



ReadySystem™ Fanless

User's Guide

P/N 5001836A Rev B

Notice Page

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REVISION HISTORY

Revision	Reason for Change	Date
A, A	Initial Release	Apr/08
A, B	Added 1.0GHz CPU power measurements in table 1-2	June/09

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Audience

This manual provides reference only for computer design engineers, including but not limited to hardware and software designers and applications engineers. ADLINK Technology, Inc. assumes you are qualified to design and implement prototype computer equipment.

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Chapter 1 ReadySystem Fanless Setup

About the ReadySystem Fanless

The ReadySystem products are intended for users of turn-key embedded systems who prefer long life-cycle, configuration controlled computers over desktop grade systems with frequently changing motherboards. ReadySystem models feature the ReadyBoard Single Board Computer (SBC) which is available in a variety of processors and memory. The desired operating system (OS) is pre-loaded onto the internal 2 ½" hard disk drive (HDD) with capacity 40 GB or greater. Just use a Compact Flash card or USB memory stick to load your application software and you are ready to use your system applications.

Using this Guide

This guide provides the most efficient way to set up your ReadySystem Fanless with your desired operating system (OS). The instructions provided in this guide include:

- Removing the ReadySystem Fanless from the shipping container and inspecting the accessories
- Connecting peripherals to the ReadySystem Fanless
- Powering up the ReadySystem Fanless
- Opening the ReadySystem Fanless
- Replacing the Hard Disk Drive

Information not provided in this User's Guide includes:

- ReadyBoard specifications
- ReadyBoard header/pin numbers and definitions
- Operating system programming or operating instructions

NOTE Refer to ADLINK's Software Release Notes or other OS manufacturers' manuals for instructions when using OS software.
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Requirements

The following peripherals and devices are needed to make full use of the ReadySystem Fanless.

- Peripherals (customer provided):
 - ♦ PS/2 keyboard - optional
 - ♦ PS/2 mouse - optional
 - ♦ CRT, DVI, or LCD monitor (VGA) - optional
- Power Supply (customer supplied):
 - ♦ AC to DC (+12 or +24 VDC/6A) Power Brick (with plug-type mating connector)

CAUTION Using a power supply with a higher voltage will damage the system.

- Device/Peripheral connections:
 - ♦ Ethernet (LAN) connection
 - ♦ USB device connections
 - ♦ Up to two PC/104 expansion modules

Power Specifications

Tables 1-1 through 1-3 list the current draw values of the ReadySystem Fanless.

Table 1-1. System Power Requirements (ReadyBoard 620, 500 Mhz Geode LX 800)

Input Type	In-rush Current (Typical)	Idle	BIT* Current (Typical)
+12VDC	<u>Max</u> : 2.08A (24.96W)	0.64A (7.66W)	0.92A (11.09W)
+14VDC	<u>Max</u> : 2.08A (29.12W)	0.54A (7.62W)	0.79A (11.07W)
+16VDC	<u>Max</u> : 2.04A (32.64W)	0.53A (8.49W)	0.72A (11.44W)
+18VDC	<u>Max</u> : 1.92A (34.56W)	0.49A (8.84W)	0.67A (12.01W)
+20VDC	<u>Max</u> : 0.96A (39.20W)	0.49A (9.74W)	0.59A (11.85W)
+22VDC	<u>Max</u> : 1.96A (43.12W)	0.51A (11.25W)	0.57A (12.65W)
+24VDC	<u>Max</u> : 1.80A (43.20W)	0.42A (10.09W)	0.52A (12.44W)

Operating configurations:

- In-rush operating configuration includes 1.0GB DDR RAM, AMI BIOS, AC/DC external power supply, DC/DC internal power module, ReadyBoard 620, CRT monitor, HDD with WinXP Pro, keyboard and mouse.
- Idle operating configuration includes the same items as the in-rush configuration.
- BIT* = Burn-In-Test. Operating configuration includes Idle configuration as well as four serial loop backs, one parallel port with loop back, two Ethernet connections, three external USB flash drives, and one Compact Flash card.

Table 1-2. System Power Requirements (ReadyBoard 820, 1.0 GHz Pentium M CPU)

Input Type	In-rush Current (Typical)	Idle	BIT* Current (Typical)
+12VDC	<u>Max</u> : 2.72A (32.64W)	1.26A (15.12W)	1.72A (20.65W)
+14VDC	<u>Max</u> : 1.96A (27.44W)	1.09A (15.30W)	1.51A (21.14W)
+16VDC	<u>Max</u> : 1.76A (28.16W)	1.00A (15.99W)	1.35A (21.56W)
+18VDC	<u>Max</u> : 1.52A (27.36W)	0.89A (16.06W)	1.20A (21.54W)
+20VDC	<u>Max</u> : 1.56A (31.20W)	0.83A (16.57W)	1.02A (20.50W)
+22VDC	<u>Max</u> : 1.40A (30.80W)	0.78A (17.26W)	1.05A (23.01W)
+24VDC	<u>Max</u> : 1.32A (31.68W)	0.70A (16.82W)	0.94A (22.68W)

Table 1-3. System Power Requirements (ReadyBoard 820, 1.4 GHz Pentium M CPU)

Input Type	In-rush Current (Typical)	Idle	BIT* Current (Typical)
+12VDC	<u>Max</u> : 2.60A (31.20W)	1.25A (14.99W)	2.10A (25.22W)
+14VDC	<u>Max</u> : 2.12A (29.68W)	1.19A (16.66W)	1.65A (23.16W)
+16VDC	<u>Max</u> : 0.96A (15.36W)	1.01A (16.21W)	1.50A (24.02W)
+18VDC	<u>Max</u> : 0.92A (16.56W)	0.97A (17.39W)	1.33A (23.87W)
+20VDC	<u>Max</u> : 0.92A (18.40W)	0.84A (16.80W)	1.21A (24.19W)

Table 1-3. System Power Requirements (ReadyBoard 820, 1.4 GHz Pentium M CPU) (Continued)

+22VDC	<u>Max</u> : 0.88A (19.36W)	0.79A (17.38W)	1.07A (23.58W)
+24VDC	<u>Max</u> : 0.92A (22.08W)	0.73A (17.47W)	1.00A (24.09W)

Operating configurations:

- In-rush operating configuration includes 1.0GB DDR RAM, AMI BIOS, AC/DC external power supply, DC/DC internal power module, ReadyBoard 820, CRT monitor, HDD with WinXP Pro, keyboard and mouse.
- Idle operating configuration includes the same items as the in-rush configuration.
- BIT* = Burn-In-Test. Operating configuration includes idle configuration as well as four serial loop backs, one parallel port with loop back, two Ethernet connections, three external USB flash drives, and one Compact Flash card.

Environmental Specifications

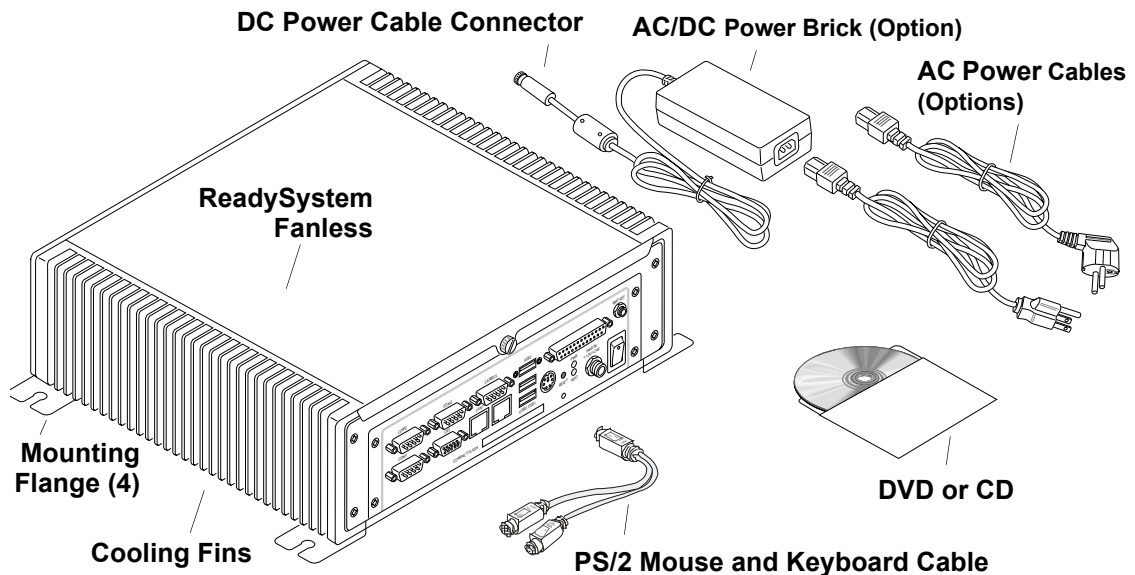
Table 1-4 provides the most efficient operating and storage condition ranges required for this system.

Table 1-4. Environmental Requirements

Temperature (Dependent on ReadyBoard version)			Humidity (Dependent on ReadyBoard version)	
Operating	Storage	Extended	Operating	Non-operating
0° to +60°C (+32° to +140°F)	-20° to +75°C (-4° to +167°F)	-20° to +60°C (-4° to +140°F)	5% to 90% relative humidity, non-condensing	5% to 95% relative humidity, non-condensing

What's in the Box

The Contents List identifies the items in the shipping box for the ReadySystem Fanless QuickStart Kit. See Figure 1-1.

**Figure 1-1. ReadySystem Fanless and Accessories**

Setup Steps

Follow the setup steps in this section in the exact order listed but skip any steps that do not apply to your application. References to chapters within this guide or to other ADLINK manuals are provided in this section for more information about installation and use of this ReadySystem Fanless.

Preparations

1) Open shipping box.	• Locate the ReadySystem Fanless Contents List. See Figure 1-1 on page 3. • Unpack the contents of the shipping box.
2) Verify contents.	• Verify the contents of the shipping box against the Contents List included with your ReadySystem Fanless. • If anything is missing or damaged, call your sales representative. Refer to the Amprom By ADLINK web page at www.adlinktech.com for contact information.
3) Verify support documentation.	<i>ReadySystem Fanless User's Guide</i> This document describes how to set up and power up the ReadySystem Fanless and is provided on the Amprom By ADLINK web page as a PDF file.
	<i>ReadyBoard Reference Manual</i> This document provides detailed information on the ReadyBoard and is located on the Amprom By ADLINK web page as a PDF file.
	<i>Operating System Manual(s)</i> These documents describe how to use the desired operating system (OS) with the ReadySystem Fanless and provide more detailed operating information. These documents may or may not be provided with the ReadySystem Fanless depending on the specific licensing requirements.

Setting Up the Work Space

CAUTION

To prevent damage to the ReadySystem Fanless, ensure sufficient clearance exists around the cooling fins for unrestricted airflow. See [Figure 1-1 on page 3](#).

The air temperature inside the enclosure could rise above the specified operating temperature limits if the airflow through the cooling fins is restricted.

4) Select workbench location.	• The workbench location should be a flat clean surface for setup and operation (including the connection of any external peripherals and optional devices). • Ensure sufficient airflow clearance exists around the complete enclosure.
5) Unpack ReadySystem Fanless.	• Remove the ReadySystem Fanless from its shipping container and place it on a flat work surface. • The ReadyBoard, the ReadySystem Fanless enclosure with hard drive, and the desired OS form a complete system, ready for operation.

Installing Mounting Hardware

6) Install mounting screws.	Install the mounting screws for surface or wall mounting to the four mounting flanges of the ReadySystem Fanless. See Figure 1-2 on page 5.
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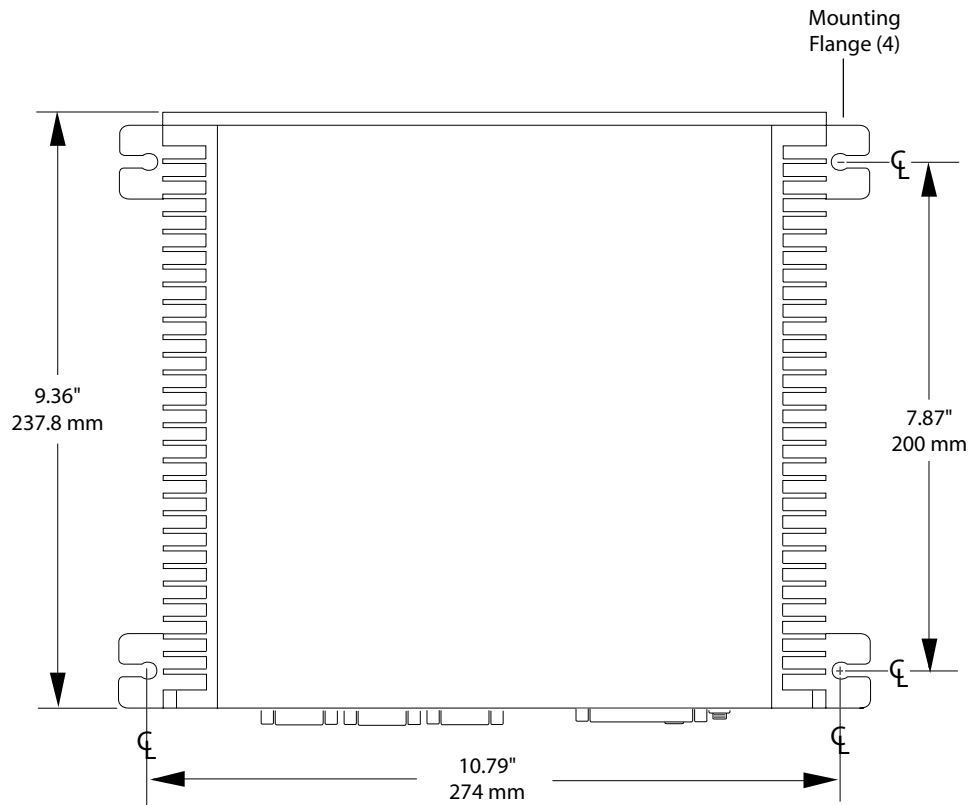
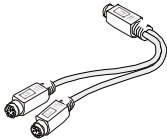
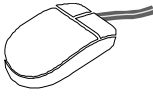
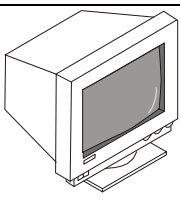


Figure 1-2. Top View of Enclosure with Mounting Dimensions

Locating the I/O Connectors

7) Connect the Y-cable and the respective peripheral cables/devices.	This includes the Y-cable for the PS/2 keyboard and mouse. Refer to Figure 1-3 on page 6 for locations and descriptions of the connectors and controls before making connections or powering on the ReadySystem Fanless.
	Connect the PS/2 keyboard & mouse Y-cable assembly to the keyboard and mouse ports on the ReadySystem Fanless I/O panel. This cable assembly provides two connectors for the PS/2 keyboard and PS/2 mouse ports with icons for the specific devices.
	Connect the keyboard to the PS/2 keyboard connector on the Y-cable.

Locating the I/O Connectors

	Connect the mouse to the PS/2 mouse connector on the Y-cable.
	Connect the CRT or LCD monitor through its 15-pin cable to the VGA connector on the I/O panel.

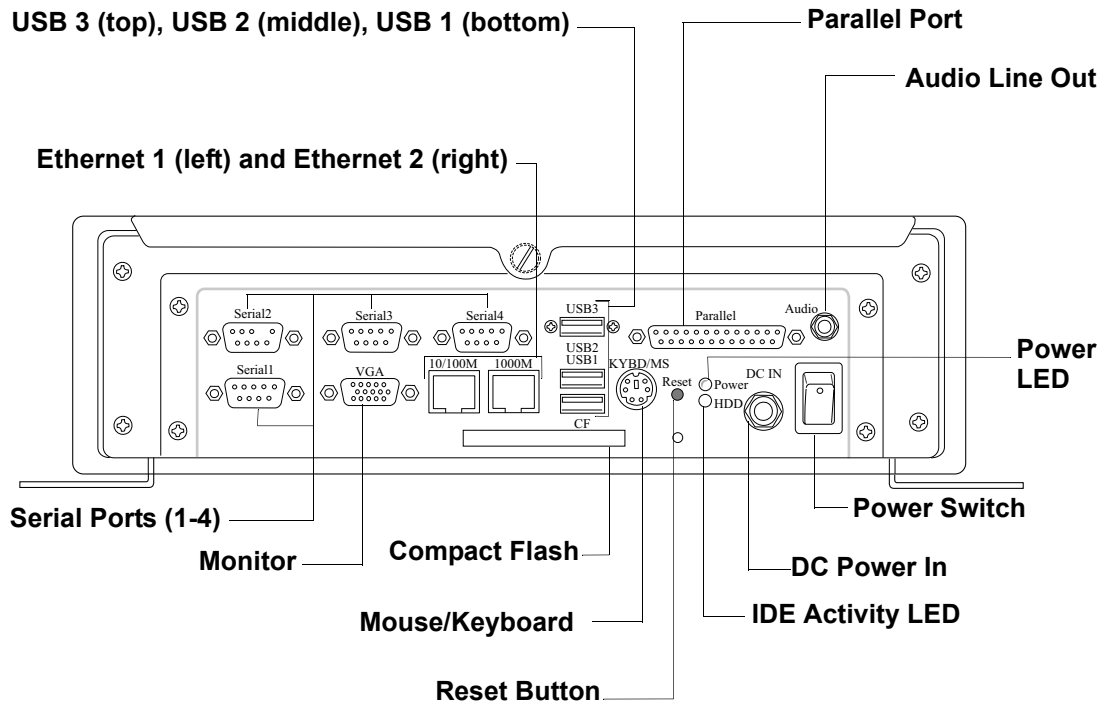


Figure 1-3. Flat View of ReadySystem Fanless I/O Panel

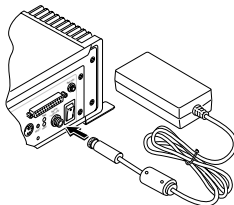
Table 1-5. I/O Panel Connectors, Controls, and Indicators

Control/Connector	Description
Power Switch	This power switch controls DC power and connects to the ReadyBoard from the I/O panel shown in Figure 1-3 .
DC Power In	This two-pin connector accepts input from the external DC In cable adapter shown in Figure 1-1 on page 3 .
Monitor	Use this standard 15-pin (DB15) female connector for the VGA video connection. This connector resides on the ReadyBoard.
Mouse/Keyboard	Use this PS/2 connector for keyboard and mouse connected through the required PS/2 Y-cable adapter provided in the ReadySystem Fanless QuickStart Kit or shipping container. The Y-cable has icons on each cable for the respective mouse or keyboard connection. This PS/2 connector is on the ReadyBoard.

USB 1, 2 & 3	These standard USB connectors reside on the ReadyBoard.
	NOTE These connectors may be labelled 0, 1, 2 in some ReadyBoard reference manuals.
10/100M (Ethernet 1)	This 8-pin (RJ45) Ethernet port is used for the 10BaseT/100BaseTX Ethernet connection and resides on the ReadyBoard.
1000M (Ethernet 2)	This 8-pin (RJ45) Ethernet port is used for the 1000BaseT Ethernet connection and resides on the ReadyBoard.
	NOTE This port may be another 10BaseT/100BaseTX port depending on the version of ReadyBoard.
Serial 1 & Serial 2	Use these two 9-pin (DB9) serial ports for the standard RS-232 connections to the ReadySystem Fanless. These connectors reside on the ReadyBoard.
Serial 3 & Serial 4	Use these two serial ports (DB9, 9-pin) for the standard RS-232 and RS-485/RS-422 connections to the ReadySystem. An internal cable connects these two serial ports to the ReadyBoard installed inside the enclosure.
Audio: Line Out	Use this audio out connector for standard stereo out connection from the ReadySystem Fanless.
Power LED	This green power-on indicator resides on the ReadyBoard. The LED glows when the ReadySystem Fanless power is turned on and dims when the power is turned off.
IDE Activity LED	This yellow activity indicator, shown in Figure 1-3 , resides on the ReadyBoard and flickers when IDE or compact flash card activity occurs in the ReadySystem Fanless.
Reset Button	Press this reset button, momentarily, to reset the ReadySystem (hard reset). This button resides on the ReadyBoard.
Compact Flash Cover and Slot	This compact flash cover and slot (not shown) protects the compact flash card if installed, and ensures good EMI shielding for the ReadySystem Fanless.
Compact Flash Socket (not shown)	The compact flash socket is provided on the underside of the ReadyBoard and accepts the compact flash card through the compact flash slot.
Hard Disk Drive (2 ½")	The enclosure holds a 2 ½" hard disk drive (HDD) mounted to an internal drive bracket and connected to the ReadyBoard.
Parallel Port	Use this 25-pin female connector for parallel printer signals.

NOTE If you wish to connect a Floppy Disk Drive (FDD) or CD-ROM to the ReadySystem Fanless, you can use one of the USB ports to connect the device.

Applying Power to the ReadySystem Fanless

8) Follow these steps to apply power to the ReadySystem Fanless 	• Connect the AC Power In cable to the power brick. See figure Figure 1-1 on page 3. • Plug in the DC cable from the power brick to the DC IN jack of the ReadySystem Fanless. See Figure 1-3 on page 6. NOTE Power supplied to the unit must be within the allowed +12VDC +/- 5% to +24VDC +/- 5%. Failure to provide proper power may damage the system and void the warranty. • Plug in the CRT monitor's power cord to an AC outlet, and turn on the monitor. • Plug in the AC Power In cable adapter to an AC outlet. • Press the ReadySystem Fanless power switch (≈ 1 second) before continuing.
9) Verify the ReadySystem Fanless satisfactorily powers on.	• If you want to enter the BIOS Setup, press the key during POST at the prompt. Use BIOS Setup during the initial boot to set the desired options. • You should see POST complete successfully before the system starts loading the operating system. If you are using Linux, the boot loader will appear first, similar to the one shown below with the desired OS name displayed. NOTE The optional 2 1/2" hard disk drive comes with partitions for the OS and swap space.
(The Linux 2.6 OS is shown as an example.) GNU GRUB version 0.95 (632k lower/250768 upper memory) Linux Kernel 2.6.x-xxx (recovery mode) Use the ↑ and ↓ keys to select which entry is highlighted. Press Enter to boot the selected OS, 'e' to edit the commands before booting, 'a' to modify the kernel arguments before booting, or 'c' for a command-line. RdySysFanless Linux_Boot_a	

NOTE The GNU GRUB boot loader screen will continue to display indefinitely unless you execute one of the listed options.

10) Using the Operating System (OS)	• You should see a prompt on the monitor screen indicating the OS is loading, or has loaded. • If you are required to log into the OS, use <i>root</i> for the admin name and <i>software</i> as the password to log on. If you are logging in as a normal user, use <i>software</i> for the name and password. • Refer to the desired OS manual (ADLINK's or OS Manufacturer's) that may be provided with the ReadySystem, depending on licensing agreements. • If you require drivers not available on the 2½" HDD inside the ReadySystem, refer to ReadyBoard Support Software CD-ROM or DVD for additional drivers and instructions.
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Chapter 2 ReadySystem Fanless Components

This chapter identifies components inside the ReadySystem Fanless enclosure. These components include the DC/DC Power Module, cables, heat pipe (if required), and the ReadyBoard Single Board Computer (SBC).

NOTE Refer to the specific ReadyBoard Reference Manual for more information than this chapter provides.

ReadySystem Fanless Assembly Procedures

The following procedures describe how to gain access to the ReadySystem Fanless internal components and to replace the ReadySystem Fanless Hard Disk Drive.

Tools Required

Use these tools to install and remove components into or out of the ReadySystem Fanless enclosure.

- Phillips #2 screwdriver
- Anti-static service kit - Use a complete anti-static service kit (or the equivalent) to remove or install the ReadyBoard. A complete anti-static service kit should include a static-dissipating work surface, a chassis clip lead, and a wrist or ankle strap.

Opening the ReadySystem Fanless Enclosure

Always use the following procedure when gaining access to the ReadySystem Fanless internal components.

To remove the cover of the ReadySystem Fanless

1. Initiate a shut down sequence through the OS, or press the Power Switch for 4-6 seconds to turn off power. See [Figure 1-3 on page 6](#).

NOTE If the ReadySystem Fanless power has been turned off, the cover already removed, and the DC Power cable disconnected, skip to [“Replacing the ReadySystem Fanless Hard Disk Drive \(HDD\)” on page 13](#).

2. Make sure the power LED on the I/O panel is completely off.
3. Disconnect the power cable from the DC Power In connector on the I/O panel.

CAUTION Components on the ReadyBoard are sensitive to static electricity and can be easily damaged by improper handling. Do the following when handling the ReadyBoard.

Always use an anti-static wrist/ankle strap and a grounding mat.

Before you handle the ReadyBoard, touch a grounded, unpainted metal surface to discharge any static electricity.

4. Remove the cover from the ReadySystem Fanless enclosure. See [Figure 2-1](#).
 - a. Remove the cover screw from the cover.
 - b. Slide the cover out of the grooves at the top of the enclosure.
 - c. Set aside the cover and screw for later installation.

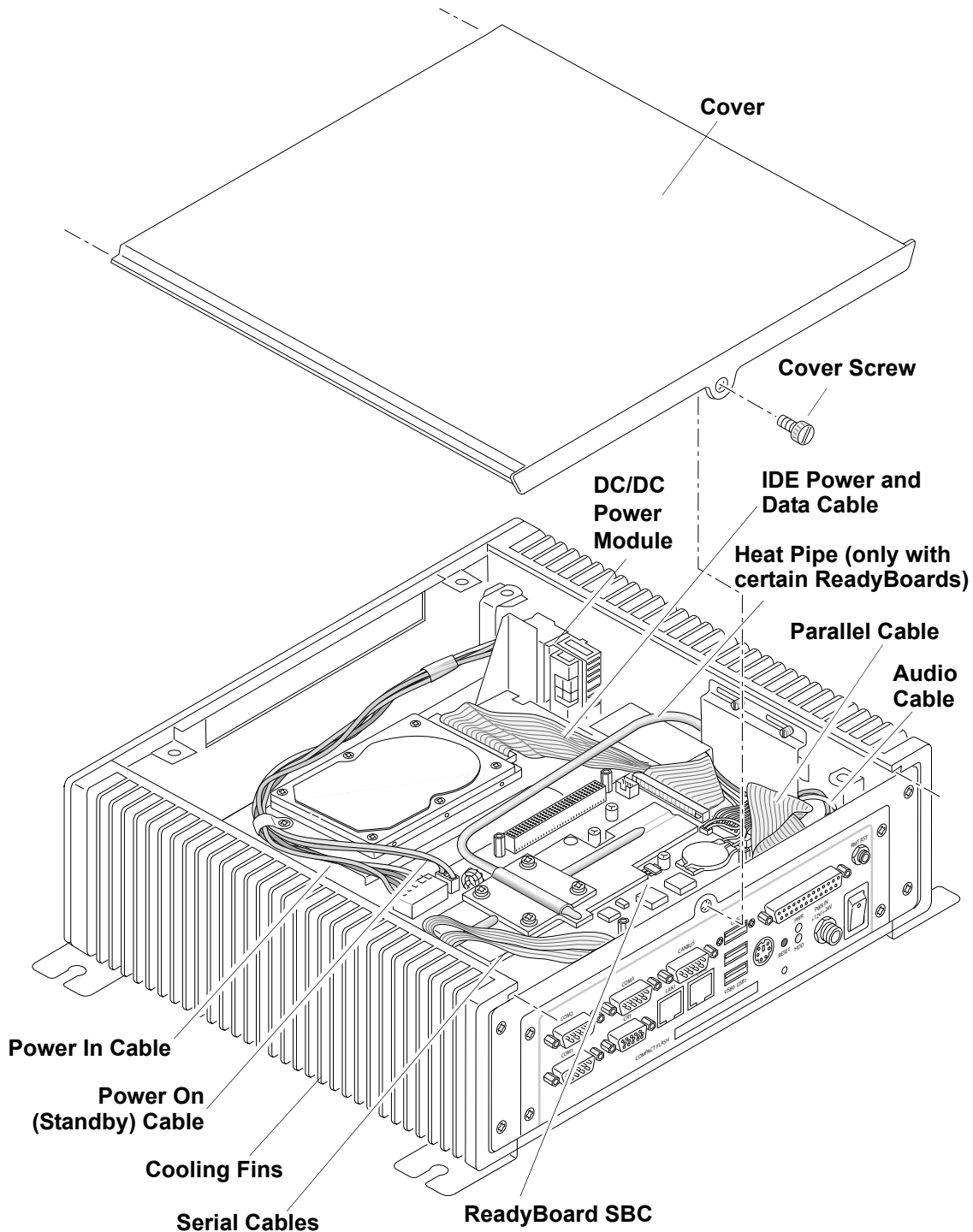


Figure 2-1. Exploded View of ReadySystem Fanless Assembly with Cover and Screws

Replacing the ReadySystem Fanless Hard Disk Drive (HDD)

Use the following steps to remove and install the optional 2.5" HDD.

CAUTION

Do not touch the drive with magnetic objects (such as magnetic screw drivers) and avoid placing items that are sensitive to magnets near the HDD, such as credit cards and employee ID cards.

To Remove the HDD

1. Remove the four screws that mount the HDD to the chassis as shown in [Figure 2-2](#).

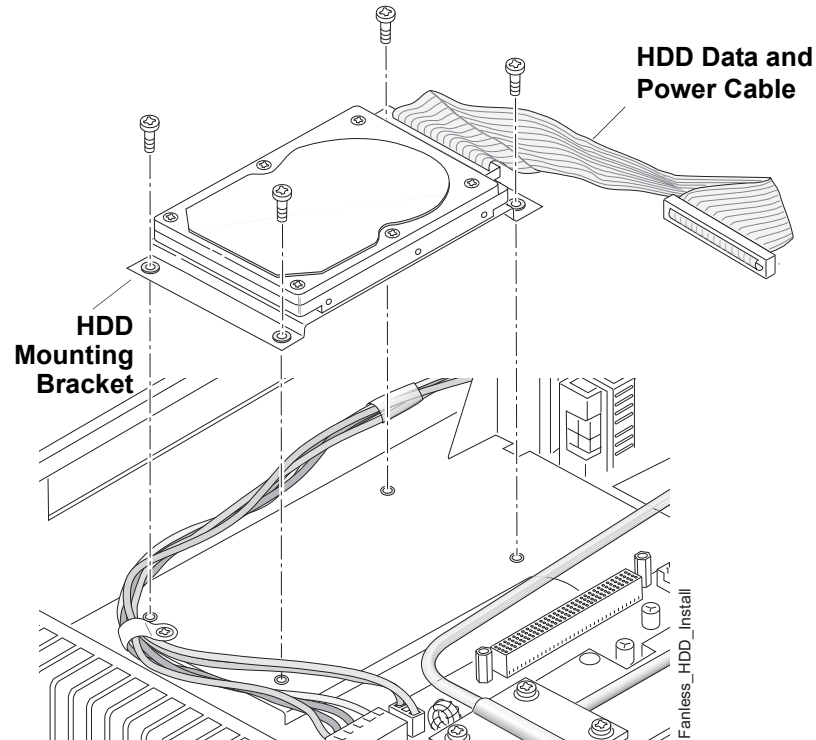


Figure 2-2. Exploded View of HDD and Drive Bracket

2. Unplug the data/power cable from the HDD.
3. Remove the mounting bracket from the HDD. See [Figure 2-3](#).

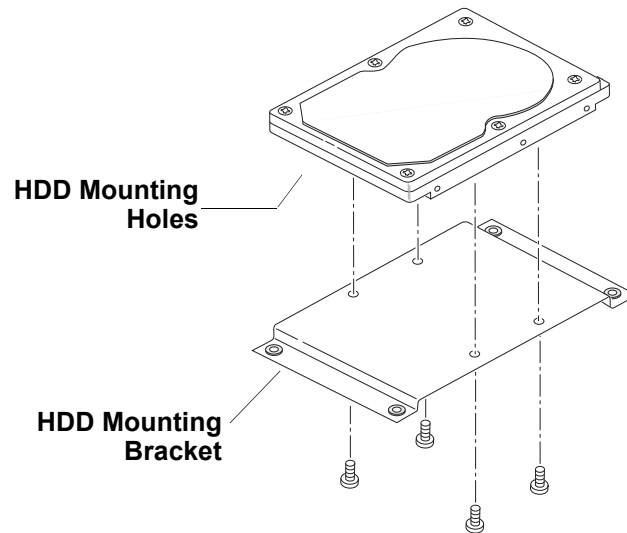


Figure 2-3. Exploded View of HDD and Bracket

4. Place the HDD on an anti-static work surface.

To Install the HDD

1. Align the mounting holes on the HDD with the holes on the drive bracket as shown in [Figure 2-3 on page 14](#).
2. Install the four original screws using hand tension to secure the drive to the bracket.
3. Plug in the HDD data and power cable to the correct pins on the HDD.
4. Mount the bracket to the chassis using hand tension and the four mounting screws in the orientation shown in [Figure 2-2 on page 13](#).

NOTE Refer to the ReadyBoard Reference Manual for locations of the cable headers.
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Appendix A Technical Support

ADLINK Technology, Inc. provides a number of methods for contacting Technical Support listed in the [Table A-1](#) below. Requests for support through the Ask an Expert web page are given the highest priority, and usually will be addressed within one working day.

- **ADLINK Ask an Expert** – This is a comprehensive support center designed to meet all your technical needs. This service is free and available 24 hours a day through the Ampro By ADLINK web page at <http://www.adlinktech.com/AAE/>. This includes a searchable database of Frequently Asked Questions, which will help you with the common information requested by most customers. This is a good source of information to look at first for your technical solutions. However, you must register online if you wish to use the Ask a Question feature.
- **Personal Assistance** – You may also request personal assistance by creating an Ask an Expert account and then going to the Ask a Question feature. Requests can be submitted 24 hours a day, 7 days a week. You will receive immediate confirmation that your request has been entered. Once you have submitted your request, you must log in to go to the My Stuff area where you can check status, update your request, and access other features.
- **InfoCenter** – This service is also free and available 24 hours a day at the Ampro By ADLINK web page at <http://www.adlinktech.com>. However, you must sign up online before you can login to access this service.

The InfoCenter was created as a resource for embedded system developers to share ADLINK's knowledge, insight, and expertise. This page contains links to technical manuals, white papers, specifications, and additional technical information.

Table A-1. Technical Support Contact Information

Method	Contact Information
Ask an Expert	http://www.adlinktech.com/AAE/
Web Site	http://www.adlinktech.com
Standard Mail	ADLINK Technology, Incorporated 5215 Hellyer Avenue San Jose, CA 95138-1007, USA

Appendix B Physical Dimensions

Figure B-1 shows the ReadySystem Fanless enclosure dimensions.

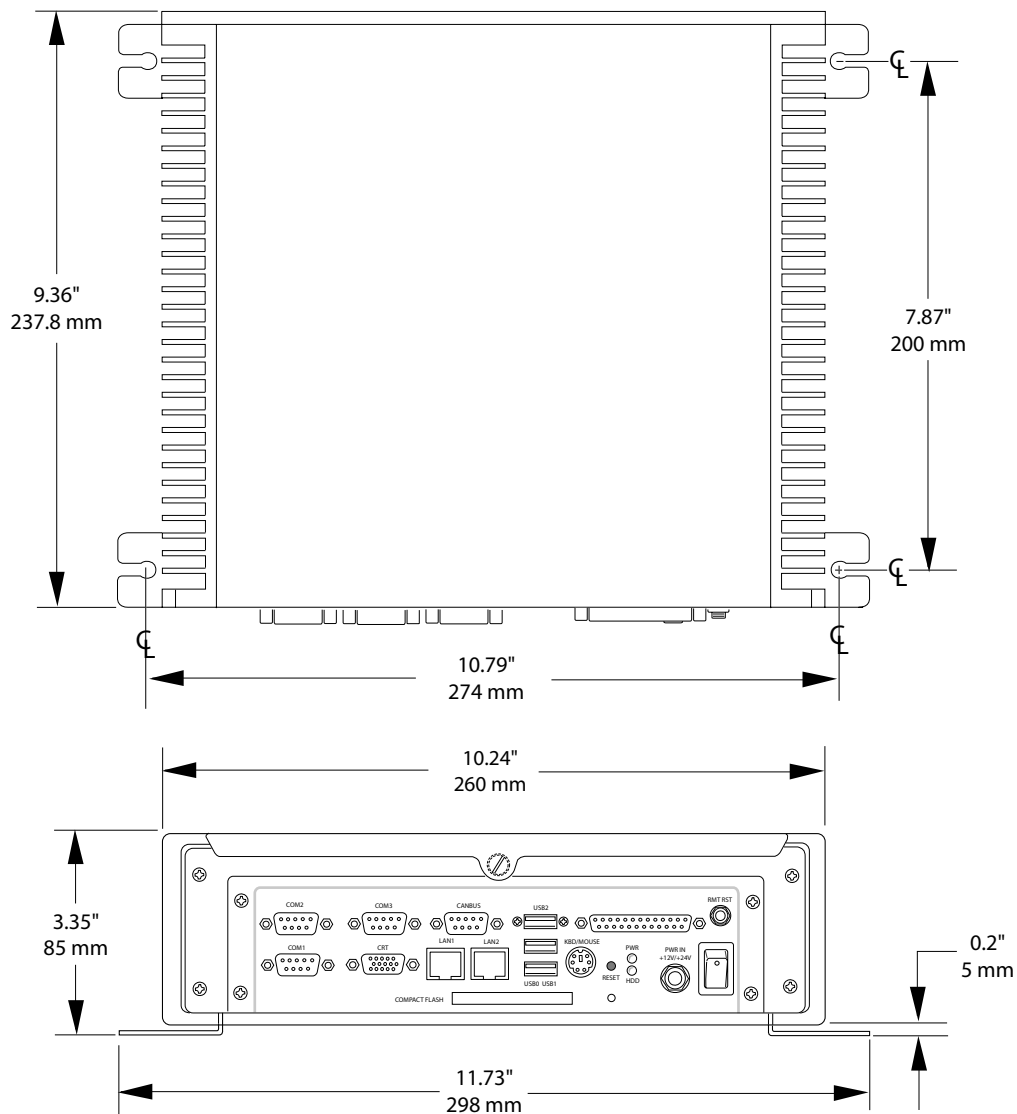


Figure B-1. Width and Depth Dimensions

