Simple IDE User Guide

The Simple IDE is designed for programming the Parallax Propeller.
This guide is not comprehensive. It describes using basic features.

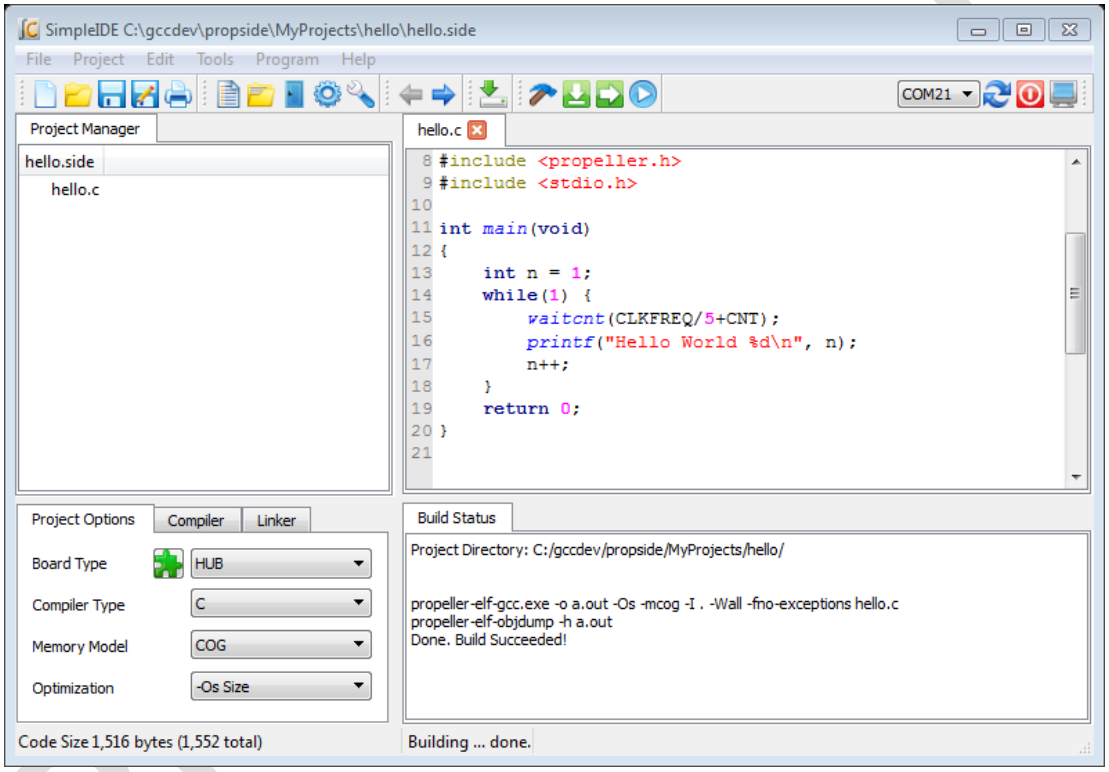
Table of Contents

Document Revisions:

Preliminary May 26, 2012 untracked.

Simple IDE Features

- Menu Bar with File, Project, Edit, Tools, Debug, and Help
- Tool Bar with most Menu Bar operations
- Project manager menu and area for project file settings
- Compiler area for setting build attributes
- Tabbed text editor with optional highlighting
- Source Browser finds declarations
- Project build status pane
- Build Status shows build progress
- Status bar shows compile size, brief messages, and progress bar
- Board type and COM port selector



Installing SimpleIDE

SimpleIDE is distributed as a Windows InnoIDE install package, a Mac OSX zip (.zip), Linux i686, Debian x86_64, Fedora x86_64, and is available as open source to compile with Qt 4.8 and GCC.

Windows Installer

The windows installer is about 76MB and contains the Propeller-GCC tool-chain, Simple IDE, and Propeller Demo programs installed in the user's selected work-space. The installer will ask the user for directories and other info for setup. The installer makes the package usable in one simple process.

A properties dialog will open the first time, and the Compiler tab should always have the correct information for windows. Just click OK to get started.

Mac OSX

The SimpleIDE.zip is about 60MB and contains the Propeller-GCC tool-chain, Simple IDE, and Propeller Demo programs in the file. Use finder to unpack the contents of the .zip to your folder. Once the .zip is unpacked, click on the app icon to start SimpleIDE.

A properties dialog may open the first time, and the Compiler tab should always have the correct information except for the user workspace.

Linux Packaging

Linux packages are primitive at the moment and will be changed to use the typical packager tools for the platform. The current package includes a setup script and supporting shared libraries. If you are items missing from the system required by SimpleIDE you can use the ldd tool to find out what you need, I.E. $ ldd SimpleIDE

This Linux SimpleIDE package contains only the SimpleIDE. It does not contain the Propeller-GCC tool-chain. Debian packages are known to work on Ubuntu.

In the instruction below SimpleIDE-packagename.bz2 refers to the package such as SimpleIDE-0-6-2-i686-linux.bz2. SimpleIDE-version refers to the SimpleIDE version such as SimpleIDE-0-6-2

1. Download and install Propeller-GCC to /opt/parallax
2. Unpack SimpleIDE with $ tar -xjf SimpleIDE-packagename.bz2
3. Change directory $ cd SimpleIDE-version.
4. Setup with $ ./setup.sh
5. Run with $ ./simpleide
6. In SimpleIDE Compiler Properties:
    a. Choose the compiler from /opt/parallax/bin
    b. Choose the loader path as /opt/parallax/propellerl-load
    c. Choose a workspace for new projects.
7. Open the hello demo from SimpleIDE-version/demos/hello/hello.side

Starting the IDE the first time

Start-up "About" Splash

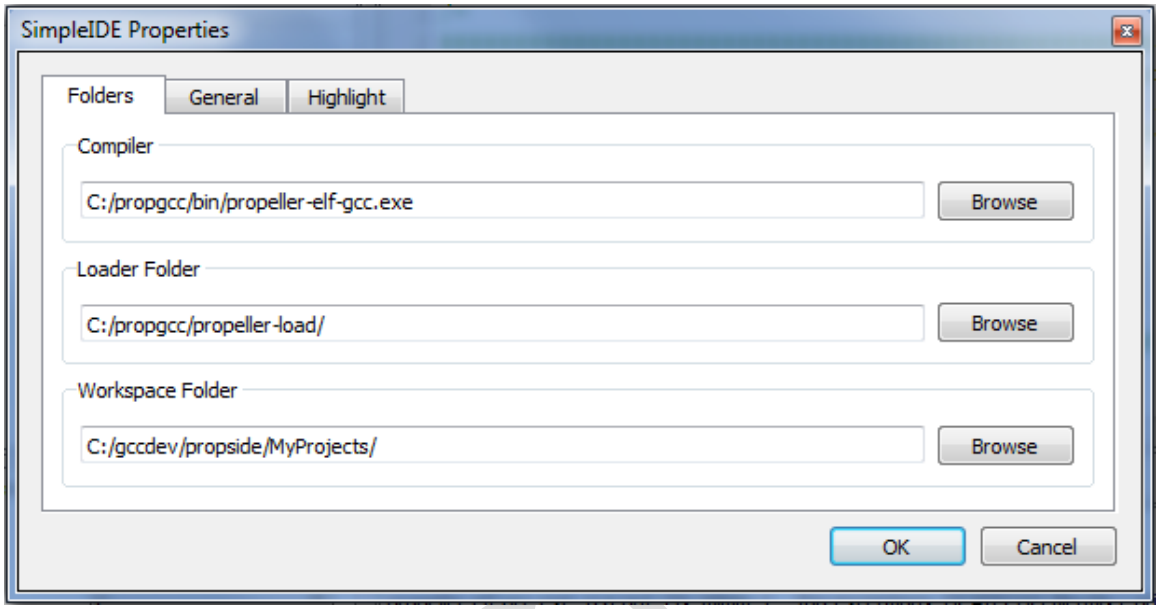
At first startup the SimpleIDE "About" window appears. This shows you the current version which can be greater than the one shown below, a link to this user guide (or web site containing it), a check-box to choose showing or disabling the window at start-up, and an OK button.

If the "Show this window at startup" is checked, you will see this window on every startup. You can disable this by clearing the check box.

SimpleIDE Properties

On some O/S a dialog window titled SimpleIDE Properties appears. It allows setting critical Folders, General properties, and Highlights.

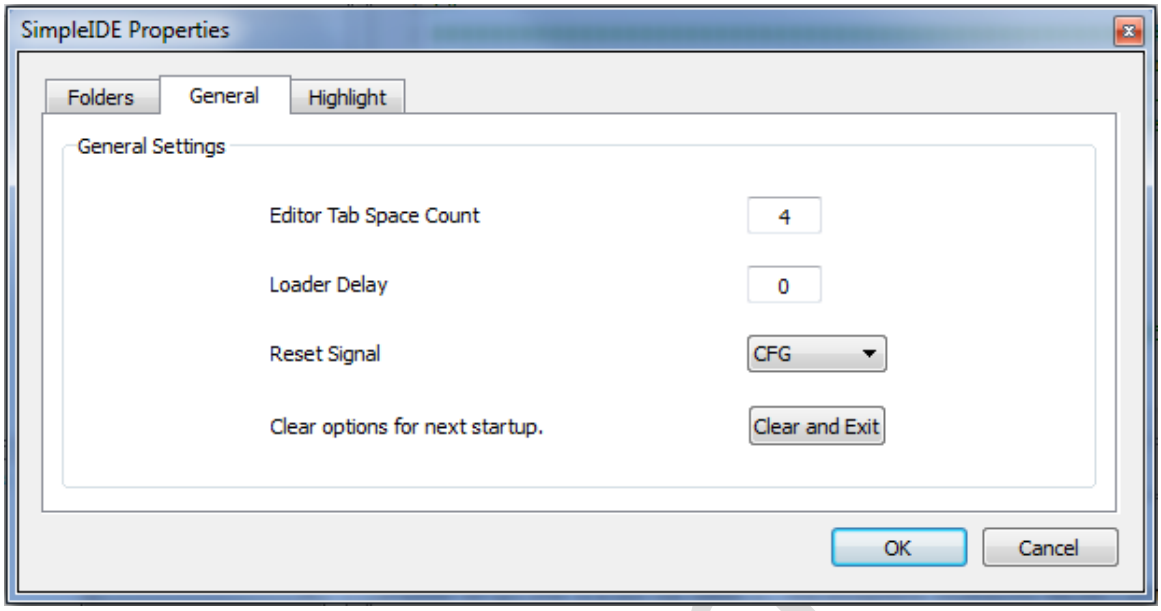
Folders



In most cases, the Folders tab will already have the fields properly set. The back-slash '\' folder separators used in windows are replace by '/' in the IDE. Please take note of the fields and click OK when ready. The Compiler and Loader Folder must be set correctly before you can move to the next step. You should choose a work-space if one is not already set. You can skip to **Preparing the Hello Demo** when the folders are properly set.

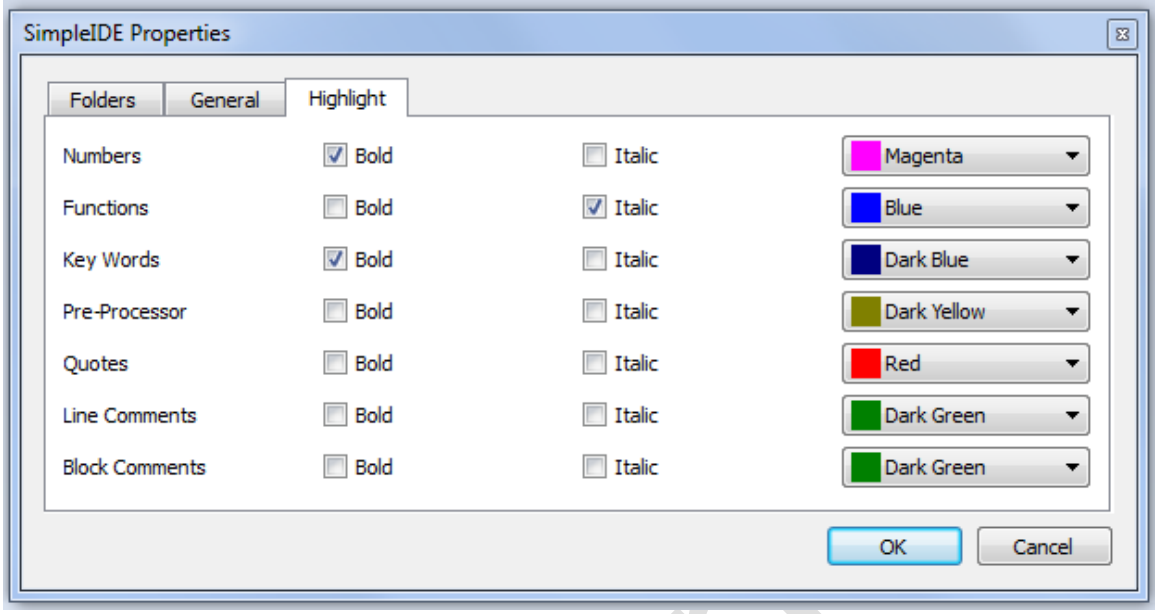
All of these properties may be changed when the IDE is running to allow using another compiler directory by clicking the tool-bar wrench. If you click OK to save/close the window and it comes back, that means that the critical "Compiler" or "Loader Folder" information is not correctly set. In most cases this will not be a problem, but if it is you can use the Browse buttons to find the propeller-elf-gcc compiler program and propeller-load folder.

General Settings



Some general property details may need to be changed for different boards. For example, some USB serial devices do not have DTR for controlling Propeller reset and should use RTS instead. You can change the Reset Signal from DTR to RTS if necessary. in the properties "General" tab. This can be changed at any time.

Syntax Highlighting



The Highlight properties tab can be used to change editor syntax colors. At this time only a select set of system colors is available.

Open the SimpleIDE Properties window any time by clicking the toolbar wrench button.

The SimpleIDE Properties dialog window controls are the same regardless of user's Operating Systems.

Hello World Demo

Traditionally, a "hello" demo is the first program to run with a tool set. A hello program is included in the demo package, and that will be the first program to compile, load, and run. Later we will use a blinker program to show starting a new project.

SimpleIDE uses a separate loader and terminal program. The hello program run with SimpleIDE demonstrates a weakness in this arrangement. That is, the program must delay printing otherwise the output can be lost in transition.

A minimum hello program used in SimpleIDE will look like this.

```
[code]
#include <stdio.h>
#include <propeller.h>

int main(void)
{
    /* one second delay before printf */
    waitcnt(CLKFREQ+CNT);
    /* traditional hello message */
    printf("hello, world\n");
    return 0;
}
[/code]
```

The demo code included in the package runs a loop and prints the loop iteration.

Before running anything on Propeller, there are a few simple things to do. That is, you need to configure a board type and a serial port.

Preparing the Serial Port

To use SimpleIDE with Propeller on a computer having only USB ports it may be necessary to install an FTDI USB/VCP driver.

Windows FTDI USB/VCP Installation

Please follow directions described here
http://www.parallax.com/Accessories/USBDrivers/tabid/530/Default.aspx
If that page is not found, please visit www.parallax.com page to find the USB drivers page.

Mac OSX FTDI USB/VCP Installation

FTDI drivers should be preinstalled for OSX. Simple IDE packages do not support other OS versions.

Linux OS FTDI USB/VCP Installation

Linux users can install FTDI USB/VCP drivers using their package manager.

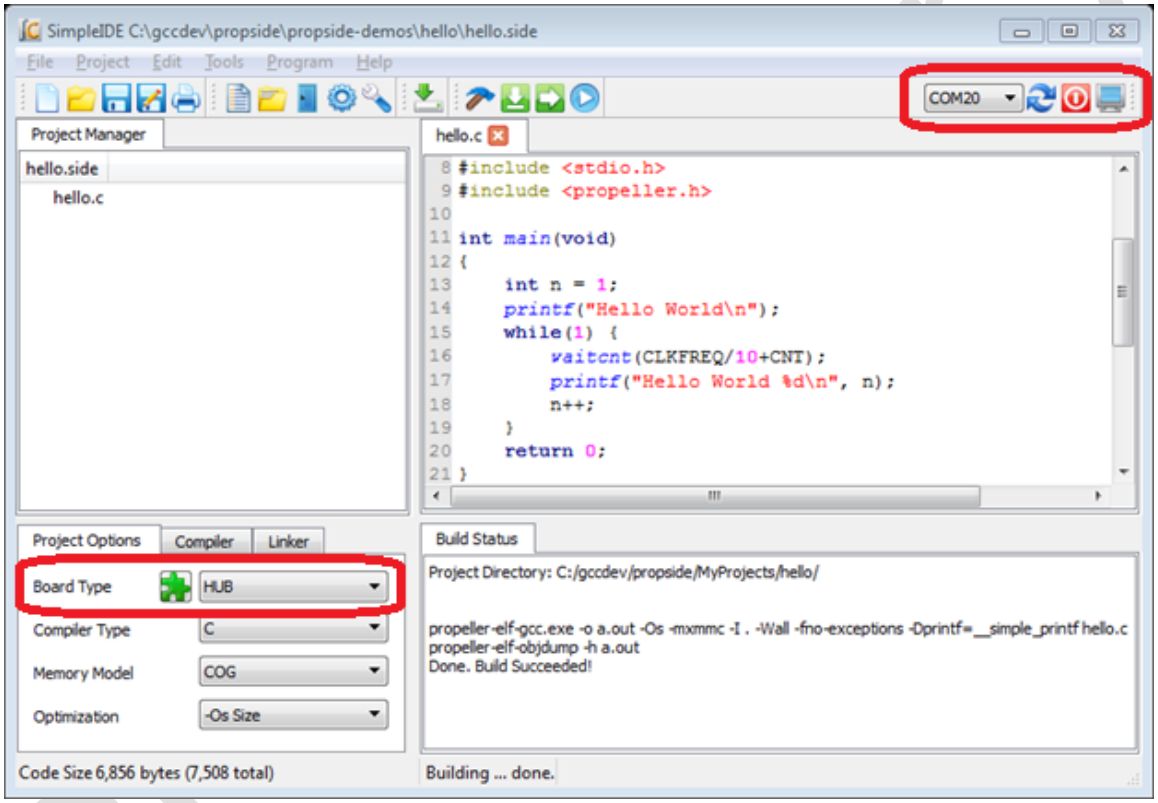
In other cases, if there are problems with the drivers, one can visit the FTDI driver web page at http://www.ftdichip.com/Drivers/VCP.htm and follow their instructions.

Selecting Board Type and Serial Port

To run the Hello demo, you must have a Propeller board connected, a suitable board type selected, and the right COM port selected. The COM port will only appear if the Propeller board is connected.

The picture below shows the location of the board type and serial port selectors. In this case the board is set to HUB, and serial port set to COM20.

The board type is part of the project manager side bar because it is saved per project. In this case board type HUB is used for the "hello.side" project. The serial port is not saved in the project because it is more of a general setting.



The Hello demo should be run with a simple board type like HUB like shown above.

If you see the ASC board type, it will be good enough for most 5MHz Propeller board tests. Browse the board types and see what else is available. There is practically no difference between HUB and ASC for simple programs like hello. Some boards have a different clock type. The HYDRA and SPINSTAMP are a good examples that use a 10MHz crystal.

If you start the SimpleIDE without a serial port device connected, the COM port (here shown as COM6) will be blank. If the port is blank, connect your USB port Propeller board to your computer and click the rescan button.

The rescan button looks like this: 

Some computers have serial ports like BlueTooth. BlueTooth serial port programming is possible, but not recommended at this point.

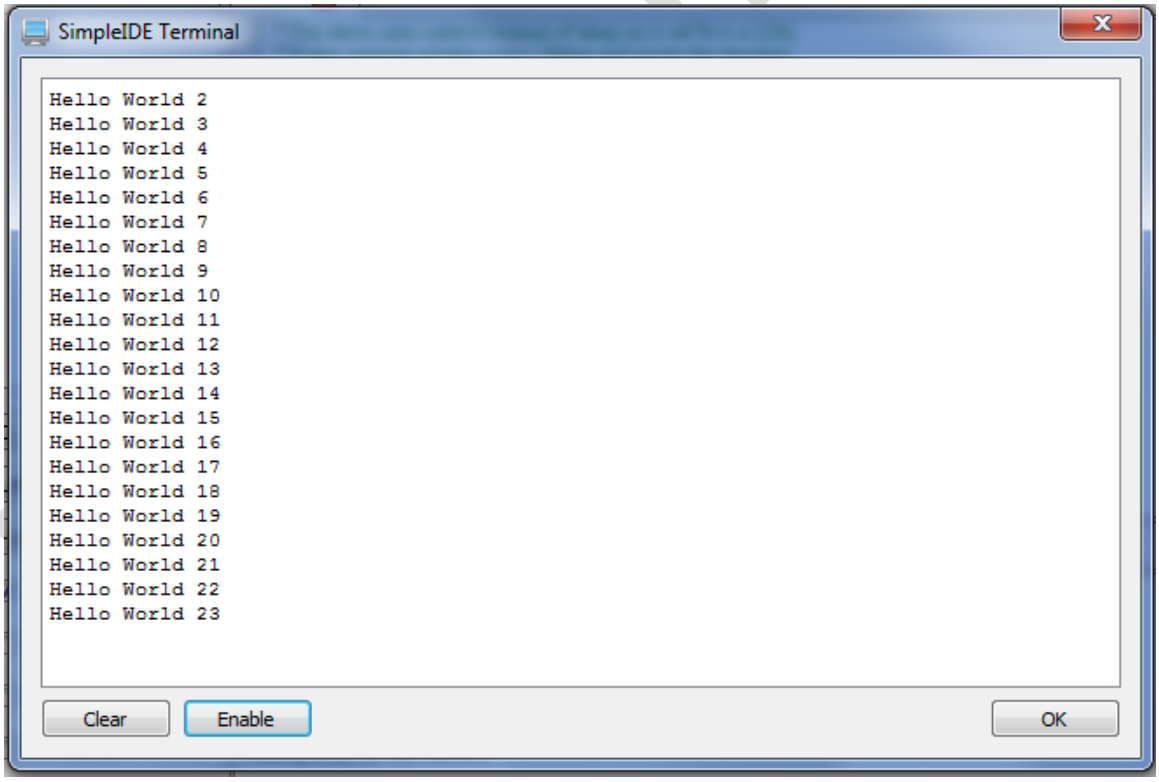
Place the mouse cursor over the port name for "hover help". Make sure hover help shows the port type such as "USB Serial ..." or "FT232 ..." and select a different port if necessary. If a port is not found, connect a Propeller board and refresh.

SimpleIDE does not automatically detect and use the Propeller port at this time. It is up to the user to specify the port.

Running the Hello Demo

1. Open the hello.side project using Menu->Project->Open Project or the tool button. 
2. Use Menu->Run Console F8 or click the blue play button: 

Run Console compiles, loads, and runs the program. The serial console will appear after loading.



Note that the terminal is not fast enough to catch the first few hello lines. This is because of the transition from propeller-load loading the program, releasing the serial port, and starting the terminal.

Other notes about the SimpleIDE Terminal worth mentioning: If you press OK or close the window, the terminal will close and reset the port. If you press the Enable/Disable button, it will not close the port - it simply stops or restarts the screen update. The clear button clears the screen. Text can be copied from the terminal using the OS copy keyboard command.

Special Clock Boards

If you do not have an 80MHz Propeller board, you can make your own board type and set the clock frequency (typically crystal frequency times PLLx mode). Assuming C:\propgcc is your installation directory:

1. Copy the C:\propgcc\propeller-load\hub.cfg to propgcc\propeller-load\yourboard.cfg

2. Change clock frequency in yourboard.cfg, and save the file.
3. Click the Jigsaw puzzle piece in the Project Option control to reload board types.

4. Choose YOURBOARD from the board type combobox.

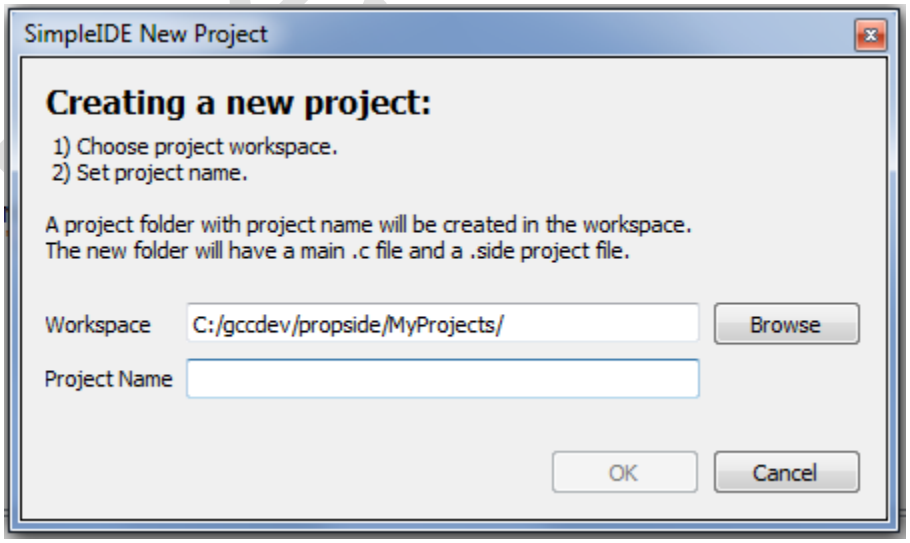
Note RCFAST and RCSLOW board types are available in the board types, but these should not be picked for programs using the serial port console.

Creating a new project

There are two ways to start a new project:

Option 1: New Project

1. Choose Menu->Project->New Project or click the New Project button.



2. Click the folder browse button to select a new folder.

3. Enter your project name. The name will be added to the folder path. When you have a valid project name and path, the OK button will be enabled. You can't start a new project in an existing folder.

When you press OK to finish the New Project dialog the folder/project name will be created. A main program template will be added for your new project.

Option 2: Close All, Use an existing main file

If one has an existing main file it can also be used with SimpleIDE.

1. Close all open files.
2. Choose Menu->Project->Set Project to Current File 
3. Note that project manager only has the existing file listed.
4. Add other files to the project.

Option 3: Close All, start new.

1. Choose Menu->File->Close all to close all editors and the project.

2. Fill in new main program with code below (please do not copy/paste the [code] tags).
3. Choose Menu->File->Save As to rename the "untitled" editor tab to "blinker.c". 
4. Choose Menu->Project->Set Project 

5. Select Memory Model LMM or COG from the project options.

Example Code

```
[code]
#include <propeller.h>

int main(int argc, char* argv[])
{
    int mask = 0x3fffffff;
    DIRA = mask;
    for(;;) {
        OUTA ^= DIRA;
        waitcnt(CLKFREQ/2+CNT);
    }
    return 0;
}
[/code]
```

Using Menu->Project->Set Project to Current File  will set the project name to the editor tab file name. Set Project saves the project properties to the current state.

Click the hammer button  to build your program after setting up your project.

There should be no warnings or errors. If you see a warning or error, click on that line in the build output and it will take you to the problem area in the editor in most cases. Check your code for typos.

If you did copy/paste the [code] tags for example you might see the message below. Click the error message and remove the line from the editor panel.

```
blink.c:1:1: error: expected identifier or '(' before '[' token
```

Once any errors are resolved you should be able to download and run the blinker.c example with Run (F10) 

If you want to store the program permanently you can use Burn EE (F11) 

IDE Controls

Many features of the IDE will be familiar to new users. Some need explanation.

File Menu

-  New: Creates a new file called "untitled" in the tabbed editor space.
-  Open: Opens an existing file in the tabbed editor space.
-  Save: Saves the tab editor text to the filename in shown on the tab.
-  Save As: Saves the current tabbed editor text to another filename.
-  Close: Closes the currently visible tabbed editor.
- Close All: Closes all files and projects.
-  Print: Prints the current document to a selected printing device.
- Previous file names: Lists the last 5 opened files.
-  Exit: Asks to save any unsaved files and exits the program.

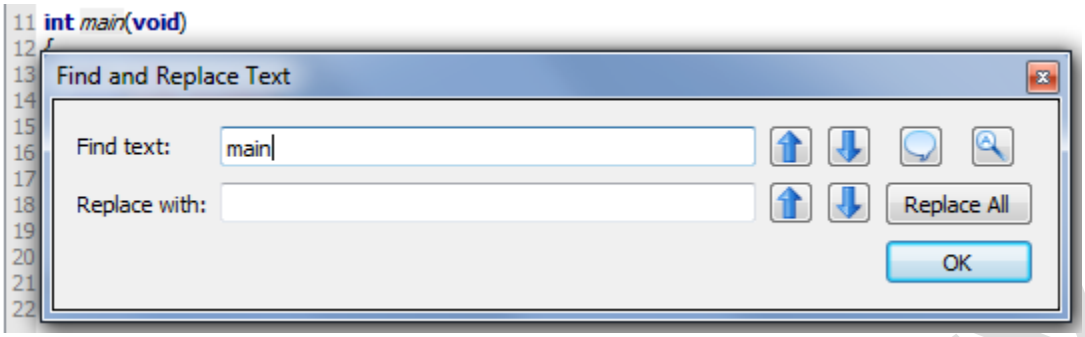
Project Menu

-  New Project: Opens a dialog for creating a new project in "folder/name" selected by user. Project name will be added to the folder by the program from the user's project name. If the folder/name does not exist, it is created.
-  Open Project: Opens an existing project file with extention .side
-  Save and Close Project: projects are always saved before they are closed.
-  Set Project. The function of the set project button (F4 or Project->Set Project) has been discussed in the example above. Please review that section if you haven't already.
- Previous project names: Lists the last 5 opened projects.
-  Properties. This will open the SimpleIDE properties menu which was discussed in the first time use section.

Edit Menu

-  Copy: Copies selected editor text to the clip-board.
-  Cut: Copies selected editor text to the clip-board and deletes text.
-  Paste: Pastes text from clipboard to the editor at cursor.
-  Find and Replace: Opens a dialog with find and replace tools that allows for optional whole word and case sensitive find and replace.
-  Redo: Undoes the last undo.
-  Undo: Reverses the last edit.

Find and Replace



The Find and Replace dialog window allows searching and replacing text in the editor.

- Find text: when a word is entered in this field, the tool will try to find it in the editor. To find more instances of the word, press the previous or next buttons.
- Replace with: when a word is entered in this field, it will be used to replace the find word when the replace previous or next button is clicked. The Replace All button will replace all instances of the find word with the replace word in the current editor.
- Previous: finds or replaces the previous word depending on the row of the button.
- Next: finds or replaces the next word depending on the row of the button.
- Whole Word: find only whole words.
- Case Sensitive: find only words that match the case of the find text.

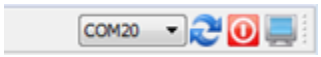
Tools Menu

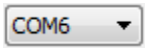
- Send File to Target SD Card: If the board-type has SDLOAD or SDXMMC in the name, this button can be used to send any file to the SD Card. Typically clicking this button will also compile the project to an AUTORUN.PEX image that can be used when Propeller boots up.
- Go Back: When not greyed, this button will let you browse back from Browse Declaration.
- Browse Declaration: Allows zooming to a user defined function or global variable declaration. Library functions such as printf that are not in the project file-list can't be browsed.
- Font: Allows selecting an editor font.
- Bigger Font: Increases the editor font by %20.
- Smaller Font: Decreases the editor font by %20.
- Next Tab: Lets user scroll to the next tab in the editors.

Program Menu

-  Run Console (F8): Build, load, and run program on Propeller RAM (or external memory for XMM). It opens a serial port console terminal window.
-  Build (F9): Build program only.
-  Burn F11): Build and load program to Propeller EEPROM (and external flash for XMM). Board types with SDLOAD or SDXMMC in their name will have program saved to SD card first.
-  Run (F10): Build, load, and run program on Propeller RAM (or external flash for XMM). Board types with SDLOAD or SDXMMC in their name will have program saved to SD card first.

Serial Port Control



-  Serial Port: This is the drop-down box on the left of the rescan button. It lets you choose the port to use where your board is attached. The example above shows COM20 while this bullet shows COM6 - it just demonstrates that any port can be selected. If the mouse hovers over the control, the "hover help" may tell you more information such as whether the port is a USB serial port or even Bluetooth.
-  Rescan: You must click the rescan button every time you change physical port hardware connections.
-  Port Reset: This red “power switch” button lets you reset the board.
-  Serial Port Console: This is a "display" button. Press to show and connect terminal window to the selected port. If pressed (square around the button), it is connected and you can disconnect by pressing the button again.

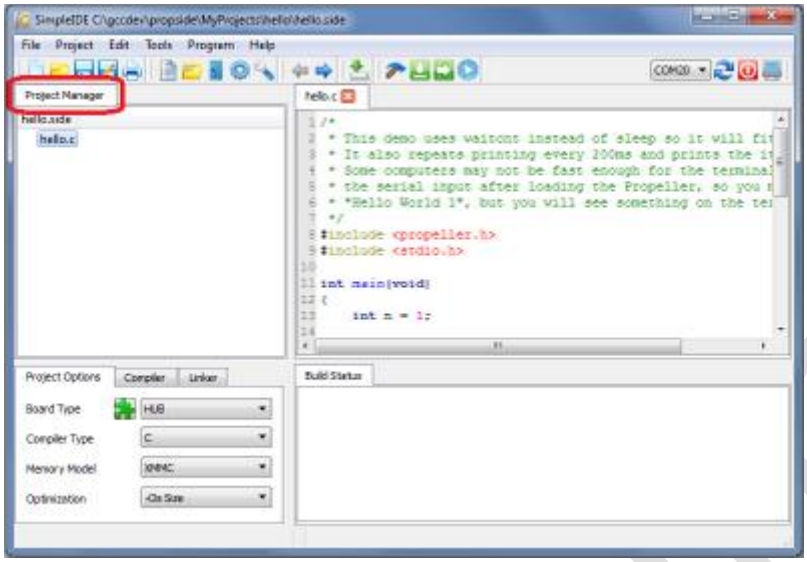
Help Menu

The help menu gives users access to documents for the IDE and Propeller GCC Library.

-  About: Shows the startup splash, SimpleIDE version number, startup disable check-box, Propeller-GCC on-line link, and the Propeller-GCC bug report support email.
-  Credits: Shows links to third-party information and translation credits. License texts are distributed with the SimpleIDE package. Translations are greatly appreciated.
-  Help: Shows this user guide in your system web browser.
-  Library: Shows the main Propeller GCC library page. Context sensitive help for library symbols is available by putting the mouse over a symbol name and pressing F1.

Project Manager

SimpleIDE uses a project manager - note the tab circled in red below. This is not a list of files based on the open file like found in the Propeller Tool. The project manager defines what is built regardless of what is shown in the editor tabs.



A SimpleIDE project is called a "side project" because SIDE is an abbreviation of Simple IDE. The ways to start a side project are described above in **Creating a New Project.**

It may be obvious to some, but it is still worth stating that a project consists of several files. If files are not listed in the project, the project can’tt be built and run. Some .h header files may not be listed, but they must exist in the project folder pr a specified link for successful builds.

The minimum required file in the side project is the main .c file. For example, the hello.side project must contain a file called hello.c as shown above. The hello.c file must contain the "main" function, that is: int main(void) or some variation of that. Any other files containing code being used by hello.c must be listed in the side project.

Please note, that there is no issue using a main .c type file for projects that include C++ in Propeller-GCC.

Project File Types

Source Files

These files can be added to the project manager by right clicking an existing project file and using the popup menu.

- C files (*.c *.cc *.cpp) typically contain function or class method implementations.
- COG C files (*.cogc) is a special type of C file that will compile to an image that will run in a COG.
- SPIN files (*.spin) contain PASM that can be compiled and extracted for starting in a COG.
- GAS files (*.s *.S) contain PASM like GNU Assembly that can be compiled and extracted for starting in a COG.

Include Files

These files also known as header files typically contain interface information.

- Header files (*.h) are used to define data types and declare functions that may be in libraries.
- Header files are included in C source and do not need to be added to the project manager.
- Sometimes we need to specify an include path for the files.
    - An include path can be added with "-I folder" in the Other Compiler Options box
    - An include path can be added using the project manager popup menu.

Object Files

These files are generated by the build process and are not added to the project manager.

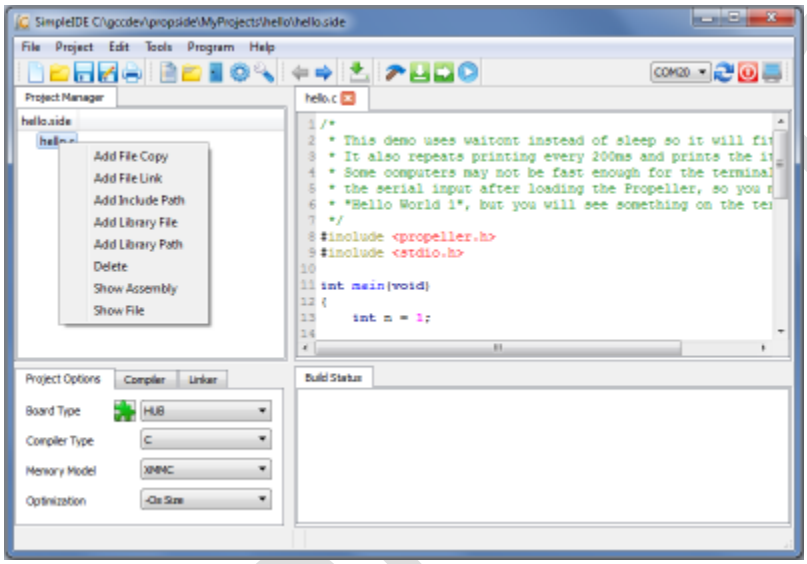
- Object files (*.o): object files are always generated by the compiler.
- COG Object file (*.cog): this is a generated object file created from a .cogc file.
- Dat files (*.dat): this type of file is generated by BSTC or other Spin programs used for making PASM COG code.

Project File List

The project pane is blank if no project is set. If a project is set, the project name with .side will be displayed as in the hello.side example above. All projects are .side projects. The first indented entry is the main program. It should have the main start-up function as in the case of hello.c .

Often we want to have more than one file per project. The project manager lets us add files, links to files, and paths for extra includes and libraries.

If you right-click on the hello.c file entry in the project file list (or any other entry in the list), you will get a popup menu that gives you several options. Most menu items are related to adding entries like files or links. The function of each popup menu item is described below.



If you just want to see the contents of a file, left click on the file-name. The file will open in the editor tabs if the entry is a file. Entries starting with -I and -L are path specifiers, not files. Clicking the .side file does nothing.

- **Add File Copy**: Add a new file to the project. When you add a file to the project, it must already exist somewhere on your computer. You can make a new file in the editor and save-as for example. If you choose a file outside of the project directory, the file will be copied to the directory. File names are added in alphabetical order except the main project file.

- **Add File Link**: Add a link to an existing file to the project. When you add a link to a file, the file must already exist. When you link to a file it will not be copied to the project directory. A link will have the short file name and -> full path name as shown above.

- **Add Include Path**: Add an include path for .h header files not in the project folder or tool-chain library folder. This adds a -I path to the project.

- **Add Library File:** Add a library file to the project. Add only .a library file(s) to the project. Files will not be copied to the folder.

- **Add Library Path**: Add a library path for .a library files not in the project folder or tool-chain library folder. This adds a -L path to the project.

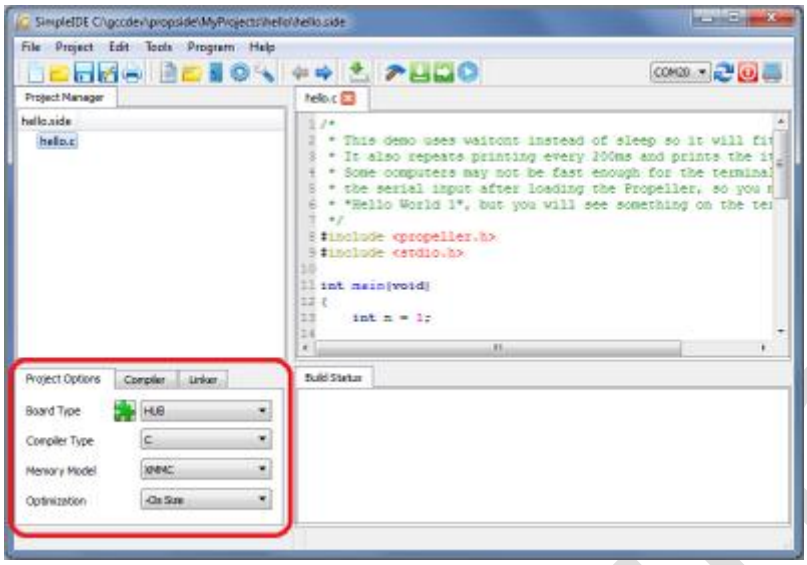
- **Delete**: to delete a file or link from the project, right click on the item and choose delete. Do not delete the top file - it has a special meaning. If you want another top file, create it and set the project.

- **Show Assembly**: right click the file name and click Show Assembly to see the Propeller-GCC assembly.

- **Show File**: this is the same as left click on a file name.

Project Options

The compiler pane lets you choose typical Propeller-GCC compile options. These options are automatically saved in the .side project file.



- **Board Type**: The board type option selects the basic board type where the program will be loaded. In many cases the board type doesn't matter for LMM or COG programs. Some boards have non-standard system clock frequencies though and must be properly selected. In all cases XMM type programs will need an XMM capable board selected.

- **Reload Board Types**: This puzzle piece button will read all C:\propgcc\propeller-load*.cfg files and load the names into the Board Type combo box. The selected board type is saved in the .side project file.

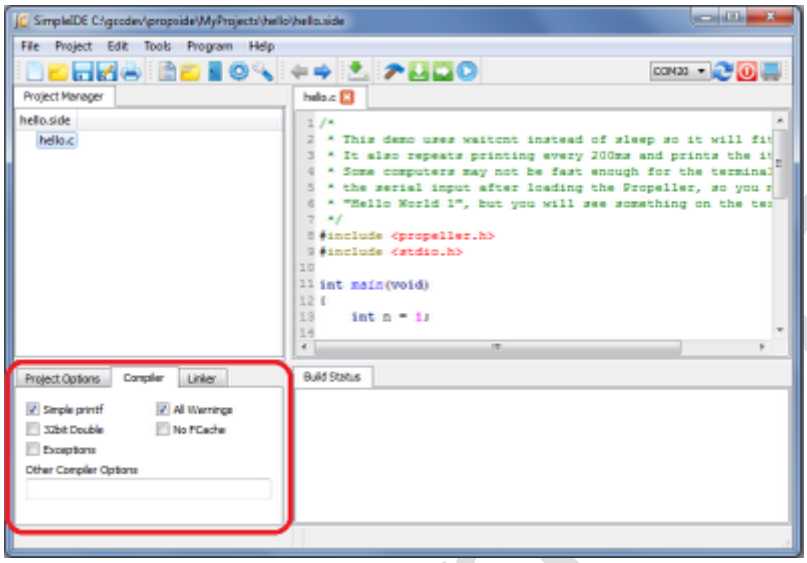
- HUB **Board Type**: This is the drop-down box on the left side of the green puzzle piece. It lets you choose the board type to use with your program. Board types with SDLOAD or SDXMMC are special and when selected tell the IDE that certain functions will be performed.

- **Compiler Type**: C compiles C programs and can compile very simple C++ programs such as the C++_toggle demo. C programs needing std namespace and libraries, etc... will need to use the C++ compiler. Typially a full C++ program will need an external memory to be useful.

- **Memory Model**: Many programs use LMM, but some programs use COG or XMMC. The C-VGA demo is a COG only program. To compile that, use the COG memory mode. Some programs are too big for LMM and can be run on external memory modes like XMMC. The included graphics demo can run on LMM, but it can also run on XMMC with board type EEPROM selected (64KB or more EEPROM

should be used). XMM-SINGLE should be used for RAM based external memory devices. XMM-SPLIT is the same as XMM and should be used where external memory is split into code and data where code lives in Flash and data lives in RAM – XMM is originally used on boards like C3.

- **Optimization**: Typically we want to optimize for size, but there are some programs that we want to optimize for speed at the cost of a larger program. Use -O2 for speed optimizations.



- **Simple Printf**: GCC's default printf is very big (12KB or more). Simple printf provides most of the default printf features and is fine for most programs although it is not completely standard compliant. Simple printf programs using integers only can be as small as about 7KB so there is great advantage in using it on Propeller most of the time. There are cases though when the normal printf can be slightly smaller than simple printf.

- **32bit Doubles**: Use 32bit doubles for floating point double variables. The default is 64bit doubles, and may be too big for most LMM programs.

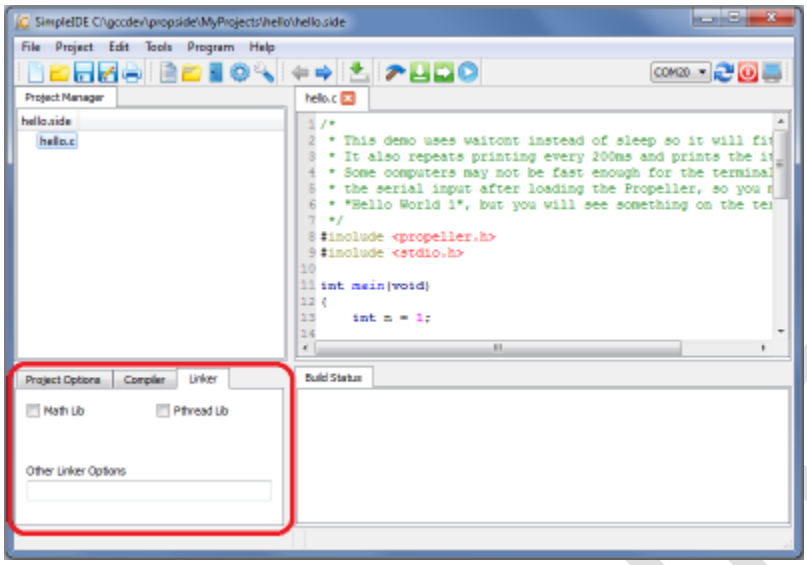
- **All Warnings**: Tells compiler to generate all possible warnings on issues in code that can cause trouble.

- **No Fcache**: This tells compiler to not use Fast Cache (fcache). Fcache generally improves performance but it can be disabled.

- **Exceptions**: This should be enabled for C++ programs that use try/catch exceptions. Using exceptions may cause bigger programs.

- **Other Compiler Options**: This lets you add -D flags for programs that may need them. For example the dry11 demo needs "-DLOOP=50000" (without

quotes) to compile correctly. Use that flag for building dry11. There are other flags that can be added here when using libraries. One may need –I <path-to-library-headers> for using prebuilt libraries.



- **Math Lib**: Must be checked if you are using float or double in your program. The program will compile without this, but it will not run correctly unless the library is included.

- **Pthread Lib**: Must be checked if you are using Pthreads for running multiple threaded programs in one COG or many COGs. The number of threads available is limited by memory. XMM/XMMC programs will run all threads on the main program cog. LMM programs can run M*N threads on N COGS.

- **Other Linker Options**: This lets you add linker specific options. For example "-l name" may be added for using a prebuilt library. One can also add special linker scripts here if a board does not fit a built-in memory layout.

Board Types

SimpleIDE lets you specify your board type from the drop-down box as mentioned above. There are many board types and variations. Board type .cfg files contain information for the loader to use only for starting your program. That is: the loader needs the main serial port, the clock mode, the clock frequency, the cache driver for external memory programs, and SD Card pin assignments. Board types do not attempt to define user devices such as TV or VGA (TV_PIN is defined in some .cfg files, but is only used for the loader in special cases).

Basic Board Types

Basic board types can work on many boards that have only a Propeller, Crystal, and EEPROM. A Crystal is not necessary for RCSLOW and RCFAST board types. EEPROM is only required if you want the Propeller to boot without the help of download from your PC.

- **RCFAST**: The most common of the basic board types are RCSLOW and RCFAST. RCFAST relies on the internal Propeller 12MHz oscillator and will boot any board. Serial port communications with RCSLOW and RCFAST will not behave properly because both modes are imprecise.

- **RCSLOW**: RCSLOW is like RCFAST except that it uses the slowest and most energy efficient clock mode.

- **HUB**: The HUB board type specifies an 80MHz system clock and an external 5MHz crystal with PLL16x clock mode. Any board that has a 5MHz crystal should work with HUB board type. Good serial communications and TV/VGA output are possible with HUB board type and a good 5MHz crystal. Other board types related to HUB are ASC, ASC, QUICKSTART, and others.

- **SPINSTAMP**: The SpinStamp board type is like the HUB board type except that it relies on a 10MHz crystal to produce an 80MHz system clock by using PLL8x in the clock mode. Any Propeller board that has a 10MHz crystal should work with the SPINSTAMP board type. HYDRA is a related board type.

EEPROM Board Types

The EEPROM board type is like the HUB board type except that it has a cache driver defined for running XMMC memory model programs. With the EEPROM or similar board types, you can load a program into the EEPROM and the program can fetch code to run from the EEPROM device.

This mode is usable with single 32KB EEPROMs (using two 32KB EEPROMs will not work), 64KB EEPROM, 128KB linear address space EEPROMs (24FC1025 parts do not have a linear address space and will not work. 24LC1024 parts will work), and 256KB EEPROM from ST.

Any set of 64KB+ EEPROM can be configured to add more code space to your program (using two 32KB EEPROMs will not work). All devices should be the same type.

The XMMC model is the only X* memory model that will work with EEPROM board types. Other board types related to EEPROM that run XMMC programs are PROPBOE, QUICKSTART, and ASC+.

External Flash Board Types

- External Flash board types like C3F and SSF will run XMMC memory model programs from Flash memory.

- **C3F**: C3F XMMC programs are stored in the on board 1MB SPI Flash. C3F is a variant of the C3 board type that uses all of cache for program code (the C3 type splits cache between Flash and SRAM storage and is less efficient).

- **SSF**: SSF is the SpinSocket-Flash board type that uses 2 Winbond W25Q* QuadSPI parts for storing and running XMMC memory model code in. This is the fastest practical external memory solution available for propeller because of low cost (< $0.75 per MB), low pin count (10 pins for byte-wide solution), high density (up to 32MB), and high performance.

External RAM Board Types

External RAM boards are generally boards that have external SRAM, SPI-SRAM, or SDRAM. Boards having only SRAM will only boot stand-alone if the code can be loaded from SDCard or some other non-volatile storage. SRAM only boards can be loaded by the PC and SimpleIDE using the serial loader protocol for testing.

- **C3**: The C3 type allows using the XMM (or XMM-SPLIT) memory model store program code in SPI Flash and data in a device like external SPI SRAM. The only default board type that uses this model today is C3. It is possible for a cache driver to be written for other boards that will use the XMM memory model. The C3F board type will only use C3 Flash and only works with XMMC memory model programs.

- **DRACBLADE**: This board has SRAM and SD card. It can be loaded by the IDE for testing, but must be programmed using SDLOAD for stand-alone boot.

- **SDRAM**: This board has SDRAM and SD card. It can be loaded by the IDE for testing, but must be programmed using SDLOAD for stand-alone boot.

SDLOAD Board Types

SDLOAD board types are typically RAM board types that do not have an on board flash. With the SDLOAD board type, the program to be run is sent to the SDcard. The RUN, RUN Console, or BURN IDE buttons will cause the AUTORUN.PEX output to be downloaded to SD Card and then booted to RAM and run. Once the BURN button has been used, you can replace AUTORUN.PEX either using the Send File to Target SD Card command/button or by replacing the program by copying it to SDCard from your PC.

SDXMMC Board Types

SDXMMC board types are used to download XMMC memory model AUTORUN.PEX programs to SDCard and run them using the RUN, RUN Console, or BURN buttons. Any board that has an SD card can use SDXMMC.

SimpleIDE SDLOAD and SDXMMC Attributes

How does a board type include SDXMMC or SDLOAD attributes? This is added to the .cfg file for a board. If a board has an SD Card, the SDXMMC option can be added to the .cfg file with the line "# IDE:SDXMMC". If a board has an SD Card and a supported RAM cache driver, SDLOAD can be added to the .cfg file as "# IDE:SDLOAD". Some examples follow.

Below is an example of the ppusb.cfg file. Note that it has IDE:SDXMMC in a comment like described above. Other interesting items are cache-driver and sd-driver. The cache driver in this case is the eeprom_cache.dat driver. Today, the SDXMMC cache driver is part of the sd_driver.dat.

If you want to use the SDXMMC, the board type PPUSB-SDXMMC should be selected. If you only want to use the EEPROM cache for XMMC, the board type PPUSB should be selected.

```
# ppusb
# IDE:SDXMMC
    clkfreq: 80000000
    clkmode: XTAL1+PLL16X
    baudrate: 115200
    rxpin: 31
    txpin: 30
    cache-driver: eeprom_cache.dat
    cache-size: 8K
    cache-param1: 0
    cache-param2: 0
    eeprom-first: TRUE
    sd-driver: sd_driver.dat
    sdspi-do: 0
    sdspi-clk: 1
    sdspi-di: 2
    sdspi-cs: 3
```

Configuration Files

Board configuration files provide customization for Propeller-GCC board hardware. When a Propeller-GCC program is loaded on the hardware, it is done with the propeller-load loader program (see http://www.parallax.com/propellergcc/). The loader will scan the board type .cfg file to use with the compiled Propeller-GCC program and patch properties to the program if necessary before loading.

Configuration Variable Patching

Numeric properties found in the .cfg file can be applied to a Propeller-GCC program to let the program run on boards with different hardware connections. Any variable can be defined. http://www.parallax.com/propellergcc/ has more information.

As a simple example, one board can have an LED on pin 15 and another board can have an LED on pin 20. The same code can run on boards using different .cfg files.

```
# file: led15.cfg
# LED pin 15 example
    clkfreq: 80000000
    clkmode: XTAL1+PLL16X
    baudrate: 115200
    rxpin: 31
    txpin: 30
    ledpin: 15

# file: led20.cfg
# LED pin 15 example
    clkfreq: 80000000
    clkmode: XTAL1+PLL16X
    baudrate: 115200
    rxpin: 31
    txpin: 30
    ledpin: 20
```

The Propeller-GCC program that uses ledpin can look like this:

```
[code]
#include <propeller.h>
/* Config variables must be global.
 * If a variable is patched it will not have the value -1.
 */
int _cfg_ledpin = -1;
int main(void)
{
    if(_cfg_ledpin > -1) {
       DIRA |= (1 << _cfg_ledpin);
       while(1) {
           waitcnt(CLKFREQ/2+CNT);
           OUTA |= (1 << _cfg_ledpin);
           waitcnt(CLKFREQ/2+CNT);
        }
    }
    while(1);
    return 0;
}
[/code]
```

Source Browsing

A source browser is a special IDE feature that allows the user to find symbols in the source files (function declarations and global variable names). For example a complex project can have many files and thousands of lines of code. To simplify dealing with such projects, a program called ctags was created. SimpleIDE uses open source exuberant ctags to help with source browsing.

In the example below, the function LCD_start is highlighted. This highlight happens when the text cursor is in the the symbol, mouse is over the symbol, Ctrl (or Command on Mac) is pressed, and the symbol is found in the project source files.

The highlight will only appear if the mouse is over a symbol, Ctrl is pressed, and the symbol is found in the project. Library symbols will not be found.

Use the Ctrl+LeftClick (keyboard+mouse) combination to browse to the symbol definition.

Once the function is found, the Go Back button is enabled. This means you can browse back to where you started. When there is no more "back" left to do, the button goes gray again.

On a PC compatible keyboard, you can use Alt+RightArrow when the cursor is on a browse-able symbol. Using Alt+RightArrow will find the declaration and Alt+LeftArrow to go back.

One disadvantage of Ctrl browse highlighting is that it can interfere with normal Ctrl-C and Ctrl-V editing a little if the mouse is over a browse-able function or variable name. Just move the mouse if this happens.

Miscellaneous Notes

The editor will convert "tabs" to spaces. The built-in setting for tabs is 4 spaces. The number of spaces can be set in the General tab of SimpleIDE Properties. If you really need to use tabs, you can use another editor.

There have been many enhancements and bug fixes since last update. In the future, bug fixes will be tracked here. For the time being look at propside.googlecode.com for bug fixes.

Support

Report problems with SimpleIDE or Propeller-GCC via email gccbeta@parallax.com or http://code.google.com/p/propside/issues/list