PHYTEC

FlashTools98

User's Manual

Edition: January 1999

PHYTEC Technologie Holding Aktiengesellschaft
WWW: http://www.phytec.de • http://www.phytec.com
E-Mail: info@phytec.de • info@phytec.com

In this manual are descriptions for copyrighted products that are not explicitly indicated as such. The absence of the trademark (®) symbol does not infer that a product is not protected. Additionally, registered patents and trademarks are similarly not expressly indicated in this manual.

The information in this document has been carefully checked and is believed to be entirely reliable. However, the PHYTEC Technologie Holding Aktiengesellschaft assumes no responsibility for any inaccuracies. PHYTEC gives no guarantee nor accepts any liability whatsoever for consequential damages resulting from the use of this manual or its associated product. PHYTEC reserves the right to alter the information contained herein without prior notification and accepts no responsibility for any damages that might result.

Additionally, PHYTEC offers no guarantee nor accepts any liability for damages arising from the improper usage or improper installation of the hardware. PHYTEC further reserves the right to alter the layout and/or design of the hardware without prior notification and accepts no liability for doing so.

This document contains copyright information. All rights including those of translation, reprint, broadcasting, photomechanical or similar reproduction and storage or processing in computer systems, in whole or in part, are reserved.

© Copyright 1999 PHYTEC Technologie Holding Aktiengesellschaft.

All rights - including those of translation, reprint, broadcast, photomechanical or similar reproduction and storage or processing in computer systems, in whole or in part - are reserved. No reproduction may occur without the express written consent from PHYTEC Technologie Holding Aktiengesellschaft. Every effort has been made to ensure that the information contained here is correct and current. Please report any errors, omissions or suggested modifications.

PHYTEC Meßtechnik GmbH
Robert-Koch-Straße 39
D-55129 Mainz
Tel: +49 (06131) 9221-0 • Fax: +49 (06131) 9221-33

North American Subsidiary:
PHYTEC America LLC
755 Winslow Way E, Suite #302
Bainbridge Island, WA 98110
Tel: (206) 780-9047 • Fax: (206) 780-9135

1. Edition: January 1999

Table of Contents

1 Introduction to FlashTools98 for Windows 1

1.1 System Requirements 1
1.2 Installing FlashTools98 3
1.3 Starting PHYTEC FlashTools98 for Windows 3
1.4 Interfacing the target hardware to a Host-PC 4
1.5 Downloading Example Code with FlashTools 4

2 Advanced User Information 11

2.1 FlashTools98 11

© PHYTEC Technologie Holding Aktiengesellschaft 1998

1 Introduction to FlashTools98 for Windows

This tutorial provides:

- general information on the PHYTEC FlashTools98 for Windows

Please refer to the Hardware Manual of your Single Board Computer for specific information on board-level features.

FlashTools98 for Windows is a utility program that allows download of user code in ****.hex***-file and ****.bin***-file format from a host-PC to a PHYTEC Single Board Computer (SBC) via an RS-232 connection.

Based upon the common absence of any bootstrap loader feature the FlashTools98 for PHYTEC 8-Bit Single Board Computers consists of a firmware resident in the external Flash and corresponding software installed in the host-PC. Proper connection of a PHYTEC Single Board Computer (SBC) to a host-PC enables the software portion of FlashTools98 to recognize and communicate to the firmware portion.

1.1 System Requirements

Use of FlashTools98 requires:

- any PHYTEC Single Board Computer capable of running Flash-Tools98:
  - Any PHYTEC 8-Bit standard Single Board Computer with on-board Flash programming feature delivered since March 1999
  - Any PHYTEC 8-Bit Rapid Development Kit with on-board Flash programming feature
  - Any PHYTEC 8-Bit Single Board Computer capable of running the DOS-based FlashTools after applying an appropriate firmware update
- an IBM-compatible host-PC (486 or higher running at least Windows95/NT)

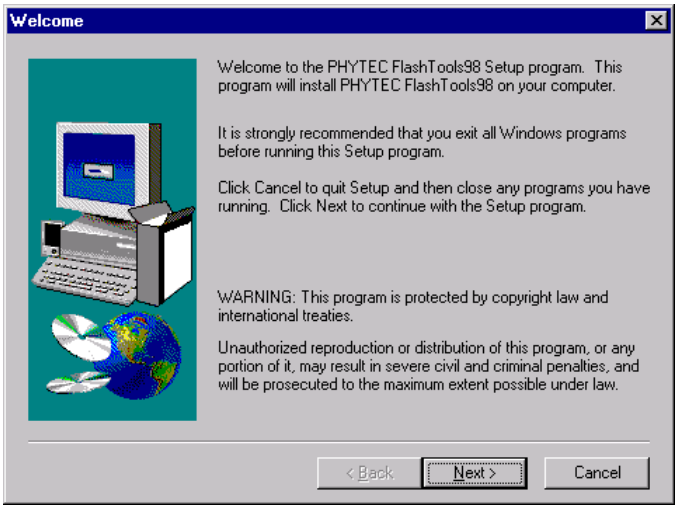
For more information and example updates, please refer to the following sources:

http://www.phytec.com - or - http://www.phytec.de
support@phytec.com - or - support@phytec.de

© PHYTEC Technologie Holding Aktiengesellschaft 1999 L-405-01

1.2 Installing FlashTools98

To install FlashTool98 please execute ***setup.exe*** from within the root directory or the appropriate FlashTool98 directory depending on the type of your installation medium.
The following window will appear:



After accepting the license agreement enter your User information and select the destination location and the program group for the following installation of FlashTools98 software.

We recommend that you accept the default destination location.

1.3 Starting PHYTEC FlashTools98 for Windows

FlashTools98 should have been installed during the initial setup procedure as described in section 1.2.

- You can start FlashTools98 by selecting it from the *Programs* menu using the Windows *Start* button.

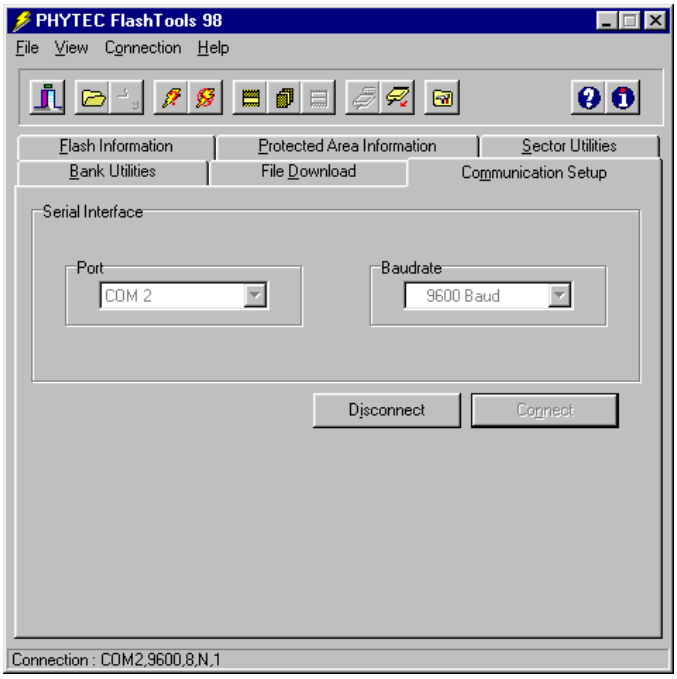
It is recommended that you drag the FlashTools98 icon onto the desktop of your PC. This enables easy start of FlashTools98 by double-clicking on the icon.

1.4 Interfacing the target hardware to a Host-PC

Please refer to the Hardware-Manual of your Modul for the Information how to connect the target hardware to a Host-PC.

1.5 Downloading Example Code with FlashTools

- Setup your Modul to start FlashTools (refer to the Hardware Manual).
- Start FlashTools98 for Windows by double-clicking on the FlashTools98 icon or by selecting *FlashTools98* from within the *Programs|PHYTEC FlashTools98* program group.
- The Communication Setup tab of the FlashTools98 Worksheet window will now appear. Here you can specify connection properties to the Modul.

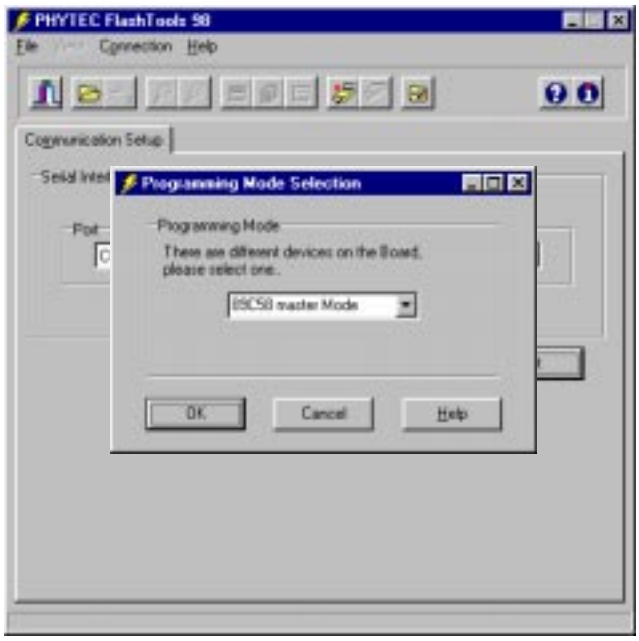


 © PHYTEC Technologie Holding Aktiengesellschaft 1999

- Choose the correct serial port for your host-PC and a 9,600 baud-rate.
- Click the *Connect* button to establish connection to the target hardware.

The microcontroller firmware tries to automatically adjust to the baud rate selected within the baud rate tab. However it may occur that the selected baud rate can not be reached. This results in a connection error. In this case, try other baud rates to establish a connection. Before further connection attempts, be sure to reset the target hardware and render it into Flash Programming Mode as described in section 0.

- **Optional:** if FlashTools98 detects multiple Flash devices on the target hardware (e.g. controller derivatives with internal Flash) the following *Programming Mode Selection* dialog window will appear:



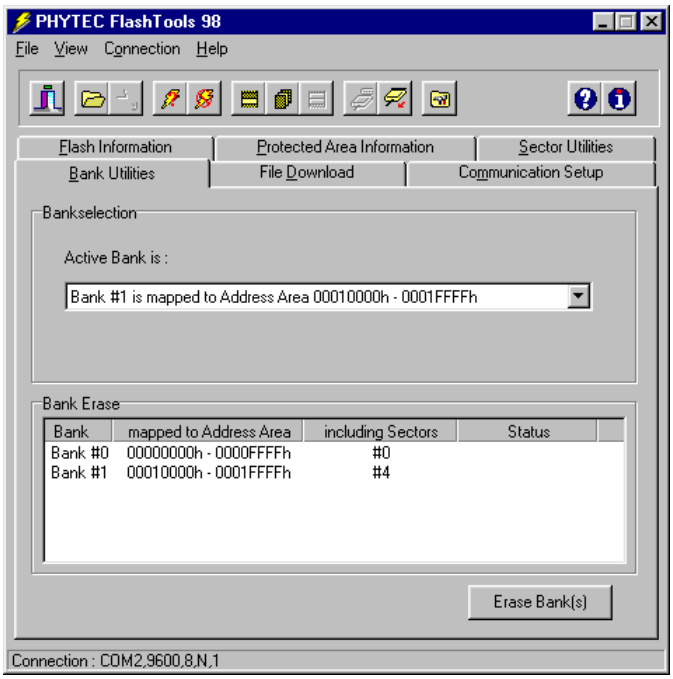
- If the *Programming Mode Selection* window appears choose *xxx external Flash* where *xxx* describes the Flash device currently mounted on the Modul.

Currently no 8051 controller derivatives used on our Moduls offer on-chip Flash. Hence no Programming Mode option will appear as no on-chip memory will be detected by the FlashTools98 firmware.

- Click on the *OK* button to select download of code to the external memory.

Returning to the FlashTool98 Worksheet window, you will see the following tabs:

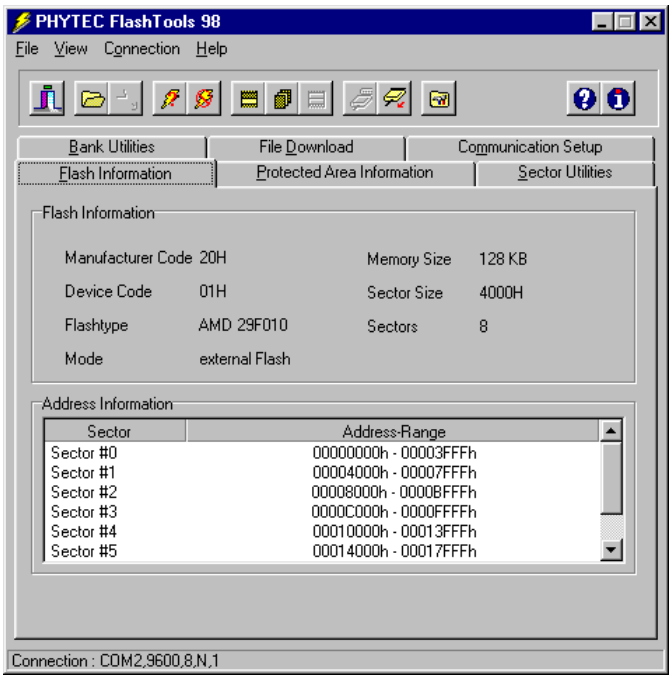
Bank Utilities enable erasure and status check of whole banks of memory specified by the user:



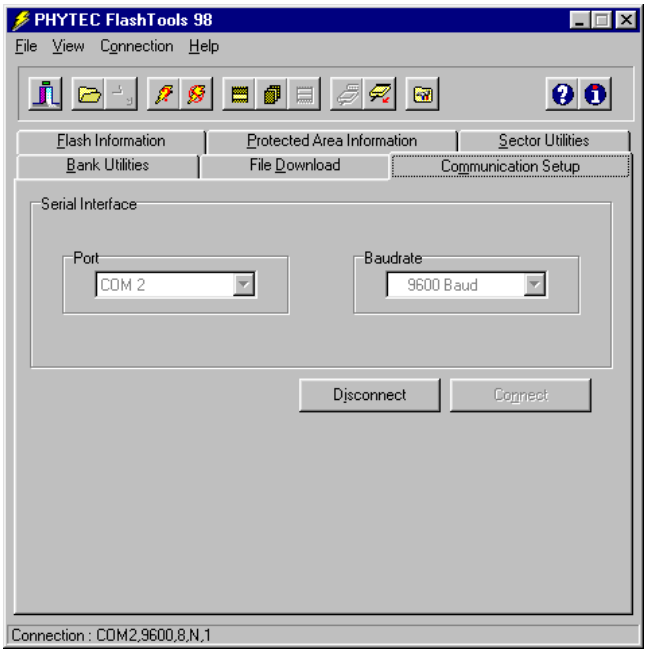
This tab is called *Bank Utilities* if external Flash has been selected in the Programming Mode window. If internal Flash has been selected for a controller supporting on-chip Flash, this tab is called *Block Utilities*. These tabs enable erasure of memory banks and blocks, respectively. The *Block Utilities* also supports chip erase of the entire on-chip Flash.

© PHYTEC Technologie Holding Aktiengesellschaft 1999

Flash Information shows sector and address ranges in Flash memory:

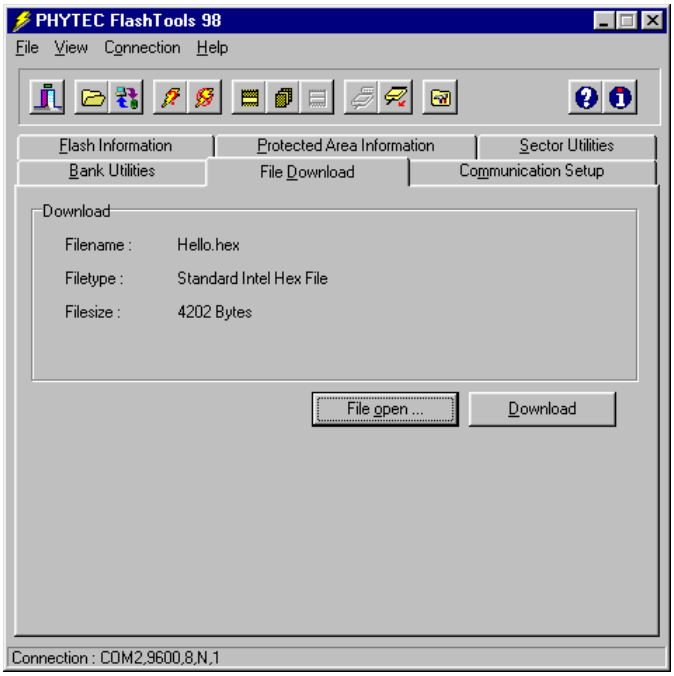


Communication Setup allows selection of the serial port and speed (this is the same window that was used when you first entered FlashTools98 for Windows):

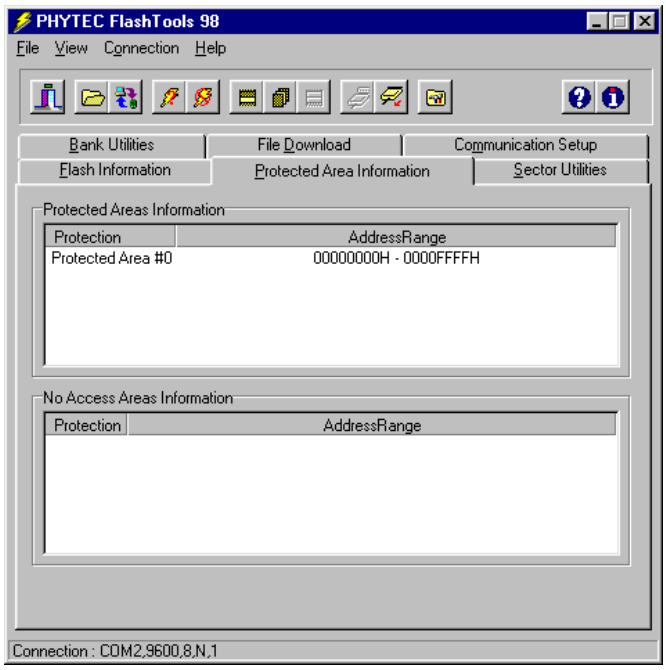


© PHYTEC Technologie Holding Aktiengesellschaft 1999

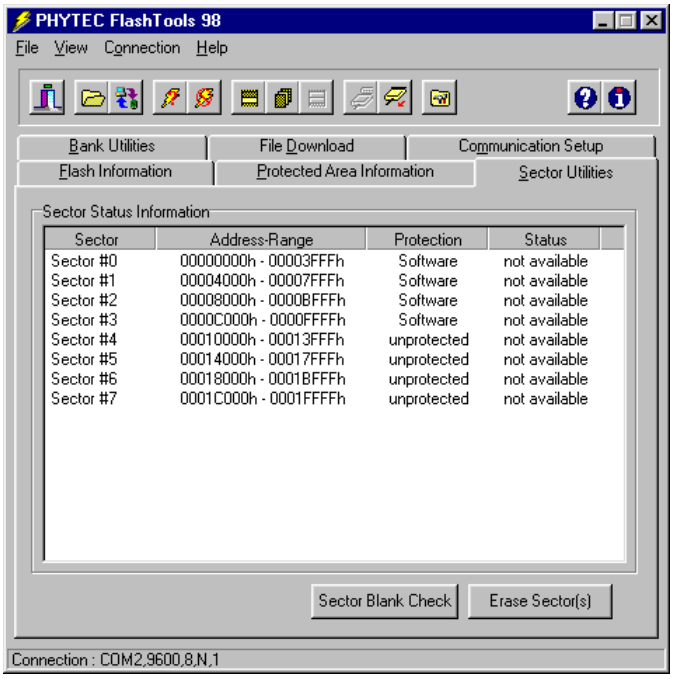
File Download downloads specified hex-files to the target hardware:



Protected Areas Information *shows protected areas of Flash memory:*



Sector Utilities allow erasure of individual sectors of Flash memory:



 © PHYTEC Technologie Holding Aktiengesellschaft 1999

2 Advanced User Information

This section provide advanced information for successful operation your Modul in conjunction with FlashTools98.

2.1 FlashTools98

Flash is a highly functional means of storing nonvolatile data. One of its advantages among many others is the possibility of on-board programming. Programming tools for the Flash device are always included with the Modul in the form of a pre-programmed Flash with a resident microcontroller firmware and a counterpart software serving as the user interface on a host-PC. Once the firmware communicates with the PC-based software, FlashTools98 allows the download of user code from the host-PC into the Flash. Additionally, the reprogrammable Flash device on the SBC allows you to easily update your own code and target the application in which the Modul has been implemented.

Currently the Modul´s can be populated by two different sized Flash devices: a 29F010 with 128 KB or a 29F040 with 512 KB (if supported). To support the entire memory area of these devices the address decoder of the Modul is equipped with an integrated banking mechanism that allows code-bank switching in code-banks of 64 KB each.

Please note that the FlashTools98 always occupies the first 64 KB bank (bank 0, FA[18..15] = 0000b) of the Flash memory in which the microcontroller firmware resides. This bank is already pre-programmed upon delivery of the Moduls. The remaining banks are available to house your application. This makes available one user application bank if the Modul is mounted with a 29F010 and seven user application banks if the Modul is mounted with a 29F040 Flash memory device. Multiple user application banks can easily be managed by using the Code Banking mechanism of the Keil tool chain.

The following description is valid only for the FlashTools98 included with the Modul and is not intended as guidelines for using any other program.

The FlashTools98 incorporates a safety mechanism that ensures that its system bank (bank 0), in which the firmware is resident, can not be overwritten during programming of the available user banks of the Flash device.

Resetting the Modul also activates the system bank (bank 0) of the Flash device, which automatically starts the FlashTools98 firmware. Then the module either enters the Flash programming mode or it starts your user application.

To distinguish between download and execution modes, the firmware checks immediately for the presence of a pull-up resistor (usually 4.7kΩ) connected to pin D0 (Data 0) of the Modul after reset. Refer to the Hardware-Manual for more information.

Execution of your user application will always start in the second 64 KB bank (bank 1, FA[18..15] = 0010b). This is to be noted when preparing a software copy of the contents of the address decoder's internal write-only registers.

The extended features of the address decoder of the Moduls allows you to flexibly configure the memory model according to your needs and to address additional Flash code-banks. The Tools directory of the PHYTEC Spectrum CD contains various sample programs that illustrate the use of this feature.

Do not use Flash-bank 0 in your application program in order to preserve the FlashTools98 microcontroller firmware and the associated Flash reprogramming capability.

Document: FlashTools98 User's Manual
Document #: L-405-01, January 1999

How would you improve this Manual? _____

_____

_____

_____

_____

Did you locate any errors in this Manual? **Page**

_____

_____

_____

_____

Submitted by:

Name: _____

Company: _____

Address: _____

_____

Invoice #: _____

Return to:

PHYTEC Meßtechnik GmbH
Postfach 42 11 51
D-55069 Mainz
Fax: +49 (06131) 9221-33

PHYTEC America LLC
755 Winslow Way E, Suite #302
Bainbridge Island, WA 98110
Fax: (206) 780-9135

© PHYTEC Technologie Holding Aktiengesellschaft 1999 L-405-01

Published by

PHYTEC

© PHYTEC Technologie Holding Aktiengesellschaft 1999

Ordering No. L-405-01
Printed in Germany