EthernetBlaster Communications Cable

User Guide

nsai

I.S. EN ISO 9001

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Introduction

The EthernetBlaster communications cable connects to a standard Ethernet network port with an RJ-45 connector. This cable communicates with client systems using the TCP/IP protocol and supports both static and dynamic IP addressing. The EthernetBlaster communications cable can be plugged into an existing 10/100 Base-T Ethernet network to communicate with clients remotely or interfaced directly via a standard 10/100 Base-T Ethernet port using a crossover cable. Because design changes are downloaded directly to the device, prototyping is easy and you can accomplish multiple design iterations in quick succession. Harnessing the power of an Ethernet network, multiple users can remotely access Altera® devices, bringing a new level of productivity to prototyping and debugging.

Supported Devices

You can use the EthernetBlaster communications cable to download configuration data to the following Altera devices:

■ Stratix® series FPGAs

■ Cyclone® series FPGAs

■ MAX® series CPLDs

■ APEX™ series FPGAs

■ ACEX® 1K FPGAs

■ Mercury™ FPGAs

■ FLEX® series FPGAs

■ Excalibur™ FPGAs

You can perform in-system programming of the following devices:

■ Advanced configuration devices, including EPC2, EPC4, EPC8, and EPC16 devices.

■ Serial configuration devices, including EPCS1, EPCS4, EPCS16, EPCS64 and EPCS128 devices.

In addition, the EthernetBlaster communications cable supports target systems using 5.0-V TTL, 3.3-V LVTTL/LVCMOS, and single-ended I/O standards from 3.3 V down to 1.5 V.

Power Requirements

The EthernetBlaster communications cable requires between 1.5 V and 5.0 V from the target circuit board, and 12.0 VDC (0.875A) input power for the EthernetBlaster $V_{CCSUPPLY}$ (a 12.0 VDC wall transformer is supplied).

1–2   **Chapter 1: About the EthernetBlaster Communications Cable**

Introduction

The EthernetBlaster $V_{CC(TARGET)}$ pin must be connected to the appropriate voltage for the device being programmed. The pull-up resistors on the target circuit board for the configuration/programming signals must be connected to the same power supply as the EthernetBlaster $V_{CC(TARGET)}$.

Software Requirements

The EthernetBlaster communications cable is available on the Windows, UNIX, and Linux platforms, including the following:

- Windows NT 4.0

- Windows 2000

- Windows XP x32 edition and x64 edition

- Windows Vista x32 edition and x64 edition

- Solaris 2.6

- Solaris 2.7/7

- Solaris 8/9

- Solaris 10

- Red Hat Linux version 7.3

- Red Hat Linux version 8.0

- Red Hat Linux version 9

- Red Hat Enterprise Linux WS 3.0

- Red Hat Enterprise Linux 4

- Red Hat Enterprise Linux 5

- HP-UX version 11.0 or later

Use the Quartus® II software beginning with version 4.0 to configure your device. The EthernetBlaster communications cable also supports the following tools:

- Quartus II Programmer (for programming and configuration), which you can run within the Quartus II software or as a stand-alone version

- Quartus II SignalTap® II Logic Analyzer (for logic analysis), which you can run within the Quartus II software or as a stand-alone version

- Nios® II IDE (for software downloading and debugging)

- Nios II IDE Flash Programmer (for programming Flash devices)

Connections

The EthernetBlaster communications cable houses an Ethernet port on one side and a 10-pin female target port on the opposite side. The Ethernet port side contains an Ethernet port, a reset button, and a DC12V jack. The target port side includes the 10-pin female target port and LED status light. The base of the cable includes the MAC address and host name. Figure 1–1 shows the side and base views of the hardware.

Figure 1–1. EthernetBlaster Communications Cable Ethernet Port, Target Port, and Base Views
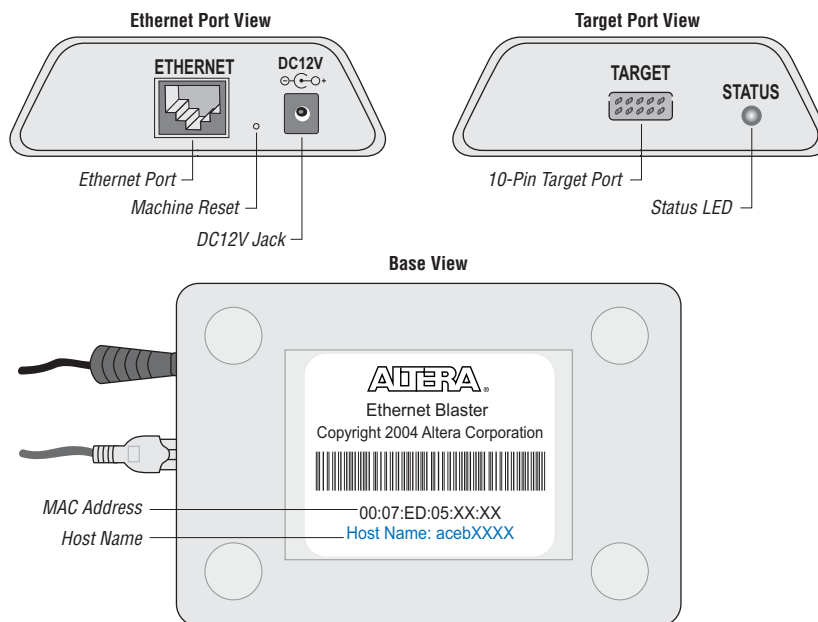
The status LED on the target port side of the cable displays the operation status of the EthernetBlaster communications cable. See Table 1–1 for a description of each LED status modes.

Table 1–1. Status LED Modes

Status LED	Status Description
Red-Green	Power on, reset
Green, blinking	Cable initialization
Green, steady	Cable ready
Blue, blinking	Downloading data to target printed circuit board

Static & Dynamic IP Addressing

The EthernetBlaster communications cable supports both static IP and dynamic IP addressing, the latter by means of Dynamic Host Configuration Protocol (DHCP). By default, the EthernetBlaster cable is configured at the factory to use dynamic IP addressing. Upon power up, the cable attempts to obtain an IP address from your network DHCP server. The Status LED is green and blinking while the network address is being obtained and the cable is initializing. This process may take up to two minutes.

When an IP address is obtained and the cable is ready to use, the status LED emits a steady green light. If the attempt to obtain an IP address is unsuccessful (the DHCP server may be down or absent), the cable switches to static IP addressing. The default IP address is configured to 192.168.0.50. If static IP addressing is used, you must configure your computer to an IP address in the same subnet as the cable to communicate with it. The default setting requires your address to be in the 192.168.0.X network domain.

☞ Refer to your operating system manual or contact your network administrator to verify that your network supports DHCP services and for instruction on how to change your IP address.

To maintain your computer's IP address and change the EthernetBlaster communications cable's default IP address, see "Configuring the EthernetBlaster Hardware to Use Static IP Addressing" on page 1–10.

The EthernetBlaster communications cable includes a self-hosted administrative web page, allowing you to configure various aspects of cable operation. The following section describes how to access this web page based on your mode of connection.

Cable Setup

This section describes how to install and set up the EthernetBlaster communications cable for device configuration or programming including the following setups:

■ Remote Connection via Network Using Default Factory Settings

■ Direct Connection to a Computer Using Default Factory Settings

■ Configuring the EthernetBlaster Hardware to Use Static IP Addressing

■ Configuring the EthernetBlaster Hardware to Use Dynamic IP Addressing

■ Setting Up the EthernetBlaster Hardware in the Quartus II Software

■ Removing the EthernetBlaster Hardware from the Quartus II Software

☞ For plug and header dimensions, pin names, and operating conditions, see "EthernetBlaster Communications Cable Specifications" on page 3–1.

Remote Connection via Network Using Default Factory Settings

Use the following steps to connect remotely to the EthernetBlaster communications cable:

☞ These steps assume no changes have been made to the default factory settings.

1. Disconnect the power cable from the circuit board.

2. Plug one end of a standard CAT 5 UTP 4-pair patch cable into the Ethernet jack on the EthernetBlaster communications cable, and the other end into a network port of a switch, router, or hub. See Figure 1–2 below.

Figure 1–2. Remote Connection via Network
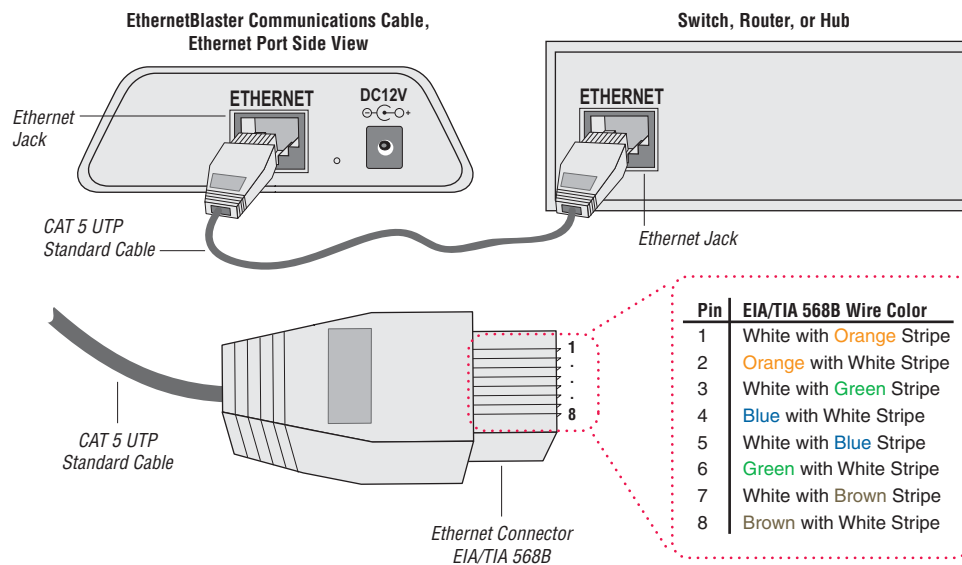
Pin	EIA/TIA 568B Wire Color
1	White with Orange Stripe
2	Orange with White Stripe
3	White with Green Stripe
4	Blue with White Stripe
5	White with Blue Stripe
6	Green with White Stripe
7	White with Brown Stripe
8	Brown with White Stripe

3. Connect the 10-pin female plug of the flexible, PCB-shielded cable labeled "BLASTER SIDE" to the 10-pin female target port on the Ethernet communications cable, and the 10-pin female plug of the cable labeled "TARGET SIDE" to the 10-pin male header on the target circuit board as shown in Figure 1–3 on page 1–5.

Figure 1–3. Connecting the EthernetBlaster Communications Cable to the Target Circuit Board
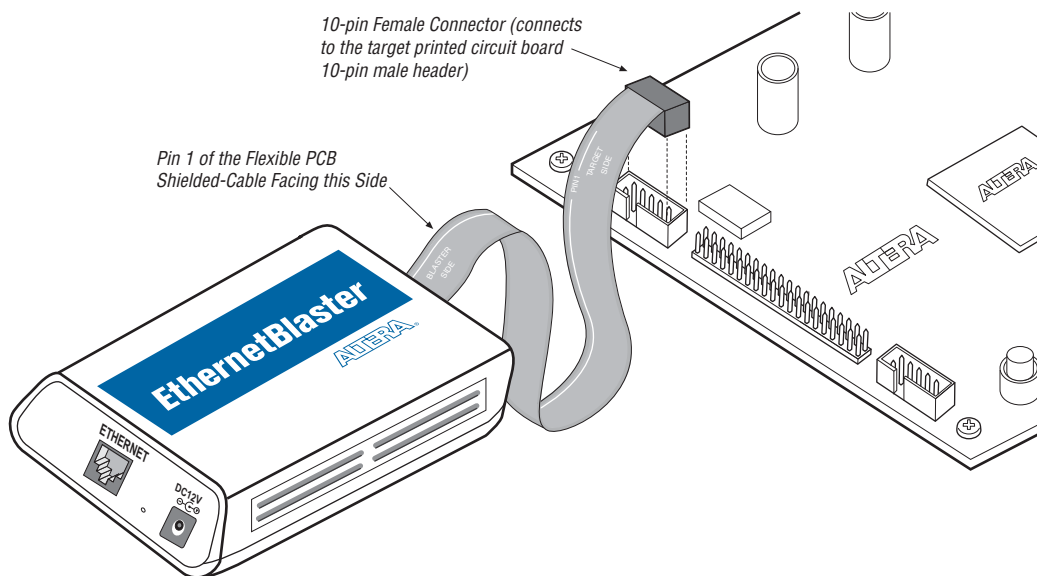
4. Plug the supplied 12.0 VDC wall transformer into a power outlet and then into the EthernetBlaster communications cable.

☞ Always connect the network patch cable as instructed in step 2 before connecting the power cord. This allows the EthernetBlaster communications cable to obtain a DHCP address (if your network is configured to do so). Wait until the Status LED emits a steady green light.

5. Reconnect the power cable to the circuit board to reapply power.

6. If your network supports DHCP, see step 7 on the following page for configuration instructions. If your network does not support DHCP, see step 8 on the following page for configuration instructions.

7. If your network supports DHCP, you can access the **EthernetBlaster Configuration** administrative web page using a web browser with the hostname as the address. The hostname is located on the label on the base of the EthernetBlaster communications cable as shown in Figure 1–4 on page 1–6.

Figure 1–4. MAC Address & Host Name
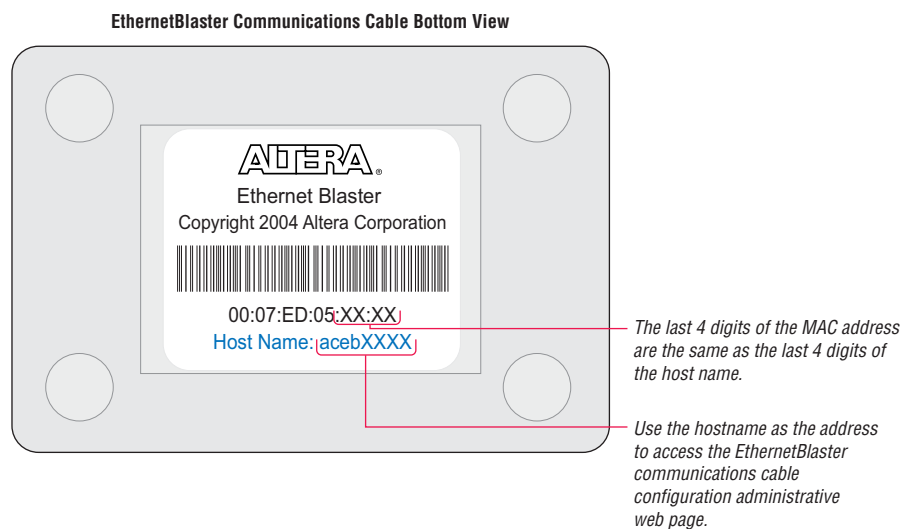
Browse to **http://<*host name*>** and specify the host name from the label on the base of your EthernetBlaster communications cable. The **EthernetBlaster login** window opens.

☞ Note that the last 4 digits of the MAC address match the last 4 digits of the host name on the label on the base of your EthernetBlaster cable.

or

If you know the IP address obtained by the EthernetBlaster communications cable, you can access the administrative web page by entering this address in your browser.

☞ See step 9 on the following page for system configuration details.

8. If your network does not support DHCP, you must configure your computer to an address in the **192.168.0.X** network domain, and then browse to **http://192.168.0.50**. See step 9 on the following page for system configuration details.

👉   Refer to your operating system manual or contact your network administrator for instruction on how to change your IP address.

👉   To maintain your computer's IP address and change the EthernetBlaster communications cable default IP address, see "Configuring the EthernetBlaster Hardware to Use Static IP Addressing" on page 1–10.

9. In the **EthernetBlaster login** window, enter `admin` as the login and `password` as the default password. The **EthernetBlaster Status** page opens, displaying the status of your EthernetBlaster communications cable, including the current IP address. See Figure 1–5.

Figure 1–5. EthernetBlaster Configuration Administrative Page
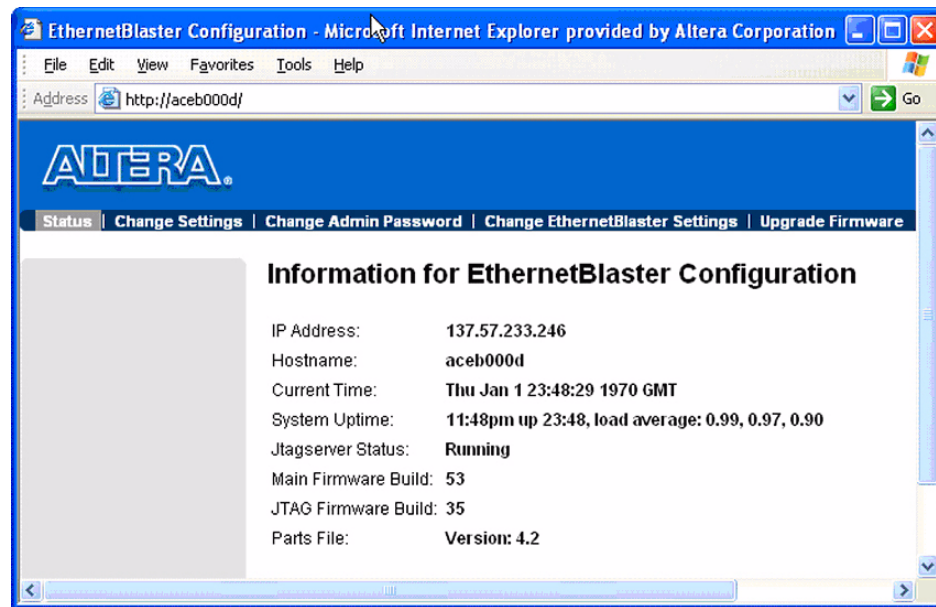
👉   See "Managing Passwords" on page 2–1 to manage your password after initial login.

10. Proceed to "Setting Up the EthernetBlaster Hardware in the Quartus II Software" on page 1–12 to set up your hardware in the Quartus II software.

Direct Connection to a Computer Using Default Factory Settings

The EthernetBlaster communications cable can be connected directly to the network port of a computer. This setup does not allow remote users to access the EthernetBlaster communications cable.

Use the following steps to connect the EthernetBlaster communications cable directly to your system:

👉   These steps assume no changes have been made to the default factory settings.

1. Disconnect the power cable from the circuit board.

2. Plug the EIA/TIA 568B connector of a crossover CAT 5 UTP 4-pair patch cable into the Ethernet jack on the EthernetBlaster communications cable, and the EIA/TIA 568A connector into your computer. See Figure 1–6 below.

Figure 1–6. Direct Connection to a Computer Using a Crossover Cable
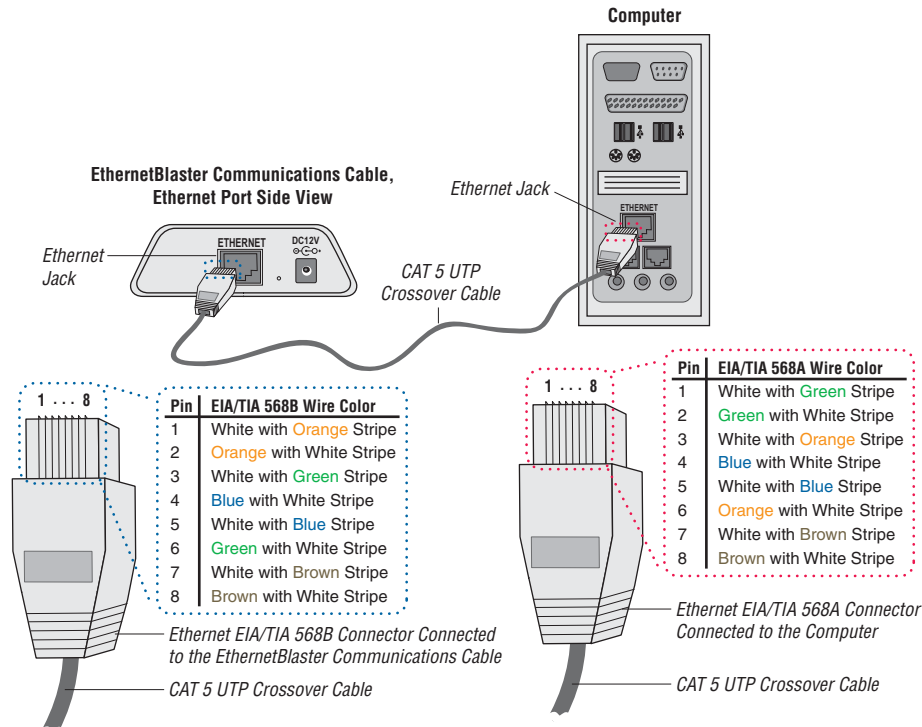
or

Plug one end of a standard CAT5 UTP 4-pair patch cable into the Ethernet jack on the EthernetBlaster communications cable, and add a crossover adapter to the other end of the cable. Plug the adapter end of the cable into your computer. See Figure 1–7 on page 1–9.

Figure 1–7. Direct Connection to a Computer Using a Standard Cable and a Crossover Adapter
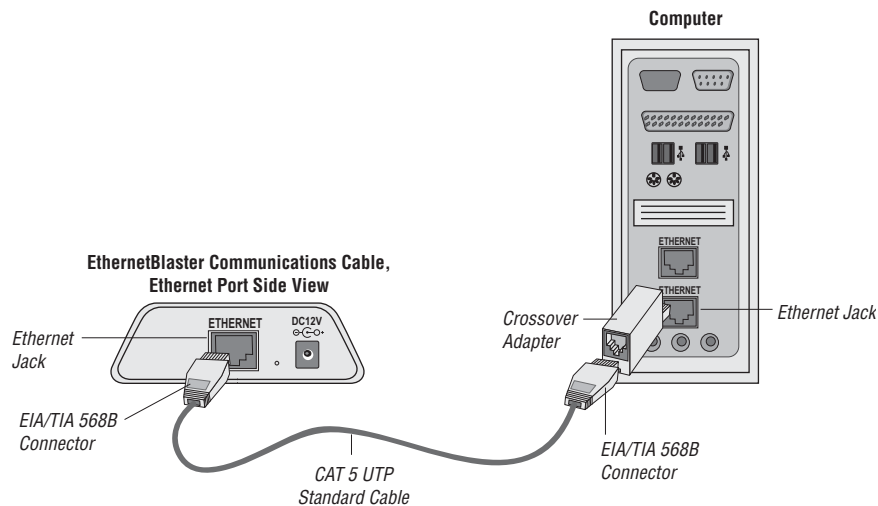
3. Connect the 10-pin female plug of the flexible, PCB-shielded cable labeled "BLASTER SIDE" to the 10-pin female target port on the Ethernet communications cable, and the 10-pin female plug of the cable labeled "TARGET SIDE" to the 10-pin male header on the target circuit board as shown in Figure 1–3 on page 1–5.

4. Plug the supplied 12.0 VDC wall transformer into a power outlet and then into the EthernetBlaster communications cable.

5. Reconnect the power cable to the target circuit board to reapply power.

6. To access the **EthernetBlaster Status** web page, configure your computer to an address in the **192.168.0.X** network domain and then browse to **http://192.168.0.50**. The **EthernetBlaster login** window opens.

   ☞ Refer to your operating system manual or contact your network administrator for instruction on how to change your IP address.

   To maintain your computer's IP address and change the EthernetBlaster communications cable default IP address, see "Configuring the EthernetBlaster Hardware to Use Static IP Addressing" on page 1–10.

7. In the **EthernetBlaster login** window, enter `admin` as the login and `password` as the default password. The **EthernetBlaster Status** page opens displaying the status of your EthernetBlaster communications cable including the current IP address. See Figure 1–5.

   ☞ See "Managing Passwords" on page 2–1 to manage your password after initial login.

8. To set up the EthernetBlaster communications cable in the Quartus II software, see "Setting Up the EthernetBlaster Hardware in the Quartus II Software" on page 1–12.

Configuring the EthernetBlaster Hardware to Use Static IP Addressing

By default, the EthernetBlaster communications cable is factory configured to use dynamic IP addressing.

☞ Depending on your connection mode, this section assumes that you have completed the steps in "Remote Connection via Network Using Default Factory Settings" on page 1–4, or "Direct Connection to a Computer Using Default Factory Settings" on page 1–7.

To configure your cable to use static IP addressing and complete your remote connection, follow the directions below:

1. Open the **EthernetBlaster Status** page.

2. Click the **Change Settings** tab and select **Static IP** from the **Connection Type** menu. Enter the desired IP address and other appropriate data in the settings fields. See Figure 1–8 on page 1–10.

   ☞ Contact your network administrator if you do not know the settings to complete the **Change Settings** page.

Figure 1–8. EthernetBlaster Change Settings Page

3. Click **Apply**. The EthernetBlaster communications cable automatically restarts. When the status LED returns to a steady green state, the EthernetBlaster communications cable has successfully restarted and can now be added to the Quartus II software. See "Setting Up the EthernetBlaster Hardware in the Quartus II Software" on page 1–12.

Configuring the EthernetBlaster Hardware to Use Dynamic IP Addressing

To configure the EthernetBlaster communications cable to use dynamic IP addressing, follow the directions below:

☞ Depending on your connection mode, this section assumes that you have completed the steps in "Remote Connection via Network Using Default Factory Settings" on page 1–4, or "Direct Connection to a Computer Using Default Factory Settings" on page 1–7.

1. Open the **EthernetBlaster Status** page.

2. Click the **Change Settings** tab and select **DHCP** from the **Connection Type** menu. See Figure 1–9 below.

Figure 1–9. EthernetBlaster Change Settings Page

☞ Contact your network administrator if you do not know the settings to complete the **Change Settings** page.

3. Click **Apply**. The EthernetBlaster communications cable automatically restarts. When the status LED returns to a steady green state, the EthernetBlaster communications cable has successfully restarted and can now be added to the Quartus II software. See "Setting Up the EthernetBlaster Hardware in the Quartus II Software" on page 1–12.

Setting Up the EthernetBlaster Hardware in the Quartus II Software

Use the following steps to set up the EthernetBlaster communications cable in the Quartus II software.

1. Start the Quartus II software.

2. Choose **Programmer** (Tools menu).

3. Click **Hardware Setup**. The **Hardware Settings** tab of the **Hardware Setup** dialog box is displayed.

4. Click **Add Hardware**. The **Add Hardware** dialog box is displayed. Select **EthernetBlaster** and click **Auto Detect**.

    ☞ The server name list is automatically populated with the EthernetBlaster communications cable detected on your subnet if **Auto Detect** is selected. However, if the cable is not on your subnet, you must manually type the name or IP address of the EthernetBlaster cable in the **Server Name** field of the **Add Hardware** dialog box.
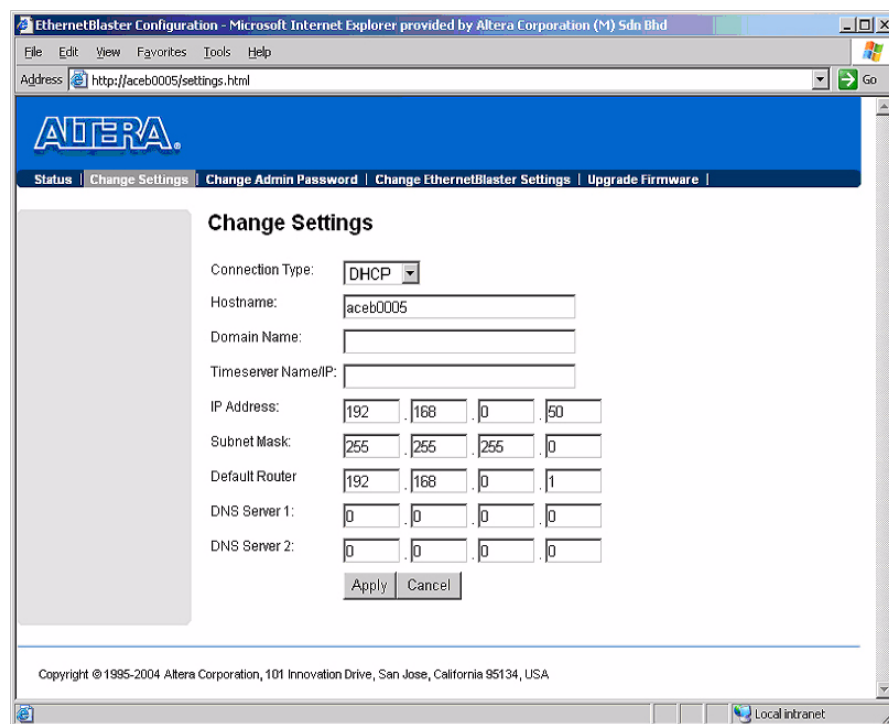
    If you are using a direct connection to your computer, type `192.168.0.50` in the **Server Name** field.

5. Type the server password in the **Server password** field ("password" is the factory default), and click **OK**.

6. **EthernetBlaster** is now visible in the **Available hardware** items list of the **Hardware Setup** dialog box, as shown in Figure 1–10 below.

Figure 1–10. Hardware Setup Dialog Box
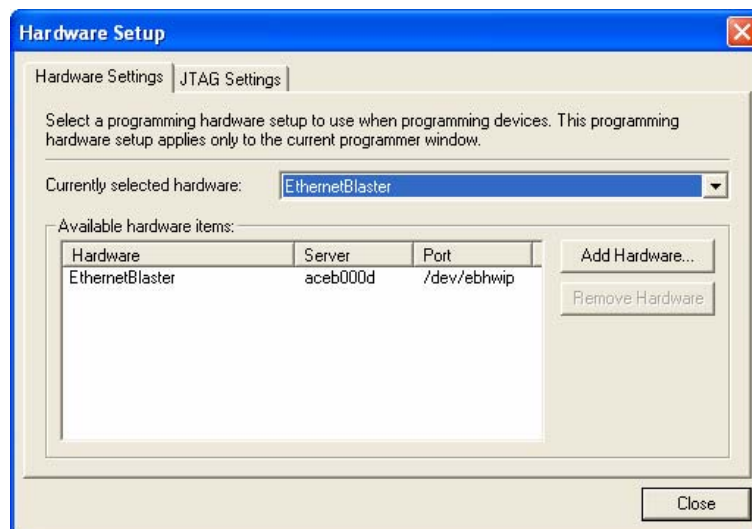
7. Click **Close** to close the **Hardware Setup** dialog box.

8. In the **Mode** list, select the desired mode (Programmer window). Table 1–2 describes each mode.

☞ The EthernetBlaster communications cable supports the Joint Test Action Group (JTAG), Passive Serial Programming, and Active Serial modes.

Table 1–2. Programming Modes

Mode	Mode Description
Joint Test Action Group (JTAG)	Programs or configures all Altera devices supported by the Quartus II software, excluding FLEX 6000 devices.
In-Socket Programming	Not supported by the EthernetBlaster cable.
Passive Serial Programming	Configures all Altera devices supported by the Quartus II software, excluding the following devices: MAX 3000 and MAX 7000 devices, advanced configuration devices, and serial configuration devices.
Active Serial Programming	Programs a single EPCS1, EPCS4, EPCS16, EPCS64, or EPCS128 serial configuration device.

Removing the EthernetBlaster Hardware from the Quartus II Software

Changes to the EthernetBlaster communications cable setup, including password change and IP addressing mode change, necessitate removal of the cable from the Quartus II Programmer Hardware setup on client systems, followed by adding the cable back into the Quartus II Programmer Hardware setup. To remove the EthernetBlaster communications cable from the Quartus II Programmer hardware setup, follow the instructions below.

1. Start the Quartus II software.

2. Choose **Programmer** (Tools menu).

3. Click **Hardware Setup**. The **Hardware Settings** tab of the **Hardware Setup** dialog box is displayed.

4. Click **JTAG Settings**. The **JTAG Settings** dialog box is displayed. Select the corresponding hostname or IP address of the EthernetBlaster hardware to remove. Click **Remove Server**.

☞ See "Setting Up the EthernetBlaster Hardware in the Quartus II Software" on page 1–12 for instructions to add the EthernetBlaster communications cable back into the Quartus II Programmer Hardware setup.

👣 For details about programming devices and creating secondary programming files, see the *Programming & Configuration* chapter of the Introduction to Quartus II Manual.

For further information, see the Programming module of the Quartus II online tutorial.

For further information, refer to the following topics in the Quartus II online Help:

■ Changing the Hardware Setup

■ Programmer Introduction

■ Overview: Working with Chain Description Files

■ Overview: Converting Programming Files

Introduction

This chapter describes how to administer your EthernetBlaster communications cable:

- Managing Passwords
  - Changing the Administrative Password
  - Changing the Quartus II Remote Connection Password
- Resetting the Hardware
- Firmware Upgrade

Managing Passwords

Networking allows multiple users in both remote and local locations to use the EthernetBlaster communications cable, increasing the productivity in prototyping and debugging. However, because of this flexibility, it is necessary to limit and control user access using the provided password service in the EthernetBlaster communications cable setup.

The EthernetBlaster communications cable contains two types of passwords, an administrative password and a Quartus II remote connection password.

The administrative password is the master password used to enter the EthernetBlaster administrative web page. If you know the administrative password you have full control of settings and the ability to modify both the administrative password and the Quartus II remote connection password.

The Quartus II remote connection password enables clients to add the EthernetBlaster hardware to their Quartus II Programmer hardware setup. This password is used to control who has access to the EthernetBlaster communications cable. However, they do not have access to the EthernetBlaster administrative web page and cannot modify the settings or change passwords.

☞ When you change the Quartus II remote connection password, client systems using the EthernetBlaster communications cable must remove the hardware from their Quartus II Programmer hardware setup. See "Removing the EthernetBlaster Hardware from the Quartus II Software" on page 1–13 for details. The hardware then needs to be added back into the Quartus II software. See "Setting Up the EthernetBlaster Hardware in the Quartus II Software" on page 1–12 for details.

Changing the Administrative Password

To change the administrative password, follow the directions below:

1. Open and log into the EthernetBlaster administrative web page in your browser.

☞ See "Cable Setup" on page 1–4 for instructions on accessing the administrative web page using your specific connection.

2. Click the **Change Admin Password** tab. See Figure 2–1 below.

Figure 2–1. Change Admin Password Page
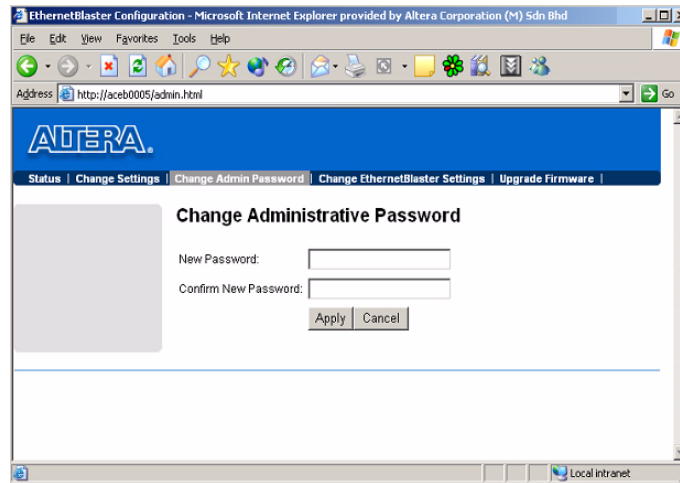
3. Enter the new administrative password in the **New Password** field and again in the **Confirm New Password** field. Click **Apply**.

The new password takes effect immediately when logging back into the administrative web page.

☞ The EthernetBlaster communications cable does not restart when the administrative password is reset.

Changing the Quartus II Remote Connection Password

To change the Quartus II remote connection password, follow the directions below:

1. Open and log into the EthernetBlaster administrative web page in your browser.

☞ See "Cable Setup" on page 1–4 for instructions on accessing the administrative web page using your specific connection.

2. Click the **Change EthernetBlaster Settings** tab. See Figure 2–2 below.

Figure 2–2. Change Quartus II Remote Connection Password Page
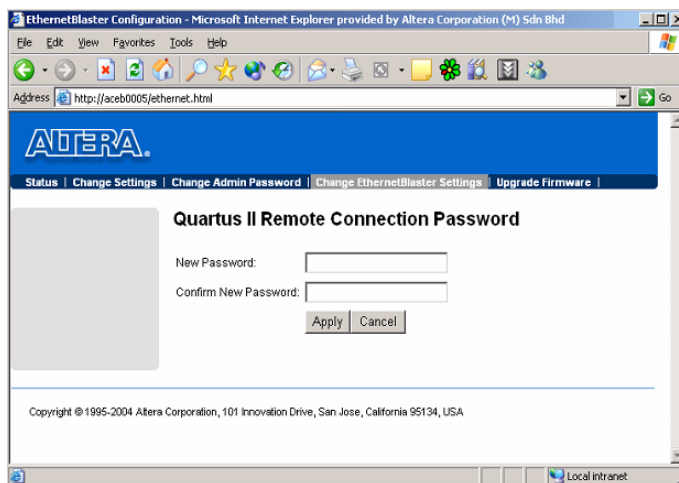
3. Enter the new Quartus II remote connection password in the **New Password** field and again in the **Confirm New Password** field. Click **Apply**.

The EthernetBlaster communications cable restarts. When the status LED emits a steady green light, the EthernetBlaster has successfully reset and the new password is effective.

Resetting the Hardware

The EthernetBlaster communications cable reset button is located on the Ethernet port side of the hardware. See Figure 2–3.

Figure 2–3. Machine Reset button
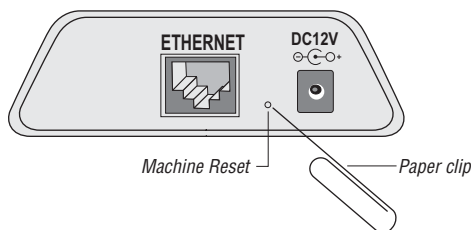
Use a small pointed object such as a paper clip to press the machine reset button to restart and reset all values to the default factory settings. See Table 2–1 for a list of factory default settings.

Table 2–1. Default Factory Settings

Setting	Value
Connection Type	DHCP
Host name	acebXXXX *(1)*
Domain name	Clear
Timeserver Name/IP	Clear

Table 2–1. Default Factory Settings

IP Address	192.168.0.50
Subnet Mask	255.255.255.0
Default Router	192.168.0.1
DNS Server 1	0.0.0.0
DNS Server 2	0.0.0.0
Administrative Password	password
Quartus II Remote Connection Password	password

Note:

(1) The host name and MAC address are located on the label on the base of your cable. The last 4 digits of the MAC address represent the "XXXX" in the host name.

☞ When the ErthenetBlaster is reset, existing client system using passwords other than the fastory default must remove the ErthernetBlaster hardware from their Quartus II Programmer Hardware Setup. See "Removing the EthernetBlaster Hardware from the Quartus II Software" on page 1–13 or instruction on removal of the EthernetBlaster hardware. The hardware then needs to be added back into the Quartus II software. See Setting Up the EthernetBlaster Hardware in the Quartus II "Setting Up the EthernetBlaster Hardware in the Quartus II Software" on page 1–12 for details.

Firmware Upgrade

The EthernetBlaster communications cable has been designed to enable remote firmware upgrade when a new version of firmware is available from Altera Corporation. New firmware may contain enhanced features, better performance, or bug fixes.

⚠ CAUTION Do not turn off the EthernetBlaster communications cable power when performing the firmware upgrade or severe damage will occur.

Firmware upgrades are included in Quartus II releases. Firmware upgrades and GPL source code updates are also available on the Altera website. For details, go to http://www.altera.com/support/software/drivers/dri-index.html.

To upgrade the EthernetBlaster communications firmware, follow the directions below.

1. Open and log into the **EthernetBlaster Configuration** administrative web page in your browser.

☞ See "Cable Setup" on page 1–4 for instructions on accessing the administrative web page using your specific connection.

2. Click the **Upgrade Firmware** tab. See Figure 2–4 on page 2–5.

Figure 2–4. Upgrade Firmware Page
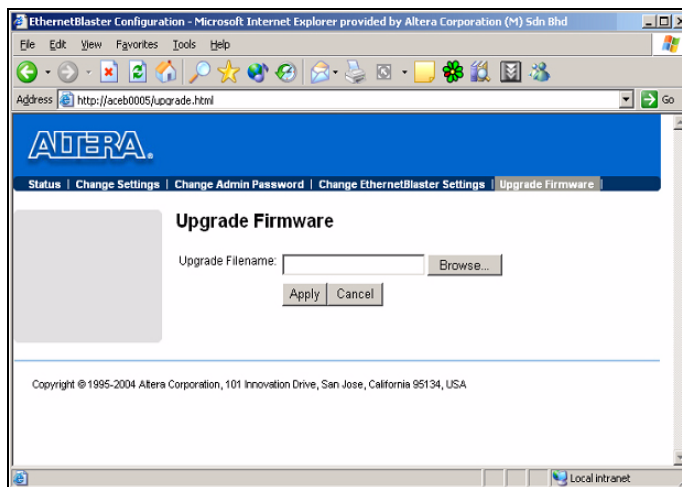
3. Click **Browse** and then locate and select the firmware file on your system. Click **Apply**.

The EthernetBlaster communications cable restarts automatically after the firmware has been successfully upgraded. When the status LED returns to a steady green state, the EthernetBlaster communications cable has restarted successfully.

Overview

This chapter provides comprehensive information about the EthernetBlaster communications cable, including the following:

- EthernetBlaster Hardware Connections
- Operating Conditions

EthernetBlaster Hardware Connections

The EthernetBlaster cable connects to an Ethernet cable with a RJ45 jack to a 10/100Base-T Ethernet hub/switch (via a straight 8-wire data cable) or a 10/100Base-T Ethernet port of a PC (via a crossover data cable). Depending on your connection (remote or direct), data is downloaded through the EthernetBlaster communications cable to the circuit board via the connections discussed in this section.

Voltage Requirements

The EthernetBlaster $V_{CC(TARGET)}$ pin must be connected to a specific voltage for the device being programmed. Connect pull-up resistors to the same power supply as the EthernetBlaster $V_{CC(TARGET)}$. See Table 3–1.

Table 3–1. EthernetBlaster $V_{CC(TRGT)}$ Pin Voltage Requirements

Device Family	USB-Blaster VCC Voltage Required
MAX® II devices	As specified by VCCIO of Bank 1
MAX 7000S device	5 V
MAX 7000AE and MAX 3000A devices	3.3 V
MAX 7000B device	2.5 V
Stratix® III and Stratix IV devices	As specified by V_{CCPGM} or V_{CCPD}
Cyclone® III devices	As specified by V_{CCA} or V_{CCIO}
Stratix II, Stratix, Stratix II GX, Stratix GX, and Arria™ GX devices	As specified by V_{CCSEL}
Cyclone II, Cyclone, APEX II, APEX 20K, and Mercury devices	As specified by VCCIO
FLEX 10K, FLEX 8000, and FLEX 6000 devices	5 V
FLEX 10KE device	2.5 V
FLEX 10KA and FLEX 6000A devices	3.3 V
EPC2 devices	5 V or 3.3 V
EPC4, EPC8, and EPC16 devices	3.3 V
EPCS1, EPCS4, EPCS16, EPCS64, and EPCS128 devices	3.3 V

EthernetBlaster Ethernet Jack Connection

The Ethernet cable Ethernet jack connects to the EthernetBlaster communications cable Ethernet port. The Ethernet jack pin number designations are shown in Figure 3–1 below.

Figure 3–1. Ethernet Jack Pin Number Designations

Pin	Signal
1	TxData +
2	TxData −
3	RecvData +
4	–
5	–
6	RecvData −
7	–
8	–
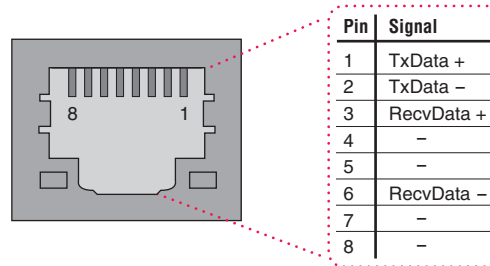
EthernetBlaster Plug Connection

The 10-pin female plug connects to a 10-pin male header on the circuit board containing the target device. See Figure 3–2.

Figure 3–2. EthernetBlaseter 10-Pin Female Target-Side Plug Dimensions

Dimensions are shown in inches. Spacing between pin centers is 0.1 inches.
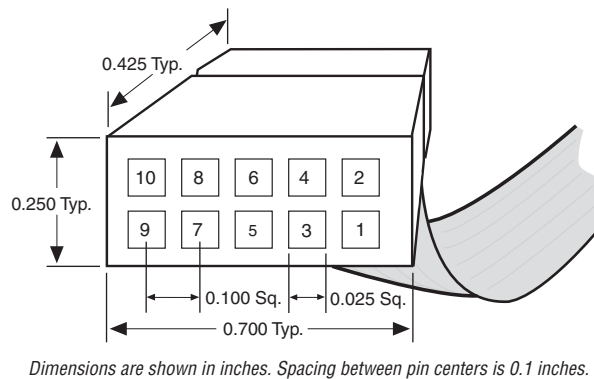
Table 3–2 identifies the 10-pin female plug pin names and the corresponding programming mode.

Table 3–2. *EthernetBlaster Female Plug Signal Names & Programming Modes* (Part 1 of 2)

	AS Mode		PS Mode		JTAG Mode	
Pin	Signal Name	Description	Signal Name	Description	Signal Name	Description
1	DCLK	Clock signal	DCLK	Clock signal	TCK	Clock signal
2	GND	Signal ground	GND	Signal ground	GND	Signal ground
3	CONF_DONE	Configuration done	CONF_DONE	Configuration done	TDO	Data from device
4	VCC(TARGET)	Target power supply	VCC(TARGET)	Target power supply	VCC(TARGET)	Target power supply

Table 3–2. *EthernetBlaster Female Plug Signal Names & Programming Modes* (Part 2 of 2)

5	nCONFIG	Configuration control	nCONFIG	Configuration control	TMS	JTAG state machine control
6	nCE	Cyclone chip enable	–	No connect	–	No connect
7	DATAOUT	Active serial data out	nSTATUS	Configuration status	–	No connect
8	nCS	Serial configuration device chip select	–	No connect	–	No connect
9	ASDI	Active serial data in	DATA0	Data to device	TDI	Data to device
10	GND	Signal ground	GND	Signal ground	GND	Signal ground

☞ The circuit board must supply VCC(TARGET) and ground to the EthernetBlaster cable for the I/O drivers.

Circuit Board Header Connection

The circuit board's 10-pin male header, which connects to the EthernetBlaster cable's 10-pin female plug, has two rows of five pins. These pins are connected to the device's programming or configuration pins. Figure 3–3 shows the dimensions of a typical 10-pin male header.

☞ Although a 10-pin surface mount header can be used for the JTAG, AS or PS download cable, Altera recommends using a through-hole connector due to the repeated insertion and removal force needed.

Figure 3–3. 10-Pin Male Header Dimensions

Dimensions are shown in inches.
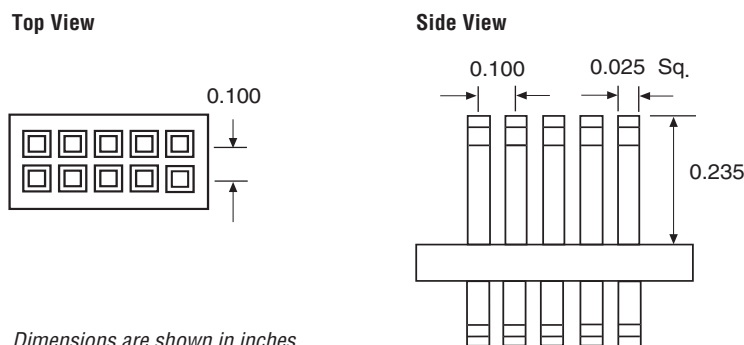
Operating Conditions

Table 3–3 through Table 3–5 summarize the maximum ratings, recommended operating conditions, and DC operating conditions for the cable.

Table 3–3. EthernetBlaster Cable Absolute Maximum Ratings

Symbol	Parameter	Conditions	Min	Max	Unit
$V_{CC(TARGET)}$	Target supply voltage	With respect to ground	−0.3	5.5	V
$V_{CC(SYS)}$	System supply voltage	With respect to ground	−0.5	14.0	V

Table 3–3. EthernetBlaster Cable Absolute Maximum Ratings

Symbol	Parameter	Conditions	Min	Max	Unit
I$_I$	Input current	`TDO` or `dataout`	−10.0	10.0	mA
I$_o$	Output current	`TCK, TMS, TDI, nCS, nCE`	−10.0	10.0	mA

Table 3–4. EthernetBlaster Cable Recommended Operating Conditions

Symbol	Parameter	Conditions	Min	Max	Unit
V$_{CC(TARGET)}$	Target supply voltage, 5.0-V operation	—	4.75	5.25	V
	Target supply voltage, 3.3-V operation	—	3.0	3.6	V
	Target supply voltage, 2.5-V operation	—	2.375	2.625	V
	Target supply voltage, 1.8-V operation	—	1.71	1.89	V
	Target supply voltage, 1.5-V operation	—	1.43	1.57	V

Table 3–5. EthernetBlaster Cable DC Operating Conditions

Symbol	Parameter	Conditions	Min	Max	Unit
V$_{IH}$	High-level input voltage	VCC(TARGET) < or = 3.3 V	VCC(TARGET) −0.2	—	V
	High-level input voltage	VCC(TARGET) > 3.3 V	3.1	—	V
V$_{IL}$	Low-level input voltage	—		0.15	V
V$_{OH}$	5.0-V high-level output voltage	VCC(TARGET) = 4.5 V, IOH = 20 A	3.3	—	V
	3.3-V high-level output voltage	VCC(TARGET) = 3.0 V, IOH = 20 A	2.0	—	V
	2.5-V high-level output voltage	VCC(TARGET) = 2.375 V, IOH = 20 A	1.6	—	V
	1.8-V high-level output voltage	VCC(TARGET) = 1.71 V, IOH = 20 A	1.15	—	V
	1.5-V high-level output voltage	VCC(TARGET) = 1.43 V, IOH = 20 A	0.95	—	V
V$_{OL}$	5.0-V low-level output voltage	VCC(TARGET) = 5.5 V, IOL = 1 mA	—	0.4	V
	3.3-V low-level output voltage	VCC(TARGET) = 3.6 V, IOL = 1 mA	—	0.4	V
	2.5-V low-level output voltage	VCC(TARGET) = 2.625 V, IOL = 1 mA	—	0.4	V
	1.8-V low-level output voltage	VCC(TARGET) = 1.89 V, IOL = 1 mA	—	0.4	V
	1.5-V low-level output voltage	VCC(TARGET) = 1.57 V, IOL = 1 mA	—	0.4	V
I$_{CC(SYS)}$	Operating current (No Load)	Typical ICC(SYS) = 350mA @ VCC(SYS) = 12V	—	700	mA

Referenced Documents

For more information on configuration and in-system programmability (ISP), see the following sources:

- *AN 39: IEEE 1149.1 (JTAG) Boundary-Scan Testing in Altera Devices*

- *AN 95: In-System Programmability in MAX Devices*

- *Configuring Cyclone FPGAs* chapter in volume 1 of the *Cyclone Device Handbook*

- *Configuring Cyclone II Devices* chapter in volume 1 of the *Cyclone II Device Handbook*

- *Configuring Stratix and Stratix GX Devices* chapter in volume 2 of the *Stratix Device Handbook*

- *In-System Programmability Guidelines for MAX II Devices* chapter in volume 1 of the *MAX II Device Handbook*

- *Serial Configuration Devices Data Sheet*

- *Programming & Configuration* chapter in the *Introduction to Quartus II manual*

- The Programming module of the Quartus II online tutorial

- Refer to the following glossary definitions in Quartus II Help:

    - "EthernetBlaster Cable" (general description)

    - "Configuration scheme" (general description)

    - "Programming files" (general description)

- Refer to the following procedures in Quartus II Help:

    - Programming a Single Device or Multiple Devices in JTAG or Passive Serial Mode

    - Programming a Single Device in Active Serial Programming Mode

    - Selecting the Communications Cable for the SignalTap II Logic Analyzer

- Refer to the following introduction and overview topics in Quartus® II Help:

    - Programmer Introduction

    - Overview: Working with Chain Description Files

    - Overview: Converting Programming Files

Revision History

The table below displays the revision history for the chapters in this user guide.

Date and Document Version	Changes Made	Summary of Changes
July 2008, v1.1	Updates included: ■ Updated the style and format. ■ Created "Additional Information" page. ■ Updated Table 1–2. ■ Updated Table 3–1. ■ Updated Software Requirements"Software Requirements" section. ■ Updated "Supported Devices" section.	—
December 2004, v1.0	Initial release.	—

How to Contact Altera

For the most up-to-date information about Altera® products, refer to the following table.

| Contact (1)	Contact Method	Address
Technical support	Website	www.altera.com/support
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	Email	custrain@altera.com
Product literature	Website	www.altera.com/literature
Altera literature services	Email	literature@altera.com
Non-technical support (General)	Email	nacomp@altera.com
(Software Licensing)	Email	authorization@altera.com

Note to table:

(1)   You can also contact your local Altera sales office or sales representative.

Typographic Conventions

This document uses the typographic conventions shown below.

Visual Cue	Meaning
Bold Type with Initial Capital Letters	Command names, dialog box titles, checkbox options, and dialog box options are shown in bold, initial capital letters. Example: **Save As** dialog box.
bold type	External timing parameters, directory names, project names, disk drive names, filenames, filename extensions, and software utility names are shown in bold type. Examples: f_{MAX}, **\qdesigns** directory, **d:** drive, **chiptrip.gdf** file.
Italic Type with Initial Capital Letters	Document titles are shown in italic type with initial capital letters. Example: *AN 75: High-Speed Board Design.*

Visual Cue	Meaning
Italic type	Internal timing parameters and variables are shown in italic type. Examples: t_{PIA}, $n + 1$. Variable names are enclosed in angle brackets (< >) and shown in italic type. Example: *<file name>*, *<project name>*.**pof** file.
Initial Capital Letters	Keyboard keys and menu names are shown with initial capital letters. Examples: Delete key, the Options menu.
"Subheading Title"	References to sections within a document and titles of on-line help topics are shown in quotation marks. Example: "Typographic Conventions."
`Courier type`	Signal and port names are shown in lowercase Courier type. Examples: `data1`, `tdi`, `input`. Active-low signals are denoted by suffix `n`, for example, `resetn`. Anything that must be typed exactly as it displays is shown in Courier type. For example: `c:\qdesigns\tutorial\chiptrip.gdf`. Also, sections of an actual file, such as a Report File, references to parts of files (for example, the AHDL keyword `SUBDESIGN`), as well as logic function names (e.g., `TRI`) are shown in Courier.
1., 2., 3., and a., b., c., etc.	Numbered steps are used in a list of items when the sequence of the items is important, such as the steps listed in a procedure.
■ ● •	Bullets are used in a list of items when the sequence of the items is not important.
✓	The checkmark indicates a procedure that consists of one step only.
☞	The hand points to information that requires special attention.
⚠ CAUTION	A caution calls attention to a condition or possible situation that can damage or destroy the product or the user's work.
⚠ WARNING	A warning calls attention to a condition or possible situation that can cause injury to the user.
↵	The angled arrow indicates you should press the Enter key.
👣	The feet direct you to more information about a particular topic.