

Introduction

The Tiny InterNet Interface (TINI[®]) platform is based on Maxim/Dallas microcontrollers and enables the development of code for executing embedded web servers. The TINIm390 verification module is designed to provide developers a reference implementation of the TINI chipset and allow quick development of network aware applications. These applications can put real-world signals on the Internet. This application note describes the necessary steps to begin development with the TINI platform.

TINIm390 Verification Module Features

- Hosts the TINI runtime environment in validated hardware design
- Dual serial ports
- Dual 1-Wire[®] net interfaces
- Dual CAN ports
- Real-time clock (RTC) for time stamping
- Direct connection to 10 or 10/100 Base-T Ethernet
- 512k flash ROM
- 1MB NV SRAM

Requirements

The minimum hardware and software requirements are as follows:

- TINI Hardware Requirements
 - [TINIm390 Verification Module](#)—DS-TINI1-1MG or equivalent
 - [TINI Sockets Board](#)—DS-TINIS-005 or equivalent
- TINI Software Requirements
 - [TINI Software Development Kit](#) Version 1.02d, 1.1 or equivalent
 - [JDK \(Java™ Development Kit\)](#)—from Sun Microsystems or equivalent*
 - [Java Communications API](#)—from Sun Microsystems or www.rxtx.org/
- Development System Requirements
 - Operating system meeting requirements of the JDK from Sun Microsystems
 - 1 RS232 (COM) port—115200 baud recommended
 - [RS232C Serial Cable DB9 Male to DB9 Female](#)—Radio Shack Catalog Number 26-117 or equivalent
 - [Crossover Ethernet Cable](#)—Radio Shack Catalog Number 950-0368 or equivalent for direct connection to host computer, a straight through cable should be used for connecting to a router or hub
 - [5V DC Power Supply](#)**—Radio Shack Catalog Number 900-2740 or equivalent (Center Positive)

*The TINI Software Development Kit has been extensively tested with JDK1.3 from Sun Microsystems. Other versions of the JDK should work in the same manner. Check the documentation for your version of the JDK to verify the installation procedure

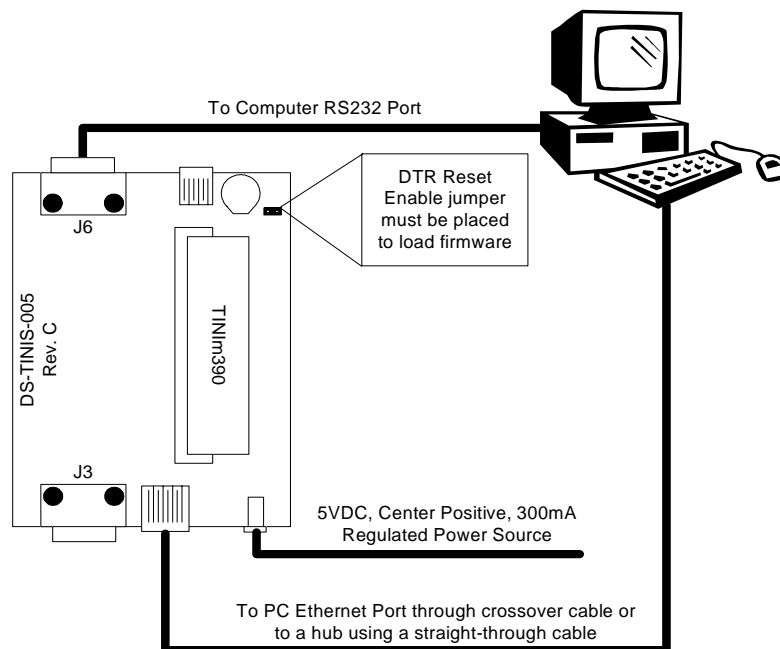
**If using the DSTINIS-006, a 9V–18V power supply is required.

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Quick Start

- 1) Prior to beginning, verify power is not connected to the TINI sockets board.
- 2) Insert the TINIm390 verification module into the 72-pin connector on the DS-TINIS-005 sockets board.
- 3) Verify the DTR Reset Enable jumper (J1) is placed on the sockets board.
- 4) Attach an RS232 serial cable to the connector on the DS-TINIS-005 sockets board, as shown in Figure 1.
- 5) Connect the serial cable to a serial port on your PC.
- 6) Next, attach the crossover Ethernet cable between the PC and the DS-TINIS-005 sockets board.
Note: If the TINI sockets board is not being connected directly to a NIC, a straight through Ethernet patch cable should be used.
- 7) Connect the power adapter to your DS-TINIS-005 sockets board, as shown in Figure 1. A 5V DC-regulated power supply must be used with the DS-TINIS-005 sockets board. Other sockets boards may have different power requirements. Refer to the sockets board documentation for more information.
- 8) Plug the power adapter into a wall socket.

Figure 1. Typical Hardware Setup



Software Setup

First, download and install the Java Development Kit and Java Communications API from Sun Microsystems. Installation instructions and example applications are included in both packages. You should verify correct installation by running the `BlackBox` example provided with the Java Communications API.

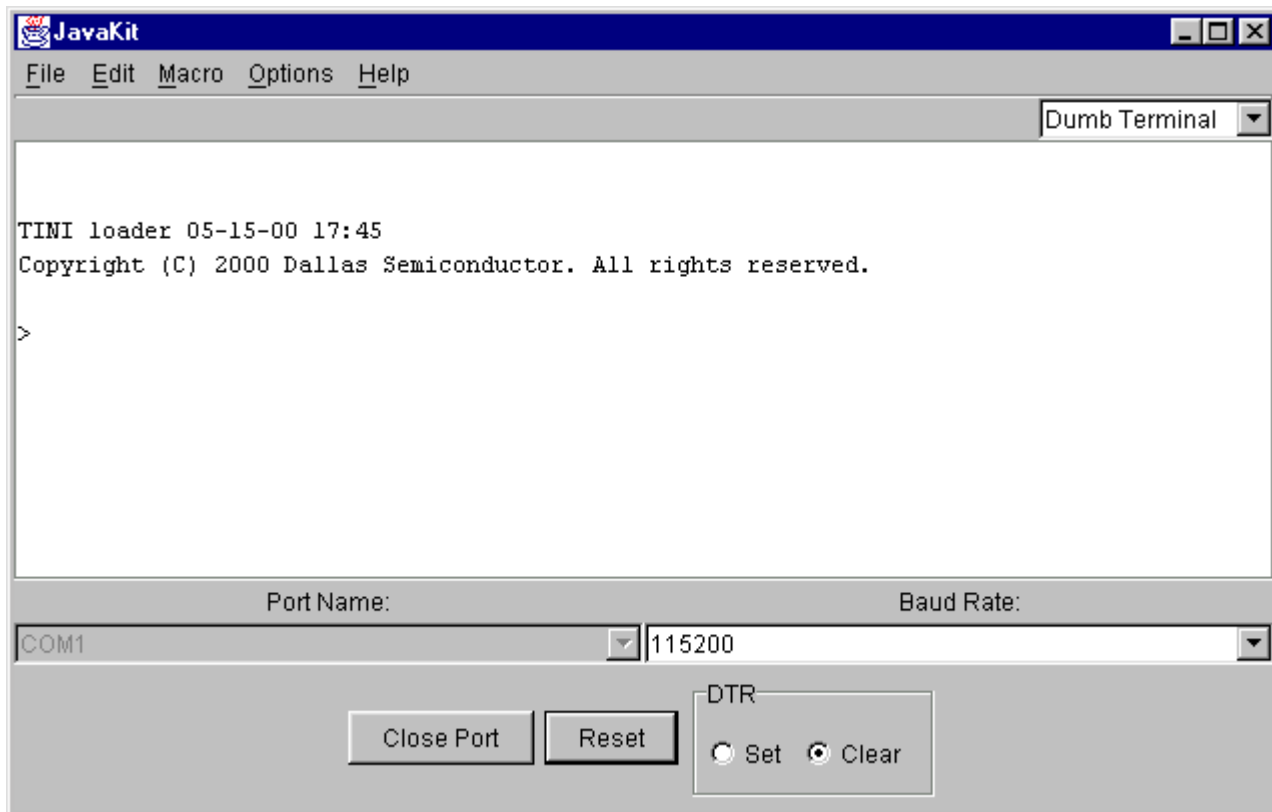
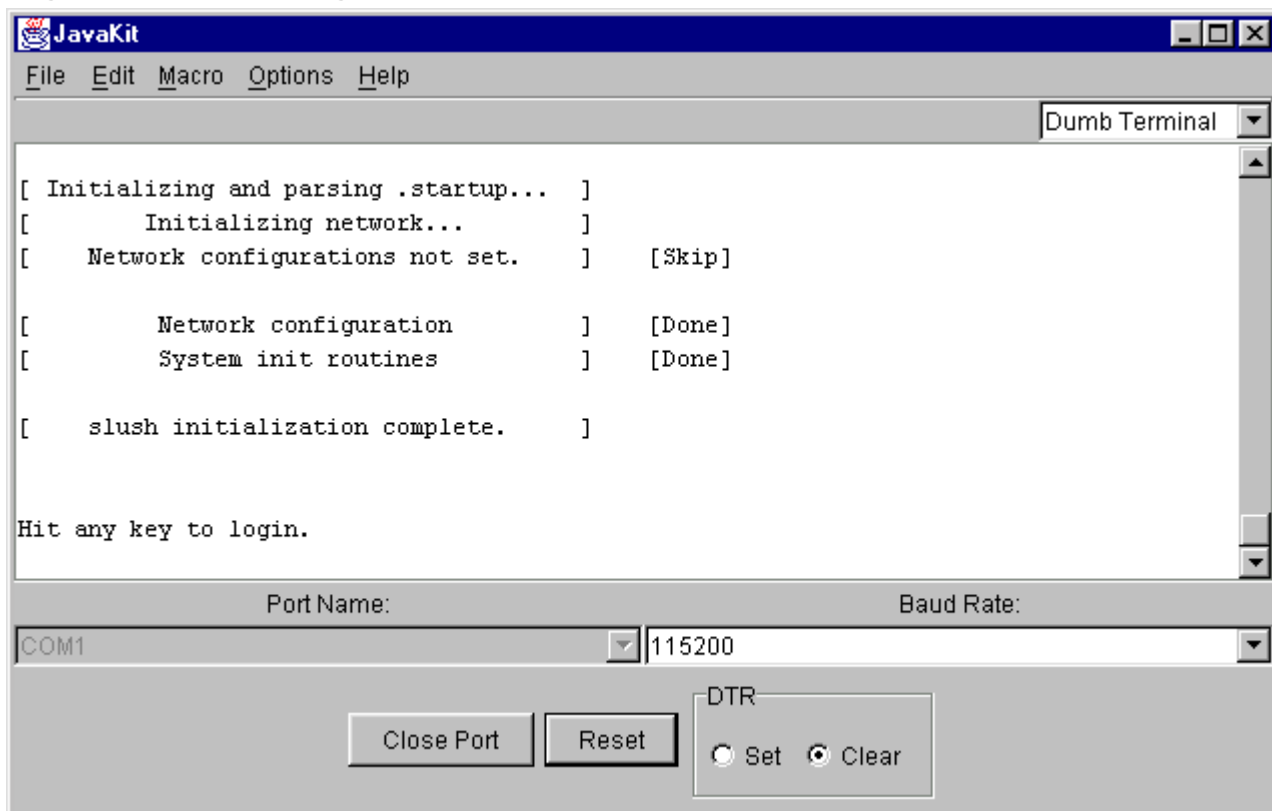
Loading the TINI Runtime Environment

Download the TINI Software Development Kit from <ftp://ftp.dalsemi.com/pub/TINI>. The download file should be unzipped at the desired location on your hard drive.

To begin using the TINIm390 Verification Module, the TINI Runtime Environment must first be loaded into the flash of the verification module. Loading the runtime environment requires executing a program called JavaKit. JavaKit loads the binary files for the runtime environment through the serial port on a workstation or PC.

Running JavaKit

- 1) To run JavaKit, open a command shell or DOS prompt on your PC. Change to the <TINI SDK Install Dir>\bin directory.
- 2) Next, type `java -classpath tini.jar JavaKit` and press 'Return' to run the JavaKit application. If you have the Java Development Kit and the Java Communications API properly installed, JavaKit should appear on the screen (Figure 2).
- 3) Select the port name where the TINI Verification Module is attached. Press the 'Open Port' button. The default baud rate of 115200 should be used on all platforms where it is supported.
- 4) After opening the port, press the 'Reset' button. The loader prompt should be displayed on the JavaKit screen.
- 5) If the message is not displayed, verify the cable connections and check that the correct port name is selected. If everything appears to be attached correctly, read the `Running_JavaKit.txt` file contained in the TINI SDK for more detailed information.
- 6) At the JavaKit prompt, type `B18` and press 'Return' followed by `F0` and return. This initializes the RAM of the TINI Verification Module. Any time a new runtime environment is loaded the memory should be cleared.
- 7) Now click on the File menu in JavaKit and select 'Load File'. A file dialog will appear on the screen. Browse to the <TINI SDK Install Dir>\bin directory and select the `tini.tbin` file and click the 'Open' button. Load Complete will be displayed on the screen when the firmware is loaded, this may take up to 30 seconds.
- 8) To load the command shell, click on the File menu and select 'Load File' again. Select the `slush.tbin` file and click on the 'Open' button. When Load Complete appears, Slush has been successfully loaded into the flash of the TINIm390 Verification Module.
- 9) Press the 'Reset' button and the JavaKit loader prompt shown in Figure 2 will be displayed.
- 10) At the JavaKit prompt, type `E` and hit 'Return'. Slush will begin booting and text similar to that shown in Figure 3 will print on the JavaKit screen.
- 11) Press any key and a Slush login prompt will be displayed. Type in the username `root` and press 'Return'. The initial password is `tini`.
- 12) You should now be logged into Slush. To view a list of valid shell commands, type `help` at the command prompt. Detailed information on specific commands, such as `dir`, can be obtained by typing `help` followed by the command.

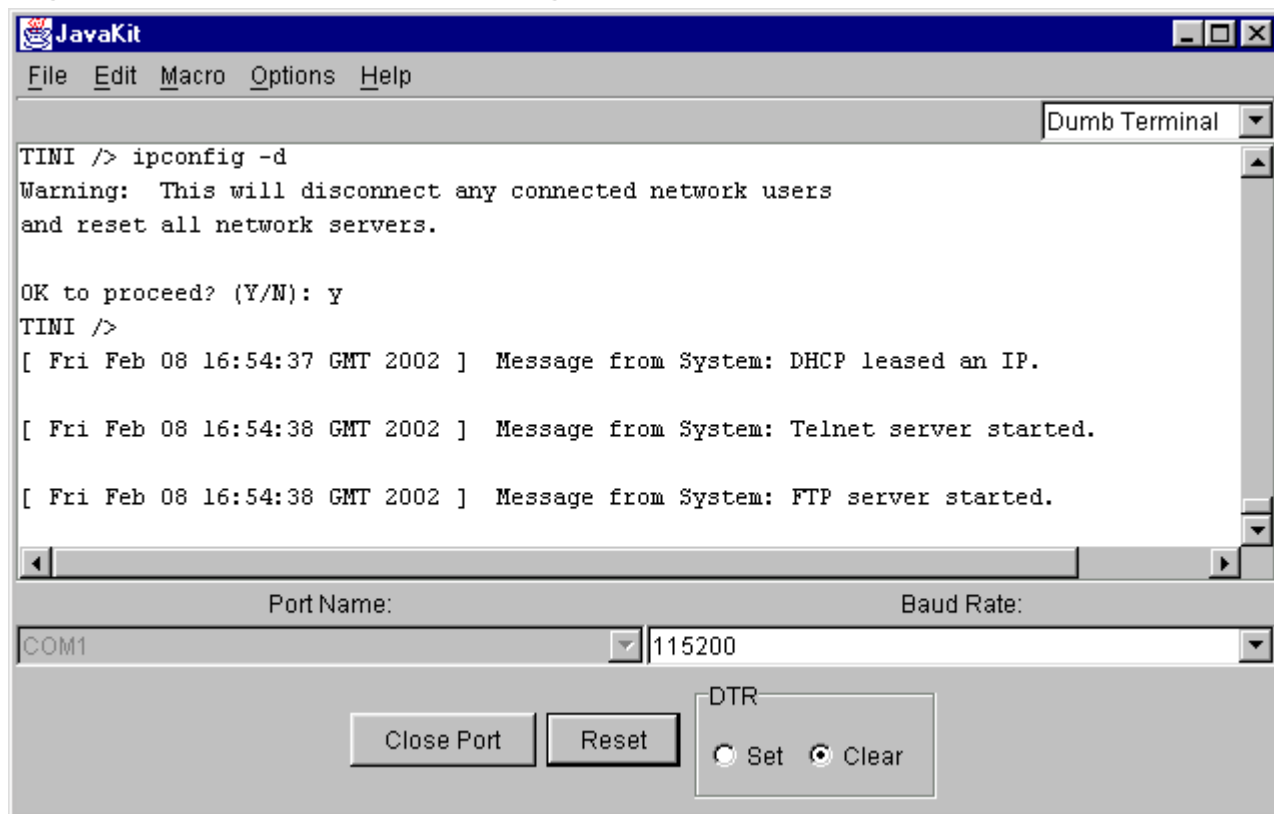
Figure 2. JavaKit Loader Prompt**Figure 3. Slush Login Prompt**

Network Setup

One of the primary features of the TINI Platform is its ability to access the network. The Slush command to configure network access is `ipconfig`. Typing `ipconfig -h` at the command prompt will display detailed configuration options. The `-h` option may be used with any slush command to view options.

The simplest method of connecting to the network is with DHCP, assuming it is supported on your network. To enable DHCP, type `ipconfig -d` and press enter. Once the TINI Verification Module has successfully leased a network address, a message is displayed on the Slush prompt indicating success as in Figure 4.

Figure 4. DHCP Network Configuration



If your network does not support DHCP, then it is necessary to use a static IP address. First, you must get a valid network address and subnet mask from the network administrator. To set the IP address to a static value, use `ipconfig -a x.x.x.x -m y.y.y.y` where the IP address is denoted by `x.x.x.x` and the subnet is `y.y.y.y`. For example, to set your IP address to 192.168.0.1 with a subnet of 255.255.255.0, type `ipconfig -a 192.168.0.1 -m 255.255.255.0` at the Slush command prompt and press 'Enter'.

A good way to test your network settings is to use the `ping` command. Either attempt to ping the TINI Verification Module from the host computer or ping the host computer from the TINI Verification Module using the slush `ping` command.

Running Your First Application

The TINI SDK contains many example applications. Each example application has batch files for compiling and converting it to a binary file for execution on the TINI Runtime Environment. A very simple application included with the TINI SDK is `Blinky`. This application blinks an LED (D1) on the TINIm390. To transfer the application to your TINIm390, open a command prompt on your host computer and change to the `<TINI SDK Install Dir>\examples\Blinky\bin` directory. This directory contains a file called `Blinky.tini`. From the command prompt on the host computer type `ftp`. The commands below will connect to the TINI and transfer the `Blinky.tini` file to the TINIm390's file system. Replace the IP address used below with the IP address you set earlier in Slush. The default password for `ftp` and `telnet` on the TINI Runtime Environment is `tini`.

```
ftp> open 192.168.0.1
Connected to 192.168.0.1.
220 Welcome to slush. (Version 1.02d) Ready for user login.
User (192.168.0.15:(none)): root
331 root login allowed. Password required.
Password:
230 User root logged in.
ftp> bin
200 Type set to Binary
ftp> put Blinky.tini
200 PORT Command successful.
150 BINARY connection open, putting Blinky.tini
226 Closing data connection.
ftp: 220 bytes sent in 0.00Seconds 220000.00Kbytes/sec.
ftp> bye
221 Goodbye.
```

The file now exists in the TINIm390 file system. Next, connect to your TINIm390 using `telnet` on your PC. Verify the existence of the `Blinky.tini` file using the Slush command `ls`. To run the `Blinky.tini` file, type `java Blinky.tini` followed by 'Enter.' The `Blinky` program executes and the LED should begin a steady blink.

More Information

Details of the TINI Platform are on our website at www.maxim-ic.com website. The *TINI Specification and Developer's Guide* is an invaluable resource when developing with the TINI platform and can be downloaded from the Maxim website. Chapter 2 is dedicated to getting started with the TINI Platform and includes a detailed description of building and running several small example applications.

Additional Information and Links

- Java Development Kit—java.sun.com/j2se
- Java Communications API (Java COMM)
 - Windows/Solaris—java.sun.com/products
 - Linux—www.rxtx.org/

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Ordering Information:

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FTP Site:

<ftp://ftp.dalsemi.com>