

XE8000 ProStart II

User Guide

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1 GENERAL INTRODUCTION

1.1 INTRODUCTION

This first chapter contains general information that will be useful to know before using the ProStart II.

1.2 HIGHLIGHTS

The information you will gain from this chapter:

- About this Guide
- Recommended Reading
- Troubleshooting
- The Semtech Web Site
- Customer Support

1.3 ABOUT THIS GUIDE

This document describes how to use The ProStart II as a development tool to develop and debug programs on our XE8000 series of products.

The manual Layout is as follows:

- Chapter 2 : Overview and Installation
- Chapter 3 : Installing and using the GUI
- Chapter 4 : Using the ProStart Without RIDE.
- Chapter 5 : Electrical specifications and hardware description
- Chapter 6 : Programming connectors description
- Chapter 7 : Socket Boards
- Chapter 8 : Troubleshooting
- Chapter 9 : Schematics

1.3.1 Documentation Updates

All documentation evolves and this User's Guide is no exception. Since ProStart II and other Semtech tools are constantly evolving to meet customer needs, some tool descriptions may differ from those in this document. Please refer to our web site at <http://www.semtech.com> to obtain the latest documentation available.

1.4 RECOMMENDED READING

This user's guide describes how to use the ProStart II. Other useful documents are listed below:

Datasheets (XE88LCxx).

Semtech Application notes (AN8000.xx).

Raisonance Getting Started document.

These can be found on our web site <http://www.semtech.com>

1.5 TROUBLESHOOTING

See Chapter 8 for information on common problems.

1.6 THE SEMTECH INTERNET WEB SITE

Semtech provides on line support on the Semtech World Wide Web site. The web site is used by Semtech as a means to make files and information easily available to customers. It is at <http://www.semtech.com>

1.7 CUSTOMER SUPPORT

Customers should call their distributor, representative or field application engineer for support. Users of Semtech products can receive assistance through several channels:

- Distributors or Representative, Local Sales Office
- Field Application Engineer (FAE)
- Third party for source code

2 OVERVIEW AND INSTALLATION

2.1 INTRODUCTION

This chapter gives you an overview of the XE8000 ProStart II system and then explains how to install the system hardware.

2.2 HIGHLIGHTS

The items discussed in this chapter include:

- What is the ProStart II
- ProStart II components
- How ProStart II helps you
- Installing ProStart II hardware

2.3 WHAT IS THE PROSTART II

The ProStart II is the new development tool for the XE8000 series. The ProStart II replaces the ProStart that was used until now. The ProStart II is a combination of a **Programmer** for the MTP devices and a **Starter** kit for the development of user applications.

The ProStart II is the evolution of the ProStart, the first XE8000 development tool. The new features will be described in the chapter named "how ProStart II helps you".

2.4 PROSTART II COMPONENTS

- XE8000EVxxx (Evaluation board for the specific XE8000 product)
- XE8000MP (Multipurpose programming and debug board with cables and power supply)
- XE8000SW RIDE-Lite / Entreprise Development environment both versions available through Raisonance website www.raisonance.com. For more information see chapter 3

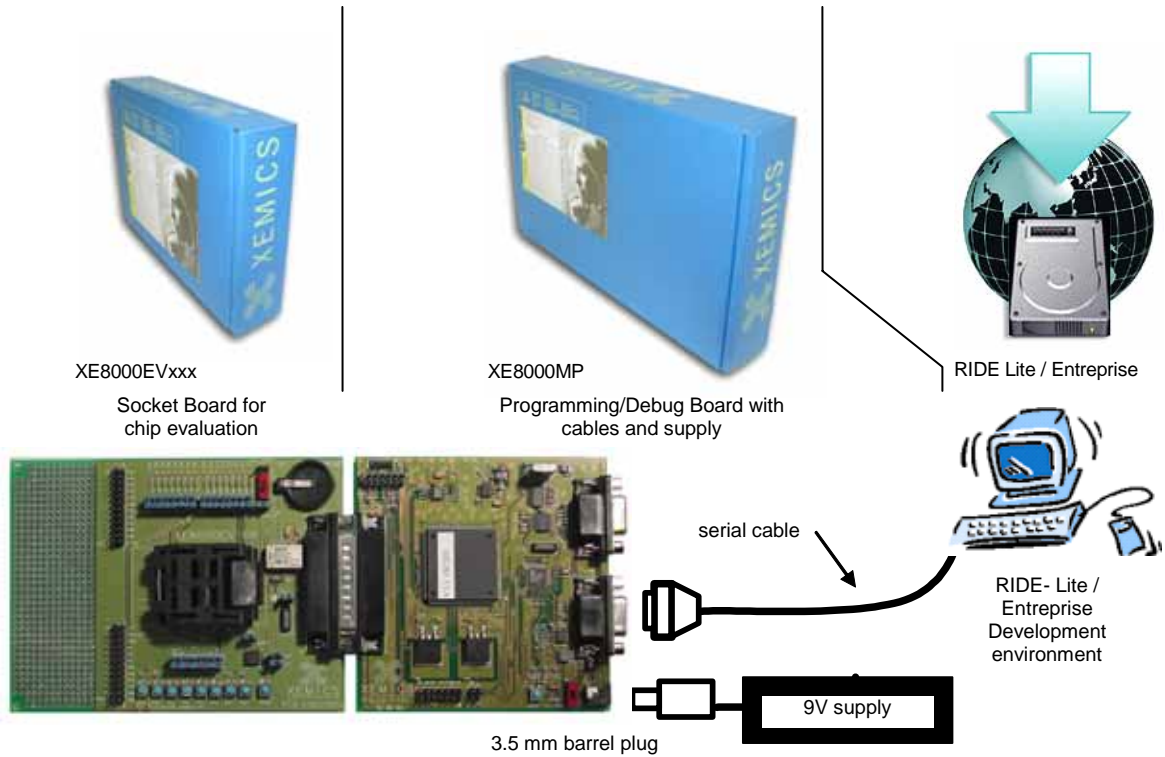


Figure 1 : Overview of the system (real boxes, boxes content and boards may differ from illustrations)

2.5 HOW PROSTART II HELPS YOU

ProStart II allows you to:

- Program XE88LCxxMTP devices.
- Guarantee the retention specified in the datasheets
- Do basic debugging using the In Socket Debugger feature of the RIDE graphical environment
- Read the checksum of a chip at any time.
- Change the operating voltage between 2.4 to 5 Volts.
- Use the RS232 interface by simply connecting a RS232 cable to the DB9 connector labeled RS232

2.6 INSTALLING PROSTART II HARDWARE

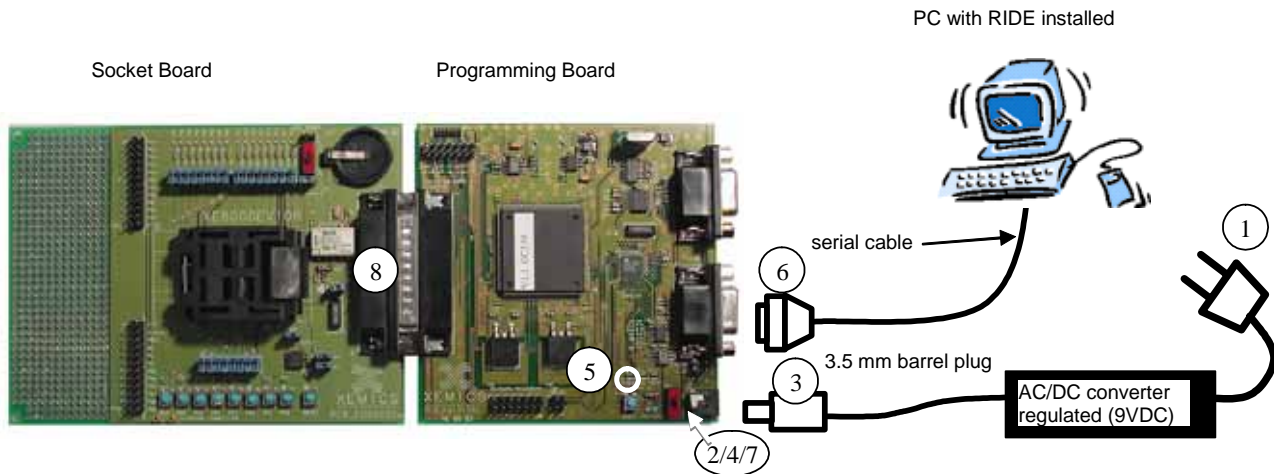


Figure 2 : Installation

Follow the steps in this section to install ProStart II hardware (see next chapter for software installation).

Warning
Neither the PC nor the ProStart should have power turned on at this time

- 1 Connect your AC/DC converter to supply / mains.
- 2 Verify that the on/off switch is in the "off" position
- 3 Connect the DC connector to the board.
- 4 Put the on/off switch into the "on" position.
- 5 The LED labeled power must be lit. (The power consumption must be around 340 mAmps)
- 6 Connect the RS232 cable to the connector labeled "prog" and to a free COM port of the PC.
- 7 Put the on/off switch in the "off" position.
- 8 Connect your EVxxx board.

Now the hardware is ready to work at the next power on.
Please follow the chapters 3 or 4 for the software installation.

3 INSTALLING AND USING RIDE DEVELOPMENT ENVIRONMENT

3.1 INTRODUCTION

This chapter gives you the guidelines to install and use the Graphical User Interface RIDE.

3.2 HIGHLIGHTS

- RIDE installation
- Reference documentation
- Getting started with RIDE
- Using the ProStart II with RIDE

3.3 RIDE INSTALLATION

3.3.1 RIDE Software

There are two version of the RIDE environment:

RIDE Lite features (free):

- Editor
- Compiler, Linker, Assembler
- ROM Monitoring
- Simulator limited to 4k Instructions

RIDE Enterprise features (license needed):

- All RIDE lite features plus
- Simulator for 8kInstructions
- Multi-project management
- Scripting support
- Code Compressor

3.3.2 Minimum System Requirements

Windows 98/NT/2000/Me/XP (Windows 95 is NOT supported)

3.3.3 Installing the Software

Both versions are available on Raisonance web site www.raisonance.com , simply download the latest version from the download section and follow the instructions.

3.4 REFERENCE DOCUMENTATION

This chapter is enclosed in the manual named *Getting Started with the Raisonance Development kit for the XE8000 family* that comes with RIDE.

Because of one limitation of the GNU tools, it is strongly recommended that you install the software in its default location. (GNU is the base of several elements of RIDE-Pro, including its compiler. This implementation of GNU tools requires a specific syntax for file naming and paths.)

After installation, you may find it on the environment menu bar *Help > PDF > XE-TOOLS > Getting Started XE* or on your hard drive on C:\RIDE\DOC\Getting_Started_XE.PDF or in the directory where you choose to install RIDE.

3.5 GETTING STARTED WITH RIDE

This section refers to chapter 4 of the *Getting Started with the Raisonance Development kit for the XE8000 family* manual

In that chapter you will see:

- Overview of RIDE
- Simulator/Debugger
- Starting RIDE
- Creating a Project
- Creating and Adding a Source File
- Building the Project
- Adding More Code
- Starting the RIDE Debugger
- Breakpoints and Measuring Execution Time
- Setting Watch points
- Simulation Animation
- Stepping Through Code
- Final Code Additions
- Tracing and Displaying Waveforms
- Generating Waveforms on Pins

3.6 USING THE PROSTART II WITH RIDE

This section refers to chapter 5 of the *Getting Started with the Raisonance Development kit for the XE8000 family* manual

In that chapter you will see:

- The ROM-monitor
- Example's Starting point
- Loading a program
- Calibrating the chip
- Inserting the monitor code
- Starting the monitor
- Basic features
- Step by step
- Debugging the same program again
- Invalidating the breakpoints
- Tips about the monitor

4 USING THE PROSTART II WITHOUT LAUNCHING RIDE

4.1 INTRODUCTION

This Chapter contains information about uploading a “.rom” “.bin” or “.axe” file to an XE8000 using the ProStart II without launching RIDE environment.

4.2 HIGHLIGHTS

The information you will gain from this chapter:

- The XELOADER (xeloader.exe)
- XELOADER features
- XELOADER stand alone usage
- XELOADER GUI
- XELOADER command line
- Programming
- Changing the target power supply
- Getting the XE8000 checksum
- Enabling / disabling the RS232 line driver (Port B 6/7)

4.3 THE XELOADER (XELOADER.EXE)

The RIDE XELOADER tool is an executable file produced by SEMTECH that can be run either in command line or through a GUI version.

The file is included in the RIDE installation; you can find it under C:\RIDE\COOLRCTS\WIN32\BIN\XeLoader.EXE, or you can download it using the following link <http://www.semtech.com>

4.4 XELOADER FEATURES

The XELOADER offers the following features

- User friendly GUI interface or online command interface.
- Downwards compatibility with the ProStart (first version)
- Upload a “.rom” “.bin” or “.axe” file to a XE8000
- Reading of the XE8000 Checksum
- Computing the checksum of the source file.
- Switching the PortB 6/7 on or off for the old ProStart version
- Changing the Target board voltage

4.5 XELOADER STAND ALONE USAGE

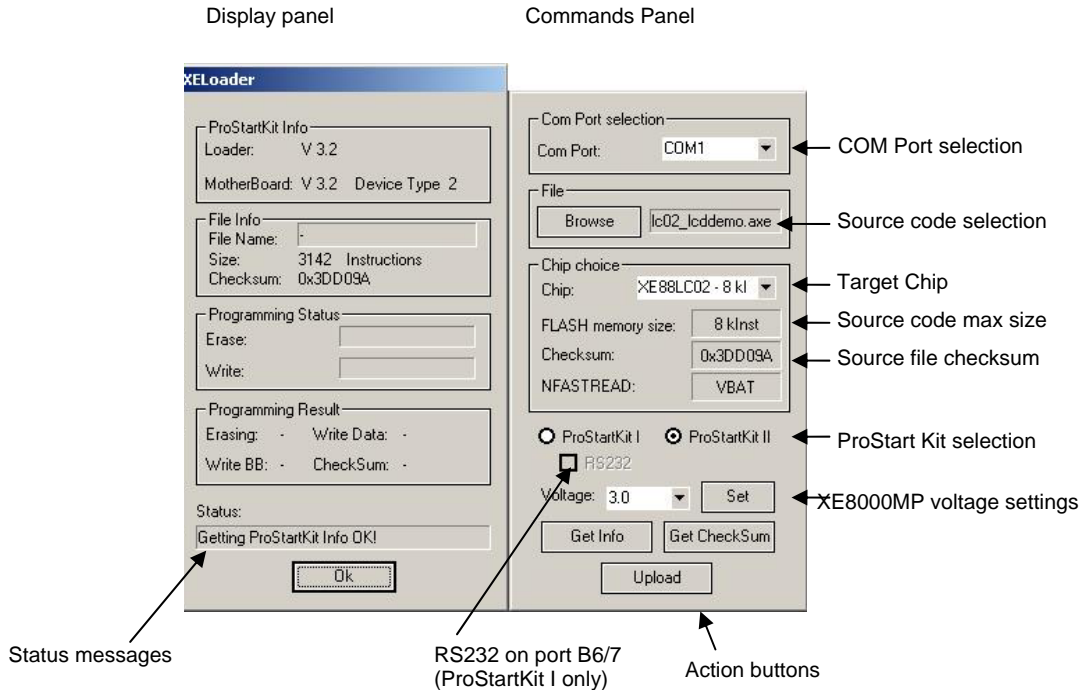
In order to use XELoader in a stand alone way, i.e. on another machine, you will need to copy the following files from C:\RIDE\COOLRCTS\WIN32\BIN\ directory

- XELoader.EXE
- c816-srec2rom.EXE
- c816-objcopy.EXE
- cygwin.DLL

On the other machine, place all these files in the same directory i.e. C:\semtech\ and then launch XELoader.exe file.

4.6 XELOADER GUI

From version 2.0 the XELoader is available in a graphical version that gives a better overview of the download process. See image below:



This window comes up when the user types xeloder on the command line window.

4.7 DEBUG MODE

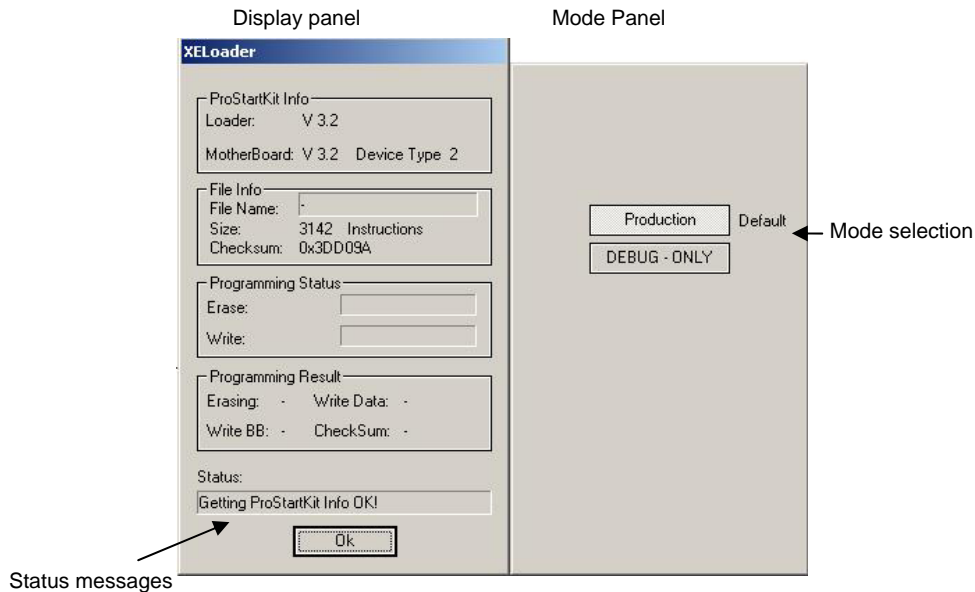
The version 3.1 integrates a new feature called debug mode, this allows the users who are debugging their code to program faster.

Note that you do not have to choose the mode for every usage of the XELoader, your choice will be memorized.

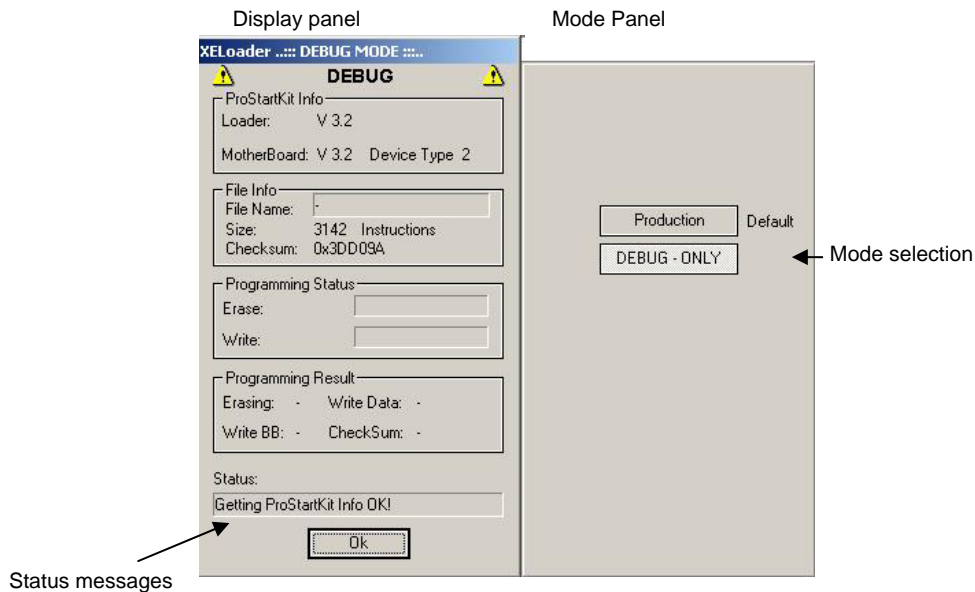
THE DEBUG MODE SHOULD NOT BE USED IN PRODUCTION, THE DATA RETENTION OF THE FLASH IS NOT GUARANTEED

This feature is accessible by pressing the keys [Ctrl + r] when the XELoader window is selected

NOTE : The keys [Ctrl + o] show the command panel again.



The debug mode is clearly indicated in order to avoid confusion between debug and production mode.



4.8 XELOADER COMMAND LINE

If the command line version fits your application better, you can still use it this way. Simply add the following option at the end of the command line : “-c”, the GUI will still display but there is no need to interact with it.

```
C:\>XEloader -c

Usage: XEloader prostart_type comport [-h] | [-i] | [-t target_name] | [-u input_file] | [-s
voltage] | [-g] | [-r state]

Interfaces the XE8000 family ProStart kits

-h                : Display this information.

prostart_type     : Specifies the ProStart type
                  1 for ProStartI
                  2 for ProStartII

com_port          : Specifies the com port (COM1, COM2, ...)

-t target_name    : Specifies the target chip to upload
-i               : Display information about XEloader and connected
                  ProStartKit.
-u input_file     : Uploads input_file to the XE8000 microcontroller
                  Input file formats : *.axe, *.bin, *.rom

-s voltage        : Sets the given voltage on the ProStart
                  Voltage : 2.4, 3.0, 5.0

-g               : Reads the XE8000 microcontroller Checksum
                  (only for ProStartII)
-r state         : Enables or disables the PortB pins 6 and 7
                  connection to the RS232 line driver.
                  state : ON, OFF (only for ProStartI)

***              XEloader Version V 3.2 Release date Apr 11 2005              ***
Copyright (c) 1997-2004, SEMTECH SA, Monruz 2, CH-2000 Neuchatel, Switzerland
```

The “-c” option makes the command line program act the same way as previous versions.

4.9 PROGRAMMING

You can see an upload example of a first generation XE8000 (XE88LC01/01A-03-05/05A) below

```
D:\Projet\XEloader\Release> XEloader 2 COM2 -u prostartdemo1.bin -c

ProStart Info:

-> Loader      : V 3.2
-> Mother Board : V 3.2
-> Device type : 1

File Info:

-> File Name      = C:\_Last_.axe
-> Program Size   = 2907 instructions.
-> File CheckSum  = 0x06AF8

Programming Status:

|< Erasing FLASH memory...
| |||||
|
| Uploading FLASH memory...
| 0% |<----->| 100%
| |||||
FLASH memory Upload finished...

Programing Status:

Erasing           =          1
Write Blocking Bits =          1
Write Data        =          1
Calculated CheckSum =       0x06AF8
XE8000 CheckSum   =       0x06AF8

Programming OK...

or

Programming Failed
```

You can see an example upload of a second generation XE8000 (XE88LC02-06A-07A & XE1283) below

```
D:\Projet\XEloader\Release> XEloader 2 COM2 -u prostartdemo1.bin -c
ProStart Info:

-> Loader      : V 3.2
-> Mother Board : V 3.2
-> Device type  : 2

Sending ProStartKit parameters...

File Info:

-> File Name      = C:\_Last_.axe
-> Program Size   = 2907 instructions.
-> File CheckSum  = 0x122556

Programming Status:

| < Erasing FLASH memory...

Uploading FLASH memory...
0% | <-----> | 100%
   ||||||||||||||||

Checking FLASH memory programing...

FLASH memory Upload finished...

Programming Status:

Erasing           =          1
Write Blocking Bits =          1
Write Data        =          1
Calculated CheckSum =      0x122556
XE8000 CheckSum   =      0x122556

Programming OK...

or
Programming status : Failed
Try to download again or change the chip!

Detailed Status:
Low margin : Failed
or
Programming status : Failed
This device may be used for debugging purpose

Detailed Status:
Low margin : Ok
High margin : Failed
Nom. margin : Ok

or
Programming status : Failed
Try to download again or change the chip!

Detailed Status:
Low margin : Ok
High margin : Failed
Nom. margin : Failed

D:\Projet\XEloader\Release>
```

The difference between the two uploads are

- Time of erasing shorter for second generation
- Margin checks at the end of the upload for the second generation

You can see an example upload of a second generation (XE88LC02-4kl - 07A – XE1283-4kl) below

```
D:\Projet\XEloader\Release> XEloader 2 COM2 -u prostartdemo1.bin -f -c
ProStart Info:

-> Loader          : V 3.2
-> Mother Board   : V 3.2
-> Device type    : 2

Sending ProStartKit parameters...

File Info:

-> File Name       = C:\_Last_.axe
-> Program Size   = 2907 instructions.
-> File CheckSum  = 0x122556

Programming Status:

| < Erasing FLASH memory...

Uploading FLASH memory...
0% | <-----> | 100%
   ||||||||||||||||

Checking FLASH memory programming...

FLASH memory Upload finished...

Programming Status:

Erasing           =          1
Write Blocking Bits =          1
Write Data        =          1
Calculated CheckSum =      0x122556
XE8000 CheckSum   =      0x122556

Programming OK...

or
Programming status : Failed
Try to download again or change the chip!

Detailed Status:
Low margin : Failed
or
Programming status : Failed
This device may be used for debugging purpose

Detailed Status:
Low margin : Ok
High margin : Failed
Nom. margin : Ok

or
Programming status : Failed
Try to download again or change the chip!

Detailed Status:
Low margin : Ok
High margin : Failed
Nom. margin : Failed

D:\Projet\XEloader\Release>
```

4.10 CHANGING TARGET POWER SUPPLY

```
D:\Projet\XEloader\Release> XEloader 2 COM2 -s 5.0 -c
Sending ProStartKit supply voltage...
ProStartKit power supply set to 5.0

D:\Projet\XEloader\Release>
```

Note: This option is available for both generations of ProStart

4.11 GETTING THE XE8000 CHECKSUM

```
D:\Projet\XEloader\Release> XEloader 2 COM2 -g -c
Reading target chip checksum...
XE8000 CheckSum      :      0x122556
Checksum Read OK!
D:\Projet\XEloader\Release>
```

Note: This option is only available for the second generation of ProStart (ProStart II)

4.12 ENABLING / DISABLING THE RS232 LINE DRIVER (PORT B 6/7)

Note: This option is only available for the first generation of ProStart

Note: For the ProStart II the enable / disable of the RS232 line driver is managed by hardware, simply connecting a RS232 DB9 cable to the connectors enables the line driver

```
D:\Projet\XEloader\Release> XEloader 2 COM2 -r ON -c
Sending port B behavior...

D:\Projet\XEloader\Release> XEloader 2 COM2 -r OFF -c
Sending port B behavior...

D:\Projet\XEloader\Release>
```

5 ELECTRICAL SPECIFICATIONS AND HARDWARE DESCRIPTION

5.1 INTRODUCTION

This chapter gives you a view of the main characteristics of the ProStart II hardware.

5.2 HIGHLIGHTS

The items discussed in this chapter include:

- Hardware layout
- Electrical parameters
- Programmer parameters

5.3 HARDWARE LAYOUT

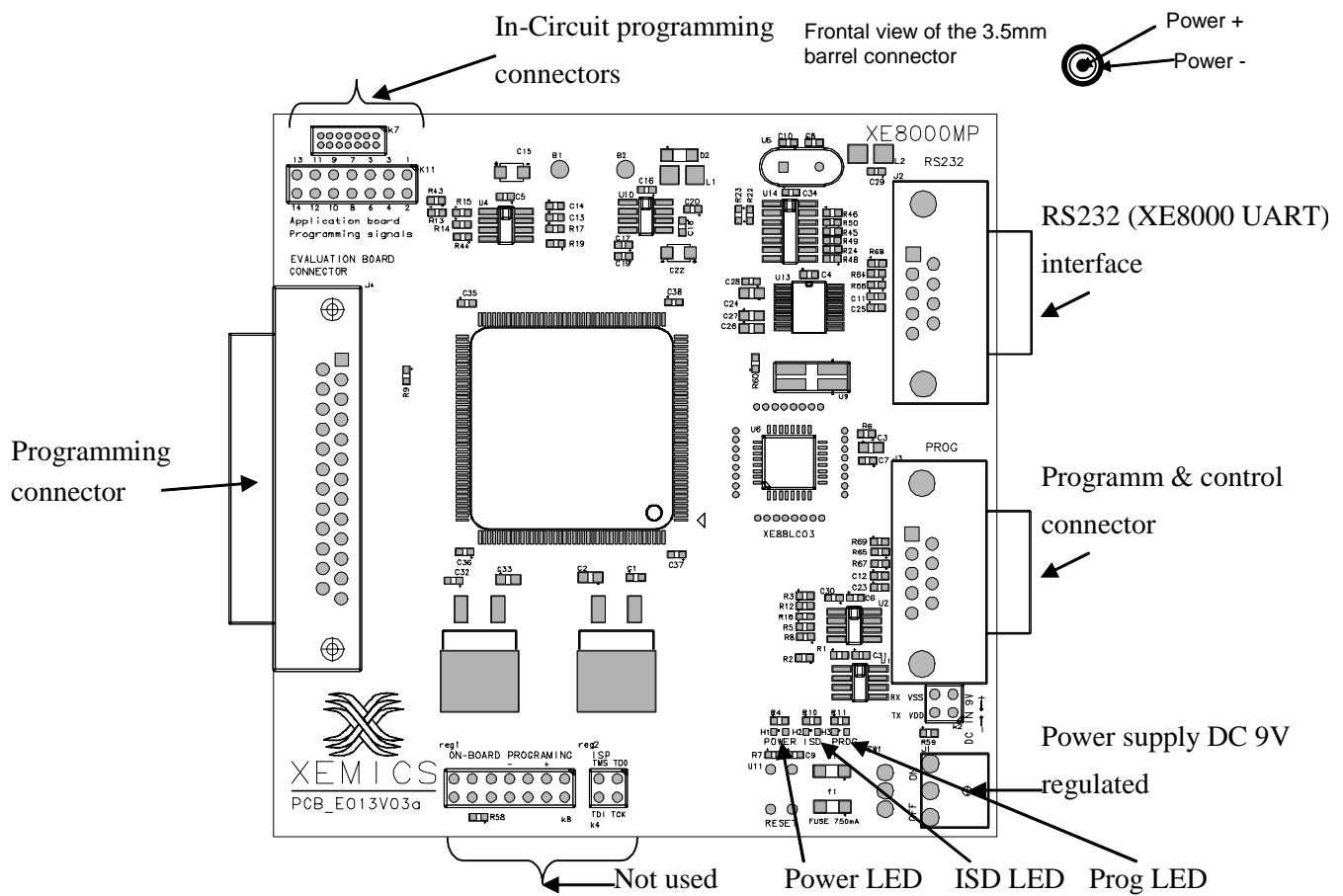


Figure 3 : Programming Board

5.4 ELECTRICAL PARAMETERS

Power supply: 9VDC

Current consumption

- Without Evaluation board connected : 340mA
- With Evaluation board connected, no LED lit about 360mA
- During the programming phase peaks up to 550mA
- Consumption with all the LEDs on 680mA

Please be careful when handling the board, the regulators and the CPLD may be hot !

Values generated by the board

- High voltage for programming purposes 12VDC
- VDD for MP and EV boards : 5VDC
- VDDA for EV boards : 2.4 to 5VDC

Default EV board supply value : 3VDC

Programming supply value : 5VDC

5.5 PROGRAMMER PARAMETERS

The programming of a XE8000 MTP chip is done in 3 phases.

Erasing the flash array

Writing the blocking bits

Writing the data

Timings:

Upload 8k instruction	Type I flash	Type II flash
Best case 1erase 1write	1 min 5 sec	47 sec
Worst case 5erase 5 write	5 min	3.35 min

Table 1 : Flash programming timings

Simplified programming flow

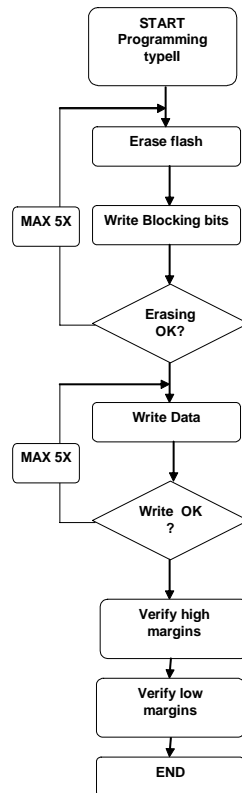


Figure 4 : Simplified Flash programming flowchart

6 PROGRAMMING CONNECTOR DESCRIPTION

6.1 INTRODUCTION

This chapter gives useful information about the programming signals for those XE8000 developers who want to program their application in circuit.

6.2 HIGHLIGHTS

The items discussed in this section are:

- DB25 connector
- Programming on board
- Example of application connection for the two types

6.3 DB25 CONNECTOR

The connector below is a SUB-D 25 pin (male) connector. The pins are implemented in the following way:

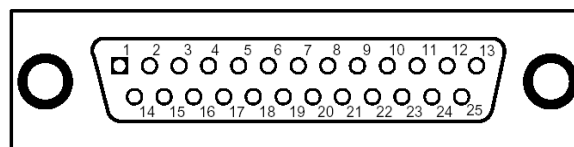


Figure 5 : Frontal view of the programming connector

Pin N°	XE88LC01/01A-03-05/05A (Flash Type I) Pin Descriptions	XE88LC02-06A-07A-XE1283 (Flash Type II) Pin Descriptions
1	VDDA	VDDA
2	VDDA	VDDA
3	RESET	NRESET
4	VDD	VDD
5	TESTIN / RX ISD / PA0	TESTIN / PB2
6	RESERVED	SCAN / PB0
7	TESTCK / PA1	TEST_E / PB1
8	TYPE	TYPE
9	CK_CR / OSCIN	CKMSTR / XIN
10	RESERVED	RESERVED
11	PTCK / OSCOUT	CKSLV / XOUT
12	GND	GND
13	VDD (COM_REL)	VDD (COM_REL)
14	RESERVED	RESERVED
15	RESERVED	RX ISD / PA0
16	GND	GND
17	RX (XE8000 UART) PB7	RX (XE8000 UART) PB7
18	TX (XE8000 UART) PB6	TX (XE8000 UART) PB6
19	TEST / VPP	VPP
20	TESTOUT / TX ISD / PB0	TESTOUT / TX ISD / PB3
21	RESERVED	TEST
22	XE8000 USRT CLK / PB4	XE8000 USRT CLK / PB4
23	NC	NC
24	XE8000 USRT DATA / PB5	XE8000 USRT DATA / PB5
25	NC	NC

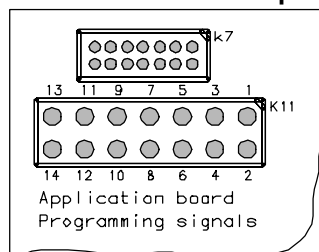
Table 2 : Programming connector signals

Note about the naming conventions: All the test signal are described for the target device **TESTOUT** means the output of the target device, and **TESTIN** the input of the target device

6.4 PROGRAMMING ON-BOARD / ISD FEATURE

It is possible to program your chip on a board. In order to complete this you must set up a connector on your application board to the one on the programming board named K11 or K7 (smaller pitch)

IMPORTANT NOTE: These connectors are only available with the V03a revision number (see chapter XE8000MP Revisions), for the V02a, the workaround is to make an adaptor between the DB25 connector and a 12 pin connector.


Figure 6 : Reduced programming connector

Since there are two types of flash in the XE8000 series of products, there are two different signal sets.

6.4.1 Type I Flash (XE88LC01/01A-03-05/05A)

1. Pin "RESET" must be connected to the pin Reset of the microcontroller.¹
2. Pin "TEST/VPP" must be connected to the pin TEST of the microcontroller.²
3. Pin "VDDA_1" must be connected to the pin Vbat of the microcontroller.³
4. Pin "TESTOUT" must be connected to the pin PB0 of the microcontroller.
5. Pin "PTCK" must be connected to the pin OSCOUT of the microcontroller.
6. Pin "TESTCK" must be connected to the pin PA1 of the microcontroller.
7. Pin "GND" must be connected to the ground of the target board.
8. Pin "TESTIN" must be connected to the pin PA0 of the microcontroller.
9. Pin "CK_CR" must be connected to the pin OSCIN of the microcontroller.
10. Not used for Type I flash
11. Not used for Type I flash
12. Pin "TYPE" must be connected through a pull down to the ground.
13. Not used – Cut to avoid inverting
14. Not used for Type I flash

6.4.2 Type II Flash (XE88LC02-06A-07A-XE1283...)

1. Pin "NRESET" must be connected to the pin nReset of the microcontroller.¹
2. Pin "VPP" must be connected to the pin VPP of the microcontroller.³
3. Pin "VDDA_1" must be connected to the pin Vbat of the microcontroller.⁴
4. Pin "TESTOUT" must be connected to the pin PB3 of the microcontroller.
5. Pin "CKSLV" must be connected to the pin XOUT of the microcontroller.
6. Pin "TEST_E" must be connected to the pin PB1 of the microcontroller.
7. Pin "GND" must be connected to the ground of the target board.
8. Pin "TESTIN" must be connected to the pin PB2 of the microcontroller.
9. Pin "CKMSTR" must be connected to the pin XIN of the microcontroller.
10. Pin "TEST" must be connected to the pin TEST of the microcontroller.
11. Pin "SCAN" must be connected to the pin PB0 of the microcontroller
12. Pin "TYPE" must be connected through a pull up to VBAT.
13. Not used – Cut to avoid inverting
14. Pin ISD RX must be connected to PA0 of the microcontroller.⁵

¹ This pin is used to make a power-on-reset when the chip is in programming mode.

² The pin provides three different voltages (5., 7, 11.6 V). Each of them is controlled by the Prostart.

³ The pin provides two different voltages (5 and 11.6 V). Each of them is controlled by the Prostart.

⁴ Note the fact that during the chip code uploading, VDDA_1 will be equal at 5 V.

⁵ In socket debugger pin, only used for this feature, **not necessary for programming**.

6.4.3 Programming on-board requirements

On the user application board, one capacitor must be mounted between Vreg and VSS of the microcontroller with a value of 1uF.

To identify your type of your product, the ProStart must have a resistor on the pin type.

Tip : In order to reduce your on board programming connector you can put the resistor on your cable.

WARNING! Since the programming is done using I/O pins you must pay ensure they are connected to non sensitive parts in your design.

The table below helps you to know which I/O pins are used during programming.

I/O pin	Signal name	Function during programming	Signal type
PA0	TESTIN	Input	Dynamic
PA1	TESTCK	Input	Dynamic
PB0	TESTOUT	Output	Dynamic

Table 3 : Type I I/O pin used during programming

I/O pin	Signal name	Function during programming	Signal type
PB0	SCAN	Input	Static
PB1	TEST_E	Input	Dynamic
PB2	TESTIN	Input	Dynamic
PB3	TESTOUT	Output	Dynamic

Table 4 : Type II I/O pin used during programming

For further information on the table list of XE8000 pins, please refer to the product datasheet.

6.4.4 In Socket Debugging Principle & Hardware requirements

The In Socket Debugger is an alternative to the emulator solution; it allows the user to add breakpoints to their code, to go step by step, to upload and download the memory. This solution requires about 1k instruction more.

Since the ISD adds code to your code you need to be able to download the code with the monitor add in and breakpoints. Practically it means that the programming pins are used for the ISD.

To use this feature the target circuit communicates with the XE8000MP with a software UART over two I/O pins or the hardware UART peripheral. (you can choose one ore the other in RIDE). The I/O pins used for this feature vary between type I and type II flash.

See the table below for the pin usage (RX - TX is seen from the XE8000 chip).

Flash Type	Software UART		Hardware UART	
	ISD RX	ISD TX	ISD RX	ISD TX
I	PA0	PB0	PB7	PB6
II	PA0	PB3	PB7	PB6

Table 5 : ISD pins assignment

Important note: Since The pin PA0 doesn't appear in the programming pins for the type II flash, you must add PA0 to your programming connector if you plan to do on-board In Socket Debugging

7 XE8000MP REVISIONS

7.1 INTRODUCTION

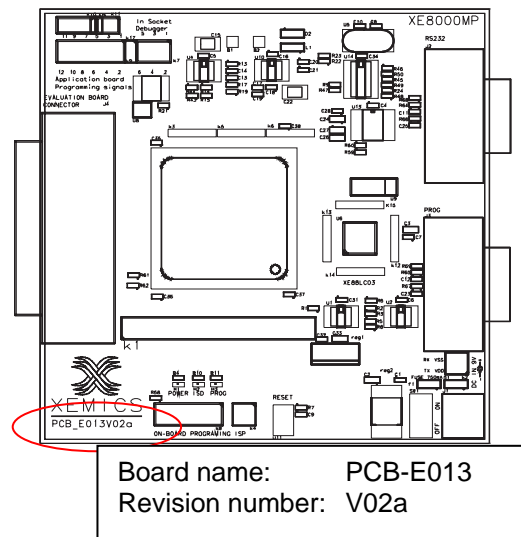
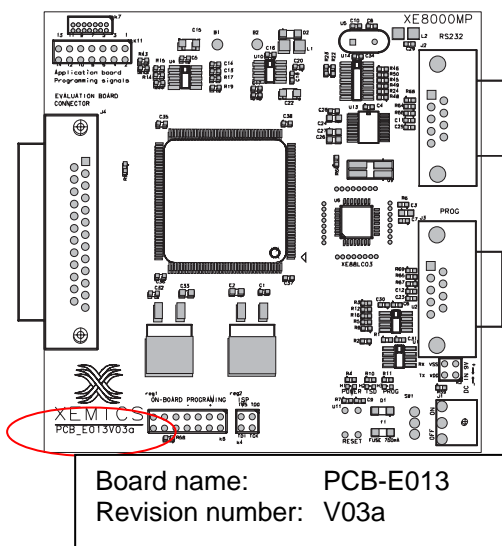
This chapter presents the different revisions of XE8000MP, and describes the difference between them.

7.2 HIGHLIGHTS

- Boards revision number
- Boards available
- Improvements / Differences

7.3 BOARDS REVISION NUMBERS

On each Semtech PCB there is a board name and a revision number you can find it under the Semtech logo see picture below:



7.4 BOARDS VERSIONS

There are currently two revision numbers:

Revision number	Release date	Comments
V02a	June 2002	Replaced by the V03a in March 2003
V03a	March 2003	Actual board delivered

Table 6 : Boards revision numbers

7.5 DIFFERENCES BETWEEN REVISIONS

Revision number	Differences / Improvements
ProStart I & earlier V01a	<ul style="list-style-type: none">• Not recommended for programming (no data retention warranty)• No ISD feature
V02a	<ul style="list-style-type: none">• First version
V03a	<ul style="list-style-type: none">• PCB Cleanup, wires suppressed• Functionality of programming connectors included• HV modification included

Table 7 : Difference between boards revisions

8 SOCKET BOARDS

8.1 INTRODUCTION

This chapter presents the main characteristics of the Evxxx boards

8.2 HIGHLIGHTS

- Socket board types
- Jumper default settings
- External power supply
- External clock on xin
- Reset button

8.3 SOCKET BOARD TYPES

Each product in the XE8000 series corresponds to a different socket board named EVxxx. Detailed descriptions can be found in the relevant datasheet. The following is a description of the common parts you will always find on the different versions.

Each pin of the XE8000 microcontroller is accessible on the edge of the board. The user application board can be connected to this board with the external headers.

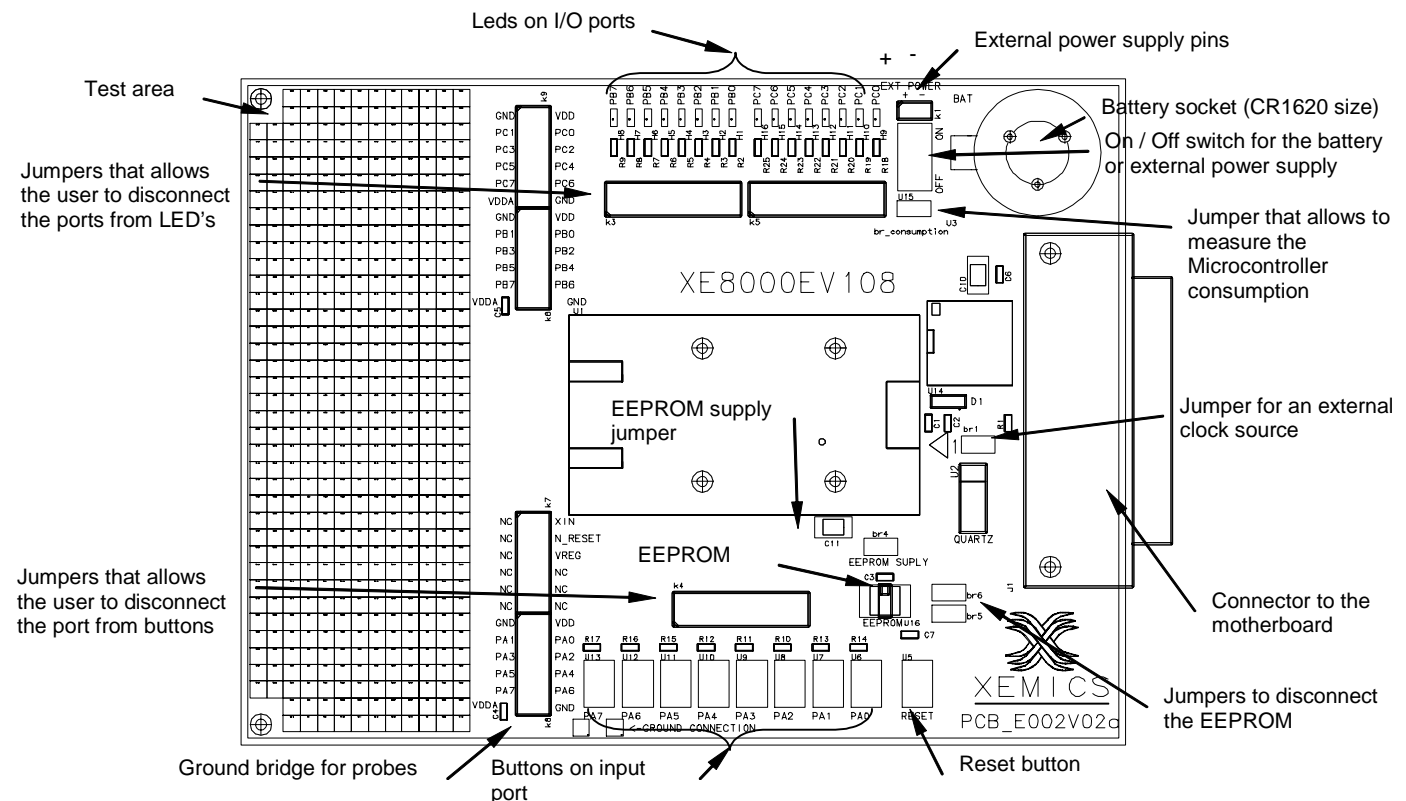


Figure 8 : Socket board example

8.4 JUMPER DEFAULT SETTINGS

On all the future versions of daughter boards there will be different jumper configurations. However there are some common jumpers that will be described in the table below.

Jumper name	Function	Open	Closed	Default
version dependent	LEDs on I/O ports	LEDs disabled	LEDs enabled	Closed
version dependent	Buttons on input port	Buttons disabled	Buttons enabled	Closed
br_consumption	Used to put an ampere meter in serial with uC VBAT	No uC VBAT (measurement)	VBAT connected to uC	Closed
near the xtal	Allows the user to put another xtal source on xin and xout	User Xtal	Board Xtal	Closed
near the EEPROM	connects PB4 & PB5 to the EEPROM	Disconnected	Connected	Closed *
EEPROM supply	Disconnects VBAT for the EEPROM	Disconnected	Connected	Closed

Table 8 : Default jumpers settings

*Note that when you're using the EEPROM, you must disable the PB4 and PB5 LED's. When you're using a battery supply, it's suggested to disable the LEDs.

8.5 EXTERNAL POWER SUPPLY

The evaluation board can be powered with a 2.4 to 5 V lithium battery.

The battery needs to be inserted in the correct way.

When connected to the motherboard the evaluation board is automatically powered by the motherboard, the battery or external power supplies are bypassed.

The on-off button allows the user to the switch between the battery supply and the external source supply.

When the on-off button is set to external source supply, the battery is not subject to discharge.

8.6 EXTERNAL CLOCK ON OSCIN

To operate the microcontroller with an external oscillator connected to the OSCin pin, first remove the "external clock source" jumper on the socket board. Once completed, connect the external oscillator to the header on pin "OSCIN".

8.7 RESET BUTTON

This enables users to restart the program.

When the power supply is turned off and on, the power on reset feature can be disturbed by the time of the Vreg capacitor discharge (Vreg capacitor = 1uF).

To ensure a better start-up of the chip, it is advised to use the reset button in order to ensure the reset functionality.

9 TROUBLESHOOTING

9.1 INTRODUCTION

This section is intended to help the ProStart II users to perform basic hardware debugging

9.2 HIGHLIGHTS

This chapter contains the following points:

- ProStart II functions
- Programming phase
- Whole programming troubleshooting procedure
- General ProStart II test procedure

9.3 PROSTART II FUNCTIONS

The power LED is not on.
Possible causes :1 The "on/off" switch is in "off" position 2 The power supply is not at 9VDC 3 The power supply is inverted (short circuit on the supply, diode protected) 4 The fuse has blown
All the XE8000MP LEDs are lit at startup
Possible causes :1 When using an XE8000EV108 eval board, remove the EEPROMS jumpers br6 & br5 and push the RESET button of the XE8000MP
The ProStart II doesn't answer to the PC
Possible causes :1 If the power LED is off, see Problem 1 2 The serial cable is disconnected at one end 3 The selected COM port is wrong 4 The serial cable is not connected to PROG labeled DB9 connector (near power supply sw) 5 Press the reset button on the XE8000MP, the LEDs labeled ISD & PROG must blink shortly then they must be off. If this is not the case the board must be shipped back to your SEMTECH representative.
The ProStart II CPLD and regulators seems to be too hot
Causes : 1 The power consumption of the CPLD is relatively high, thus it is hot but it's normal temperature for this element. 2 The regulators are at their maximum output current thus their temperatures are also normal.

9.4 PROGRAMMING PHASE

The ProStart II answers no chip detected
Possible causes :1 If you are using a EV board verify that the chip is present and correctly inserted. 2 If the chip is correctly inserted, try to move the chip a little bit and close the zif socket again. 3 For on-board programming, verify that the programming signals are correctly connected specially TESTIN and TESTOUT 4 Short circuit the resistor labelled R13 on the XE8000MP. 5 Are your XEloader & Firmwares up to date? see on http://www.semtech.com
The ProStart II answers that it is unable to erase flash.
Possible causes :1 Does the Prog LED light up? If not check if the power supply is not limited in current. 2 The chip is faulty 3 The High voltage is not correctly generated. Please measure the 12 Volts on the B2 testpoint 4 Are your XEloader & Firmwares up to date? see on http://www.semtech.com
The ProStart II answers "unable to write the data".
Possible causes :1 The chip has been written to more than the maximum numbers of cycles, you can try to restart the upload 2 Are your XEloader & Firmwares up to date? see on http://www.semtech.com
The ProStart II answers "unable to read checksum".

Possible causes :

- 1 Is an Evxxx board connected to the programming connector?
- 2 If the answer on point 1 is yes does the Prog LED blink shortly during the read? If not verify if your power supply can deliver at least 1Amp. If it's still not working, the board must be shipped back to your SEMTECH representative.
- 3 Are your XELoader & Firmwares up to date? see on <http://www.semtech.com>

9.5 WHOLE PROGRAMMING TROUBLESHOOTING PROCEDURE

The following procedure determines whether or not the Prostart is properly functioning.

During the erasing mode (the first 2 seconds), you can check the voltage (multimeter) on the pin 19 TEST/VPP of the programming connector. Your voltage should be equal to ~11.6 V.

You can check the voltage on VReg too (dependent on the socket). This voltage must be between 1.7 volt and 2.4 volt. If it's not, this is either related to a faulty chip, a badly connected Vreg capacitor or at the start, the chip was badly inserted.

During the program mode, the consumption has to be about 550mA. If it's not then again it may be due to a faulty component.

9.6 GENERAL PROSTART II TEST POINTS

9.6.1 Behavior

At the power on the power LED must be on and the LEDs prog and ISD must blink shortly. If that is not the case please check your power supply (regulated 9VDC an the polarity (GND outside)), then check if the current is not limited by the power supply.

9.6.2 Voltages

There are 4 different voltages on the ProStart II

Pt.	Name	Value	Tolerance	Unit
0	GND	-	-	-
1	VDDD	5.00	+/- 0.010	VDC
2	VDDA	3	+/- 0.075	VDC
3	VTEST	VDDA	-	VDC
4	HV	12	+/- 0.010	VDC

Table 9 : ProStart II basic analog values

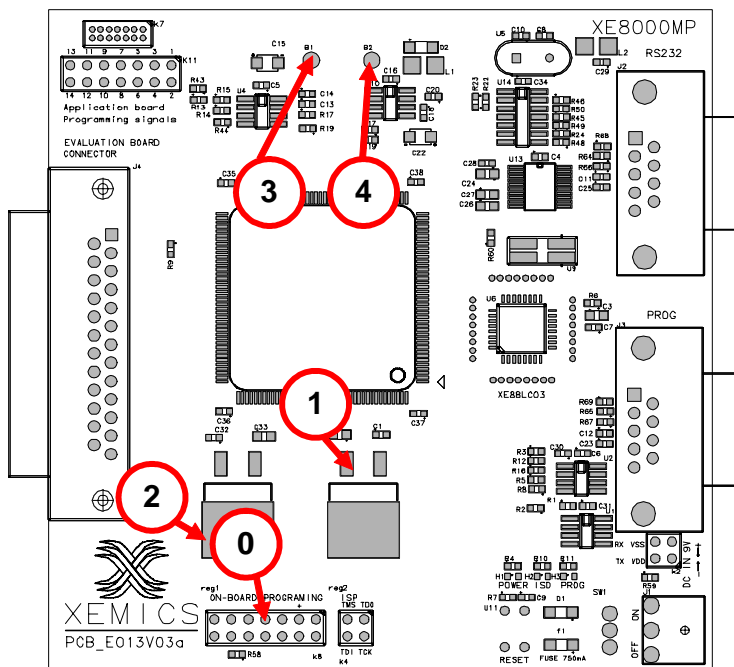


Figure 9 : ProStart II basic testpoints

10 Schematics

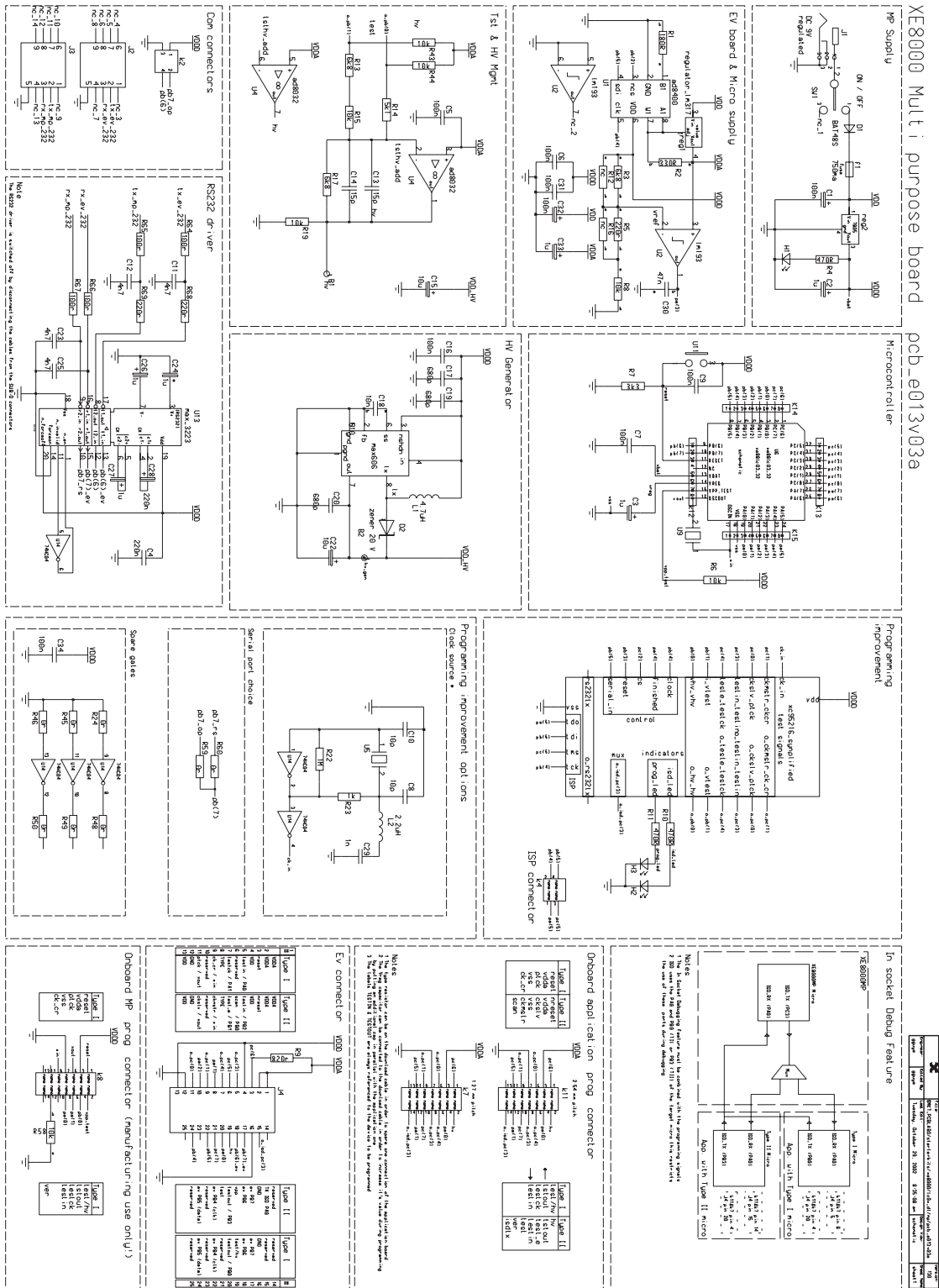


Figure 10 : XE8000MP board schematic

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