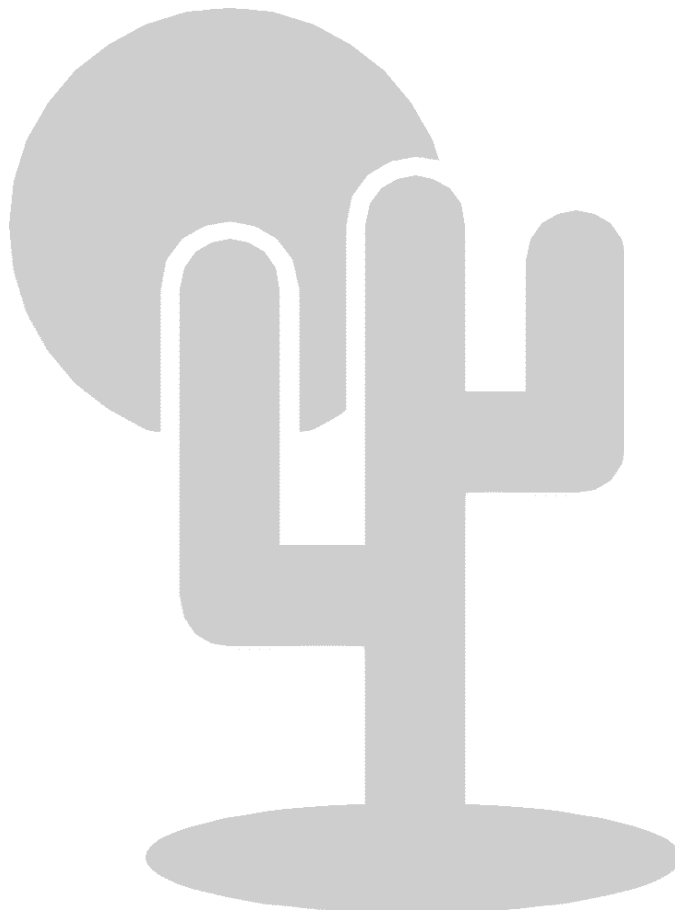


DIGILAB picoMAX MANUAL

ALTERA[®] MAX[®] Architecture
Starter Kit



DIGILAB picoMAX – What and Where

With your DIGILAB you have received the following items:

- DIGILAB board
- Power supply
- Parallel Port Cable
used to connect your board to a PC's parallel port and program a MAX 7000S, MAX 7000AE, MAX 7000B or MAX 3000A EPLD.
- Altera Documentation CD
- Altera Software CD
- Documentation Floppy Disc containing:
 - Readme file on installing the Acrobat Reader and viewing this document
 - This DIGILAB manual



We acknowledge that the following organizations claim trademark rights in their respective products or services mentioned in this document specifically:
Altera, Quartus II, MAX, ByteBlaster

We reserve the right to make changes without notice on the boards or specifications described in this document.

Copyright © 2000, El Camino GmbH, D-84048 Mainburg

Chapter 2

Obtaining Your License File

The Quartus II Web Edition is a free, entry-level version of the Altera Quartus II programmable logic development system. Quartus II is more powerful than its predecessor MAX+plus II and Altera now recommends using it as the preferred design tool for all Altera devices. In order to use Quartus II you need to request a license and register with Altera. The license is valid for six month and free of charge. You may renew your licenses whenever necessary or use multiple systems or licenses. Refer to the Altera license agreement for further details. In order to request your license file you will need to fill out the form at the following WWW address.

<http://www.altera.com/support/licensing/lic-index.html>

If the address should have changed check <http://www.altera.com> for Tools/Licensing

You will need to provide your Network Interface Card Number (NIC).

Your NIC number is a 12-digit Hexadecimal number of the format *nn-nn-nn-nn-nn-nn*, where *n* is any Hexadecimal character (e.g., 62-E4-5A-74-C9-FE). You can obtain your NIC number by typing **ipconfig -all** at a DOS or command prompt on your PC. Your NIC number is the number on the physical address line.

Your license file information will be sent to the e-mail address you specify. If you don't have e-mail or access to the WWW you may also use the fax form below. Follow the instructions you receive with your license file information and save it as "license.dat" on your hard disk.

If you don't have WWW access fill out the form below with block letters and fax it to:

El Camino GmbH, Fax +49-(0)8751-842876

NIC number: - - - - -

E-mail:

First Name:

Last Name:

Company:

Address:

City:

State/Province: Zip/Postal Code:

Country:

Phone:

Fax:

Installing Quartus II

System Requirements

- Pentium II 400 or higher
- Microsoft Windows NT version 4.0 (Service Pack 3 or higher), Windows 2000, Windows XP
- Microsoft Windows-compatible graphics card and SVGA monitor
- CD-ROM drive
- Parallel Port
- Network Interface Card
- TCP/IP networking protocol installed
- Internet Explorer 5.0 or later
- About 256 MB of free hard disk space plus 256 MB of Swap Space

Refer to the **readme.txt** file, which is located in the quartus directory on the Quartus II Design Software for PCs CD-ROM, for specific information about disk space and memory requirements in the current version of the Quartus II software. After installation, the readme.txt file is available from the Quartus II Help menu and in the Quartus II system directory.

Quartus II Web Edition Installation

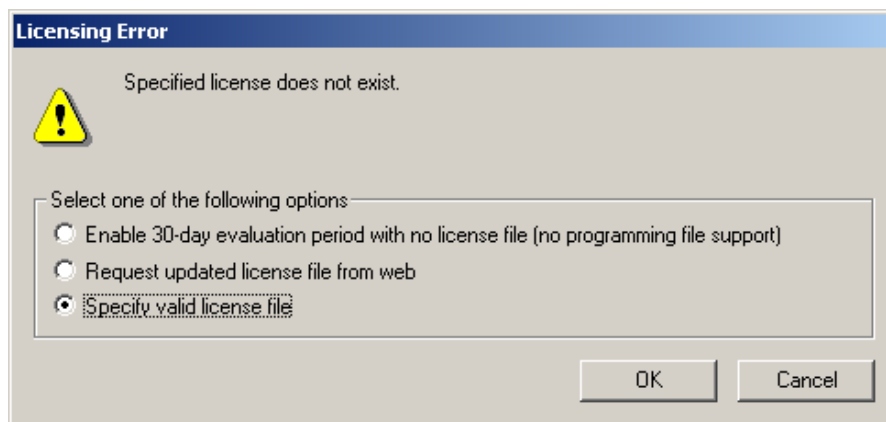
To install the Quartus II Web Edition software, perform the following steps:

- 1) Make sure you have system administration (Administrator) privileges to install the Quartus software.
- 2) Place your Altera Software CD in your CD-ROM.
- 3) The CD should start up with a dialog if autorun of your CD-ROM drive is not deactivated. Navigate through the menu to start Quartus II Web Edition installation. If autorun fails you can execute the installation program in the folder \QUARTUS of your CD.
- 4) The Quartus II installation wizard is launched and guides you through the installation process.

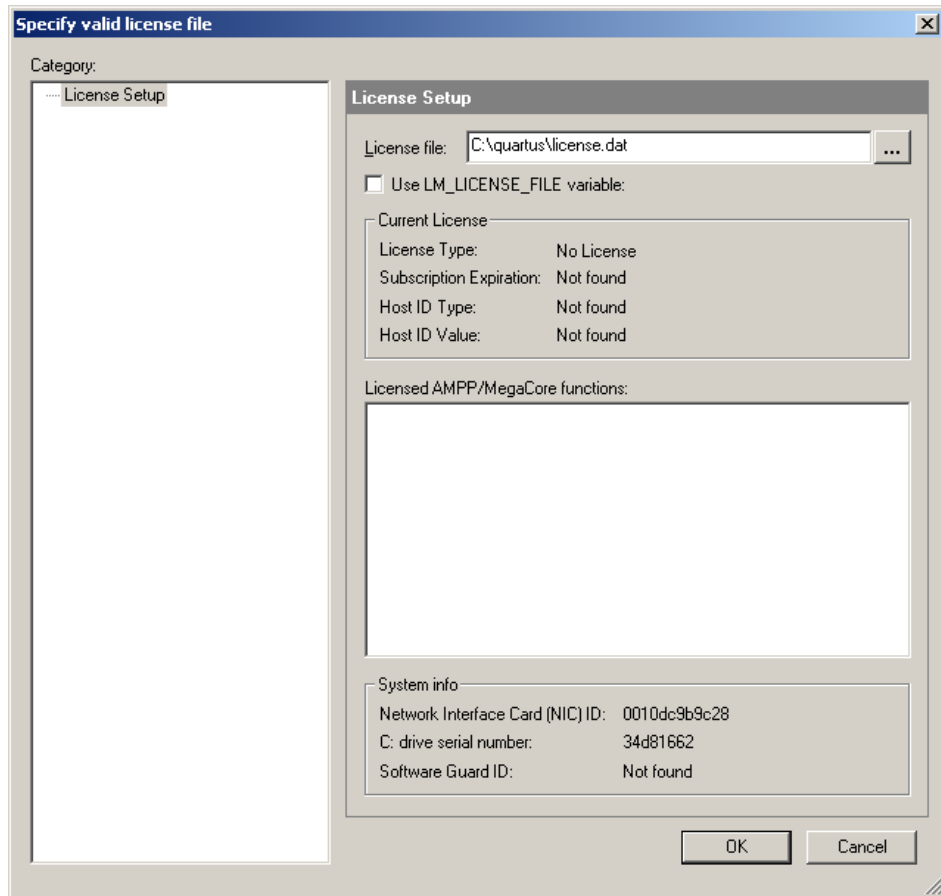
Setting Up Quartus II Web Edition Licensing

Follow the appropriate steps below for specifying a license file in the Windows NT, Windows 2000 or Windows XP Control Panel.

- 1) Save the license file you got from Altera by e-mail to your hard disk. It is recommended to choose the Quartus II installation folder as location and rename the file to "**license.dat**" (e.g. c:\quartus\license.dat).
- 2) Start the Quartus II Web Edition.
- 3) If Quartus II Web Edition does not find a valid license at start up it shows the following message:



- 4) Select **Specify a valid license file** and press **OK**.
- 5) Specify the **full path** to your license.dat file in the following window and confirm with **OK**.



Installing the ByteBlaster Driver for Windows NT, Windows 2000, Windows XP

On a PC with Windows NT, 2000 or XP you need to install a driver for the Altera download cable ByteBlaster, which is part of your DIGILAB board. The ByteBlaster is used for downloading the configuration information through the parallel port of your PC to the JTAG port of the MAX device.

Windows NT

- 1) Go to **Start/Settings/Control Panel** and double-click on **Multimedia** icon.
- 2) Click on **Devices** tab and choose the **Add** button
- 3) Select **Unlisted or Updated Driver** from the List of Drivers list box and choose **OK**. The Install Driver dialog box opens.
- 4) Type or select **\\<Quartus II system directory>\drivers** in the text box, and choose **OK**. The Add Unlisted or Updated Driver dialog box opens.

- 5) Select **Altera ByteBlaster** from the list box and choose **OK**.
- 6) To install the driver at the current address, choose **OK**. The System Setting Change dialog box is displayed.
- 7) Choose the **Restart Now** button in the System Settings Change dialog box to reboot your computer.

Windows 2000

- 1) Open the Control Panel (Start menu -> **Settings** -> **Control Panel**).
- 2) Double-click on the Add/Remove Hardware icon to start the **Add/Remove Hardware Wizard** and click **Next** to continue.
- 3) In the **Choose a Hardware Task** panel, select the **Add/Troubleshoot a device** radio button and click **Next** to continue. Windows 2000 will search for new Plug and Play hardware (**New Hardware Detection** window).
- 4) In the **Choose a Hardware Device** window, select **Add a new device** and click **Next** to continue.
- 5) In the **Find New Hardware** window, select the **No, I want to select the hardware from a list** radio button and click **Next** to continue.
- 6) In the **Hardware Type** window, select **Sound, video and game controllers** and click **Next** to continue.
- 7) In the **Select a Device Driver** window, select **Have Disk...**
- 8) Specify the full directory path to the **win2000.inf** file (e.g., <Quartus II directory>\drivers\win2000) and click **OK**.
- 9) In the **Digital Signature Not Found** warning dialog box, click **Yes** to continue the installation.
- 10) In the **Select a Device Driver** window, select the hardware to install and click **Next** to continue.
- 11) The **Start Hardware Installation** window displays the hardware being installed. Click **Next** to continue.
- 12) In the **Digital Signature Not Found** warning dialog box, click **Yes** to continue the installation.
- 13) In the **Completing the Add/Remove Hardware Wizard** window, click **Finish** to continue.
- 14) A system dialog appears prompting a reboot so that the new settings can take effect.

Windows XP

- 1) Choose **Control Panel** (Windows Start menu).
- 2) Click the **Switch to Classic View** link.
- 3) In the **Control Panel** windows, double-click **Add Hardware** and click **Next**. The **Add/Remove Hardware Wizard** dialog box appears.
- 4) Select **Yes, I have already connected the hardware** and click **Next**.
- 5) In the **Installed hardware** list, select **Add a new hardware device** and click **Next**.
- 6) Select **Install the hardware that I manually select from a list (Advanced)** and click **Next**.
- 7) Select **Sound, video and game controllers** and click **Next**.
- 8) Select **Have disk**
- 9) Specify the full directory path to the **win2000.inf** file (e.g., <Quartus II directory>\drivers\win2000) with **Browse (...)**, and click **OK**.
- 10) In the **Digital Signature Not Found** page, click **Yes**. A software installation warning appears.
- 11) Click **Continue Anyway**.
- 12) Select **Altera ByteBlaster** and click **Next**. A hardware installation warning appears.
- 13) Click **Continue Anyway**.
- 14) Click **Finish**.
- 15) When prompted to restart your computer, click **Yes**.

Setting Up the ByteBlaster in Quartus II

- 1) Start the Quartus II software.
- 2) Choose **Programmer** from the Tools menu. The programmer window will open.
- 3) Click the **Hardware** button to open the Hardware Setup window.
 - a. The selected programming hardware is identified as Currently Selected Hardware.
 - b. Programming hardware that is already set up appears in the Available hardware items window.

- 4) Click the **Add Hardware** button to open the Add Hardware window if the programming hardware you would like to use is not listed in the Available hardware items window.
- 5) Select **ByteBlasterMV or ByteBlaster II** as hardware type.
- 6) Click **OK**.
- 7) Select ByteBlaster in the Available hardware items window then clicking the **Select Hardware** button. Your choice will be listed as the Currently Selected Hardware.
- 8) Click **Close**.
- 9) Your programming hardware has been set up.

Congratulations!

You have successfully installed and licensed the Quartus II development system.

Using Quartus II for your own Designs

Further Documentation

Part of the DIGILAB picoMAX Kit is the Altera Documentation Library. On this CD you'll find all current Altera documentation and data sheets. You may also want to check the Altera homepage at <http://www.altera.com> for more up to date information or newer versions of the Quartus II Web Edition software.

Open index.html to browse through the different chapters on your CD.

If you are new to Quartus II Software it is recommended to read the Quartus II Software Quick Start Guide (**mnl_qts_quick_start.pdf**) and the Introduction to Quartus II Manual (**intro_to_quartus2.pdf**).


If you are experienced user of Altera MAX+plus II software you should read the technical brief TB81: Quartus II Software Advantages for MAX+plus II Software Users in MAX+plus II and Quartus II software documentation (**tb81.pdf**).

Browse through the section device documentation to find information about MAX 7000 or MAX 3000 devices.

Getting started with the demo design in Quartus II


Open and compile the demo project

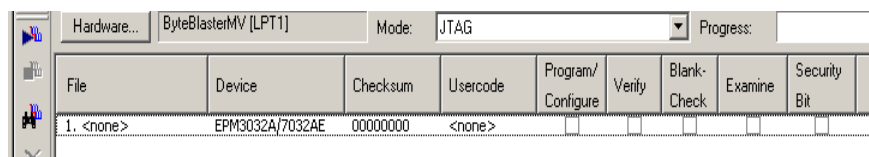
To check your DIGILAB picoMAX board a simple demo project has been created with Quartus II. Follow the steps below to learn how to compile the project with Quartus II.

1. Create a folder for the demo project on your hard disk drive (e.g. c:\picoMAX).
2. Run **demo.exe** on your floppy disk to extract the design files. Choose the path to the formerly created folder when asked.
3. Open Quartus II Web Edition.
4. Choose **File→Open Project...** Navigate to folder where demo project is located and select **demo.quartus**. Click **Open** to open it.
5. **Double click** on **demo** in the Project Navigator window. The schematic of the top-level design file is opened.
6. Explore the design and read the comments. Decide to use an external oscillator on your board (default, recommended) or change the design and try the internal ring oscillator (the ring oscillator is only used for demo purposes and not recommended for real designs).
7. Press  to run a full compilation.

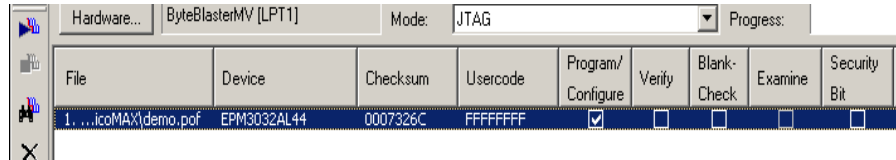
Program your DIGILAB picoMAX board


To program the device on your DIGILAB picoMAX board with Quartus II do the following steps.

8. Connect the parallel cable and power supply to DIGILAB picoMAX board
9. Open programmer with **Tools→Programmer**.
10. Click  from programmer window to search for devices. The programmer like in the figure below should detect one device.



11. Double click on <none> in the file column to select a programming file.
12. Choose **demo.pof** and click **Open**.
13. Click in the check box under column **Program/Configure** to select the programming action like in the figure below.



14. Press  to program the device.
15. If progress bar shows 100% you have successfully programmed your device. Now the assigned pins (no. 18, 20, 24, 26, 28) toggle at a specific fractional frequency of the oscillator used.

Board Description

Power Supply

The DIGILAB includes a power supply, strong enough for programming a MAX device and for the board itself. Depending on any custom logic, higher frequencies or other external consumers you may need to evaluate power consumption, use a different power supply and consider limitations of the on board voltage regulator.

Connectors

1. Power – J6
Connect VCC to the inner pin and GND to the outer shell of the power connector. There's a variable regulator (LM317T) on board and you may supply 5 to 10V unregulated DC.
2. Parallel Port – P1
Use the included parallel port cable to connect your PC's parallel port with the DIGILAB parallel port connector. This interface is used to program the MAX EPLD on the DIGILAB picoMAX.

Jumper Settings

The DIGILAB picoMAX has four Jumpers. Two are used to set the power supply, the two others are used to adapt for MAX3000A devices.



The Jumper Locations are documented on page 12 in this manual.

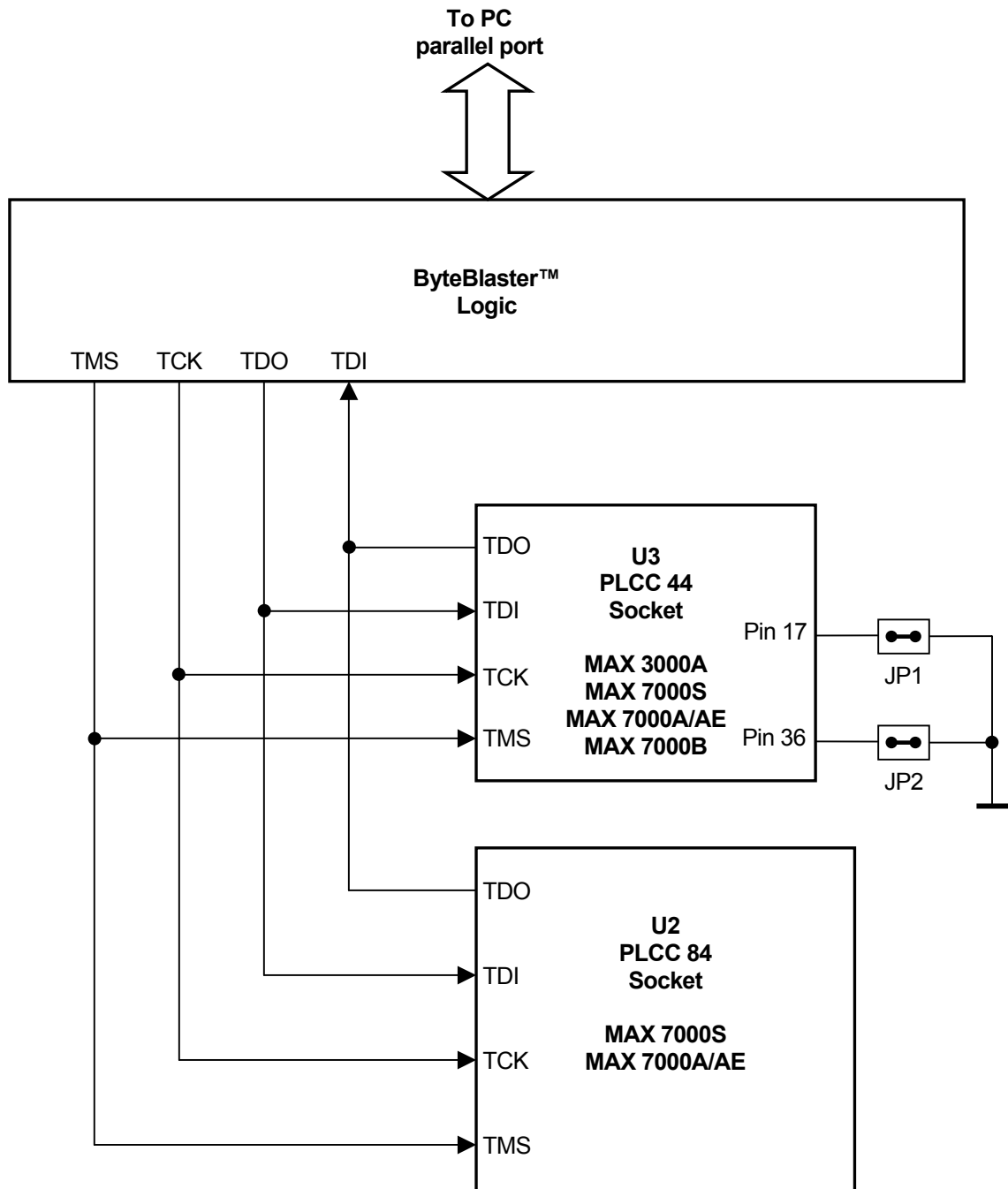


The correct setting of JP9 and JP3 is very important as they select between 2.5V, 3.3V and 5V supply voltages. Setting it to a higher voltage than required while using a 3.3V EPLD (MAX 7000A, MAX 7000AE or MAX 3000A) or 2.5V EPLD (MAX 7000B) might cause permanent damage to the MAX device.

	Voltage	JP9	JP3	JP1	JP2
MAX7000S	5V	open	open	open	open
MAX 7000A or MAX 7000AE	3.3V	closed	open	open	open
MAX 3000A	3.3V	closed	open	closed	closed
MAX 7000B	2.5V	open	closed	open	open

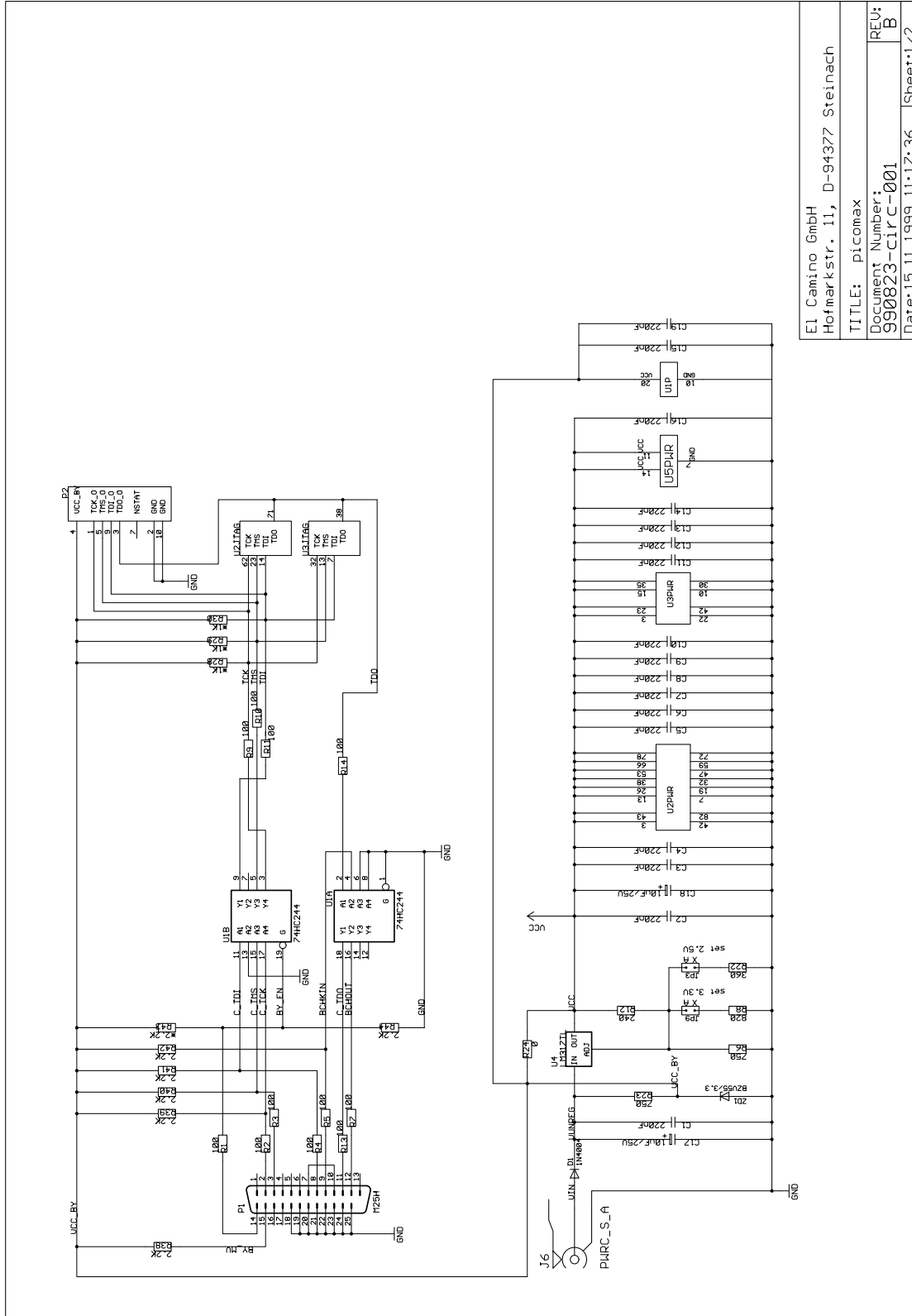
default

JTAG Chain Configuration



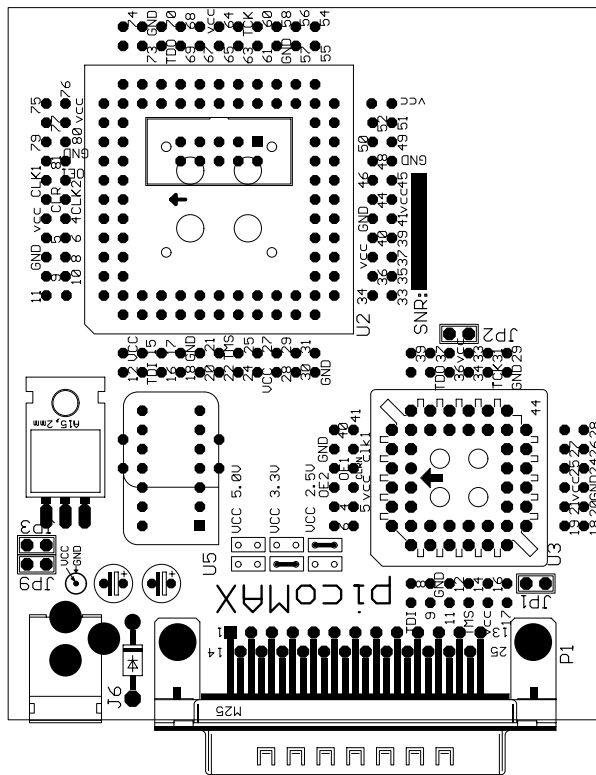
**Only one device may be on the board at any given time!
(TDO Outputs are connected)**

Board, Schematic, Page 1

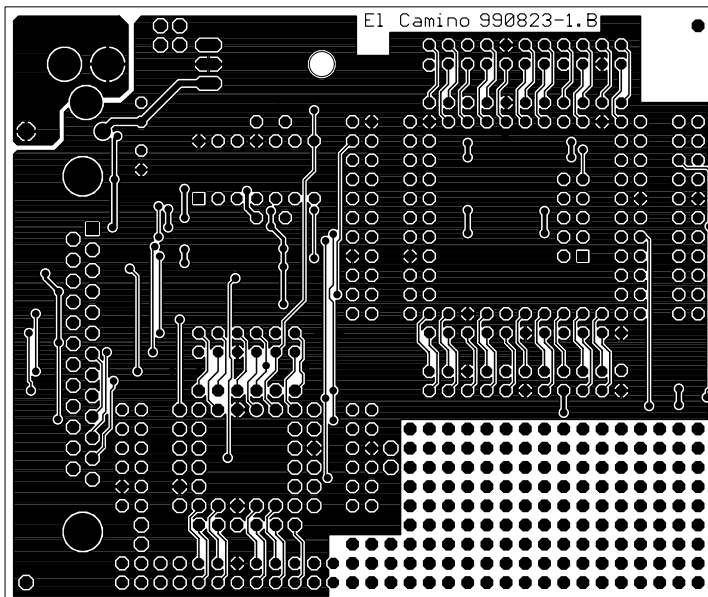


E1 Camino GmbH
 Hofmarkstr. 11, D-94377 Steinach
 TITLE: picomax
 Document Number:
 990823-circ-001
 Date: 15.11.1999 11:17:36 | Sheet: 1/2

Board, Components Top Side



Board, Layout Top Side



Board, Layout Bottom Side

