and power supply.

If your ProFile chassis does not have the back panel cutout for the DB-25 connector, contact your supplier; a mounting plate may be available for a minimal charge if there is sufficient demand. In the meantime, leave the connector hanging free out of the rear of the ProFile.

If your ProFile chassis has the back panel cutout for the data connector, remove the screwlocks from the 25 pin D connector as shown in Figure 46.
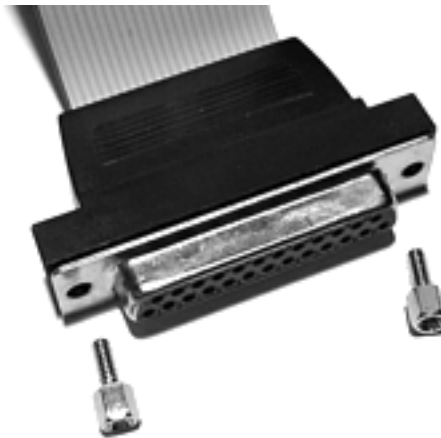
Figure 46. Remove the screwlocks from the DB-25 connector

Figure 47. Attaching the DB-25 connector to the chassis back panel

Arrange the short data cable as shown in Figure 47, and use the two screwlocks to attach the connector to the back panel cutout of the ProFile chassis.

Note: screwlocks are easily broken when overtightened; use minimal force, especially if a wrench is used.

As shown in Figure 48, connect the power cable from the OUTPUT of the X/ProFile Regulator to the X/ProFile. This connector is polarized for insertion one way only.
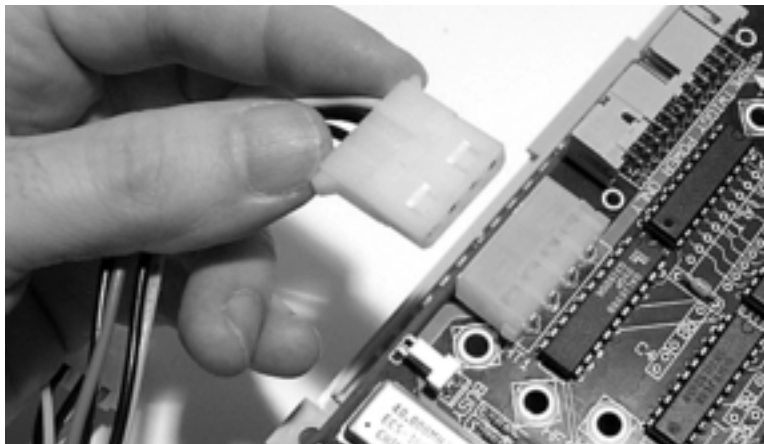
Figure 48. Connecting the power cable from the X/ProFile Regulator to the X/ProFile

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If you have installed a hard drive on the X/ProFile Regulator, connect the 40 pin IDE cable to the 3.5" drive or 2.5" drive adapter as shown in Figure 49 or 50. Double check that pin 1 of the drive's connector corresponds to the stripe on the cable.

After the connections are complete, your ProFile should look similar to one of the examples in Figures 49-51.
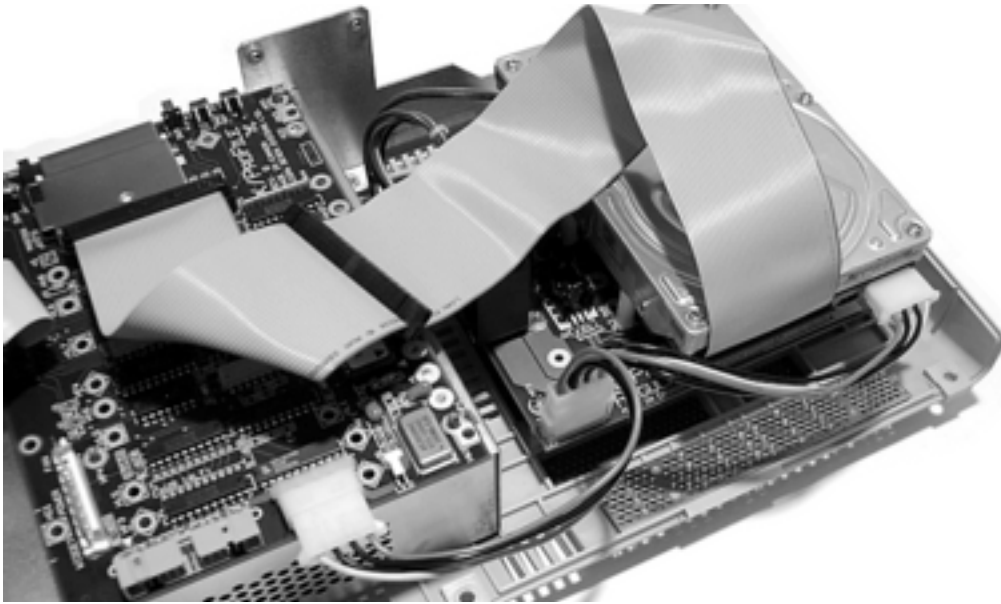
Figure 49. After installation of the X/ProFile, Regulator, and 3.5" hard drive
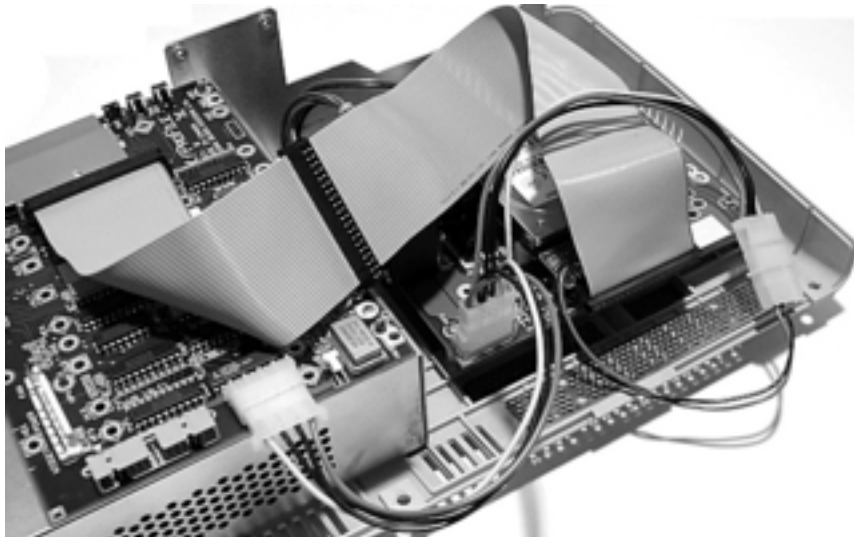
Figure 50. After installation of the X/ProFile, Regulator, 2.5" hard drive and adapter

Reassembly

Before reassembly, it is prudent to double-check the internal connections and connect the X/ProFile to your computer to check that everything works as expected. When you are satisfied that the installation is complete, reassemble the case as follows:

Check that there are no loose cables between the power supply and the fan that could later move and interfere with the rotation of the fan impeller.

As shown in Figure 51, place the top cover of the ProFile in front of the chassis. (You may have installed a hard drive, not shown in the picture.)
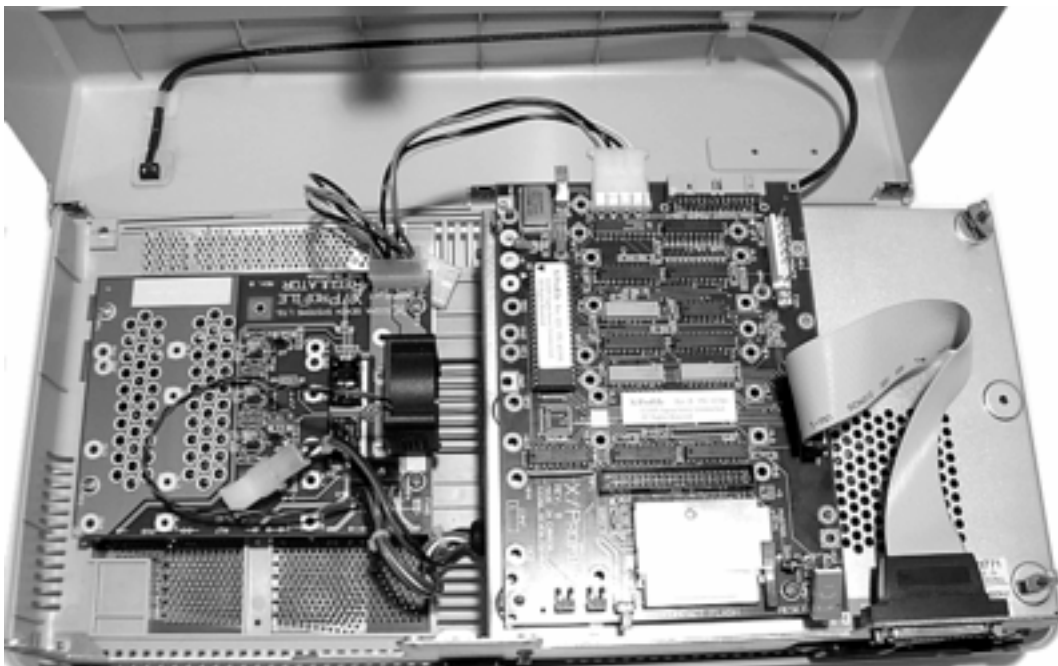
Figure 51. Preparing to replace the top cover

Figure 52. Re-connecting the READY LED cable

Connect the cable from the front panel READY LED to the X/ProFile BUSY LED connector.

Dress the power cable from the X/ProFile downwards so that it will not interfere with the front when replacing the top cover.

If you have installed a 2.5" or 3.5" drive on the X/ProFile Regulator, dress the IDE cable so that it will not interfere with the top cover. This typically requires two angle folds in the cable as shown in Figures 49 and 50 above. To prevent damage, do not crease the ribbon cable more than necessary.

Without attempting to engage the latches at the front edge, place the top cover over the chassis, slightly raised at the rear as shown in Figure 53.

Figure 53. Initial location for replacing the top cover

Figure 54. Engaging the latches along the front edge

Holding the top and bottom of the ProFile together, carefully rotate the ProFile so the front of the case is up. While in this position, take care to keep the ProFile from falling over.

Work the front edge of the top cover to lift it over and engage the ridges along the front edge of the chassis. This usually requires a few attempts; take your time and work slowly.

When you have the front edge of the top cover engaged with the chassis, hold the top and bottom together and gently return the ProFile to the upright position.

Check that the rear of the top cover is correctly positioned and that the front edge is still engaged with the chassis.

When you are satisfied that the top cover is correctly in place, replace the smaller escutcheon plate (by the X/ProFile Regulator) and fasten with its two original screws (Figure 55).

Do not replace the larger escutcheon plate (covering the X/ProFile) yet.

Figure 55. Replacing an escutcheon plate

Holding the top and bottom of the ProFile case together, invert the ProFile and replace the three screws along the front edge of the bottom of the case (Figure 4). Return the ProFile to its normal upright position.

The X/ProFile is now ready for use. See the manual included with your X/ProFile for detailed operation instructions.

After you have your X/ProFile working as desired, you may replace the second escutcheon plate to better approximate the original appearance. You may also leave the plate removed for easy access to the Compact Flash socket and the X/ProFile switches.

Trouble-shooting

Visual Check

Check for damage to the X/ProFile Regulator circuit board (eg. traces cut 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).

Functional Check

Disconnect the X/ProFile and any IDE device from the X/ProFile Regulator. Turn on the power and check the +12 and +5 voltages at the OUTPUT connector. These should be within 5% of the nominal voltage, and if the fan is connected to the X/ProFile Regulator, it should be blowing. If the voltages are low, suspect a problem with the power supply.

Reconnect the X/ProFile without any IDE devices, and check the voltages again.

X/ProFile Trouble-shooting

See the X/ProFile Operation Manual for additional troubleshooting suggestions.

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.

Appendix A - Adjustments

Caution: Making adjustments to the X/ProFile Regulator may result in damage to your X/ProFile and IDE devices. Such damage is not covered by your warranty. Do not attempt adjustments without adequate training, equipment, and care.

If the X/ProFile Regulator requires repair, it is best to contact your supplier. However, if this is not possible and another technician repairs the X/ProFile Regulator, it will need to be re-adjusted after repair.

Overview

The X/ProFile Regulator provides shunt regulation for +5V and +12V supplies. As such, all testing requires a current limited supply to prevent damaging the X/ProFile Regulator. An additional overvoltage protection circuit triggers an SCR to crowbar the 12V supply when the 5V output exceeds 5.4V.

Note: The X/ProFile Regulator cannot be properly adjusted while connected to the Apple ProFile power supply.

5.2V Clamp Adjustment

Disconnect everything from the X/ProFile Regulator

Connect a 200mA current-limited 6V source to the +5 volt input or output

Adjust 5.2V CLAMP to achieve 5.20 V ± 0.05

12.5V Clamp Adjustment

Disconnect everything from the X/ProFile Regulator

Connect a 200mA current-limited 13V source to the +12 volt input or output

Adjust 12.5V CLAMP to achieve 12.5 V ± 0.1

5.4 OVP Adjustment

Disconnect everything from the X/ProFile Regulator

Short TP1 to ground

Connect a 200mA current-limited, variable 6V voltage source to the +5 volt input or output

Set the voltage source to 5.0V, the current draw should be a few mA

Slowly increase the source voltage, note the current draw jumps to 100ma or more at the trigger point of the OVP circuit

Adjust 5.4 OVP so that this jump occurs when the supply approaches 5.4V ± 0.05

Remove the short from TP1 to ground

Before reconnecting the X/ProFile and IDE devices for operation, connect the X/ProFile Regulator to the Apple ProFile power supply, and check the output voltages are correct.

Appendix B - Current Balance

Caution: Making alterations to the X/ProFile Regulator may result in damage to your X/ProFile and IDE devices. Such damage is not covered by your warranty. Do not attempt alterations without adequate training, equipment, and care.

As with most switching power supplies, the +12 output voltage of the Apple ProFile power supply is not directly regulated, but is within specifications when the currents on the +5 and +12 outputs are within design limits.

Since the Apple ProFile power supply was designed with a specific controller and hard disk in mind, the design limits for the power supply are quite narrow, hence the need for the X/ProFile Regulator.

The X/ProFile Regulator provides voltage clamps to prevent excess voltage when the +5 or +12 current is outside of the normal design limits of the Apple ProFile power supply. In most cases this is adequate to achieve the desired voltages as the current required by modern drives is so much lower than the original ProFile drive.

However, some 3.5" IDE drives require much more current at 12V than they do at 5V. As the voltage regulation of the Apple ProFile power supply is based on the 5V current, the result is that the 12V supply may droop, and the drive may not spin-up or work correctly.

Compact Flash cards and 2.5" hard drives do not use the 12V supply, so this is only a concern with some 3.5" hard drives.

To make the Apple ProFile power supply produce sufficient voltage at the 12V output, it may be necessary to provide an additional load on the 5V output. This can be achieved by adding a power resistor to the X/ProFile Regulator at the R14 position. Note that this is very rarely required.

To select the value of the load resistor, consider that the X/ProFile consumes about 150mA at 5V, add this to the 5V current requirement of your hard drive. As a rule of thumb, this load, plus the load resistor typically needs to draw as much current as the 12V current requirement of your hard drive.

Example:
A particular 3.5" hard drive draws 350mA @ 5V and 1000mA @ 12V, and the X/ProFile draws 150mA @ 5V.

Estimated load resistor required 5V / (1000 - (350+150)) mA = 10 Ohms
Actual power dissipated in the load resistor = 5V * (1000 - (350+150)) mA = 2.5 Watts

For long life, power resistors are typically derated at least 50%, so one would use a 5 or 10 Watt resistor. Therefore a 10 Ohm 10 Watt resistor may be selected.

Note: There is some variation in Apple ProFile power supplies as well as hard drives: your power supply may require a load demanding somewhat more (or less) 5V current in order to produce 12V at the current required for your drive.

As the load resistor will be doing nothing except producing heat, do not choose an excessively low resistance.

It is strongly recommended that the voltages be checked with an accurate voltmeter before (and after) installing an additional load resistor.

Caution: The load resistor will become hot during operation. Make sure all wires are routed away from it, and make sure you turn off the power and allow it to cool before touching it.

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A searchable version of this document in Acrobat PDF format can be downloaded from the X/ProFile web site at:

www.SigmaSevenSystems.com/xprofile