

Using PropGCC – GCC on the Parallax Propeller

1. Introduction

The who, what and why of this book. What you'll learn and what you'll need to work on the projects. An overview of each of the chapters...sort of like what follows in the outline.

Part 1 – The Pieces Of The Puzzle

Details about each of the individual pieces that go into writing any PropGCC program. The first part is intended to be used as a reference for details about each topic.

1) Intermediate C Programming

An overview/review of C programming concepts that will be used in this book that are more advanced than what you may have learned in your beginning C class. This book will not teach you beginning C programming but there are many techniques used that need to be understood to understand how to use PropGCC and the libraries.

An overview of the PropGCC package.

Things to understand in C that you may not be clear on or may not have used much:

- Pointers (referencing, dereferencing)
- struct
- passing parameters
- VOLATILE
- STATIC
- ???

2) The Propeller Architecture

COG
COGRAM
HUBRAM
I/O PINS
COUNTERS

3) Propeller.h

Overview of propeller.h to see how the hardware was mapped into C. Now that the software and hardware is known, take a look at the glue that comes with PropGCC to let you put them together.

4) PropGCC Memory Models

Features, benefits and restrictions of LMM, CMM, COGC, XMM. Why you would or wouldn't use one over the other. What things you can and can't do in each.

5) Working with I/O Pins

The basic MCU “hello world” program in PropGCC. Blink an LED attached to an I/O Pin in LMM mode.

6) Using COGs – MultiProcessing on the Propeller

How to start multiple COGs in LMM mode to blink multiple LEDs. COGs versus pthreads. Restrictions on COGs and COG availability in the various memory models.

7) Using Counters

Part 2 – Putting It All Together

A collection of projects, samples and examples showing how to put the pieces together into working programs. They will progress in difficulty as more concepts are combined. This section provides hands-on coding and circuit building. The concepts and theories from the first section are put into practical use. When possible, examples will show multiple memory modes and the effect of each on the program.

8) The Toggle Programs

How to toggle once or more LEDs from the various memory models and using one or more COGs. Comparing the output of the various memory models. Detailing any tricks or traps as you use the various memory models.

9) Serial Communications

Serial communication back to the PC via the USB/Prop Plug

Serial communication to an Xbee – using other pins and alternate fdserial drivers and configurations

10) PING!

How to use the Parallax Ping))) to measure distance

11) Using I2C to Read/Write EEPROM

Data Logging to EEPROM

Remembering data when the power goes off.

12) Using SPI

Using the SD card for storage – Data logging and ???

Talking to a ??? - ned to pick an interesting yet inexpensive SPI device to create some experiments and examples for.

13) Controlling a Servo

First one, then two, then ????

14) Video

TV, VGA

Part 3 – Advanced Topics

Some topics, some programmers just may not get to for a while.

15) Using PASM code with C

How to take advantage of Parallax OBEX code from your C programs.

16) Using GAS and Inline Assembler

How to create Propeller code using GAS and how to incorporate GAS into your C as inline assembler.

Appendices

A) Learning C and C References and Resources

A brief coverage of basic C programming and a list of resources for C programming books and tutorials.

B) Propeller Hardware References

The Propeller data sheet in detail.

C) The Propeller Libraries delivered with PropGCC

A reference to the Propeller specific libraries. For the latest, always go to the online resources.

D) Choosing and Using the Tools

SimpleIDE, PropGCC with your favorite editor, make, the loader, etc.