

## Introduction

The purpose of this application note is to guide users through the initial setup process for the TINIm400 Verification Module. Following the directions provided, a user should be able establish communications with the verification module and load a simple example application. A list of required hardware and software components is included.

## TINIm400 Verification Module Features

- Hosts the TINI<sup>®</sup> Runtime Environment in validated hardware design
- DS80C400 hardware reference design
- Three serial ports
- Integrated 1-Wire<sup>®</sup> net master
- CAN 2.0B port
- Real-Time Clock for time stamping
- Direct connection to 10/100 Base-T Ethernet
- 1MByte flash ROM
- 1MByte NV SRAM

## Requirements

The minimum hardware and software requirements are:

- TINI Hardware Requirements
  - TINIm400 Verification Module or equivalent
  - TINIs400 Sockets Board or equivalent
- TINI Software Requirements
  - [TINI Software Development Kit](#) Version 1.1 or later
  - [JDK \(Java Development Kit\)](#) – from Sun Microsystems or equivalent<sup>1</sup>
  - [Java Communications API](#) – from Sun Microsystems or <http://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

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<sup>1</sup> The TINI Software Development Kit has been extensively tested with JDK1.3 from Sun Microsystems. Later versions of the JDK should work in the same manner. Check the documentation for your version of the JDK to verify the installation procedure.

- [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](#) capable of supplying 150mA – Radio Shack Catalog Number 900-2740 or equivalent (Center Positive)

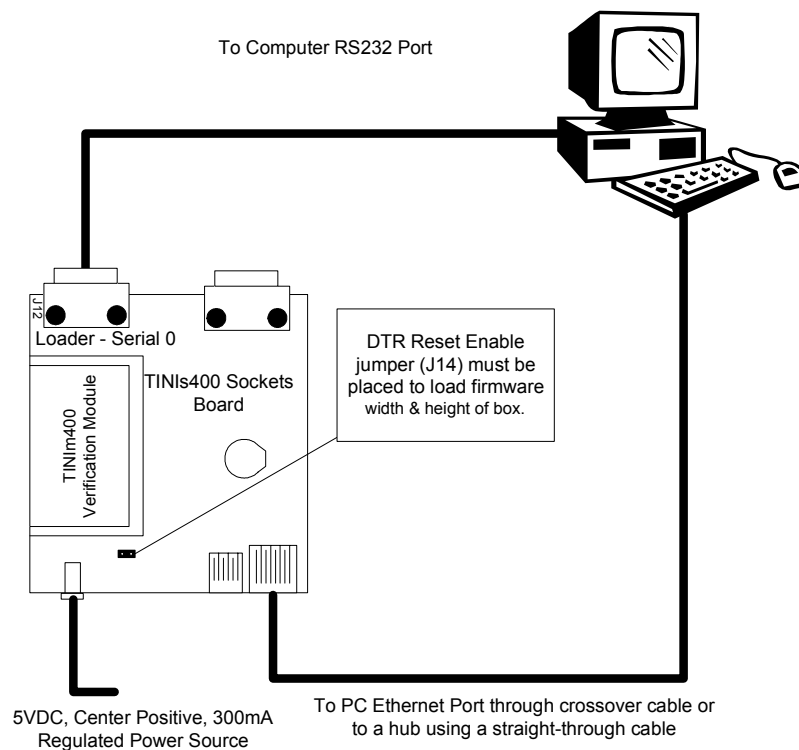
## Quick Start

1. Prior to beginning, verify power is not connected to the TINIs400 sockets board.
2. Insert the TINIm400 Verification Module into the 144-pin connector on the TINIs400 sockets board.
3. Verify the jumper labeled as DTR Reset (J14) is placed on the sockets board.
4. Attach an RS232 serial cable to the connector labeled “Loader – Serial 0” on the TINIm400 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 TINIs400 sockets board.

**NOTE:** If the TINI sockets board is not being connected directly to a network interface card, but instead to a separate network port on a hub or switch, a straight through Ethernet patch cable should be used.

7. Connect the power adapter to your TINIs400 sockets board as shown in Figure 1. A center positive 5V DC regulated power supply must be used with the TINIs400 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

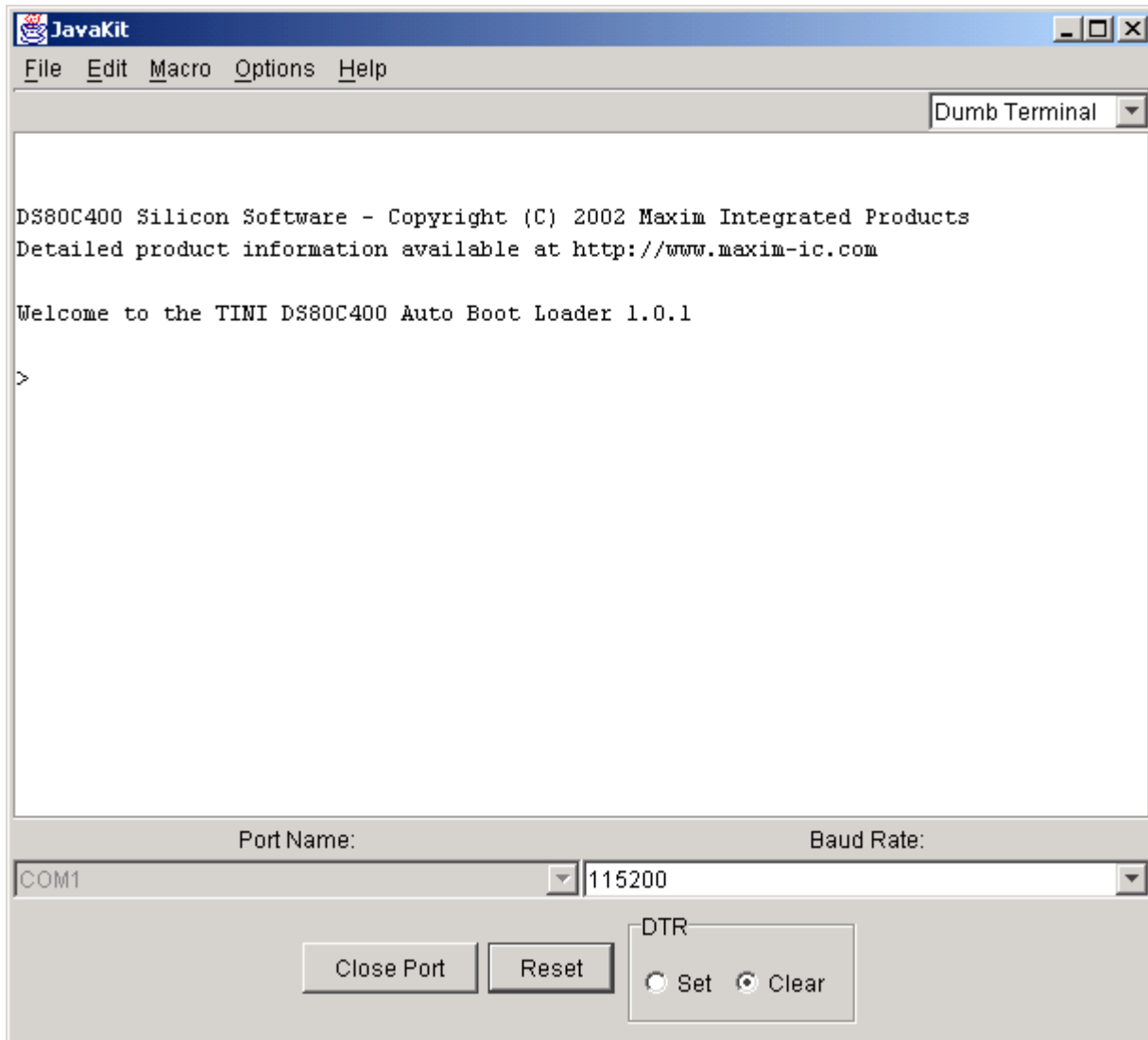
Download the TINI Software Development Kit from <http://www.maxim-ic.com/TINI>. The download file should be unzipped to a location of your choice on your hard drive (<TINI SDK Install Dir>).

To begin using the TINIm400 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. Application binaries are loaded through the serial port of the TINI verification module.

## 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 -400 -flash 40` at the command prompt 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.
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 (see Figure 2).

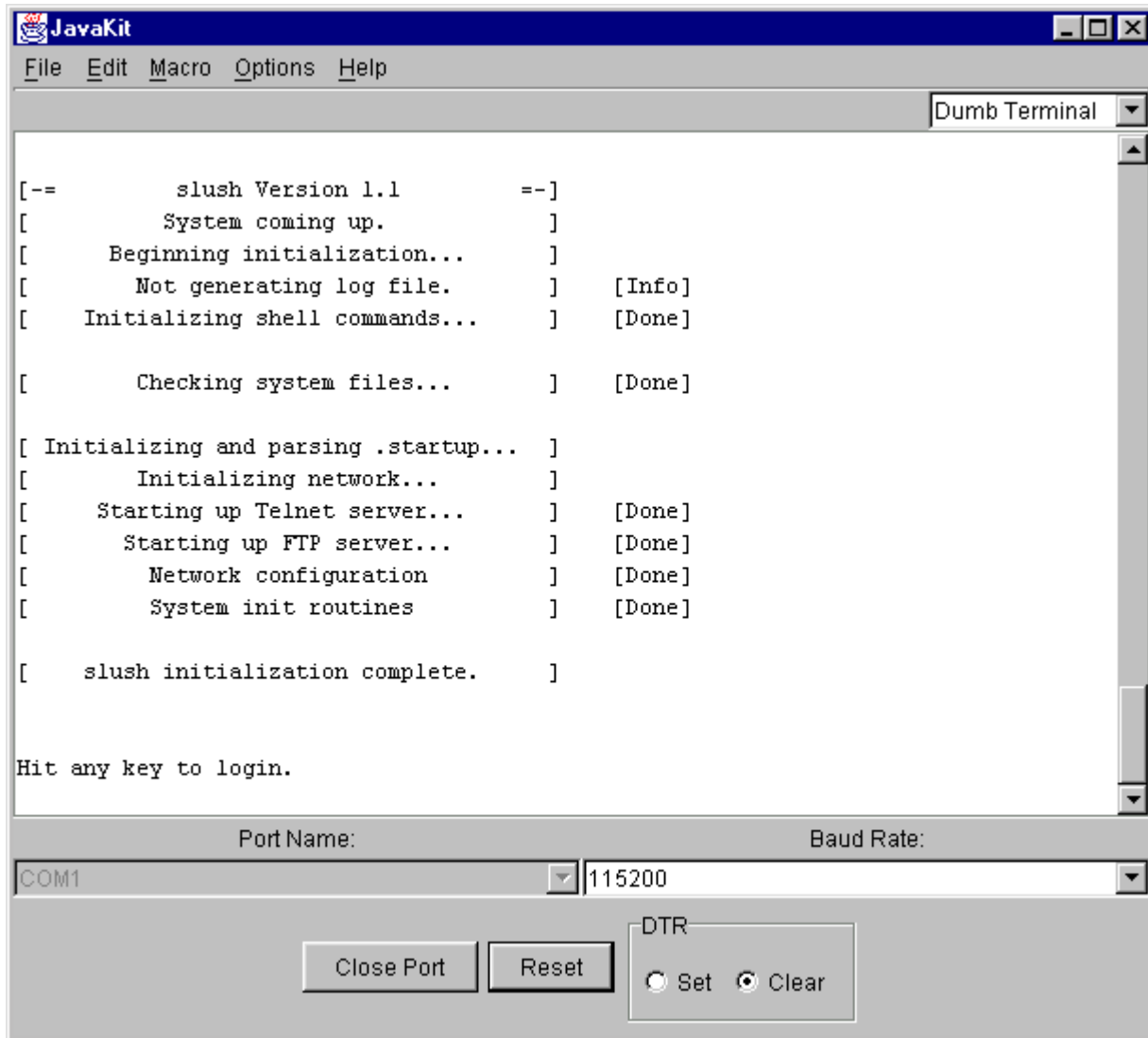
Figure 2: JavaKit Loader Prompt



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 `B0` and press return followed by `F0` and return. This clears 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_400.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_400.tbin` file and click on the `Open` button. When `Load Complete` appears, slush has been successfully loaded into the flash of the TINIm400 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.

**Figure 3: Slush Login Prompt**



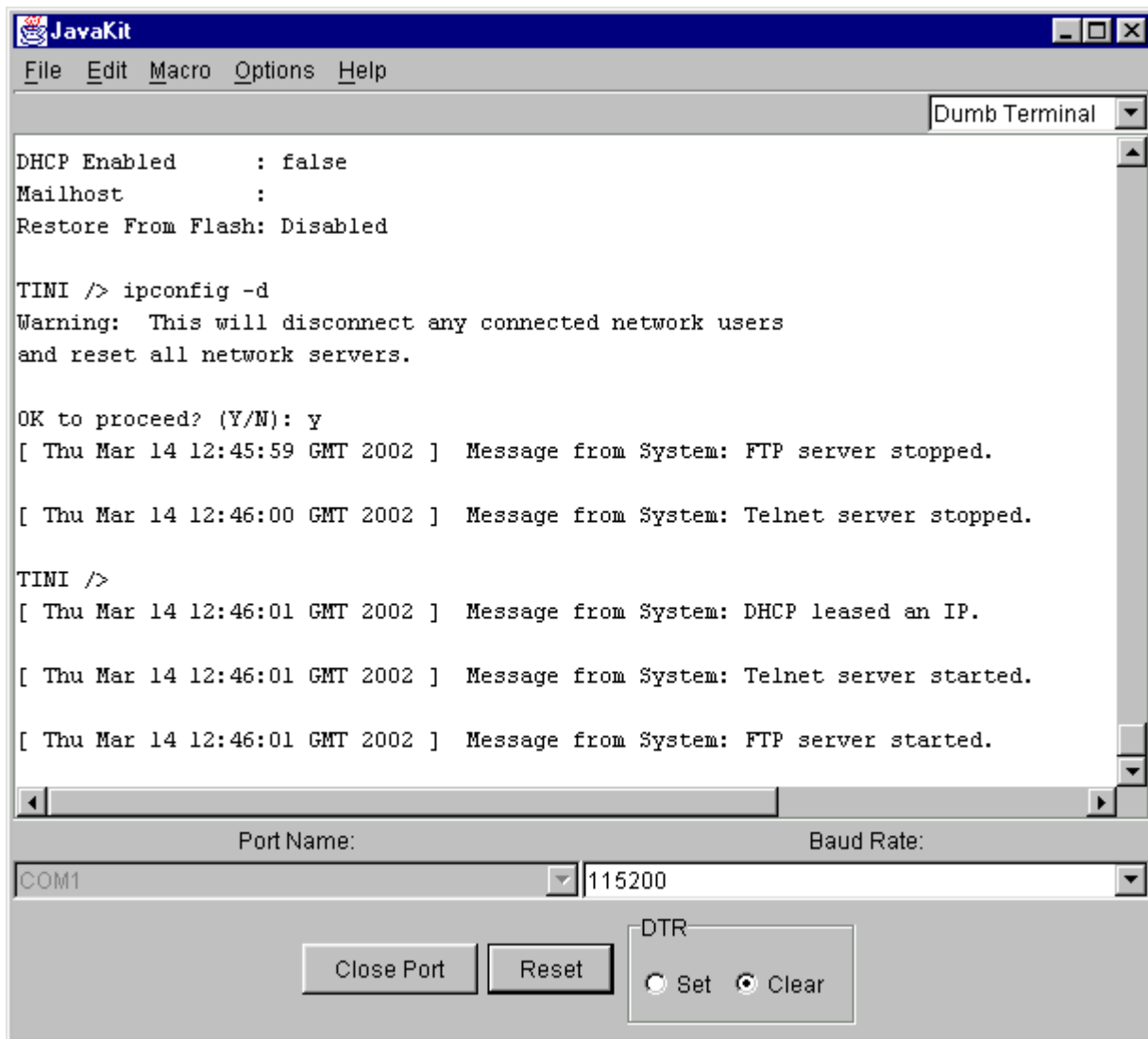
11. Press return and a Slush login prompt will be displayed. Type in the username `root` and press return. The initial password is `tini`.
12. You should now be logged into Slush. To view a list of valid shell commands, type `help` at the command prompt. Detailed information on specific commands, such as `dir`, can be obtained by typing `help` followed by the command.

## 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`<sup>2</sup>. 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



<sup>2</sup> The DS80C400 ROM supports IPv6 for networking. By default, it is always on and configured automatically.

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 (DS1) on the TINIm400. To transfer the application to your TINIm400, 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 TINIm400'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 1.1) Ready for user login.
User (192.168.0.1:(none)): root
331 Password Required for root
Password:
230 User root logged in.
ftp> bin
200 Type set to Binary
ftp> put Blinky.tini
200 Command successful.
150 BINARY connection open, putting Blinky.tini
226 Closing data connection.
ftp: 514 bytes sent in 0.00Seconds 514000.00Kbytes/sec.
ftp> bye
221 Goodbye
```

The file now exists in the TINI file system. Next, connect to your TINIm400 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 the <http://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 web site. 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 – <http://java.sun.com/j2se>
- Java Communications API (Java COMM)
  - Windows/Solaris – <http://java.sun.com/products>
  - Linux – <http://www.rxtx.org>

## Maxim Integrated Products / Dallas Semiconductor Contact Information

### *Company Addresses:*

#### Maxim Integrated Products, Inc

120 San Gabriel Drive  
Sunnyvale, CA 94086  
Tel: 408-737-7600  
Fax: 408-737-7194

#### Dallas Semiconductor

4401 S. Beltwood Parkway  
Dallas, TX 75244  
Tel: 972-371-4448  
Fax: 972-371-4799

### *Product Literature / Samples Requests:*

(800) 998 – 8800  
(408) 737 - 7600

### *Sales and Customer Service:*

#### *World Wide Web Site:*

[www.maxim-ic.com](http://www.maxim-ic.com)

#### *Product Information:*

<http://www.maxim-ic.com/MaximProducts/products.htm>

#### *Ordering Information:*

<http://www.maxim-ic.com/BuyMaxim/Sales.htm>

#### *FTP Site:*

<ftp://ftp.dalsemi.com>

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