TURBO 040™
68040 UPGRADE CARD

DAYSTAR
DIGITAL

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About
The
Turbo 040

Thank you for purchasing the DayStar Turbo 040. You have purchased a performance upgrade with unsurpassed compatibility, reliability and performance.
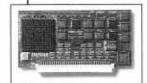
The Turbo 040 substantially increases Macintosh system speed and responsiveness. Users benefit through increased productivity - complete more work in a day or spend the time saved to improve work quality.

There are two versions of the Turbo 040. The standard Turbo 040 uses the Motorola 68040 CPU, which includes a built-in floating point unit (FPU) for high-speed 3-D rendering, complex spreadsheet recalcs, and scientific and statistical applications. The Turbo 040i uses the Motorola 60LC040, which leaves out the FPU. Throughout this manual, we will simply refer to both models as the Turbo 040.

The Turbo 040 has a 128K high speed Static RAM cache that provides data at zero wait-states. This allows the CPU to operate at peak performance.

Included with the Turbo 040 is DayStar's PowerMath, a powerful software utility that boosts the performance of math-intensive tasks which don't use the math chip directly. PowerMath traps application calls to Apple's Standard Apple Numeric Environment (SANE) routines and diverts them to the built-in math routines of the 68040. This greatly increases performance over that of SANE without compromising accuracy, a feature unique to DayStar's software.

About the Turbo 040

NOTE: Although this manual covers the installation of the Turbo 040 into many different Macs, be sure to check the Turbo box for a list of Macs that this particular board supports.

Upgrade Program

DayStar has always provided upgrade paths for its customers. For further information on upgrading to more speed or changing platforms, turn to page 127, "Upgrading the Turbo 040", in Appendix B.

Included with your Turbo 040

The Turbo 040 is shipped with the following parts:

- Turbo 040 in an anti-static bag
- Turbo 040 Installation Manual
- QuadControl disk
- PowerDemo disk
- Network Installer disk
- Anti-Static wrist strap

Included with your Adapter

Included with your adapter:

- PGA puller (II and IIx versions only)
- Power Supply removal tool (IIcx version only)
- Anti-Static Motherboard Bag (IIcx version only)
- Electrical tape (removable - 2 pcs. on a strip) (SE/30 version only)
- Case Separating Tool (SE/30 version only)
- Torx-like screwdriver (SE/30 version only)
- Rubber pad (IIx version only)
- Metal shield and 6 screws (Adapter IIsi - NuBus version only)

If any of the parts above are missing when you receive your Turbo 040, please contact your computer dealer or call DayStar Technical Support (9 am to 6 pm EST) at 404-967-2077 for further assistance. You can also contact DayStar online through CompuServe: 75300,1544, AppleLink: DAYSTAR.TECH, America Online: DAYSTAR OL or GEnie: DAYSTAR.

Installation tools required:

· Phillips screwdriver

As DayStar continues to improve and enhance its product line, we would like to keep you informed of new product advancements. To take advantage of our upgrade programs and new product releases, please take a moment to complete the product warranty card.

This manual provides basic information for installing and using the DayStar Turbo 040. If you are unfamiliar with using the Macintosh, review the Owner's Guide before installing the board.

Here's what you'll find in this manual:

* **Chapter 1:** "Getting Started" lists some of the precautions which should be taken before installation. It also includes quick reference sections for installing the Turbo 040.

* **Chapter 2:** "Installing The Turbo 040 - Mac SE/30" includes detailed instructions for the preparation and installation of the Turbo 040 in a Mac SE/30. It includes a section on testing the installation.

* **Chapter 3:** "Installing The Turbo 040 - Mac II" includes detailed instructions for the preparation and installation of the Turbo 040 in a Mac II. It includes a section on testing the installation.

* **Chapter 4:** "Installing The Turbo 040 - Mac IIx" includes detailed instructions for the preparation and installation of the Turbo 040 in a Mac IIx. It includes a section on testing the installation.

- **Chapter 5:** "Installing The Turbo 040 - Mac IIcx" includes detailed instructions for the preparation and installation of the Turbo 040 in a Mac IIcx. It includes a section on testing the installation.

- **Chapter 6:** "Installing The Turbo 040 - Mac IIsi" includes detailed instructions for the preparation and installation of the Turbo 040 in a Mac IIsi. It includes a section on testing the installation.

- **Chapter 7:** "Installing The Turbo 040 - Mac IIvx, IIvi, Performa 600" includes detailed instructions for the preparation and installation of the Turbo 040 in a Mac IIvx, IIvi and Performa 600. It includes a section on testing the installation.

- **Chapter 8:** "Installing The Turbo 040 - Mac IIci" includes detailed instructions for the preparation and installation of the Turbo 040 in a Mac IIci. It includes a section on testing the installation.

- **Chapter 9:** "Installing The Turbo 040 Software" covers the procedures for installing and using the software included with the Turbo 040. It also contains sections on troubleshooting and compatibility issues, should you experience any problems.

- **Appendix A:** "Performance Notes" discusses ways to increase your system's performance.

- **Appendix B:** "Product Support" includes the product specifications, warranty and instructions for returning the Turbo 040 for service.

Getting Started

Please read all of the instructions before you start the installation procedure. The Quick Installation Reference is designed for those who have experience installing DayStar accelerator boards in specific Macintoshes. Since all installations vary, we recommend that the full set of installation instructions be followed the first time you install a Turbo 040.

QuadControl

Note: Your Turbo 040 may look slightly different than the one pictured above. The installation and functionality is identical for all Turbo 040 cards.

Important: DayStar recommends you have the Turbo 040 installed by your dealer or an Apple Authorized Technician. If instructions are not explicitly followed, you can severely damage electronic circuitry or sustain serious personal injury.

WARNING: The DayStar Turbo 040 uses electronic components that are sensitive to static electricity. When handling and installing these boards, you must take care to prevent the components from being damaged by static currents. Always work in an area of low static electricity. Connect the anti-static bracelet to a grounded surface to prevent static discharge.

The Danger of Static Electricity

Precautions

Here is a brief list of precautions that help ensure proper grounding:

- **WEAR THE ANTI-STATIC WRIST STRAP**

- **DO NOT** attempt installation on a carpeted floor.

- **DO NOT** wear leather shoes — we recommend shoes with rubber soles.

- **DO NOT** attempt installation in an overly dry environment — spray mist the work area with water prior to installation.

- **DO NOT** wear silk or polyester clothing while doing the installation — we recommend cotton clothing.

- **REMOVE ALL JEWELRY** (rings, bracelets, watches, etc.) before installation.

If you are experienced in the installation of the Turbo 040 in the **Mac SE/30**, follow these steps:

1. **Back up your hard drives.**

2. **Check your hard drives** with Apple's Disk First Aid.

3. **Update your hard drives' driver software** with a version known to be compatible with the 68040. If you used a non-Apple for-matter, make sure that blind transfers are disabled (see page 118 for more information).

4. **Remove all connectors and the power cord.**

5. **Flip power switch on/off 3 times.**

6. **Let the unit sit for 1 hour** to discharge.

7. **Remove the four screws and the cover.**

8. **Put on the anti-static wrist strap.**

9. **Remove any SE/30 expansion cards that may be present and insulate the brackets.**

10. **Install the Turbo 040 into the DayStar Adapter PDS and then install the com-bined boards into the PDS slot on the motherboard.**

11. **Re-assemble the cover** - Make sure all cables are properly connected.

12. **Test the installation** - Attach the power cord. Restart the Mac SE/30. You should hear the customary "BONG".

13. **Install QuadControl software** - Boot the Mac, insert the DayStar disk and copy the QuadControl file to the System Folder.

14. **Restart the Mac** - If any problems occur, see the troubleshooting section at the end of Chapter 9.

WARNING! DayStar recommends you have the Turbo 040 installed by your dealer or an Apple Authorized Technician. The Mac SE/30, when open, exposes the installer to a CRT vacuum tube which can implode or cause extreme electrical shock.

NOTE: *An adapter is required for installing the Turbo 040 into the SE/30.*

If you are experienced in the installation of the Turbo 040 in the **Mac II,** follow these steps:

1. **Back up your hard drives.**

2. **Check your hard drives** with Apple's Disk First Aid.

3. **Update your hard drives' driver software** with a version known to be compatible with the 68040. If you used a non-Apple formatter, make sure that blind transfers are disabled (see page 118 for more information).

4. **Remove all connectors and the power cord.**

5. **Remove the Mac II cover and disk tray.**

6. **Put on the anti-static wrist strap.**

7. **Remove the CPU and AMU chips** – Use the PGA puller provided with the adapter.

8. **Install the adapter board** – Align the adapter board's pins over the empty CPU and AMU socket. Press above the socket connection until the board is seated.

9. **Connect the Turbo 040 to adapter board.**

10. **Test the installation** – Attach the power cord. Restart the Mac II. Listen for the customary "BONG", then turn off.

11. **Replace the disk tray, cover** and make sure all cables are properly connect

12. **Install QuadControl software** – Boot the Mac, insert the DayStar disk and copy the QuadControl file to the System Folder.

13. **Restart the Mac** – If any problems occur, see the troubleshooting section at the end of Chapter 9.

If you are experienced in the installation of the Turbo 040 in the **Mac IIx**, follow these steps:

1. **Back up your hard drives.**

2. **Check your hard drives** with Apple's Disk First Aid.

3. **Update your hard drives' driver software** with a version known to be compatible with the 68040. If you used a non-Apple formatter, make sure that blind transfers are disabled (see page 118 for more information).

4. **Remove all connectors and the power cord.**

5. **Remove the Mac IIx cover and disk tray.**

6. **Put on the anti-static wrist strap.**

7. **Check to see if the CPU needs socketing** — If it needs a socket, contact DayStar Technical Support before proceeding.

8. **Remove the CPU** – Use the PGA puller provided with the adapter.

9. **Install the CPU onto the adapter board.**

10. **Install the IIx Adapter Board** – Align the Adapter over the empty CPU socket. Press above the socket until the board is seated.

11. **Connect the Turbo 040 to adapter board.**

12. **Test the installation** – Attach the power cord. Restart the Mac IIx. Listen for the customary "BONG", then turn off.

13. **Replace the disk tray, cover** and make sure all cables are properly connected.

14. **Install QuadControl software** – Boot the Mac, insert the DayStar disk and copy the QuadControl file to the System Folder.

15. **Restart the Mac** – If any problems occur, see the troubleshooting section at the end of Chapter 9.

Quick installation reference for the Mac IIx

CAUTION: It is possible that the processor is soldered to the motherboard and that the unit must to be sent to DayStar for socket installation. If you are not experienced at removing processors, follow the detailed instructions in Chapter 4.

NOTE: An adapter is required for installing the Turbo 040 into the Mac IIx. The adapter IIx must be part #000339. Earlier models did not support the Turbo 040.

*CAUTION:
The processor
is most likely
soldered into
the mother-
board and
will require
socket instal-
lation by
DayStar. If
you are not
experienced
at removing
processors,
follow the
detailed
instructions
in Chapter 5.*

*NOTE:
An adapter is
required for
installing the
Turbo 040
into the
Mac IIcx.*

If you are experienced in the installation of the Turbo 040 in the **Mac IIcx**, follow these steps:

1. **Back up your hard drives.**

2. **Check your hard drives** with Apple's Disk First Aid.

3. **Update your hard drives' driver software** with a version known to be compatible with the 68040. If you used a non-Apple formatter, make sure that blind transfers are disabled (see page 118 for more information).

4. **Remove all connectors and the power cord.**

5. **Remove the Mac IIcx cover and remove the power supply.**

6. **Put on the anti-static wrist strap.**

7. **Check to see if the CPU needs socketing.** If it does, contact DayStar before proceeding. If it is has a socket, contact DayStar to have a PGA puller sent to you to remove the CPU.

8. **Install the adapter** – Align the adapter above the empty CPU socket. Slightly pull the adapter toward the front of the Mac to move the plastic power supply tab out of the way. Once aligned, gently press the center of the socket connection until it is firmly seated.

9. **Reinstall the power supply.**

10. **Connect the Turbo 040 to the adapter.**

11. **Test the installation** – Attach the power cord. Restart the Mac IIcx. Listen for the customary "BONG", then turn off.

12. **Replace the cover** – Make sure all cables are properly connected.

13. **Install QuadControl software** – Boot the Mac, insert the DayStar disk and copy the QuadControl file to the System Folder.

14. **Restart the Mac** – If any problems occur, see the troubleshooting section at the end of Chapter 9.

If you are experienced in the installation of the Turbo 040 in the **Mac IIsi**, follow these steps:

1. **Back up your hard drives.**

2. **Check your hard drives** with Apple's Disk First Aid.

3. **Update your hard drives' driver software** with a version known to be compatible with the 68040. If you used a non-Apple formatter, make sure that blind transfers are disabled (see page 118 for more information).

4. **Remove all connectors and the power cord.**

5. **Remove the Mac IIsi cover.**

6. **Put on the anti-static wrist strap.**

7. **Attach the metal shield to the adapter.** (NuBus Adapter only)

8. **Connect Turbo 040 to the adapter's middle connector.** If adding an additional card to the top slot, do so now. (If the additional card requires connections outside the IIsi, remove the case's cover panel.)

9. **Install the combined boards into the motherboard's PDS connector.**

10. **Insert the two screws through the chassis into the adapter's metal shield.** (NuBus Adapter only)

11. **Test the installation** – Attach the power cord. Restart the Mac IIsi. Listen for the customary "BONG", then turn off.

12. **Replace the cover** – Make sure all cables are properly connected.

13. **Install QuadControl software** – Boot the Mac, insert the DayStar disk and copy the QuadControl file to the System Folder.

14. **Restart the Mac** – If any problems occur, see the troubleshooting section at the end of Chapter 9.

Quick installation reference for the Mac IIsi

CAUTION:
The Turbo 040 should not be installed into other Mac IIsi PDS adapters. Only DayStar adapters provide the correct pin configuration.

NOTE:
An adapter is required for installing the Turbo 040 into the Mac IIsi.

If you are experienced in the installation of enhancement boards for the **Mac IIvi, IIvx or Performa 600**, follow these steps:

1. **Back up your hard drives.**

2. **Check your hard drives** with Apple's Disk First Aid.

3. **Update your hard drives' driver software** with a version known to be compatible with the 68040. If you used a non-Apple formatter, make sure that blind transfers are disabled (see page 118 for more information).

4. **Remove all connectors and the power cord.**

5. **Remove the Mac cover.**

6. **Put on the anti-static wrist strap.**

7. **If present, remove any card from the accelerator slot.**

8. **Install the Turbo 040** - Connect the Turbo 040 to the accelerator slot.

9. **Test the installation** – Attach the power cord. Restart the Mac. Listen for the customary "BONG", then turn off.

10. **Replace the cover** – Make sure all cables are properly connected.

11. **Install QuadControl software** – Boot the Mac, insert the DayStar disk and copy the QuadControl file to the System Folder.

12. **Restart the Mac** – If any problems occur, see the troubleshooting section at the end of Chapter 9.

NOTE: Some Turbo 040's require an adapter to support the IIvi, IIvx and Performa 600. If your Turbo 040 came with an adapter, follow the instructions that came with the unit.

If you are experienced in the installation of enhancement boards for the **Mac IIci,** follow these steps:

1. **Back up your hard drives.**

2. **Check your hard drives** with Apple's Disk First Aid.

3. **Update your hard drives' driver software** with a version known to be compatible with the 68040. If you used a non-Apple formatter, make sure that blind transfers are disabled (see page 118 for more information).

4. **Prepare the Mac - Remove all connectors and the power cord. Remove the Mac cover.**

5. **Put on the anti-static wrist strap.**

6. **Remove any cache cards** - Remove Apple or other third party cache card from cache connector slot, if any.

7. **Install the Turbo 040** - Connect the Turbo 040 to the cache connector slot.

8. **Test the installation** – Attach the power cord. Restart the Mac. Listen for the customary "BONG", then turn off.

9. **Replace the cover** – Make sure all cables are properly connected.

10. **Install QuadControl software** – Boot the Mac, insert the DayStar disk and copy the QuadControl file to the System Folder.

11. **Restart the Mac** – If any problems occur, see the troubleshooting section at the end of Chapter 9.

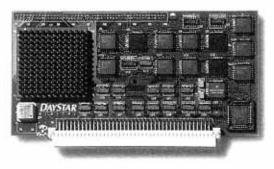**Quick installation reference for the Mac IIci**

Removing the Turbo 040

If you must remove the Turbo 040, follow the instructions below:

1. Remove the QuadControl software from the Control Panels Folder.

2. Follow the "Quick Installation Instructions" for opening your particular Mac.

3. Remove the Turbo 040 from either your motherboard (Mac IIci, IIvi, IIvx and Performa 600) or the adapter (all other Macs). This concludes IIci, IIvi, IIvx and Performa 600 removal.

4. Remove the adapter card from the motherboard socket (Mac II, IIx and IIcx) or the motherboard connector (Mac SE/30 and IIsi). This concludes Mac SE/30 and IIsi removal.

5. Replace the CPU chip (and AMU chip for the Mac II) by aligning pin 1 on the chips with pin 1 on the appropriate sockets on the motherboard. (The gold Y-line is pin 1 on the CPU. The raised bump represents pin 1 on the AMU. The white dots on the motherboard sockets represent its pin 1s).

6. Gently press the center of the chips until they are fully seated into the sockets. This concludes II, IIx and IIcx removal.

Installing The Turbo 040 – Macintosh IIci

No adapter is required for installing the Turbo 040 (Mac IIci compatible version) in the Mac IIci. The Turbo 040 plugs directly into the cache slot of the Mac.

Turbo 040

The installation of the DayStar Turbo 040 was designed to be easy. You must, however, take certain precautions:

1. **Back up all hard drives** before beginning the installation.

2. **Check your hard drives** with Apple's Disk First Aid.

3. **Update your hard drives' driver software** with a version known to be compatible with the 68040. If you used a non-Apple formatter, make sure that blind transfers are disabled (see page 118 for more information).

4. **Turn off the Macintosh** and remove the power cord and all accessory cables from the back of the Macintosh.

5. **Press the power switch** on rear of the Macintosh three times to drain the power.

6. **Place the Macintosh** on an unobstructed flat work area with the front of the Macintosh facing toward you.

Installing the DayStar Turbo 040

1. **Open the Macintosh.** (This procedure is detailed in the Apple IIci Owner's Guide).

Power Supply

Cache Slot
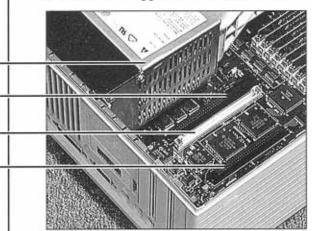
ROM Connector

NuBus Slots

Figure 66 – View of the Macintosh IIci

2. Put on the anti-static wrist strap.

3. Locate the cache slot and remove any existing cards.

4. With the component side of the Turbo 040 facing the power supply, align the board's connector over the 120 pin cache slot on the motherboard. Gently push the card down until it is fully seated.
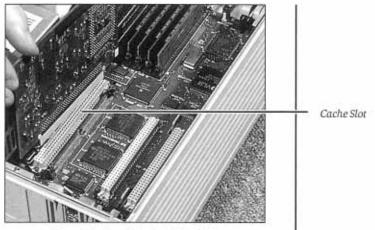
Cache Slot

Figure 67 – Installing the Turbo 040

You have installed the Turbo 040. Make sure all connections are tight. You must now test the installation and install the software.

Please read all of this section before you test the installation.

Plug the power cord into the back of the Macintosh. Turn the Macintosh on. You should hear the customary "BONG". If you do not hear the "BONG", go to the next page.

YES! I hear the "BONG".

1. Turn the power off and remove the power cord from the Mac.

2. Replace the case cover and screw. Attach all cables you have removed. Now you are ready to install the software. Please go to Chapter 9 in the Turbo 040 manual, "Installing the Turbo 040 Software."

Testing the installation

NO! I DO NOT hear the "BONG".

There is no response when the Macintosh is turned on.

or

A different sound (the failure tone) is heard when power is turned on.

If you experience any of the above, remove the power cord from the back of the Mac. Then, do the following:

1. Review the instructions and verify proper installation. Then,

   • Make sure the Turbo 040 is firmly seated in the cache slot.

2. If the failure tone was heard, make sure all of the SIMMs are properly installed.

3. Plug the power cord into the back of the Macintosh and restart as before.

If the startup process continues to fail, the board may have been damaged during installation or shipment. Contact your computer dealer or call DayStar Technical Support (9 am to 6 pm EST) at 404-967-2077 for further assistance. You can also contact DayStar online through CompuServe: 75300,1544, AppleLink: DAYSTAR.TECH, America Online: DAYSTAR OL or GEnie: DAYSTAR.