

RPN Prime SurveyCalc

Version 3.1 - by Jacob Wall – <https://sgss.ca>

Summary


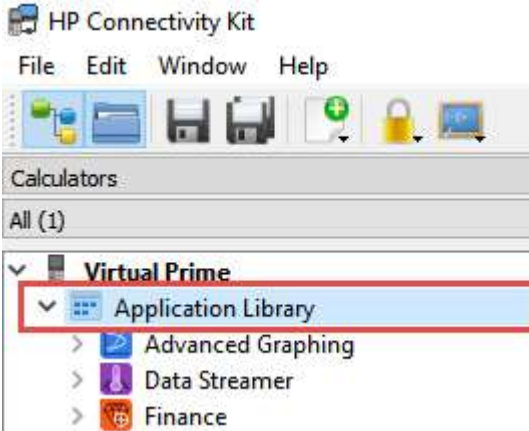
The RPN Calculator is designed for survey calculations, with angle, distance, area and volume unit support. Converting between units is simple, and results can be stored in variables for later use.

Installation

Install the **Prime RPN SurveyCalc** application for HP Prime on any of the following devices:

- ▶ Physical HP Prime Graphing Calculators
- ▶ Virtual Calculators for [Windows or Mac](#)
- ▶ Windows UWP [HP Prime Pro](#) app
- ▶ Android [HP Prime Pro](#) app
- ▶ iOS [HP Prime Pro](#) app

Required: Installation requires the Connectivity Kit for [Windows or Mac](#).

Step	Action
1	Unzip the installation files.
2	Navigate into the folder where the files were extracted, a folder with a .hpappdir extension will be inside. 
3	Open the Connectivity Kit on your PC or Mac.
4	A. For physical HP Prime calculators; plug in the USB cable to connect. B. For HP Prime Pro apps; open the app on the device that is on the same Wi-Fi network as the PC or Mac running the Connectivity Kit.
5	Confirm your calculator connection, it will be visible in the Calculators pane of the Connectivity Kit once connected.
6	Drag and Drop the RPN Prime SurveyCalc.hpappdir folder from Step 2 onto the Application Library of your calculator. It may take a few seconds to complete the transfer. Close the Connectivity Kit. 

Incompatible Firmware

Problem: The HP Prime firmware for G1 calculators dated 2021-05-05 or later have a serious bug which renders this app unusable. NOTE: This is for G1 Hardware A and C only, G2 calculators and emulators are not affected.

Solution: Downgrade to firmware dated 2020-01-16.

Procedure:

1. Download the previous firmware files from <https://sgss.ca/files/prime/PrimeG1Firmware20200116.zip>
2. Open the folder at **C:\Users\USERNAME\Documents\HP Connectivity Kit\Firmware\PrimeG1**
3. Delete everything from that folder
4. Copy the contents of the ZIP folder downloaded in Step 1 to this folder
5. Start Connectivity Kit
6. Plug in USB to calculator
7. In Connectivity Kit, right-click on your calculator's name
8. Choose 'Update Firmware'
9. The firmware is installed

This app will once again function as designed with this firmware.

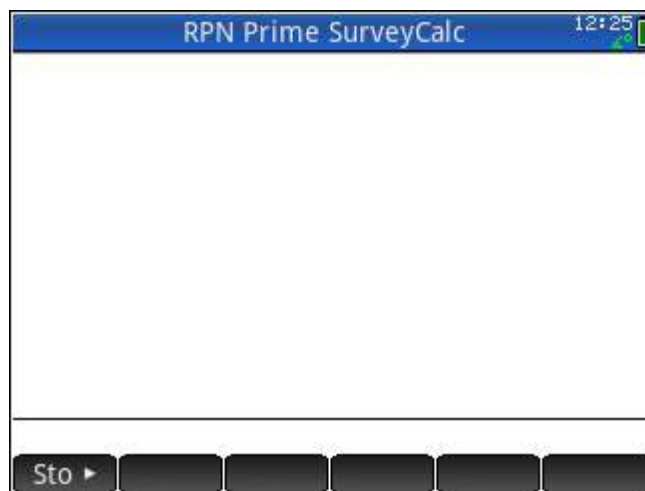
Running the App

Once installed, run **RPN Prime SurveyCalc** by one of the following methods:

1. Open the Application Library on your calculator by using the **Apps Info** key. Locate the **RPN Prime SurveyCalc** app and tap the icon or **Start** on the menu to open the application.




2. From the Home or CAS screen, if **RPN Prime SurveyCalc** is the active application with the title visible at the top of the screen, use the **Num** key to start the application.



Other shortcut keys available from the Home or CAS screen:

- ▶ **Shift** and **Num** opens the Settings.
- ▶ **Shift** and **Apps Info** displays the version of the app.

Settings

On the first run the settings screen will automatically display. Use **Shift** and **Num**  to access the Settings screen any time after, from within the app or from the Home or CAS screens with the app active.

Angle Unit is the default angle unit that will be assigned if required. Options include **360° dms**, **360° dec**, and **400 gon**. **Angle precision** can be set from 4 to 8 decimals.

Distance Unit is the default distance unit. Options include **Metres** or **Feet**. **Distance precision** can be set from 1 to 8 decimals which is used for the vector input form only, otherwise controlled by current calculator settings and can be set with the FIX option in the edit menu.

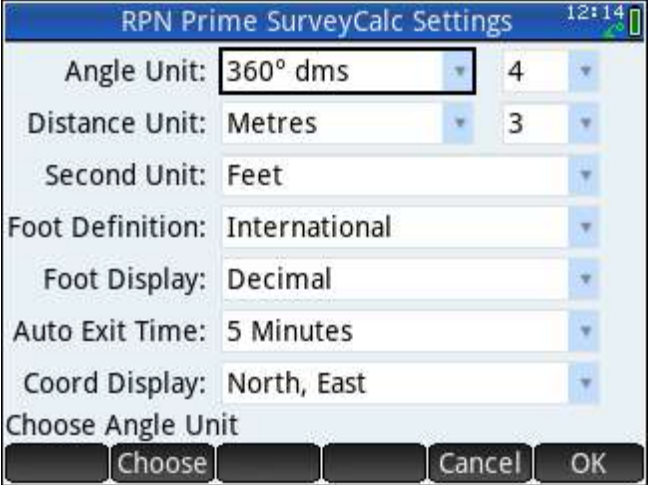
Second Unit is a secondary distance unit. Options include **Metres**, **Feet**, **Links**, or **Chains**.

Foot Definition can be set to **International** or **US Survey**.

Foot Display can be set to **Decimal** or **Fractional 1/16**.

Auto Exit Time can be set to **5 Minutes** (default), **10 Minutes**, **20 Minutes** or **60 Minutes**. When the app is running and there is no activity for the specified time; then the app will automatically close to allow the calculator to go into sleep mode.

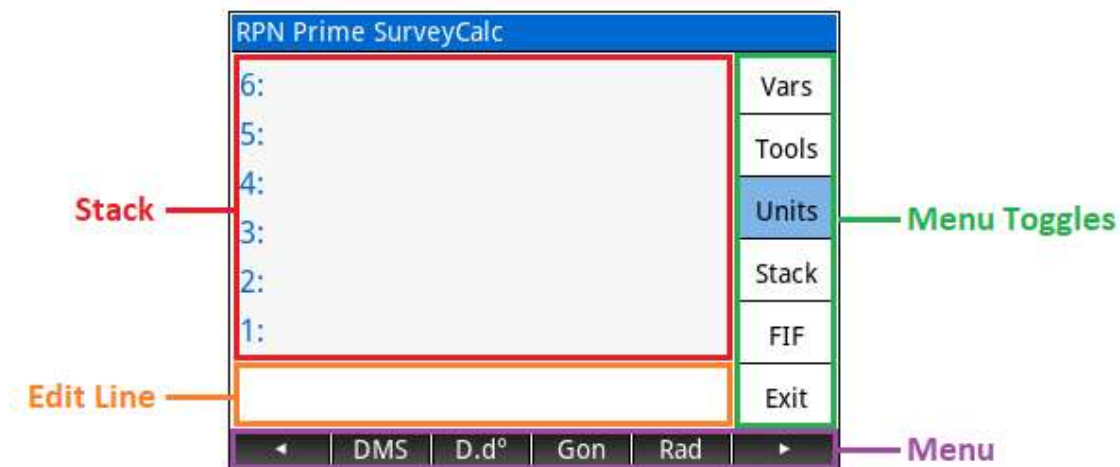
Coord Display can be set to **North, East, East, North, X, Y, South, West**, or **West, South**. This setting determines the order of vector components for display, defining and editing.



RPN Prime SurveyCalc Settings		12:14
Angle Unit:	360° dms	4
Distance Unit:	Metres	3
Second Unit:	Feet	
Foot Definition:	International	
Foot Display:	Decimal	
Auto Exit Time:	5 Minutes	
Coord Display:	North, East	
Choose Angle Unit		
	Choose	Cancel OK

Main Interface

The calculator responds to the System Color Theme settings.





Use the **touch screen** to:

- ▶ Select an object on the stack
- ▶ Open the Edit Line
- ▶ Toggle the current menu
- ▶ Execute a menu option

The **Keyboard** keys have common functions assigned:

- ▶ **Enter** to DUP Level 1 of the stack
- ▶ **◀** or **▶** to SWAP Level 1 and 2 of the stack. Moves the cursor when the Edit Line is open.
- ▶ **Del** to DROP Level 1 of the stack. **Shift** + **Del** clears the stack.
- ▶ **Esc** to exit the application, cancel the Edit Line, or unselect a stack object.
- ▶ **▲** or **▼** to scroll through the stack. **Shift** + **▲** or **▼** jumps to the top or bottom level of the stack. When no object is selected on the stack, **▼** opens the Edit Line or vector editor.
- ▶ **Shift** and **Ans** to UNDO the previous action. Only one level of UNDO is possible.
- ▶ **Vars** / **Mem** / **Shift** + **Units** to toggle the **Vars** / **Tools** / **Units** menus.
- ▶ **Shift** + **EEX** to store a variable, more details in the **Vars** menu section.
- ▶ **Shift** + **5** to define a vector.

Stack Area

The Stack Area displays six levels of the stack. Stack objects can be selected by using the touch screen or the  and  keys. The stack will scroll up and down as required.

When a stack object is selected, the menu will always change to the following options (except when the FIF menu is active):

EDIT Edit the selected value. When editing is complete, the value remains selected.

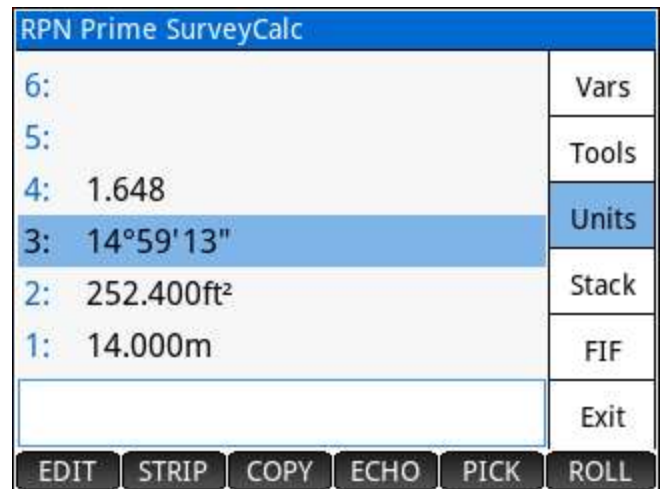
STRIP Strip any associated unit from the object.

COPY Copy the object to the Clipboard.

ECHO Echoes the selected object to the Edit Line.
When editing is complete, the previous stack selection is no longer selected.

PICK Pick the selected object and copy it to Level 1 of the stack. The object remains selected on the stack.

ROLL Roll the selected object down to Level 1 of the stack. The stack level of the selection is not changed.



Edit Line

The Edit Line displays the value being entered or edited and is also used to display any status or error messages. When the Edit Line is open; the menu updates (except if the FIF menu is current) to show these options: **DMS** **m** **ft** **FIX** **Cancel** **OK**. The first button will depend on your angle unit settings, and the second and third buttons will be the primary and secondary distance units. The first three buttons are used to assign a unit to the entered value. The fourth button is FIX, enter -1 to set Standard mode, or values 1-11 to set the number of decimals to display.

Copy and Paste are available with **Shift** and , and **Shift** and .

NOTE: It is possible to enter feet, inches, fractions in the [specified comma-delimited format](#). The current feet display mode will automatically be applied to the distance value entered.

Menu Toggles






Four different menus are available within the app for specific tasks; the menu toggles change the current menu or group of menus.

Menus






Vars Menu

The **Vars** Menu displays all the variables stored on the HP Prime as **HVars**. The first and last menu keys are used to change the page of the menu while the middle four keys show the names of the variables.



- ▶ Tap any of the keys to pop the variable's content onto Level 1 of the stack.
- ▶ Press  and then tap any of the keys to store the value on Level 1 of the stack into the variable.
- ▶ Enable  mode and then  followed by the menu key to quote a variable name. Use the  option from the Tools menu to purge the quoted variable.
- ▶ Type the variable name (without quotes) followed by  to recall the variable contents.
- ▶ When storing or recalling a variable, any associated units are kept intact (with the exception of the Links distance unit).

Tools Menu

-  Edit Level 1 of the stack.
-  Strip any associated unit from the object on Level 1 of the stack.
-  Stores the object on Level 2 of the stack into the variable name on Level 1 of the stack. When Level 1 is not a string, then a touchscreen keypad opens to enter a variable name.
-  Purges the variable name on Level 1 of the stack from memory. When Level 1 is not a string, then a list of variables is shown, and the variable can be chosen to be purged.
-  Toggles between rectangular and polar display modes of vectors.

Requires a vector on Level 1 of the stack.

-  Compiles a vector from stack objects or explodes a vector if Level 1 contains a vector.

To build a vector; Level 1 of the stack needs to be a 2 or 3 to specify the dimension (2D or 3D) and levels above must contain either the rectangular or polar components of the vector.

Exploding a vector results in vector components on the stack and a 2 or 3 on Level 1 of the stack indicating if it was a 2D or 3D vector.

Units Menu

Four pages of the **Units** menu exist. The first and last menu keys on each page are used to change the page of the menu. The four menus are

► Angle Units	◀	DMS	D.d°	Gon	Rad	▶
► Distance Units	◀	m	ft	lks	ch	▶
► Area Units	◀	m²	ft²	ha	Ac	▶
► Volume Units	◀	m³	ft³	yd³		▶

Units can be assigned to any value as it is typed, is on Level 1 of the stack or is selected on the stack.

Unit conversions are single tap if the existing value is unit-less or is of the same type of unit.

Stack Menu

DUP	DUPLICATE Level 1 of the stack. {... 3 2 1} to {... 3 2 1 1}
SWAP	SWAP Level 1 and Level 2 of the stack. {... 3 2 1} to {... 3 1 2}
DROP	DROP Level 1 of the stack. {... 3 2 1} to {... 3 2}
OVER	COPY OVER Level 2 and place it on Level 1 of the stack. {... 3 2 1} to {... 3 2 1 2}
ROT	ROTate the bottom three levels of the stack. {... 3 2 1} to {... 2 1 3}
UNROT	UNROTate the bottom three levels of the stack. {... 3 2 1} to {... 1 3 2}

FIF Menu

Inspired by the FIF49 app for HP 50g, see

<https://www.hpcalc.org/details/4824>.

ft	in	/2	/4	/8	/16
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ft Assigns feet units to a value in the edit line, or Stack Level 1 and sets the default feet display mode for it. If Stack Level 1 is a distance with a different unit, then it is converted to feet. If Stack Level 1 already has a distance in feet, then it toggles between decimal and fractional display modes.

For all the remaining buttons, from the edit line adds the number of [see below] entered to the distance on Level 1 of the stack. Adds number of [see below] on Level 1 to the distance on Level 2 if edit line is not active.

in	Whole inches, can be decimal.
/2	Half inches.
/4	Quarter inches.
/8	Eighth inches.
/16	Sixteenth inches.

Vector objects

2D and 3D vectors are supported.

- ▶ Use **Shift** + 5_v to open the vector entry form where a rectangular or polar vector can be entered. A choose list opens to select the type of vector to define.
- ▶ Use **Shift** + ↻_x to convert the vector on Level 1 of the stack between polar and rectangular display modes.
- ▶ Vectors can be added or subtracted, and multiplied or divided by a scalar.

Feet, Inches, Fractions

Feet, Inches and fractions may be input by delimiting each part by a comma character. The value will be displayed using the foot display setting, either decimal or fractional. The table below shows example use cases to illustrate how this entry method is implemented.

User Entered Value	Interpreted As	Displayed As (Fractional 1/16)
10,	10'	10'
10,6	10'-6"	10'-6"
10,6,1/2	10'-6 1/2"	10'-6 1/2"
10,6,15/32	10'-6 15/32"	10'-6 1/2"
10,6,7	10'-6 7/16"	10'-6 7/16"