

# **Diamond Systems Poseidon Single Board Computer FastStart Guide**

**DSC Document #7461010 Rev A**

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This document describes a series of quick steps to bring up and verify correct operation of your new Poseidon EPIC single board computer (SBC). All the elements you need are provided in the Poseidon Development Kit (Diamond Systems #DK-PSDE10-01 or #DK-PSDC20-01). Once you have your Poseidon SBC up and running, you can make further adjustments using additional elements that you supply.

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

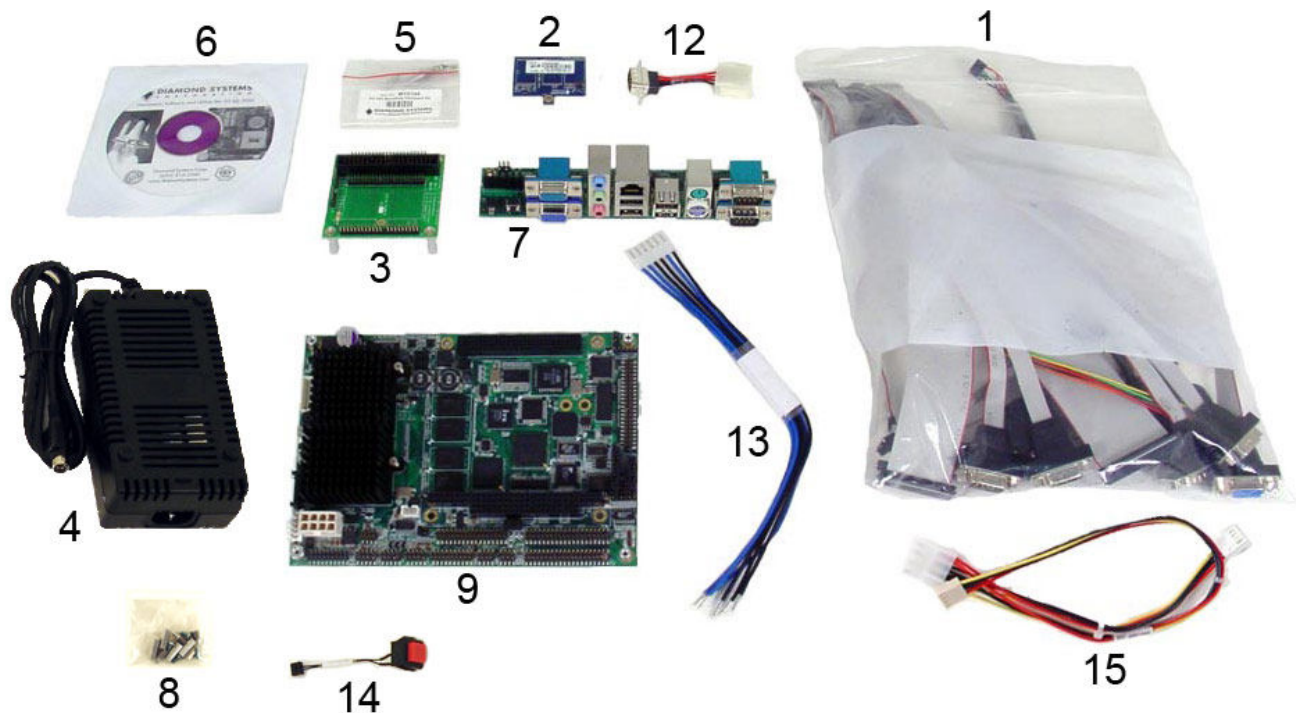
## **Quick List of Assembly Steps**

1. Install the IDE FlashDisk Drive with bootable Linux binary on primary IDE connector CN2
2. Install the Poseidon Panel Board (#PNL-PSD-01) on connectors CN14 to CN21
3. Install a VGA monitor.
4. Install either a PS/2 keyboard / mouse or USB keyboard / mouse
5. Connect the AC Adapter to the power connector CN9
6. Turn on the monitor and plug in the AC Adapter. The Poseidon board will boot to a Linux prompt.

## Poseidon Development Kit (DK-PSDE10-01 or DK-PSDC20-01)

The Poseidon Development Kit contains all the pieces necessary to bring up and verify correct operation of your Poseidon SBC. The following table lists the elements of the Poseidon Development Kit and each is shown in Figure 1. Please unpack and identify each item at this time. If any item is missing, please contact Diamond Systems Technical Support at 1-800-36-PC104.

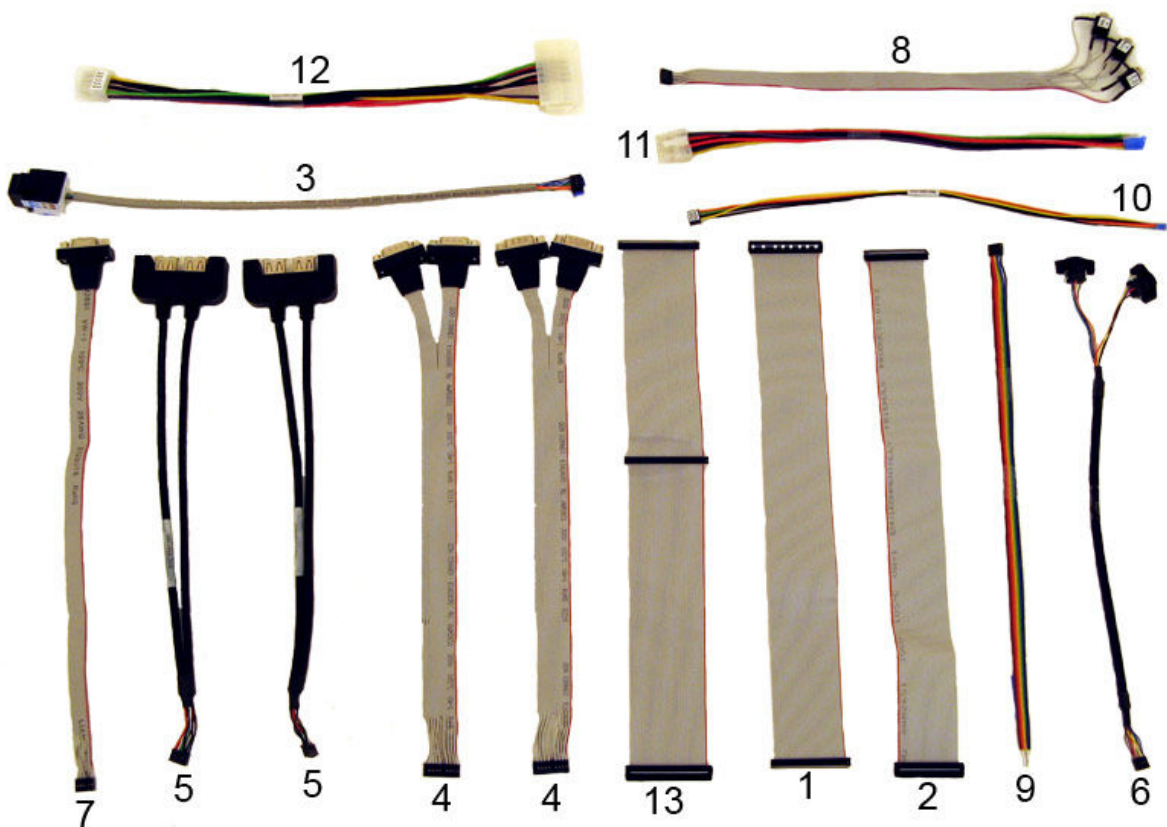
Photo No.	DSC Number	Description
1	C-PSD-KIT	Poseidon Cable Kit
2	DK-LINUX-PSD512	512MB FlashDisk with bootable Linux, CD
3	ACC-IDEEXT	FlashDisk Programmer Board with 40-pin and 44-pin IDE Cables (not shown)
4	PS-5V-04	AC Adapter, 100-240VAC in, 5VDC / 8A out
5	6801020	Poseidon Panel Board Mounting Hardware (not shown)
6	6710010	Diamond Systems CD with driver software and manuals
7	PNL-PSD-01	Poseidon Panel I/O Board
8	MTG104	PC/104 Mounting Hardware
9	PSDE10-256A PSDC20-512A	Poseidon SBC, either 1.0GHz with 512MB RAM or 2.0GHz with 512MB RAM. Both are provided with built-in data acquisition
12	6981093	Transition cable for power interface between AC Adapter and Panel I/O board
13	6981092	Cable for power interface between Panel I/O Board and optional PC/104 power supply module
14	6981094	Power button interface to Panel I/O Board Utility connector
15	6981006	Auxiliary power interface for 40-pin IDE devices (CD-ROM)
	7461010	Poseidon FastStart Guide (this manual)



**Figure 1. Poseidon Development Kit**

## Poseidon Cable Kit (C-PSD-KIT)

Photo No.	DSC No.	Description
1	6981072	Analog I/O
2	6981073	Digital I/O
3	6981080	Ethernet
4	6981081	Dual Serial (two each)
5	6981082	Dual USB (two each)
6	6981083	PS/2 Keyboard / Mouse
7	6981084	VGA Monitor
8	6981085	Audio
9	6981087	Speaker Output
10	6981088	Utility
11	6981090	Power input for lab-type supply
12	6981091	ATX Power Input
13	6981004	44-pin IDE cable



**Figure 2. Poseidon Cable Kit**

## Other Development Kit Contents

### Poseidon Panel I/O Board (PNL-PSD-01)

The Poseidon SBC uses pin headers for each I/O connector allowing custom configuration of a system using only those cable connections required and increased flexibility with the mounting of the Poseidon board within an enclosure. For some applications, however, it is useful to have standard PC-style connectors for common PC peripheral devices such as a VGA monitor, keyboard and mouse, USB devices and serial ports. Hence, Poseidon offers an optional Panel I/O Board that mounts on a row of pin headers along one edge of the board and provides PC-style connectors for immediate, easy connection of these devices. The Poseidon Panel I/O Board is shown in Figure 3.



**Figure 3. Poseidon Panel I/O Board**

### 512MB FlashDisk with bootable Linux

The Poseidon Development Kit contains a 512MB IDE FlashDisk with a bootable Linux binary which provides a quick-boot compact Linux environment based on the Slackware 2.6 kernel. It is preconfigured for Poseidon and includes our Universal Driver for the Poseidon 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 Poseidon Development Kit also includes a CD which provides a binary image of the FlashDisk files that you may copy freely for use on Poseidon CPUs.

Diamond Systems Linux is also available on a hard drive (DSC# DK-LINUX-HD60) 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 CPU, 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 Poseidon board, the Poseidon Development Kit comes with a FlashDisk Programmer Board. When connected directly to the Poseidon 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

The Poseidon Development Kit contains an AC Adapter with a connector that plugs directly into the power input connector of the Poseidon board. Operating with 110VAC to 240VAC input voltage, the AC Adapter provides sufficient current at 5VDC to power the Poseidon board.

There are a variety of ways to power a Poseidon board, depending on the power source and its voltage, whether the application requires instant-on access or use of a power switch / button and ATX-style soft shutdown. All the alternatives are discussed in a Diamond Systems Application Note, Poseidon Power Options, DSC #0700051 which can be found on the included Software and Documentation CD or downloaded from the Diamond Systems web site at [www.diamondsystems.com/products/poseidon](http://www.diamondsystems.com/products/poseidon).

## Diamond Systems Software and Documentation CD

The Poseidon Development Kit contains the Diamond Systems Software and Documentation CD which provides Poseidon manuals (including this manual) and software. Software includes drivers for components specific to the Poseidon 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 Poseidon. This Universal Driver Software will operate under DOS, Windows XP/2000, Linux, Windows CE, VxWorks and QNX.

## Additional Cables

Three additional cables are provided with your Poseidon Development Kit.

6981092 – Used if you use the Panel I/O Board and a wide-voltage PC/104 Power Supply module such as the Diamond Systems Jupiter MM to power your system. This cable may be used to route incoming power from the Panel I/O Board to the PC/104 Power Supply module. It is included with Panel Board Kit (DSC#PNL-PSD-KIT).

6981093 – Used to connect the PS-5V-04 AC Adapter to the DB9 power input connector on the Panel I/O Board. If you place the Poseidon board with Panel I/O Board in an enclosure such as the Diamond Systems' Triton, you will need this cable to utilize the AC Adapter. It is included with Panel Board Kit (DSC#PNL-PSD-KIT).

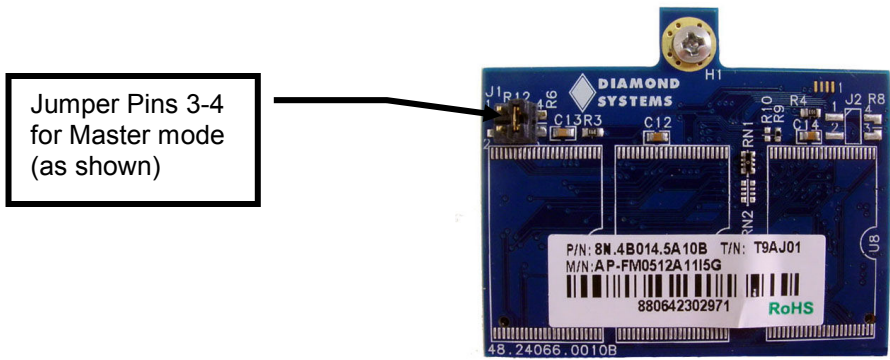
6981006 – Used to provide power from the Poseidon board to an IDE device with a 40-pin interface.

# Assembling your Poseidon System

## Install the FlashDisk

The flashdisk module installs directly on the IDE connector CN2 and is held down with a spacer and two screws onto a mounting hole on the board. Mounting hardware is provided in the Poseidon Development Kit in the packet marked with DSC #6801008.

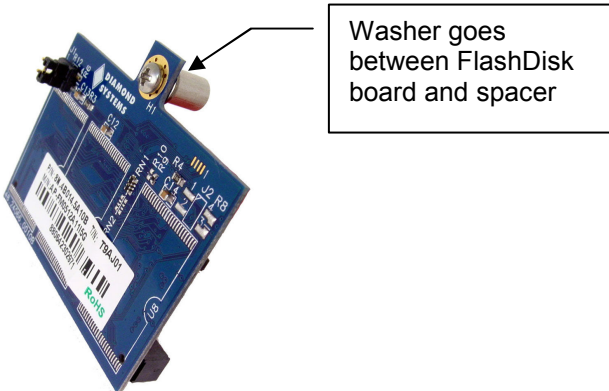
1. The FlashDisk module contains a jumper to determine master or slave mode. The FlashDisk must be in master mode for the BIOS to automatically detect the FlashDisk at boot time. Insure that the jumper is over pins 3-4 to set master mode (See Figure 4).



**Figure 4. Layout of FlashDisk Module showing IDE connector and 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 5.
3. Attach the female IDE connector on the FlashDisk to the IDE connector CN2 on the Poseidon board.
4. Fasten the FlashDisk in place by inserting one 2-56x pan head screw from the solder side of the Poseidon board into the round spacer.

Figure 6 shows the appearance of the Poseidon board with the FlashDisk attached.



**Figure 5. FlashDisk Installation**



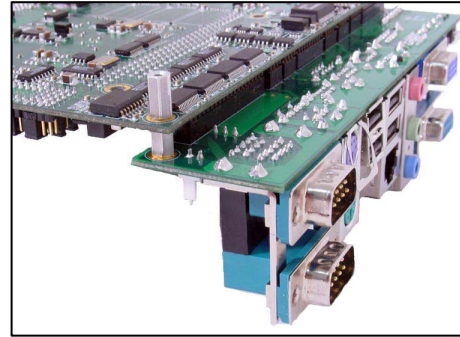
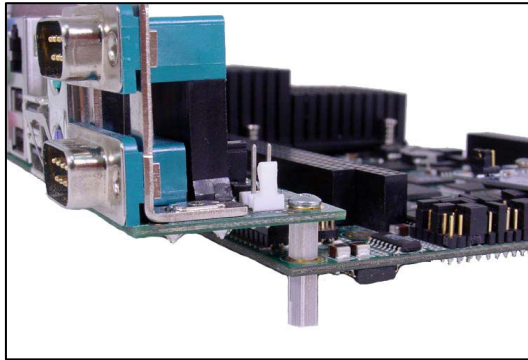
**Figure 6. FlashDisk Installed on Poseidon**

### Install the Poseidon Panel I/O Board

The Poseidon Development Kit provides a Panel I/O Board enabling standard PC peripherals to be connected directly to the Poseidon board without the use of transition cables. To speed the process of bringing up your Poseidon board, install the panel I/O board to your Poseidon board as follows using the Panel I/O Board Mounting Hardware Kit (DSC #6801020) provided with your Poseidon Development Kit.

1. Carefully connect the panel I/O board to the (8) 2mm pin header connectors on the edge of the Poseidon board as shown in Figure 7.
2. Screw a pan head Phillips 4-40 screw through each of the two mounting holes from the top (component side) of the panel board into the 7mm round spacer provided on the top of the Poseidon board.





**Figure 7. Poseidon Panel I/O Board Installation Detail**

## **Install the Video Display, Keyboard and Mouse**

Poseidon 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 will assume usage of a VGA-compatible Monitor. Connect a VGA-compatible CRT display to the female DB15 connector on the Panel I/O board.

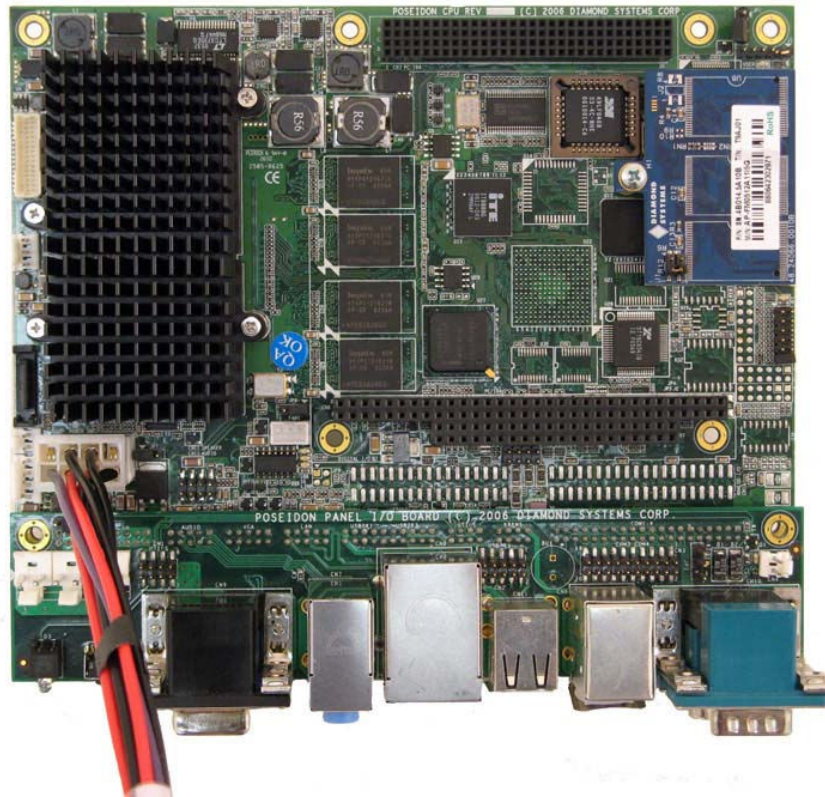
The Poseidon SBC supports either a legacy PS/2 keyboard and mouse interface or a USB keyboard and mouse interface. Connect either a PS/2 keyboard to the bottom mini-DIN connector on the Panel I/O board or a USB keyboard to one of the four USB connectors. Connect a PS/2 mouse to the top mini-DIN connector or one of the USB connectors.

Note that a mouse is NOT required to prove correct operation of the Poseidon SBC.

## **Connect Power**

Connect the PS-5V-04 AC Adapter provided in the Poseidon Development Kit to connector CN9 on the Poseidon Board.

When the FlashDisk, the Panel I/O Board and the AC Adapter are connected as required, your set up should appear as shown in Figure 8.



**Figure 8. Poseidon with Panel I/O Board and power cable 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-04 AC Adapter and plug the power cord into the wall. The Poseidon 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 Poseidon's data acquisition features. You may access the directory of these programs by typing:

```
>cd /root/PSD_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 by jumper settings JP2. For demonstration purposes type 0x300.
- ◆ Range to calibrate: This is the A/D modes users would typically calibrate. The modes are 0-3, 8-15. 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, 8-15. 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 Poseidon 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](http://docs.diamondsystems.com/dscud/manual_Main+Page.html).

## Adding a Hard Disk Drive or CD-ROM or any 40-pin IDE device to your system

There are two methods to attach additional device such as a S-ATA hard disk drive or IDE hard disk drive (40 pin or 44-pin interface) or CD-ROM to your system while continuing to use the provided FlashDisk as a primary boot device.

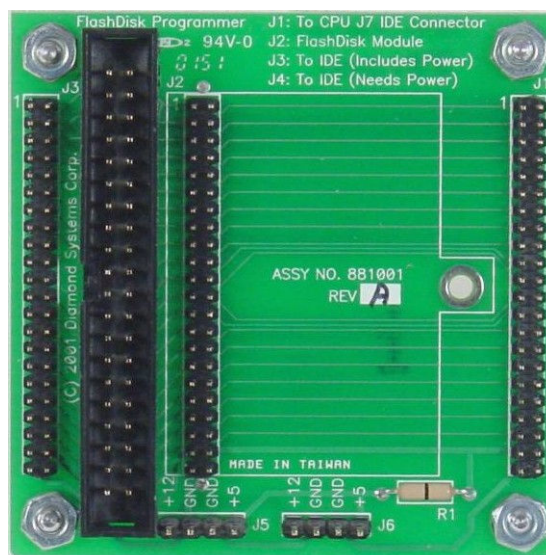
1. Attach a S-ATA hard disk drive to the S-ATA interface connector at CN5.
2. Attach a second IDE device to the primary IDE controller using the FlashDisk Programmer Board to provide a simultaneous connection of both the FlashDisk module and the IDE device. Instructions are provided below to installation and use of the FlashDisk Programmer Board.

### Install the FlashDisk Programmer Board (FDPB)

The Flash Disk Programmer Board (DSC# ACC-IDEEXT) provided with the Poseidon Development Kit enables the simultaneous connection of both a FlashDisk module and a standard IDE hard drive or CD-ROM drive to the primary IDE connector on the Poseidon board.

1. Install the FlashDisk to the FlashDisk Programmer Board using the instructions provided above.
2. Attach the female IDE connector on the FlashDisk to the IDE connector J2 on the FDPB.
3. Fasten the FlashDisk in place by inserting one 2-56x pan head screw from the solder side of the FDPB board into the round spacer. Figure 5 shows the appearance of the Poseidon board with the FlashDisk attached.
4. Connect the J1 connector on the FDPB to the primary IDE connector (CN2) on the Poseidon SBC with a 44-pin ribbon cable (DSC#6981004) provided in the Poseidon Cable Kit.
5. 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. Any two devices (i.e. FlashDisk and HDD) may be connected simultaneously using this board with proper master / slave jumper configurations on the devices. Insure that your IDE device is configured as a slave.

Note: The 44-pin connectors (J1, J2, and J3) and mating cables carry +5V power, but the 40-pin connector (J4) and mating cable do not. J5 and J6 on the FDPB or CN10 on the Poseidon may be used to provide power to an IDE device when the device is attached to the 40-pin J4 connector on the FDPB using the Auxiliary Power Cable (DSC#6981006) provided with the Poseidon Development Kit. If +12V power is required, it must be supplied externally.



**Figure 9. ACC-IDEEXT FlashDisk Programmer Board**