Diamond Systems
Athena II Single Board Computer
FastStart Guide

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This document describes a series of quick steps to bring up and verify correct operation of your new Athena II Single Board Computer. All the elements you will need to complete this assembly are provided in the Athena II Development Kit (Diamond Systems # DK-ATH2-01). Once you have your Athena II board up and running, you can make further adjustments using additional elements that you supply.

The set of steps involve unpacking and identifying each part in the Athena II Development Kit, attaching a minimum subset of cables required to verify operation, and powering the board.

Quick List of Assembly Steps

1. Install the IDE FlashDisk module with bootable Linux binary on primary IDE connector J8

2. Install the VGA cable (#698030) and monitor on connector J25

3. Connect the keyboard and mouse

    a. For PS/2 connections install combination cable (C-PRZ-01) on connector J3 then connect PS/2 keyboard and mouse

    b. For USB connections install USB cable (6981012) on connector J5 for USB ports 0&1 or USB cable (6981032) on connector J21 for USB ports 3&4 and connect USB keyboard and mouse

4. Connect the AC Adapter to the power connector J11

5. Turn on the monitor and plug in the AC Adapter. The Athena II board will boot to a Linux prompt.

The Athena II Development Kit (DK-ATHM500A-01)

The Athena II Development Kit contains all the pieces necessary to bring up and verify correct operation of your Athena II Single Board Computer. The following table lists the elements of the Athena II Development Kit. Each of the elements is shown in the picture in Figure 1. It is suggested that you unpack and identify each item at this time. If any item is missing, please contact Diamond Systems Technical Support.

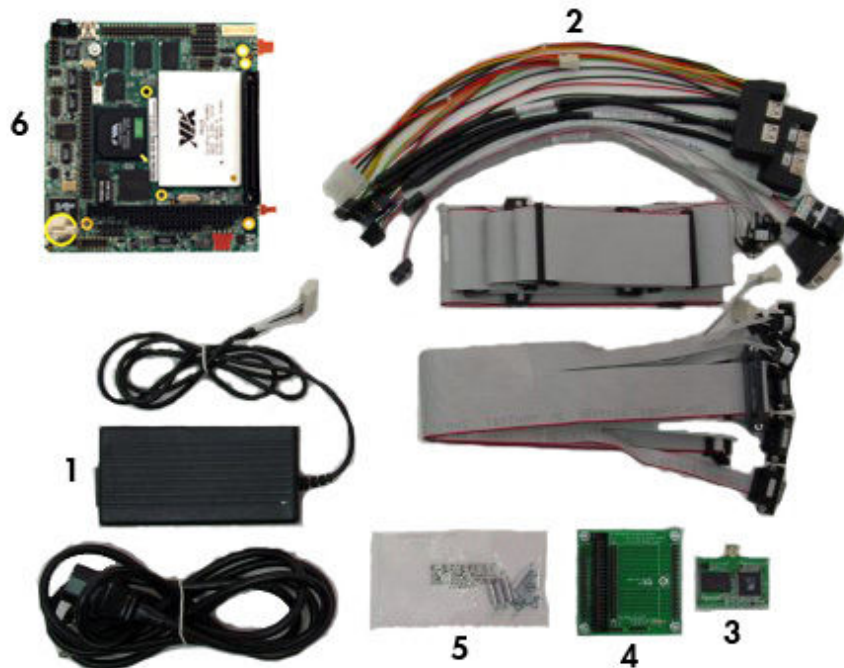| Photo No.	DSC Number	Description
	891001	USB Floppy Drive, External
1	PS-5V-04	AC Adapter, 5VDC / 8A
2	C-ATH-KIT	Athena II Cable Kit
3	FD-218-XT	128MB FlashDisk with bootable Linux and CD
4	ACC-IDEEXT	FlashDisk / IDE Extender Board
5	MTG104	PC/104 Mounting Hardware Kit
6	ATHM500-256A	Athena II SBC, 500MHz, 256MB RAM, data acquisition
7	6710010	CD-ROM, DSC files (not shown)
8	7460002	Guide, Athena II Fast Start Guide (not shown)

Figure 1. Athena II Development Kit

Athena II Cable Kit (C-ATH-KIT)

| Photo No.	DSC No.	Description
1	**6981032**	USB cable, ports 2 & 3
2	**6981012**	USB cable, posts 0 & 1
3	**6981009**	Power input cable
4	**6981006**	Power output cable
5	**6981011**	External battery cable
6	**C-PRZ-02**	6-wire Ethernet cable with panel-mount RJ-45 connector
7	**C-PRZ-01**	Breakout combination cable: serial, parallel, PS/2, utility
8	**6981030**	VGA cable
9	**6981031**	Audio cable
10	**C-50-18**	Data acquisition, 50 conductor 0.1" ribbon cable
11	**6981004**	IDE, 44 conductor 0.2mm ribbon cable
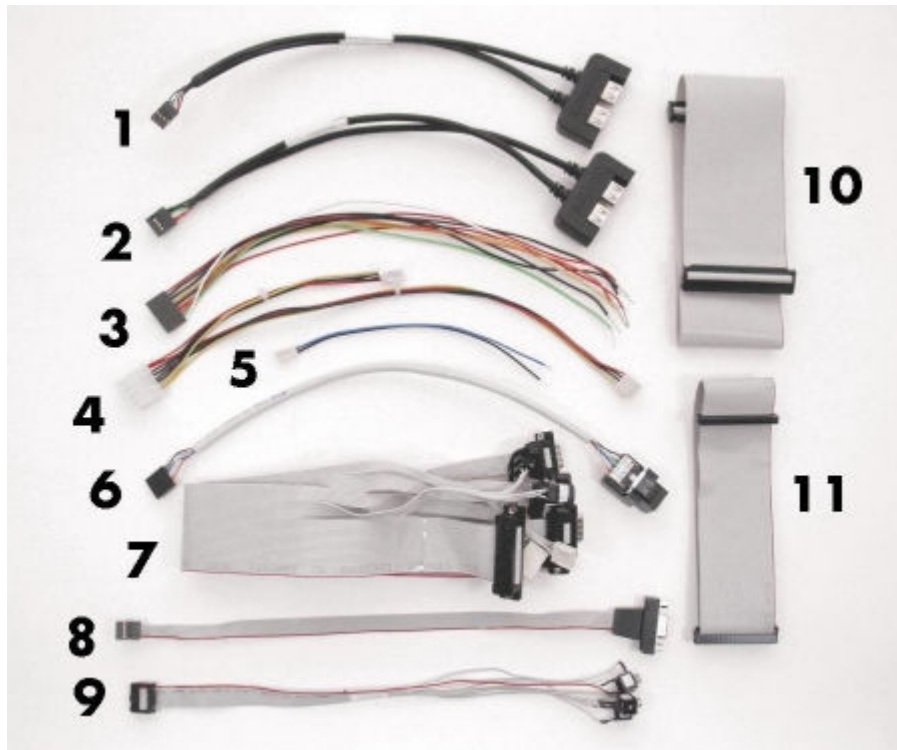
Figure 2. Athena II Cable Kit

Other Athena II Development Kit Contents

128MB FlashDisk with bootable Linux

The Athena II Development Kit contains a 128MB IDE FlashDisk with a bootable Linux binary. Diamond Systems' Flash Linux provides a quick-boot compact Linux environment based on the Slackware 2.6 kernel. It is preconfigured for Athena II and includes our Universal Driver for the Athena II data acquisition features. Flash Linux utilizes the Minix file system for enhanced file protection during power loss or improper shutdown, and the Lilo bootloader for a quick 15 second boot time. The Athena II Development Kit also includes a CD which provides a binary image of the FlashDisk files that you may copy freely for use on Athena II SBCs.

Linux is also available on a hard drive (DSC# DK-LINUX-HD20) which includes all the features of the CD plus a current desktop Linux distribution, including a full set of software development tools ready to run. This can be used to create an instant development system running on the target SBC, so you can develop application code and run it immediately on the same system. Please contact your Diamond Systems representative for more information and a price quotation.

ACC-IDEEXT FlashDisk Programmer Board

In the event that you wish to connect both a FlashDisk and an IDE hard disk drive or CD-ROM drive to your Athena II board, the Athena II Development Kit comes with a FlashDisk Programmer board. When connected directly to the Athena II board, the FlashDisk occupies the primary IDE interface connector which does not allow for a second drive to be attached to the primary IDE connector. The FlashDisk Programmer Board enables both the connection of the FlashDisk drive and a second, slave IDE device, using either a 40-pin or 44-pin IDE connector.

PS-5V-04 AC Power Adapter

To enable your immediate use of the Athena II board, the Athena II Development Kit contains an AC Adapter with a connector that plugs directly into the power input connector of the Athena II board. Operating with 110VAC to 240VAC input current, the AC Adapter provides sufficient current at 5VDC to power the Athena II board.

Diamond Systems Software and Documentation CD

The Athena II Development Kit contains the Diamond Systems' Software and Documentation CD which provides Athena II manuals (including this manual) and software. Software includes drivers for components specific to the Athena II board for Windows XP and Linux along with a demonstration binary of Windows CE. The CD also contains full documentation and software for Diamond Systems Universal Driver Software that supports the analog and digital I/O capabilities of Athena II. This Universal Driver Software will operate under DOS, Windows XP/2000, Linux, and Windows CE.

Assembling your Athena II System

Install the FlashDisk

The flashdisk module installs directly on the IDE connector J8 and is held down with a spacer and two screws onto a mounting hole on the board. Mounting hardware is provided in the Athena II Development Kit in the packet marked with DSC #6801008.

1. The FlashDisk module contains a jumper to determine master or slave mode. The FlashDisk must be in master mode for the BIOS to automatically detect the FlashDisk at boot time. Insure that the jumper is over pins 3-4 to set master mode (See Figure 3).
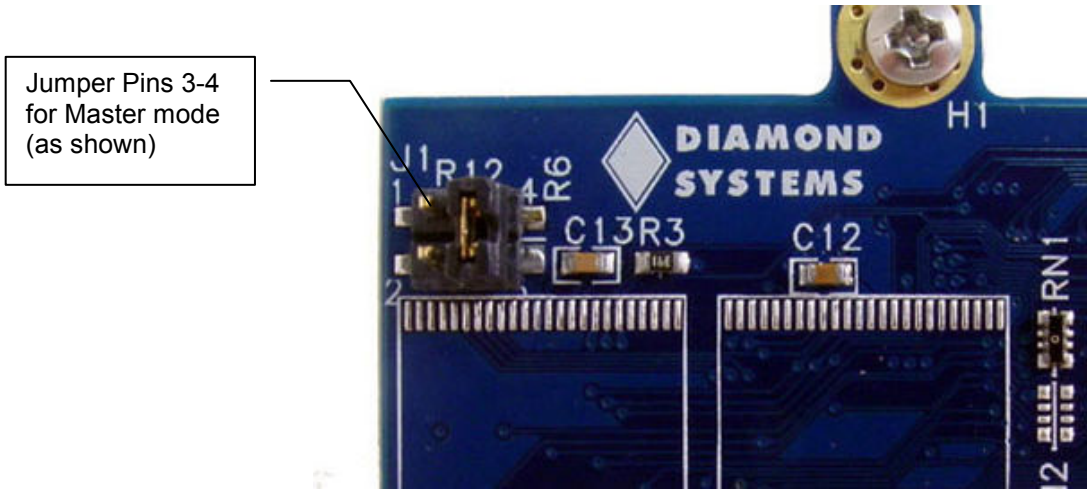
Jumper Pins 3-4 for Master mode (as shown)

Figure 3. Layout of FlashDisk Module showing Master/Slave jumper

2. Connect round spacer (DSC# 6841002) to the FlashDisk module using one 2-56x pan head screw and one #2 flat washer. The spacer should be on the side of the FlashDisk module with the female IDE connector. The washer should be on the top of the spacer. See Figure 4.

3. Attach the female IDE connector on the FlashDisk to the IDE connector J8 on the Athena II board.

4. Fasten the FlashDisk in place by inserting one 2-56x pan head screw from the solder side of the Athena II board into the round spacer.

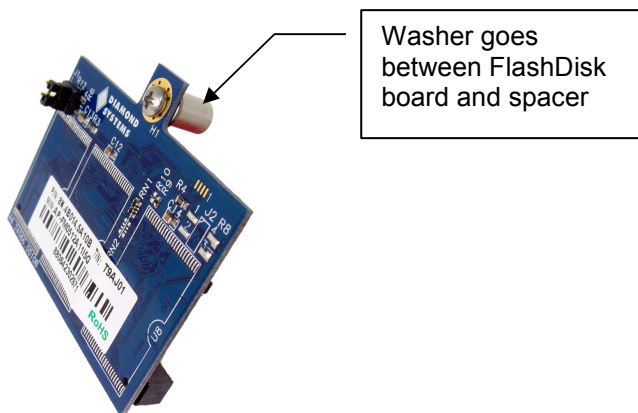Figure 5 shows the appearance of the Athena II board with the FlashDisk attached.

Washer goes between FlashDisk board and spacer

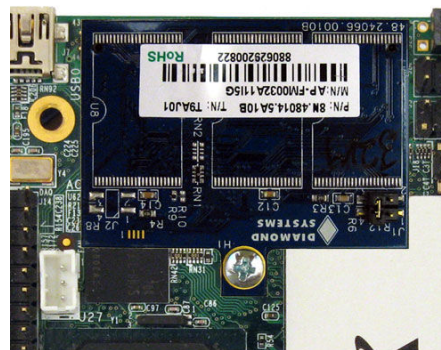**Figure 4. FlashDisk Installation**   **Figure 5. FlashDisk Installed on Athena II**

Install the Video Display

Athena II SBC supports both a VGA Monitor and an LVDS flat panel interface. Because of the complexities required in interfacing the flat panel, this FastStart Guide assumes usage of a VGA-compatible monitor.

1. Connect the video cable (DSC# 698030) provided in the Athena II Cable Kit to the VGA connector J25 on the Athena II board.

2. Connect a VGA-compatible CRT display to the female DB15 connector at the other end of the video cable.

Install the Keyboard and Mouse

The Athena II SBC supports either a legacy PS/2 keyboard and mouse interface or a USB keyboard and mouse interface. For the PS/2 interface, connect the Breakout cable (DSC #C-PRZ-01) provided in the Athena II Cable Kit to the Keyboard / Mouse connector J3 on the Athena II board. Connect a PS/2 keyboard to the mini-DIN connector with KB labeled on the connector. Connect a PS/2 mouse to the mini-DIN connector with MS labeled on the connector.

For the USB interface, connect one of the Port 0/1 USB cable (DSC# 698012) provided in the Athena II Cable Kit to the two USB connectors (J5) on the Athena II board. Connect a USB keyboard to one of the Type A USB connectors at the other end of the USB cable. Connect a USB mouse to one of the Type A USB connectors at the other end of the USB cable. Connect USB mouse and keyboard the same way when using USB ports 2/3, except use cable (DSC# 698032) on connector J21.

Note that a mouse is NOT required to prove correct operation of the Athena II single board computer.

Connect Power

Connect the PS-5V-03 AC Adapter provided in the Athena II Development Kit to connector J11 on the Athena II Board

When the FlashDisk, all cables and the AC Adapter are connected as required, your set up should appear as shown in Figure 7.

Figure 7. Athena II with all cables installed

Apply Power to Boot the Board

Plug in the video monitor and turn it on.

Attach the power cord provided to the PS-5V-03 AC Adapter and plug the power cord into the wall. The Athena II Board will power up immediately. After the BIOS information display, you should see the Diamond Systems' Linux information display and receive a prompt.

Demonstrate Data Acquisition Operation

The Diamond Systems' Linux installed on the FlashDisk contains software demonstration programs for Athena II's data acquisition features. You may access the directory of these programs by typing:

>cd /root/ATH_DEMO

In this directory resides the source code, makefile and executables of the demonstration programs. Each demonstration program executable and source code is contained in its own directory. A good first demonstration program to run is the DSCADAutoCal program.

The DSCADAutocal program will calibrate the A/D data acquisition circuitry to guarantee accurate A/D input readings. To run the program type the following while in the demonstration programs directory:

>./DSCADAutoCal/DSCADAutoCal

The program will ask the user to input the following values:

- Base address: This is the base address of the board determined is 0x280. For demonstration purposes type 0x280.
- Range to calibrate: This is the A/D modes users would typically calibrate. The modes are 0-3, 5-7. For demonstration purposes type 255.
- Range to boot: This is the A/D mode users typically boot up the board in. The modes are 0-3, 5-7. For demonstration purposes type 0.

Once initiated the program will calibrate the mode the user specified. The process may take up to 15 seconds, after which the error values will be printed on screen for each mode; values less than +-2 are within tolerance.

For more details regarding A/D modes refer to section "Input Ranges and Resolutions" in the Athena II User's Manual. For more information regarding the software API and functions please refer to the DSCUD software manual at http://docs.diamondsystems.com/dscud/manual_Main+Page.html.

Adding an IDE Hard Disk Drive or CD-ROM to your system

You may also attach an additional IDE device such as a hard disk drive or CD-ROM to your system while continuing to use the provided FlashDisk as a primary boot device. The Flash Disk Programmer Board (DSC# ACC-IDEEXT) provided with the Athena II Development Kit enables the simultaneous connection of both a FlashDisk module and a standard IDE hard drive to the primary IDE connector on the Athena II board.

Install the FlashDisk Programmer Board (FDPB) and IDE Device

1. Install the FlashDisk to connector J2 on the FlashDisk Programmer Board using the instructions provided on page 5.

2. Connect the J1 connector on the FDPB to the primary IDE connector (J8) on the Athena II SBC with the 44-pin ribbon cable (DSC# 698004) provided in the Athena II Cable Kit.

3. Connect your IDE device to either the 40-pin .1" spacing J4 connector on the FDPB or the 44-pin 2mm spacing J3 connector on the FDPB. A FlashDisk and any second IDE device (i.e. HDD or CD-ROM) may be connected simultaneously using this board with proper master / slave jumper configurations on both the FlashDisk and the IDE device. To boot from the FlashDisk, insure that the FlashDisk is configured as the master and your IDE device is configured as a slave. Power for the additional IDE device must be provided from an external power source.
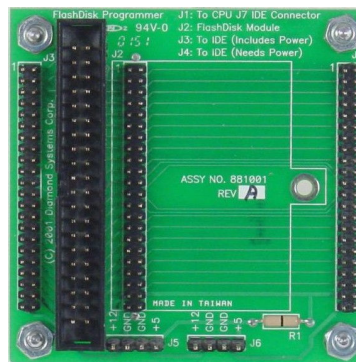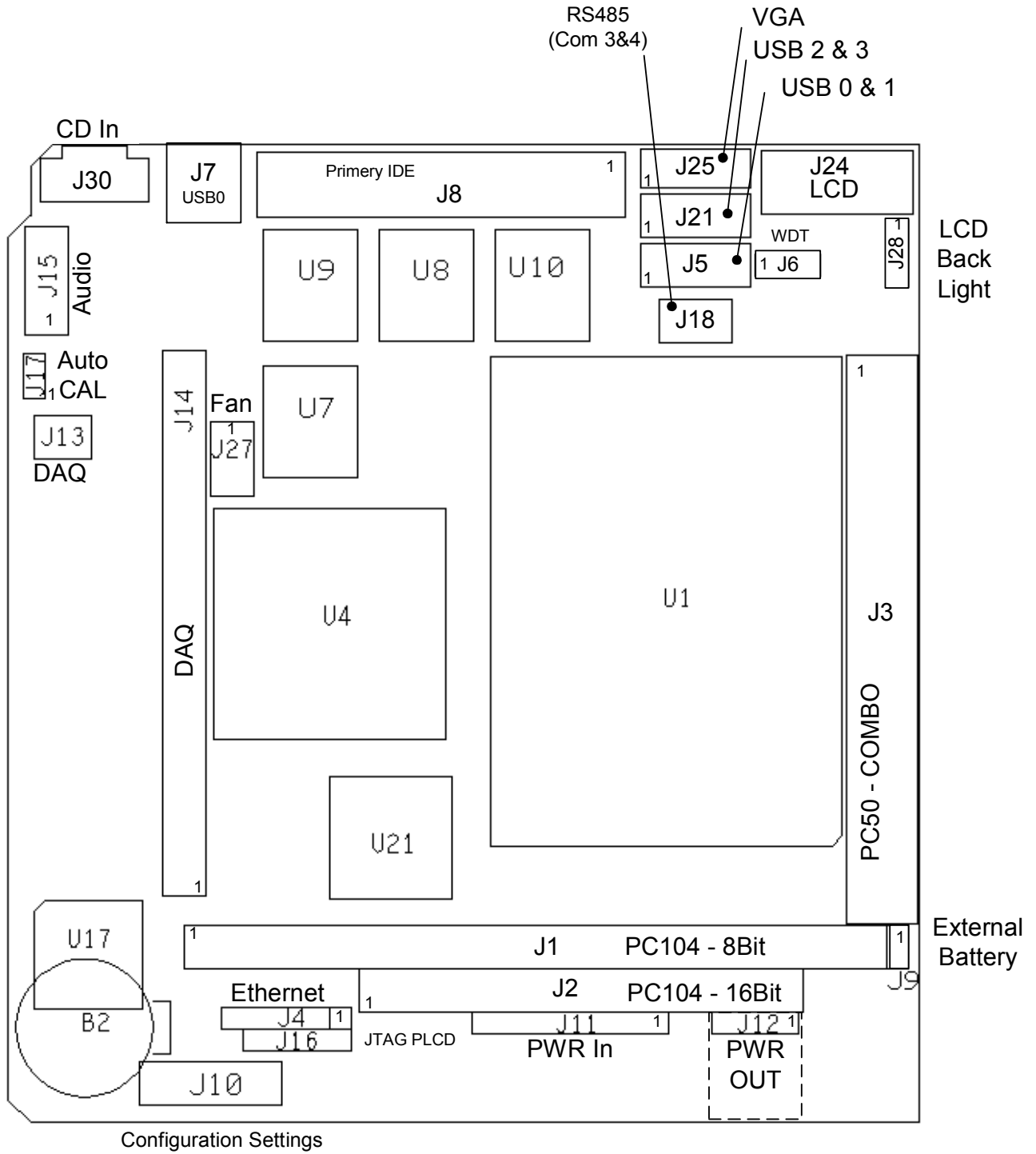

<u>Figure 8 : ACC-IDEEXT *FlashDisk Programmer Board*</u>

Figure 9 : Athena II connector locations and pin 1 designations