E6BPlus

The "Pilot's" Friend

Documentation

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INTRODUCTION

What Is E6BPlus

E6BPlus is a PalmPilot program that calculates and stores information needed by Pilots of light aircraft. This program calculates most of the E6B functions that are needed for flight planning (and a few that can not be found on a Manual E6B). Not only will you be able to perform many of the flight planning aspect, but E6BPlus will also allow for you to calculate Weight and Balance information.

If you rent aircraft, keeping up with all the different equipment lists, weights, and moments for all the FBO aircraft can be frustrating. E6BPlus will allow you store this information for over 20 different aircraft. The information about these aircraft will be automatically entered into various calculations where needed to save you even more time.

Requirements

E6BPlus Requires:
> 1) PalmPilot with 3.0 or Higher ROM.
> 2) Shared Math Library (Included).

Registration

E6BPlus is Trialware. You can test the program, and if you continue to use E6BPlus, you will be required to register your copy. (This version will allow you to use E6BPlus for 15 days before you must register you copy.)

Registration of E6BPlus is $20 (USD). A Site License costs $500 (equal to 25 users) and covers all locations for your organization within a 160 kilometer radius of your site (100 miles). One big advantage of a Site License is that you do not need to keep track of how many people at your site are using the software. A World-Wide License costs $4000 and it covers all locations for your organization on the planet earth. After registering you copy of E6BPlus, you will be sent an unlock key. This key will allow you unrestricted use for the registered number of E6BPlus Version 1.x.x. This Registration Key will allow to use all future releases that include bug fixes and product improvements, up to the release of Version 2.0.

Paying for E6BPlus is fairly simple. If using a Macintosh, open the Register program that accompanies E6BPlus. Enter your name, your email address, and the number of single user licenses you desire for each program you wish to purchase (or Site or Word-Wide licenses). Save or Copy or Print the data from the Register program and send the data and payment to Kagi. More specifics on the Register program to follow. Kagi handles payment processing for E6BPlus. (Or if you are using PC, Unix, Linux, or would just like to register over the web this can be done by visiting our web site at http://www.qsyssoft.com)

If paying with Credit Card or First Virtual, you can email or fax the data to Kagi. Their email address is sales@kagi.com and their fax number is +1 510 652-6589. You can either Copy the data from Register and paste into the body of an email message or you can save the data to a file and you can attach that file to an email message. There is no need to compress the data file; it's already pretty small. If you have a fax modem, just Print the data to the Kagi fax number.

Payments sent via email are processed within 3 to 4 days. You will receive an email acknowledgment when it is processed. Payments sent via fax take up to 10 days and if you provide a correct internet email address you will receive an email acknowledgment and password.

If you are paying with Cash or USD Check you should print the data using the Register application and send it to the address shown on the form, which is:

Kagi
1442-A Walnut Street #392-2W5
Berkeley, California 94709-1405
USA

You can pay with a wide variety of cash from different countries but at present if you pay via check, it must be a check drawn in US Dollars. Kagi cannot accept checks in other currencies, the conversion rate for non-USD checks is around USD 20 per check and that is just not practical. If you have a purchasing department, you can enter all the data into the Register program and then select Invoice as your payment method. Print three copies of the form and send it to your accounts payable people. You might want to highlight the line that mentions that they must include a copy of the form with their payment. Kagi can not invoice your company, you need to act on my behalf and generate the invoice and handle all the paperwork on your end.

Please do not fax or email payment forms that indicate Cash, Check or Invoice as the payment method. As far as we know, there is still no technology to transfer physical objects via fax or email and without the payment, the form cannot be processed. Payments send via postal mail take time to reach Kagi and then up to 10 days for processing. Again, if you include a correct email address, you will hear from Kagi when the form is processed.

Protection:
E6BPlus has a protection scheme and when you pay, we tell you how to indicate to E6BPlus that you have paid the registration fee. If you do not have an email address, please enter your complete postal address and please remember, we do not know what country you live in so please enter that into the postal address also. If you do not have an email address you should consider selecting the Postcard Receipt so that Kagi can inform you of your registration code. Kagi transmits the registration codes via email and paid postcard receipt only.

Restrictions

E6BPlus should only be copied with the Program, Documentation, and Registration together. It can be uploaded on free download sites, free diskettes, or free CDs. E6BPlus can not be sold, packaged on diskettes, CDs, or other Medium that charges Money for Access without express written permission by QSys Software.

Suggestions/Error Reporting

If you have any suggestions for product improvements, or errors to reports, drop me an email to Qsys@kagi.com. Also, check our web page at www.qsyssoft.com for the latest information on products from QSys Software.

Legal Statements

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Warning:

E6BPlus is **NOT** FAA or any other federal agency approved for use in flight planning or operations. E6BPlus if for informational purposes only. All pilots are the final authority for obtaining and determining if the information received will allow the flight to proceed safely. The pilot must use judgement as to the accuracy of the information calculated.

PREFACE

Installation

The installation of E6BPlus requires only a copy of the Application (E6BPlus.prc), and the GNU math library (MathLib.prc)

QUICKSTART

1) Install the E6BPlus.prc and the MathLib.prc onto your PalmPilot using your standard install method. (If you are already using MathLib.prc, you will not need to install MathLib.prc)

2) Click on E6B to start the program running
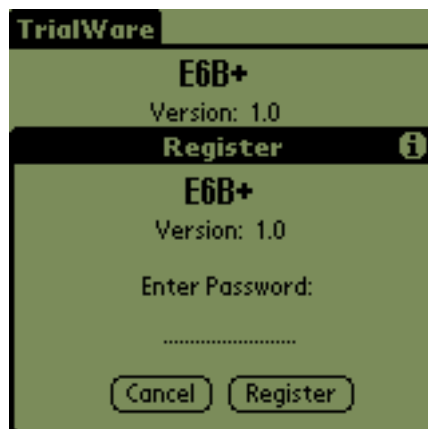
DIALOGS

TrialWare Dialog

When using an UnRegistered Version of E6BPlus, the 'TrialWare' Dialog box will appear at startup. This dialog box will present you with the version of E6BPlus you are using, the number of days you have remaining during your evaluation period, a 'Register' button, a 'Continue' button, and a 'Cancel' Button.

Once you have Registered and received your Password, click the 'Register' button to enter you Password. Once you have entered your Password correctly, you will be able to run E6BPlus without having to see this dialog again. (However, if you ever need to reinstall the application, or have to reinstall your system, you may need to re-enter your password.)

If you are evaluating E6BPlus, and you want to see how E6BPlus performs, you can click on the 'Continue' Button. Note: Once the evaluation period has ended, you will not be able to use the 'Continue' Button.

If you have started E6BPlus in error, and would like to Quit the application, simply click the 'Cancel' Button and E6BPlus will stop execution.

Password

When you click on the 'Register' Button in the TrialWare dialog box, you will be presented with this dialog box.

Enter your password that you received when you registered E6BPlus, and press the 'Register' Button. If you entered your password correctly, you will be able to use E6BPlus without the limits of the TrialWare box. Keep your password in a safe place, to use on future releases of Version 1.x.x of E6BPlus.

If you do not wish to register, click the 'Cancel' button and you will be returned to the 'TrialWare' Dialog.

Main Features

Main Screen
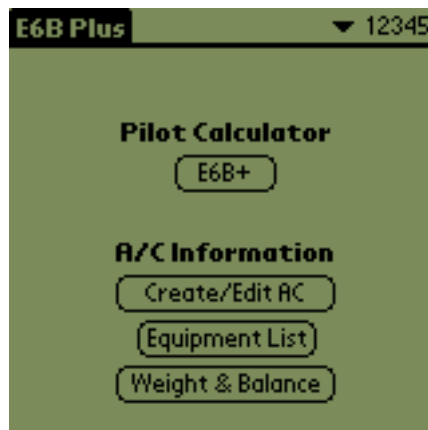
The main screen of E6BPlus is presented into to major areas. The first area is the Pilot Calculator functions (E6B+ button). The second half is used to enter, store, and display information about aircraft in the database. The last button under A/C Information will allow you to calculate Weight and Balance information.   The use of these two major areas will be presented below in two main areas: 1) A/C Information and 2) Pilot Calculator.

You will note that in the upper right corner of this screen is a pull down menu. This menu will allow for you to select an aircraft to edit or use in various calculations.

A/C Information

Create/Edit AC

The Create/Edit AC button has a dual function (to save on screen space). To enter a new aircraft into the database, select 'No AC' from the pull down menu in the upper right corner of the screen. If you would like to edit information about an aircraft already in the database, select the aircraft number from the pull down menu. Press the Create/Edit AC button to begin to add/change information in the Aircraft database.

Screen 1

The first screen that will appear in the Create A/C function will allow for you to enter basic information that will be used during Weight and Balance calculations. The first thing that you enter is the Aircraft number that will be used to identify the aircraft.

The next option is the units that are used by the Aircraft Manufacture. Thus, if you enter lb-in. then the Weights Will be in Pounds, the Arms in Inches, and the Moments in Pound-In. If you select Kg-cm, then you would use Kg and cm repectively. The following information should be entered for the Aircraft:

Mandatory Information

Weight: Empty: Weight of the Aircraft (Pounds or Kg accordingly)

Moment: Empty: Moment of the Aircraft (In lb-In., lb-feet, Kg-m, or Kg-cm)

Front Arm: The Front Seat Arm (in, feet, m, or cm)

Rear Arm: The Rear Seat Arm (in, feet, m, or cm)

Fuel Arm: The Fuel Arm (in, feet, m, or cm)

Baggage Arm: The Baggage Location Arm (in, feet, m, or cm)

Optional Information

Three Custom Arm locations can be stored for each aircraft for those lucky pilots who fly Aircraft having more stations.

Screen 2

The information of this screen is to continue the entry of data from the first screen. The information on this screen is general information about the type of aircraft. The A/C Number is carried forward from the first screen and will not need to be changed.

The data to enter is as follows:

Burn Rate Per Hour: Use Gallons/Hour or Liter/Hour where appropriate for this Aircraft.

Max Fuel: The max fuel in Gallons or Liters accordingly.

Weight/Unit: The Weight Of A Unit Of Fuel. IE. 6lb/gallon = 6.0
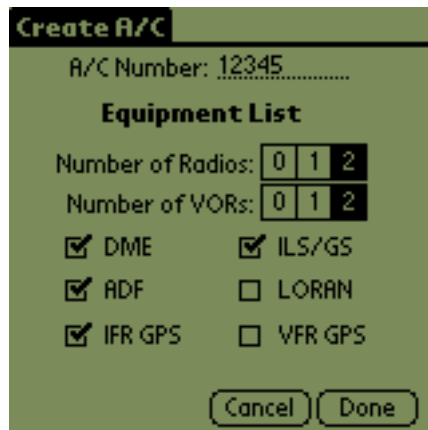
Sea Level Climb Rate (ft/min): The sea level climb rate in feet per minute (from the POH)

Absolute Ceiling: The Absolute Ceiling of the aircraft in Feet. This is not the service ceiling and can be calculated with the following formula.

1) Pick a Rate of Climb from the POH at High Altitude (the higher the number, the more accurate the calculations)

2) Alt = Altitude picked in #1

3) Difference = Rate of Climb at Sea Level – Rate of Clime in #1 above

4) Ratio = Alt/Difference

5) Absolute Ceiling = Ratio * Rate of Climb at Sea Level

Max A/C Weight: The Maximum Aircraft Weight (lb or kg)

Screen 3

   The third and final screen is used to enter information about the Equipment List for that Airplane. This list is used to keep track of information about planes that are available from an FBO. This information is presented when the user selects the Equipment List from the Main Screen.

Equipment List

   By selecting an aircraft from the pull down menu, the Equipment list entered when adding a new aircraft to the database is displayed. The number of radios and VORs are indicated on the first two lines. The rest of the equipment options are listed in a list format for the equipment available on that aircraft.

   With this screen, you can choose different aircraft from the pull down menu to view the different equipment available on the various aircraft available.

Weight & Balance

Weight & Balance		▼ 12345
	Weight	**ARM**	**Moment**
Empty	1306.0		47600.0
Front	250	37.20	9300.0
Rear	120	73.9	8772.0
Baggage	55	95.80	5269.0
Fuel	240.0	48.20	11568.0
Custom 1		0.0	0.0
Custom 2		0.0	0.0
Custom 3		0.0	0.0
Total	**1971.0**	**41.86**	**82509.0**
			Done

Aircraft Not Exceeding Max Weight

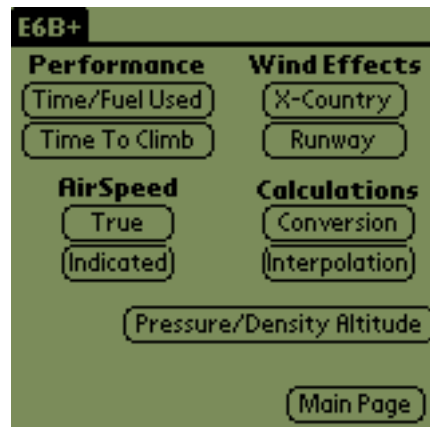	Weight & Balance		▼ 12345
	Weight	**ARM**	**Moment**
Empty	1306.0		47600.0
Front	450	37.20	16740.0
Rear	320	73.9	23392.0
Baggage	55	95.80	5269.0
Fuel	240.0	48.20	11568.0
Custom 1		0.0	0.0
Custom 2		0.0	0.0
Custom 3		0.0	0.0
Total	**2371.0**	**44.10**	**104569.0**
Over Max Weight			Done

Aircraft Exceeding Max Weight

By selecting an aircraft from the Pull Down Menu in the upper right corner of the screen, the Empty Weight, Empty Moment, Fuel Weight (Assuming Max Fuel entered for aircraft) and Fuel Moment. You will then be required to fill in the weight for the Front Passenger, Rear Passengers, Baggage Compartment, and any custom location weights. These weights are assumed to be in Pounds or Kg based upon the Aircraft preferences. The moments will be calculated from the weights and ARMS for each location.

The total Weight, Moment, and ARM will continuously be calculated. If the total weight EXCEEDS the weight that is in the Max Weight location for that aircraft, the message 'Over Max Weight' will be displayed in the bottom left corner.

From the Total Weight and Moment, you will be able to determine if the Aircraft is within limits for normal and utility limits.

CAUTION: If you entered the Max. Aircraft Weight Wrong, you could be overweight and NO caution statement will be presented!

E6B+

E6B+

Performance
[Time/Fuel Used]
[Time To Climb]

Wind Effects
[X-Country]
[Runway]

AirSpeed
[True]
[Indicated]

Calculations
[Conversion]
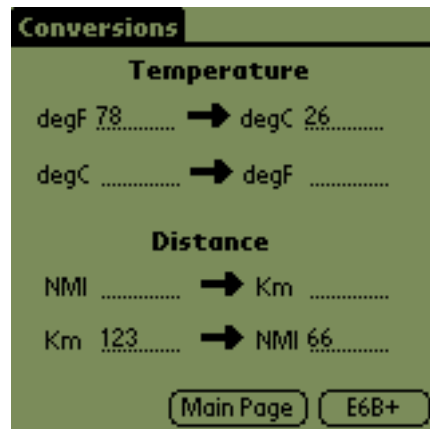[Interpolation]

[Pressure/Density Altitude]

[Main Page]

By pushing the E6B+ button on the main screen, the above sub menu is displayed. From this screen you will be able to calculate the various functions of the E6B computer. Each button is discussed below on what data will be calculated and what data will be required to perform the calculations.

Calculations

Conversion

Conversions

Temperature

degF 78 ➡ degC 26

degC _____ ➡ degF _____

Distance

NMI _____ ➡ Km _____

Km 123 ➡ NMI 66

[Main Page] [E6B+]
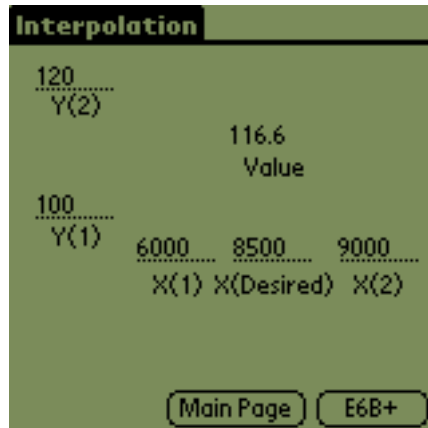
The Conversion Window will allow for you to convert Temperature and Distance. The first line under Temperature will convert the Degrees Fahrenheit to Degrees Celsius. The second line will convert Degrees Celsius to Degrees Fahrenheit. Just enter in the desired value on the left, and the solution will automatically be calculated on the right side.

To convert Distances, E6BPlus allows for the conversion between Nautical Miles (NMI) and kilometers (Km). Just enter the desired values and E6BPlus will calculate the conversion for you.
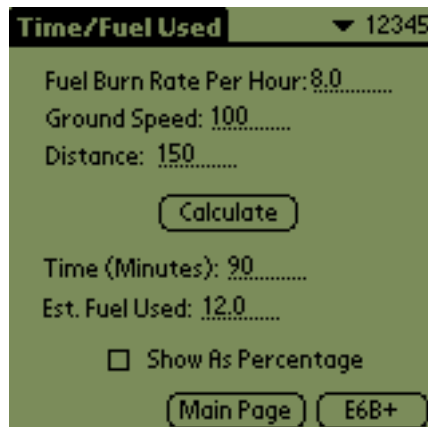
Interpolation

When using your POH, there are times when you will be required to interpolate between a few points. The points to be interpolated between are the X(1) and X(2) values. The desired point is X(Desired). The Range over what to do interpolation is the Y(1) which corresponds to X(1) and Y(2) corresponds to X(2).

An example is where we are given the True Airspeed for an aircraft at 6000 and 9000 ft. We would like to find the True Airspeed at our flight altitude of 8500 ft MSL. According to the POH the True Airspeed at 6000 ft is 100Knots and at 9000ft is 120 Knots. Thus, the values entered are shown in the graphic above. Our interpolated airspeed at 8500ft is 116Knots.

Performance

Time/Fuel Used

Actual Fuel Usage

Fuel Burn Rate Per Hour: 20.0
Ground Speed: 100
Distance: 150

(Calculate)

Time (Minutes): 90
Est. Fuel Used: 30.0

☑ Show As Percentage

(Main Page) (E6B+)

Percentage Fuel Usage

The Time/Fuel Used screen combines two functions of the E6B calculator into one location. The data that is required for this calculation are the Fuel usage rate (in Gallons Per Hour or Liters/Hours), Ground Speed (in Knots or Km/hour), and the Distance (in Knots or Km). After entering this information, press the Calculate button to obtain the Time to fly the distance, and the fuel (in Gallons or Liters) that would be used for that leg.

IF An Aircraft Is Entered (See Note Below), and the Max Fuel Has been Entered For this Aricraft, you can select the "Show As Percentage" checkbox. (Note: If An A/C is NOT selected, then the Checkbox cannot be selected). If the checkbox is selected, the Fuel Burn Rate Per Hour will be shown as a percentage of Max Fuel. The Ext. Fuel Used will also be shown as a Percentage for the Max Fuel Entered for the selected Aircraft.

Note: that by selecting an aircraft from the pull down menu in the upper right corner, the Fuel Burn Rate Per Hour will be entered automatically from the database.

Time To Climb

Time To Climb ▼ 12345

Rate Of Climb@SL: 645.0
Absolute Ceiling (Feet): 15530.0

        True Alt (Feet)   Temp (f):
Initial 1000   95
Final   8000   75

Altimeter(inch): 30.00
(Calculate)
Time To Climb (Min): 23
Avg. Rate Of Climb(F/min): 319

E M (Main Page) (E6B+)

The Time To Climb calculation you will not find on any E6B manual computer. This screen was added to give the pilot an Estimate of the time to climb from one altitude to another based upon the performance of the aircraft. The values required are the Sea Level Rate of Climb (in ft/min), the Absolute Ceiling of the Aircraft (feet) (See 'Screen 2' on 'Aircraft Information' above), the Initial True Altitude to begin climb (feet), the Temperature at The Initial Altitude (Fahrenheit or Celsius, see Note Below), the Final True Altitude (in feet), the Temperature at the Final Altitude (Fahrenheit or Celsius, see Note Below),, and the Altimeter setting (inch or mb, see Note Below) The Sea Level Rate of Climb and the

Absolute Ceiling can be stored in the Aircraft database and can be accessed by the pull down menu in the upper right corner.
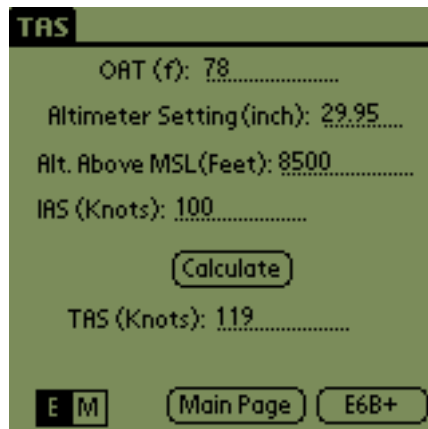
Once this information has been entered, press the 'Calculate' button to obtain an estimate on the amount of time required to climb (in Minutes), and the Average Rate of Climb (in feet/min).

Note: The selection box can be used to select English Units (Fahrenheit and inch Hg) or Metric Units (Celsius and mB). Thus, you can select either 'E' for English units or 'M' for Metric units. The Units displayed for Temp. and the Altimeter will reflect the units selected.

Caution: This calculation is the **theoretical** climb performance of the aircraft. The performance of an aircraft is based on many factors, like weight, engine performance, leaning, aircraft age, etc. All of these factors, plus many others (like pilot skill), will cause the each aircraft to climb at a different rate. Thus, the average Rate of Climb should not be used in IFR conditions to determine SIDs or other climb conditions. It is only provided to give you a better understanding of various aircraft **theoretical** performance.

AirSpeed

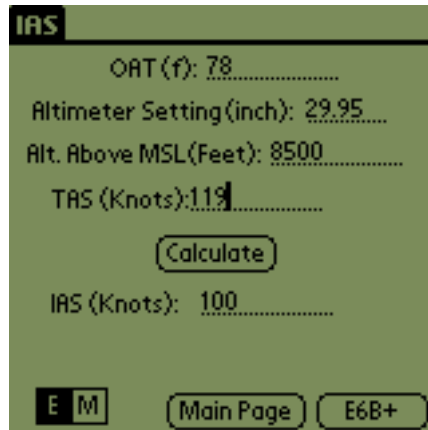*TAS*

To calculate the True Air Speed, you will be required to enter the Outside Air Temperature (OAT) (Fahrenheit or Celsius), the Altimeter Setting (inHg or mBars accordingly), True Altitude (in feet) and the Indicated Air Speed (in Knots). After you have entered this information, press the 'Calculate' button to obtain the True Air Speed (TAS) in Knots.

See NOTE In "Time To Climb" On How To Select English Vs. Metric Units

IAS

To calculate the Indicated Air Speed (IAS), you will be required to enter the Outside Air Temperature (OAT) (Fahrenheit or Celsius), the Altimeter Setting (inHg or mBars accordingly), the True Altitude (in feet), and the True Air Speed (TAS) in Knots. After you have entered this information, press the 'Calculate' button to obtain the Indicated Air Speed (IAS) in Knots.

See NOTE In "Time To Climb" On How To Select English Vs. Metric Units

Wind Effects

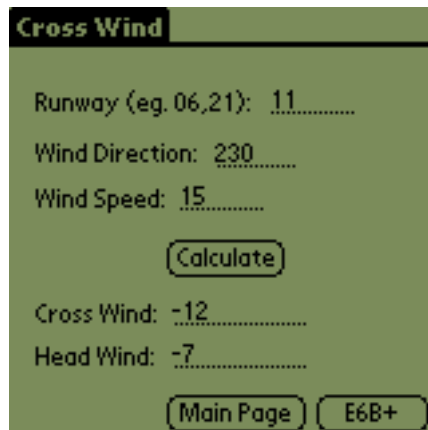*X-Country*

The Wind Correction screen allows for you to determine your true ground speed and heading to correct for wind during a cross-country flight. To determine this information you will be required to enter the wind direction (in degrees), the wind speed (in Knots), the course direction you desire (in degrees), and your True Air Speed (TAS) in Knots.

Once you have entered the required data, press the 'Calculate' button to determine the Heading you should fly to give you the desired course direction. Also, the true ground speed (in Knots) will be calculated.
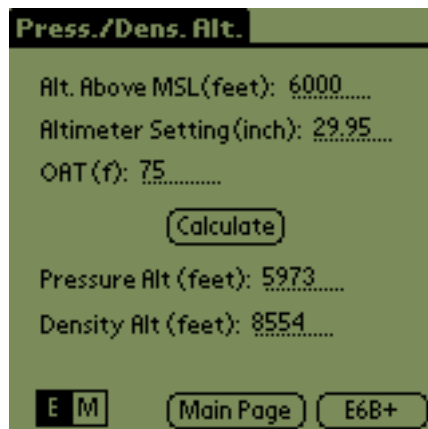
Runway

The CrossWind screen allows for you to determine the cross wind and head wind components during landing. To determine this information you will be required to enter the Runway you wish to land (i.e., Runway 06 you would enter 06, NOT 60 degrees), and the Wind Direction (in Degrees) and Wind Speed (in Knots).

Once you have entered the required data, press the 'Calculate' button to determine the Cross Wind Component (in Knots), and the Head Wind Component (in Knots).

Note: A Positive Crosswind value signifies a Crosswind from the Left. A Negative Crosswind is a Crosswind from the Right. A Positive Headwind Component is a Headwind. While a Negative Headwind Component is a Tailwind.

Pressure/Density Altitude

The Pressure And Density Altitude can be calculated rapidly by entering the True Altitude (in Feet), the Altimeter Setting (inHb or mBars, see note below), and the Outside Air Temperature (OAT) (Fahrenheit or Celsius, see note below)

See NOTE In "Time To Climb" On How To Select English Vs. Metric Units

MathLib

        To date the ability to perform Trigonometric and other math calculations internal to the PalmPilot Operating System (OS) is not possible. Since this program requires the use of Trigonometric functions, the MathLib.prc must be installed. The math library will allow for programs like calculators and E6BPlus to have access to these required functions.

        A copy of the MathLib.prc has been included and is required to be installed before E6BPlus will operate. If you already have installed MathLib.prc, there will be no reason to install the program again, since this library can be shared across all you PalmPilot applications.

        For more information on Mathlib see http://www.probe.net/~rhuebner/mathlib.html