



## NANO54415 Quick Start Guide

NetBurner, Inc

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# 1 Introduction

## 1.1 Quick Start Guide Overview

The NetBurner Network Development Kit (NNDK) is designed as a complete development platform for NetBurner's hardware devices. This quick-start guide will help with the installation of the NetBurner software, hardware setup and accessing the factory application running on the device.

## 1.2 Software Licensing

The Software included in your NetBurner Network Development Kit is licensed to run only on NetBurner provided hardware. Please read the license.txt file located (by default) in your \Nburn\docs directory.

If your application involves manufacturing your own hardware, please contact [sales@netburner.com](mailto:sales@netburner.com) for details on a royalty-free software license.

## 1.3 Kit Contents

- Quick start guide
  - NANO54415 Module
  - NANO Adapter Board
  - Mini USB Cable for power and/or serial communication
  - Serial Cable
  - Standard Ethernet Cable (Blue)
  - Red card with NNDK software and tools registration number and download link
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1.4 NANO54415 Module

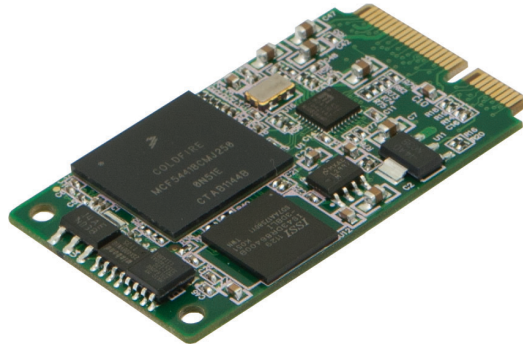


Figure 1: NANO54415

## 1.5 NANO-Dev Adapter Board

The default factory configuration is all jumpers installed, which routes UART signals through USB (UART0), RS-232 (UART1) and RS-485 (UART2) peripherals.

Remove the appropriate jumpers if you wish to interface any of the UART signals at TTL 3.3V levels through the headers P2 or P3.

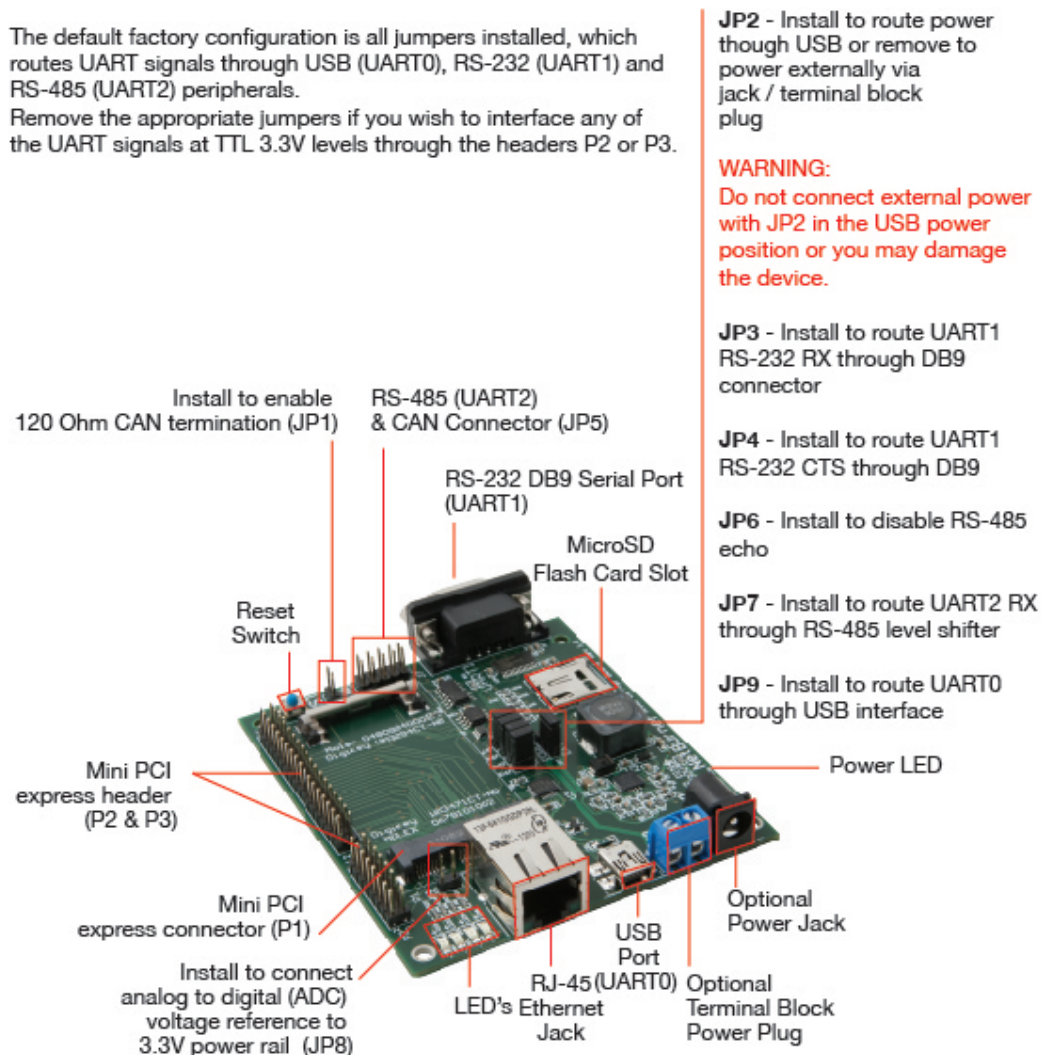


Figure 2: NANO-ADPT Carrier Board

The hardware features on the carrier board help you evaluate your peripheral connectivity and to configure the core module. DB9 connectors use the onboard RS-232 level shifter, allowing devices to connect via the serial ports. Extension headers make it easy to connect to a daughterboard or wrapping board for you specific application. The USB port can be used to monitor UART0 and/or power the board.

## Features

- 52-pin connector to interface for connection to NetBurner Module
- DB9, CAN, RS-485 port connectors
- RJ-45 Ethernet jack
- Switching power supply
- Reset button
- MicroSD Card flash memory slot with SDHC support
- RS-232 and RS-485 Level Translator
- USB connector (for serial data and power)
- Power via two position terminal block or barrel connector

## 2 Software Installation

The NetBurner Network Development Kit includes all the software and documentation you need to develop an application for NetBurner hardware. To begin development, the first step is to install all software, drivers and documentation required to write an application and learn about the hardware.

### 2.1 Download the NNDK

All software used in this development kit must be downloaded from the NetBurner website. NNDK software download instructions are available at: <http://www.netburner.com/support/get-tools>

#### Note

Java Runtime Environment (JRE) (32-bit) 1.6 or later is required to run the NetBurner NBEclipse IDE. This software is not included with our installation. Please ensure that your OS Java tools are up to date before running the NetBurner NBEclipse IDE. The JRE can be downloaded at <http://java.com/en/download/>

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## 2.2 Installing the Tools

After downloading the NNDK Software, run the setup application and follow the on screen directions to install the NNDK. During the installation, you must provide a valid serial number for each NetBurner platform type you wish to install. For example, if you have a MOD5441X and a MOD5270, you should include both a valid MOD5441X and a valid MOD5270 serial number in the serial number validation page.

### Note

The serial number for your installation can be found on the red card that is included with your NNDK kit.

## 2.3 Tools Provided

The following software utilities are installed on your computer once the NNDK setup process is complete:

<b>Tool</b>	<b>Function</b>
NBEclipse	IDE used to develop, download and debug applications
AutoUpdate, TCPUpdate, SerialLoad	Download new applications to the module (SerialLoad for MOD5213)
IPSetup	Identify NetBurner modules on local Network
MTTTY	PC to NetBurner Serial communication
Application Wizard	Auto-generate basic applications
TaskScan	Monitor applications currently running on modules
TFTP Server	Host a TFTP Server
UDPTerminal	Send and receive UDP packets
WinAddr2Line	Decipher trap messages to get source location of program faults

## 2.4 Documentation

The following documentation, schematics, and guides are available in the /nburn/docs folder.

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Tool	Function
NBEclipse Getting Started Guide	How to start using NBEclipse. This is required reading before using the integrated development environment (IDE)
NetBurner Runtime Libraries & uC/OS RTOS Library	Reference guides which list the function libraries available in the NNDK, as well as for the uC/OS real-time operating system
Freescale Manual	Detailed reference manual for the Freescale ColdFire microprocessor
GNU Manuals	Manuals for GNU C/C++ libraries, compiler and linker. This includes the C/C++ language API functions
NetBurner PC Tools Reference Guide	Reference manual for NetBurner tools that run on the PC, such as IPSetup, AutoUpdate, and MTTY
Platform Reference and Hardware Schematic	NetBurner hardware manuals that include memory map and design guides

## 3 Running the Factory Application

### 3.1 Plug in the Module

After installing the NNDK software, it's a good idea to plug in your module and connect to it to verify that the network and USB driver are properly configured.

To proceed, carefully insert the NetBurner module in to the 52-pin PCI express connector that is on the NANO-DEV-100 included in your development kit.

#### Note

A crossover cable is not required in any network configuration. The network PHY includes Auto MDI/MDIX, which will automatically adjust to make link over both crossover and straight-through cable types.

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The default setup for UART 0, 1, and 2 is USB connector, RS-232 D-B9 connector, and RS-485 connector, respectively. If you would like to connect to the UARTs directly, they can be accessed through the Mini PCI express (P3) connector by configuring their respective jumpers, which are detailed in the hardware errata section.

## 3.2 Network Setup

Once your device is powered on and plugged in to the network, you may need to configure the network settings of the device. If a DHCP server is running on the local network, then the module will automatically use the DHCP server when the factory application is running.

### 3.2.1 Dynamic IP Address (DHCP)

When the factory application boots, it will first attempt to obtain an address from a DHCP server. If you are connected to a network with a DHCP server, then the device IP address, network mask and gateway should be configured automatically. If your PC is on the same DHCP network, you will be able to communicate with the device after a short boot period of 2-3 seconds.

### 3.2.2 Static IP Address

If the module is plugged in to a network that does not have a DHCP server, you must provide a static IP address, network mask and gateway. These addresses should be provided by your network administrator. Ensure that the IP address and mask selected are able to communicate with the static IP settings of your PC.

### 3.2.3 Auto IP Address (APIPA)

The default factory application contains an auto IP negotiation system. This allows the device to automatically configure its address in the absence of a central DHCP server, and without the need for a static IP address. This scheme is utilized as a fallback that will activate when both

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dynamic and static IP addresses fail to initialize. In order to communicate with a device in auto IP mode, the host system must support auto IP. auto IP support is included in both Windows and OS X operating systems. By default, auto IP addressing starts in the 169.XXX.XXX.XXX address range.

The factory application that is included with the NetBurner module includes a simple web page, network configuration options and a demo of some of the hardware available on the device.

### 3.3 Find your Device

To begin, you will need to find out the IP address of your module. There are several ways to do this. One option is to use the included utility IP-Setup. If the device is powered on and plugged in to the same network as your PC, run IPSetup and all NetBurner devices on your network will be displayed with configuration options available.

Another option to find the IP address of your device is to use the NBEclipse IDE. As before, ensure that your device is powered on and plugged in to the same network as your PC. Open NBEclipse, and in the bottom left of the workspace, NBFind can be found running. This will list the I-P, application and MAC address of all NetBurner devices on your local network.

**If these options are failing, there may be a firewall issue blocking the applications from sending the UDP broadcast that is used to locate NetBurner devices on the network. Always grant NetBurner applications the ability to get through your OS firewall. Ensure that UDP port 20034 is open for use.**

### 3.4 View the Web Page

The factory application is running a web server with a basic web page detailing some of the features of the device and development board. Once you have found your device's IP address, open your favorite browser and point it at the IP address of the device.

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### 3.5 Develop your own Application

Now that the NetBurner tools are installed, the hardware is set up and you have verified this by accessing the device's web server. You have now graduated beyond this quick start guide.

To begin writing an application, we recommend reading through the NBEclipse Getting Started guide and the NetBurner Programmers Guide. In the NBEclipse guide, you will find information on writing NetBurner applications, sending new applications to the module and debugging with the graphical debugger. The Programmers guide will teach you more about the NetBurner libraries, operating system, and writing of applications in a multitask environment. Both of these documents can be found in the `\nburn\docs` folder of your NNDK software installation.

### 3.6 NetBurner Examples

The NNDK includes a multitude of examples that demonstrate the various hardware and software applications of the kit. These examples can be found in your NNDK installation directory, under the examples folder. The default location is `\nburn\examples`.

## 4 Hardware Errata

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## 4.1 Jumper Descriptions

Jumper	Description	Configuration
JP2	Power - USB	Jumper
JP2	Power via external power jack or block plug	No Jumper
JP3	UART1 RX - RS232 DB9 Connector	Jumper
JP3	UART1 RX - Mini PCI Express at TTL 3.3V	No Jumper
JP4	UART1 CTS - RS-232 DB9 Connector	Jumper
JP4	UART1 CTS - Mini PCI Express at TTL 3.3V	No Jumper
JP6	UART2 RX - RS-232 DB9 Connector	Jumper
JP6	UART2 RX - Mini PCI Express at TTL 3.3V	No Jumper
JP7	UART2 RX - RS-485 level shifter (JP5)	Jumper
JP7	UART2 RX - Mini PCI Express at TTL 3.3V	No Jumper
JP9	UART0 - USB	Jumper
JP9	UART0 - Mini PCI Express at TTL 3.3V	No Jumper

Jumper Descriptions

## 4.2 UART 0-2 Data Routing Configurations

Mode	Jumpers Enabled	Jumpers Removed
UART0 via USB	JP9, JP2[1-2]	N/A
UART0 via Mini PCI Express	N/A	JP9
UART1 via RS-232 DB9	JP3, JP4	N/A
UART1 via Mini PCI Express	N/A	JP3, JP4
UART2 via RS-485 5-pin header (JP5)	JP7, JP6 (Optional)	N/A

Jumper Mode. Note - Power must be selected in all modes JP2[1-2] or JP2[2-3]

## 4.3 Hardware Pin Guide

52-pin connector on the NANO54415 module. For additional signal information, please refer to the NANO54415-100IR datasheet.

Pin	Signal	Pin	Signal
1	No Connect	6	Short to 4
2	TX	7	CTS
3	RX	8	RTS
4	Short to 6	9	No Connect
5	Ground	N/A	N/A

RS-232 Serial Port for UART 1 Femal DB9 Connector Pin-out

Pin	Signal	Pin	Signal
Odd	RS-485	Even	CAN
1	RX- (FD)	2	GND
3	RX+ (FD)	4	GND
5	Power	6	CANL
7	TX+ (FD/HD)	8	CANH
9	TX- (FD/HD)	10	GND

UART 2 RS-485 and CAN Male 10-pin Header Connector Pin-Out

#### Note

In the UART 2 RS-485 pin-out table above, pins 1, 3, 7, 9 are needed in an RS-485 full duplex configuration. In an RS-485 half duplex configuration, only pins 7 and 9 are used.

The P5-type power input jack is used with an optional AC power adapter (the center pin is positive). This can be used as an alternative to using USB or the screw terminal block as a power source.

For the most up to date pin references and schematics, visit the product page for your device at <http://www.netburner.com>

## 5 Disclaimers

### 5.1 Life Support Disclaimer

NetBurner's products both hardware and software (including tools) are not authorized for use as critical components in life support s or systems, without the express written approval of NetBurner, Inc. prior to use. As used herein: (1) Life support s or systems are s or systems that (a) are intended for surgical implant into the body or (b) support or sustain life, and whose failure to perform, when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user. (2) A critical component is any component of a life support or system whose failure to perform can be reasonably expected to cause the failure of the life support or system, or to affect its safety or effectiveness.

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## 5.2 Anti-Piracy Policy

NetBurner, Inc. vigorously protects its copyrights, trademarks, patents and other intellectual property rights.

In the United States and many other countries, copyright law provides for severe civil and criminal penalties for the unauthorized reproduction or distribution of copyrighted material. Copyrighted material includes, but is not limited to: computer programs and accompanying sounds, images and text.

Under U.S. law, infringement may result in civil damages of up to \$150,000, and/or criminal penalties of up to five years imprisonment, and/or a \$250,000 fine. In addition, NetBurner, Inc. may seek to recover its attorneys' fees.

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