

DELGEN

X-Graph Software Module

xgBIOS Users Manual

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1 Welcome

1.1 Introduction

The xgBIOS library includes a set of Dynamic C BIOS upgrades which either speed up specific X-Graph hardware related issues and/or reduce the memory footprint used by the BIOS.

A specific X-Graph Dynamic C BIOS (xgBIOS) is under development.

1.2 How This Book Is Organized

You can find following chapters in it:

Chapter 1 contains a view on all the information in this book.

Chapter 2 gives helps on using the xgBIOS library functions.

xgBIOS integration in Dynamic C is described in **Chapter 3**.

1.3 More Questions

If you have questions while using your X-Graph module or one of the X-Graph Software Modules, check first if the information is available in this book or the other X-Graph Users Manuals. If you cannot find the answer check the information and forum on the X-graph website (www.x-graph.be). Finally you can also contact your local distributor or the X-Graph technical support by e-mail (techsup@x-graph.be).

This manual includes information on the X-Graph modules. It is strongly advised to download and read documentation on the Rabbit processor from the Rabbit Semiconductor (www.rabbitsemiconductor.com) website.

This manual is complimentary to the documentation found on these websites.

2 X-Graph Dynamic C BIOS Improvements

The X-Graph coldloader-pilot files reduce development time and flash wear level. Large programs during development are downloaded in seconds in stead of minutes.

2.1 X-Graph Coldloader

The Dynamic C download protocol is slow. Development time is increased due to the slow download speed. And the protocol always downloads the program code to Flash which wears the flash. During development there is no need to write each test program to Flash. Most X-Graph modules have a program SRAM and development programs can easily be downloaded to this SRAM in stead of the Flash. Only the standard Dynamic C coldloader does not support this.

2.1.1 Download programs in seconds not minutes

In the BIOS directory of your Dynamic C root, you'll find several X-Graph versions of the coldload.bin and pilot.bin files.

- First make a backup of the original coldload.bin/pilot.bin set by running the dc_make_backups.bat batch file. Just double click the file. This needs to be done only ones.
- To get started with the X-Graph coldloader, click the XG5000_FRAM.BAT (for all X-Graph modules except the XG4x01 modules) or XG4x01_FRAM.BAT (for XG4x01 modules) batch files.
- Whenever you want to use the default coldloader just run the dc.bat batch file. You will want to do this to store a program in flash or if you want to start a non X-Graph project.

IMPORTANT: Use the 'Compile to Flash, run in RAM' mode !!! Do not use the 'Compile to RAM' mode.

2.1.2 How do DC downloads work?

1. The module is reset with the serial port DTR line.
2. Then the coldloader is loaded with then Rabbit bootstrap protocol. As this requires 12.5msec for each byte, the coldloader should be very small.
3. Once loaded the program starts automatically. First the coldloader identifies the crystal frequency. Then it downloads the pilot program and reports the crystal frequency to the pilot program. The pilot download speed is 57600 baud.
4. The pilot program is actually a state machine which communicates with Dynamic C. It downloads the main program to Flash and it can start this program.

Both the standard coldloader and pilot of Dynamic C have a lot of overhead because they work with all the available Rabbit hardware.

The X-Graph coldloader and pilot are stripped down versions of the originals. Also the X-Graph pilot includes an improved communication protocol to download the main program and supports writes to program SRAM in stead of Flash.

2.1.3 What's the actual download time improvement?

Let's use an example. A 310kByte program compiled with DC9.50 and running on a (currently) fast PC. The fast PC (3GHz Intel Core2Duo processor, 2GByte RAM, fast RAID-5 array) is used to reduce the compile time, not the download time.

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	115kBaud	460kBaud	X-Graph Coldloader
Reset	0.5	0.5	0.5
Download Coldload	4	4	1.4
DC wait	2.2	2.2	2.2
Download Pilot	1.3	1.3	0.3
Compile time + Erase Flash	8	8	5
Download program	50	22	4.2
Total	66	38	13.6

Table 1: X-Graph Dynamic C Download Times (seconds)

Column 1 are measured times with the standard 115kBaud using a serial port.
Column 2 is the same thing at 460kBaud only possible with the X-Graph USB port.
And column 3 lists the timings with the X-Graph coldloader files.

In stead of waiting more then a minute for each compile cycle, the X-Graph coldloader files let you only wait 13.6 seconds.

3 X-Graph BIOS (xgBIOS)

xgBIOS replaces the standard DynamicC BIOS. It is especially tailored for the X-Graph modules and increases boot-up speed. It also adds new BIOS features as Ethernet booting, SDCard booting, Serial Flash booting, ...

More information on xgBIOS will be added in the next manual release.

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1.0

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