# PropellerIDE Documentation

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# **Table of Contents**

Introduction	0
User Guide	1
Getting Started	1.1
Installing PropellerIDE	1.1.1
Installing FTDI Drivers	1.1.2
The Main Window	1.2
Tool Bar	1.2.1
Editor View	1.2.2
Code Completion	1.2.2.1
Documentation View	1.2.3
Project View	1.2.4
Keyboard Shortcuts	1.2.5
Project Archive Tool	1.2.6
Debugging Tools	1.3
Terminal	1.3.1
Memory Map	1.3.2
Heat Map	1.3.3
Oscilloscope	1.3.4
Logic Analyzer	1.3.5
Language Support	1.4
Spin	1.4.1
PropBASIC	1.4.2
C	1.4.3
Preferences	1.5
Frequently Asked Questions	1.6
Developer Guide	2
Building PropellerIDE	2.1

# Introduction

PropellerIDE is a fun, easy, beautiful editor for the Propeller microcontroller.

- Code the way you like with a colorful, customizable editor.
- Dig deeper into your applications with the built-in memory map.
- Speak your Propeller's language with the integrated serial terminal.
- Find what you need fast with searchable project view and auto-complete.
- Start coding right away with the included Spin Standard Library.
- Runs great on Windows, Mac, Linux, and Raspberry Pi!

# **User Guide**

# **Getting Started**

# **Installing PropellerIDE**

PropellerIDE is currently officially supported on Windows, Mac, Debian, and Raspbian OS.

First, download PropellerIDE for your platform. Then follow the corresponding instructions to get started.

#### Windows

PropellerIDE is packaged as a Windows installer that will guide the user throughout the installation process.

## Mac OS X

PropellerIDE is packaged as a regular DMG image, so mount the Volume and drag the icon into the Applications folder.

# Linux

#### Ubuntu

PropellerIDE requires a minimum of Qt 5.2 which is only available on Ubuntu as of 14.04.

After downloading the Debian package for your platform, install it with dpkg.

sudo dpkg -i propelleride-(version)-amd64.deb

It will complain about dependencies at which point you can run apt-get to fix them.

```
sudo apt-get install -f
```

Make sure you install the FTDI drivers!

sudo apt-get install libftdi1

Add yourself to the dialout group so you can use the serial port.

sudo usermod -a -G dialout USER\_NAME

#### Ubuntu 14.04 or earlier

PropellerIDE is known to build in Ubuntu versions as old as 12.04, but doing so will take some work.

Add the Utopic Unicorn sources to your /etc/apt/sources.list .

deb http://cz.archive.ubuntu.com/ubuntu utopic main

Run an update to ensure your apt repositories are up-to-date.

sudo apt-get update

#### **Raspberry Pi - Raspbian Wheezy**

Qt5 is not available in the standard repository, but you can obtain it from Debian backports.

Add the following entries to /etc/apt/sources.list .

deb http://twolife.be/raspbian/ wheezy main backports
deb-src http://twolife.be/raspbian/ wheezy main backports

Add the repository key.

```
sudo apt-key adv --keyserver keyserver.ubuntu.com --recv-key 2578B7
```

Update and install Qt5 and its dependencies.

```
sudo apt-get update
sudo apt-get install qt5-default qt5-qmake libegl1-mesa libgles2-me
```

# **Installing FTDI Drivers**

In this tutorial we will walk you through installing the FTDI USB-to-Serial driver. This is required to use the Propeller on all wired platforms.

#### Windows

Currently Supported VCB Drivers

Head over to the FTDI website, and scroll down to the chart under "VCP Drivers" and select the download according to your operating system.

			Processor Architecture						
Operating System	Release Date	x86 (32-bit)	x64 (64-bit)	PPC	ARM	MIPSII	MIPSIV	SH4	Comments
Windows*	2015-07-28	2.12.06	2.12.06	-	-	-	-	-	2.12.06 WHQL Certified Available as <u>setup executable</u> <u>Release Notes</u>
Linux	2009-05-14	1.5.0	1.5.0	-	-	-	-	-	All FTDI devices now supported in Ubuntu 11.10, kernel 3.0.0-19 Refer to <u>TN-101</u> if you need a custom VCP VID/PID in Linux
Mac OS X 10.3 to 10.8	2012-08-10	2.2.18	2.2.18	2.2.18	-	-	-		Refer to TN-105 if you need a custom VCP VID/PID in MAC OS
Mac OS X 10.9 and above	2015-04-15		<u>2.3</u>	1.20	1.20	-	- <u>-</u>	-	This driver is signed by Apple
Windows CE 4.2-5.2**	2012-01-06	1.1.0.20	-	-	1.1.0.20	1.1.0.10	1.1.0.10	1.1.0.10	
Windows CE 6.0/7.0	2012-01-06	1.1.0.20 CE 6.0 CAT CE 7.0 CAT		-	1.1.0.20 CE 6.0 CAT CE 7.0 CAT	1.1.0.10	1.1.0.10	1.1.0.10	For use of the CAT files supplied for ARM and x86 builds refer to AN_319
Windows CE 2013	2015-03-06	BETA			BETA				BETA VCP Driver Support for WinCE2013

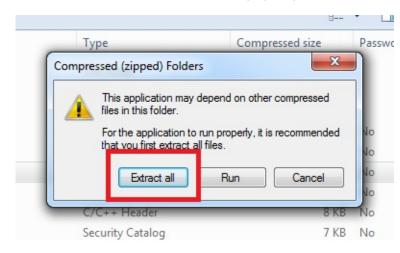
Select the most recent version and start the download (either will download the same zipped file).

x64 (64-bit)	x86 (32-bit)	Release Date	Operating System
2.12.06	2.12.06	2015-07-28	Windows*
	2.12.06	2015-07-28	Windows*

After download finishes, open the zipped file. This file will contain both executables for 32and 64-bit processors. Select the one your computer runs (dpinst-amd64 for 64-bit and dpinst-x86 for 32-bit).

■ Desktop       ■ amd64       File folder         ● Downloads       ■ i386       File folder         ■ Recent Places       ■ Static       File folder         ■ dp-chooser.exe       Application       43 KB       No         ■ Documents       ■ dpinst-amd64.exe       Application       318 KB       No         ■ Documents       ■ dpinst-amd64.exe       Application       308 KB       No         ■ Pictures       ■ ttd2xx.h       C/C++ Header       8 KB       No         ■ Homegroup       ● ftdibus.cat       Security Catalog       7 KB       No         ● Homegroup       ● ftdiport.cat       Security Catalog       6 KB       No         ● Local Disk (C:)       ■ icence.txt       Text Document       4 KB       No		- N	-	a 1:	
Downloads   Recent Places   Static   Ibraries   I	🔆 Favorites	Name	Туре	Compressed size	Password
Recent Places   Static   File folder   dp-chooser.exe   Application   dpinst-amd64.exe   Music   Music   Music   Image: transformation   ftdibus.cat   ftdibus.inf   ftdibus.inf   ftdiport.cat   ftdiport.cat   ftdiport.inf   ftdip	🧮 Desktop	🍌 amd64	File folder		
Ibraries   Ibrar	퉳 Downloads	鷆 i386	File folder		
Libraries Image: dninst.xml XML Document 1 KB No   Documents Image: dpinst-amd64.exe Application 318 KB No   Music Image: dpinst-x86.exe Application 308 KB No   Pictures Image: dpinst-x86.exe Application 308 KB No   Image: dpinst-x86.exe Application 6 KB No   Image: dpinst-x86.exe Security Catalog 6 KB No   Image: dpinst-cat Security Catalog 6 KB No   Image: dpinst-cat Security Catalog 6 KB No   Image: dpinst-cat Text Document 4 KB No   Image: dpinst cat Image: dpinst.exe Image: dpinst.exe Image: dpinst.exe   Image: dpinst cat Image: dpinst.exe Image: dpinst.exe Image: dpinst.exe   Image: dpinst cat Image: dpinst.exe Image: dpinst.exe Image: dpinst.exe   Image: dpinst cat Image: dpinst.exe Image: dpinst.	📳 Recent Places	🍌 Static	File folder		
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Image: Setup Information       6 KB       No         Image: Setup Information       6 KB       No         Image: Setup Information       6 KB       No         Image: Setup Information       5 KB       No <th></th> <td></td> <td>C/C++ Header</td> <td>8 KB</td> <td>No</td>			C/C++ Header	8 KB	No
Homegroup   Image: Computer   Image: Computer <th>Videos</th> <th></th> <th>Security Catalog</th> <th>7 KB</th> <th>No</th>	Videos		Security Catalog	7 KB	No
Image: Computer       Image: Computer				6 KB	No
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III	I툎 Computer ▷ 🏭 Local Disk (C:)	licence.txt	Text Document	4 KB	No
	🙀 Network				
13 items		•	III		
	12 itoms				

Click "Extract All" when a window pops up to extract the files.



Click "Extract" into a destination. Another window will pop up containing files.

ftdibus.cat

1			23
0	🛛 🚹 Extract Compressed (Zipped) Folders	- 4 - 4	
-	Select a Destination and Extract Files		
	Files will be extracted to this folder:		
	C:\Users\USER\Desktop\CDM v2.12.06 WHQL Certified	Browse	
	✓ Show extracted files when complete		
		Extract Cane	cel

In this popped up window, double click on the same executable from before. Remember to click ""Yes" to allow the program to make changes to your computer.

Device Driver Installation Wizar	d
	Welcome to the Device Driver Installation Wizard! This wizard helps you install the software drivers that some computers devices need in order to work.
	< Back Next > Cancel

License Ag	reement					
Ň	To continue, accept the following license agreement. To read the entire agreement, use the scroll bar or press the Page Down key.					
	IMPORTANT NOTICE: PLEASE READ CAREFULLY BEFORE INSTALLING THE RELEVANT SOFTWARE: This licence agreement (Licence) is a legal agreement between you (Licensee or you) and Future Technology Devices International Limited of 2 Seaward Place, Centurion Business Park, Glasgow G41 1HH, Scotland (UK Company Number SC136640) (Licensor or we) for use of driver software provided by the Licensor(Software).					
	BY INSTALLING OR USING THIS SOFTWARE YOU AGREE TO THE $\ \mathbf{\neg}$					
	I accept this agreement     Save As     Print					
	I don't accept this agreement					
	< Back Next > Cancel					
	< Back Next > Cancel					
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vice Driver In	stallation Wizard					
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vice Driver In	stallation Wizard					
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vice Driver In	stallation Wizard Completing the Device Driver Installation Wizard The drivers were successfully installed on this computer.					
vice Driver In	stallation Wizard  Completing the Device Driver Installation Wizard  The drivers were successfully installed on this computer. You can now connect your device to this computer. If your device					
vice Driver In	stallation Wizard         Image: Stallatio					
vice Driver In	stallation Wizard         Image: Control of the stallation wizard					

Follow the instructions until installation is completed.

## Linux

On Debian, open a terminal and use the "apt" package manager to install to your system.

sudo apt-get install libftdi1

On Fedora, use the "yum" package manager.

sudo yum install libftdi

# **The Main Window**

<u>E</u> dit <u>V</u> iew <u>P</u> roject		
	K 🔁 🛃 🜉 ttyUSBO 🗧	
arch		
FrappyBard.spin	DataBlast.spin     DungeonsDagrons.spin     debug.shell.spin     FrappyBard.spin       46     SKY = 1	
▶ LameLCD.spin	40  SKT = 1	
LameGFX.spin	48  BUSH = 2	
<pre>LameGFX.spin</pre> LameText.spin	49 FLOOR = 4	
LameText.spin LameAudio.spin	50 UNDER = 6	
<pre>LameAudio.spin</pre> LameMusic.spin	51	
LameControl.s	52	
LameFunctions	53 VAR	
▶ gfx tilemap.s	54	
▶ gfx_trappy.sp	55 long xoffset 56 long xoffsetcounter	
▶ gfx_frappy.sp	56 long xoffsetcounter 57	
▶ gfx_rrappybir	58 long playerx	
▶ gfx_youdie.sp ▶ gfx numbers.s	59 long playery	
▶ gfx pressa.sp	60 Long speedx	
<pre>song frappy.s</pre>	61 long speedy	
Main	62 byte flighttimeout, clicked, died, tapped	
- TitleScreen	63 byte score	
- 200 GameLoop	64	
- M GameOver	65 66 PUB Main	
- W HandlePlayer	67	
- InitPipes	68 lcd.Start(gfx.Start)	
- ControlPipes	69 lcd.SetFrameLimit(lcd#FULLSPEED)	
- 200 PutPipeOpen	70 txt.Load(font.Addr, "0", 4, 6)	
- 200 PutTilePara	71 audio.Start	
- PutTile (x,	72 music.Start	
- W KeepScore	73	
- W SFXEngine	74 cognew(SFXEngine, @SFXStack)	
- W RunSound (s	75 76 clicked := 0	
-m Jump (chann	70 CLICKED := 0	
Ding (chann		

# **Tool Bar**



## File



Creates a new file.



Opens an existing file.



Saves the current file to disk.

## 🔚 Save As

Saves a copy of the current file under a new name. The original file is not saved.

## Project

#### Archive Project

Builds an archive of the current project.

#### Suild Project

Compiles the current project without downloading it.

#### 🗳 Run Project

Compiles and downloads it to the currently selected board.

## 🛂 Write Project

Compiles the project, downloads it to the board, and writes it to the board's first EEPROM.

#### ttyUSB0 C Device Selector

Selects the target download device from any available devices connected to the system.

# Debugging

### 📣 Memory Map

Opens the Memory Map widget.



Opens the Terminal widget.

# **Editor View**

DataBlast.sp	in 🗵 DungeonsDagrons.spin 🗵 debug.shell.spin 🗵 FrappyBard.spin 🗵 com.serial.terminal.spir
1 {{	
2	
3	
4	
5	
7	
5 6 7 8	
9	
10	
11	A shockingly original game for the LameStation!
12	
13	Brett Weir, 2014
14 }}	
15 16 CON	
17	_clkmode = XTAL1   PLL16X
18	_xinfreq = 5 000 000
19	
20 <b>OBJ</b>	
21	
22	lcd : "LameLCD"
23	gfx : "LameGFX"
24	txt : "LameText"
25	audio : "LameAudio" music : "LameMusic"
26	

## **Code Completion**

With PropellerIDE, you can complete code from the current file or another file in the path in the main file's directory or a directory in the library path.

The following completions are supported.

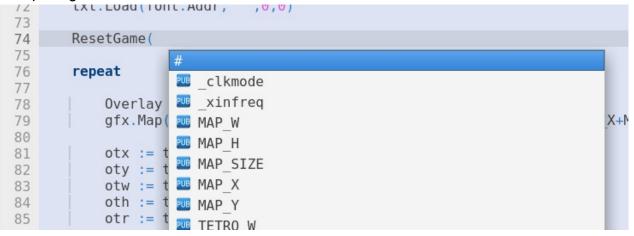
- Public functions
- Constants

#### **Completing From The Current File**

As of v0.36.7, PropellerIDE supports completing within the current file.

- Typing # brings up a list of constants.
- Typing . brings up a list of functions.

Press Esc to quit without completing. Press Enter or Return to accept the completion.



Completing a constant from the current file.

## **Completing From Another File**

You can also complete code from another file.

- Typing the alias of an object[1], then # opens a list of constants.
- Typing the alias of an object, then . opens a list of functions.

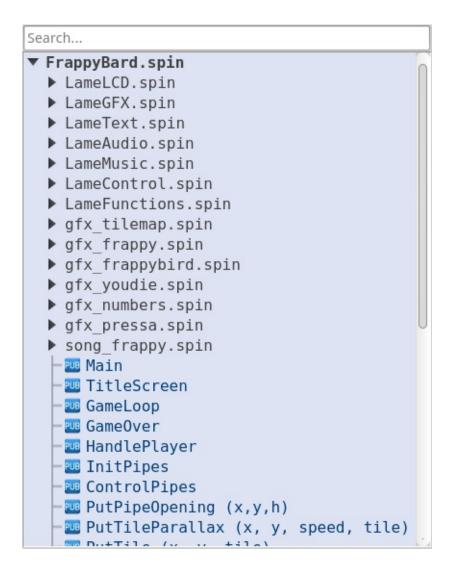
As with before, Esc quits, Enter or Return accepts.

Completing a function from another file.



1 e.g. where we declare an object kbd : "Keyboard" , the alias is kbd .

# **Project View**



# **Keyboard Shortcuts**

## **Basic Shortcuts**

### **Editing Shortcuts**

Ctrl+Z	Undo
Ctrl+Shift+Z	Redo
Ctrl+X	Cut
Ctrl+C	Сору
Ctrl+V	Paste
Ctrl+A	Select all

#### **View Controls**

Ctrl++	Increase font size
Ctrl+-	Reduce font size
Ctrl+X	Cut
Ctrl+C	Сору
Ctrl+V	Paste
Ctrl+A	Select all

## **Project Controls**

F8	Open memory map
F9	Compile current program
F10	Run current file
F11	Write current file
F12	Open terminal on current device

## **Tab Controls**

Ctrl+T	Create a new file
Ctrl+Shift+T	Create a new file from a template
Ctrl+W	Close the current tab
Ctrl+PgUp	Go to previous tab
Ctrl+PgDn	Go to next tab

# **Debugging Tools**

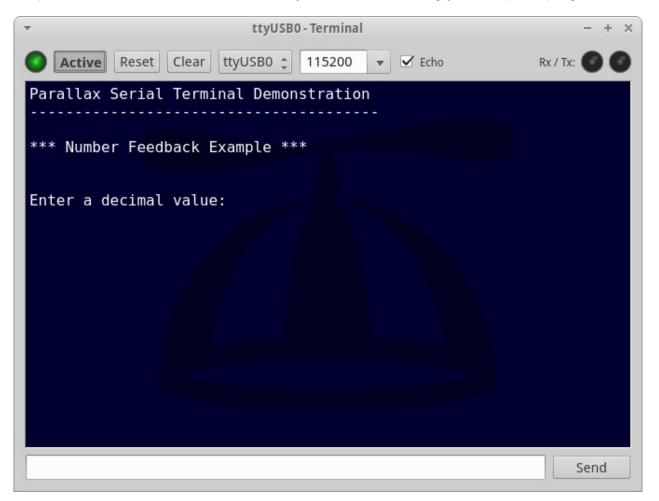
You just wrote an awesome program, you sit down to test it out, you cross your fingers, dripping with anticipation, and... it doesn't work.

Agh! What a frustrating moment!

Luckily, PropellerIDE can help. It has lots of built-in tools to help you pinpoint where you went wrong.

# Terminal

PropellerIDE has a built-in serial terminal you can use to debug your Propeller programs.



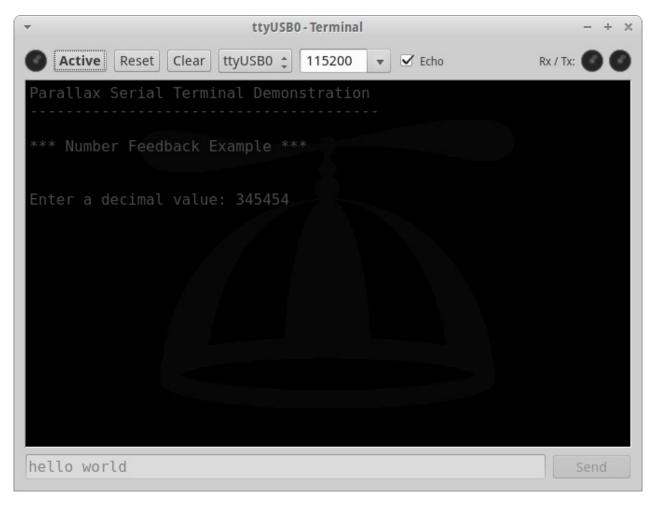
There are no restrictions on the number of terminals that can be open at a time, even on the same device, and software can be downloaded to attached devices without disconnecting terminals first.

#### **Tool Bar**



When the light is green and **Active** is pressed, the device is connected and ready to send and receive data.

When the terminal is disconnected, it goes black and will stop receiving data and responding to key presses.





Sends a hardware reset to the board.



Clears all text from the console and sets the cursor back to the top left.

#### ttyUSB0 🗧 Device

The name of the device this terminal is currently attached to. This list of devices varies depending on your platform, but generally speaking, they look as follows:

Serial devices:

Windows	COM1, COM2,
Linux	ttyUSB0, ttyUSB1,
Мас	cu.usbserial

Wifi devices:

not yet available

#### 115200 **T** Baud Rate

The rate of transmission to the board. Type in the baud rate you want, or click the arrow to select from the following baud rates:

9600, 19200, 38400, 57600, 115200, 230400, 460800, 921600

The default baud rate is 115200.

#### Echo Echo

When echo is enabled, everything you type will be copied to the console, in addition to being sent to the device. Some software expects echo to be enabled, while others send the data back to the console themselves, which will result in duplicated text.

Try toggling this feature if your application isn't behaving how you want it to.



These lights indicate when data is received or sent. Red is received, blue is sent.

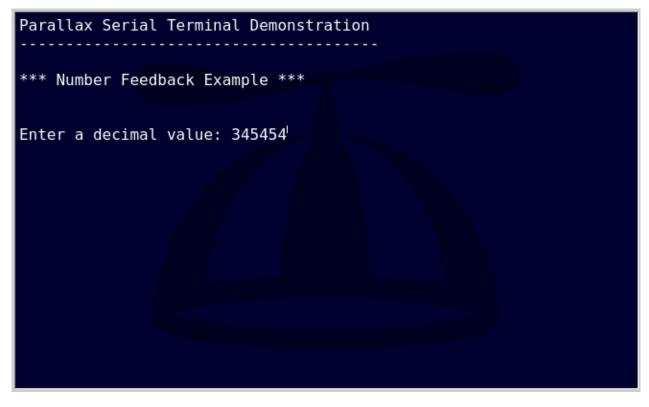
#### Input

There are two ways to input text

- Through the console itself
- Through the *input line* at the bottom of the window

#### Console

Using the console is recommended when the target device supports a more advanced command-line interface, as it will allow you to take advantage of things like readline capabilities, cursor positioning, etc.



Pressing the Enter Or Return key sends a single newline (ASCII 10 ) to the device.

#### **Input Line**

For simpler interfaces, the input line is a better choice.

hello world	Send
-------------	------

Pressing the Enter or Return sends the text without newline. Pressing the *Send* button sends the text plus a single newline.

## Parallax Serial Terminal Compatibility

The following ASCII characters implement basic terminal compatible with the original Propeller Tool's serial terminal.

16	Clear Screen
11	Clear to End of line
1	Home cursor
2	Position Cursor in x,y
14	Position cursor in X
15	Position cursor in Y
13	New Line
10	Line Feed
3	Move cursor Left
4	Move cursor Right
5	Move cursor Up
6	Move cursor Down
9	Tab
8	Backspace

PropellerIDE includes a corresponding com.serial.terminal object that implements these
control characters.

# Language Support

# Spin

# Preferences

#### Appearance

PropellerIDE can be themed to suit your preference in the *Appearance* tab. Click to select from a drop-down of themes or monospace fonts, or double-click on one of the color swatches to open a color picker.

*		Preferences		+ ×
Languages Editor A	Appearance			
Themes				
Ice				-
Font				
DejaVu Sans Mono	)		12	÷
Syntax Colors		Block Colors		
Text		CON		
Numbers		VAR		
Operators		OBJ		
Keywords		PUB		
Strings		PRI		
Comments		DAT		
Restore Defaults			<u>C</u> ancel	<u>o</u> ĸ

Changes to the appearance will propogate instantly throughout the IDE.

#### **Classic Theme**

PropellerIDE provides the *Classic* theme for compatibility with the original Propeller Tool. It supports the legacy Parallax font with the proprietary Propeller character mapping.

	Warning	The Parallax font is deprecated The proprietary character mapping is not portable and is only provided for legacy support. Consider the use of a standalone diagramming tool or plain ASCII for creating in-source diagrams.
--	---------	---

<u>File Edit View Project H</u> elp			
🗋 😂 🔒 🔚 🔛 🖓	ي 🛃 🔄 🖌		
Search ▼ LoopBack.spin ↓ com.serial.spin ↓ ∰ Main ↓ CM _clkmode com _xinfreq	1 CON 2clkmode = x 3xinfreq = 5	Preferences + x Languages Editor Appearance  Themes  Classic  Font	

# Languages

PropellerIDE supports multiple library paths to be searched from top to bottom.

uages       Editor       Appearance         spin       Spin       Browse         Compiler       /usr/bin/openspin       Browse         Includes       /usr/bin//share/propelleride/library/library       Add Path         Delete Path       Delete Path	Spin Compiler /usr/bin/openspin Browse Includes /usr/bin//share/propelleride/library/library Add Path		Preferences	+ ×
Compiler /usr/bin/openspin Browse Includes /usr/bin//share/propelleride/library/library Add Path	Compiler /usr/bin/openspin Browse Includes /usr/bin//share/propelleride/library/library Add Path	uages Ed	itor Appearance	
Includes /usr/bin//share/propelleride/library/library Add Path	Includes /usr/bin//share/propelleride/library/library Add Path	spin		
	Addradi	Compiler	/usr/bin/openspin	Browse
Delete Path	Delete Path	Includes	/usr/bin//share/propelleride/library/librar	Y Add Path
				Delete Path
		Defends		
ore Defaults	u Defaulte			

# Editor

-		Preferences	+ x
Languages Ec	ditor Appearance		
Features	Settin	gs	
🗹 Auto co	mpletion Tab	stop 4	
🗹 Indent ;	guides		
🗹 Smart i	ndent		
🗹 Highligh	ht line		
Restore Default	ts		<u>C</u> ancel <u>O</u> K

#### Auto completion

Toggles code completion

# **Frequently Asked Questions**

1. What is PropellerIDE?

A modern editor for the Parallax Propeller.

# **Developer Guide**

# **Building PropellerIDE**

The following dependencies are needed to build PropellerIDE:

• Qt5.3 or later

PropellerIDE has been built on the following platforms:

- Windows (Vista, 7, 8)
- Mac OS X (10.6 onward)
- Ubuntu (12.04 onward)
- Raspbian OS
- pcDuino

PropellerIDE has been built with the following compiler toolchains:

- GCC
- MinGW-x64
- Clang
- MSVC

#### Getting the source

Check out the project and its dependencies.

```
git clone --recursive https://github.com/parallaxinc/PropellerIDE.c
```

#### **Building the executable**

#### Using qmake

PropellerIDE can be built from the command-line using qmake to generate makefiles.

cd PropellerIDE qmake

If you have made changes to the <u>.pro</u> files, remember to use <u>-r</u> to update all makefiles, not just the current one.

qmake -r

Use Make to build the project. On most Linuxes, GNU Make is ubiquitous. PropellerIDE supports parallel builds, so make sure to specify the number of jobs with -j.

make -j16

The makefiles support standard makefile targets: make clean removes object files, make distclean removes object files and makefiles.

#### Windows

You will need to download Qt5 from the Qt website. You will also need Inno Setup to build the Windows installer.

- https://www.qt.io/download/
- http://www.jrsoftware.org/isinfo.php

Qt is distributed with either a MinGW or MSVC toolchain on Windows. Be sure to add the paths to the toolchain and Inno Setup to the system environment.

```
C:\Qt\Tools\mingw482_32\bin;C:\Qt\5.3\mingw482_32\bin;C:\Program Fi
```

The MinGW toolchain is painfully slow, but you can build with mingw32-make, which supposedly supports parallel builds but is slow as a dog anyway so it makes little difference.

mingw32-make

If you've decided to install Visual Studio, you'll have an instance of <code>nmake</code>. You can enable parallel builds by setting the CL environment variable, which will speed things up considerably.

set CL=/MP

Then start the build.

nmake

#### **Using QtCreator**

PropellerIDE may also be built with QtCreator, but it should be noted that QtCreator and qmake builds seem to be incompatible with each other, so make distclean should be called before switching between them.

#### **Using CMake**

Instructions on CMake builds are not yet available.

### **Packaging For release**

PropellerIDE is distributed in standalone packages using packthing, an open source packaging tool available on GitHub or downloadable via the Python Package Index.

Via GitHub:

```
git clone https://github.com/lamestation/packthing
cd packthing
pip install -r requirements.txt
python setup.py install
```

Via PyPI:

pip install packthing